DESIGNING AND DELIVERING
A SUSTAINABLE FUTURE

ENVIRONMENTAL IMPACT ASSESSMENT REPORT (EIAR) FOR THE PROPOSED SHANCLOON WIND FARM, CO. GALWAY

Volume 2 - MAIN EIAR

CHAPTER 10 - ORNITHOLOGY

Prepared for:

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10. ORNITHOLOGY

10.1 Introduction

This chapter has been prepared to assess the potential effects that the proposed Shancloon Wind Farm (described in Chapter 2 - Development Description) may have on the avifauna. This chapter considers the potential effects with regard to each phase of the development: construction phase, operational phase, and decommissioning phase. Appropriate mitigation measures are described to avoid or reduce potential significant negative effect(s).

The Proposed Development is described in detail in Chapter 2 - Development Description, and comprises the following elements:

- The wind farm site (referred to in this EIAR as the 'Site') which includes the turbine array and associated civil and electrical infrastructure and the on-site 110 kV substation and loop-in connection to the existing Cashla-Dalton overhead line;
- The turbine delivery route (referred to in this EIAR as the 'TDR').

The Site includes the wind turbines, internal access tracks, hard standings, the permanent meteorological mast, onsite substation and loop-in connection, internal electrical and communications cabling, temporary construction compounds, drainage infrastructure and all associated works related to the construction of the wind farm.

The TDR includes all aspects of the route from Galway Port to the Site entrance including proposed temporary accommodation works to facilitate the delivery of wind turbine components.

Ornithological survey work was carried out by Woodrow APEM Group, and was compliant with Scottish Natural Heritage (SNH, 2017), commenced at the proposed development site in April 2019 and was completed in September 2024. See Appendix 10.1 for full details.

The following definitions are also used within this chapter:

- The "Zone of Influence" (ZoI) refers to the area in which potential effects may occur. The ZoIs differ depending on the sensitivities of bird species and ornithological receptors.
- "Key Receptors" represent bird species and their supporting habitats that occur within the ZoI of the Proposed Development, upon which potential impacts may occur.

10.2 Legislative Context

All wild birds are protected under the Wildlife Act, 1976 (as amended).

The conservation of birds and their habitats in Ireland has been expanded by EU law, most notably by the EU Habitats Directive (Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Flora and Fauna) (as amended) (the 'Habitats Directive') together with the Birds Directive (Council Directive 2009/147/EC on the Conservation of Wild Birds) (as amended) (the 'Birds Directive') are, which provide bird protection legislation.

Species listed in Annex I and migratory species are subject to special conservation measures to protect their habitat, through the establishment of Special Protection Areas (SPAs), under the Birds Directive. The Habitats Directive (and Birds Directive were transposed into Irish law inter alia by the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477 of 2011), as amended and the Planning and Development Act 2000 as amended.

10.3 Consultation

The full list of the bodies consulted as part of the ornithological assessment of the Proposed Development, and summary of their responses, are presented in Chapter 5 - EIA Scoping and Consultation. Specific to ornithology, the following environmental bodies were contacted:

National Parks and Wildlife Service

The Development Application Unit (DAU)/ National Parks and Wildlife Service (NPWS) (consultation reference G Pre00069/2023) - An informal meeting was held with Eoin Connolly and Tim Rodrick of NPWS on 10th October 2023 the aim of which was to present the findings of ecological field surveys to date and to focus on the road crossing of the Cloonbar Bog (raised bog habitat). NPWS advised that where feasible, as part of wind farm design, opportunity should be taken to block bog drains at Cloonbar bog. NPWS noted the proposed alignment of the road along the periphery of the bog, which will take a path through bog habitat which is subject to scrub encroachment and will be a floated road design. NPWS also advised that they anticipate a Natura Impact Statement would be required for the Proposed Development.

Irish Hen Harrer Winter Survey Group – responded 7th May 2023 as follows:

> *"The Irish Hen Harrier Winter Survey has known Hen Harrier activity in the area. If surveys are to be done to determine presence and 'winter' roosting during the non-breeding season (August-March, 75% of the year), surveys should be undertaken at suitable habitat (roosting habitat in this terrain being cutaway bogs/bracken/willow scrub/tall heathers and grasses either in combination or as a habitat in their own right) on a frequent and regular basis, at least once-weekly in the period from 2h before dusk to darkness. Vantage points and coordinated watches will be necessary given the flat topography and nature of terrain which affords relatively small viewsheds.*
> *The birds using this area are likely to be linked to Hen Harrier SPAs or active in Hen Harrier non-breeding SPAs so this needs to be carefully considered and addressed also. Discretion needs to be applied to any correspondence or information pertaining to the location of sensitive species like Hen Harrier which have been persecuted and disturbed in Ireland previously."*

Hen harrier winter roost dusk surveys were carried out during the non-breeding 2019/20, 2020/21 and 2023/24 non-breeding seasons, in accordance with the 'Irish National Hen Harrier Winter Roost Survey Guidelines' (O'Donoghue, 2019). Refer to Appendix 10.1 for further details. No hen harrier roosts were recorded during surveys.

BirdWatch Ireland (BWI)

Scoping consultation request was issued to BWI on 19th April 2023. However, BWI responded stating that they do not have capacity to revert on projects at pre-planning stage given resource constraints.

10.4 Statement of Authority

The lead authors of this chapter are Éimear Stephenson (BSc. Marine Science (Hons); MSc Biodiversity and Conservation (Hons)) and Kate O'Regan (MSc Marine Biology, BSc. Zoology). This chapter was reviewed by Rita Mansfield (BSc Applied Ecology [Hons]; H.Dip Environmental Protection and Pollution Control (Hons)).

Ornithological surveys and Collision Risk Model were undertaken by Woodrow Ltd.

Background information and biographies of report authors are presented in Table 10-1, and qualifications of ornithological surveyors are presented in Table 10-2.

Table 10-1: Biographies of Authors

Name	Role	Biography
Éimear Stephenson	Co-author EIAR Ornithology Chapter	Éimear Stephenson is a Project Ecologist with Fehily Timoney and Company and has 4 years' experience in the environment sector. Éimear's work focused on the survey and assessment of proposed wind and solar energy development sites. She has been the lead author on a multitude of ecological impact reports, and has carried out a variety of surveys including bat, otter, general mammal, botanical, white-clawed crayfish, freshwater pearl mussel, and habitat surveys. Éimear is highly experienced in the use of QGIS and ArcGIS,and is proficient in analysing bird survey data and writing relevant ornithological reports. She holds a BSc in Marine Science from the University of Galway, where she graduated top of her class with a 1:1. She also received an academic scholarship to attend the University of Dublin, Trinity College Dublin, where she graduated her MSc in Biodiversity and Conservation with a 1:1.
Kate O'Regan	Co-author EIAR Ornithology Chapter	Kate O'Regan is a Project Ecologist with Fehily Timoney and Company. She holds a first-class MSc in Marine Biology and first-class BSc. in Zoology from University College Cork. Since joining Fehily Timoney, she has prepared Appropriate Assessments and Ecological Impact Assessments for infrastructure projects along with ornithological reports and collision risk models for renewable energy projects. Kate has previous experience in data management, statistical analysis, mapping and technical report writing. Kate has also completed a wide range of fieldwork including ornithological, bat, freshwater aquatic, intertidal, subtidal, insect and mammal surveys.
Rita Mansfield	Reviewer EIA Ornithology Chapter	Rita holds a BSc.(Hons) in Applied Ecology and a H. Dip Environmental Protection and Pollution Control. Rita is a Principal Ecologist and Associate Director with 20 years' experience as a technical ecology lead within the environmental and planning services sector. She specialises in statutory consent and environmental assessment for large scale public infrastructure projects in the energy, water (including flood relief schemes) and transport sectors. She is a qualified ecologist with responsibility for environmental impact assessment, planning applications (conventional and strategic infrastructure development), Appropriate Assessment, foreshore licensing, and stakeholder engagement for large scale plans and projects in Ireland, including for wind energy developments.

Name	Role	Biography
Aoife Moroney	Author Ornithological Results Report (EIAR Appendix 10.1)	Aoife is an Ecologist – Ornithologist with Woodrow Sustainable Solutions Ltd. She has completed a B.Sc. in Engineering at University College Dublin and M.Sc. in Environmental Engineering (specialising in Environmental Management) at the Technical University of Denmark and the Royal Institute of Technology, Sweden. She has also recently completed a Post-graduate Certificate in Ecological Survey Techniques at the University of Oxford. Aoife is highly proficient in data analysis and management as well as mapping using ArcGIS and QGIS. She regularly carries out ornithological surveys and compiles ornithological reports, including Collision Risk Modelling to inform wind farm planning B.Sc. – Engineering, University College Dublin, 2015 M.Sc. – Environmental Engineering (specialising in Environmental Management), Technical University of Denmark/Royal Institute of Technology Sweden, 2018 Post-graduate Certificate – Ecological Survey Techniques, University of Oxford, 2022
Julieta Pedrana	Author Ornithological Results Report (EIAR Appendix 10.1)	Julieta is a Senior Ecologist with Woodrow. She has completed a B.Sc. in Biological Science at the University of Mar del Plata, Argentina and a Ph.D. in Conservation Biology at the University of Southern Patagonia, Argentina. From 2017 to 2023, Julieta worked as a Senior Scientist researcher at the National Council of Scientific Research from Argentina at the Department of Environmental Science, National Technological University, Argentina. The main themes of her research have been the application of GIS-based modelling in nature conservation focusing on the predictive models for species occurrence and habitat suitability. She regularly carries out ornithological surveys and compiles ornithological reports, including carrying out Collision Risk Modelling to inform wind farm planning. B.Sc. – Biological Sciences, University of Mar del Plata, Argentina, 2006 Ph.D. – Conservation Biology at the University of Southern Patagonia, Argentina, 2006 – 2010
Maeve Maher-McWilliams	Reviewer Ornithological Results Report (EIAR Appendix 10.1) Author Collision Risk Model (Appendix XIII of EIAR Appendix 10.1)	Maeve Maher-McWilliams, Associate Director with Woodrow. Maeve is an experienced ecologist and has worked for over ten years on complex environmental impact assessments and mitigation strategies for development projects across Ireland, Northern Ireland, and Scotland. Maeve has been involved in projects across several sectors such as renewable energy; linear infrastructure; flood relief schemes and port developments; tourism and recreation; residential, pharmaceutical and data centre developments. She is proficient in ecological impact assessment and Appropriate Assessment. Maeve's specialism is ornithology. B.Sc. (Hons) – Biological Sciences, Queen's University Belfast, 2008

Table 10-2: Qualifications of Ornithology Surveyors

Name	Biography
Mikee Hoit	B.Sc.- Ecology, University of East Anglia, 1999 Ornithological survey experience: 20 years
Joe Kelly	B.Sc. – Wildlife Biology & Environmental Science, IT Tralee, 2012 Ornithological survey experience: 12 years
Daelyn Purcell	B.Sc. – Wildlife Biology & Environmental Science, IT Tralee, 2013 Ornithological survey experience: 3 years
Ken Westman	Diploma – Field Ecology, University College Cork, 2017 Ornithological survey experience: 4 years
Mike Trewby	B.Sc.- Zoology & Botany, University of Namibia, 1997 PGDip - Environmental Studies, University of Strathclyde, 2002 Ornithological survey experience: 20 years

10.5 Methodology

10.5.1 Relevant Guidance

The methodology for this assessment has been devised in accordance with the following relevant guidance published by the Environmental Protection Agency (EPA) 'Guidelines on the information to be contained in Environmental Impact Assessment Reports' (EPA, 2022) and 'Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment' (DoHPLG, 2018) and the Chartered Institute of Ecology and Environmental Management (CIEEM) 'Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine (Version 1.1)' (CIEEM, 2018 and revisions).

Additional guidance available from the EU such as 'Guidance document on wind energy developments and EU nature legislation' (2020) and 'Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment' (2013) has also been complied with. The Heritage Council publication 'Best Practice Guidance for Habitat Survey and Mapping' (Smith et al., 2011) is also complied with.

Relevant guidance published by the National Roads Authority (NRA) such as 'Guidelines for Assessment of Ecological Impacts of National Road Schemes' (2009a) has been complied with.

Relevant guidance from Scottish Natural Heritage (SNH) in relation to birds such as SNH Recommended bird survey methods to inform impact assessment of onshore windfarms (2017), 'Survey Methods for use in assessing the impacts of onshore wind farms on bird communities (2005 & 2010)' and 'Assessing the cumulative impact of onshore wind energy developments (2012)' and 'Assessing significance of impacts from onshore wind farms outwith' (2018).

10.5.2 Determining the Zone of Influence (ZoI)

As per CIEEM guidelines (2018), the study area for the Proposed Development has been defined having regard to the spatial and temporal scale of potential biophysical changes in the environment which might occur as a result of the development and throughout its lifetime. Consideration is given to the following:

- the characteristics, size and location of the Proposed Development,
- whether there could be landscape1 or ecological connectivity2 to any ornithological receptor or their supporting habitat.

As such the study area extends beyond the footprint of the Proposed Development and associated red line boundary and considers potential for direct and indirect links to ornithological receptors and associated ecological structure and function of ornithological receptors. From this, the key ecological receptors (KER)[3] are identified and are considered further in terms of their Zones of Influence (ZoI) i.e. the pathway for an effect on the KER (as determined through source-pathway-receptor/target model[4]) and the sensitivity of the KER to the effect as informed by best available guidance / data.

10.5.3 Desktop Study

A desk study (20km study area) was carried out throughout the EIA process and finalised in August 2025 to collate and review available information, datasets and documentation sources pertaining to relevant information on bird species of conservation concern. The desk study collated and analysed ornithological data from the following sources:

- National Parks and Wildlife Service (NPWS) website (mapviewer);
- National Biodiversity Data Centre (NBDC) website and data;
- Irish Wetland Bird Survey I-WeBS datasets;
- Bird Atlases, including: Ireland's Wetlands and their Waterbirds: Status and Distribution (Crowe 2005), the Atlas of Wintering Birds in Britain and Ireland (Lack, 1986), the Atlas of Breeding Birds in Britain and Ireland (Sharrock, 1976); the Breeding and Winter Birds of Britain and Ireland Bird Atlas 2007-11 (Balmer et al., 2013); and the European Bird Atlan (European Bird Census council - https://ebba2.info/maps/).
- Aerial imagery of the Site and surrounding lands (captured in 2022)
- Tailte Éireann National Land Cover Map
- OSI Aerial photography and 1:50000 mapping
- OPW drainage and flood maps

[1] Landscape connectivity is a combined product of structural and functional connectivity, i.e. the effect of physical landscape structure and the actual species use of the landscape.
[2] Ecological connectivity is defined as a measure of the functional availability of the habitats needed for a particular species to move through a given area. Examples include the flight lines used by bats to travel between roosts and foraging areas or the corridors of appropriate habitat needed by some slow colonising species if they are to spread.
[3] According to the National Roads Authority guidelines (NRA 2009), key ecological receptors will be features of sufficient value to be material in the decision-making process for which potential effects are likely. According to the NRA Guidelines, key ecological receptors are therefore defined as features of Local (Higher Value), County, National, or International Importance.
[4] Based on the guidance provided in the Office of the Planning Regulator practice notes (OPR, 2021a and 2021b).

- Baseline flood model prepared for the Proposed Development
- Wetland survey Ireland wetland maps:
    - North East Galway Wetland Field Survey 2022
    - North East Galway Wetland Audit 2021

In relation to designated sites: NPWS Protected Sites map-viewer[5], National Parks and Nature Reserves mapping[6] and Wildfowl sanctuaries[7] were also referred to.

10.5.4 Field Surveys

Woodrow Sustainable Solutions Ltd. carried out two years of ornithological surveys from 2019 to 2024. Further details are provided in Appendix 10.1 - Ornithology Report.

10.5.4.1 Target Species

The following criteria has been utilised to select target species for the current study. Scottish Natural Heritage (SNH) guidance (SNH, 2017) on the assessment of the effects of wind farms on ornithological interests suggests that there the important species lists from which target species can be drawn, as follows:

- Species listed on Annex 1 of the Birds Directive (EC, 2009)
- Red-listed birds of Conservation Concern
- Amber-listed birds of Conservation Concern
- Schedule 1 of the Wildlife and Countryside Act 1981 (not applicable in Ireland) and;
- Regularly occurring migratory species.
- Ground nesting species.

In addition to the above, consideration was given to species identified locally as being of conservation concern, regionally or those particularly susceptible to impact from wind farm development. Note that not all species on the above lists would be categorised as target species, e.g. most passerine species and general lowland farmland birds are not considered to be particularly susceptible to impacts from wind farms (SNH, 2017).

In the Irish context, it has been suggested that target species should be taken from species of conservation concern in Ireland (BOCCI) (Gilbert et al., 2021), those likely to occur within the vicinity of the Proposed Development, and those most at risk from particular impacts such as disturbance and displacement (Nairn, R. and Partridge, K., 2013).

'Birds of Conservation Concern in Ireland' (BoCCI) are classified into three separate lists: red, amber, and green. Red-listed species are of high conservation concern, Amber-listed species are of medium conservation concern and Green-listed species are considered to be of no conservation concern (Gilbert et al., 2021).

[5] https://experience.arcgis.com/experience/edf34d92e28040fd87d3d14f55d8d95f
[6] https://www.npws.ie/national-parks and https://www.npws.ie/nature-reserves
[7] https://www.npws.ie/protected-sites/wildfowl-sanctuaries

To date four BoCCI lists have been published with the current list by Gilbert et al., (2021) superseding the three former lists by Colhoun and Cummins (2013), Lynas et al., (2007), and Newton et al., (1999). The conservation status of bird species found in this study was assessed using the most recent (2021) BoCCI List (Gilbert et al., 2021).

Additionally, a review of the bird species listed on Annex I of the EU Birds Directive (2009/147/EC) was undertaken in assessing the conservation status of birds. Annex I species are afforded additional protection through the designation of Special Protection Areas (SPAs) throughout EU countries in addition to existing National legislation.

10.5.4.2 Overview of methods of surveys

Initial walkovers of the Site were carried out in 2019 to enable the identification of suitable survey locations and to assess the likely importance of the study area for bird species.

Field surveys were undertaken to gather detailed information on bird distribution and flight activity in order to predict the potential effects of the Proposed Development on birds.

The field surveys comprised two main elements; vantage point (VP) watches and targeted distribution and abundance surveys which comprised:

Vantage Point Surveys were undertaken in accordance with NatureScot (SNH, 2017) to monitor flight activity within the Wind Farm Site and to a 500m radius of the potential turbine development area to inform the collision risk model and to identify any regular flight paths across the Wind Farm Site. Surveys were conducted from 5 fixed vantage points with comprehensive coverage of the Wind Farm Site, as informed by viewshed analysis[8] and validated in the field. The surveyor collected data on bird observations and flight activity from a scanning arc of 180° to a 2km radius at the fixed vantage point locations for two 3-hour watches separated by a minimum 30-minute break (i.e., 6 hours total) per month to provide a minimum of 36 hours for each winter and breeding season and spread over the full daylight period, including dawn and dusk watches, to coincide with the highest periods of bird activity. Surveys were conducted from March 2019 to March September 2024 (excluding 2022).

Breeding Bird Surveys followed methodologies set out in O'Brien & Smith (1992), Gilbert et al. (1998) and Brown & Sheperd (1993) and included dawn and dusk surveys and daytime walkovers for species including lowland breeding waders (e.g., snipe, curlew and lapwing) and crepuscular/nocturnal woodland species (e.g., woodcock and long-eared owls), as well as waterbirds e.g. kingfisher, and dedicated breeding raptor surveys.

Winter Bird Surveys comprised walkover surveys and wetland surveys (following IWeBS methodology) as well as winter hen harrier roost searches in accordance with (O'Donoghue, 2019)

For full survey methodologies and respective survey areas see Appendix 10.1 - Ornithology Report.

[8] Viewsheds were calculated using ESRI ArcMap using a notional layer representative of the minimum height considered for the potential collision risk area based on the turbine dimensions considered in the EIAR.

10.5.5 Avifauna Receptor Evaluation

Avifauna resources were evaluated as to whether they constitute key receptors for the assessment following NRA guidance. For the purposes of impact assessment, a receptor 'importance value' or sensitivity, is determined following published guidance in Percival (2007) and SNH (2017) and literature review of published information on birds and wind farms (Pearce-Higgins J. L., 2009; Pearce-Higgins J. S., 2012; Drewitt A. L., 2006; Drewitt and Langston, 2008 and Masden, 2009). Where available, receptor values from Percival (2007) are below those recommended in guidance within the Irish context (NRA, 2009); then the evaluation has been increased in line with the recommended Irish evaluation as a precautionary principle. Table 10-3 illustrates the combined receptor evaluation criteria used to assign a value to key receptors:

Table 10-3: Avifauna Receptor Evaluation

Evaluation of key receptor	Percival 2007 criteria	NRA Resource Evaluation	NRA Criteria	Combined Criteria
Very High	Species is cited as a Special Conservation Interest of an SPA. Species present in Internationally important numbers.	International Importance	Resident or regularly occurring populations (assessed to be important at the national level) of the following: Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive.	Species is cited Special Conservation Interest of an SPA. Species present in Internationally important numbers. Resident or regularly occurring populations (assessed to be important at the national level) of the following: Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive
High	Other non-cited species which contribute to integrity of SPA. Ecologically sensitive species (<300 breeding pairs) and less common birds of prey. Species listed on Annex 1 of the EU Birds Directive. Regularly occurring relevant migratory species which are rare or vulnerable	National Importance	Resident or regularly occurring populations (assessed to be important at the national level) of the following: Species protected under the Wildlife Acts; and/or Species listed on the relevant Red Data list	Other non-cited / not a Special Conservation Interest species which contribute to integrity of SPA. Ecologically sensitive species (<300 breeding pairs nationally) and less common birds of prey. Species listed on Annex 1 of the EU Birds Directive. Regularly occurring migratory species which are rare or vulnerable. Resident or regularly occurring populations (assessed to be important at the national level) of the following:

Evaluation of key receptor	Percival 2007 criteria	NRA Resource Evaluation	NRA Criteria	Combined Criteria
				Species protected under the Wildlife Acts; and/or Species listed on the relevant Red Data list (in this case BOCCI Red list).
Medium	Species present in regionally important numbers (>1% of regional population). Species occurring within SPA's but not crucial to the integrity of the site. Species listed as priority species.	County Importance	Resident or regularly occurring populations (assessed to be important at the County level) of the following: Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; County important populations of species. Sites containing habitats and species that are rare or are undergoing a decline in quality or extent at a national level.	Species present in regionally important numbers (>1% of regional population). Species occurring within SPA's but not crucial to the integrity of the site. Resident or regularly occurring populations (assessed to be important at the County level) of the following: Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; County important populations of species. Species that are rare or are undergoing a decline in quality or extent at a national level.
Low	Species covered above which are present very infrequently or in very low numbers. Any other species of conservation interest not covered above, e.g. species listed on the red or amber lists of the BoCC.	Local Importance (High Value)	Locally important populations of priority species or habitats or natural heritage features identified in the Local BAP, if this has been prepared; Resident or regularly occurring populations (assessed to be important at the Local level) of the following: Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; Species protected under the Wildlife Acts; and/or Species listed on the relevant Red Data list.	Locally important populations of priority species identified in the Local BAP, if this has been prepared. Resident or regularly occurring populations (assessed to be important at the Local level) of the following: Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; Species protected under the Wildlife Acts; and/or Species listed on the relevant Red Data list. Amber listed species.

Evaluation of key receptor	Percival 2007 criteria	NRA Resource Evaluation	NRA Criteria	Combined Criteria
Negligible	Species that remain common and widespread	Local Importance (Low Value)	n/a	Species that remain common and widespread.

A species is determined a key ecological receptor when it is of sufficient value to be material in the decision-making process for which potential effects are likely. Key ecological receptors are defined as features of Low to Very High value as per Table 10-3. Species evaluated to be of negligible value are not considered as KERs.

10.5.6 Assessing Effect Significance

Assessment of effects follows the criterion included in the Guidelines on the Information to be contained in Environmental Impact Assessment Reports (EPA 2022) to describe the quality, significance, duration and type of effect, and considers construction, operational and decommissioning effects with reference to the potential for direct, indirect, and cumulative effects. The assessment also takes account of any residual effects that may persist following the implementation of any mitigation or best practice design. The characterisation of effects reflects the ecological structure and function upon which the key ecological receptors depend. Detailed assessment of effects considers the magnitude of effects affecting populations.

The characterisation of effects reflects the ecological structure and function upon which the key ecological receptors depend. Detailed assessment of effects takes into account the magnitude of effects affecting populations.

Effects on avifauna are assessed following published guidance by Percival (2003): the significance of potential effects are rated as a product of both the magnitude of the predicted effect and the sensitivity of the key receptor affected. The criteria to determine the sensitivity of species is outlined in Table 10-4.

The magnitude of effect is based on probability of the likely effect occurring, which as per Percival (2003), for assessing sites outside of European Sites (i.e. SPAs) '*the test of significance of an impact will be whether the wind farm impact is causing a significant change to the population, its range or distribution*'. It is important to consider availability of alternative habitat elsewhere during this assessment (Percival, 2003). Percival suggests a 5km zone from the wind farm site for making this assessment and notes that "*A key point in the assessment is whether the development results in a loss of potential for the site to support its current bird populations. Generally, an area wider than the wind farm needs to be considered to allow a balanced view of any displacement effects. A small scale (e.g. 0-1km) displacement to an adjacent area may have little or no ecological consequence, in which case the magnitude would be low. However, if the displacement were over a wider area (e.g. >5km) then it may be more appropriate to regard the impact as medium or high*".

The criteria outlined in Table 10-5 has been developed by Percival (2003) to determine the magnitude of potential effects on a species.

Table 10-4: Determining Bird Species Sensitivity (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 an SPA but which are not cited as species for which the site is designated. Ecologically sensitive species including the following: divers, common scoter, hen harrier, golden eagle, rednecked, phalarope, roseate tern and chough. Species present in nationally important numbers (>1% Irish population).
Medium	Species on Annex 1 of the EC Birds Directive Species present in regionally important numbers (>1% regional (county) population) Other species on BirdWatch Ireland's red list of Birds of Conservation Concern
Low	Any other species of conservation interest, including species on BirdWatch Ireland's amber list of Birds of Conservation Concern not covered above.

Table 10-5: Determination of Magnitude Effects (Percival, 2003)

Magnitude	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

The significance of potential effects is assessed by cross tabulating the magnitude of effects (Table 10-5) against bird ecological value (Table 10-3) to predict significance of each potential effect. Population status, distribution, and trends of potentially affected species such as migratory winter birds should be taken into consideration when undertaking the assessment. A significance matrix table, combining magnitude and bird ecological value to assess overall significance is presented Table 10-6.

Table 10-6: Significance matrix: combining magnitude and sensitivity to assess significance (Percival, 2003)

Magnitude	Bird Sensitivity				
	Very High	High	Medium	Low	Very High
Very High	Very High	Very High	Very High	High	Medium
High	High	Very High	Very High	Medium	Low
Medium	Medium	Very High	High	Low	Very Low
Low	Low	Medium	Low	Low	Very Low
Negligible	Negligible	Low	Very Low	Very Low	Very Low

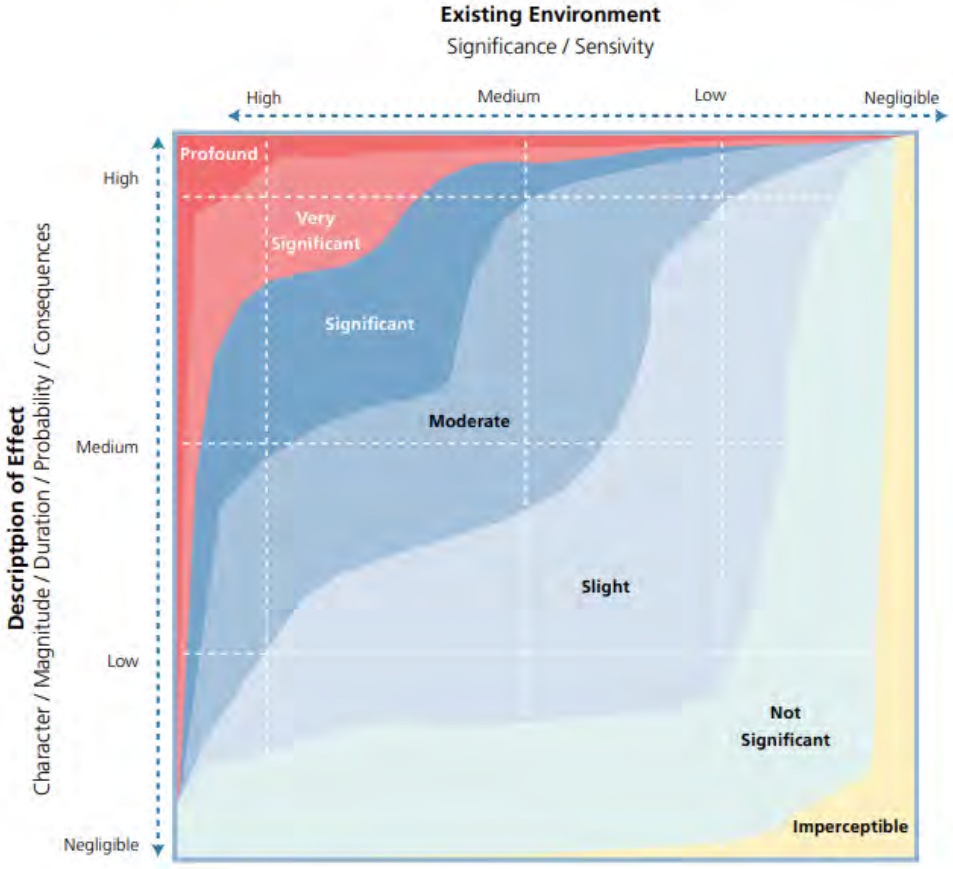
Percival (2003) recommends the following interpretation of the significance ratings: are interpreted as follows:

- Very low and low significance are effects that will not alter aspects of the environment so as to cause concern, however normal design care should be undertaken to minimise effects,
- Medium significance represents a potentially significant effect that requires careful individual assessment,
- Very high and high represents a highly significant effect on bird populations.

Impacts have been characterized using two the two assessment criteria, EPA (2022) and Percival (2003) to provide a robust evaluation of potential impacts. While Percival (2003) has also been followed given its specific focus on birds, this equates to EPA impact assessment criteria which has been used for consistency between the Biodiversity and Ornithology chapters of this EIAR Image (10-1).

Determining Significance

Figure 3.4 shows how comparing the character of the predicted effect to the sensitivity of the receiving environment can determine the significance of the effect.



There are seven generalised degrees of effect significance that are commonly used in EIA. Imperceptible, Not Significant, Slight, Moderate, Significant, Very Significant and Profound. Generalised definitions of each of these are provided in Table 3.4. When more specific definitions exist within a specialised factor or topic, e.g. biodiversity, these should be used in preference to these generalised definitions. (ref. Advice Notes[68].)

Image 10-1: EPA Classification of Significance of Effects (EPA, 2022)

10.6 Description of the Existing Environment

The ecology of the existing environment is described within this section.

The Proposed Development comprises an 11 no. turbine wind farm and associated infrastructure. The wind farm Site is situated c. 4km to the north-east of Shrule, County Mayo, and ca. 8.5km to the north-west of Tuam, County Galway. The Site is located within the townlands of Beagh, Beagh More, Cloonbar, Cloonmweelaun, Cloonnaglasha, Cloonteen, Corillaun, Derrymore, Ironpool, Shancloon, Toberroe and Tonacooleen, County Galway.

The Proposed Development is located within a rural setting. Land use within the Site comprises agriculture and historic peat extraction, with smaller pockets of commercial forestry also present along the periphery. Residential property density in the area is low with ribbon development and one-off housing dominating the residential development in the area.

The Proposed Development is predominantly located within improved agricultural grassland habitat (GA1) (often in mosaic with wet grassland (GS4)) and within cutover bog (PB4), areas of willow scrub (WS1), conifer plantation (WD4), raised bog (PB1) and calcareous and neutral grassland (GS1) in mosaic with dry calcareous heath (HH2). There is also an area of dry-humid acid grassland (GS3) associated with Cloonbar East Wetland. Waterbodies within the Site include a network of drainage ditches, small streams/watercourses classified as lowland depositing rivers, many of which are the subject of arterial drainage. The hedgerows and treelines within the Site are mainly associated with the agricultural lands and riparian areas The surrounding landscape is dominated by agricultural grassland, with some cutover bog, intact raised bog, and conifer plantations also present. Turbary is ongoing at a small scale within these bogs and will likely continue during the operation of the Shancloon Wind farm. Similarly, forestry and agricultural practices in the area will continue and will not be affected by the operation of the wind farm.

Habitats of note in the wider study area, in relation to their potential to support bird assemblages, include:

- Cloonbar Bog - active raised bog in mosaic with cutover bog
- Commonage Area / Cloonbar East Wetland – dry-humid acid grassland with heath dominating in the south
- Beagh More North Cutover - mosaic of cutover bog and raised bog habitat.
- Cloonsheen-Shancloon bog and cutover complex - a mosaic of wet grassland, raised bog, scrub, fen and cutover bog.
- Cloonmweelaun-Cloonaglasha - raised bog in mosaic with cutover bog

For further information, please refer to Chapter 9 - Biodiversity, and Chapter 2 - Development Description.

A habitat map of the Proposed Development lands is provided in Figure 9.3a-d, Volume IV.

