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ENVIRONMENTAL IMPACT ASSESSMENT REPORT (EIAR) FOR THE PROPOSED LITTLETON WIND FARM, CO. TIPPERARY

Volume 2 - Main EIAR

Chapter 7 - Ornithology

Prepared for:
Littleton Wind Farm DAC

BnM | sse

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7. ORNITHOLOGY

7.1 Introduction

This chapter has been prepared to assess the potential effects that the proposed Littleton Wind Farm (described in Chapter 4 Project 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).

This Chapter of the EIAR is supported by Figures in Volume IV, Planning Drawings accompanying the planning application and the following Appendix documents provided in Volume III:

- Appendix 4.1: Construction Environmental Management Plan (CEMP);
- Appendix 7.1: Baseline Ornithology Report;
- Appendix 7.2: Collision Risk Model Report.

The Proposed Development assessed in this EIAR comprises the following elements:

- The 'Proposed Wind Farm' (also referred to in this EIAR as the '**Site'**);
- The 'Proposed Grid Connection' (also referred to in this EIAR as the **'GC'**);
- The 'Turbine Delivery Route' (also referred to in this EIAR as the **'TDR'**);
- The 'Biodiversity Enhancement and Management Plan Lands' (also referred to in this EIAR as the **'BEMP Lands'**);

Ornithological survey work was carried out by qualified ornithologists and was compliant with Scottish Natural Heritage (SNH, 2017). Bird surveys commenced at the Site in October 2020 and were completed in March 2025. See Appendix 7.1 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.

7.2 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.

7.3 Consultation

The full list of the bodies consulted as part of the environmental assessment are presented in the EIAR, Chapter 2 Background to the Proposed Development. Specific to ornithology, the following responses were received.

7.3.1 Initial Consultation

Development Applications Unit (DAU)/ National Parks and Wildlife Service (NPWS) (consultation reference Pre00244/2021): A response was issued following submission of the EIAR scoping report in 2021. The response advised on best-practice assessment approaches and key areas to cover in relation to nature conservation in order to prepare a robust assessment. Specific subjects raised included consideration of existing bog rehabilitation proposals, potential for effects on habitat/species of high biodiversity value, potential conflicts between strategic ecological value and use of site for wind energy, consideration of optimal site use in contributing to reductions in carbon emissions, effects of site/habitat management on how wildlife uses the site during operational the phase, assessment of drainage requirements and associated potential for water quality effects, long term peatland rehabilitation plans following wind farm decommissioning, and potential effects on a known wintering whooper swan flock in the immediate locality.

The response noted that the EIAR should take account of Objective 1 of the National Biodiversity Action Plan which is to mainstream biodiversity into decision-making across all sectors and also referenced guidance which should inform the preparation of the EIAR. The importance of avoidance through design as a first principle was highlighted. The response also noted that thorough and complete descriptions of both the proposed development and baseline environments are required for a robust assessment, with a particular focus on peat management, drainage and hydrological connectivity. The requirement to mitigate habitat loss and the importance of potential Annex I habitats occurring outside the Natura 2000 network were also noted. Potential effects of turbine lighting and consideration of alternatives were also raised.

A section on key survey requirements was included, with ornithology, bats, aquatic ecology, habitats, marsh fritillary butterfly and invasive alien plant species noted as key areas of interest. Guidance and legislation relevant to the impact assessment was listed and discussed, in addition to guidance relevant to Appropriate Assessment.

Assessment of cumulative effects, post-construction monitoring, and derogation licence requirements were also discussed.

7.3.2 Follow-Up Consultation

Based on availability of more detailed project information, requests for updated consultation were issued to the DAU and IFI in on 22 September 2023.

The DAU response to this request referred back to their initial response summarised above in Section 7.1.1.

Inland Fisheries Ireland (IFI) did not respond to a request for consultation (issued to South Eastern district office in Clonmel via email on 22 November 2023).

7.3.3 Final Stage of Consultation

A further request for consultation was issued to the DAU/NPWS on 15 December 2025. A response from NPWS offering a meeting and summarising key ecological considerations was received on 22 January 2026 (reference: G Pre00401/2025). The key items communicated by NPWS in advance of the meeting were:

- Requirement to ensure robustness of collision risk model (CRM) by ensuring adequate visibility of flight activity study area from vantage points (VPs);
- Importance of completing robust survey using suitable methodology for breeding curlew which are known to occur in the locality;
- Importance of contextualising any potential effects on breeding curlew, noting their conservation status and distribution;
- Ensure survey effort and methodology for hen harrier roost surveys are adequate and suitable.

These items and others were discussed during the consultation meeting (14 February 2026). The key items presented for discussion at the meeting were:

- Summary of proposed development and key ecological considerations;
- Use of iterative design informed by surveys to avoid and minimise potential effects;
- Summary of how initial NPWS observations (G Pre00244/2021) have informed project design, survey effort and design;
- Responses to the key ecological considerations communicated by NPWS on 22 January 2026 (reference: G Pre00401/2025).