10.6.1 Desktop Study

10.6.1.1 Designated Sites

The OPR (2021) guidelines[9] was complied with in establishing potential for connectivity to European sites. In this regard a Source-Pathway-Receptor (S-P-R) model was adopted to identify potential pathways for designated sites and was informed by the following best practice publications:

- Scottish Natural Heritage (2016) 'Guidance on Assessing Connectivity with Special Protection Areas (SPAs)'
- SEPA Land Use Planning System (2017) 'Guidance on Assessing the Impacts of Development Proposals on Groundwater Abstractions and Groundwater Dependent Terrestrial Ecosystems', Guidance Note 31
- NRA (2009). Guideline for the Assessment of Ecological Impacts of National Road Schemes, National Roads Authority

[9] Office of the Planning Regulator (OPR) (2021) Practice Note PN01 Appropriate Assessment Screening for Development Management

The S-P-R model minimises the risk of overlooking distant or obscure effect pathways, while also avoiding an over reliance on turbine locations zones (e.g. 15 km), within which all designated sites should be considered. This approach follows the DEHLG (2010) guidance which states that:

"For projects, the distance could be much less than 15 km, and in some cases less than 100m, but this must be evaluated on a case-by-case basis with reference to the nature, size and location of the project, and the sensitivities of the ecological receptors, and the potential for in combination effects".

Sites of International Importance

An Appropriate Assessment (AA) Screening Report and Natura Impact Statement (NIS) have been completed to appraise the likely significant effects of the Proposed Development either alone or in combination with other plans or projects on European Sites; these accompany this planning application. Figure 9.1 shows the locations of the protected sites relative to the location of the Proposed Development. The full list of European sites subjected to S-P-R assessment are included in the screening for Appropriate Assessment which accompanies the planning application.

Special Areas of Conservation (SACs)

SACs are protected under the European Union (EU) 'Habitats Directive' (92/43/EEC), as implemented in Ireland by S.I. No. 477/2011 - European Communities (Birds and Natural Habitats) Regulations 2011 (as amended) and Part XAB of the Planning and Development Act 2000 (as amended).

There is one SAC with potential Source-Pathway-Receptor (S-P-R) connectivity to the Proposed Development: Lough Corrib SAC (000297). This is also designated as an SPA and is discussed further hereunder. The consideration of potential for significant effects on species and habitats associated with SACs from the Proposed Development is considered in Chapter 9 – Biodiversity.

Special Protection Areas (SPA's)

SPAs are designated under the EU Birds Directive (2009/147/EC) ('The Birds Directive') as implemented in Ireland by S.I. No. 477/2011 - European Communities (Birds and Natural Habitats) Regulations 2011 (as amended) and Part XAB of the Planning and Development Act 2000 (as amended).

The Lough Corrib SPA (004042) has potential hydrological S-P-R connectivity to the Proposed Development. The Proposed Development is located within the Corrib-Togher-BeaghMore, Corrib-Togher-Bellanagarraun and Corrib-Black-CloghansBeg waterbody catchments. The drains and watercourses within these catchments flow to the BLACK (SHRULE)_020 river which ultimately flows to the Lough Corrib SPA. The potential pathway for connectivity is via the potential for site runoff associated with in-stream and bankside works which are part of the Proposed Development, including:

- Culvert crossing near the source of the Black (Shrule) river (Culvert No CV14, ITM 535417.3152, 755371.7636)
- Floated access road along the periphery of Cloonbar Bog, parallelling the Black (Shrule) river
- New bridge crossing (ITM 533089.53, 754307.53) on Togher River
- HDD crossing (ITM 529758.48,753338.06) on Togher River
- Drain crossings (see Table 2-3, Chapter 2 – Development Description)

In considering the potential S-P-R connectivity via other (non-hydrological) sources and in compliance with SNH, 2016 '*Guidance on Assessing Connectivity with Special Protection Areas (SPAs)*', an initial study area of 20km was adopted (based on the largest documented core foraging range for SPA bird species). Within this study area are Lough Corrib SPA (004042), Lough Carra SPA (004051) and Lough Mask SPA (004062) protected for wetland and waterbirds and their associated habitats.

Having examined the species for which the SPAs are designated, along with their core foraging ranges and their typical foraging, roosting, breeding and wintering habitat associations, it was determined that a landscape/ecological connectivity could exist for all of the SPAs within 20km of the Proposed Development (as per Scottish Natural Heritage guidance on Assessing Connectivity with Special Protection Areas, 2016):

- Lough Carra SPA is designated for the protection of Common Gull (*Larus canus*). This SPA is also designated a Wildfowl Sanctuary.
- Lough Mask SPA is designated for Tufted Duck (*Aythya fuligula*), Common Tern (*Sterna hirundo*), Greenland White-fronted Goose (*Anser albifrons flavirostris*) and various gull species. This SPA is also designated a Wildfowl Sanctuary.
- Lough Corrib SPA is designated for various duck species, gull species and tern species as well as Greenland White-fronted Goose and Hen Harrier. This SPA is also designated a RAMSAR site.

Sites of National Importance

Sites of National Importance in Ireland are termed Natural Heritage Areas (NHA) and proposed Natural Heritage Areas (pNHA).

An initial assessment was made to identify all sites of National importance within 20km of the Proposed Development, having regard to core foraging ranges for birds set out in SNH, 2016.

There are no NHAs located within 20 km of the Proposed Development. Slieve Bog NHA is located 21 km from the Proposed Development and, from an ornithological perspective is noted to have historically supported Red Grouse. SNH (2016) guidelines notes grouse species to have a small core foraging range of 2km. As such, the NHA is determined to be outside the ZoI of the Proposed Development.

There are 28 pNHAs within 20 km of the Proposed Development, of which the following have potential to support birds of conservation concern: Rathbaun Turlough (000215), Altore Lake (000224), Belclare Turlough (000234), Drumbulcaun Bog (000263), Killower Turlough (000282), Knockavanny Turlough (000289), Lough Corrib (000297), Levally Lough (000295), Turlough O'Gall (000331), Rostaff Turlough (000385), Ardkill Turlough (000461), Carrowkeel Turlough (000475), Cloughmoyne (000479), Clyard Kettle-Holes (000480), Greaghans Turlough (000503), Kilglassan/Caheravoostia Turlough (000504), Shrule Turlough (000525) and Skealoghan Turlough (000541), Ross Lake And Woods (001312), Turlough Monaghan (001322), Mocorha Lough (001536) Lough Carra/Mask Complex (001774) and Turloughcor (001788). The majority of these sites are identified as important turlough habitats, while there are some proposed for protection for lowland wet grassland, freshwater marsh, reed-beds, raised bog and fen (see Table 10-6).

Rostaff Turlough is also a Wildfowl Sanctuary (Moyne Wildfowl Sanctuary WFS-63). The turlough and surrounding lands support many wetland bird species including duck, geese and swan species as well as other wetland species such as snipe (*Gallinago gallinago)*, lapwing (*Vanellus vanellus*) and curlew (*Numenius Arquata)*.

Wildfowl Sanctuaries are areas that have been excluded from the 'Open Season Order' so that game birds can rest and feed undisturbed.

The locations of these sites relative to the Proposed Development is shown on Figure 9.2.

Table 10-7: Summary of SPAs and pNHAs Assessed for Potential S-P-R Connectivity

Designated Site	Site code	Features of Interest (Birds)	Distance from the Proposed Development (km)
Lough Corrib SPA	004042	Gadwall (*Anas strepera*) [A051], Shoveler (*Anas clypeata*) [A056], Pochard (*Aythya ferina*) [A059], Tufted Duck (*Aythya fuligula*) [A061], Common Scoter (*Melanitta nigra*) [A065], Hen Harrier (*Circus cyaneus*) [A082], Coot (*Fulica atra*) [A125], Golden Plover (*Pluvialis apricaria*) [A140], Black-headed Gull (*Chroicocephalus ridibundus*) [A179], Common Gull (*Larus canus*) [A182], Common Tern (*Sterna hirundo*) [A193], Arctic Tern (*Sterna paradisaea*) [A194], Greenland White-fronted Goose (*Anser albifrons flavirostris*) [A395], Wetland and Waterbirds [A999]	11.2km W
Lough Carra SPA	004051	Common Gull (*Larus canus*) [A182]	18.5km NW
Lough Mask SPA	004062	Tufted Duck (*Aythya fuligula*) [A061], Black-headed Gull (*Chroicocephalus ridibundus*) [A179], Common Gull (*Larus canus*) [A182], Lesser Black-backed Gull (*Larus fuscus*) [A183], Common Tern (*Sterna hirundo*) [A193], Greenland White-fronted Goose (*Anser albifrons flavirostris*) [A395], Wetland and Waterbirds [A999]	20.3km NW
Altore Lake pNHA	000224	This is a drained lake that is now comprised of wet grassland, freshwater marsh and reed-beds. It is an important winter feeding site for Greenland White-fronted Geese. Other wintering waterbirds here include teal, mallard, lapwing, and curlew. Teal, mallard and snipe are reported as breeding here.	3.8km NE
Ardkill Turlough pNHA	000461	No site synopsis is available. This area is also designated as an SAC, for turloughs. Lapwing has been recorded breeding on this turlough, and snipe and common sandpiper likely breed here, according to the SAC Site Synopsis document.	8.4km NW
Belclare Turlough pNHA	000234	This is a turlough surrounded by flat, drift-covered fields and a bog to the north-east. Winter wildfowl and waders recorded here include wigeon, teal, mallard, lapwing, golden plover, dunlin, greenland white-fronted goose and curlew.	4.7km SE
Carrowkeel Turlough pNHA	000475	No site synopsis is available. This pNHA is also designated as a SAC for the SCI turlough. No waterbirds have been recorded within this area, however it is likely that this turlough can support typical turlough waterbirds.	13.0km N

Designated Site	Site code	Features of Interest (Birds)	Distance from the Proposed Development (km)
Castle Hackett Souterrain pNHA	002038	This is a man-made stone underground passageway with records of Lesser Horseshoe Bat (*Rhinolophus hipposideros*). It is not of ornithological importance.	5.21km S
Cloughmoyne pNHA	000479	No site synopsis is available. This is an area of limestone pavement, and is also designated as a SAC. It is not of ornithological importance.	7.0km SW
Clyard Kettle-Holes pNHA	000480	No site synopsis is available. This area is designated as a SAC for turloughs and Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae*. The series of turloughs in this area are likely to support waterbirds.	8.7km NW
Greaghans Turlough pNHA	000503	No site synopsis available. According to an I-WeBS data request, a number of birds have been recorded at this site including greylag goose, Greenland white-fronted goose, mute swan, whooper swan, shoveler, wigeon, mallard, teal, tufted duck, red-breasted merganser, lapwing, curlew, black-headed gull, lesser black-backed gull, grey heron, and light-bellied brent goose.	7.5km NNW
Kilglassan/Caheravoostia Turlough Complex pNHA	000504	No site synopsis available. According to an I-WeBS data request, a number of birds have been recorded at this site including greylag goose, mute swan, whooper swan, shoveler, wigeon, mallard, teal, tufted duck, lapwing, golden plover, curlew, black-headed gull, lesser black-backed gull, redshank, and grey heron.	8.6km NNW
Killower Turlough pNHA	000282	This is a turlough surrounded by lowland grassland, as well as wet, dry and improved heath and reedswamp. It is noted as of local or regional importance for 14 species of waterfowl, including whooper swan and Greenland white-fronted geese.	3.1km SSE
Knockavanny Turlough pNHA	000289	This is a turlough, typically used by wigeon.	10.1km ESE
Knockmaa Hill pNHA	001288	This is a limestone knoll, surrounded by pastoral farmland. This site is of interest due to deciduous woodland on thin limestone knoll. It is not of ornithological importance.	5.5km S
Lough Corrib pNHA	000297	No site synopsis available. However, this is also designated as an SPA for gadwall, shoveler, pochard, tufted duck, common scoter, hen harrier, coot, golden plover, black-headed gull, common gull, common tern, arctic tern, Greenland white-fronted goose, and wetland and waterbirds.	9.2kkm W

Designated Site	Site code	Features of Interest (Birds)	Distance from the Proposed Development (km)
Lough Hacket pNHA	001294	This is a small lake of regional and local importance for wigeon, pochard, tufted duck, lapwing and curlew. There are also breeding grey herons and cormorant here, as well as a wintering population of golden plover.	2.7km SSW
Mocorha Lough pNHA	001536	No site synopsis is available. This pNHA is designated as a SAC for Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae*. According to the SAC Site Synopsis, this site supports locally important numbers of wetland birds, in particular snipe and mallard.	6.6km W
Rathbaun Turlough pNHA	000215	This is a turlough, of importance for plant communities. It is noted that it is too dry and heavily grazed to be of importance for breeding birds. However, there is potential for birds to use this site.	4.2km N
Rostaff Turlough pNHA	000385	No site synopsis available. However, Boland and Crowe (2008) report a feral (resident) population of greylag geese using this turlough. Additionally, an I-WeBS data request indicates whooper swan, shoveler, wigeon, mallard, teal, pochard, tufted duck, lapwing, curlew, black-headed gull, common gull, cormorant, and grey heron have been recorded here. The data for the Moyne Wildfowl Sanctuary (WFS-6) which overalps the turlough notes the turlough and its surrounding lands supports many wetland species such as duck, geese and swan species along with waders namely snipe (*Gallinago gallinago)*, lapwing (*Vanellus vanellus*) and curlew (*Numenius Arquata).*	5.3km SW
Shrule Turlough pNHA	000525	No site synopsis is available. This area is designated as a SAC for turloughs, and is likely to support wetland birds.	2.5km W
Skealoghan Turlough pNHA	000541	No site synopsis is available. This area is designated as a SAC for turloughs. Several pairs of lapwing have been recorded breeding at the site, according to the SAC Site Synopsis. Additionally, it notes wintering waterfowl are likely to use the turlough.	10.1km NW
Turlough Monaghan pNHA	001322	This is a turlough, with records of lapwing.	6.5km S
Turlough O'Gall pNHA	000331	This is a turlough of importance for plant communities. However, there is potential for birds to use this site.	2.9km S

Designated Site	Site code	Features of Interest (Birds)	Distance from the Proposed Development (km)
Turloughcor pNHA	001788	This is a turlough with records of wigeon, teal, and mallard. Historical records of Greenland white-fronted geese exist here however it is noted that they no longer use this site. Mute swans, mallard and lapwing reportedly breed here.	10.4km S

10.6.1.2 Avifauna

A desktop study was conducted by Woodrow Ltd. on the avifauna recorded within the Proposed Development and surrounding lands. A summary of the desktop study findings is described below, and the full report can be found in Appendix 10.1 - Ornithology Report. This desktop study was further updated in August 2025by Fehily Timoney and Company and findings are incorporated into the below summary.

The Proposed Development is situated within the 10km grid squares M35 and M25 (including electrical infrastructure and turbine accommodation works subject to the SID application). Examination of the NBDC Biodiversity Maps website indicates there are 108 birds recorded within the M35 hectad. Of which, 62 are of conservation concern. The full list of birds recorded within the NBDC database is documented in Appendix 10.1 - Ornithological Report. There was a total of 98 species recorded in the M25 10km grid square, of which 50 were of conservation concern. Full list of avian species recorded is shown in Table 10-18 (included at the end of this Chapter).

BirdWatch Ireland's Bird Sensitivity Mapping Tool, which can be accessed via the NBDC Biodiversity Maps website, was utilised to predict the sensitivity of birds to wind farm developments within the 10km grid square M35 that overlaps the site, as per McGuinness et al. (2015). There is no data available for the western portion of the Site. However, this tool indicated that the eastern portion of the site has low sensitivity and a small portion within the north-west of the Site has medium sensitivity. This result was driven by close proximity to areas identified for barn owl and whooper swan.

An Irish Wetland Bird Survey (I-WeBS) data request for data nearby wetland areas of the Proposed Development was conducted in September 2022 and reviewed in October 2024. The full list of birds recorded within the I-WeBS information request can be found in Appendix 10.1 - Ornithological Report, and peak count data is presented in Table 10-17 included at reh back of this Chapter. Datasets for the following wetlands were sourced from I-WeBS and analysed: Ballybackagh - 0DS30, Ballyhaunis Lakes - 0D004, Belclare Turlough - 0G393, Blindwell Turlough (Rathbaun) - 0G394, Clare River Callows (Clonkeen) - 0G396, Corafin - 0GS40, Curragh Turlough Doolough Headford Turloughcor - 0G317, Gardenfield Turlough - 0G392, Greaghans - 0DS11, Kilbenan - 0G370, Kilglassan Turlough - 0D314, Lough Mask - 0D005, Lough Carra - 0D098, Lough Corrib - 0G004, North Central Galway Lakes - 0G00, North East Galway Lakes - 0G006, River Clare - 0G396, River Robe - 0D334, Rostaff Lake - 0D305, Polleagh Turlough - 0G328.

The latest work on wintering and breeding birds in Ireland is "Bird Atlas 2007-11: The breeding and wintering birds of Britain and Ireland" (Balmer *et al*. 2013). Prior to the publication of this atlas, three previously published atlases existed, namely: "The atlas of breeding birds in Britain and Ireland (Sharrock, 1976); "The atlas of wintering birds in Britain and Ireland" (Lack, 1986), and "The new atlas of breeding birds in Britain and Ireland: 1998 - 1991 (Gibbons *et al.* 1993). The European Breeding Bird Atlas 2 was produced in 2022, which modelled the abundance and presence of 596 bird species across Europe. These atlases were examined for the presence of species of conservation interest.

Table 10-7 displays data on birds recorded in the existing bird atlases, within the 10km grid squares M35 and M25 and Table 10-8 shows equivalent 10km grid squares for EBBA 2 Atlas.

Table 10-8: Birds of Conservation Interest recorded in Bird Atlases

Species Name	Date of Last Record	Dataset	BoCCI	Annex I
Common Kingfisher (Alcedo atthis)	31/07/1972	The First Atlas of Breeding Birds in Britain and Ireland: 1968-1972.	Amber List	Yes
Common Sandpiper (Actitis hypoleucos)	31/07/1972	The First Atlas of Breeding Birds in Britain and Ireland: 1968-1972.	Amber List	No
Common Swift (Apus apus)	31/07/1972	The First Atlas of Breeding Birds in Britain and Ireland: 1968-1972.	Amber List	No
Red Grouse (Lagopus lagopus)	31/07/1972	The First Atlas of Breeding Birds in Britain and Ireland: 1968-1972.	Red List	No
Stock Pigeon (Columba oenas)	31/07/1972	The First Atlas of Breeding Birds in Britain and Ireland: 1968-1972.	Amber List	No
Common Grasshopper Warbler (Locustella naevia)	31/07/1991	The Second Atlas of Breeding Birds in Britain and Ireland: 1988-1991	Amber List	No
Corn Crake (Crex crex)	31/07/1991	The Second Atlas of Breeding Birds in Britain and Ireland: 1988-1991	Amber List	Yes
Merlin (Falco columbarius)	31/07/1991	The Second Atlas of Breeding Birds in Britain and Ireland: 1988-1991	Amber List	Yes
Yellowhammer (Emberiza citrinella)	31/07/1991	The Second Atlas of Breeding Birds in Britain and Ireland: 1988-1991	Red List	No
Barn Owl (Tyto alba)	31/12/2011	Bird Atlas 2007 - 2011	Red List	No
Barn Swallow (Hirundo rustica)	31/12/2011	Bird Atlas 2007 - 2011	Amber List	No
Black-headed Gull (Larus ridibundus)	31/12/2011	Bird Atlas 2007 - 2011	Red List	No
Common Kestrel (Falco tinnunculus)	31/12/2011	Bird Atlas 2007 - 2011	Amber List	No
Common Linnet (Carduelis cannabina)	31/12/2011	Bird Atlas 2007 - 2011	Amber List	No
Common Pochard (Aythya ferina)	31/12/2011	Bird Atlas 2007 - 2011	Amber List	No
Common Redshank (Tringa totanus)	31/12/2011	Bird Atlas 2007 - 2011	Red List	No

Species Name	Date of Last Record	Dataset	BoCCI	Annex I
Common Snipe (Gallinago gallinago)	31/12/2011	Bird Atlas 2007 - 2011	Amber List	No
Common Starling (Sturnus vulgaris)	31/12/2011	Bird Atlas 2007 - 2011	Amber List	No
Dunlin (Calidris alpina)	31/12/2011	Bird Atlas 2007 - 2011	Amber List	Yes
Eurasian Curlew (Numenius arquata)	31/12/2011	Bird Atlas 2007 - 2011	Red List	No
Eurasian Teal (Anas crecca)	31/12/2011	Bird Atlas 2007 - 2011	Amber List	No
Eurasian Wigeon (Anas penelope)	31/12/2011	Bird Atlas 2007 - 2011	Amber List	No
European Golden Plover (Pluvialis apricaria)	31/12/2011	Bird Atlas 2007 - 2011	Red List	Yes
Gadwall (Anas strepera)	31/12/2011	Bird Atlas 2007 - 2011	Amber List	No
Greater White-fronted Goose (Anser albifrons)	31/12/2011	Bird Atlas 2007 - 2011	Amber List	Yes
House Martin (Delichon urbicum)	31/12/2011	Bird Atlas 2007 - 2011	Amber List	No
Mallard (Anas platyrhynchos)	31/12/2011	Bird Atlas 2007 - 2011	Amber List	No
Mute Swan (Cygnus olor)	31/12/2011	Bird Atlas 2007 - 2011	Amber List	No
Northern Lapwing (Vanellus vanellus)	31/12/2011	Bird Atlas 2007 - 2011	Red List	No
Northern Pintail (Anas acuta)	31/12/2011	Bird Atlas 2007 - 2011	Red List	No
Northern Shoveler (Anas clypeata)	31/12/2011	Bird Atlas 2007 - 2011	Red List	No
Northern Wheatear (Oenanthe oenanthe)	31/12/2011	Bird Atlas 2007 - 2011	Amber List	No
Peregrine Falcon (Falco peregrinus)	31/12/2011	Bird Atlas 2007 - 2011	Green	Yes
Sand Martin (Riparia riparia)	31/12/2011	Bird Atlas 2007 - 2011	Amber List	No
Sky Lark (Alauda arvensis)	31/12/2011	Bird Atlas 2007 - 2011	Amber List	No
Spotted Flycatcher (Muscicapa striata)	31/12/2011	Bird Atlas 2007 - 2011	Amber List	No
Tufted Duck (Aythya fuligula)	31/12/2011	Bird Atlas 2007 - 2011	Amber List	No
Whooper Swan (Cygnus cygnus)	31/12/2011	Bird Atlas 2007 - 2011	Amber List	No

Table 10-9: Birds of Conservation recorded for EBBA 2 Atlas

Species Name	Dataset	BoCCI	Annex I
Buzzard (Buteo buteo)	European Breeding Bird Atlas 2: 2022	Green List	No
Common Ringed Plover (Charadrius hiatcula)	European Breeding Bird Atlas 2: 2022	Amber List	No
Dunnock (Prunella modularis)	European Breeding Bird Atlas 2: 2022	Green List	No
Great Crested Grebe (Podiceps cristatus)	European Breeding Bird Atlas 2: 2022	Amber List	No
Kestrel (Falco tinnunculus)	European Breeding Bird Atlas 2: 2022	Red List	No
Linnet (Linaria cannabina)	European Breeding Bird Atlas 2: 2022	Amber List	No
Long-eared Owl (Asio otus)	European Breeding Bird Atlas 2: 2022	Green List	No
Meadow Pipit	European Breeding Bird Atlas 2: 2022	Red List	No
Mew Gull (Larus canus)	European Breeding Bird Atlas 2: 2022	Amber List	No
Sparrowhawk (Accipiter nisus)	European Breeding Bird Atlas 2: 2022	Green List	No
Willow Grouse (Lagopus lagopus)	European Breeding Bird Atlas 2: 2022	Amber List	No

Wintering waterbirds

The waterbodies within the Proposed Development comprise small bog pools and two tributaries of the Black River and are not capable of supporting significant numbers of waterbirds. No records of nationally or internationally important numbers of wintering waterbird or sensitive wintering wetland species exist within the Proposed Development. The North Galway Lakes comprising several small loughs and turloughs are located within 5km of the Proposed Development and are the closest habitats containing nationally important populations. Whooper swan, wigeon, shoveler and tufted duck have been recorded here as nationally important populations.

No internationally important populations of whooper swan have been recorded within the wider environment, however smaller flocks of up to 250 but mostly <50 birds have been recorded within Blindwell turlough and Belclare turlough. As these habitats are situated within 5km of the Proposed Development, the Proposed Development lies within the core foraging range for these populations.

Greeland white-fronted geese have been recorded within Rostaff and Killower, Greaghans turlough, Belclare turlough, and Bindwell turlough. The Proposed Development is within the maximum foraging range for these populations. Feral (resident) populations of greylag geese have been recorded within Rostaff Lake.

Wintering waders such as snipe, golden plover, black-tailed godwit, ringed plover, lapwing and woodcock are likely to occur within the zone of influence of the Proposed Development due to the availability of suitable habitats including forestry scrub, wet grassland, and bog habitats.

Breeding waders

The breeding bird atlases confirm breeding records of snipe, and probable breeding records of lapwing within the zone of influence of the Proposed Development. Due to the presence of suitable breeding habitat within open bogs and wet pasture, there is also potential for curlew to breed also within the zone of influence of the Proposed Development.

Raptors

There is suitable habitat for foraging hen harrier in the winter and limited suitable habitat for breeding hen harrier within the Proposed Development. One hen harrier was recorded in the western portion of the Proposed Development according to the NBDC database, and a winter hen harrier roost is located ca. 20km to the west of the Proposed Development as per NBDC records.

There are small areas of forestry plantations adjacent to open bog within the Proposed Development, that may provide suitable breeding habitat for merlin, but they are more likely to be used as foraging habitat in the winter.

Buzzard, sparrowhawk and kestrel have been recorded within the 10km grid M35/25M overlapping the Proposed Development. These species are likely to be breeding within 2km of the Proposed Development based on habitat availability.

Suitable foraging habitats exist within the zone of influence of the Proposed Development for barn owl due to the presence of lower-lying open agricultural habitats with scrub and woodland and treelines. Wintering records of barn owl exist in Headford, 7.5km from the Proposed Development, and in Ballagh, 15km from the proposed development.

Owls and other crepuscular / nocturnal species

Habitats within and surrounding the Proposed Development, such as the lower-lying open agricultural habitats with scrub and woodland and treelines, may support barn owls and long-eared owls during the breeding and non-breeding seasons. According to the NBDC database, barn owls were last recorded within the 10km grid squares M35/25M that overlaps the Proposed Development in 2011, and long-eared owls were last recorded in 2022.

Short-eared owls are unlikely to breed due to the lowland nature of the Proposed Development, however there is some potential for this species to visit during the non-breeding seasons. This species was not recorded within the 10km grid square M35/25M that overlaps the Proposed Development, however records of this species in the wider environment exists.

Other species of conservation concern

The latest record of kingfisher within the 10km grid squares overlapping the Proposed Development is from 2014, according to the NBDC biodiversity maps.

Red Grouse was historically recorded within the 10km grid squares overlapping the Proposed Development in 1972. There are more recent records (between 2018 and 2022) for this species in the wider environment (associated with the bog habitats in the Glenamaddy area). Located approximately 30 km from the Proposed Development.

There are no records of nightjars, or of most rare passerines such as whinchat, ring ouzel, and tree sparrow, within the vicinity of the Proposed Development, and they are unlikely to occur here given habitat types. The rare passerine yellowhammer was historically recorded within the 10km grid square M35 in 1991. Due to the open agricultural lands and hedgerow in the surrounding environment, there is potential for this species to occur within or adjacent to the Proposed Development.

For further information, please refer to Appendix 10.1 - Ornithological Report.

10.6.2 Field Surveys

Species of conservation concern that are known to be potentially vulnerable to wind farm developments are discussed in this section, with more detailed information presented in Appendix 10.1 - Ornithological Report. Species have been selected for detailed discussion on the basis of conservation status, vulnerability to wind farm developments and results of desktop and field survey.

10.6.2.1 Target Species Observation (Flight Activity Surveys)

In accordance with SNH guidance (2017), for the purposes of the flight activity surveys (vantage point surveys), the study area is called the 'flight activity survey area' and is unique to this survey type. Any target species passing within 500m from the potential turbine development area (flight activity survey area) is considered within the Site under the SNH (2017) guidance.

During the 2019 - 2020 non-breeding season, 22 target species were recorded within the flight activity survey area. Of these six were red-listed (curlew, golden plover, kestrel, lapwing, snipe, woodcock), nine were amber-listed (black-headed gull, cormorant, hen harrier, lesser black-backed gull, mallard, merlin, mute swan, teal, whooper swan), and seven were green-listed (buzzard, great black-backed gull, grey heron, jack snipe, little egret, peregrine falcon, sparrowhawk). Six are also listed under Annex I of the EU Birds Directive (golden plover, hen harrier, merlin, whooper swan, little egret, peregrine falcon).

During the 2020 - 2021 non-breeding season, 19 target species were recorded within the flight activity survey area. Of these, four species were red-listed (golden plover, kestrel, lapwing, snipe), ten species were amber-listed (cormorant, greylag goose, gyrfalcon, hen harrier, herring gull, lesser black-backed gull, mallard, merlin, mute swan, whooper swan), and five were green-listed (buzzard, grey heron, little egret, peregrine sparrowhawk). Six are also listed under Annex I of the EU Birds Directive (golden plover, hen harrier, little egret, merlin, peregrine and whooper swan).

During the 2019 breeding season, 16 target species were recorded within the flight activity survey area. Of these three were red-listed (curlew, kestrel, snipe), seven were amber-listed (common gull, hen harrier, herring gull, lesser black-backed gull, mallard, merlin), and six were green-listed (buzzard, crane, greenshank, grey heron, sparrowhawk, whimbrel). Three are also listed under Annex I of the EU Birds Directive (hen harrier, merlin, common crane).

During the 2020 breeding season, 12 target species were recorded within the flight activity survey area. Of these two were red-listed (kestrel, snipe), five were amber-listed (common sandpiper, herring gull, lesser black-backed gull, mallard, mute swan), and five were green-listed (buzzard, grey heron, peregrine falcon, sparrowhawk, whimbrel). One was listed under Annex I of the EU Birds Directive (peregrine falcon).

During the 2023-24 non-breeding season, 19 target species were recorded within the flight activity survey area. Of these four were red-listed (golden eagle, kestrel, snipe, white-tailed eagle), nine were amber-listed (cormorant, golden plover, grey heron, hen harrier, herring gull, lapwing, lesser black-backed gull, mallard, merlin), and five were green-listed (buzzard, Canada goose, great black-backed gull, little egret, whooper swan). Six are also listed under Annex I of the EU Birds Directive (golden eagle, golden plover, hen harrier, little egret, white-tailed eagle and whooper swan).

During the 2024 breeding season, 18 target species were recorded within the flight activity study area. Of these three were red-listed (golden plover, kestrel, snipe), 11 amber-listed (black headed gull, brent goose, common gull, cormorant, great black-backed gull, herring gull, lesser black-backed gull, mallard, merlin, mute swan, whooper swan) and four were green-listed (buzzard, grey heron, sparrowhawk, whimbrel). Of the mentioned species, three are also listed under Annex I of the EU Birds Directive (golden plover, merlin, whooper swan).

10.6.2.2 Breeding Bird Surveys

Breeding bird surveys were conducted within the 500m surrounding the potential turbine development area for the presence of breeding waders. Based on topography and habitat availability, the desk-based study determined that within this 500 m area the habitats had the potential to support a range of target species, including lowland breeding waders (e.g., snipe, curlew and lapwing) and crepuscular/nocturnal woodland species (e.g., woodcock and long-eared owls). Additionally, surveys surrounding 800m from the proposed turbine locations were carried out to determine the presence of curlew as recommended by Pearse-Higgins et al. (2009). These surveys captured the baseline avian species using the proposed development, as well as their abundance and seasonal visitors of the summer months.

Over the 2019 breeding season, a total of 39 species were recorded. Of the 39 species, one is listed on Annex I of the EU Birds Directive (kingfisher), four are red-listed (curlew, kestrel, meadow pipit, snipe), nine are amber-listed (goldcrest, kingfisher, lesser black-backed gull, linnet, mallard, sand martin, skylark, swallow, willow warbler), and 26 are green-listed. Meadow pipit, snipe, goldcrest, sand martin, skylark and willow warbler were confirmed to be breeding within the study area. The breeding status was not confirmed for linnet and mallard, however surveyors indicated they were likely breeding within the 500m survey area. Kingfisher were found holding breeding territory outside of this 500msurvey area.

Over the 2020 breeding season, a total of 49 species were recorded. Of the 49 species, two are listed on Annex I of the EU Birds Directive (kingfisher, mute swan), three are red-listed (kestrel, meadow pipit, snipe), 13 are amber-listed (goldcrest, greenfinch, house sparrow, kingfisher, lesser black-backed gull, linnet, mallard, mute swan, sand martin, skylark, spotted flycatcher, swallow, willow warbler), and 36 are green-listed.

Over the 2024 breeding season, a total of 51 species were recorded. Of these, five were red-listed (grey wagtail, kestrel, meadow pipit, snipe, swift) and 10 were amber-listed (common gull, goldcrest, lesser black-backed gull, linnet, mallard, sand martin, skylark, starling, swallow, willow warbler and the remaining 36 species are green-listed.

The breeding status of meadow pipit, goldcrest, skylark, and willow warbler was confirmed within the 500m survey area. Linnet, mallard, and skylark were identified as likely breeding within the 500m of turbine locations. Additionally, snipe, kingfisher, and sand martin were recorded breeding and holding breeding territories outside of the 500m.

10.6.2.3 Breeding Raptor Surveys

The study area for the breeding raptor surveys comprised 2km surrounding the potential turbine development lands, as per SNH guidance (2017). VPs, as well as driven and walked transects were used to identify potential nesting habitat within the surrounding hinterland during the breeding seasons.

During the 2019 breeding season, two raptors were observed, namely kestrel and buzzard. Kestrel (red-listed) was identified to the south-west to the 2km turbine area. Buzzard (green-listed) was observed to the north and north-east of the 2km surrounding turbine area. No breeding activity was detected in either raptor species.

During the 2020 breeding season, three raptors were observed, namely kestrel, buzzard and sparrowhawk. Kestrel were observed flying or hunting, within the west of the 500m surrounding the turbine area. A juvenile kestrel was identified flying in this area in July. No nest sites were observed, however records indicate kestrel held a breeding territory within the western portion of the study area in 2020. Surveyors identified buzzard and detected breeding in the northern part of the 2km turbine area in July when three fledgling buzzards were observed on an oak tree. Sparrowhawk (green-listed) were observed in the north and north-east of the 500m turbine area. One breeding territory was confirmed, and another two potential breeding territories were detected.