Following presentation of the above listed items which provided an overview of the project and a starting point for discussion, the key items discussed were:

- Importance of assessing effects on the local curlew population robustly, noting the small size of this population means it is vulnerable, and that potential loss of one breeding pair could also significantly affect the national population due to its small size and localised distribution. NPWS stressed the importance of characterising potential population effects correctly. FT agreed to follow NPWS advice on assessing curlew population dynamics;
- Correct phenological contextualisation of potential collision effects on curlew should be ensured, noting juvenile curlew are likely to be more susceptible to collision risk, resulting in increased risk at certain times of the year;
- NPWS indicated they are receptive to inclusion of measures such as habitat and/or predator management to help offset any potential negative effects on breeding curlew. It was noted that any existing wader management ongoing at the Site cannot be used as mitigation/offset measures; any measures undertaken as part of the proposed development need to be implemented specifically for the proposed development. NPWS noted we could potentially explore collaborating with Breeding Wader EIP, and should also contact them to see if they are already undertaking any actions in the area or have site-specific data;

- In relation to the potential to compensate for a single collision mortality of breeding curlew over a 5 to 10 year period with predator control and nest protection, it was recommended that an attempt is made to illustrate this concept using an approach such as net reproductive rate (R0) / Lifetime reproductive success using the best demographic data available for curlew in Ireland. The idea would be to characterise the potential difference between a do nothing scenario, a scenario where there is a reduction in the adult population due to a collision mortality over a given period, and then a scenario with this breeding population reduction but also an increase in fledgling success caused by predator control /nest protection measures.
- It should be emphasised that this approach would not be a predictive but simply illustrative to show that it is possible. There is Irish / UK data available on the relative differences between fledging success for unprotected nests and nests with predator control / nest protection. For such an exercise it is recommended to assume that the collision mortality will be a breeding adult, as this would be precautionary, and more difficult to offset with increased fledging success. This approach would more accurately characterise the potential impact in the EIAR and also the probability of success of the proposed compensation measures.
- Requirement for robust monitoring protocol to monitor potential effects of amenity use on curlew in addition to standard collision monitoring;
- The potential for more widespread adoption of automated turbine curtailment systems in the future should be noted;
- NPWS noted that mitigation should include provisions to temporarily close sections of amenity trails if required at certain times of the year to avoid disturbance to curlew and other breeding waders. Monitoring of both bird and amenity user behaviour should be undertaken to inform any such decisions;
- Monitoring the effects of the amenity trails will also be required to check what other effects they may have, and to confirm the effectiveness of any barriers, screening fencing etc. installed;
- Requirement to identify ‘desire lines’ i.e. locations where amenity users may potentially stray from paths or cut corners with potential effects on breeding wader/waterbird areas. This would need to be looked at during the planning stage, but behaviour of recreational users during operation would also need to be monitored to allow adaptive responses during operation;
- If feasible, predator control to protect breeding curlew delivered within the ecological enhancement programme (if proven to reduce curlew mortality) could be considered as contributing to offsetting potential collision risk.
- NPWS noted FT should refresh their data request (received 12 December 2025) to ensure we have the most up to date information on breeding curlew in the area.

The above DAU/NPWS observations have been addressed through the design process, within the EIAR assessment, and by mitigation prescribed in this Ornithology Chapter and also within the Hydrology chapter of the EIAR.

7.4 Statement of Authority

The lead author of this chapter is Shannon Burke (PhD Environmental Biology; BSc (Hons) Plant Biology); co-author was Ben O'Dwyer (BSc (Hons) Wildlife Biology). This chapter was reviewed by Rita Mansfield (BSc.(Hons) Applied Ecology and H. Dip Environmental Protection and Pollution Control).

The collision risk models were undertaken by Ben O'Dwyer (BSc (Hons) Wildlife Biology).

Ornithological surveys were undertaken by Adrian Allen, Brian Porter, Gyr Penn, Kevin Collins, Lorraine Benson, Mara Van Aelst and Stephen King.

Background information and biographies of report authors are presented in , and qualifications of ornithological surveyors are presented in . Contributor CVs are included in Appendix 7-2.

Table 7-1: EIAR Chapter Contributors

Name	Role	Biography
Shannon Burke	EIAR Ornithology Chapter	Shannon Burke is a Project Ecologist with Fehily Timoney and Company and has 1 years' experience in the environmental consultancy sector. Shannon's work focused on the survey and assessment of proposed wind and solar energy development sites. She has been the lead author on numerous ecological impact reports and has carried out a variety of surveys including bat, otter, mammal, botanical, freshwater pearl mussel, insect, freshwater, and habitat surveys. She holds a BSc (Hons) in Plant Biology and a PhD in Environmental Biology from the University College Dublin.
Carla Deane	EIAR Ornithology Chapter Co-Author	Carla Deane is a Project Ecologist with Fehily Timoney and Company and has over 2 years' experience in the environmental consultancy sector. She holds a BSc (Hons) in Zoology from University College Dublin and a MSc in Marine Biology from the University College Cork. Carla's work focused on survey and assessment of large infrastructure projects and smaller commercial and residential developments. She has prepared AA Screening reports and assisted with Natura Impact statements and EcIAs for numerous projects in the commercial and transport sectors. She has carried out a variety of surveys including bat, otter, mammal, botanical, freshwater, wintering bird and habitat surveys.
Ben O'Dwyer	EIAR Ornithology Chapter Co-Author Collision Risk Model Ornithological Data Management	Ben is a Senior Project Ecologist with Fehily Timoney with over 9 years' experience in ecological assessment and holds a BSc (Hons) in Wildlife Biology from Institute of Technology Tralee (now MTU). He has prepared EcIAs, EIAR Biodiversity chapters, AA Screening reports and Natura Impact Statements for numerous large scale infrastructure projects in the renewable energy, commercial, waste management and transport sectors. He is an experienced and versatile field surveyor and his experience across a broad range of habitats and projects in Ireland has given him an extensive knowledge of protected sites and species across the country.
Rita Mansfield	Reviewer EIAR 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.

Table 7-2: Qualifications of Ornithology Surveyors

Name	Contribution	Biography
Adrian Allen	Vantage point surveys Hinterland survey	Adrian holds a BSc in Environmental management, is a Qualifying Member of CIEEM, a member of the British Trust for Ornithology and the Botanical Society of Britain and Ireland. Adrian is a skilled and highly experienced ornithologist, with over 20 years' experience carrying out bird surveys for various organisations including ecological consultancies. These surveys include general breeding/wintering bird, hinterland, vantage point, breeding waders/raptors and specialised surveys for hen harrier, merlin, barn owl and woodcock. Adrian has experience in using a range of bird survey methodologies in an ecological consultancy capacity across various proposed wind energy projects. His surveys adhere to the required standards (SNH, 2017) and the survey methodologies he employs are the most up to date, ensuring his survey work is robust and adheres to best practice and relevant guidelines. Adrian is also experienced in habitat mapping using the Fossitt methodology. He also carries out pollinator surveys and monitors rare plant populations for the National Biodiversity Data Centre.
Brian Porter	Vantage point surveys Hen harrier roost watches Breeding wader surveys Breeding bird surveys Barn owl survey Merlin survey Kingfisher survey Hinterland survey	Brian holds a Diploma in Field Ecology from UCC. He is also a member of the Irish Raptor Study Group and has contributed to the National Hen Harrier Surveys 1998/2000; 2005; 2010 & 2015. He has been a member of birdwatch Ireland since 1975 and contributed to BWI countryside bird surveys since 1998. Brian is an experienced birdwatcher with extensive consultancy experience utilising a wide range of methods (e.g. Winter Dawn & Dusk fixed Vantage Point Survey, modified Brown & Shepherd Survey, Breeding Wader Surveys, Merlin & Barn Owl Surveys, Offshore Seabird Surveys) to survey proposed onshore and offshore wind farm sites.
Gyr Penn	Vantage point surveys Hen harrier roost watches Hinterland survey	Gyr Penn is a field ornithologist with extensive experience working for both private consultancies and state conservation bodies. During his early ornithological career he then worked for the Royal Society for the Protection of Birds for four years as a warden at Bramshot Farm in Surrey, Bempton Cliffs in Yorkshire and Coombes Valley in Staffordshire and then as a species protection officer in the Norfolk Brecklands. He left the RSPB to set up his own countryside management and tree surgery business, working for various conservation bodies (RSPB, local wildlife trusts and county councils), which he ran for ten years. He moved to Ireland in 1997 and is currently employed as a freelance ornithological consultant, working for clients such as National Parks and Wildlife, Birdwatch Ireland, UCC and private consultants.

Name	Contribution	Biography
Kevin Collins	Vantage point surveys Hen harrier roost watches Hinterland survey	Kevin has worked with environmental consultants as a sub-contractor on breeding and winter bird surveys for developments such as wind farms in Monaghan, Offaly, Laois, Cork, Kerry and Wicklow over the past 15 years. These surveys involved vantage point watches especially for Hen Harriers and flight path and collision risk assessments for Whooper Swans and Greenland-White-fronted Geese. He has carried out bird surveys on roads projects on the N11 in Wexford, the N4 in Sligo and the R624 in Cobh. He worked for BirdWatch Ireland on the Breeding Curlew Surveys in 2015 and2021. Kevin was also a director on the board of BirdWatch Ireland for three years up to 1998. At that time he was on the technical steering group which set up the Countryside Bird Survey. He has surveyed 2 one kilometre squares for the Countryside Bird Survey since 1998 and 3 one km squares since 2009. He has also surveyed 4 sites in Co. Tipperary for I-WeBs since 1995/96 and is the regional organiser for I-WeBS in Co. Tipperary. He has organised single species surveys for Yellowhammer, Grey Heron and Nightjar in Co. Tipperary. Kevin took part in the last two breeding atlases 1988-91 and 2007-2011 (being the regional organizer and validator for Co. Tipperary), Whooper & Bewick's Swan, Peregrine, Hen Harrier and Barn Owl surveys and the non-estuarine waterbird survey.
Lorraine Benson	Vantage point surveys Hinterland survey	Lorraine is an Ecologist with a Masters in Environmental Science from UCD. She has published in Irish Birds and Bird Habitats in Ireland and has led a campaign to recover and restore large scale habitats in Kildare for birds and nature. Lorraine is an experienced ornithologist, with experience carrying out bird surveys for both ecological consultancies and voluntary organisations.
Mara Van Aelst	Vantage point surveys	Mara Van Aelst is an avid ornithologist who began her birdwatching career at an early age. She has progressed from assisting on hen harrier, CBS and I-WeBS surveys to operating as a professional ornithologist undertaking surveys for environmental consultancies since 2022. She has undertaken vantage point and hinterland surveys at both proposed and operational wind farm sites and is competent in all best-practice ornithological survey methods required for the assessment of proposed wind energy developments. She is currently completing the 4th and final year of her degree in Wildlife Biology at MTU Tralee.