During the 2024 breeding season, three raptor species were observed namely buzzard, kestrel and sparrowhawk along with short-eared owl. A male and juvenile kestrel were observed hunting over bog habitats in the west of the 500m surrounding the turbine area in July. While a nest site was not located, records indicate that kestrel held a breeding territory within the west of the breeding raptor survey area. Buzzards have been confirmed to be breeding in the eastern part of the 500 m surrounding the turbine area in July when one fledging was observed on a spruce.

No hen harrier, peregrine falcon or merlin were recorded within the 2km turbine locations during these surveys.

10.6.2.4 Winter Walkover Surveys

In compliance with the SNH (2017) guidelines, 500m surrounding the potential turbine development area were examined during the winter walkover surveys / non-breeding seasons. This comprised of surveyors walking the study area and noting all avifaunal species observed, to provide information on the distribution of winter bird species occurring within the Proposed Development and how they use the respective habitats.

During the 2019-2020 non-breeding season, a total of 15 species were recorded. Of the 15 species, four are listed on Annex I of the EU Birds Directive (golden plover, mute swan, little egret, peregrine falcon), five are red-listed (curlew, golden plover, lapwing, snipe, woodcock), five are amber-listed (cormorant, mallard, mute swan, teal, wigeon), and five are green-listed (little egret, grey heron, jack snipe, moorhen, peregrine falcon).

During the 2020-2021 non-breeding season, a total of 22 species were recorded. Of the 22 species, five are listed on Annex I of the EU Birds Directive (golden plover, hen harrier, kingfisher, whooper swan, little egret), six are red-listed (golden plover, kestrel, pochard, shoveler, snipe, woodcock), ten are amber-listed (cormorant, hen harrier, kingfisher, lesser lack-backed gull, mallard, merlin, mute swan, teal, whooper swan, wigeon), and six are green-listed (buzzard, grey heron, jack snipe, little egret, sparrowhawk, whimbrel).

During the 2023-24 non-breeding season, a total of 57 species were recorded. Of these seven were red-listed (golden plover, kestrel, lapwing, meadow pipit, redwing, snipe, woodcock) and 14 amber-listed (cormorant, goldcrest, hen harrier, kingfisher, lesser black-backed gull, linnet, mallard, sand martin, skylark, starling, teal, whooper swan, wigeon and willow warbler). The remaining 36 species are green-listed. Of all, the mentioned species four are also listed under Annex I of the Eu Birds Directive (golden plover, hen harrier, kingfisher and whooper swan).

10.6.2.5 Wintering Waterbird Surveys

SNH (2017) guidelines recommend study areas for wintering waterbirds to occur up to 500m from the Proposed Development to comprehensively examine foraging locations, and up to 1km for roost locations. As swan and goose distributions are not well documented outside of designated sites in Ireland, and as many wintering waterbirds occur outside of SPAs, the wintering waterbird surveys study area was extended to 6km from the proposed development. This allowed turloughs and loughs in the surrounding environment to be studied, and the approach is in line with that employed by Irish Wetland Bird Surveys (I-WeBS).

During the 2019-2020 non-breeding season, a total of 36 species were recorded. Of the 36 species, five are listed on Annex I of the EU Birds Directive (dunlin, golden plover, little egret, ruff, whooper swan), eleven are red-listed (black-tailed godwit, curlew, dunlin, golden plover, goldeneye, lapwing, pochard, redshank, shoveler, snipe, woodcock), 18 are amber-listed (black-headed gull, common gull, coot, cormorant, gadwall, great crested grebe, greylag goose, herring gull, lesser black-backed gull, mallard, mute swan, pintail, ruff, teal, tufted duck, whimbrel, whooper swan, wigeon), and seven are green-listed (great black-backed gull, green sandpiper, grey heron, little egret, little grebe, moorhen, pink-footed goose).

During the 2020-2021 non-breeding season, a total of 24 species were recorded. Of the 24 species, three are listed on Annex I of the EU Birds Directive (golden plover, little egret, whooper swan), five are red-listed (curlew, golden plover, lapwing, pochard, snipe), 13 are amber-listed (greater white-fronted goose, black-headed gull, common gull, cormorant, greylag goose, herring gull, lesser black-backed gull, mallard, mute swan, teal, tufted duck, whooper swan, wigeon), and six are green-listed (great black-backed gull, grey heron, little egret, little grebe, pink-footed goose, whimbrel).

During the 2023-2024 non-breeding season, a total of 33 species were observed. Of these, seven were red-listed (curlew, dunlin, golden plover, lapwing, pochard, shoveler and snipe) and 19 amber-listed ((Greater) white-fronted goose, black-headed gull, common gull, coot, cormorant, gadwall, great crested grebe, greylag goose, herring gull, lesser black-backed gull, mallard, mute swan, pintail, teal, tufted duck, whooper swan, wigeon, barnacle goose, red-breasted merganser, and seven green-listed (great black-backed gull, grey heron, little egret, little grebe, moorhen, pink-footed goose and ring-necked duck). Of the mentioned species, five are also listed under Annex I of the EU Birds Directive (golden plover, (Greater) white-fronted goose, whooper swan, barnacle goose and little egret).

10.6.2.6 Nocturnal Surveys for Snipe, Woodcock, Owls and other crepuscular and nocturnal species

Two dusk surveys were conducted during the 2019 breeding season, and two in the 2020 breeding season, to identify breeding waders, in particular roding woodcock and other crepuscular and nocturnal species such as owls. The study area for these surveys comprised the 500m surrounding the potential turbine development area in compliance with the SNH (2017) guidelines.

The surveys conducted during the 2019 breeding season determined there was no potential for breeding woodcock to occur within the 500marea. As such, targeted woodcock surveys were not necessary to repeat during the 2020 breeding season.

During the 2019 breeding season, a total of 12 species were recorded. Of the 12 species, none are listed on Annex I of the EU Birds Directive, three are red-listed (kestrel, meadow pipit, snipe), four are amber-listed (lesser black-backed gull, mallard, skylark, swallow), and five are green-listed (cuckoo, grey heron, reed bunting, song thrush, wren).

During the 2020 breeding season, a total of 17 species were recorded. Of the 17 species, none are listed on Annex I of the EU Birds Directive, two are red-listed (meadow pipit, snipe), six are amber-listed (linnet, mallard, mute swan, skylark, spotted flycatcher, willow warbler), and nine are green-listed (blackbird, buzzard, grey heron, lesser redpoll, mistle thrush, robin, sedge warbler, siskin, stonechat).

10.6.2.7 Kingfisher Surveys

Kingfisher habitat suitability surveys were carried out to determine if there were suitable habitats within the study area for kingfisher. Due to the elusive and territorial nature of kingfisher, any sighting of this species during the breeding season was considered to be holding breeding territory.

During the 2019 breeding bird surveys, kingfisher were detected outside of the 500m study area recommended by SNH (2017) guidance, and were considered to be holding territory along the Black (Shrule) River.

During the 2019 VP watches, kingfisher were also detected outside of the 500m area, holding territory along the Black (Shrule) River.

During the 2019-2020 non-breeding season, one individual was recorded along the Togher River within 500m of the turbine area.

Habitat suitability surveys as per Cummins et al. (2010) indicated there are suitable nesting habitats for this species along the Black (Shrule) River (outside of the 500m of the turbine area) and the Togher River (within 500m of the turbine area). The bird surveys indicated breeding kingfisher territories exist at both of these locations.

10.6.2.8 Hen Harrier Roost Searches

Hen harrier roost searches were conducted in a study area that encompassed 2km from the proposed development, in accordance with SNH (2017) guidelines.

During the 2019-2020 non-breeding season, no hen harrier observations were made during the targeted hen harrier roost searches.

During the 2020-2021 non-breeding season, hen harriers were observed on five instances. A male hen harrier was observed in the south-western portion of the 500m surrounding the proposed turbine development area before dusk. In the same area, two ringtail hen harriers were detected hunting along the Black (Shrule) River and briefly interacting in a display flight.

During the 2023-2024 non-breeding season, no hen harrier observations were made during the targeted hen harrier roost searches.

There was no evidence of roosting hen harrier recorded during targeted hen harrier roost searches that were undertaken over the three winter seasons

10.6.2.9 Survey 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 Development.

Surveying within the study area was conducted between 2019 and 2024 (excluding 2022), and provides an indication of bird assemblages at the Site and how the Site and surrounding lands are utilised by birds. While walkover surveys were limited to areas within the study area where permission to access lands had been granted, this did not limit the comprehension of bird activity in the area, given that lands that were accessible were located well beyond the red line boundary and represented the full array of habitat types in the study area.

For breeding waders three visits are recommended by SNH (2017) guidance, however only two visits were conducted in the 2020 survey season. While this is a limitation, dusk and dawn surveys specifically for breeding snipe were undertaken which is additional to the SNH (2017) recommendations and compensates adequately.

Hen harrier roost searches did not cover all winter months, as recommended by Hardey *et al*. (2013), however, nine visits were carried out in winter 2019-20 and eight visits in winter 2020-21 and in winter 2023-24 with even coverage of the non-breeding season.

Sufficient data was collected over a three-year survey period between 2019 and 2024 (excluding 2022), to identify any ornithological activity within the study area.

The desktop and field survey data collected are in line with the five-year data age recommendations of SNH (2017) which states that "*the data are reliable and not too dated (collected within the last 5 years or within 3 years if the populations of key species are known to be changing rapidly)*". This aligns also with the 'Advice note on the Lifespan of Ecological Reports and Surveys' (CIEEM, 2019) which recommends using data no greater than three years old unless justifications can be provided. Such justifications can include no significant change to the habitat present onsite, this is the case at the Proposed Development and associated ornithology study area. The dominant habitat types throughout the bird survey period to present day remain as cut-over bog, raised bog, agricultural grassland and conifer plantation. The land-use (farming, turbary and commercial forestry) within the study area has not changed. Given the habitats and land uses haven't changed significantly it is reasonable to conclude that the bird assemblages within the study area have not changed between the start of bird survey in 2019 to present day. The data therefore is robust and representative of bird usage at the Proposed Development.

10.6.3 Avifauna Habitat Associations within the Study Area

Interrogation of field survey results indicates particular habitat associations for certain species within the study area as follows:

- Kestrel (*Falco tinnunculus*), red-listed in Ireland, was observed most frequently in association with bog habitat, and was not generally observed within agricultural lands within the study area or the conifer plantations. Kestrel presence within the study area was most prevalent during the breeding season, whereby Cloonsheen-Shancloon bog and cutover complex showed the highest level of activity (mainly flying/hunting above the bog).
- Flight activity for Golden Plover (*Pluvialis apricaria*), red-listed in Ireland, was observed wholly within the non-breeding season and was most frequently in association with the Commonage Area / Cloonbar East Wetland. In this area, golden plover flocks of approximately 20 to 120 individuals were observed circling above the Cloonbar East Wetland and more recent data from 2023-2024 indicates habitat usage within Beagh More West Cutover and the improved grassland north of this. The concentration of activity here is likely attributed to the habitat consisting of patches of bare ground and low grass sward caused by overgrazing.
- Waterbird flight activity (e.g. mallard, cormorant, lesser black-backed gull and heron) was predominantly observed in association with the Black (Shrule) and Togher rivers, with flight direction often in a parallel direction to the watercourse. These waterbird species were found roosting and foraging in the surrounding hinterland sites including at Shrule Turlough (~4.7km N) and Hackett Lough (~3km S).
- Waders such as Snipe and Curlew were mainly observed in association with raised bog habitat within Cloonclasha-Beagh More cutover complex, Cloonteen-Cloonbar-Toberroe cutover complex, Cloonsheen-Shancloon bog and cutover and north of Beagh More Shancloon wetland and cutover. Although these species were observed less frequently during the breeding season, there was evidence of breeding with drumming activity recorded withing the bogs.
- Meadow Pipit (*Anthus pratensis*), red listed species, was observed only during the breeding season within the raised bog habitats in the Cloonteen-Cloonbar-Toberroe cutover complex and the Cloonclasha-Beaghmore cutover complex. Similarly, Skylark (*Alauda arvensis), amber-listed,* was observed on site during the breeding season only and was observed display and singing at Beaghmore-Shancloon Wetland and Cloonbar East Wetland.

10.7 Avifauna Evaluation

The basis of impact assessment should be a determination of which ornithological resources within the zone of influence of the Proposed Development are of sufficient value to be material in decision making and therefore, included in the assessment (NRA, 2009a and CIEEM 2019). Outlined below in table 10-5 are the key receptors selected for assessment and the rationale for the inclusion or exclusion of each target species recorded during field surveys as a key receptor based on NRA guidance (NRA, 2009a); the overall importance or sensitivity evaluation for each key receptor, taken from guidance such as Percival 2007 is also illustrated. All other ecological receptors are dealt with in Chapter 9 Biodiversity.

Table 10-10: Key Receptors Selected for Assessment

Species	BoCCI	Annex I (Y/N)	NRA Evaluation	Receptor Evaluation for Impact Assessment (Sensitivity)	Key Receptor	Rationale
Species considered as Key Receptors						
Black-headed gull (*Larus ridibundus*)	Amber	N	Local Importance (High value)	Low	Yes	This species was recorded within the Proposed Development during breeding seasons 2019 and 2024 and during winter seasons. Black-headed gull were recorded for a total flight time of 61 seconds during Vantage Point (VP) watches (<400s and not considered within CRM).
Buzzard (*Buteo buteo*)	Green	N	Local Importance (High value)	Medium	Yes	This species was recorded across all seasons over the three-year survey period, and breeding and territorial behaviour was detected within the Proposed Development. A confirmed breeding territory within the northern section 2 km of turbine locations where three fledging buzzards were observed on an oak tree. Buzzards were observed within the collision risk zone for a total of 9,998 flight seconds.
Common gull (*Larus canus*)	Amber	N	Local Importance (High Value)	Low	Yes	This species was recorded during breeding season 2019/2020 and 2024 and once in non-breeding 2023/24. This species was recorded on a small number of occasions (five observations total) within 500m of turbine locations and observed for a total of 473s. Common gulls was omitted from the CRM as only 397s of the total time were within the collision risk zone (<400s). There were more records in the wider hinterland.

Species	BoCCI	Annex I (Y/N)	NRA Evaluation	Receptor Evaluation for Impact Assessment (Sensitivity)	Key Receptor	Rationale
Cormorant (*Phalacrocorax carbo*)	Amber	N	Local Importance (High value)	Medium	Yes	There were a total of 38 observations during VP watches which were predominantly recorded during non-breeding seasons with just three records from summer 2023/24. Records were also made during every winter walkover survey. Most observations recorded individuals commuting along watercourses which traverse the 500 m surrounding the turbine locations. During wider area wintering waterbird surveys, cormorant observations were associated with the Black (Shrule) River and Togher River systems. Cormorants were recorded within 500m of the turbine locations and included in the CRM with a total watch time of 1,838s, of which 1,363s were within the collision risk zone.
Curlew (*Numenius arquata*)	Red	N	County Importance	Medium	Yes	There were a total of eight observations during VP watches which primarily occurred during non-breeding season of 2029-20. Records were also from winter walkover surveys within this season. Non-breeding season records observed curlew flying or commuting, consistent with passive migrant behaviour. Curlew activity was low during breeding season where they were primarily seen flying infrequently over wet grassland and agricultural fields scattered across the study area. However, it is thought there was one failed breeding attempt in July 2019 (outside of the Proposed Development boundary).

Species	BoCCI	Annex I (Y/N)	NRA Evaluation	Receptor Evaluation for Impact Assessment (Sensitivity)	Key Receptor	Rationale
						Observations also at 3,300 seconds of flight were recorded, of which 2,145s were within the collision risk zone was detected. This species was recorded in the wider area at Blindweel Turlough, Belclare Lough and Lough Hacket.
Golden plover (*Pluvialis apricaria*)	Red	Y	County Importance	Medium	Yes	Golden plover were recorded across multiple surveys during the 2019-2020, 2020-2021 and 2023/24 non-breeding seasons and 2024 breeding season. Flock size ranged from one to 180 birds with an average flock size of 27 birds. Flight activity was recorded during the non-breeding seasons with higher activity noted over winter 2023-24 compared to winter 2020-21 and winter 2020-19. Activity is representative of golden plover over-wintering in the area. Golden plover observations were also made in the wider area, at Blindwell Turlough. A total of 6,180 seconds flight time were recorded, of which 5,481s were within the collision risk zone.
Great black-backed gull (*Larus marinus*)	Green	N	County Importance	Medium	Yes	There were a total of eight observations across the whole survey period with four occurring during non-breeding 2019-20 season, one in non-breeding 2023/2024, and three during breeding 2024 season. This species was recorded within the collision risk zone for 528 seconds. Observations indicate that gulls commute across the site.

Species	BoCCI	Annex I (Y/N)	NRA Evaluation	Receptor Evaluation for Impact Assessment (Sensitivity)	Key Receptor	Rationale
(Greenland) white-fronted goose (*Anser albifrons flavirostris*)	Amber	N	County Importance	Medium	Yes	This species was only recorded during wider area wintering waterbird surveys. In the 2020/21 nonbreeding season, white-fronted goose were observed over two visits, with numbers up to 50 birds recorded. In the 2023/24 non-breeding season, this species was recorded over three visits, with a maximum of 46 birds observed. This species had < 200 flight seconds within the potential collision risk zone and so omitted from the CRM.
Greylag goose (*Anser anser*)	Amber	N	National Importance	High	Yes	During VP surveys, a single greylag goose flock (14 birds) was recorded flying through the 500 m surrounding the turbine locations during the 2020-21 non-breeding season, generating a total of 2 flight seconds. This species was also recorded during wider area winter waterbird surveys on five occasions.
Hen harrier (*Circus cyaneus*)	Amber	Y	County Importance	Medium	Yes	Hen Harrier have been recorded across multiple surveys during the 2019 breeding season, and the 2019-2020, 2020-2021 and 2023/24 non-breeding seasons. This species has been recorded hunting in the bog habitats that lie within 500m of turbine locations. A total of 637 flight seconds was recorded within 500m of the turbine locations for this species, of which 98s were recorded within the collision risk zone. There was no evidence of roosting hen harrier recorded during roost searches undertaken over

Species	BoCCI	Annex I (Y/N)	NRA Evaluation	Receptor Evaluation for Impact Assessment (Sensitivity)	Key Receptor	Rationale
						the three winter seasons. Flight data indicates that usage of the site was limited and periodic. Flights are not associated with breeding or winter roosting within 2km of turbine locations.
Herring Gull (*Larus argentatus*)	Amber	N	Local Importance (High Value)	Low	Yes	This species was recorded on multiple occasions across every season during the two-year survey period. The maximum number of individuals recorded during a single breeding bird survey was 17 individuals. Herring Gull were recorded flying within the collision risk zone for a total of 1,535 seconds.
Kestrel (*Falco tinnunculus*)	Red	N	Local Importance (High Value)	Low	Yes	Kestrel have been regularly recorded throughout multiple surveys across the two-year survey period with observation noted during every season. This species has been observed hunting and foraging behaviours within the habitats of the Proposed Development. In May 2024, a pair was recorded displaying to the south-west of the 500m surrounding the turbine locations. While a nest site was not located, records indicate that kestrel held a breeding territory within the west of the breeding raptor survey area. Kestrel was the most active raptor species within 500 m of the turbine locations. A total of 17,263 seconds of flight within the collision risk zone has been recorded

Species	BoCCI	Annex I (Y/N)	NRA Evaluation	Receptor Evaluation for Impact Assessment (Sensitivity)	Key Receptor	Rationale
Kingfisher (*Alcedo atthis*)	Amber	Y	County Importance	Medium	Yes	Kingfisher have been recorded across multiple surveys across the 2019 and 2020 breeding seasons, and the 2020-2021 and 2023/24 non-breeding seasons. This species has been observed using riverine habitats within the Proposed Development. During breeding bird surveys across the three-year survey period, two breeding kingfisher territories were identified. One territory was located to the north of the proposed development site outside 500 m of turbine locations along the Black (Shrule) River, and the second was within the south of 500 m surrounding turbine locations along the Togher River.
Lapwing (*Vanellus vanellus*)	Red	N	Local Importance (High Value)	Low	Yes	This species has been observed across multiple surveys over the 2019-2020, 2020-2021 and 2023/24 non-breeding seasons. Lapwing have been observed flying within the red line boundary of the Proposed Development. A maximum flock size of 105 birds was recorded. A total of 421s flight time was recorded across the three year period, of which 343s was within the collision risk zone.

Species	BoCCI	Annex I (Y/N)	NRA Evaluation	Receptor Evaluation for Impact Assessment (Sensitivity)	Key Receptor	Rationale
Lesser black-backed gull (*Larus fuscus*)	Amber	N	Local Importance (High Value)	Low	Yes	This species has been observed across multiple surveys across all seasons. Observations were primarily of one individual, however flocks of up to 30 individuals have been recorded within the Proposed Development. This species has been observed flying, foraging and hunting within the habitats of the Proposed Development. There were observations recorded during summer compared with winter seasons. The high frequency of flights recorded in summer, mainly located in the west and south-west of the 500 m surrounding the turbine locations, suggests that there is likely breeding in the wider area. This species was the most frequently observed gull species with a total flight time of 9,222s, of which 6,524s were within the collision risk zone.
Linnet (*Linaria cannabina*)	Amber	N	Local Importance (Low Value)	Negligible	Yes	This passerine was recorded on multiple occasions over the 2019, 2020 and 2024 breeding seasons and 2023-24 non-breeding season within the Proposed Development.
Little egret (*Egretta garzetta*)	Green	Y	County Importance	High	Yes	This species was recorded over multiple surveys across the 2019-2020, 2020-2021 and 2023/24 non-breeding seasons. A total of 198 flight seconds were observed during the VP watches.
Mallard (*Anas platyrhynchos*)	Amber	N	County Importance	Medium	Yes	Mallard have been observed across all seasons during various surveys. Mallards were frequently recorded within 500 m of the turbine locations, with a total of 102 observations equating to 3,027

Species	BoCCI	Annex I (Y/N)	NRA Evaluation	Receptor Evaluation for Impact Assessment (Sensitivity)	Key Receptor	Rationale
						flight seconds, with 1,043s occurring within the collision risk zone. Flights were generally of one to six individuals. Within the surrounding environment (ca. 5km), there is evidence of roosting and foraging within the nearby loughs reported.
Meadow pipit (*Anthus pratensis*)	Red	N	County Importance	Medium	Yes	This species has been recorded regularly during the 2019, 2020 and 2024 breeding seasons along with during the 2023/24 non-breeding season. Meadow pipit was the most abundant and widespread passerine recorded during the breeding seasons and bred within suitable open bog and grassland habitat within the 500 m of turbine locations.
Merlin (*Falco columbariu*)	Amber	Y	County Importance	Medium	Yes	Merlin have been recorded across various surveys during the 2019 and 2024 breeding season and the 2019-2020, 2020-2021 and 2023/24 non-breeding seasons. This species has been observed flying, mobbing and hunting within the habitats of the Proposed Development. While observations are infrequent, merlin appear to be using the lands within the proposed development site to over-winter. A total of 532 seconds of flight time was recorded during VP watches. Of this, only 76s were within the collision risk zone and therefore excluded from the CRM.

Species	BoCCI	Annex I (Y/N)	NRA Evaluation	Receptor Evaluation for Impact Assessment (Sensitivity)	Key Receptor	Rationale
Mute swan (*Cygnus olor*)	Amber	N	County Importance	Medium	Yes	Mute Swan were observed throughout various surveys during the 2020 and 2024 breeding seasons and 2019/2020 and 2020/21 non-breeding season. This species was observed swimming and nesting in the Black (Shrule) 010 River that passes through the southern portion of the Proposed Development, and flying within the southern section of the proposed development. During the 2020 breeding season, pair of mute swans were recorded incubating a nest along the Black (Shrule) River in the centre of the 500 m surrounding the turbine locations. This species has been observed flying and nesting within the habitats of the Proposed Development. A total of 277 flight seconds were recorded, of which only 174 were within the collision risk zone. Therefore this species was omitted from the CRM.
Peregrine Falcon (*Falco peregrinus*)	Green	Y	County Importance	Medium	Yes	This species has been recorded across the 2020 breeding season, and the 2019/20 and 2020/21 non-breeding seasons. This species has been recorded hunting and travelling within the Proposed Development. Considering this and the infrequency of flights over two years of surveys, the proposed development site does not represent a particularly important site for peregrine. A total of 336 seconds of flight time was recorded during VP watches, of which 89s were within the collision risk zone. Therefore, this species was omitted from the CRM.

Species	BoCCI	Annex I (Y/N)	NRA Evaluation	Receptor Evaluation for Impact Assessment (Sensitivity)	Key Receptor	Rationale
Shoveler (*Spatula clypeata*)	Red	N	National Importance	High	Yes	Shoveler was recorded during 2020-2021 non-breeding seasons. This species was predominantly found roosting and foraging in the turloughs within the wider environment. Only one record occurred within the Proposed Development during 2020/21 season when one flock of eight birds was observed in the south-west of the 500 m surrounding the turbine locations along a tributary of the Black (Shrule) River. Shoveler were not recorded during VP watches.
Skylark (*Alauda arvensis*)	Amber	N	Local Importance (High Value)	Low	Yes	This species has been regularly recorded within the Proposed Development during the 2019, 2020 and 2024 breeding seasons and considered to be breeding in suitable habitat within 500m of the turbine locations. Skylark was also recorded during the 2023/24 non-breeding season when observations were mainly distributed across bog habitats within 500m of the turbine locations.
Snipe (*Gallinago gallinago*)	Red	N	County Importance	Medium	Yes	This species was recorded across all seasons throughout a variety of surveys. Foraging, as well as breeding and territorial behaviour was detected within the Proposed Development. Display flights (drumming) were regularly recorded around VP3 and numbers of birds using the site to over-winter A total of 4,020 seconds flight time were recorded of which 3,731s were within the collision risk zone.

Species	BoCCI	Annex I (Y/N)	NRA Evaluation	Receptor Evaluation for Impact Assessment (Sensitivity)	Key Receptor	Rationale
Sparrowhawk (*Accipiter nisus*)	Green	No	Local Importance (High Value)	Low	Yes	This species was recorded across all seasons within the Proposed Development. Sparrowhawk were observed for a total of 2,683s of which 2,226s were within the collision risk zone. During VP watches, a confirmed breeding territory including a sparrowhawk family of two adults and three juveniles in a nest was recorded in the south of the 500 m surrounding turbine locations of the proposed development site. Separately, a second possible territory was recorded, where a female was observed carrying prey along a hedgerow heading to the east of 500 m surrounding the turbine locations, likely towards the nest. A third possible territory was observed where one female was observed soaring in the north of 500 m surrounding the turbine locations.
Swallow (*Hirundo rustica*)	Amber	N	Local Importance (High Value)	Low	Yes	Swallows were recorded on four occasions during the 2019, 2020 and 2024 breeding seasons. This species was found foraging within the Proposed Development. Swallows were considered to be likely breeding in suitable structures within the 500 m of turbine locations and the wider area.

Species	BoCCI	Annex I (Y/N)	NRA Evaluation	Receptor Evaluation for Impact Assessment (Sensitivity)	Key Receptor	Rationale
Teal (*Anas crecca*)	Amber	N	National Importance	High	Yes	This species was recorded across the 2019-2020 and 2020-2021, 2023/24 non-breeding seasons throughout a variety of surveys. This species was recorded using the habitats within and adjacent to the Proposed Development. A total of 155 flight seconds was recorded across the entire surveyed season. Teal observations were made in the south of the 500 m surrounding the turbine locations along the Togher River, a tributary of the Black (Shrule) River.
Whimbrel (*Numenius phaeopus*)	Green	N	County Importance	High	Yes	This species was recorded during the 2019, 2020 and 2024 breeding seasons within the Proposed development. A total flight time of 1,590s was recorded, all of which was within the collision risk zone. Whimbrel are spring passage migrants in Ireland and all observations were limited to late April/early May, with numbers recorded ranging between 1 and 16 birds.
Whooper swan (*Aythya fuligula*)	Amber	Y	County Importance	Medium	Yes	This species was recorded across the 2019-2020, 2020-2021 and 2023/24 non-breeding seasons, throughout a variety of surveys. This species was recorded commuting across the site. A total of 951s seconds of flight time was recorded, of which 585s were within the collision risk zone.

Species	BoCCI	Annex I (Y/N)	NRA Evaluation	Receptor Evaluation for Impact Assessment (Sensitivity)	Key Receptor	Rationale
						Flock sizes recorded were between three and 14 birds, and the occurrence of flights was periodic with no pattern emerging that was suggestive of birds regularly travelling between roost sites and foraging areas.
Wigeon (*Mareca Penelope*)	Amber	N	County Importance	Medium	Yes	Wigeon were recorded during all wintering seasons surveyed and observations were associated with the Togher River, a tributary of the Black (Shrule) River. This species was found foraging and roosting within the wider environment.
Willow warbler (*Phylloscopus trochilus*)	Amber	N	Local Importance (High Value)	Low	Yes	This passerine was recorded throughout the 2019, 2020 and 2024 breeding seasons. Willow Warbler breeding in suitable woodland and scrub habitat within 500 m of turbine locations and wider area.
Woodcock (*Scolopax rusticola*)	Red	N	Local Importance (High Value)	Low	Yes	Woodcock were recorded during the 2019-2020, 2020-2021 and 2023-24 non-breeding seasons across various surveys. Small numbers of woodcock were recorded within 500m of the turbine locations. This species was detected in flight for a total of 12 seconds during VP watches.
Species not considered to be Key Receptors						
Black-tailed godwit (*Limosa limosa*)	Red	N	Local Importance (High Value)	Low	No	Black-tailed Godwit was recorded once during the 2019-2020 winter waterbird survey within the Shrule turlough, ca. 4km to the west of the nearest turbine (T2).

Species	BoCCI	Annex I (Y/N)	NRA Evaluation	Receptor Evaluation for Impact Assessment (Sensitivity)	Key Receptor	Rationale
						As this species was not recorded within the Proposed Development or its immediate surroundings, and as it was recorded only once, this species is not considered to be a key receptor.
Brent Goose (*Branta bernicla*)	Amber	N	Local Importance (High Value)	Low	No	A single brent goose was recorded commuting within 500 m of the turbine locations during the 2024 breeding season, for a total of four seconds. As there was only, one observation over the entire survey period, this species is not considered to be a key receptor.
Canada Goose (*Branta canadensis*)	NA	N	Local Importance (High Value)	Low	No	One Canada goose was recorded flying through the 500 m surrounding the turbine locations during the 2023-24 non-breeding season, equating to a total of 17 flight seconds. As there was only, one observation over the entire survey period, this species is not considered to be a key receptor.
Common sandpiper (*Actitis hypoleucos*)	Amber	N	Local Importance (High Value)	Low	No	This species was recorded on one occasion during VP watches within the 2020 breeding season. It was noted flying over the bog habitats within the Proposed Development, repeatedly calling. However as only one individual on one occasion was this species was only recorded once, this species is not considered a key receptor.

Species	BoCCI	Annex I (Y/N)	NRA Evaluation	Receptor Evaluation for Impact Assessment (Sensitivity)	Key Receptor	Rationale
Coot (*Fulica atra*)	Amber	N	Local Importance (High Value)	Low	No	This species was recorded on four occasions during the 2019-2020 and 2023/24 wider area winter waterbird surveys. However, it was not recorded within the Proposed Development, or within the immediate surroundings of the Proposed Development. The closest record is ca. 5.1km to the west of the nearest turbine (T2), within Shrule turlough. In addition, a maximum of three birds were seen at one time. Due to this species only being recorded on four occasions, and the lack of time spent within the Proposed Development, this species is not considered a key receptor.
Crane (*Grus grus*)	N/A	N/A	Local Importance (High Value)	High	No	One individual was recorded flying at a height of 10m over the Proposed Development during the 2019 breeding season, within the western area of 500 m surrounding the turbine locations. Due to this species only being recorded on one occasion, and the low amount of time spent within the Proposed Development, this species is not considered a key receptor.
Dunlin (*Calidris alpina*)	Red	Y	County Importance	Medium	No	This species was recorded on five occasions during the wider area winter waterbird surveys of the 2019-2020 and 2023-24 non-breeding seasons. Dunlin were not recorded within the Proposed Development or immediate environment.

Species	BoCCI	Annex I (Y/N)	NRA Evaluation	Receptor Evaluation for Impact Assessment (Sensitivity)	Key Receptor	Rationale
						The closest records are ca. 5.4km to the north of the nearest turbine (T10) in Rathbaun turlough, and ca. 5.4km to the south of the nearest turbine (T13) in Belclare turlough. Due to the absence of this species within the study area, this species is not considered a key receptor.
Gadwall (*Mareca strepera*)	Amber	N	National Importance	High	No	This species was recorded during on during one visit during 2019-20 and during four visits of the 2023-24 wider area wintering waterbird surveys. This species was only recorded within the wider area. Due to the absence of this species within 500m of the turbine locations, this species is not considered a key receptor.
Goldeneye (*Bucephala clangula*)	Red	N	Local Importance (High Value)	Low	No	This species was recorded on one occasion during the winter waterbird survey of the 2019-2020 non-breeding season. One individual was detected foraging within Rathbaun turlough, ca. 5.4km to the north of the nearest turbine (T10). As this species was only recorded on one occasion, and no records exist within the Proposed Development, this species is not considered a key receptor.
Golden Eagle	Red	Y	Local Importance (High Value)	High	N	There were a total of two golden eagle observations made across the entire survey period, both of which occurred on the 22nd February 2024. With that and considering golden eagle was not recorded within the collision risk zone and only observed flying through the site, this species is not considered a key receptor.