Name	Contribution	Biography
Stephen King	Vantage point surveys Hinterland survey	Stephen King is a skilled ornithologist who started birdwatching at a young age. His ornithological experience and achievements include birding tours of Europe, Africa, Asia, Middle East and North America; finding Spain's 2nd Bar Tailed Lark; finding Ireland's 2nd Eastern Black Eared Wheatear and founding of Irelands "Rare and Scarce" Whatsapp group contributing to bringing all of Irelands bird news to one place for over 350+ people. He has undertaken ornithological surveys including vantage point, transect, hen harrier roost watch and tidal counts in a professional capacity for environmental consultancies since 2020. Stephen is familiar with all required best-practice ornithological survey methods, and his surveys adhere to the required methods and standards for assessment of onshore wind farms.

7.5 Methodology

7.5.1 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' (DoECLG, 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' (EC, 2020) and 'Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment' (EC, 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 the survey of 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 (SNH, 2012; NatureScot, 2025)' and 'Assessing significance of impacts from onshore wind farms' (2018).

7.5.2 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 landscape[1] or ecological connectivity[2] 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.

The ZoI for potential collision effects is defined as a 500m buffer around the proposed turbine locations.

The ZoI for construction noise disturbance has been conservatively defined as a 500m buffer around all proposed infrastructure.

7.5.3 Desktop Study

A desk study (20 km study area) was carried out throughout the EIA process and finalised in March 2026 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) designated sites mapping (SPAs, pNHAs, NHAs, Wildfowl Sanctuaries);
- NPWS rare/protected species data obtained by request (received 12/11/2025; updated 16/02/2026)
- National Biodiversity Data Centre (NBDC) Mapping & Data;
- Bird Atlas 2007 – 2011;
- The European Breeding Bird Atlas 2 (2022);
- BirdWatch Ireland Irish Wetland Bird Survey Mapping & Data;
- The Eurasian African Bird Migration Atlas (https://migrationatlas.org/).

[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).

7.5.3.1 Peatland Rehabilitation

Following cessation of peat extraction, decommissioning processes were implemented at Littleton, Longfordpass and Lanespark bogs (within the site) to ensure that no environmental liability remains from infrastructure and material associated with former extraction operations and that the bog can be deemed suitable for surrender of the license under Section 95 of the EPA Act. Decommissioning encompassed measures such as:

- Clean-up of remaining or unconsolidated waste or materials located in Bogs, Yards, Buildings and Offices;
- Cleaning of Silt Ponds;
- Decommissioning of Peat Stockpiles;
- Decommissioning or Removal of Buildings and Compounds;
- Decommissioning Fuel Tanks and associated facilities;
- Decommissioning/Removal of Bog Pump Sites;
- Decommissioning or Removal of Septic Tanks;
- Removal of Rail Infrastructure.

It is also a requirement of '*Condition 10 Cutaway Bog Rehabilitation'* of the IPC Licence that following the above decommissioning of use of all or part of their bogs, Bord na Móna, prepares (to the satisfaction of the EPA) and implements a Cutaway Bog Rehabilitation Plan. Bord na Móna produced Cutaway Bog Decommissioning and Rehabilitation Plans covering Littleton and Lanespark bogs (Bord na Móna 2026a, 2026b & 2025a).

Phase 1 Rehabilitation works commenced in Littleton, Longfordpass and Lanespark in 2018 with extensive drain-blocking and hydrological management. It is noted that no drain blocking has been carried out in the small area of Longfordpass Bog overlapped by the site. The key objective of peatland rehabilitation is environmental stabilisation. The rehabilitation works that have been completed and commenced in Phase 1 are described in the Cutaway Bog Decommissioning and Rehabilitation Plans (Bord na Móna 2026a, 2026b & 2025a). The measures associated with Phase 1 Rehabilitation works are drain blocking and monitoring.

Drain Blocking

Drains have been blocked using a number of methods depending on the size and type of drain. These methods include the following:

- Peat dams within small drainage channels on the cutover bog; and,
- Removal or blocking of drainage pipes, or modification of drainage levels, where required.

These methods are fully described in the Irish Wildlife Manual, Best Practice in Raised Bog Restoration in Ireland (Mackin et al, 2017).

These Rehabilitation Phase 1 measures at Littleton, Longfordpass and Lanespark were completed between 2018-2021.