Species	BoCCI	Annex I (Y/N)	NRA Evaluation	Receptor Evaluation for Impact Assessment (Sensitivity)	Key Receptor	Rationale
Great crested grebe (*Podiceps cristatus*)	Amber	N	Local Importance (High Value)	Low	No	This species was recorded on two occasions during the 2019-2020 and 2023-24 wintering waterbirds surveys, outside of the Proposed Development within the Belclare turlough. Due to the absence of records within the Proposed Development, this species is not considered to be a key receptor.
Greenfinch	Amber	N	Local Importance (High Value)	Low	No	Greenfinch were recorded on two occasions during the 2020 breeding season. However, as this species was recorded on only two occasions, and outside of the 500m surrounding the turbines, this species is not considered to be a key receptor.
Gyr falcon (*Falco rusticolus*)	N/A	N	Local Importance (Low Value)	Negligible	No	One individual was recorded flying across the Proposed Development during the VP watches of the 2020-2021 non-breeding season. This is not a resident or regular migratory species in Ireland, and is not considered to be a key receptor as this sighting is of a rare accidental visitor.
House Sparrow (*Passer domesticus*)	Amber	N	Local Importance (High Value)	Low	No	Five individuals were recorded on one occasion, during the 2020 breeding season. As this species was only recorded once, and the sighting occurred outside of the Proposed Development, this species is not considered to be a Key Receptor.

Species	BoCCI	Annex I (Y/N)	NRA Evaluation	Receptor Evaluation for Impact Assessment (Sensitivity)	Key Receptor	Rationale
Pink-footed goose (*Anser brachyrhynchus*)	Green	N	County Importance	Medium	No	This species was recorded during the wider area winter waterbird surveys of the 2019-2020, 2020-2021 and 2023-24 non-breeding seasons. This species was not located within the Proposed Development however, and records indicate they were present ca. 3-4km to the south of the Proposed Development near the village Caherlistrane. As a result, this species was not selected as a key receptor.
Pintail (*Anas acuta*)	Amber	N	Local Importance (High Value)	Low	No	Three individuals were observed on one occasion during the 2019-2020 and 2023-24 wider area winter waterbird surveys. This observation occurred ca. 7.9km to the north of the nearest turbine (T10), within Greaghans turlough. There is no evidence to suggest pintail use the habitats within or adjacent to the Proposed Development. As such this species was not selected as a key receptor.
Redshank (*Tringa totanus*)	Red	N	Local Importance (High Value)	Low	No	This species was recorded once during the 2019-2020 wider area winter waterbird surveys, ca. 5km to the south of the Proposed Development within the Beclare turlough. As this species was not found within or adjacent to the Proposed Development, and was only found once, the potential for disturbance, displacement, habitat loss and collision risk is limited.

Species	BoCCI	Annex I (Y/N)	NRA Evaluation	Receptor Evaluation for Impact Assessment (Sensitivity)	Key Receptor	Rationale
Ruff (*Calidris pugnax*)	Amber	Y	Local Importance (High Value)	Low	No	Ruff were recorded on two instances during the 2019-2020 non-breeding season, outside of the Proposed Development. There is no evidence to suggest ruff use the habitats within or adjacent to the Proposed Development. As such this species was not selected as a key receptor.
Sand martin (*Riparia riparia*)	Amber	N	Local Importance (High Value)	Low	No	This species was recorded during the 2019 and 2020 and 2024 breeding seasons, outside of the proposed development. There is no evidence to suggest sand martin use the habitats within or adjacent to the Proposed Development. As such this species was not selected as a key receptor.
Spotted flycatcher (*Muscicapa striata*)	Amber	N	Local Importance (High Value)	Low	No	Only one observation of this species occurred, whereby a fledgling was recorded during the 2020 breeding season within 500m of the turbine locations. This species is not considered as a key receptor due the infrequent and low number of observations.
Tufted duck (*Aythya fuligula*)	Amber	N	County Importance	Medium	No	Tufted Ducks were recorded during the wider area winter waterbird surveys that took place during the 2019-2020, 2020-2021 and 2023-24 non-breeding seasons. This species was not found within the Proposed Development. The closest record was located ca. 2km to the south of the nearest turbine (T5). As such, this species is not a Key Receptor.

Species	BoCCI	Annex I (Y/N)	NRA Evaluation	Receptor Evaluation for Impact Assessment (Sensitivity)	Key Receptor	Rationale
Pochard (*Aythya farina*)	Red	N	County Importance	Medium	No	This species was recorded during the 2020-2021 winter walkover surveys within the Proposed Development. Pochard was also observed on multiple occasions over the 2019-2020, 2020-2021 and 2023-24 winter waterbird surveys. Due to the low number of records within the Proposed Development, this species is not considered as a key receptor.
White-tailed Eagle	Red	Y	Local Importance (High Value)	Low	N	There was one observation of white-tailed eagle during 2023/24 non-breeding season on 8th November 2023, which recorded one bird flying for 125s within 500m of the turbine locations. Considering that this species was only recorded flying over on one occasion throughout the entire survey period and during the non-breeding season, white-tailed eagle is not considered to be a key receptor.

10.8 Potential Effects

All elements of the Proposed Development have been considered in assessing effects on ecological receptors, including: 11 no. turbines with a tip height range of 179.25 m to 180m, the substation, and all ancillary infrastructure, plus electrical infrastructure and turbine delivery accommodation works.

10.8.1 Do Nothing Scenario

If the proposed development does not proceed, the 'do nothing' scenario is that the existing environment and key receptors identified are likely to remain as described previously. This assumes the continuation of existing agricultural activities at the Site and forestry operations (thinning, harvesting and replanting).

If forestry management activities proceed, the lands will undergo changes as they are harvested and subsequently replanted. Although key ecological receptors can fluctuate in abundance and may be found in different locations during different stages of said forestry operations (e.g. post-felling, plantation habitats can be replaced by scrub habitats, which may cause animals that use wooded habitats to move to different locations in the forestry), overall, the habitats and species found at the project site will remain as they are currently.

10.8.2 Potential Effects During the Construction Phase

Developments such as wind farms in general have many effects on birds, including potential direct habitat loss and fragmentation, displacement due to disturbance, death, and injury due to collisions and disruption of local or migratory movements, with a consequent increase in energy expenditure (Drewitt, A., and Langston, R., 2008). However, the principal concerns in terms of adverse effects on birds are (1) disturbance / displacement, (2) collision, (3) habitat loss/change and (4) barriers to movement (Langston, R., 2010). Of these, only two are applicable during construction: 1) disturbance and / or displacement and 2) habitat loss/alteration. Habitat loss is the primary potential direct impact during constructions and although disturbance and / or displacement could be viewed as effective habitat loss, it is essentially indirect (SNH, 2017) and therefore covered under indirect Impacts.

Direct Effects: Habitat loss or alteration

The design of the wind farm is such that the road alignment and locations of turbine infrastructure has been selected to minimise the requirement for removal of higher value avian habitat such as scrub, raised bog and woodland. The road alignment, hardstand orientation and locations of turning heads seek to minimise scrub, tree and hedge removal by using existing gaps in treelines/hedgerows and by being orientated in so far as possible away from areas of higher value habitat. Similarly, the turbines and on-site substation have been located in areas of cutover bog or within agricultural grassland. These habitats are heavily managed and disturbed and of lower value for avian fauna.

Direct habitat loss by the development of wind farms tends to be relatively small (Drewitt and Langston 2006). Habitat loss can be direct through land take of habitats which support birds or indirect such as effective habitat loss through avoidance or disturbance.

Effects on avifauna were assessed following guidance in Percival (2007). As outlined previously, key avian receptors have been assigned an evaluation of importance (or sensitivity) for assessment. Following this, the significance of potential effects are rated as a product of both the magnitude of the predicted effect and the importance value (sensitivity) of the key receptor affected, based on the probability of the likely effect occurring.

The construction of the wind farm will result in habitat loss as per Table 10-10.

Table 10-11: Area of Habitat Loss

Habitat Type	Area of Habitat within the Proposed Development Boundary (m^2)	Area of Habitat Loss (m^2)
Improved agricultural grassland (GA1)	849,074.42	99,174.78
Hedgerows (WL1), Treelines (WL2), Stone Walls (BL1)	5,682 m	2,032 m
Scrub (WS1) and Bog woodland (WN7)	128,618.50	71,112.20
Wet grassland (GS4)	56,015.90	4,743.68
Cutover bog (PB4)	195,394.89	32,403.71
Uncut Raised bog (PB1)	28,291.40	304.89
Dry calcareous and neutral grassland (GS1) and Dry calcareous heath (HH2)	125,380.80	46,077.22
Dry Humid-Acid grassland (GS3)	46,159.04	5,703.42
Broadleaved Woodland (WD1)	16,856.85	168.00
Conifer Plantation (WD4) and (Mixed) Conifer Woodland (WD3)	6,742.25	5,432.74
Buildings and other artificial surfaces (BL3)	45,238.32	143.00

Indirect Effects: disturbance and / or displacement

High levels of activity and disturbance during construction may cause birds to vacate territories close to works, especially for species vulnerable to disturbance. The displacement of birds from areas within and surrounding developments can effectively amount to habitat loss (Drewitt, A. L. and Langston, R. H., 2006). If a habitat is therefore avoided as a result of the disturbance, then effective habitat loss can occur. Examples of causes of disturbance during construction which may lead to displacement are vehicle and personnel movements, vibration and noise impacts from the construction process and visual intrusion (Drewitt, A. L. and Langston, R. H., 2006).

Chapter 8 – Noise and Vibration presents the construction noise model for the Proposed Development which assessed all tasks with the potential to generate high noise levels. These tasks included:

- tree felling
- deliveries and/or removal of material to and from site
- preparation of access roads, preparation of hardstands and drainage
- sheet piling along arterial drainage channel CH4/13/7, in Cloonbar Bog
- Installation of turbine and substation foundations (both gravity and piled)
- installation of wind turbines and
- works associated with grid connection.

The construction works on site will be carried out in accordance with the guidance set out in BS 5228:2009+A1:2014.

10.8.2.1 Effects on Key Ornithological Receptors During Construction

The potential effects during the construction stage of the Proposed Development are set out hereunder.

Table 10-12: Potential Construction Effects Key Ornithological Receptors

Key Receptor (Sensitivity)	Direct Effect (Habitat Loss/Alteration)	Indirect Effect (Disturbance/Displacement)
Black-headed Gull (Low)	There were low levels of black-headed gull activity recorded with a total of six records; one in summer 2019, two in winter 2019/20 and three in summer 2024, with numbers ranging from two to six individuals. This species is a coastal breeder a generalist feeder. Although, the habitats present within the redline boundary could support black-headed gull foraging, this species was seen commuting over the site within no evidence of landing or foraging in the site. Therefore, there is no pathway for effects.	Black-headed gull was not a frequent visitor within the study area. There was no evidence of regular use of the site for landing or foraging by this species. Therefore, construction related disturbance is not anticipated to have an effect.
	Significance without Mitigation:	**Significance without Mitigation:**
	No Effect.	***Significance (Percival, 2003):*** The magnitude of the effect is assessed as ***Negligible***. By cross-tabulating ***Low*** sensitivity and Negligible magnitude, a ***Very Low significance*** of effect is predicted. ***Significance (EPA, 2022):*** The proposed impact of disturbance will be a ***Short-term, Imperceptible*** effect.
Buzzard (Medium)	This study area is used frequently by buzzards primarily for foraging and commuting with a total of 115 observations during VP watches while also recorded during every year of breeding raptor surveys. This site provides abundant suitable open foraging habitat (open bog and grasslands) and breeding habitat with mixed broadleaf woodland, conifer plantation and treelines within the site boundary.	There were high levels of buzzard activity throughout the study area primarily for hunting and commuting across a range of habitats. Buzzards are an adaptable species often found in close proximity to humans and are not considered to be sensitive to human disturbance. Excessive disturbance during egg laying and early incubation can cause nest abandonment. The nest location identified during the breeding season is located >1km N outside of the footprint of the Proposed Development and as such will not be affected.

Key Receptor (Sensitivity)	Direct Effect (Habitat Loss/Alteration)	Indirect Effect (Disturbance/Displacement)
	There was evidence of territorial behaviour in the northwest of Cloonteen-Cloonbar-Toberroe cutover complex, Cloonbar-east wetland, and in the improved agricultural grassland (GA1) in mosaic with wet grassland (GS4) below Cloonsheen Shancloon bog and cutover. Furthermore, a nest was confirmed ~420m N of Cloonteen – Cloonbar -Toberroe cutover complex (outside of the Proposed Development noundary), with fledglings recorded in an oak tree in 2020 and 2024. Hunting during both the breeding and non-breeding seasons was widespread across the study area and primarily outside the footprint of works, with no evident pattern of area utililisation. Therefore, no significant effects of direct habitat loss are envisaged.	As such, construction related disturbance is not anticipated to cause a significant effect on buzzards.
	Significance without Mitigation:	**Significance without Mitigation:**
	Significance (Percival, 2003): The magnitude of the effect is assessed as ***Negligible***. By cross-tabulating ***Medium*** sensitivity and ***Negligible*** magnitude, a ***Very Low significance*** of effect is predicted. ***Significance (EPA, 2022):*** The proposed impact of disturbance will be a ***Short-term, Not significant*** effect.	***Significance (Percival, 2003):*** The magnitude of the effect is assessed as ***Negligible***. By cross-tabulating ***Medium*** sensitivity and Negligible magnitude, a ***Very Low significance*** of effect is predicted. ***Significance (EPA, 2022):*** The proposed impact of disturbance will be a ***Short-term, Not significant*** effect.
Common Gull (Low)	There were low levels of common gull activity recorded with a total of five records during VP watches. This species is a coastal breeder a generalist feeder. Although, the habitats present within the redline boundary could support black-headed gull foraging, this species was seen commuting over the site with no evidence of landing or foraging in the site. Therefore, there is no pathway for effects.	Common gull was not a frequent visitor to the lands within the site boundary. There was no evidence of regular use of the site for landing or foraging by this species. Therefore, construction related disturbance is not anticipated to have an effect.

Key Receptor (Sensitivity)	Direct Effect (Habitat Loss/Alteration)	Indirect Effect (Disturbance/Displacement)
	Significance without Mitigation:	**Significance without Mitigation:**
	No effect.	***Significance (Percival, 2003):*** The magnitude of the effect is assessed as ***Negligible***. By cross-tabulating ***Low*** sensitivity and Negligible magnitude, a ***Very Low significance*** of effect is predicted. ***Significance (EPA, 2022):*** The proposed impact of disturbance will be a ***Short-term, Imperceptible*** effect.
Cormorant (Medium)	There were a total of 38 observations during VP watches which were predominantly recorded during non-breeding seasons with just three records from summer 2023/24. Cormorant observations were seen commuting along the Black (Shrule) River and Togher River. Therefore, there is no pathway for effects.	Cormorants were found commuting through the site boundary. Construction related disturbance is therefore not anticipated to have an effect on cormorants that are traversing over the site.
	Significance without Mitigation:	**Significance without Mitigation:**
	No effect.	***Significance (Percival, 2003):*** The magnitude of the effect is assessed as ***Negligible***. By cross-tabulating **Medium** sensitivity and ***Negligible*** magnitude, a ***Very Low significance*** of effect is predicted. ***Significance (EPA, 2022):*** The proposed impact of disturbance will be a ***Short-term, Not significant*** effect.
Curlew (Medium)	Curlew winters in a variety of wetland habitats and nests in pastures, meadows and heather. Curlew activity was low during breeding season where they were primarily seen flying infrequently over wet grassland and agricultural fields scattered across the study area. However, it is thought there was one failed breeding attempt in July 2019 (outside of the Proposed Development boundary).	There were low levels of curlew activity within the study area. The results show one failed breeding attempt in July 2019 but no evidence of breeding has observed thereafter. Curlew instead were seen commuting over the site. Therefore, construction related disturbance is not anticipated to have an effect on curlew.

Key Receptor (Sensitivity)	Direct Effect (Habitat Loss/Alteration)	Indirect Effect (Disturbance/Displacement)
	There was more curlew activity observed during the nonbreeding season, predominantly landing on and commuting over bog habitat in Beagh More Shancloon, associated with the River Black (Shrule)_010. However, the number of observations are not consistent with regular wintering roost behaviour. There is abundant suitable habitat in the surrounding hinterland with records of foraging and roosting on Lough Shore, 3.9km S of redline boundary. As such, there is no pathway for effects.	
	Significance without Mitigation:	**Significance without Mitigation:**
	No effect.	***Significance (Percival, 2003):*** The magnitude of the effect is assessed as ***Negligible.*** By cross-tabulating **Medium** sensitivity and ***Negligible*** magnitude, a ***Very Low significance*** of effect is predicted. ***Significance (EPA, 2022):*** The proposed impact of disturbance will be a ***Short-term, Not significant*** effect.
Golden Plover (Medium)	A total of 48 golden plover observations were recorded during VP watches. Flock size ranged from one to 180 birds with an average flock size of 27 birds. Flight activity was recorded during the non-breeding seasons with higher activity noted over winter 2023-24 compared to winter 2020-21 and winter 2020-19. No golden plover were noted within the study area during the breeding season. Golden Plover breed on open upland habitats (which includes blanket bogs, heather dominated areas and marginal grasslands). The species has a restricted range in Ireland, breeding in upland areas in the north-west.	According to Pearse-Higgins et al. (2012), golden plover is susceptible to disturbance during the construction of windfarms. As mentioned, Cloonbar East Wetland is occupied by golden plover intermittently at numbers ranging from one to 180. The short swathes of grass, provide optimal habitat for winter roosting. Golden plover would therefore be vulnerable to disturbance during the construction works in proximity to the wetland. Having regards to Cutts, et al (2013) a potential disturbance zone of 500m is assumed, which encompasses the Cloonbar East Wetland.

Key Receptor (Sensitivity)	Direct Effect (Habitat Loss/Alteration)	Indirect Effect (Disturbance/Displacement)
	The Cloonbar East Wetland was noted as an area of higher frequency of usage within the study area for wintering golden plover and more recent data from 2023-2024 indicates habitat usage within Beagh More West Cutover and the improved grassland north of this where T5,6,8 and 9 are located. In Cloonbar East Wetland, golden plover flocks with up to 120 individuals were primarily observed circling the wetland. During winter 2023-24, flocks of up to 180 were observed with activity more widespread. Beagh More West cutover bog and the improved grassland north of this are evident as being areas of use. The dense concentration of activity in these areas can be attributed to the habitat consisting of bare ground and low grass swards. According to Parr (1980) and Whittingham et al. (2001), they are known to favour areas of short vegetation (<10 cm), particularly dominated by heather mixed with grasses. The Cloonbar East Wetland and Beagh More West Cutover bog are therefore providing optimal wintering habitat for this species. Other records of golden plover roosting in Cloonteen Cloonbar Toberroe Cutover complex and Cloonsheen Shancloon Bog in raised and cutover bog. These observations were infrequent. The Proposed Development includes the construction of road and turning head within the Cloonbar East Wetland. This will result in minor loss of habitat along the northern boundary of the wetland. Although the majority of golden plover activity was concentrated in the southeast of Cloonbar East Wetland, the potential for the effect of habitat loss cannot be omitted. However, due to the abundant available retained habitat, a significant effect is not anticipated.	

Key Receptor (Sensitivity)	Direct Effect (Habitat Loss/Alteration)	Indirect Effect (Disturbance/Displacement)
	Significance without Mitigation:	**Significance without Mitigation:**
	Significance (Percival, 2003): The magnitude of the effect is assessed as ***Negligible***. By cross-tabulating **Medium** sensitivity and Negligible magnitude, a ***Very Low significance*** of effect is predicted. ***Significance (EPA, 2022):*** The proposed impact of disturbance will be a ***Permanent, Not Significant*** effect.	***Significance (Percival, 2003):*** The magnitude of the effect is assessed as ***Low*** noting golden plover's intermittent use of the site and short-term duration of disturbance during construction. By cross-tabulating ***Medium*** sensitivity and ***Low*** magnitude, a ***Low significance*** of effect is predicted. ***Significance (EPA, 2022):*** The proposed impact of disturbance will be a ***Short-term, Slight, Negative*** effect.
Great Black-backed Gull (Medium)	There were low levels of great black-backed gull activity recorded with a total of seven observations. This species is a coastal breeder a generalist feeder. Although, the habitats present within the redline boundary could support great black-backed gull foraging, this species was predominantly seen commuting over the site within no evidence of landing or foraging in the site. Therefore, there is no pathway for effects.	Great Black-backed gull was not a frequent visitor to the lands within the site boundary, There was no evidence of regular use of the site for landing or foraging by this species. Therefore, construction related disturbance is not anticipated to have an effect.
	Significance without Mitigation:	**Significance without Mitigation**:
	Significance (Percival, 2003): The magnitude of the effect is assessed as ***Negligible***. By cross-tabulating **Medium** sensitivity and Negligible magnitude, a **Very *Low significance*** of effect is predicted. ***Significance (EPA, 2022):*** The proposed impact of disturbance will be a ***Short-term, Not significant*** effect.	***Significance (Percival, 2003):*** The magnitude of the effect is assessed as ***Negligible***. By cross-tabulating **Medium** sensitivity and Negligible magnitude, a **Very *Low significance*** of effect is predicted. ***Significance (EPA, 2022):*** The proposed impact of disturbance will be a ***Short-term, Not significant*** effect.

Key Receptor (Sensitivity)	Direct Effect (Habitat Loss/Alteration)	Indirect Effect (Disturbance/Displacement)
(Greenland) white-fronted goose (Medium)	There is a lack of evidence to suggest Greenland white-fronted goose are regularly wintering within the lands of the site. They are more likely to be regularly wintering in nearby areas with records in the surrounding hinterland at Belclare Lough. Therefore, there is no pathway for effects.	The results indicate no activity within the site boundary of the Proposed Development. Therefore, this species is unlikely to be impacted by disturbance during the construction phase. No significant effects are anticipated.
	Significance without Mitigation:	**Significance without Mitigation:**
	No Effect.	***Significance (Percival, 2003):*** The magnitude of the effect is assessed as ***Negligible***. By cross-tabulating **Medium** sensitivity and Negligible magnitude, a **Very *Low significance*** of effect is predicted. ***Significance (EPA, 2022):*** The proposed impact of disturbance will be a ***Short-term, Not significant*** effect.
Greylag Goose (High)	Greylag Geese were recorded during multiple surveys across the 2019-2020 and 2020-2021 non-breeding seasons. A single greylag goose flock (14 birds) was recorded flying through the 500 m surrounding the turbine locations during the 2020-21 non-breeding season, generating a total of two flight seconds. As such, this species is not considered to be using the habitat within the Proposed development. This species was recorded on five occasions during the 2019-2020 wider area winter waterbird surveys, and on three occasions during the 2020-2021 wider area winter waterbird surveys. Behaviours observed included flying, foraging and loafing. Due to the low number of observations recorded within the Proposed Development and considering no birds were recorded using the habitats associated with the Proposed Development. Therefore, there is no pathway for effects.	Greylag Goose records were associated with wetland habitats within the 2km study area of the Site. No observations for this species were associated with the proposed development lands. Therefore, this species will not be subjected to construction related disturbance and no significant effects are anticipated.

Key Receptor (Sensitivity)	Direct Effect (Habitat Loss/Alteration)	Indirect Effect (Disturbance/Displacement)
	Significance without Mitigation:	**Significance without Mitigation:**
	No effect.	***Significance (Percival, 2003):*** The magnitude of the effect is assessed as ***Negligible***. By cross-tabulating **High** sensitivity and Negligible magnitude, a ***Low significance*** of effect is predicted. ***Significance (EPA, 2022):*** The proposed impact of disturbance will be a ***Short-term, Not significant*** effect.
Hen Harrier (Medium)	During the non-breeding seasons, hen harrier was observed hunting, with activity scattered across the site primarily over bog habitat (Cloonteen Cloonbar Toberrroe, Beagh More West and Cloonsheen Shancloon bog). There were a low number of infrequent records with no evidence of roosting. Additionally, hen harrier are not breeding or using the lands within the site/study area regularly during breeding season, with just one observation recorded. The habitat within the redline boundary is sub-optimal for hen harrier breeding, which preference heather moorland and second rotation conifer. Hen harrier predominantly hunt over moorland but may sometime hunt along the edges of woodland plantations. Although, hunting was recorded within this site, the habitat is suboptimal and only very low levels of hen harrier activity was observed. Therefore, there is no pathway for effects.	The results indicate infrequent hen harrier activity within the study area with limited suitable habitat available. A total of 22 observations of this species were recorded at this site and were not thought to be associated with breeding or winter roosting sites. Therefore, this species is unlikely to be impacted by disturbance during the construction phase.
	Significance without mitigation:	**Significance without mitigation:**
	No effect.	***Significance (Percival, 2003):*** The magnitude of the effect is assessed as ***Negligible***. By cross-tabulating **Medium** sensitivity and *Negligible* magnitude, a ***Very Low significance*** of effect is predicted. ***Significance (EPA, 2022):*** The proposed impact of disturbance will be a ***Short-term, Not significant*** effect

Key Receptor (Sensitivity)	Direct Effect (Habitat Loss/Alteration)	Indirect Effect (Disturbance/Displacement)
Herring Gull (Low)	There was a total of 22 observations across the three year survey period. This species is a coastal breeder a generalist feeder. During the first two years of survey this species was predominantly seen commuting over the site within no evidence of landing or foraging in the site. In the non-breeding 2023-24 season, there was an increase in circling and landing activity within the wet grassland (GS4) south of Clonsheen Shancloon Bog and cutover. This species is likely using this improved agricultural grassland (GA1) in mosaic with wet grassland (GS4) in the west of the site, where turbines T2, T3 and T4, Construction Compound # 2, and the meteorological mast are located. Therefore, there is potential for temporary disturbance from this foraging habitat for this species. However, considering the generalist nature of this species and abundance of retained available habitats within the site and in the wider area, there is no pathway for effects.	There is an increasing volume of activity recorded within improved agricultural grassland (GA1) in mosaic with wet grassland (GS4) in the west of the site, where turbines T2, T3 and T4, Construction Compound # 2, and the meteorological mast are located. Therefore, there is potential for construction related disturbance this species.
	Significance without mitigation:	**Significance without mitigation:**
	No effect.	***Significance (Percival, 2003):*** The magnitude of the effect is assessed as ***Negligible.*** By cross-tabulating ***Low*** sensitivity and ***Negligible*** magnitude, a ***Very Low significance*** of effect is predicted. ***Significance (EPA, 2022):*** The proposed impact of disturbance will be a ***Short-term, Imperceptible*** effect.
Kestrel (Low)	There was abundant kestrel activity recorded during breeding season, primarily associated with bog habitat within the Cloonsheen-Shancloon bog and cutover complex. Habitat availability within 2 km of the turbine locations of the Proposed Development was considered potentially suitable for breeding kestrel. A pair was recorded displaying in May 2024 to the south-west of the 500 m surrounding the turbine locations.	There was abundant kestrel activity recorded during breeding season, primarily associated with bog habitat within the Cloonsheen-Shancloon bog and cutover complex. There is potential for disturbance to kestrel from this area during construction. Habitat availability within 2 km of the turbine locations of the Proposed Development was considered potentially suitable for breeding kestrel, however no nest site was observed during field survey.

Key Receptor (Sensitivity)	Direct Effect (Habitat Loss/Alteration)	Indirect Effect (Disturbance/Displacement)
	During the breeding raptor surveys of 2024, records indicate that kestrel held a breeding territory within the west of the breeding raptor survey area. However, a confirmed nest site was not identified. During the non-breeding season, kestrel activity was more widespread across the study area. This species was primarily flying, commuting and hunting over bog habitat in the non-breeding season, dispersed across the study area. The Proposed Development will involve minor loss of cutover bog habitat in the locations of T1, T5, T7, T10 and T11, which is a habitat used for hunting by Kestrel. However, a significant loss of habitat will not occur given that the design of the wind farm is such that it avoids the key areas of Kestrel activity at the Clonsheen - Shancloon Bog.	
	Significance without Mitigation: ***Significance (Percival, 2003):*** The magnitude of the effect is assessed as ***Negligible***. By cross-tabulating ***Low*** sensitivity and Negligible magnitude, a ***Very Low significance*** of effect is predicted. ***Significance (EPA, 2022):*** The proposed impact of habitat loss will be a ***Short-term, Imperceptible*** effect.	**Significance without Mitigation:** ***Significance (Percival, 2003):*** The magnitude of the effect is assessed as ***Medium*** given the associated habitat usage by kestrel with Clonsheen - Shancloon Bog complex during breeding season***.*** By cross-tabulating ***Low*** sensitivity and Medium magnitude, a ***Very Low significance*** of effect is predicted. ***Significance (EPA, 2022):*** The proposed impact of disturbance will be a ***Short-term, Moderate, Negative*** effect.
Kingfisher (Medium)	Kingfisher were detected within the study area. Three observations were made to the north of the proposed development site outside 500 m of the turbine locations along the Black (Shrule) River, and the second recorded one individual flying within the south of the 500 m surrounding turbine locations along the Togher River. The watercourses within the study area are used by kingfisher. However, there is no suitable nesting habitat within a 500m	There is only evidence of commuting kingfisher within 500m of the proposed bridge crossing as there are no vertical nest banks present. Additionally, there was only one observation of kingfisher in this area throughout the two year survey period. It is not a regularly utilized commuting corridor. Therefore, construction related disturbance is not anticipated to have an effect.

Key Receptor (Sensitivity)	Direct Effect (Habitat Loss/Alteration)	Indirect Effect (Disturbance/Displacement)
	if the turbine locations. Therefore, there is no pathway for effects.	
	Significance without Mitigation:	**Significance without Mitigation:**
	No effect.	***Significance (Percival, 2003):*** The magnitude of the effect is assessed as ***Negligible.*** By cross-tabulating ***Medium*** sensitivity and ***Negligible*** magnitude, a ***Very Low significance*** of effect is predicted. ***Significance (EPA, 2022):*** The proposed impact of disturbance will be a ***Short-term, Not significant*** effect.
Lapwing (Low)	Lapwing was only recorded during the non- breeding season and observations were infrequent. This species was primarily seen flying over and commuting over Cloonsheen Shancloon bog cutover, Beagh More Turlough and Beagh More Shancloon wetland and cutover with two records of landing in the latter. Lands within site boundary are not used regularly by lapwing. This species is most likely commuting between agricultural fields and wetlands in wider hinterland with records of roosting at Shrule Turlough (~4.7km N) and Hackett Lough (~3km S). Therefore, there is no pathway for effects.	The lands within the site boundary are not utilized regularly by lapwing despite suitable habitat present. This species was recorded primarily in the western section of the site where it was seen commuting likely between agricultural fields and wetlands in the wider area. Therefore, construction related disturbance is not anticipated to cause significant effects to lapwing.
	Significance without Mitigation:	**Significance without Mitigation:**
	No effect.	***Significance (Percival, 2003):*** The magnitude of the effect is assessed as ***Negligible .*** By cross-tabulating ***Low*** sensitivity and ***Low*** magnitude, a ***Very Low significance*** of effect is predicted. ***Significance (EPA, 2022):*** The proposed impact of disturbance will be a ***Short-term Imperceptible*** effect.

Key Receptor (Sensitivity)	Direct Effect (Habitat Loss/Alteration)	Indirect Effect (Disturbance/Displacement)
Lesser Black-backed gull (Low)	Lesser black-backed gulls were frequently seen flying/commuting over the site. Activity was concentrated over Improved agricultural grassland (GA1) in mosaic with wet grassland (GS4), in between Cloonsheen Shancloon bog and cutover, Beagh More Shancloon wetland and cutover and Beagh More west cutover where they were predominantly recorded foraging and commuting. There was no evidence of regular habitat use during the non-breeding season, with infrequent activity recorded. This species is a coastal breeder and a generalist feeder. The high frequency of activity during summer season is indicative of breeding in the wider area, along the west coast. The habitats present within the redline boundary would support lesser black-backed foraging. The turbines within the west of the Site (T2, T3 and T4), Construction Compound # 2, and the meteorological mast are located within improved grassland in mosaic with wet grassland area in use by lesser black-backed gulls during breeding season as discussed above. Therefore, there is potential for a loss of this foraging habitat for this species. However, considering the generalist nature of this species and abundance of retaining available habitats within the site and in the wider area, a significant effect is not anticipated.	As discussed, there is a high level of activity over Improved agricultural grassland (GA1) in mosaic with wet grassland (GS4) in the west of the site, where turbines T2, T3 and T4, Construction Compound # 2, and the meteorological mast are located. Therefore, there is potential for construction related disturbance to this species.
	Significance without mitigation: ***Significance (Percival, 2003):*** The magnitude of the effect is assessed as ***Negligble.*** By cross-tabulating ***Low*** sensitivity and Low magnitude, a ***Very Low significance*** of effect is predicted. ***Significance (EPA, 2022):*** The proposed impact of disturbance will be a ***Permanent, Imperceptible*** effect.	**Significance without mitigation:** ***Significance (Percival, 2003):*** The magnitude of the effect is assessed as ***Low.*** By cross-tabulating ***Low*** sensitivity and Low magnitude, a ***Very Low significance*** of effect is predicted. ***Significance (EPA, 2022):*** The proposed impact of disturbance will be a ***Short-term, Slight, Negative*** effect.

Key Receptor (Sensitivity)	Direct Effect (Habitat Loss/Alteration)	Indirect Effect (Disturbance/Displacement)
Little Egret (High)	Recorded during non-breeding season across all three survey years. Little egrets winter on a variety of wetland habitats primarily lakes, riverbanks, lagoons and coastal estuaries. Little egrets were observed on just five occasions and always in flight/commuting. The infrequency of activity within the site boundary indicates that this species is not utilising the site regularly. Therefore, there is no pathway for effects.	Little egret activity was low and infrequent within the lands of the site boundary. This species is not regularly utilizing the site with a total of five observations recorded across the three year survey period. Therefore, this species will not be affected by construction related disturbance.
	Significance without mitigation:	**Significance without mitigation:**
	No effect.	***Significance (Percival, 2003):*** The magnitude of the effect is assessed as ***Negligible.*** By cross-tabulating ***High*** sensitivity and ***Negligible*** magnitude, a ***Very Low significance*** of effect is predicted. ***Significance (EPA, 2022):*** The proposed impact of disturbance will be a ***Short-term, Not significant*** effect.
Mallard (Medium)	There was a high amount of mallard activity recorded across the three-year period, with a total of 102 observation recorded. There was a high concentration of mallard activity in the west of Cloonclasha Beagh More Cutover complex. Mallard were seen flying/ circling and landing in this area along with one record of drumming. The bog habitat within this area is evidently in regular use by this species. Other observations of mallard were primarily associated with bog pools and along river networks. This area is outside the footprint of the Proposed Development. During breeding 2024, activity was mainly recorded along the River Black (Shrule)_010 between Cloonsheen Shancloon bog and cutover and Individuals landed along this route, particularly in Beagh More Shancloon wetland and cutover but no evidence of regular roosting was observed.	There is potential for construction related disturbance to impact mallard activity discussed previously in the north of Cloonclasha Beagh More Cutover Complex, Cloonbar East wetland and Cloonsheen Shancloon bog and cutover during the breeding season. Although this species is known to be highly adaptable and tolerant of predictable human disturbance, activity lies within the 500m of T2,3,7 and 11 and therefore, the potential for effect during breeding season cannot be omitted.

Key Receptor (Sensitivity)	Direct Effect (Habitat Loss/Alteration)	Indirect Effect (Disturbance/Displacement)
	In March 2024, there was one record of display behaviour within the southeast of Cloonbar East wetland. The Proposed Development includes the construction of road and turning head within the Cloonbar East Wetland. This will result in minor loss of habitat along the northern boundary of the wetland. However, considering the March 2024 observation was recorded outside the Proposed development (ie. southeast of Cloonbar) and due to the infrequency of similar observations indicative of breeding, a significant effect is not anticipated This species was found roosting and foraging in the surrounding hinterland at Shrule Turlough (~4.7km N) and Hackett Lough (~3km S).	
	Significance without mitigation:	**Significance without mitigation:**
	Significance (Percival, 2003): The magnitude of the effect is assessed as ***Negligible.*** By cross-tabulating ***Medium*** sensitivity and ***Negligible*** magnitude, a ***Very Low*** significance of effect is predicted. ***Significance (EPA, 2022)*** The proposed impact of habitat loss will be a ***Short-term***, ***Not significant*** effect.	***Significance (Percival, 2003):*** The magnitude of the effect is assessed as ***Low.*** By cross-tabulating ***Medium*** sensitivity and ***Low*** magnitude, a ***Low significance*** of effect is predicted. ***Significance (EPA, 2022):*** The proposed impact of disturbance will be a ***Short-term, Slight, Negative*** effect.
Merlin (Medium)	A total of 17 observations were recorded across the three year period. There were more records in 2023/24 non-breeding season compared with previous years (seven total). Overall observations were more frequent during nonbreeding season with a total of 15 records noted during winter seasons. Hunting was recorded in bog habitat scattered across the study area. There was a small concentration of activity within Cloonclasha Beagh More Cutover Complex but observations were infrequent. Notwithstanding this, Cloonclashsa Beagh More Cutover Complex is outside the Proposed Development.	There is potential for construction related disturbance to impact non-breeding hunting merlin activity concentrated in the north of Cloonclasha Beagh More Cutover Complex. There is some evidence to suggest that merlin have a medium sensitivity to human disturbance during breeding season (Goodship & Furness, 2022). As such and considering hunting activity lies within the 500m of T2,3,7 and 11 the potential for effect during non-breeding season cannot be omitted.

Key Receptor (Sensitivity)	Direct Effect (Habitat Loss/Alteration)	Indirect Effect (Disturbance/Displacement)
	Therefore, there is no pathway for effects.	
	Significance without Mitigation:	**Significance without Mitigation:**
	No Effect.	***Significance (Percival, 2003):*** The magnitude of the effect is assessed as ***Low.*** By cross-tabulating ***Medium*** sensitivity and ***Low*** magnitude, a ***Low significance*** of effect is predicted. ***Significance (EPA, 2022):*** The proposed impact of disturbance will be a ***Short-term, Slight, Negative*** effect.
Mute Swan (Medium)	Observations were infrequent during VP watches with a total of eight records during breeding and non-breeding seasons. Predominantly the results show that this species was flying during every observation and did not land within the site. However, during breeding bird walkover 2020 surveys, a pair was observed incubating a nest along the Black (Shrule) River. There are however no works proposed in this location. Therefore, there is no pathway for effects.	Mute swan activity was low and infrequent within the lands of the site boundary. This species is not regularly utilizing the site with a total of eight observations recorded across the three year survey period, in which they were seen flying over. Therefore, significant effects due to disturbance on this species are not anticipated.
	Significance without Mitigation:	**Significance without Mitigation:**
	No Effect.	***Significance (Percival, 2003):*** The magnitude of the effect is assessed as ***Negligible.*** By cross-tabulating ***Medium*** sensitivity and ***Negligible*** magnitude, a ***Low significance*** of effect is predicted. ***Significance (EPA, 2022):*** The proposed impact of disturbance will be a ***Short-term, Not significant*** effect.
Peregrine (Medium)	Peregrine was recorded primarily during the non-breeding season with a total of nine observations primarily seen hunting. Two records were made during breeding season when peregrine were seen commuting and travelling. The infrequency of peregrine observations indicates that this site is not of particular importance to this species.	There were low levels of peregrine flight activity within and adjacent to the site boundary. The habitats present, are not preferred by this species. Additionally, peregrines have been found to become habituated to various sources of human disturbance with many records of nesting in active quarries and urban environments.

Key Receptor (Sensitivity)	Direct Effect (Habitat Loss/Alteration)	Indirect Effect (Disturbance/Displacement)
	The habitat found within the site is not optimal for this species, that prefer to breed on mountain cliffs and are often found wintering on estuaries. Therefore, there is no pathway for effects.	Therefore, this species is unlikely to be affected by construction related disturbance and significant effects due to disturbance on this species are not anticipated.
	Significance without mitigation:	**Significance without mitigation:**
	No effect.	***Significance (Percival, 2003):*** The magnitude of the effect is assessed as ***Negligible.*** By cross-tabulating ***Medium*** sensitivity and ***Negligible*** magnitude, a ***Very Low significance*** of effect is predicted. ***Significance (EPA, 2022):*** The proposed impact of disturbance will be a ***Short-term, Not significant*** effect.
Shoveler (High)	This species was predominantly found roosting and foraging in the turloughs within the wider environment. Only one record occurred within the Proposed Development. Given the low level of activity within the footprint of the works, there is no pathway for effects.	There is no evidence of regular use of habitat within the footprint of the Proposed Development. Therefore, no significant effect is anticipated.
	Significance without mitigation:	**Significance without mitigation**:
	No effect.	***Significance (Percival, 2003):*** The magnitude of the effect is assessed as ***Negligible.*** By cross-tabulating ***High*** sensitivity and ***Negligible*** magnitude, a ***Low significance*** of effect is predicted. ***Significance (EPA, 2022):*** The proposed impact of disturbance will be a ***Short-term, Not significant*** effect.
Snipe (Medium)	Snipe were predominantly observed across the study area during the non-breeding season. There was concentration of wintering activity in the north of Cloonclasha-Beagh More cutover complex. along with Cloonteen- Cloonbar-Toberroe cutover complex, Cloonsheen-Shancloon bog and cutover and north of Beagh More Shancloon wetland and cutover.	This species is known to be susceptible to disturbance with evidence of snipe population density reducing during the construction of windfarm (Pearse-Higgins et al., 2012). Snipe activity is concentrated in Cloonclasha-Beagh More cutover complex. Given the scale of works and as shown in Figure 10-1, noise sheet piling has a small ZoI relative to the snipe activity in this area.

Key Receptor (Sensitivity)	Direct Effect (Habitat Loss/Alteration)	Indirect Effect (Disturbance/Displacement)
	Snipe were observed flying over and landing in bog throughout these areas, congruent with winter roosting behavior. Although snipe were observed less frequently during the breeding season, there was evidence of holding breeding territory with drumming activity recorded, in the north of Cloonclasha-Beagh More cutover complex, Cloonteen- Cloonbar-Toberroe and Cloonsheen-Shancloon bog. Snipe were also recorded chipping and drumming from wet grassland habitats along the margins of the Black (Shrule) River, and its tributaries, to the north and south-west of the 500 m surrounding the turbine locations. These areas are outside the footprint of the Proposed Development and there is no pathway for effects.	Notwithstanding this, the potential for disturbance cannot be omitted.
	Significance without mitigation:	**Significance without mitigation:**
	No Effect.	***Significance (Percival, 2003):*** The magnitude of the effect is assessed as ***Low*** given breeding territory present***.*** By cross-tabulating ***Medium*** sensitivity and ***Low*** magnitude, a ***Low significance*** of effect is predicted. ***Significance (EPA, 2022):*** The proposed impact of disturbance will be a ***Short-term, Slight, Negative*** effect.
Sparrowhawk (Low)	During breeding season, sparrowhawk activity (72 flightlines) was spread across the study area, primarily seen hunting along the edge of bog habitat. The southeast edge of Cloonsheen-Shancloon bog and cutover and agricultural grassland below and the northwest of Cloonteen-Cloonbar -Toberroe appear to be most regularly used by these species with evidence of breeding/territorial behaviour and hunting observed in these areas. Territorial behaviour was recorded on a total of seven occasions, five of which were in April 2019 in the areas mentioned above. Three confirmed territories were identified.	The lands within the site boundary are being utilized regularly by sparrowhawk primarily for hunting with some evidence of probable breeding. There is potential for construction activities to disturb this species within the site boundary. However, sparrowhawks are adaptable and can live in close proximity to human disturbance. What's more, sparrowhawk commonly breed in conifer plantations which are not rare in the wider area or unique to this site. Significant effects are therefore not anticipated.

Key Receptor (Sensitivity)	Direct Effect (Habitat Loss/Alteration)	Indirect Effect (Disturbance/Displacement)
	During non-breeding season, sparrowhawk was observed hunting primarily over bog habitat. Activity was scattered across the study area with some concentration in the NW of Cloonteen Cloonbar Toberroe cutover complex but no clear pattern was evident.	
	Significance without mitigation:	**Significance without mitigation:**
	Significance (Percival, 2003): The magnitude of the effect is assessed as ***Low.*** By cross-tabulating Low sensitivity and ***Low*** magnitude, a ***Low significance*** of effect is predicted. ***Significance (EPA, 2022):*** The proposed impact of disturbance will be a ***Permanent, Slight Negative*** effect.	***Significance (Percival, 2003):*** The magnitude of the effect is assessed as ***Low.*** By cross-tabulating Low sensitivity and ***Low*** magnitude, a ***Low significance*** of effect is predicted. ***Significance (EPA, 2022):*** The proposed impact of disturbance will be a ***Short-term, Slight, Negative*** effect.
Teal (High)	This species was recorded across the 2019-2020, 2020-2021 and 2023-2024 non-breeding seasons throughout a variety of surveys. These records were primarily outside the footprint of the Proposed Development in association with the River Shrule south of turbine 4. There is no pathway for effects.	Although, this species was not recorded frequently within the footprint of works, there were regular observations during non-breeding along the River Shrule ~470m south of turbine 4. Flocks of up to 72 individuals were observe. Therefore, the potential for disturbance to teal due to construction works cannot be omitted.
	Significance without mitigation:	**Significance without mitigation:**
	No Effect.	***Significance (Percival, 2003):*** The magnitude of the effect is assessed as ***Negligible.*** By cross-tabulating ***High*** sensitivity and Low magnitude, **a Low *significance*** of effect is predicted. ***Significance (EPA, 2022):*** The proposed impact of disturbance will be a ***Short-term, Slight, Negative*** effect.

Key Receptor (Sensitivity)	Direct Effect (Habitat Loss/Alteration)	Indirect Effect (Disturbance/Displacement)
Whooper Swan (High)	Whooper swan was only recorded during the non-breeding season with a total of 27 records across the three years survey period. This species was commuting or travelling across the site. Flight activity was sporadic with no evident pattern that would suggest regular use of the site for wintering or as a regular migratory/commuting route. Although there is suitable wintering habitat for whooper swan within the site, such as open farmland and wetlands, it does not appear to be in regular use by this species.. Whooper swan does appear to be using lands south of the site more regularly (~1.5-2km S including Beagh More Turlough). Therefore, there is no pathway for effects.	The sporadic records of whooper swan at this site indicate that it is not regularly used by this species despite suitable wintering habitat present. However, given the infrequency and low number of observations at this site, significant effect due to disturbance is not anticipated.
	Significance without Mitigation:	**Significance without Mitigation:**
	No effect.	***Significance (Percival, 2003):*** The magnitude of the effect is assessed as ***Negligible.*** By cross-tabulating ***High*** sensitivity and ***Negligible*** magnitude, a ***Very Low significance*** of effect is predicted. ***Significance (EPA, 2022):*** The proposed impact of disturbance will be a ***Short-term, Not Significant*** effect.
Whimbrel (Medium)	Recorded during late April/early May indicating that this species migrates over the site during spring migration. Whimbrel are spring passage migrants in Ireland. Therefore, there is no pathway for effects.	Whimbrel activity was low and infrequent within the lands of the site boundary. This species is a passage migrant not regularly utilizing the site, with a total of five observations recorded across the two year survey period. Therefore, significant effect due to disturbance is not anticipated.
	Significance without Mitigation:	**Significance without Mitigation:**
	No effect.	***Significance (Percival, 2003):*** The magnitude of the effect is assessed as ***Negligible.*** By cross-tabulating ***Medium*** sensitivity and ***Negligible*** magnitude, a ***Very Low significance*** of effect is predicted.

Key Receptor (Sensitivity)	Direct Effect (Habitat Loss/Alteration)	Indirect Effect (Disturbance/Displacement)
		Significance (EPA, 2022): The proposed impact of disturbance will be a ***Short-term, Not significant*** effect.
Wigeon **(Medium)**	Wigeon were recorded infrequently within the non-breeding season across the three years survey period. These observations were associated with the Togher River, a tributary of the Black (Shrule) River and not recorded within the footprint of works. Therefore, there is no pathway for effects.	Given the absence of wigeon from the footprint of the Proposed Development and overall low level of activity, no significant effect of disturbance is anticipated.
	Significance without Mitigation:	**Significance without Mitigation:**
	No effect.	***Significance (Percival, 2003):*** The magnitude of the effect is assessed as ***Negligible.*** By cross-tabulating ***Medium*** sensitivity and ***Negligible*** magnitude, a ***Very Low significance*** of effect is predicted. ***Significance (EPA, 2022):*** The proposed impact of disturbance will be a ***Short-term, Not significant*** effect.
Woodcock **(Low)**	Following the 2019 dusk surveys for woodcock, along with the results of the desk study, it was determined that there was no potential for breeding woodcock to occur within 500 m of the turbine locations and targeted woodcock surveys were not deemed necessary during the 2020 and 2024 breeding season surveys. Despite abundant suitable breeding and wintering habitat (e.g. woodland, scrub), there were infrequent and low number of observations woodcock across the three year survey period. This species was flying on both occasions. The lands within the site boundary are not evidently in regular use by woodcock. Therefore, there is no pathway for effects.	Woodcock do not appear to utilize the lands withing the site boundary regularly with very low levels of activity recorded (two observations). Therefore, significant effect due to disturbance is not anticipated.

Key Receptor (Sensitivity)	Direct Effect (Habitat Loss/Alteration)	Indirect Effect (Disturbance/Displacement)
	Significance without Mitigation:	**Significance without Mitigation:**
	No effect.	***Significance (Percival, 2003):*** The magnitude of the effect is assessed as ***Negligible.*** By cross-tabulating ***Low*** sensitivity and ***Negligible*** magnitude, a ***Very Low significance*** of effect is predicted. ***Significance (EPA, 2022):*** The proposed impact of disturbance will be a ***Short-term, Imperceptible*** effect.

Passerines/Non-target Species

The loss of habitat due to the construction of the Proposed Development has the potential to affect some passerines. This can result in reduced feeding and nesting opportunities for birds.

The field survey results recorded one red-listed passerine species; meadow pipit, the most abundant and widespread passerine species recorded during the survey period with confirmed breeding recorded within 500m of the turbine locations within open bog and grassland habitat. A total of nine amber-listed passerine species were recorded; goldcrest, greenfinch, house sparrow, linnet, skylark, willow warbler, spotted flycatcher, sand martin and swallow. These were all considered to be breeding within 500m of the turbine layout in scrub, woodland, forestry, grassland, bog habitats and peat banks. Habitat loss to these species is predicted to be minor and significant effects are not anticipated.

10.8.3 Potential Effects on Key Receptors during the Operational Phase

10.8.3.1 Direct Effects: Collision Risk

Studies on operational impacts of wind farms (Pearce-Higgins et al., 2009) show that certain species exhibit levels of turbine avoidance during operational phases which may be extrapolated to reductions in breeding bird densities; however, this may not be as significant as previously thought, certainly in comparison to impacts during construction (Pearce-Higgins et al., 2012). It seems that there is little evidence for consistent post-construction population declines in any species, suggesting for the first time that wind farm construction can have greater effects on birds than wind farm operation; this is supported in the literature (Devereux et al., 2008).

A recent study on the effects of wind turbines on the distribution of wintering farmland birds (Devereux et al., 2008) did not find any consistent patterns of turbine avoidance across the species groups studied (corvids, seed-eaters, gamebirds, and skylark).

The primary cause of direct effects on birds during the operational phase of a development is collision risk. Collision risk behavioural observations of birds in relation to operational wind farms provide the basis of studies on collision risk. Fixed point observations of flight behaviour, flight lines into, through and out of the area and information about the birds' use of the area help to inform the environmental evaluation of the Proposed Development. Bird mortality may result from potential bird collision with turbine structures or turbine blades.

Not all bird species are equally susceptible to collision, and some species suffer proportionately high levels of collision mortality (Drewitt and Langston, 2008). Morphology, physical flight characteristics and differences in vision are all influencing factors. Martin and Shaw (2010) suggest that it is the characteristics of the section of a birds visual field that projects forward and hence 'looks' that are the key factors.

In some species the vertical extent of the forward binocular vision is reduced and therefore the bird is rendered blind, if, whilst in the process of flying, it undertakes behaviour such as the detection of conspecifics, remote food sources, etc. (Martin, 2011 and Martin and Shaw, 2010).

Other species have reduced fovea, are emmetropic (default focus is distant) or may contain blind spots in their field of vision (as an evolutionary trait) which may cause susceptibility to collision. Flight height or the flight heights which birds habitually use along either migration or local flight paths is also an influencing factor. Relative size and high wing loading (or low manoeuvrability) are influencing factors as larger birds with poor manoeuvrability are generally perceived as at greater risk of collision with structures (see Brown et al., 1992, quoted in Drewitt and Langston, 2006). Various species therefore exhibit different morphological and behavioural attributes which may contribute to collision risk.

Recent studies show that modern, larger multi-MW turbines show comparable fatality estimates with older generation models and expected increases in fatalities due to increases in rotor surface are not as expected, possibly due to increased altitude, increased distance between turbines and slower rotation speeds (Krijgsveld et al., 2009).Three turbine models have been specified for use in the proposed development: the Vestas V150 5.6 MW (V150), Nordex 149 5.7 MW (N149), and Siemens Gamesa 155 (SG155). The model has been run for each turbine model. The collision risk zone (CRZ, defined as the height between the minimum and maximum swept height of the turbine rotor within a 500 m of turbines) is 25-180 m for the SG155, 30 – 179 for the N149, and 30-180 for the V150 model (see Chapter 2 Description of Development).

Relatively little is known about collision as a threat to birds. One problem is that most studies rely on the number of corpses found, but this can be extremely unreliable, since it is known that corpses are quickly removed by predators. At a wind farm site in Co. Tipperary in 2011, it was found that 72% of bird corpses left out were removed after five days. At this site in Co. Tipperary in 2012, scavengers were present at a bird corpse within forty-five minutes of it being placed in the vicinity of a turbine (J. Kearney principal ecologist FT, per. comm. 2022).

The colour, mode, intensity, and density of lighting has been shown to influence the degree to which birds (specifically, nocturnally migrating passerines) are attracted to wind turbines at night. Studies have shown that red lighting is more attractive to birds, and that steady burning lights are more attractive than flashing ones, while structures with no lighting were the least attractive (Kerlinger et al., 2010; Gehring et al., 2009). The directional intensity of lighting is also a factor in reducing the attraction of birds. As such, specification of aviation obstruction lighting to minimise effects on birds is included under operational mitigation measures.

Collision Risk Model Analysis

The Collision Risk Model Report (See Appendix 10.1, and Appendix XIII thereof) presents the results of collision risk modelling for the proposed Shancloon Wind Farm, Co. Galway. Flightline data for selected target species were collected from five VPs between April 2019 and September 2024. The survey covered three breeding bird seasons and three non-breeding seasons of VP watches. This amounted to 1,085 hours of VP watch data.

The modelling was carried out using the Scottish Natural Heritage Collision Risk Model (Scottish Natural Heritage, 2000; Band et al., 2007, Band, 2012, and Band, 2024). The new guidance published by Scottish Natural Heritage (SNH) (2007, 2014, 2024) was used, which aims to promote a standardised approach to collision risk assessment for onshore wind farms, to increase the transparency of calculations and to promote greater confidence in the results.

The bird occupancy method (Scottish Natural Heritage, 2000) was used to calculate the number of bird transits through the rotors, and the spreadsheet accompanying the Scottish Natural Heritage report was used to calculate collision probabilities for birds transiting through the rotors.

Three turbine models have been subjected to CRM assessment which align to the Design Flexibility opinion from An Bord Pleanála: the Vestas V150 5.6 MW (V150), Nordex 149 5.7 MW (N149), and Siemens Gamesa 155 (SG155) as detailed in Appendix 10.1 of Volume III. The collision risk zone (CRZ, defined as the height between the minimum and maximum swept height of the turbine rotor within a 500 m of turbines) is 25-180 m for the SG155, 30 – 179 for the N149, and 30-180 for the V150 model.

The following target species were recorded during vantage point surveys: black-headed gull, buzzard, common gull, common sandpiper, cormorant, crane, curlew, golden plover, great black-backed gull, greenshank, grey heron, greylag goose, gyr falcon, hen harrier, herring gull, jack snipe, kestrel, lapwing, lesser black-backed gull, little egret, mallard, merlin, mute swan, peregrine, snipe, sparrowhawk, teal, whimbrel, whooper swan, and woodcock.

Based on professional judgement, Collision Risk Modelling (CRM) was run for target species with a total aggregate flight time (i.e., number of individuals x flight time) of > 400 seconds occurring within the potential CRZ over the three years (i.e. at collision risk height and within the turbine envelope = 500 m of the turbine locations), and with more than 3 observations over the study period. In consideration of this, a total of 14 species were selected for collision risk modelling, namely buzzard, cormorant, curlew, golden plover, great black-backed gull, herring gull, kestrel, lapwing, lesser black-backed gull, mallard, snipe, sparrowhawk, whimbrel and whooper swan.

As the proposed grid connection will be buried underground there is no resultant collision risk associated with this element of the Proposed Development.

Passerines

Collision by resident passerines is not considered likely to be a significant issue as their flight activity is generally well below the height of rotor blades and the proposed impact of collision risk will be a Long-term Imperceptible Reversible Effect.

Non-Passerines

Potential collision risk to non-passerine target species is outlined in Table 10-12 below and presents the collision risk as a range relative to the turbine models modelled in the CRM. The assessment of effects combining magnitude and sensitivity to assess significance (Percival, 2003) has determined that the proposed Shancloon Wind Farm will not have a significant effects on the local, County or National populations of non-passerine bird species with effects determined as ranging from ***Long-term Slight Negative*** to ***Long-term Imperceptible***.

10.8.3.2 Indirect Effects: Disturbance and Displacement

There is evidence that the rotor blades of wind turbines during operation can displace or exclude some species, which effectively results in habitat loss for these birds. Habitat loss can be direct through land take of breeding or foraging habitats for key species or indirect such as effective habitat loss through avoidance or disturbance due to factors such as perceived collision risk. Birds may therefore avoid areas proximal to turbines until habituation takes place. There are examples in the literature of habituation in species such as geese and swans (see Fijn et al., 2012 and Madsen and Boertmann, 2008).

Available evidence suggests that breeding passerines are not adversely affected by the presence of wind turbines, and for this reason they are omitted from Table 10-7. For example, a German study found no effect on numbers or spatial distribution of skylarks within 1km of turbines (Langston and Pullan, 2004).

Whitfield and Madders (2006), suggest that most studies do not detect any significant displacement of raptor species by wind turbines although there are occasional notable exceptions.

10.8.3.3 Indirect Effects: Barrier Effect

One of the potential operational effects of wind farms is avoidance where the wind farm may act as a barrier to movements (Masden et al., 2009). The effect of birds altering their migration flyways or local flight paths to avoid any infrastructure is a form of displacement (Drewitt and Langston, 2006). The primary effect of barrier effect is increased energy expenditure when birds have to fly further to circumvent an obstacle.

Effects can be highly variable and range from slight 'checks' in-flight direction, height, or speed, through to larger diversions around objects. Studies have shown that birds on migration may show avoidance of wind farms (Masden, 2009) but the observed distances involved were trivial in regard to total migration distances, and hence energy expenditure.

In relation to nocturnal flight activity recent studies utilising radar on both offshore and coastal wind farms in Europe have recorded macro-avoidance rates in wildfowl at least as high, or higher at night than during the day, implying that diurnal avoidance rates are comparable to those in periods of lower visibility (Desholm, and Kahlert, 2005). In the same study migrating flocks at night were recorded increasing their distance from individual turbines once inside the wind farm and also travelling in the corridors between turbines (Desholm, and Kahlert, 2005).

Potential disturbance and barrier effects due to the operation of the proposed wind farm are outlined in Table 10-12.

Table 10-13: Potential Operational Effects to non-passerine target species

Key Receptor (Sensitivity)	Direct Effect (Collision Risk)	Indirect Effect (Barrier Effect/Displacement)
Black-headed Gull (Low)	No collision risk due to absence of records within potential collision height (PCH).	***Displacement Effect:*** There were low levels of black-headed gull activity recorded with a total of six records; one in summer 2019, two in winter 2019/20 and three in summer 2024, with numbers ranging from two to six individuals. This species was not recorded using the habitats within or immediately adjacent to the Proposed Development.

Key Receptor (Sensitivity)	Direct Effect (Collision Risk)	Indirect Effect (Barrier Effect/Displacement)
		Additionally, the surrounding environment comprises suitable roosting and foraging habitats. As such, in the event of displacement, there are extensive areas of suitable habitat for this species. No significant effects of displacement are envisaged. ***Barrier Effect:*** There is no evidence of a significant commuting or migratory path over the lands within the site boundary, with only a total of six observations across the entire survey period. Therefore, barrier effect is not anticipated.
	Significance without Mitigation:	**Significance without Mitigation:**
	Not Applicable.	***Significance (Percival, 2003)*** The magnitude of the effect is assessed as ***Negligible***. By cross-tabulating ***Low*** sensitivity and ***Negligible*** magnitude, a ***Very Low significance*** of effect is predicted. ***Significance (EPA, 2022)*** The proposed impact of displacement/barrier effect will be a ***Long-term, Not significant*** effect.
Buzzard (Medium)	A total of 27 buzzard fatalities have been recorded within the European Context, in a review of 46 wind farms up to 2004 (Hoetker et al., 2006). However, this number is low in relation to the estimated European population of up to one million pairs (Gensbol, 2008) and best available knowledge suggests mortality due to wind farms is not sufficient to cause significant population declines of this green-listed species. Predicted number of collisions (assuming avoidance) is between 0.22 - 0.29 per year.	***Displacement Effect***: The lands within the site boundary are regularly used by buzzards with a total of 115 observations recorded. This included evidence of breeding within the site boundary along with hunting and commuting. According to Hoetker et al. (2006), this species is capable of habituating to the presence of wind farms. In the event that buzzards are displaced due to the wind farm avoidance, their preferred habitats (breeding in tall trees and hunting in open areas), are not rare or unique to the habitats within the site boundary. There is available habitat in the surrounding area. Therefore, a significant effect is not envisaged. ***Barrier Effect:*** There is potential for a barrier effect on buzzard flight movement considering the high level of activity recorded within the lands of the site boundary.

Key Receptor (Sensitivity)	Direct Effect (Collision Risk)	Indirect Effect (Barrier Effect/Displacement)
		Throughout the literature, there is conflicting evidence on whether this species is vulnerable to the barrier effect and if they are known to alter the flight paths due to a windfarm. Nonetheless, in studies that found buzzard do alter their flight path due to the presence of a windfarm, it was found not to have a significant effect on the energy expenditure of the bird (Hoetker et al., 2006). Therefore, no significant effect is anticipated.
	Significance without Mitigation: ***Significance (Percival, 2003):*** The magnitude of the effect is assessed as ***Negligible*** - based on predicted maximum no. predicted 0.29 collisions per year which is equal to 0.158% of the county population (183 birds), and 0.01% of a conservative national population estimate of 3,000 birds. By cross-tabulating ***Medium*** sensitivity and ***Negligible*** magnitude, a ***Very Low*** significance of effect is predicted. **Significance (EPA, 2022):** The proposed impact of collision risk will be a ***Long-term, Imperceptible Effect.***	**Significance without Mitigation:** ***Significance (Percival, 2003):*** The magnitude of the effect is assessed as ***Low***. By cross-tabulating ***Medium*** sensitivity and ***Low*** magnitude, a **Low** significance of effect is predicted. ***Significance (EPA, 2022):*** The proposed impact of displacement /barrier effect will be a ***Long-term, Not significant effect.***
Common gull (Low)	No collision risk due to absence of records within potential collision height (PCH).	***Displacement Effect:*** This species was not recorded using the habitats within or immediately adjacent to the Proposed Development. Additionally, the surrounding environment comprises suitable roosting and foraging habitats. As such, in the event of displacement, there are extensive areas of suitable habitat for this species. No significant effects of displacement are envisaged. ***Barrier Effect:*** There is no evidence of a significant commuting or migratory path over the lands within the site boundary, with only a total of three observations across the entire survey period. Therefore, barrier effect is not anticipated.

Key Receptor (Sensitivity)	Direct Effect (Collision Risk)	Indirect Effect (Barrier Effect/Displacement)
	Significance without Mitigation:	**Significance without Mitigation:**
	No Effect.	***Significance (Percival, 2003):*** The magnitude of the effect is assessed as ***Negligible***. By cross-tabulating ***Low*** sensitivity and Negligible magnitude, a ***Very Low significance*** of effect is predicted. ***Significance (EPA, 2022):*** The proposed impact of disturbance will be a ***Short-term, Imperceptible*** effect.
Cormorant (Medium)	This species was only recorded during the non-breeding season, and is not breeding within or adjacent to the Proposed Development. Two records of collision fatalities of Cormorant at wind farms have been recorded (Hoetker et al., 2006). The SNH guidance (SNH, 2018) does not provide a specific avoidance rate for cormorant, but states that for species not covered by the guidance "we recommend a default value of 98%." Predicted number of collisions (assuming avoidance) is between 0.09 - 0.12 per year.	***Displacement Effect***: Cormorants were only found commuting over the lands within the site boundary which do not provide preferable habitat to this coastal feeder/ breeder. The site is not regularly used by cormorants and therefore a significant displacement effect is not anticipated. ***Barrier Effect:*** Cormorants were found commuting over the lands within the site boundary, with a total of 38 observations recorded, all of which were noted during the non-breeding seasons of both years.. However, studies show that cormorants were not significantly affected by the barrier effect (Hoetker et al., 2006). Therefore, a significant effect is not anticipated.
	Significance without Mitigation:	**Significance without Mitigation:**
	Significance (Percival, 2003): The magnitude of the effect is assessed as ***Negligible*** - based on maximum predicted no. collisions per year (0.12) which is equal to 0.218% of the Inner Galway Bay population (55 birds), and 0.002% of a national population estimate of 7,967 birds. By cross-tabulating ***Medium*** sensitivity and ***Negligible*** magnitude, a ***Very Low*** significance of effect is predicted. **Significance (EPA, 2022):**	***Significance (Percival, 2003):*** The magnitude of the effect is assessed as ***Negligible***. By cross-tabulating ***Medium*** sensitivity and ***Negligible*** magnitude, a ***Very Low*** significance of effect is predicted. **Significance (EPA, 2022):** The proposed impact of collision risk will be a ***Long-term, Imperceptible Effect.***

Key Receptor (Sensitivity)	Direct Effect (Collision Risk)	Indirect Effect (Barrier Effect/Displacement)
	The proposed impact of collision risk will be a ***Long-term, Imperceptible Effect.***	
Curlew (Medium)	This species was not recorded breeding within or adjacent to the Proposed Development. Records indicate curlew commute across the Proposed Development. The SNH guidance (SNH, 2018) does not provide a specific avoidance rate for curlew, but states that for species not covered by the guidance "we recommend a default value of 98%." Predicted number of collisions (assuming avoidance) is 0.22 – 0.24 per year.	***Displacement Effect***: There were low levels of curlew activity within the lands of the site boundary despite the presence of suitable wintering and breeding habitat. The results show one failed breeding attempt in July 2019 but no evidence of breeding has been observed since. Curlew instead were seen commuting over the site. Due to the lack of habitat usage by curlew, no significant effect is envisaged. ***Barrier Effect:*** Due to the low levels of activity. There is no significant effect anticipated due to the low levels of activity recorded over the site.
	Significance without Mitigation:	**Significance without Mitigation:**
	Significance (Percival, 2003): The magnitude of the effect is assessed as ***Negligible*** - based on maximum predicted no. collisions per year (0.24) which is equal to 0.632% of the county population (38 birds), and 0.001% of a national population estimate of 28,300 birds. By cross-tabulating Medium sensitivity with ***Negligible*** magnitude, a ***Very Low significance*** of effect is predicted. ***Significance (EPA, 2022):*** The proposed impact of collision risk will be a ***Long-term, Imperceptible Effect.***	***Significance (Percival, 2003):*** The magnitude of the effect is assessed as ***Negligible***. By cross-tabulating ***Medium*** sensitivity with ***Negligible*** magnitude, a ***Very Low significance*** of effect is predicted. ***Significance (EPA, 2022):*** The proposed impact of displacement/barrier effect will be a ***Long-term, Not significant*** effect.
Golden Plover (Medium)	Golden plover have been recorded in low numbers as collision fatalities at wind farms (Hoetker et al., 2006; Grunkorn 2011). The SNH guidance (SNH, 2018) does not provide a specific avoidance rate for golden plover, but states that for species not covered by the guidance "we recommend a default value of 98%." Predicted number of collisions assuming a 98% avoidance rate is between 8.28 – 8.95 per year.	***Displacement Effect:*** The frequency of golden plover records in the non -breeding season and large flock sizes (up to 180 birds) present, indicate that they over-winter within the lands of the site boundary. The habitats within the site, such as bog, wet grassland provide suitable wintering habitat for this species. Hoetker et al. (2006) reported that wind farms can result in negative effects on golden plovers.