Monitoring

As per the Cutaway Bog Decommissioning and Rehabilitation Plans, a programme of monitoring, aftercare and maintenance was implemented to validate the efficacy of the rehabilitation measures in achieving environmental stabilisation. These measures are detailed in the Rehabilitation Plan Review Reports as submitted to the EPA in April 2026 (Bord na Móna 2026a & 2026b). All surface and ground water monitoring has been submitted to the EPA as per licence requirements. Monitoring carried out assessed the general status of the site, the condition of the silt ponds, the condition of the rehabilitation measures, monitoring of any potential impacts on neighbouring lands, general land security, boundary management, dumping and littering. Monitoring visits also considered any requirements for further practical rehabilitation measures.

Rehabilitation Plan for Ballybeg-Lanespark- Derryvella Bogs

An Cutaway Bog Decommissioning and Rehabilitation Plan for Ballybeg, Lanespark and Derryella bogs was prepared in 2025 to include Phase 2 enhanced rehabilitation measures as part of PCAS (Peatlands Climate Action Scheme) for Ballybeg and Derryvella (Bord na Móna 2025a). No enhanced measures are proposed for Lanespark.

7.5.4 Field Surveys

7.5.4.1 Vantage Point Surveys

Vantage Point (VP) surveys were carried out at the proposed development site during the breeding seasons of 2021, 2022, 2023 and 2024 and non-breeding seasons of 2020-21, 2021-22, 2022-23, 2023-24 and 2024-25, in accordance with Scottish Natural Heritage (SNH) methodology for onshore Wind Farms (Scottish Natural Heritage Guidance, 2017). Additional migration VP watches were also completed in Autumn 2021, 2022, 2023 & 2024 and Spring 2022, 2023, 2024 & 2025.

A total of eight VP locations overlooking the Littleton wind farm flight activity study area were used during the VP survey (see Figure 3-1 in Appendix 7.1). These were chosen to cover specific viewsheds of the Proposed Wind Farm and to encompass a 500m buffer zone around the proposed turbine layout of the wind farm. SNH (2017)/NatureScot (2025a) guidance states that viewsheds should cover a 500 m circular buffer drawn around each proposed turbine location. This buffer is referred to as the 'SNH Buffer' (see Figure 3-1 in Appendix 7.1).

The flight activity study area, comprised of the combined viewsheds, overlaps the Proposed Wind farm and the Proposed Substation. This 'flight activity study area', or 'study area' is utilised as a geographic descriptor when detailing the results of flight activity surveys (see Figure 3-1 in Appendix 7.1).

The combined viewshed coverage of the SNH buffer is 99.6%.

The main purpose of VP survey watches is to collect data on target species that will enable estimates to be made of:

- The time spent flying over the defined survey area;
- The relative use of different parts of the defined survey area; and
- The proportion of flying time spent within the upper and lower height limits as determined by the rotor diameter and rotor hub height.

VP locations were based on observations from walkover/reconnaissance surveys, viewshed analysis (using GIS) and collated information on known feeding and roosting sites from both desktop review and consultation. The number and location of vantage points was selected in order to achieve visibility of the entire study area and important features for birds in close proximity to the site (e.g., lakes, wetlands).

In line with recommended best practice (Scottish Natural Heritage Guidance, 2017) (Band et al. 2007 and Band, 2024), viewshed analysis was undertaken using ArcMap, to calculate a theoretical zone of visibility from each vantage point. Visibility is calculated from each vantage point along an invisible layer suspended at the predicted lowermost height passed through by the rotor blade tips, using an observer height of 1.5 m. We note the following from SNH guidance in respect of priority areas for viewshed analysis (emphasis added):

> *"Where the key purpose is to estimate the risk of collision with turbines, it is the visibility of the airspace to be occupied by the turbine rotors (the collision risk volume) that is of prime importance. Therefore, it is recommended that visibility be calculated using the least visible part of this airspace, i.e. an imaginary layer suspended at the lowermost height passed through by the rotor blade tips (typically about 20-30m above ground level). Predicting visibility at this level is a simple task using GIS, however it should be noted that the baseline should take account of any forestry or other features that will potentially obstruct the view. For example, forestry may be 10-30m high and if viewshed height is taken as 20-30m ground level the visible area could be overestimated if there is forestry within the viewshed. Being able to view all or most of the site to ground level can be helpful in gauging overall bird activity and usage of the site but is not as important as being able to view the collision risk volume"*

Following SNH guidance (2017), watches were conducted to sample diurnal and crepuscular activity of target species, exceeding the required effort from SNH.

Data recorded included flight activity of target species (flight height, duration, directionality) in addition to metrics such as flock size (per recorded transit) and time of observation. Detailed notes of each observation of a target bird species was recorded including behaviour, gender (where possible), numbers, flight height, associated habitat and the period of time spent within the study area. Successful foraging events were also noted if they arose. Other bird species seen or heard during the VP surveys were also recorded and were considered separately in the analysis as additional species. Flight activity was annotated onto field maps. Total numbers of birds present both on arrival at the vantage point and on departure is noted. The Vantage Point survey schedule can be found in and Vantage Point survey results can be found in Appendix 7.1. Details of flight-path observations are also provided in Appendix 7.1. Binoculars and telescopes are used to scan for target species. Dictaphones are utilised to dictate bird heights whilst tracking flight events.

Flight heights were estimated visually as per SNH (2017) guidance.

VP surveys involved carrying out 2 x 3-hour watches at each VP every month in survey seasons covered. As per SNH guidance (2017), the requisite 36 hours were carried out at each vantage point during each surveyed breeding period, and 36 hours each surveyed wintering period. Additional VP survey rounds (6 hours per VP) were conducted in in multiple years (2021-2025) to cover the spring and autumn migration periods, exceeding SNH (2017) requirements of 2 years consecutive surveys. The survey schedule is detailed in Appendix 7.1 and a summary table detailing total hours per season completed at each VP is available in the Collision Risk Model (CRM) report in Appendix 7.3.

The bird activity recorded both inside and outside the proposed development boundary was used as part of the overall analysis and assessment of target species usage of the study area. Details of vantage point locations can be found in Table 7-3 below.

Table 7-3: Vantage Point Locations (ITM)

Vantage Point	Eastings (ITM)	Northings (ITM)
1	622926	652324
2	621290	651859
4	621066	653570
5	623254	654061
6	624306	656201
7	623263	657482
8	623122	659316
14	623662	656688

7.5.4.2 Breeding Wader & Waterbird Surveys

Due to the overlap between habitat suitability and site use for breeding waders and waterbirds such as gulls, geese, ducks and rails, the breeding wader survey methodology also captured data on breeding waterbirds.

Survey transects and point counts (see Appendix 7.1) to assess the presence of breeding wader populations were completed during the 2021, 2022, 2023 and 2024 breeding seasons (see Appendix 7.1 for wader survey schedule). A number of methods were combined from published literature including Bibby et al, (2000), Gilbert et al, (1998), O'Brien & Wilson (2011) and SNH (2017) to estimate numbers of target species breeding within this envelope.

Methods utilised were grouped into two categories; those for breeding lapwing (*Vanellus vanellus)* and those for other species such as curlew (*Numenius arquata)*, common snipe (*Gallinago gallinago)*, redshank (*Tringa totanus)*, common sandpiper (*Actitis hypoleucos)* and ringed plover (*Charadrius hiaticula)*. For each species, a pre-defined matrix of suitable habitats was created and used to select target habitats for survey (Table 7-4):

Table 7-4: Target Species and associated suitable breeding habitat

Target Species	Suitable Breeding Habitat
Lapwing	Lowland wet grassland, arable farmland, cutover bog with pools and wet grassland
Snipe	Wet pastures, marsh, bogs (intact and cutover) and fens
Redshank	Bog
Curlew	Bog
Common Sandpiper	Streams/rivers in bog
Ringed Plover	Cutover bog, milled peat with exposed gravel

Survey methods for lapwing followed those in Bibby et al. (2000) where the primary count unit for breeding birds is defined as an incubating female. In addition, displaying birds, birds standing guard near nests or distraction displays were also recorded as indications of occupied territories. Extensive areas of open ground were covered from roads, farm tracks or roadsides (where possible); larger areas of open ground not visible from easily accessible vantage points were walked using transects.

Surveys were carried out during the time periods recommended in Bibby et al. (2000) although territorial behaviour noted outside these periods was also utilised in the assessment. For all additional species of waders, the employed method was the same and utilised transects walked through suitable habitat within three hours of dawn or dusk. Count units were predefined for each target species and included in the method statement provided to surveyors (See).

Table 7-5: Count Units for each Wading Species

Species	Unit
Lapwing	Incubating Bird
Common Snipe	Drumming or Chipping Bird
Redshank	Alarming Bird
Ringed Plover	Presence or Absence/ Fledged Young late in season
Common Sandpiper	Presence or Absence/ Fledged young late in season
Curlew	Territorial Activity

All species encountered (seen or heard) (including wader species not listed above) were recorded and their abundance, behaviour, sex/age and breeding status noted. Any species occurring more than 100 m from the observer, or flying over the site and not using it, were recorded as 'additional' species to further inform the baseline survey. Weather conditions were suitable for all surveys (see Appendix 7.1).

7.5.4.3 Hen Harrier Roost Surveys

The methodology used to survey for hen harrier roosting activity adhered to the Irish Hen Harrier Winter Survey (IHHWS) (O'Donoghue, 2019) and Hardey et al. (2013).

Potentially suitable areas of hen harrier roosting habitat were identified based on a desktop study and field observations gathered during surveys. These vantage point locations (HHVPs) are shown in Figure 3-5 (Appendix 7.1). The hen harrier roost watch surveys were conducted from October to March during winter 2021-2022, 2022-2023, 2023-2024, and 2024-2025; the full schedule is included in Appendix 7.1.

Where open landscapes allowed, watches were completed by a single observer; for all other locations, two to three surveyors simultaneously conducted watches. The surveys started three hours prior to dusk and continued until observations were no longer feasible in the dark per IHHWS guidelines (O'Donoghue, 2019). IHHWS guidelines state that surveyors must be present at least 40 minutes before dusk, and as such the survey effort exceeds that required by IHHWS guidelines. Surveyors recorded all hen harrier flight lines and searched for potential roosting behaviour.

Flight durations were recorded in the following height bands: 0-20m, 20-50m, 50-100m, 100-200m and 200m. Other additional non-target species were also recorded where observed. Weather conditions were suitable for all surveys.