Key Receptor (Sensitivity)	Direct Effect (Collision Risk)	Indirect Effect (Barrier Effect/Displacement)
	However, years of post-construction monitoring sites indicate a much higher avoidance rate should be applied for non-breeding golden plover populations (Gittings, 2022). The studies had robust survey methodologies and were carried out at wind farm sites with high levels of golden plover flight activity. The review considers that an avoidance rate of 99.8% is a suitable precautionary estimate for winter golden plover (which would equate to between 2.07 – 2.24 collisions per year). In further support of a high micro-avoidance rate, a study in the Netherlands of three operational wind farms where golden plovers were both diurnally and nocturnally active found no fatalities (Krijgsveld et al., 2009). Golden plovers were not recorded breeding within 500 m of turbine locations during the survey period which reduces magnitude. Therefore, it is likely that the number of collisions would be lower in reality.	Therefore, there is potential for wintering golden plover to be displaced from the lands within the site boundary during the operational phase of the wind farm. ***Barrier Effect:*** Due to the presence of wintering golden plover within the lands of the site boundary, there is potential for birds to alter their migration routes to and from the area. Previous studies have found evidence to suggest that golden plover is susceptible to the barrier effect caused by wind farms (Hoetkar et al., 2006). Therefore, the potential for a significant effect cannot be omitted.
	Significance without Mitigation:	**Significance without Mitigation:**
	Significance (Percival, 2003): Taking a 98% avoidance rate, the magnitude of the effect is assessed as ***Negligible*** - based on maximum no. predicted 8.95 collisions per year which is equal to 0.429% of the local Lough Corrib SPA population (2,088 birds), 0.149% of the estimated County population (c. 5,000 birds), and 0.011% of a national population estimate of 80,707 birds. Taking a 99.8% avoidance rate, the magnitude of the effect is assessed as ***Negligible*** - based on maximum no. predicted 2.24 collisions per year which is equal to 0.107% of the local Lough Corrib SPA population (2,088 birds), 0.037% of the estimated County population (c. 5,000 birds), and 0.003% of a national population estimate of 80,707 birds.	***Significance (Percival, 2003):*** The magnitude of the effect is assessed as ***Low*** given the availability of suitable habitat within 5km of the site. By cross-tabulating ***Medium*** sensitivity and ***Low*** magnitude, a ***Low significance*** of effect is predicted. ***Significance (EPA, 2022):*** The proposed impact of displacement/barrier effect will be a ***Long-term***, ***Slight*** effect.

Key Receptor (Sensitivity)	Direct Effect (Collision Risk)	Indirect Effect (Barrier Effect/Displacement)
	By cross-tabulating ***Medium*** sensitivity with ***Negligible*** magnitude, a ***Very Low significance*** of effect is predicted. ***Significance (EPA, 2022):*** The proposed impact of collision risk will be a ***Long-term, Imperceptible Effect.***	
Great Black-backed Gull (Medium)	A published review of the number of bird fatalities due to collision with wind turbines indicated there were zero fatalities across 46 European wind farms (Hoetker et al. 2006). Additionally, the published avoidance rate for great black-backed gulls is 98%, suggesting this species exhibits high levels of micro-avoidance at wind farms. Predicted number of collisions (assuming avoidance) is between 0.32-0.35 per year.	***Displacement Effect:*** Great Black-backed gulls were infrequently observed in the lands within the site boundary with a total of four observations recorded over the three year survey period. This indicates that the area is not in regular use by this species. Therefore, no significant effect is anticipated. ***Barrier Effect:*** There were low levels of activity recorded for this species, with only seven observations made across the three year survey period. To this end, there is no significant effect anticipated.
	Significance without Mitigation:	**Significance without Mitigation:**
	Significance (Percival, 2003): The magnitude of the effect is assessed as ***Negligible*** - as the CRM provides a collision of 0.08% of the national population (4,500) and 0.017% of the County population (2,091). By cross-tabulating ***Medium*** sensitivity with ***Negligible*** magnitude, a ***Very Low significance*** of effect is predicted. ***Significance (EPA, 2022):*** The proposed impact of collision risk will be a ***Long-term, Imperceptible Effect.***	***Significance (Percival, 2003):*** The magnitude of the effect is assessed as ***Negligible***. By cross-tabulating ***Medium*** sensitivity and ***Negligible*** magnitude, a ***Very Low significance*** of effect is predicted. ***Significance (EPA, 2022):*** The proposed impact of displacement/barrier effect will be a ***Long-term, Not significant*** effect.
(Greenland) white-fronted goose (Medium)	No collision risk due to absence of records within potential collision height (PCH).	***Displacement Effect:*** There is no evidence to suggest that this species is regularly using the lands within the footprint of the Proposed Development as it was only recorded during wider area winter surveys. Therefore, no significant effect is anticipated.

Key Receptor (Sensitivity)	Direct Effect (Collision Risk)	Indirect Effect (Barrier Effect/Displacement)
		Barrier Effect: The low level of activity indicates that this is not an important migratory route for this species. Additionally, with reference to the Eurasian African Bird Migration Atlas (Spina et al., 2022), the locations of the Proposed Development, is not situated along any know significant migratory routes of this species. Therefore, a significant barrier effect is not anticipated.
	Significance without Mitigation:	**Significance without Mitigation:**
	No effect.	***Significance (Percival, 2003):*** The magnitude of the effect is assessed as ***Negligible***. By cross-tabulating **Medium** sensitivity and Negligible magnitude, a **Very *Low significance*** of effect is predicted. ***Significance (EPA, 2022):*** The proposed impact of disturbance will be a ***Short-term, Not significant*** effect.
Greylag goose (High)	No collision risk due to small amount of flight seconds with only 22 seconds (<400s) recorded over the three year survey period.	***Displacement Effect:*** This species is not considered to be using the habitat within the Proposed development Therefore, no significant displacement effect is anticipated. ***Barrier Effect:*** Due to the low number of records within the footprint of the Proposed Development, no significant barrier effect is anticipated. Additionally, with reference to the Eurasian African Bird Migration Atlas (Spina et al., 2022), the locations of the Proposed Development, is not situated along any know significant migratory routes of this species.
	Significance without Mitigation:	**Significance without Mitigation:**
	No effect.	***Significance (Percival, 2003):*** The magnitude of the effect is assessed as ***Negligible***. By cross-tabulating **High** sensitivity and Negligible magnitude, a ***Low significance*** of effect is predicted. ***Significance (EPA, 2022):*** The proposed impact of disturbance will be a ***Short-term, Not significant*** effect.

Key Receptor (Sensitivity)	Direct Effect (Collision Risk)	Indirect Effect (Barrier Effect/Displacement)
Hen harrier (Medium)	No collision risk due to absence of records within potential collision height (PCH).	***Displacement Effect:*** The lands within the site boundary do not provide optimal breeding or roosting habitat (heather moorland) for hen harrier. The results show an infrequent use of the site by this species, on occasion for hunting along conifer plantations. No significant effect is anticipated due to the low level of activity and unsuitability of habitat present. ***Barrier Effect:*** There were a total of 22 observations across the three year survey period. This low level of activity indicates that this is not an important commuting route for this species. Therefore, no significant effect is anticipated.
	Significance without Mitigation:	**Significance without Mitigation:**
	No effect.	***Significance (Percival, 2003):*** The magnitude of the effect is assessed as ***Negligible***. By cross-tabulating ***Medium*** sensitivity and ***Negligible*** magnitude, a ***Very Low significance*** of effect is predicted. ***Significance (EPA, 2022):*** The proposed impact of displacement/barrier effect will be a ***Long-term, Not significant*** effect.
Herring Gull (Low)	The published avoidance rate is 98% (SNH 2010), suggesting herring gulls exhibit high levels of micro-avoidance at wind farms. Predicted number of collisions (assuming avoidance) is 0.35-0.37 per year.	***Displacement Effect:*** During the first two years of survey this species was predominantly seen commuting over the site within no evidence of landing or foraging in the site. However in non-breeding 2023-24 season, there was an increase in circling and landing activity within the wet grassland (GS4) south of Clonsheen Shancloon Bog and cutover. This species is likely using this improved agricultural grassland (GA1) in mosaic with wet grassland (GS4) in the west of the site, where turbines T2, T3 and T4, Construction Compound # 2, and the meteorological mast are located. However, for this generalist feeder, there is available suitable foraging habitat in the surrounding areas. To this end, no significant effect is anticipated.

Key Receptor (Sensitivity)	Direct Effect (Collision Risk)	Indirect Effect (Barrier Effect/Displacement)
		Barrier Effect: Although herring gulls were seen commuting over the lands within the site boundary, the frequency of observations was low. There were a total 15 records across the two year survey period. To this end, no significant effects are envisaged.
	Significance without Mitigation:	**Significance without Mitigation:**
	Significance (Percival, 2003): The magnitude of the effect is assessed as Negligible - based on maximum no. collisions per year (0.37), which equates to 0.042% of the Inner Galway Bay population (873 birds), and 0.003% of the national population (11,524). Additionally, this species does not breed inland in this location. By cross-tabulating ***Low*** sensitivity and ***Negligible*** magnitude, a ***Very Low significance*** of effect is predicted. ***Significance (EPA, 2022):*** The proposed impact of collision risk will be ***Long-term, Imperceptible Effect.***	***Significance (Percival, 2003):*** The magnitude of the effect is assessed as ***Negligible***. By cross-tabulating ***Low*** sensitivity and ***Negligible*** magnitude, a ***Very Low significance*** of effect is predicted. ***Significance (EPA, 2022):*** The proposed impact of displacement/barrier effect will be a ***Long-term, Imperceptible*** effect.
Kestrel **(Low)**	Twenty-nine fatalities were recorded across 46 wind farms in a published review of the effects of turbine collision on birds in the European Context (Hoetker et al., 2006). The published avoidance rate is 95% (SNH, 2016). Predicted number of collisions (assuming avoidance) is between 0.99 – 1.3 per year.	***Displacement Effect***: The lands within the site are used frequently by kestrels for foraging and breeding with a breeding territory confirmed within 2km of the turbine locations. Some previous studies show that kestrels have a low sensitivity to displacement caused by wind farms (Madders & Whitfield, 2006). However, a more recent study found that American kestrels did not return to a wind farm in southeastern Wisconsin within an eight year post-monitoring programme (Dohm et al., 2019). There is potential for kestrel to be displaced from the lands within the site boundary, particularly from its breeding territory. However, kestrels are widespread breeders and the habitats within the site boundary are not rare or unique to this location.

Key Receptor (Sensitivity)	Direct Effect (Collision Risk)	Indirect Effect (Barrier Effect/Displacement)
		There is available habitat (trees, open farmland and wetland) in the surrounding area. ***Barrier Effect:*** There is potential for the operational wind farm to alter kestrel local flight paths given the large volume of activity recorded here. There is conflicting evidence throughout the literature on whether kestrel is vulnerable to the barrier effect (Hoetkar et al., 2006). Given the volume of activity here, the potential for an effect cannot be omitted.
	Significance without Mitigation:	**Significance without Mitigation:**
	Significance (Percival, 2003): The magnitude of the effect is assessed as ***Negligible***- based on maximum no. predicted 1.3 collisions per year, which equates to 0.129% of the county population (1,004.67 birds), and 0.01% of the national population (c.13,500). By cross-tabulating ***Low*** sensitivity and ***Negligible*** magnitude, a ***Very Low significance*** of effect is predicted. ***Significance (EPA, 2022):*** The proposed impact of collision risk will be ***Long-term, Imperceptible Effect.***	***Significance (Percival, 2003):*** The magnitude of the effect is assessed as ***Low*** given the available habitat within 5km of the site. By cross-tabulating ***Low*** sensitivity and ***Low*** magnitude, a ***Very Low significance*** of effect is predicted. ***Significance (EPA, 2022):*** The proposed impact of displacement/barrier effect will be a ***Long-term, Slight, Negative*** effect.
Kingfisher (Medium)	No collision risk due to absence of records within potential collision height (PCH).	***Displacement Effect:*** There is no suitable nesting habitat within 500m of the proposed bridge crossing and therefore no significant effects of direct habitat loss are envisaged. Additionally, the operational activities of the wind farm will not involve the watercourses. As such, no significant effect is anticipated. ***Barrier Effect:*** The foraging range of kingfishers is limited to the banks along a watercourse. Considering the operational activities of the wind farm will not have any impact on any watercourses, no significant effects on kingfishers are anticipated.

Key Receptor (Sensitivity)	Direct Effect (Collision Risk)	Indirect Effect (Barrier Effect/Displacement)
	Significance without Mitigation:	**Significance without Mitigation:**
	No effect.	***Significance (Percival, 2003):*** The magnitude of the effect is assessed as ***Negligible***. By cross-tabulating ***Medium*** sensitivity and ***Negligible*** magnitude, a ***Very Low significance*** of effect is predicted. ***Significance (EPA, 2022):*** The proposed impact of displacement/barrier effect will be a ***Long-term, Not significant*** effect.
Lapwing (Low)	Two fatalities were recorded across 46 wind farms in a published review of the effects of turbine collision on birds in the European Context (Hoetker et al., 2006). The SNH guidance (SNH, 2018) does not provide a specific avoidance rate for lapwing, but states that for species not covered by the guidance "we recommend a default value of 98%." Predicted number of collisions (assuming avoidance) is between 1.77 – 1.94 per year.	***Displacement Effect:*** The lands within the site boundary are not utilized regularly by lapwing despite suitable habitat present. This species was recorded primarily in the western section of the site where it was seen commuting likely between agricultural fields and wetlands in the wider area. Therefore, no significant effect is anticipated. ***Barrier Effect:*** Over the three year survey period, there were a total of six lapwing observations during VP watches all of which occurred in the non-breeding seasons. No significant effect is envisaged, given the infrequency and low level of activity.
	Significance without Mitigation:	**Significance without Mitigation:**
	Significance (Percival, 2003): The magnitude of the effect is assessed as ***Negligible*** - based on maximum predicted 1.94 collisions per year which is equal to 0.086% of the local Inner Galway Bay SPA population (2,260 birds), 0.039% of the County population (5,000) and 0.003% of the national population of 69,823 birds. By cross-tabulating ***Low*** sensitivity and ***Negligible*** magnitude, a ***Very Low significance*** of effect is predicted. ***Significance (EPA, 2022):*** The proposed impact of collision risk will be ***Long-term, Imperceptible Effect.***	***Significance (Percival, 2003):*** The magnitude of the effect is assessed as ***Negligible***. By cross-tabulating ***Low*** sensitivity and ***Negligible*** magnitude, a ***Very Low significance*** of effect is predicted. ***Significance (EPA, 2022):*** The proposed impact of displacement/barrier effect will be a ***Long-term, Imperceptible*** effect.

Key Receptor (Sensitivity)	Direct Effect (Collision Risk)	Indirect Effect (Barrier Effect/Displacement)
Lesser Black-backed gull (Low)	A published review of 46 European wind farms (Hoetker et al., 2006) found 45 fatalities across wind farms. However, the published avoidance rate (Furness, R.W. 2019)[10] is 99%, suggesting birds exhibit a high level of micro-avoidance. Predicted number of collisions (assuming avoidance) is between 0.15 – 0.18 per year.	***Displacement Effect:*** This species was regularly observed within the site boundary and surrounding area. For this coastal breeder, the habitat present here is unsuitable for breeding. Therefore, the large volume of activity evident here can be attributed to foraging. For this generalist feeder, there is available suitable foraging habitat in the surrounding areas. To this end, no significant effect is anticipated. ***Barrier Effect***: High levels of lesser black-backed gulls were recorded during the survey period with a total of 162 VP observations across three years. However, this species has been found to not be susceptible to the barrier effect and there is evidence to show lesser black-backed continue to utilize lands within operational wind farms. To this end, there is no significant effect anticipated.
	Significance without mitigation:	**Significance without mitigation:**
	Significance (Percival, 2003): The magnitude of the effect on the local population is assessed as ***Low*** - based on maximum predicted 0.18 collisions per year, annual predicted loss is 0.013% of the local Lough Mask SPA population (1,336 birds) and 0.001% of the National population (14,224 birds). The magnitude of effect on the national and local population is assessed as ***Negligible.*** By cross-tabulating ***Low*** sensitivity and ***Low*** magnitude, a ***Low*** significance of effect is predicted on the local population. By cross-tabulating ***Low*** sensitivity and ***Negligible*** magnitude, a ***Very Low significance*** of effect is predicted on the national population.	***Significance (Percival, 2003):*** The magnitude of the effect is assessed as ***Low*** given the available habitat within 5km of the site. By cross-tabulating ***Low*** sensitivity and ***Low*** magnitude, a ***Very Low significance*** of effect is predicted. ***Significance (EPA, 2022):*** The proposed impact of displacement/barrier effect will be a ***Long-term, Slight, Negative*** effect.

10 Furness, R.W. 2019. Avoidance rates of herring gull, great black-backed gull and common gull for use in the assessment of terrestrial wind farms in Scotland. Scottish Natural Heritage Research Report No. 1019

Key Receptor (Sensitivity)	Direct Effect (Collision Risk)	Indirect Effect (Barrier Effect/Displacement)
	Significance (EPA, 2022): The proposed impact of collision risk on the local population will be ***Long-term, Slight negative Effect.*** The proposed impact of collision risk on the national population will be ***Long-term, Imperceptible Effect.***	
Little Egret (High)	No collision risk due to absence of records within potential collision height (PCH).	***Displacement Effect:*** Little egrets were infrequently observed in the lands within the site boundary with a total of five observations recorded over the three year survey period. This indicates that the area is not in regular use by this species. Therefore, no significant effect is anticipated***.*** ***Barrier Effect:*** No significant effect is envisaged given the infrequency and low level of little egret activity recorded over the three year period.
	Significance without Mitigation:	**Significance without Mitigation:**
	No effect.	***Significance (Percival, 2003):*** The magnitude of the effect is assessed as ***Negligible***. By cross-tabulating ***High*** sensitivity and ***Negligible*** magnitude, a ***Low significance*** of effect is predicted. ***Significance (EPA, 2022):*** The proposed impact of displacement/barrier effect will be a ***Long-term, Not significant*** effect.
Mallard (Medium)	18 fatalities were recorded across 46 wind farms in a published review of the effects of turbine collision on birds in the European Context (Hoetker et al., 2006). The SNH guidance (SNH, 2018) does not provide a specific avoidance rate for lapwing, but states that for species not covered by the guidance “we recommend a default value of 98%." Predicted number of collisions (assuming avoidance) is between 0.09 – 0.11 per year.	***Displacement Effect***: Mallards were regularly observed both within and in the lands surrounding the site boundary, predominantly flying between bogs pool and along the river network. There is conflicting evidence throughout the literature regarding how mallards respond to wind farms. In some cases, they have been shown in habituate (Hoetker et al., 2006) compared within a study carried out in China where this species moved away and habited lands far from the Chongming Dongtan windfarm (Zhao et al. 2020).

Key Receptor (Sensitivity)	Direct Effect (Collision Risk)	Indirect Effect (Barrier Effect/Displacement)
		Therefore, the potential for a displacement effect cannot be omitted. ***Barrier Effect:*** Large volumes of mallard activity were recorded within with most birds seen foraging flying between bog pools within the lands of the site boundary (111 VP observations). There have been some studies to suggest that this species is susceptible to the barrier effect. Therefore, the potential for a barrier effect to occur cannot be omitted.
	Significance without mitigation:	**Significance without mitigation:**
	Significance (Percival, 2003): The magnitude of the effect is assessed as ***Negligible*** - based on predicted 0.11 collisions per year, the annual predicted loss is 0.085% of the local Lough Mask population (129 birds), and 0.003% of the national population estimate of 4,275 birds. By cross-tabulating ***Medium*** sensitivity and ***Negligible*** magnitude, a ***Low significance*** of effect is predicted. ***Significance (EPA, 2022):*** The proposed impact of collision risk will be ***Long-term, Imperceptible Effect*** (Criteria: EPA, 2022).	***Significance (Percival, 2003):*** The magnitude of the effect is assessed as ***Low***. By cross-tabulating ***Medium*** sensitivity and ***Low*** magnitude, a ***Low significance*** of effect is predicted. ***Significance (EPA, 2022):*** The proposed impact of displacement/barrier effect will be a ***Long-term, Slight, Negative*** effect.
Merlin (Medium)	No collision risk due to absence of records within potential collision height (PCH).	***Displacement Effect:*** Merlin activity was infrequent within the lands of the site boundary with a total of 17 records across the three year period. This species is not reliant on the habitat within the site and therefore no significant effect is envisaged. ***Barrier Effect:*** Given the low volume of activity recorded here, a significant effect is not anticipated.

Key Receptor (Sensitivity)	Direct Effect (Collision Risk)	Indirect Effect (Barrier Effect/Displacement)
	Significance without Mitigation:	**Significance without Mitigation:**
	No effect.	***Significance (Percival, 2003):*** The magnitude of the effect is assessed as ***Negligible***. By cross-tabulating ***Medium*** sensitivity and ***Negligible*** magnitude, a ***Very Low significance*** of effect is predicted. ***Significance (EPA, 2022):*** The proposed impact of displacement/barrier effect will be a ***Long-term, Not significant*** effect.
Mute Swan (Medium)	No collision risk due to absence of records within potential collision height (PCH).	***Displacement Effect:*** Mute swan activity was low and infrequent within the lands of the site boundary. This species is not regularly utilizing the site with a total of six observations recorded across the two year survey period, in which they were seen flying over. Therefore, no significant effect is envisaged. ***Barrier Effect:*** Given the low volume of activity recorded here, a significant effect is not anticipated.
	Significance without Mitigation:	**Significance without Mitigation:**
	No effect.	***Significance (Percival, 2003):*** The magnitude of the effect is assessed as ***Negligible***. By cross-tabulating ***Medium*** sensitivity and ***Negligible*** magnitude, a ***Very Low significance*** of effect is predicted. ***Significance (EPA, 2022):*** The proposed impact of displacement/barrier effect will be a ***Long-term, Not significant*** effect.
Peregrine (Medium)	No collision risk due to absence of records within potential collision height (PCH).	***Displacement Effect:*** The infrequency of peregrine observations, with a total of nine observations recorded across the three year survey period, indicates that this site is not of particular importance to this species. No significant effect is therefore envisaged.

Key Receptor (Sensitivity)	Direct Effect (Collision Risk)	Indirect Effect (Barrier Effect/Displacement)
		Barrier Effect: Given the low volume of activity recorded here, a significant effect is not anticipated.
	Significance without Mitigation:	**Significance without Mitigation**:
	No effect.	***Significance (Percival, 2003):*** The magnitude of the effect is assessed as ***Negligible***. By cross-tabulating ***Medium*** sensitivity and ***Negligible*** magnitude, a ***Very Low significance*** of effect is predicted. ***Significance (EPA, 2022):*** The proposed impact of displacement/barrier effect will be a ***Long-term, Not significant*** effect.
Shoveler (High)	No collision risk due to absence of records within potential collision height (PCH).	***Displacement effect:*** There is no evidence of regular use of habitat within the footprint of the Proposed Development. Therefore, no significant effect is anticipated. ***Barrier effect:*** Given the lack of regular use within the footprint of the Proposed Development, no significant effect is anticipated.
	Significance without Mitigation:	**Significance without Mitigation:**
	No effect.	***Significance (Percival, 2003):*** The magnitude of the effect is assessed as ***Negligible.*** By cross-tabulating ***High*** sensitivity and ***Negligible*** magnitude, a ***Low significance*** of effect is predicted. ***Significance (EPA, 2022):*** The proposed impact of disturbance will be a ***Short-term, Not significant*** effect.
Snipe (Medium)	A published review of 46 European wind farms (Hoetker et al., 2006) found 45 fatalities across wind farms. However, the published avoidance rate (SNH, 2010) is 98%, suggesting birds exhibit a high level of micro-avoidance.	***Displacement Effect:*** Snipe were found to be regularly utilising the lands within the site boundary that provides abundant suitable wetland and bog habitat (60 VP observations). What's more, confirmed breeding was recorded along the Black (Shrule) River and bog habitat.

Key Receptor (Sensitivity)	Direct Effect (Collision Risk)	Indirect Effect (Barrier Effect/Displacement)
	Predicted number of collisions (assuming avoidance) is between 0.16 – 0.23 per year.	According to Pearse-Higgins et al. (2009), breeding bird density can be reduced by 15-35% within 500m of operational turbines. The results show that drumming activity was recorded within 100m of the turbine layout. Therefore, there is potential for displacement of breeding snipe to occur. ***Barrier Effect:*** Given the level of snipe activity recorded during the three year survey period, there is potential for a barrier effect to occur. This species has been found to be susceptible to a barrier effect in previous studies (Hoetker et al., 2006).
	Significance without mitigation:	**Significance without mitigation:**
	Significance (Percival, 2003): The magnitude of the effect on the local population is assessed ***as Low*** - based on maximum predicted 0.23 collisions per year, 1% of the Inner Galway Bay SPA population (23 birds). The magnitude of effect on the national and county population is assessed as ***Negligible*** considering an annual predicted loss of 0.003% of the national population estimate of 8,550 birds, and the annual predicted loss is 0.23% of the County population (100 birds). By cross-tabulating ***Medium*** sensitivity and ***Low*** magnitude, a ***Low*** significance of effect on the local population is predicted. By cross-tabulating ***Medium*** sensitivity and ***Negligible*** magnitude, a ***Very Low significance*** of effect on the national population is predicted. ***Significance (EPA, 2022):*** The proposed impact of collision risk on the local population will be ***Long-term***, ***Slight Negative*** effect. The proposed impact of collision risk on the national population will be ***Long-term, Imperceptible Effect.***	***Significance (Percival, 2003):*** The magnitude of the effect is assessed as ***Low*** given available habitat within 5km of the site. By cross-tabulating ***Medium*** sensitivity and ***Low*** magnitude, a ***Very Low significance*** of effect is predicted. ***Significance (EPA, 2022):*** The proposed impact of displacement/barrier effect will be a ***Long-term, Slight, Negative*** effect.

Key Receptor (Sensitivity)	Direct Effect (Collision Risk)	Indirect Effect (Barrier Effect/Displacement)
Sparrowhawk (Low)	This species was recorded on numerous occasions within the Proposed Development, however, there was no evidence of breeding. Published fatality rates are low, with two fatalities from a review of 46 wind farms across Europe (Hoetker et al., 2006). The SNH guidance (SNH, 2018) does not provide a specific avoidance rate for lapwing, but states that for species not covered by the guidance "we recommend a default value of 98%." Predicted number of collisions (assuming avoidance) is between 0.03 – 0.04 per year.	***Displacement Effect:*** Sparrowhawks were found regularly utilising the lands within the site boundary (total 77 VP observations), primarily for hunting and with some evidence of display flight. There is conflicting evidence regarding the response of sparrowhawks to operational wind farms. Hoetker et al. (2006) reported that sparrowhawk are unlikely to alter their flight movements in response to wind farms. However, Campedelli et al. (2013), found raptor observations, including sparrowhawk, significantly decreased post construction of a wind farm in Tuscany. Displacement of sparrowhawk from the site cannot be omitted however, the open habitat and conifer plantations utilized by sparrowhawks are not rare or unique to the site. There is sufficient available habitat in the surrounding habitat and therefore a significant effect is not anticipated. ***Barrier Effect:*** As mentioned previously, there is conflicting evidence regarding how sparrowhawks respond to operational wind farms. However, considering abundant available suitable habitat surrounding the site boundary, no significant barrier effect is envisaged.
	Significance without mitigation:	**Significance without mitigation:**
	Significance (Percival, 2022): The magnitude of the effect is assessed as ***Negligible*** - based on predicted 0.003 collisions per year, the annual predicted loss is 0.006% of the county population (723.4 birds), and 0.00% of the national population estimate of 11,859 birds. By cross-tabulating ***Low*** sensitivity and ***Negligible*** magnitude, a ***Very Low significance*** of effect is predicted. ***Significance (EPA, 2022):*** The proposed impact of collision risk will be ***Long-term, Imperceptible Effect*** (Criteria: EPA, 2022).	***Significance (Percival, 2003):*** The magnitude of the effect is assessed as ***Low*** given available habitat within 5km of the site. By cross-tabulating ***Low*** sensitivity and ***Low*** magnitude, a ***Very Low significance*** of effect is predicted. ***Significance (EPA, 2022):*** The proposed impact of displacement/barrier effect will be a ***Long-term, Slight, Negative*** effect.

Key Receptor (Sensitivity)	Direct Effect (Collision Risk)	Indirect Effect (Barrier Effect/Displacement)
Teal **(High)**	No collision risk due to absence of records within potential collision height (PCH).	***Displacement Effect:*** Teal was not recorded regularly utilising habitats within the footprint of works. Therefore, no significant displacement effect is anticipated. ***Barrier Effect:*** Given the lack of records within the footprint of the Proposed Development, no significant barrier effect is anticipated.
	Significance without Mitigation:	**Significance without Mitigation:**
	No effect.	***Significance (Percival, 2003):*** The magnitude of the effect is assessed as ***Negligible.*** By cross-tabulating ***High*** sensitivity and Negligible magnitude, a ***Low significance*** of effect is predicted. ***Significance (EPA, 2022):*** The proposed impact of disturbance will be a ***Short-term, Not Significant*** effect.
Whooper Swan **(High)**	One fatality was recorded across 46 wind farms in a published review of the effects of turbine collision on birds in the European Context (Hoetker et al., 2006). The SNH guidance (SNH, 2018) provides an avoidance rate of 99.5% for all swan species, indicating swans exhibit a high-level of micro-avoidance. Predicted number of collisions (assuming avoidance) is between 0.06 – 0.08 per year.	***Displacement Effect:*** Whooper swan activity was infrequent and sporadic within the lands of the site boundary. This species is not regularly utilizing the site as whooper swans were recorded flying and commuting. Therefore, no significant effect is envisaged. ***Barrier Effect:***The activity recorded did not follow any distinct flight path patterns. This suggest that this site is not an important migratory route for this species. As such, significant effects are not anticipated.
	Significance without Mitigation:	**Significance without Mitigation:**
	Significance (Percival, 2022): The magnitude of the effect is assessed as ***Negligible*** – based on maximum predicted 0.08 collisions per year, the annual predicted loss of the county population is 0.205% (of 39 birds) and 0.001% of the national population (11,852). By cross-tabulating ***High*** sensitivity and ***Negligible*** magnitude, a ***Very Low significance*** of effect is predicted.	***Significance (Percival, 2003):*** The magnitude of the effect is assessed as ***Negligible.*** By cross-tabulating ***High*** sensitivity and ***Negligible*** magnitude, a ***Very Low significance*** of effect is predicted. ***Significance (EPA, 2022):*** The proposed impact of displacement/barrier effect will be a ***Long-term, Not significant*** effect.

Key Receptor (Sensitivity)	Direct Effect (Collision Risk)	Indirect Effect (Barrier Effect/Displacement)
	Significance (EPA, 2022): The proposed impact of collision risk will be a ***Long-term, Imperceptible Effect*** (Critera: EPA, 2022).	
Whimbrel (Medium)	The SNH guidance (SNH, 2018) does not provide a specific avoidance rate for whimbrel, but states that for species not covered by the guidance "we recommend a default value of 98%." Predicted number of collisions (assuming avoidance) is 0.05 – 0.06 per year.	***Displacement Effect:*** Whimbrel activity was low and infrequent within the lands of the site boundary. This species is a passage migrant not regularly utilizing the site, with a total of five observations recorded across the two year survey period. No significant effect is therefore envisaged. ***Barrier Effect:*** Given the infrequent and low volume of activity recorded here, a significant effect is not anticipated.
	***Significance without* Mitigation:**	**Significance without Mitigation:**
	Significance (Percival, 2003): The magnitude of the effect is assessed as ***Low*** - based on predicted 0.06 collisions per year, the annual predicted loss is 0.6% of the Inner Galway Bay population (10 birds) and 0.062% of the national population (97 birds). By cross-tabulating ***Medium*** sensitivity and ***Low*** magnitude, a ***Low significance*** of effect is predicted. ***Significance (EPA, 2022):*** The proposed impact of collision risk will be ***Long-term, Slight Negative effect.***	***Significance (Percival, 2003):*** The magnitude of the effect is assessed as ***Negligible.*** By cross-tabulating ***Medium*** sensitivity and ***Negligible*** magnitude, a ***Very Low significance*** of effect is predicted. ***Significance (EPA, 2022):*** The proposed impact of displacement/barrier effect will be a ***Long-term, Not significant*** effect.
Wigeon (Medium)	No collision risk due to absence of records within potential collision height (PCH).	***Displacement Effect:*** Given the absence of wigeon from the footprint of the Proposed Development and overall low level of activity, no significant effect of disturbance is anticipated. ***Barrier Effect***: No significant barrier effect is anticipated.