7.5.4.4 Breeding Bird Surveys

For general breeding birds the method utilised was based on the existing British Trust for Ornithology (BTO) Breeding Bird Survey (BBS or CBS; Bibby et al. 2000).

The study area comprised a total of eight transects and two point counts centred on different habitats present within the subject site (see Figure 3-2 in Appendix 7.1).

Breeding bird transects were carried out over four years (2021, 2022, 2023 and 2024). Birds were counted over two visits per breeding season, each timed to coincide with the early part of the breeding season (April to mid-May) and later part of the season (mid-May to July). Surveyors recorded all birds seen or heard as they walked methodically along the transect routes and surveyed point count locations.

Birds were noted in three distance categories, measured at right angles to the transect line (within 25 m, between 25 m-100 m and over 100 m from the transect line) and those seen in flight only. Recording birds in distance bands gives a measure of bird detectability and allows relative population densities to be estimated if required (BTO, 2018; Woodward et al., 2019).

The breeding bird survey schedule is included in Appendix 7.1 and includes the weather conditions for each survey. Weather conditions were suitable for all surveys.

7.5.4.5 Transect Surveys during Winter Months

For general wintering bird surveys, the method utilised was the same as for the breeding bird surveys, which is described in Section 7.1.1.1 above, except it was undertaken in the winter season and utilised a reduced number of transects (see Figure 3-3 in Appendix 7.1). The wintering bird surveys were carried out during October to March inclusive across all surveyed years. The wintering bird survey schedule is available in Appendix 7.1 . Weather conditions were suitable for all surveys.

7.5.4.6 Kingfisher Surveys

Targeted surveys for this species were carried out at locations with potentially suitable habitat throughout the course of their breeding season (March to early July) during the breeding seasons of 2021-2024 following NRA (2009b) guidance. Survey locations are detailed in Figure 3-8 in Appendix 7.1. The survey schedule is available in Appendix 7.1.

The first of visits were undertaken place in March/early April, to coincide with establishment of breeding territories and nest burrow excavations. During this visit, features likely to be of importance to kingfishers (such as feeding perches, potential rest sites etc.) were noted. During subsequent survey visits, the survey area was walked at a slow pace and all Kingfisher activity recorded. In addition, sections of watercourse bank which appeared potentially suitable for use by nesting Kingfisher were watched from a concealed vantage point, to avoid disturbing nesting birds. Individual watches of potentially suitable nest locations were undertaken to investigate occupancy of suitable breeding territories. Weather conditions were suitable for all surveys.

7.5.4.7 Merlin Surveys

A survey to assess the presence of merlin populations was completed during the 2021 breeding season. Merlin surveys were centred on suitable habitat for the species and methods used are based on previous surveys in Ireland (Lusby et al. 2011 and Fernandez et al. 2010); developed in association with Dr. John Lusby of BirdWatch Ireland. Prior to the first visit, all areas within the square identified as not suitable for Merlin (open water, urban areas, farmland, enclosed pastures and areas above 700m) were excluded from the target search area. Due to the size of the site and bog drains present, standard methodology could not be adhered to and targeted transects within suitable habitats were selected and intensively searched for evidence of Merlin.

The study area comprised 12 transects within potentially suitable merlin habitat (see Figure 3-6 in Appendix 7.1 for transect locations). A total of four survey rounds were completed during the 2021 merlin breeding season (April 29th May 31st, June 17th and July 26th 2023). Weather conditions were suitable for all surveys.

7.5.4.8 Barn Owl Surveys

Surveys for barn owl were undertaken during the breeding season of 2021, 2022, 2023 and 2024 across the months of April – July inclusive.

Survey methodology followed the TII guidance document 'Survey and Mitigation Standards for Barn Owls to inform the Planning, Construction and Operation of National Road Projects' (TII, 2021); the methodology utilised also referenced with Shawyer (2011) 'Barn Owl Tyto alba Survey Methodology and Techniques for use in Ecological Assessment'.

Daytime searches for potentially suitable nesting features and barn owl signs such as pellets and whitewashing were undertaken. Survey locations are shown in Figure 3-7 (Appendix 7.1).

Weather conditions were suitable for all surveys.

7.5.4.9 Hinterland Survey

Hinterland surveys covered 56 sites within 15 km from the proposed Wind Farm site. These sites were chosen as they had suitable habitat for the following target groups and species: raptors, waders and waterfowl. Hinterland surveys were carried out every month across all survey seasons from winter 2020-21 to winter 2024-25. Some sites were visited more regularly during the winter season, and others during the summer season, due to the differences in bird distribution across seasons. Some sites were visited only once or on several occasions to check for specific bird species of interest. The hinterland sites which were surveyed across this period are listed in , and the hinterland survey schedule including weather conditions is included in Appendix 7.1. Hinterland survey locations are shown in Figure 3-9 (Appendix 7.1).

also indicates the distance of hinterland sites from the closest proposed turbine. Appendix 7.1 shows the dates each site was visited.

7.5.4.9.1 Waders and waterfowl

The methodology used for wetland sites during the winter hinterland surveys followed I-WeBS (Irish Wetland Bird Survey) methodology (Lewis et al, 2019), whereby each location was surveyed for the duration necessary to identify and obtain a count for all target species present.