Key Receptor (Sensitivity)	Direct Effect (Collision Risk)	Indirect Effect (Barrier Effect/Displacement)
	Significance without Mitigation:	**Significance without Mitigation:**
	No effect.	***Significance (Percival, 2003):*** The magnitude of the effect is assessed as ***Negligible.*** By cross-tabulating ***Medium*** sensitivity and ***Negligible*** magnitude, a ***Very Low significance*** of effect is predicted. ***Significance (EPA, 2022):*** The proposed impact of disturbance will be a ***Short-term, Not significant*** effect
Woodcock (Low)	No collision risk due to absence of records within potential collision height (PCH).	***Displacement Effect:*** Woodcock activity was low and infrequent within the lands of the site boundary, with a total of two observations across the two year survey period. No significant effect is therefore envisaged. ***Barrier Effect:*** Given the infrequent and low volume of activity recorded here, a significant effect is not anticipated.
	Significance without Mitigation:	**Significance without Mitigation:**
	No effect.	***Significance (Percival, 2003):*** The magnitude of the effect is assessed as ***Negligible.*** By cross-tabulating ***Low*** sensitivity and ***Negligible*** magnitude, a ***Very Low significance*** of effect is predicted. ***Significance (EPA, 2022):*** The proposed impact of displacement/barrier effect will be a ***Long-term, Imperceptible*** effect.

10.8.4 Potential Effects on Key Receptors during the Decommissioning Phase

The decommissioning phase of the Proposed Development poses similar risks to potential effects during the construction phase. There will be no additional habitat loss during the decommissioning phase. The magnitude and significance of disturbance are similar for each species as above for the construction phase in Table 10-11.

10.8.5 Potential Cumulative Effects

Direct effects on avifauna during construction are primarily land-take related, mainly due to the loss of nesting habitats to key species. Other sources of land-take as outlined above, do have the potential for cumulative effects on nesting or resident farmland or woodland species (the typical landscape characters). Species such as robin may be affected cumulatively by further loss of hedgerows due to farming practices, etc. Even though in-combination land take is unlikely to result in range loss of any species which frequent the subject site, mitigation may be required to neutralise the effect of the Proposed Development.

Disturbance or effective habitat loss indirectly is more difficult to quantify; especially as most species of birds may habituate to disturbance over time.

Direct effects on avifauna during operation which may be cumulatively added to by other existing pressures or proposed developments include collision related mortality, ongoing disturbance/displacement, and barrier effect. Flight height, or the flight heights which birds habitually use along either migration or local flight paths, is an influencing factor in determining whether the Proposed Development will combine with additional wind farms to produce additive, synergistic or antagonistic effects. These effects include increased Barrier Effect (potentially obstructing migratory flightpaths), increased collision risk (through combined mortality in susceptible species) and increased disturbance to birds utilising foraging grounds whilst on migration.

Direct and indirect cumulative effects of were assessed as per Nature Scot guidance (SNH, 2012) which considers the following types of cumulative effects:

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

A planning search within 25km of the Proposed Development was conducted and available EIAs including Ornithology assessments were considered (Table 10-14). The planning search was conducted using the following sources:

- An Coimisiún Pleanála
- Mayo County Council Planning Search
- Galway County Council Planning Search
- Roscommon County Council Planning Search

There are two proposed wind farm developments within 25km of the Proposed Development, namely Clonberne Wind Farm and Laurclavagh Wind Farm along with a single turbine development at Cloonascragh. Additionally, there is one operational wind farm within 25km of the Proposed Development, namely Cloonlusk Wind Farm.

Table 10-14: Wind Energy Applications within 25km of the Proposed Development

Wind Farm	Number of Turbines	Distance and Direction from Proposed Development	Status
Clonberne	11	18km E	Proposed in planning
Laurclavagh	8	10.5km SE	Proposed in planning
Cloonascragh	1	12.2km SE	Granted
Cloonlusk	2	15.16km SE	Existing

Laurclavagh Wind Farm

The potential for the Proposed Development to result in cumulative effects with the proposed Laurclavagh Wind Farm, 10.5km from Shancloon was assessed. The Laurclavagh EIAR (2024), was accessed via An Bord Pleanála website and reviewed. The following species were recorded at both Shancloon and Laurclavagh: black-headed gull, buzzard, common gull, curlew, golden plover, hen harrier, kestrel, lapwing, lesser black-backed gull, little egret, meadow pipit, merlin, peregrine, whooper swan and woodcock. There were no significant effects anticipated for the majority of key receptor species discussed in the Laurclavagh EIAR report. Collision risk was found to have an effect of low significance on common gull and lesser black-backed gull. According to the Laurclavagh EIAR CRM, annual mortality of common gulls would increase by 2.3% at a county population level. Annual mortality of lesser black-backed gulls would increase by 2.3% during winter and 3.9% during breeding season.

There was evidence indicative of breeding for five target species at Laurclavagh including kestrel, buzzard, sparrowhawk, lapwing and peregrine.

Species recorded at Laurclavagh that were considered to be of county importance include golden plover, hen harrier, peregrine, wintering black-headed gull, wintering and breeding lesser black-backed gull, kestrel and snipe.

Habitats recorded within the boundary of Laurclavagh include improved agricultural grassland (GA1), dry calcareous and neutral grassland (GS1), Dry meadows and grassy verges (GS2), dense bracken (HD1), Oak-ash-hazel woodland (WN2), scrub (WS1), Immature woodland (WS2), limestone pavement, heath a grassland mosaic. Development is proposed to affect areas of improved agricultural grassland, treelines and hedgerow.

It is noted that, as per SNH, 2016 guidelines, the distance of the Laurclavagh Wind Farm from the proposed Shancloon Wind farm is generally greater than the core foraging range of most bird species. As such the potential for cumulative effects on the local bird populations is low.

Clonberne Wind Farm

The potential for the Proposed Development to result in cumulative effects with the proposed Clonberne Wind Farm 18km from Shancloon was assessed. The Clonberne EIAR (2024), was accessed via An Bord Pleanála website and reviewed. The following species were recorded at both Shancloon and Clonberne: buzzard, curlew, golden plover, hen harrier, kestrel, kingfisher, lapwing, little egret, merlin, peregrine, snipe, sparrowhawk, whooper swan, woodcock. There were no significant effects anticipated for any of the KER species identified at Clonberne in the EIAR. According to the Clonberne EIAR CRM, collision risk was considered to be low.

There was evidence to suggest that the following five species were breeding at Clonberne: merlin, kestrel, snipe, buzzard and sparrowhawk.

Habitats recorded within the boundary of Clonberne include cutover bog (PB4), depositing lowland rivers (FW2), recolonising bare ground (ED3), improved agricultural grassland (GA1), wet grassland (GS4), scrub (WS1), raised bog (PB1), conifer plantation (WD4), wet willow/alder/ash woodland (WN6), bog woodland (WN7), immature woodland (WS2), Annex I Molinia Meadow, Annex I Hydrophilous tall herb fringe communities. Development in cutover bog/bare peat, small area of bog woodland (not Annex habitat), scrub, conifer plantation, immature woodland, small section of wet-willow alder ash woodland for road widening.

It is noted that, as per SNH, 2016 guidelines, the distance of the Clonberne Wind Farm from the proposed Shancloon Wind farm is generally greater than the core foraging range of most bird species. As such the potential for cumulative effects on the local bird populations is low.

Cloonlusk Wind Farm

The potential for the proposed wind farm to result in cumulative effects with the existing Cloonlusk Wind Farm, 15.16km from Shancloon, was assessed. The planning documents were accessed via Galway County Council website and reviewed. The following species recorded at Shancloon were identified at Cloonlusk: buzzard, kestrel, peregrine, sparrowhawk, goldrest, meadow pipit, skylark, snipe and hen harrier. There was a known hen harrier nesting in the vicinity of the Cloonlusk site. Cloonlusk was deemed unsuitable for wintering wader species such as lapwing, golden plover, curlew and for swan, geese or ducks. Additionally, whooper swan and mute swan were not known to traverse the area.

Skylark, meadow pipit, snipe and woodcock were considered to be at risk of bird strike but the collision risk was thought to be low and not significant to their population.

It is noted that, as per SNH, 2016 guidelines, the distance of the Cloonlusk Wind Farm from the proposed Shancloon Wind farm is generally greater than the core foraging range of most bird species. As such the potential for cumulative effects on the local bird populations is low.

Cloonascragh

The proposed Cloonascargh single turbine is located 12.2km SE of the Proposed Development. This is an active working extraction site with part of the site sectioned for quarry operation. Given the age of the development, there is no relevant data on effects on birds, however Potential for bird collision is low given the scale of the development. It is noted that, as per SNH, 2016 guidelines, the distance of the Cloonascargh single turbine from the proposed Shancloon Wind farm is generally greater than the core foraging range of most bird species. As such the potential for cumulative effects on the local bird populations is low.

Table 10-15: Key Species at Shancloon, Laurclavagh, Clonberne and Cloonlusk

Species	Shancloon	Laurclavagh	Clonberne	Cloonlusk
Black-headed gull	✓*	✓*		
Buzzard	✓*	✓*	✓*	✓
Common gull	✓*	✓*		
Cormorant	✓*			
Curlew	✓*	✓	✓	
Goldcrest	✓*			✓
Golden Plover	✓*	✓*	✓	

Species	Shancloon	Laurclavagh	Clonberne	Cloonlusk
Great black-backed gull	✓*			
Hen harrier	✓*	✓*	✓	✓
Herring gull	✓*			
Kestrel	✓*	✓*	✓*	✓
Kingfisher	✓*		✓	
Lapwing	✓*	✓*	✓*	
Lesser black-backed gull	✓*	✓*		
Little egret	✓*	✓	✓	
Mallard	✓*			
Meadow pipit	✓*	✓		✓
Merlin	✓*	✓	✓*	
Mute Swan	✓*			
Peregrine	✓*	✓*	✓*	✓
Skylark	✓*			✓
Snipe	✓*	✓*	✓*	✓
Sparrowhawk	✓*	✓*	✓*	✓
Swallow	✓*			
Whimbrel	✓*			
Whooper swan	✓*	✓*	✓*	
Willow warbler	✓*			
Woodcock	✓*	✓	✓	
Greylag Goose	✓*			
Greater white fronted goose	✓*			
Shoveler	✓*			
Wigeon	✓*			
Teal	✓*			

*Symbolises species classified as a key receptor within that particular site.

10.8.5.1 Assessment of Cumulative Effects

Considering the turbines for all the wind farms assessed cumulatively will be constructed in a phased approach, because the ports can only accommodate a certain number of turbine imports at any given time, and the far distance of nearest windfarms, Clonberne at 18km and Laurclavagh 10.5km, significant cumulative effects during construction are not anticipated.

As discussed previously, permanent habitat loss will be minor and predominantly to low valuable improved agricultural grassland and the potential for a displacement effect is negligible to low. Similarly, displacement was of very low/imperceptible significance at Laurclavagh and Clonberne. What's more, the habitats present at the Proposed Development along with those at Laurclavagh and Cloberne are not rare or unique to the respective windfarms with extensive areas of similar habitat.

Having regard to the Eurasian African Bird Migration Atlas (Spina et al., 2022), the locations of the Proposed Development, Laurclavagh, Clonberne, Cloonlusk and Cloonascaragh are not situated along any significant routes of migratory species and same was reflected by the absence of recorded migration during field surveys, including for golden plover, greylag goose and greenland white-fronted goose. Therefore, a significant cumulative barrier effect is not anticipated.

The predicted number of collisions and cumulative predicted percentage increase in annual mortality rates in relation to the national and local populations calculated for key receptor species recorded at Shancloon, Laurclavagh and Clonberne, are shown in Table 10-15. The potential for cumulative direct effects are further considered in Table 10-17.

Table 10-16: Cumulative Effects of collision risk on species populations

	Predicted collision rates CRM			NATIONAL POP: Percentage increase in annual mortality rate due to collisions				COUNTY POP: Percentage increase in annual mortality rate due to collisions			
	Shancloon	Laurclavagh	Clonberne	Shancloon	Laurclavagh	Clonberne	Cumulative National Effect per year	Shancloon	Laurclavagh	Clonberne	Cumulative County Effect per year
Golden Plover	2.24	0.787	15.144	0.003	0.001	0.019	0.023	0.037	0.038	0.725	0.80
Kestrel	1.30	0.968	1.351	0.010	0.007	0.010	0.027	0.129	0.096	0.134	0.36
Buzzard	0.29	0.575	0.599	0.010	0.019	0.020	0.049	0.158	0.314	0.327	0.80
Lapwing	1.91	0.234	20.645	0.003	0.000	0.030	0.033	0.039	0.010	0.913	0.96
Lesser black-backed Gull	0.18	0.198	N/A	0.001	0.001	N/A	0.003	0.013	0.015	N/A	0.03
Greater black-backed Gull	0.35	1.103	N/A	0.008	0.025	N/A	0.032	0.017	0.053	N/A	0.07
Snipe	0.23	0.037	1.922	0.003	0.000	0.022	0.026	0.230	0.037	1.922	**2.19**
Sparrowhawk	0.04	0.009	0.027	0.000	0.000	0.000	0.001	0.006	0.001	0.004	0.01
Whooper Swan	0.08	0.051	0.215	0.001	0.000	0.002	0.003	0.205	0.131	0.551	0.89

* Noting that the Shancloon CRM uses the latest NatureScot Wind Farm Collision Risk Model (updated March 2025), with other wind farms using the older model.

Having regard to Table 10-15, it is assessed that there is no potential for significant effects on national bird populations due to collision risk from the proposed Shancloon Wind farm when acting cumulatively with other wind farms within 20km.

As shown in Table 10-15, for the majority of bird species the combined potential collision risk for the Shancloon, Laurclavagh and Clonberne wind farms will have a negligible (i.e. <1%) impact in terms of the loss to bird populations. Only one bird species have been identified as having a greater potential for impact at a County level:

- Snipe - potential cumulative impact on County population is assessed as Low (1-5% of population lost). In terms of significance of effect, this equates to a *Long-term, Low, Negative cumulative* effect (EPA, 2022).

It is additionally noted, that, as per Table 10-16, when comparing the outputs of the CRM models for the Shancloon, Laurclavagh and Clonberne wind farms, it is evident that the Shancloon Wind Farm is not the dominant contributor to the County level cumulative collision impact determined for Snipe.

Table 10-17: Percentage Contribution of County Level Population Effect for each Cumulative Project

% project contribution				
Species	**Cumulative Effect***	**Shancloon %**	**Laurclavagh %**	**Clonberne %**
Snipe	2.19	10.5	1.69	87.80

*as per Percival, 2003 a 1-5% loss of population is considered a low impact and a 5-20% loss of population is considered a medium impact.

Direct cumulative effects are further discussed in Table 10-17, which shows no potential for significant cumulative effects with other wind farms.

Table 10-18: Potential Direct Cumulative Effects

Species (Core Foraging Range) (Sensitivity)	**Construction Phase**	**Operational Phase**
	Habitat loss	**Collision Risk**
Black-headed Gull (Low)	As discussed in Section 10.8.2, given there is no pathway for habitat loss related effects on black-headed gull, there can be no cumulative effects.	No collision risk due to absence of records within potential collision height (PCH).
Buzzard (~1km, Walls & Kenward 2020) (Medium)	As discussed in section 10.8.2, habitat loss as a result of the Proposed Development will have a ***Very Low significance*** of effect (Percival, 2003) and ***Short-term Not significant*** effect (EPA, 2022). At Laurclavagh and Clonberne considered separately, habitat loss was predicted to have a ***Very Low effect*** of significance (Perival, 2003) and ***Long term-Slight Negative effect*** (EPA, 2022) on buzzard.	In combination, Shancloon, Laurclavagh and Clonberne could result in 1.46 collisions per year. This equates to ***Negligible*** loss of 0.80% on the county population and a ***Negligible*** loss of 0.049% on the national population (Percival, 2003). ***No significant additive, antagonistic or synergistic were identified. Significant cumulative effects are not anticipated.***

Species (Core Foraging Range) (Sensitivity)	Construction Phase	Operational Phase
	Habitat loss	**Collision Risk**
	Therefore, cumulative effects are not considered further. Considering the ***Very Low*** significance of effect predicted for these windfarms separately and available habitat within 25km radius of the Proposed Development, no significant additive, antagonistic or synergistic were identified. ***Significant cumulative effects are not anticipated.***	
Cormorant (Medium)	As shown in Table 10-14, this species was not recorded at any windfarms within 25km. Therefore, cumulative effects are not considered further.	As shown in Table 10-14, this species was not recorded at any windfarms within 25km. Therefore, cumulative effects are not considered further.
Curlew (1-2Km - SNH, 2016) (Medium)	As discussed in Section 10.8.2, given there is no pathway for habitat loss related effects on curlew, there can be no cumulative effects.	Curlew was not considered to be at risk of collision at Laurclavagh or Clonberne. Therefore, cumulative effects are not considered further.
Greater Black-backed Gull (Medium)	As shown in Table 10-14, this species was not recorded at any windfarms within 25km. Therefore, cumulative effects are not considered further.	Greater Black – backed gull was not recorded at Clonberne. In combination, Shancloon and Laurclavagh the total number of predicted collisions would be 1.45 collisions per year. This equates to a ***Negligible*** loss of 0.032% on the national loss and a ***Negligible*** loss of 0.07% loss on the county population (Percival, 2003). **No significant additive, antagonistic or synergistic were identified. Significant cumulative effects are not anticipated.**
Golden Plover (3km, Max 11km) (Medium)	As discussed in section 10.8.2, habitat loss as a result of the Proposed Development will have a ***Very low significance*** of effect (Percival, 2003) and ***Permanent, Not significant*** (EPA, 2022). At both Laurclavagh and Clonberne considered separately, habitat loss was predicted to have a Low effect of significance (Pervical, 2003) and ***Long-term, Slight negative effect*** (EPA, 2022) on golden plover. Considering the Very low- low significance of effect predicted for these windfarms	Both Shancloon and Laurclavagh are within the maximum core foraging for the Golden Plover population of the Lough Corrib. The individual magnitude of collision risk was assessed as negligible at both Shancloon and Laurclavagh. In combination, Shancloon and Laurclavagh could result in 18.17 collisions per year which is 0.87% of the Lough Corrib population. This equates to a ***Negligible*** effect.

Species (Core Foraging Range) (Sensitivity)	Construction Phase	Operational Phase
	Habitat loss	**Collision Risk**
	separately and available habitat within 25km radius of the Proposed Development, no significant additive, antagonistic or synergistic were identified. **Significant cumulative effects are not anticipated.**	In terms of the county and national population, the Clonberne, Shancloon and Laurclavagh wind farms have a cumulative predicted collision of 18.17 birds per year. This equates to 0.023% of the national population and 0.8% of the County population. This equates to a ***Negligible*** effect on population. ***No significant additive, antagonistic or synergistic were identified. Significant cumulative effects are not anticipated***
Hen Harrier (Medium)	As discussed in Section 10.8.2, given there is no pathway for habitat loss related effects on hen harrier, there can be no cumulative effects.	No collision risk due to absence of records within potential collision height (PCH).
Kestrel (1-2km)` (Low)	As discussed in section 10.8.2, habitat loss as a result of the Proposed Development will have a ***Very low significance*** of effect (Pericival, 2003) and ***Short-term Imperceptible effect*** (EPA, 2022) on kestrel. At Laurclavagh, a ***Very low effect*** of significance (Percival, 2003) and ***Long-term Imperceptible*** (EPA, 2022) were predicted. At Clonberne, a ***Low effect of significance*** (Percival, 2003) and ***Long-term Slight Negative*** effect (EPA, 2022). Considering the Very low- low significance of effect predicted for these windfarms separately and available habitat within 25km radius of the Proposed Development, no significant additive, antagonistic or synergistic were identified. **Significant cumulative effects are not anticipated**.	There are no windfarms within the core foraging range of kestrels, 2km from the site. Considering the breeding kestrel recorded within the Proposed Development boundary, the cumulative collision risk effect was considered as per the precautionary principle. This species was also recorded within the lands of Laurclavagh, and Clonberne. For the purpose of this assessment, the cumulative effect of all these developments was considered. In combination, Shancloon, Clonberne and Laurclavagh could result in 3.62 collisions per year which equates to a ***Negligible*** loss of 0.36% on the county population and a ***Negligible*** loss of 0.027% on the national population (Percival, 2003). ***Therefore, no significant additive, antagonistic or synergistic were identified. Significant cumulative effects are not anticipated.***
Kingfisher (Medium)	As discussed in Section 10.8.2, given there is no pathway for habitat loss related effects on kingfisher, there can be no cumulative effects.	No collision risk due to absence of records within potential collision height (PCH).

Species (Core Foraging Range) (Sensitivity)	Construction Phase	Operational Phase
	Habitat loss	**Collision Risk**
Lapwing (Low)	As discussed in section 10.8.2 the Proposed Development does not have the potential to cause a significant effect on lapwing in the form on habitat loss. Additionally, at both Laurclavagh and Clonberne considered separately, a ***Very Low effect*** of significance (Percival, 2003) and ***Long-term Imperceptible*** effect were predicted. Therefore, no significant additive, antagonistic or synergistic were identified. ***Significant cumulative effects are not anticipated.***	In combination, Shancloon, Laurclavagh and Clonberne, the total number of collision predicted per year would be 22.82. This equates to a loss of 0.033% on the national population and 0.96% at a County level. This is considered a ***Negligible*** effect on the national population. ***Therefore, no significant additive, antagonistic or synergistic were identified. Significant cumulative effects are not anticipated.***
Lesser black-backed gull (Low)	As discussed in section 10.8.2, habitat loss as a result of the Proposed Development will have a ***Very low significance of effect*** (Percival, 2003) and ***Permanent Imperceptible*** effect (EPA, 2022) on lesser black-backed gull. At Laurclavagh, a ***Very low effect of significance*** (Percival, 2003) and ***Long-term Imperceptible effect*** (EPA, 2022) were predicted. Lesser black-backed gulls were not recorded at Clonberne. Considering the **Very Low effect** of significance predicted for these windfarms separately and available habitat within 25km radius of the Proposed Development. Therefore, no significant additive, antagonistic or synergistic were identified. ***Significant cumulative effects are not anticipated.***	In combination, Shancloon and Laurclavagh would result in a predicted total of 0.38 collisions per year. This equates to a ***Negligible*** loss of 0.003% on the national populationand 0.028% of the Lough Mask SPA population. The magnitude of this cumulative effect is assessed as ***Low*** (Percival, 2003). By cross-tabulating ***Low*** sensitivity and ***Low*** magnitude, ***Low*** significance of cumulative effects is predicted on the Lough Mask SPA population (Percival, 2003). ***A Long-term, Slight, Negative,*** cumulative effect is predicted (EPA, 2022).
Mallard (Medium)	This species was not recorded during surveys at Laurclavagh or Clonberne. Therefore, significant cumulative effects are not considered further.	This species was not recorded in any windfarms within 25km. Therefore, significant cumulative effects are not considered further.
Merlin (Medium)	As discussed in Section 10.8.2, given there is no pathway for habitat loss related effects on merlin, there can be no cumulative effects.	No collision risk due to absence of records within potential collision height (PCH). Therefore, no potential for cumulative effects.
Mute Swan (Medium)	As discussed in Section 10.8.2, given there is no pathway for habitat loss related effects on mute swan, there can be no cumulative effects.	This species was not recorded in any windfarms within 25km. Therefore, significant cumulative effects are not considered further.

Species (Core Foraging Range) (Sensitivity)	Construction Phase	Operational Phase
	Habitat loss	**Collision Risk**
Peregrine (Medium)	As discussed in Section 10.8.2, given there is no pathway for habitat loss related effects on peregrine, there can be no cumulative effects.	No collision risk due to absence of records within potential collision height (PCH). Therefore, cumulative effects are not considered further.
Snipe (Medium)	As discussed in Section 10.8.2, given there is no pathway for habitat loss related effects on snipe, there can be no cumulative effects.	In combination, Shancloon, Laurclavagh and Clonberne the total number of collision predicted per year would be 2.19 collisions per year which equated to a loss of 0.026% national population and 2.19% of the county population. While this is considered a ***Negligible*** effect on the national population, the magnitude of effect on the county population is assessed as ***Low*** (Percival, 2003). By cross-tabulating ***Medium*** sensitivity and ***Low*** magnitude, an effect of ***Low*** significance is predicted (Percival, 2003). A ***Long-term, Slight, Negative cumulative*** effect is predicted (EPA, 2022).
Sparrowhawk (Low)	As discussed in section 10.8.2, habitat loss as a result of the Proposed Development will have a L***ow significance of effect*** (Percival, 2003) and ***Permanent, Slight, Negative*** effect (EPA, 2022) on sparrowhawk. At Laurclavagh, a ***Very low effect of significance*** (Percival, 2003) and ***Long-term Imperceptible effect*** (EPA, 2022) were predicted. At Clonberne, a Very ***Low effect*** of significance (Percival, 2003) and ***Long-term Slight Negative*** effect (EPA, 2022). Considering the **Low-Very Low effect** of significance predicted for these windfarms separately and available habitat within 25km radius of the Proposed Development. Therefore, no significant additive, antagonistic or synergistic were identified. ***Significant cumulative effects are not anticipated.***	In combination, Shancloon, Laurclavagh and Clonberne, the total number of collisions per year is predicted to be 0.08 collisions per year. This equates to a ***Negligible*** loss of 0.001% on the national population and a ***Negligible*** loss of 0.01% of the county population. ***Therefore, no significant additive, antagonistic or synergistic were identified. Significant cumulative effects are not anticipated.***

Species (Core Foraging Range) (Sensitivity)	Construction Phase	Operational Phase
	Habitat loss	**Collision Risk**
Whooper Swan (High)	As discussed in Section 10.8.2, given there is no pathway for habitat loss related effects on whooper swan, there can be no cumulative effects.	In combination, Shancloon, Laurclavagh and Clonberne, the total number of collisions per year is predicted to be 0.35, which equates to a ***Negligibl***e loss of 0.003% on the national populations and a ***Negligible*** loss of 0.89% on the county population. ***Therefore, no significant additive, antagonistic or synergistic were identified. Significant cumulative effects are not anticipated.***
Whimbrel (Medium)	As discussed in Section 10.8.2, given there is no pathway for habitat loss related effects on whimbrel, there can be no cumulative effects.	This species was not recorded in any windfarms within 25km. Therefore, significant cumulative effects are not considered further.
Woodcock (Low)	As discussed in Section 10.8.2, given there is no pathway for habitat loss related effects on woodcock, there can be no cumulative effects.	No collision risk due to absence of records within potential collision height (PCH). Therefore, significant cumulative effects are not considered further.

10.8.5.2 Cumulative Effects During Decommissioning

The potential cumulative effects during decommissioning are considered to be the same as those described for the construction phase of the Proposed Development. The windfarms within 25km of one another outlined previously will be decommissioned at separate times, causing temporary disturbance. Decommissioning will not occur simultaneously and therefore cumulative effects are not anticipated further.

10.9 Mitigation Measures

10.9.1 Mitigation by Avoidance and Design

The design and turbine layout were informed by multiple collision risk models. The findings of these CRMs were utilised to advise the layout and design alternatives considered in Chapter 3 – Consideration of Reasonable Alternatives. As such, areas of high avian activity were considered and avoided to minimise collision risk.

The layout of roads and other associated infrastructure was purposely designed to avoid habitats of high ecological value. Instead infrastructure was purposely designed to be situated in low value agricultural grassland utilising natural gaps in existing hedgerow to minimise vegetation and breeding habitat loss.

The design of the floated road in Cloonbar bog is such that construction methodology with a lower noise level will be implemented (see Figure 10.1 which shows the modelled construction noise associated with the construction of the floated road at Cloonbar Bog by sheet piling, with the 55dB and 70dB noise levels being the pertinent levels for disturbance to birds). See Chapter 8 – Noise and Vibration for further details. This will ensure minimal disturbance to avian species.

10.9.2 Mitigation Measures during the Construction Phase of the Project

10.9.2.1 Introduction

Construction of this project is expected to cause temporary (disturbance) adverse effects on local ecological receptors, as outlined in section 10.8.3 above. The mitigation measures described below will reduce these effects significantly.

10.9.2.2 Project Ecologist/ ECoW

A Project Ecologist/Ecological Clerk of Works (ECoW) with appropriate experience and expertise (in implementing ecological mitigation measure for wind farm developments) will be employed for the duration of the construction phase to ensure that all the mitigation measures outlined in relation to the environment are implemented. The Project Ecologist/ECoW will be awarded the authority to stop construction activity if there is potential for significant adverse ecological effects to occur.

10.9.2.3 Avifauna

1. The turbines will be constructed in a phased approach to limit areas of disturbance.
2. A kestrel nest box will be erected in areas identified as confirmed breeding territories as described in section 10.8.3.
3. The removal of vegetation and scrub as well as trimming of trees along the TDR and Site will be undertaken outside of the bird breeding season (March 1st to August 31st inclusive). This will help protect nesting birds. This is in line with best practice recommendations for mitigation measures in regard to birds and wind farms as recommended by statutory bodies such as English Nature and the Royal Society for the Protection of Birds (Drewitt, A. L. and Langston, R. H., 2006).
4. Construction operations will take place during the hours of daylight to minimise disturbances to roosting birds, or active nocturnal bird species. This is in line with best practice recommendations for mitigation measures in regard to birds and wind farms as recommended by statutory bodies such as English Nature and the Royal Society for the Protection of Birds (Drewitt and Langston, 2006). Limited operations such as concrete pours, turbine erection and installation of the grid connection may require night-time operating hours; these works will be supervised by the project ecologist/ECoW.
5. In the event that construction related disturbance cannot be avoided during breeding season, screens will be established around the works to minimise disturbance to birds within 500m.
6. Toolbox talks will be undertaken with construction staff on disturbance to key species during construction. This will help minimise disturbance. This is in line with best practice recommendations for mitigation measures with regard to birds and wind farms as recommended by statutory bodies such as English Nature and the Royal Society for the Protection of Birds (Drewitt and Langston, 2006).
7. Where removed or altered at TDR Nodes, re-instated hedgerows will be planted with locally sourced native species. This will result in habitat enhancement for local species of conservation importance such as meadow pipit. This is in line with best practice recommendations for mitigation measures in regard to birds and wind farms as recommended by statutory bodies such as English Nature and the Royal Society for the Protection of Birds (Drewitt and Langston, 2006).
8. A re-confirmatory pre-construction survey (March/April) will be conducted of the proposed turbine locations to assess any evidence of target species activity or occupation of new territories (e.g. in the case of breeding snipe). Should any nesting locations be recorded, works at these locations will be restricted to outside the breeding season (March 1st to August 31st inclusive) or until chicks are deemed to have fledged (following monitoring).

9. The use of "white lights" on the turbines will not occur as these can attract night flying birds such as migrants, and insects, which in turn can attract bats. Certain turbines will be illuminated with medium intensity fixed red obstacle lights of 2000 candelas where required by the IAA Lighting will be fitted with baffles to ensure that the light is directed skywards and will not be discernible from the ground.

10.9.3 Mitigation Measures during the Operation Phase of the Project

A post construction monitoring programme will be implemented at Shancloon in order to confirm the efficacy of the mitigation measures; the results of this will be submitted annually to the competent authority and NPWS. Published guidance on assessing the impacts of wind farms on birds from English Nature and the Royal Society for the protection of birds recommends the implementation of an agreed post development monitoring programme as a best practice mitigation measure (Drewitt and Langston, 2006).

In addition, published recommendations on swans and wind farms (Rees, 2012) suggests that systematic post construction monitoring; adapted to quantify collision, barrier, and displacement, be conducted over a period of sufficient duration to allow for annual variation or in combination effects. The following individual components will be carried out:

1. Fatality Monitoring (to be conducted during years 1, 2, 3, 5, 10 and 15 post construction)- A comprehensive fatality monitoring programme will be undertaken following published best practice (Shawn et al., 2010; Fijn et al., 2012 and Grunkorn, 2011); the primary components are as follows:
    a) Initial carcass removal trials to establish levels of predator removal of possible fatalities. This will be done following best recommended practice and with due cognisance to published effects such as predator swamping, whereby excessive placement of carcasses increases predator presence and consequently skews results (Shawn et al., 2010). No turbines which are used for carcass removal trials will be used for subsequent fatality monitoring. Carcass removal trials will be continued for the duration of fatality searches.
    b) Turbine searches for fatalities will be undertaken following best practice (Fijn et al., 2012 and Grunkorn, 2011) in terms of search area (minimum radius hub height of 81m) and at intervals selected to effectively sample fatality rates based on carcass removal rates (1 per month). To be conducted during years 1, 2, 3, 5, 10 and 15 post construction to allow for annual variation and cumulative effects. Dependant on results further monitoring to be agreed with NPWS.
    c) A standardised approach with a possible control group and/or variation in search techniques such as straight line transects/ randomly selected spiral transects/ dog searches will be undertaken. This will provide a means of robustly estimating the post construction collision fatality impact (if any).
    d) Recorded fatalities will be calibrated against known predator removal rates to provide an estimate of overall fatality rates.

Reports will be submitted to the competent authority and NPWS following each round of surveys.

2. Flight Activity Survey (to be conducted during years 1, 2, 3, 5, 10 and 15 post construction) - A flight activity survey will be undertaken during the summer and winter months to include both vantage point and hinterland surveys as Per SNH (2017) guidance:
    e) Record any barrier effect i.e. the degree of avoidance exhibited by species approaching or within the Site (Drewitt and Langston, 2006). Target species to be all raptors and owls, all wild goose and duck species, all swan species, and all wader species.
    f) Record changes in flight heights of key receptors post construction.

Reports will be submitted to the competent authority and NPWS following each round of surveys. This survey is to be conducted during years 1, 2, 3, 5, 10 and 15 post construction to allow for annual variation and cumulative effects. Dependant on results further monitoring requirements will be agreed with NPWS.

3. Monthly Wildfowl Census (to be conducted during years 1, 2, 3, 5, 10 and 15 post construction). A monthly wildfowl census, following the methods utilised for the baseline survey, is to be repeated on a monthly basis during the winter period. This aims to:
   g) Assess displacement levels (if any) of wildfowl such as swans post construction
   h) Assess overall habitat usage changes within the vicinity of the Proposed Development post construction.

This survey will be conducted during years 1, 2, 3, 5, 10 and 15 post construction to allow for annual variation and cumulative effects. Dependant on results further monitoring requirements will be agreed with NPWS. Reports will be submitted to the competent authority and NPWS following each round of surveys.

4. Breeding Bird Survey (to be conducted during years 1, 2, 3, 5, 10 and 15 post construction). A breeding bird survey (moorland breeding bird and Common Bird Census), following methods used in the baseline survey to be repeated yearly between early April to early July. This aims to:
   i) Assess any displacement effects such as those recorded on breeding birds. Overall density of breeding birds to be annually recorded.
5. Breeding Wader Survey (to be conducted during years 1, 2, 3, 5, 10 and 15 post construction). A breeding bird survey, following methods used in the baseline survey to be repeated yearly April-May-June.

Both of the above surveys are to be conducted during years 1, 2, 3, 5, 10 and 15 post construction to allow for annual variation and cumulative effects. Dependant on results further monitoring requirements will be agreed with NPWS.

10.10 Residual Effects on Avifauna

As in section 10.8.3 and 10.8.4, no effect greater than low as per Percival 2003 criteria was identified for any key receptor species.

No effect significance greater than short-term moderate and long-term slight as per EPA (2022) criteria was identified for any residual effect.

To minimise effects on those species which the literature suggests can be negatively impacted, a re-confirmatory pre-construction survey (March/April) will be conducted of the proposed turbine locations to assess any evidence of target species activity or the occupation of new territories. Should any new nests be recorded, works at these locations will be restricted to outside the breeding season (April-July) or until chicks are deemed to have fledged (following monitoring).

A comprehensive monitoring program, will also be implemented following construction of the Proposed Development; this will monitor the degree of barrier effect, if any, on existing species as a result of the development, in addition to comprehensively monitoring any bird fatalities.

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FEHILY TIMONEY

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APPENDIX 1

Irish Wetland Bird Survey Data – IweBS sites within 25km of the Proposed Development

Table 10-19: Irish Wetland Bird Survey Data – IWeBS sites within 25km of the Proposed Development

Species	1% national	1% international	2011/ 2012	2012/ 2013	2013/ 2014	2014/ 2015	2015/ 2016	2016/ 2017	2017/ 2018	2018/ 2019	2019/ 2020	2020/ 2021	Mean	Total	Peak months
Subsite: Lough Mask - 0D005															
Mute Swan	90	100		44*	64*	65*	57*	116	121*	74*	158*		117	699	Sep
Whooper Swan	150	340			39	33	52	98	15*	15	28		39	280	Jan
Greenland White-fronted Goose		190			5	8							0	13	Nov
Greylag Goose	35	980			15						44*		11	59	Sep, Nov
Shelduck	100	2500								3			1	3	Jan
Wigeon	560	14000		52*	245	158	161*	91	163	72	102*		107	1044	Jan
Gadwall	20	1200									2		1	2	Nov
Teal	360	5000		3*	19	53*	75*	20*	29	11	36*		24	246	Oct
Mallard	280	53000		53*	150*	324*	190*	123*	69	114	210		129	1233	Oct
Pochard	110	2000			10*	39		1*	2*	5*			2	57	Oct
Tufted Duck	270	8900		261*	291	391*	279*	325*	253*	402*	526		377	2728	Oct
Scaup	25	3100					1		1*	1*	2*		1	5	Oct
Long-tailed Duck								2*					1	2	Mar
Goldeneye	40	11400		4*	21	61*	33*	50	212	59	126		112	566	Dec
Red-breasted Merganser	25	860				11*	3	10*	2*	1	6		5	33	Jan, Sep
Great Northern Diver	20	50			2	3*		1*	6*	2	4		3	18	Feb, Dec
Little Grebe	20	4700		4*	16	27	18*	23	26	30*	36*		29	180	Oct
Great Crested Grebe	30	6300		2*	4	6*	6	9	6*	16	16		12	65	Dec
Cormorant	110	1200		20*	24	51	23*	36*	41*	42*	102*		55	339	Oct
Little Egret	20	1100								3			1	3	Jan

Species	1% national	1% international	2011/2012	2012/2013	2013/2014	2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	2019/2020	2020/2021	Mean	Total	Peak months
Grey Heron	25	5000		2*	5*	7*	5*	8*	4*	11*	25*		12	67	Sep
Moorhen				2*	9	6*	3*	10*	6*	6*	4		7	46	Oct
Coot	190	15500		5*	14	8*	15*	134*	28*	37*	14*		53	255	Oct
Oystercatcher	610	8200						2*	2*				1	4	Mar
Ringed Plover	120	540				3*		3*					1	6	Feb, Mar
Golden Plover	920	9300						74*					19	74	Mar
Lapwing	850	72300		9*	90	69	39*	53*	44	26*	122*		61	452	Oct
Snipe				3*	2	7*	6*	24*	15*	3	24		17	84	Mar, Oct, Nov
Curlew	350	7600		16*	31	38	39	7*	36	33	76*		38	276	Jan
Redshank	240	2400				1	1*		2*				1	14	Feb, Oct, Dec
Common Sandpiper											2*		1	2	Oct
Kingfisher						2*			1*				0	3	Sep
Black-headed Gull						1*	11*	162*	88*	28*	1*		70	291	Feb
Common Gull						13*	4*	174*	227*	10*	4*		104	432	Feb
Lesser Black-backed Gull							11*	15*	20*	1*			9	47	Sep
Great Black-backed Gull				21*	3*	8*	8*	6*	28*	10*	16		15	100	Sep
Greylag Goose (domestic)				14*		10	55*	27*	13*	31*	44*		29	194	Oct
Subsite: Lough Carra - 0D098															
Mute Swan	90	100	12*					6					6	18	Jan
Whooper Swan	150	340	5										0	5	Jan
Greylag Goose	35	980	3*										0	3	Feb

Species	1% national	1% international	2011/2012	2012/2013	2013/2014	2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	2019/2020	2020/2021	Mean	Total	Peak months
Wigeon	560	14000	46					1					1	47	Jan, Nov
Gadwall	20	1200	30										0	30	Jan
Teal	360	5000	65					6					6	71	Jan, Nov
Mallard	280	53000	80*					7					7	87	Jan, Feb
Shoveler	20	650	21										0	21	Nov
Pochard	110	2000	106										0	106	Jan
Tufted Duck	270	8900	229					120					120	349	Jan
Long-tailed Duck			6										0	6	Nov
Goldeneye	40	11400	94*					43					43	137	Jan, Feb
Red-breasted Merganser	25	860	2*										0	2	Feb
Little Grebe	20	4700	15*					9					9	24	Jan, Feb
Great Crested Grebe	30	6300	14*					1					1	15	Jan, Feb
Cormorant	110	1200	20*					7					7	27	Jan, Feb
Grey Heron	25	5000	3										0	3	Jan
Water Rail			3*										0	3	Feb
Moorhen			10*										0	10	Feb
Coot	190	15500	13*										0	13	Feb
Ringed Plover	120	540	2*										0	2	Feb
Golden Plover	920	9300	120										0	120	Jan
Lapwing	850	72300	210										0	210	Nov
Snipe			2*										0	2	Feb
Curlew	350	7600	30					28					28	58	Jan
Subsite: Kilglassan Turlough - No records available															

Species	1% national	1% international	2011/ 2012	2012/ 2013	2013/ 2014	2014/ 2015	2015/ 2016	2016/ 2017	2017/ 2018	2018/ 2019	2019/ 2020	2020/ 2021	Mean	Total	Peak months
Subsite: North Central Galway Lakes - 0G005															
Mute Swan	90	100	5	6*	19		7*	1*			5		3	43	Mar, Dec
Whooper Swan	150	340	233	38	154*		193*	108*			52*		80	778	Mar
Greenland White-fronted Goose	100	190	39		51*		78*	45					23	213	Dec
Greylag Goose	35	980		48*	13*						365*		183	426	Mar
Barnacle Goose	160	810		1*									0	1	Jan, Feb
Shelduck	100	2500	1										0	1	Nov
Wigeon	560	14000	637*	397*	650		1315	650			221*		436	3870	Jan
Teal	360	5000	220*	680*	20*		100	211			80*		146	1311	Feb
Mallard	280	53000	73*	212	19*		119	330			266*		298	1019	Dec
Shoveler	20	650	30*	52	150		100	72					36	404	Dec
Pochard	110	2000	50	90	8*								0	148	Jan
Tufted Duck	270	8900	220	232*	164		570	50			87*		69	1323	Jan
Cormorant	110	1200	1	2*									0	3	Jan, Feb, Mar
Little Egret	20	1100						2					1	2	Dec
Grey Heron	25	5000	1*								1*		1	2	Mar, Sep
Moorhen					1*								0	1	Mar
Coot	190	15500			1*		2*						0	3	Mar
Ringed Plover	120	540					4						0	4	Dec
Golden Plover	920	9300	400*	580	60*		922*				400*		200	2362	Feb, Oct
Lapwing	850	72300	300	592	257		699*	250			350		300	2448	Nov
Dunlin	460	13300	8				64*						0	72	Oct, Nov
Curlew	350	7600	107	1			70	80			50*		65	308	Jan, Nov
Redshank	240	2400	7				8						0	15	Jan, Nov

Species	1% national	1% international	2011/2012	2012/2013	2013/2014	2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	2019/2020	2020/2021	Mean	Total	Peak months
Black-headed Gull			178	9*	134		180	28			23*		26	552	Jan
Lesser Black-backed Gull											7		4	7	Jan
Great Black-backed Gull											2*		1	2	Mar
Subsite: Ballybackagh - 0DS30															
Mute Swan	90	100				2	5			3			3	10	Jan
Whooper Swan	150	340				25*	80						0	105	Jan, Mar
Greenland White-fronted Goose	100	190				8*	3			13			13	24	Jan, Feb, Dec
Greylag Goose	35	980				110	53						0	163	Jan, Nov
Wigeon	560	14000				80*	117*			78			78	275	Mar
Gadwall	20	1200					4						0	4	Dec
Teal	360	5000				7*	36*			2			2	45	Jan, Mar, Sep
Mallard	280	53000				33*	57			8			8	98	Nov
Pintail	20	600					1*						0	1	Feb
Shoveler	20	650				5*	19*			5			5	29	Mar
Pochard	110	2000				2*	1*						0	3	Mar
Tufted Duck	270	8900				67*	171*			28			28	266	Jan, Feb, Mar
Little Grebe	20	4700				6*	2						0	8	Mar, Dec
Great Crested Grebe	30	6300				1*	1*						0	2	Mar
Cormorant	110	1200					1*						0	1	Mar
Grey Heron	25	5000					2*			1			1	3	Jan, Feb

Species	1% national	1% international	2011/2012	2012/2013	2013/2014	2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	2019/2020	2020/2021	Mean	Total	Peak months
Water Rail						1*	1*						0	2	Mar
Moorhen						2*	1*						0	3	Mar
Coot	190	15500					2*						0	2	Mar
Golden Plover	920	9300				800	660			150			150	1610	Nov
Lapwing	850	72300				500	176			305			305	981	Nov
Dunlin	460	13300				8	15*						0	23	Sep, Nov
Snipe						5	1*			1			1	7	Jan, Sep, Nov
Woodcock							1*						0	1	Mar
Black-tailed Godwit	200	1100				1*							0	1	Mar
Whimbrel							19*						0	19	Sep
Curlew	350	7600				7*	66			51			51	124	Mar, Nov, Dec
Black-headed Gull						60	19*			36			36	115	Jan, Mar, Nov
Common Gull						39*	34*						0	73	Mar
Great Black-backed Gull							1*			1			1	2	Sep, Nov
Subsite: Rostaff Lake - 0D305															
Mute Swan	90	100	1	2*			2*		2*	3*	2*		1	12	Mar
Whooper Swan	150	340	18	5*	24	25	23*	10	14*	2	16*	9*	10	146	Jan
Greenland White-fronted Goose	100	190	20	30*			34						0	84	Mar, Nov, Dec
Greylag Goose	35	980	70*	100*		55	30*	45*	2*	170	5*		44	477	Oct
Wigeon	560	14000	300	200*	400*	300	500	330	366*	450*	300*	88*	307	3234	Jan
Gadwall	20	1200				2							0	2	Nov
Teal	360	5000	165	180	50*	20	198	30	80	8	15*	15*	30	761	Nov, Dec

Species	1% national	1% international	2011/ 2012	2012/ 2013	2013/ 2014	2014/ 2015	2015/ 2016	2016/ 2017	2017/ 2018	2018/ 2019	2019/ 2020	2020/ 2021	Mean	Total	Peak months
Mallard	280	53000	80*	35*	19*	64	110*	90*	20	14	33*	36*	39	501	Oct
Shoveler	20	650	110	42	190	44*	140	10*	60	43*	20*	42*	35	701	Jan, Mar, Oct, Dec
Pochard	110	2000	9*	11	10	40		9	16	7		1*	7	103	Nov, Dec
Tufted Duck	270	8900	23*	24*	20	340	43	30	43	68	30*	7*	36	628	Jan
Little Grebe	20	4700				1*							0	1	Feb
Great Crested Grebe	30	6300	2*				1*					1*	0	4	Sep
Cormorant	110	1200	7	5*	2	2*	4*	6	4	4	2*	3*	4	39	Nov
Little Egret	20	1100								1*			0	1	Mar
Grey Heron	25	5000			1*		1*	1*		1*	1*	2*	1	7	Oct
Moorhen									1				0	1	Dec
Coot	190	15500										1*	0	1	Sep
Golden Plover	920	9300	600			85							0	685	Jan, Nov
Lapwing	850	72300	200	2	85	300	250	70*	40	190	20*	23*	69	1160	Jan, Oct, Nov
Snipe			1			1*	3*						0	5	Sep
Curlew	350	7600	60	50	70	401	100	70	140	80*	64*	6*	72	1041	Jan
Black-headed Gull			230*	49	124*	170	106	120*	47*	54*	96*		63	996	Feb
Common Gull			145*	88*	200*	260*	350*	400*	140*	350*	400*		258	2333	Feb
Lesser Black-backed Gull					4*	2*							0	6	Mar
Herring Gull					1		1*						0	2	Jan, Oct
Great Black-backed Gull			1*	1*			1*		2				0	5	Feb
Greylag Goose (domestic)			1*	20*		3							0	24	Sep
Ring-billed Gull									6				1	6	Jan

Species	1% national	1% international	2011/2012	2012/2013	2013/2014	2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	2019/2020	2020/2021	Mean	Total	Peak months
Glaucous Gull										1*			0	1	Feb
Subsite: Lough Corrib - 0G004															
Mute Swan	90	100	161	165	270	305	8*	251	342	7*	3*	22*	125	1534	Nov
Whooper Swan	150	340	43	40*	82	92	68	27	70	58			31	480	Jan
Greenland White-fronted Goose	100	190	45								13		3	58	Jan
Greylag Goose	35	980	110	31	45*	160	44	49	160	32	11*		50	642	Jan
Wigeon	560	14000	23	357	283	240	30	64	31	2	4		20	1034	Jan
Gadwall	20	1200	23*	43	14*	8	4	50		3*			11	145	Feb, Nov
Teal	360	5000	30	294	137	8	27	107	2	13			24	618	Jan
Mallard	280	53000	165	295	62	193	39*	138	126	33	31	14*	68	1096	Jan
Pintail	20	600			4			10					2	14	Jan, Nov
Shoveler	20	650		10*	4		10	30					6	44	Jan
Pochard	110	2000	233	416	801	1261		17	14				6	2742	Jan, Nov
Tufted Duck	270	8900	1595	1059	1235	6558	42	555	714	7*	2*	6*	257	11773	Jan
Scaup	25	3100	4										0	4	Nov
Goldeneye	40	11400	52	90	48	36		41	5				9	272	Jan
Red-breasted Merganser	25	860	1	3*		5*	1*	9*	2*				2	21	Feb
Great Northern Diver	20	50	1*	2*	2	2	2*	3	2	1	1		1	16	Nov
Little Grebe	20	4700	32	27	27	45	5	20	19	4*	5	5*	11	189	Jan, Nov
Great Crested Grebe	30	6300	7	8	6	2		9	8*		3*		4	43	Jan
Cormorant	110	1200	64	32	51	42	5*	78	68	2*	2*	4*	31	348	Jan, Oct, Nov

Species	1% national	1% international	2011/2012	2012/2013	2013/2014	2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	2019/2020	2020/2021	Mean	Total	Peak months
Little Egret	20	1100			2	1		4	1	1*	3*		2	12	Jan
Grey Heron	25	5000	8	6	25	14	1*	9	3		3*		3	69	Jan, Nov
Water Rail						1		3	1				1	5	Nov
Moorhen			3	6	15	4	1*	7	2	1*	1		2	40	Jan
Coot	190	15500	7007	4183	236	174	4	3053	6372				1885	21029	Nov
Ringed Plover	120	540					2*						0	2	Feb
Golden Plover	920	9300	844	170*	6848	535	420*	790	135	277*			240	10019	Nov
Lapwing	850	72300	339	288	2226	408	38	347	155	35*	20	7*	113	3863	Nov
Dunlin	460	13300			12		12	35					7	59	Nov
Snipe				1	22	3	1*	5	2	5*	2*		3	41	Nov
Bar-tailed Godwit	170	1500						2					0	2	Nov
Curlew	350	7600	220	77	20	31	7*	63	27		8*		20	453	Jan
Redshank	240	2400	2*	6*	4	4*	3*	10		1*			2	30	Mar
Greenshank	20	3300							1				0	1	Nov
Kingfisher						1				1*			0	2	Sep, Dec
Black-headed Gull			19	78	91	27*	82*	96	40	200*	24*		72	657	Jan
Common Gull			53*	97*	105*	40*	52*	4	252*	113*	138*		101	854	Mar
Lesser Black-backed Gull			3	1	2	2		1		1*	1*	2*	1	13	Nov
Herring Gull			5*	1	1*	3		1	1				0	12	Jan, Nov
Great Black-backed Gull			3	3	12	6	1*	18	10	2			6	55	Jan
Greylag Goose (domestic)				2*									0	2	Oct
Great White Egret								2	1				1	3	Jan, Nov

Species	1% national	1% international	2011/2012	2012/2013	2013/2014	2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	2019/2020	2020/2021	Mean	Total	Peak months
Subsite: Ballyhaunis Lakes - 0D004															
Mute Swan	90	100	12	93	39*	77	4	17	135*	40	40*	67	60	524	Jan
Whooper Swan	150	340	8	23	21	61	11	77	14*	22	71*	175	72	483	Jan
Wigeon	560	14000	24	146	51		17	112	40*	64*	98	102	83	654	Jan
Gadwall	20	1200										3*	1	3	Sep
Teal	360	5000	44	78		2	9		9*	13*	13*	19	11	187	Jan
Mallard	280	53000	1	99	17*	27		12	151*	90	79	44	75	520	Jan
Pochard	110	2000	11	66	1		5	2	6*			4	2	95	Jan
Tufted Duck	270	8900	34	129	44	174	45	55	166	66	44	47	76	804	Jan
Scaup	25	3100								1*			0	1	Oct
Goldeneye	40	11400		12				7					1	19	Jan
Goosander										1			0	1	Jan
Little Grebe	20	4700	1	2	4*	3				6	2*	2	2	20	Jan
Great Crested Grebe	30	6300		1		6			1*	1*	2*	1*	1	12	Jan, Feb
Cormorant	110	1200	2	25	11	16	3	12	16	22*	9	21	16	137	Jan
Little Egret	20	1100									1		0	1	Nov
Grey Heron	25	5000	1	3	1*	5	1	1	2	5*	2*	2	2	23	Jan
Moorhen			2	1	8	3			2*	13*	4	11	6	44	Jan
Coot	190	15500		2					3	13	7*	2	5	27	Dec
Golden Plover	920	9300		5					117			180	59	302	Jan
Lapwing	850	72300		216	220		55		195	304	141	195	167	1326	Jan
Dunlin	460	13300								2*			0	2	Oct
Snipe									6*	5	2*	7*	4	20	Feb
Whimbrel												14	3	14	Dec

Species	1% national	1% international	2011/ 2012	2012/ 2013	2013/ 2014	2014/ 2015	2015/ 2016	2016/ 2017	2017/ 2018	2018/ 2019	2019/ 2020	2020/ 2021	Mean	Total	Peak months
Curlew	350	7600	114	181	195	49	23		17*	69*	33	37*	31	718	Jan
Black-headed Gull							1			88*	26*	17	26	132	Jan
Common Gull											6		1	6	Jan
Lesser Black-backed Gull									3*				1	3	Feb
Subsite: Polleagh Turlough - 0G328															
Mute Swan	90	100										2*	2	2	Jan, Feb, Mar, Sep, Nov, Dec
Whooper Swan	150	340										28*	28	28	Mar
Wigeon	560	14000										44*	44	44	Mar
Mallard	280	53000										12*	12	12	Jan, Mar
Tufted Duck	270	8900										23	23	23	Dec
Great Crested Grebe	30	6300										2*	2	2	Mar
Cormorant	110	1200										3	3	3	Dec
Little Egret	20	1100										1*	1	1	Sep
Grey Heron	25	5000										5*	5	5	Sep
Moorhen												3*	3	3	Feb
Coot	190	15500										1*	1	1	Sep
Golden Plover	920	9300										47*	47	47	Oct
Lapwing	850	72300										69*	69	69	Oct
Snipe												8*	8	8	Jan, Mar
Curlew	350	7600										37*	37	37	Oct
Redshank	240	2400										1*	1	1	Mar
Black-headed Gull												19*	19	19	Feb

Species	1% national	1% international	2011/2012	2012/2013	2013/2014	2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	2019/2020	2020/2021	Mean	Total	Peak months
Subsite: North East Galway Lakes - 0G006															
Mute Swan	90	100	8*	6	6*		5	4*			6*	15	8	50	Dec
Whooper Swan	150	340	201*	199*	16		81*	135*			75*	44	85	751	Feb
Greenland White-fronted Goose	100	190		16*				3*					1	19	Mar
Greylag Goose	35	980	10*									24*	8	34	Feb, Sep
Wigeon	560	14000	165	141	25*		95*	558			161*	198	306	1343	Mar, Dec
Teal	360	5000	14*	32*	40		23*	164			42*	76	94	391	Feb
Mallard	280	53000	106	58	11*		20*	160			70	54	95	479	Feb, Nov, Dec
Shoveler	20	650	24	27	6*		24	37			31*	76	48	225	Jan
Pochard	110	2000	1*	6	4*			2				1	1	14	Feb, Nov
Tufted Duck	270	8900	40	59*	3*		60*	29			98	19*	49	308	Jan, Feb, Mar
Red-breasted Merganser	25	860						6*					2	0	Mar
Great Northern Diver	20	50					1						0	1	Jan
Little Grebe	20	4700	5*	4*	1*						2	4	2	16	Jan, Mar
Great Crested Grebe	30	6300		2*	4*								0	0	Mar
Cormorant	110	1200	10	11	5*		13	14			10	16*	13	79	Jan
Little Egret	20	1100					2*	1			2*		1	1	Jan, Mar, Oct
Grey Heron	25	5000	3*	6*	1*		1*	5*			1*	7*	4	25	Oct
Moorhen			16	13*	7*		6*	4*			7*	20*	10	73	Feb
Coot	190	15500	18*	11*	5*		15*	8*			55	15	26	127	Mar
Golden Plover	920	9300	300	490			40	50			120		57	1000	Dec

Species	1% national	1% international	2011/2012	2012/2013	2013/2014	2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	2019/2020	2020/2021	Mean	Total	Peak months
Lapwing	850	72300	700	280	250*		200	340*			284	46	223	2100	Dec
Snipe				1								1*	0	2	Jan, Feb
Curlew	350	7600	56*	10*			24*	216*			123*	23	121	452	Feb
Black-headed Gull			8*	11			101*	117			30		49	267	Jan
Lesser Black-backed Gull								2*			6		3	8	Jan, Mar
Great Black-backed Gull												2*	1	2	Mar
Glossy Ibis			1*										0	1	Mar
Subsite: Doolough Headford Turloughcor - 0G317															
Mute Swan	90	100	5*	2*	2*	2*	2*	2	3*	3*	3		2	24	Jan
Whooper Swan	150	340	18*	48*	19	40	1	14	23*	40*	12		18	215	Nov
Greylag Goose	35	980					10*						0	10	Oct
Wigeon	560	14000	364	130	252	272*	150	280	294*	562*	350	162*	330	2816	Feb
Gadwall	20	1200	94*	107	10	50*	30*	27	60	68*	66*		44	512	Jan
Teal	360	5000	198*	180	100	78	151*	105	80	80*	81*		69	1053	Mar
Mallard	280	53000	50*	77*	30	20	120*	64*	48*	63*	30		41	502	Sep
Shoveler	20	650	85	193	86	50*	35	57	90	70	150	10*	75	826	Jan
Pochard	110	2000		1*			6						0	7	Jan, Sep
Tufted Duck	270	8900	39	94	135	37*	44	38	80*	33*	48	8*	41	556	Jan
Little Grebe	20	4700	14	9	8	2		1		1		3*	1	38	Nov
Slavonian Grebe									1				0	1	Jan
Cormorant	110	1200	1*		1	2*				2*			0	6	Jan, Feb, Sep
Grey Heron	25	5000	1*	1*		1	1*	1*		2*	6*		2	15	Oct
Moorhen					2*	1*							0	3	Sep, Oct

Species	1% national	1% international	2011/ 2012	2012/ 2013	2013/ 2014	2014/ 2015	2015/ 2016	2016/ 2017	2017/ 2018	2018/ 2019	2019/ 2020	2020/ 2021	Mean	Total	Peak months
Coot	190	15500					2*						0	2	Mar
Golden Plover	920	9300		800		100		200			500*		140	1600	Jan, Feb, Nov, Dec
Lapwing	850	72300	91	51	23	80		10		40	50*		20	345	Nov
Ruff			3*										0	3	Sep
Black-tailed Godwit	200	1100						5*					1	5	Oct
Curlew	350	7600	16*		7	3		2*	2*	2*		2*	2	34	Oct
Black-headed Gull			12	40	30			3	30*				7	115	Nov
Common Gull				40*				38			300*		68	378	Jan, Mar
Lesser Black-backed Gull										9*	1*		2	10	Feb, Sep
Herring Gull											1*		0	1	Mar
Great Black-backed Gull						1							0	1	Dec
Subsite: River Clare - No available data															
Subsite: Curragh Turlough - No available data															
Subsite: River Robe - No available data															

Table 10-20: Avian Species Recorded in 10km grid square M25.

Species name	BoCCI	Annex I	Date of last record
Barn Owl (*Tyto alba*)	Red	No	29/03/2018
Barn Swallow (*Hirundo rustica*)	Amber	No	16/04/2019
Bewick's Swan (*Cygnus columbianus subsp. bewickii*)	Red	No	31/12/2001
Black-billed Magpie (*Pica pica*)	Green	No	01/03/2022
Blackcap (*Sylvia atricapilla*)	Green	No	31/12/2011
Black-headed Gull (*Larus ridibundus*)	Amber	No	01/03/2022
Black-tailed Godwit (*Limosa limosa*)	Red	No	26/12/2022
Blue Tit (*Cyanistes caeruleus*)	Green	No	18/02/2020
Chaffinch (*Fringilla coelebs*)	Green	No	18/02/2020
Coal Tit (Periparus ater)	Green	No	31/12/2011
Common Blackbird (*Turdus merula*)	Green	No	31/12/2011
Common Bullfinch (*Pyrrhula pyrrhula*)	Green	No	31/12/2011
Common Buzzard (*Buteo buteo*)	Green	No	19/05/2020
Common Chiffchaff (*Phylloscopus collybita*)	Green	No	31/12/2011
Common Coot (*Fulica atra*)	Green	No	31/12/2011
Common Cuckoo (*Cuculus canorus*)	Green	No	31/12/2011
Common Goldeneye (*Bucephala clangula*)	Red	No	31/12/2011
Common Grasshopper Warbler (*Locustella naevia*)	Green	No	31/12/2011
Common Greenshank (*Tringa nebularia*)	Green	No	31/12/2001
Common Kestrel (*Falco tinnunculus*)	Red	No	22/11/2017
Common Kingfisher (*Alcedo atthis*)	Amber	Yes	03/07/2014
Common Linnet (*Carduelis cannabina*)	Amber	No	31/12/2011

Species name	BoCCI	Annex I	Date of last record
Common Moorhen (*Gallinula chloropus*)	Green	No	28/06/2015
Common Pheasant (*Phasianus colchicus*)	Green	No	01/06/2014
Common Pochard (*Aythya ferina*)	Green	No	18/02/2020
Common Quail (*Coturnix coturnix*)	Green	No	31/07/1972
Common Raven (*Corvus corax*)	Green	No	13/07/2022
Common Redshank (*Tringa totanus*)	Red	No	31/12/2011
Common Sandpiper (*Actitis hypoleucos*)	Amber	No	31/07/1991
Common Snipe (*Gallinago gallinago*)	Red	No	01/03/2022
Common Starling (*Sturnus vulgaris*)	Amber	No	31/12/2011
Common Swift (*Apus apus*)	Red	No	31/12/2011
Common Whitethroat (*Sylvia communis*)	Green	No	31/12/2011
Common Wood Pigeon (*Columba palumbus*)	Green	No	18/02/2020
Corn Crake (*Crex crex*)	Red	Yes	31/07/1972
Dunlin (*Calidris alpina*)	Green	No	31/12/2011
Eurasian Collared Dove (*Streptopelia decaocto*)	Green	No	28/06/2015
Eurasian Curlew (*Numenius arquata*)	Red	No	13/07/2022
Eurasian Jackdaw (*Corvus monedula*)	Green	No	01/03/2022
Eurasian Sparrowhawk (*Accipiter nisus*)	Green	No	31/12/2011
Eurasian Teal (*Anas crecca*)	Amber	No	01/03/2022
Eurasian Treecreeper (*Certhia familiaris)*	Green	No	31/12/2011
Eurasian Wigeon (*Anas penelope*)	Amber	No	01/03/2022
Eurasian Woodcock (*Scolopax rusticola*)	Red	No	01/03/2022
European Golden Plover (*Pluvialis apricaria*)	Red	Yes	31/12/2011

Species name	BoCCI	Annex I	Date of last record
European Goldfinch (*Carduelis carduelis*)	Green	No	28/06/2015
European Greenfinch (*Carduelis chloris*)	Amber	No	31/12/2011
European Robin (*Erithacus rubecula*)	Green	No	13/07/2022
Fieldfare (*Turdus pilaris*)	Green	No	31/12/2011
Goldcrest (Regulus regulus)	Amber	No	01/03/2022
Great Black-backed Gull (*Larus marinus*)	Amber	No	31/12/2001
Great Cormorant (*Phalacrocorax carbo*)	Amber	No	31/12/2011
Great Crested Grebe (*Podiceps cristatus*)	Amber	No	31/12/2011
Great Tit (*Parus major*)	Green	No	01/03/2022
Grey Heron (*Ardea cinerea*)	Green	No	13/07/2022
Grey Partridge (*Perdix perdix*)	Red	No	31/07/1972
Grey Wagtail (*Motacilla cinerea*)	Red	No	18/02/2020
Greylag Goose (*Anser anser*)	Amber	No	31/12/2011
Hedge Accentor (*Prunella modularis*)	Green	No	28/06/2015
Herring Gull (*Larus argentatus*)	Amber	No	31/12/2001
Hooded Crow (*Corvus cornix*)	Green	No	18/02/2020
House Martin (*Delichon urbicum*)	Amber	No	31/12/2011
House Sparrow (*Passer domesticus*)	Amber	No	18/02/2020
Lesser Black-backed Gull (*Larus fuscus*)	Amber	No	01/03/2022
Lesser Redpoll (*Carduelis cabaret)*	Green	No	31/12/2011
Little Grebe (*Tachybaptus ruficollis*)	Green	No	31/12/2011
Long-eared Owl (*Asio otus*)	Green	No	31/12/2011
Long-tailed Tit (*Aegithalos caudatus*)	Green	No	28/06/2015

Species name	BoCCI	Annex I	Date of last record
Mallard (*Anas platyrhynchos*)	Amber	No	01/03/2022
Meadow Pipit (*Anthus pratensis*)	Red	No	31/12/2011
Merlin (*Falco columbarius*)	Amber	Yes	31/12/2011
Mew Gull (*Larus canus*)	Amber	No	04/03/2014
Mistle Thrush (*Turdus viscivorus*)	Green	No	28/06/2015
Mute Swan (*Cygnus olor*)	Amber	No	04/02/2018
Northern Lapwing (*Vanellus vanellus*)	Red	No	04/12/2017
Northern Shoveler (*Anas clypeata*)	Red	No	31/12/2011
Northern Wheatear (*Oenanthe oenanthe*)	Green	No	31/07/1972
Peregrine Falcon (Falco peregrinus)	Green	Yes	16/08/2015
Pied Wagtail (*Motacilla alba subsp. yarrellii*)	Green	No	16/04/2019
Red-breasted Merganser (*Mergus serrator*)	Amber	No	31/07/1991
Redwing (*Turdus iliacus*)	Red	No	18/02/2020
Reed Bunting (*Emberiza schoeniclus*)	Green	No	13/07/2022
Rook (*Corvus frugilegus*)	Green	No	01/03/2022
Sand Martin (*Riparia riparia*)	Amber	No	31/07/1991
Sedge Warbler (*Acrocephalus schoenobaenus*)	Green	No	13/07/2022
Sky Lark (*Alauda arvensis*)	Amber	No	31/12/2011
Song Thrush (*Turdus philomelos*)	Green	No	01/03/2022
Spotted Flycatcher (*Muscicapa striata*)	Amber	No	31/07/1991
Stock Pigeon (*Columba oenas*)	Green	No	31/07/1991
Stonechat (*Saxicola torquata*)	Green	No	31/12/2011
Tufted Duck (*Aythya fuligula*)	Amber	No	01/03/2022

Species name	BoCCI	Annex I	Date of last record
Water Rail (*Rallus aquaticus*)	Green	No	31/12/2011
Whinchat (*Saxicola rubetra*)	Red	No	31/07/1972
White Wagtail (Motacilla alba)	Green	No	31/12/2011
Whooper Swan (Cygnus cygnus)	Amber	Yes	03/12/2019
Willow Warbler (Phylloscopus trochilus)	Amber	No	13/07/2022
Winter Wren (Troglodytes troglodytes)	Green	No	01/03/2022
Yellowhammer (Emberiza citrinella)	Red	No	31/07/1991

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