7.5.4.9.2 Raptors

A hinterland survey for raptors was conducted in accordance with Raptors: a field guide to survey and monitoring (Hardey et al. 2013) to assess Hen Harrier and other raptor activity over the winter and breeding periods in the greater surroundings. Surveys for breeding raptors were also carried out within 5km of the proposed wind farm, fulfilling and exceeding the requirement set out in SNH Guidance (2017). The hinterland survey effort also encompassed searches for potentially suitable barn owl sites, following the barn owl survey methodology described above.

Table 7-6: Hinterland Survey Locations & distance to Site

Hinterland Site	Location	Distance to closest turbine (km)	Easting (ITM)	Northing (ITM)
1	Lisheen Mine Windfarm north	10.9	622116	667888
1A	Lisheen Tailing Ponds HH Watch	9.7	623316	666843
2	Lisheen Mine Windfarm north-west	11.7	621132	668515
3	Lisheen Mine Windfarm a)	12.5	620321	669125
4	Lisheen Mine Windfarm b)	10.9	620833	667567
5	Lisheen Mine Windfarm west	11.4	619576	667677
6	River Suir Upper	11.6	613337	662509
6A	River Suir Upper floodplain a)	12.4	612295	662359
7	River Suir Upper floodplain b)	13.8	611396	663400
8	Cabragh Marshes a)	10.5	611034	655393
9	Cabragh Marshes b)	11.0	610395	655024
10	Littleton North	3.9	618527	655008
11	Two Churches/Cheese factory	1.7	622397	657737
12	Derricknew	2.6	619355	649447
13	Killeen Bog	3.1	618775	649400
14	Killeen Bog from Derrynaflan Church	4.2	618046	648486
15	Burgesland/ Horse & Jockey south	7.0	614516	649035
16	Templetouhy Bog north	15.5	620997	672315

Hinterland Site	Location	Distance to closest turbine (km)	Easting (ITM)	Northing (ITM)
17	Gilmoy	14.3	628164	670839
17a	Rossdarragh north of Gilmoy	15.6	625891	672673
18	Ballybrista on N62 Thurles to Templemore	15.7	610552	665551
19	Bruckana Windfarm	12.3	622001	669312
19A	Bruckana WF HH Watch	10.9	621906	667889
20	Castletown, north of Popes Bog	6.4	621254	662936
21	Along M8 near Twomileborris	3.1	621507	658741
22	The Loughane, Bailief	10.1	631854	663478
23	Killeen Bog east	2.3	620290	649044
24	Littleton Castle	3.42	618022	653585
25	Balief Castle	10.5	632190	663793
26	Foulkscourt Castle near Johnstown	11.5	627970	667988
27	Bawnmore a)	8.8	623801	665911
27A	Bawnmore b)	8.1	624237	665262
28	Bawnmore c)	8.3	625036	665406
29	Moyneard	8.1	619074	663599
30	Ballysorrel	18.6	615243	673592
31	Inch Bog by Drish/Black River	4.9	623903	663167
32	Boulick Grave yard & folly	2.0	625912	656320
33	Rathpatrick near Laois boarder	13.4	624457	670529
34	Rahelty Castle	7.6	617190	660852
35	Killough Roadstone	10.6	610457	650119
36	Grallagh Castle, Horse & Jockey South	5.9	615517	649298

Hinterland Site	Location	Distance to closest turbine (km)	Easting (ITM)	Northing (ITM)
37	Laffansbridge Quarry a)	5.3	618876	646373
37A	Laffansbridge Quarry b)	5.5	618717	646275
38	Graystown Castle	5.6	619301	645797
39	Shale Quarry, Kilbrennal	3.0	622099	648122
40	Templehill Castle , Templetouhy	15.4	619082	671684
41	Ballynonty/ Ballysloe	3.3	624758	651427
42	St. Peter's Moycarkey, Horse & Jockey North	6.1	614970	653076
43	Littleton Bog on site near Two Churches	3.1	627036	656409
44	Ballybeg Bog	2.3	618868	653670
45	Pope's Bog (North)	4.4	623135	661460
46	Pope's Bog (South)	3.3	623212	660227
47	Inch Bog/Graiguepadeen	4.9	624809	663018
48	Inchirourke	7.1	624549	664897
49	Derryfadda	8.0	624075	665496
50	Clonsaul	9.1	624959	665241

7.5.5 Survey Limitations

Nocturnal audio surveys were not carried out due to the high level of visual survey effort including dawn/dusk VP watches, wader surveys undertaken at dawn/dusk during spring providing sufficiently robust data for assessment of migratory species potentially occurring at the Site. Detailed information distribution and behaviour of the primary migratory species of interest, whooper swan was obtained during surveys. The proposed development is not located along any established flyways.

As such, absence of nocturnal surveys does not represent a significant or material limitation to the survey effort.

7.5.6 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).

Table 7-7: Illustrates the combined receptor evaluation criteria used to assign value to key receptors:

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 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). 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 Birds of Conservation Concern (BoCCI) 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 listed on Annex 1 of the EU Birds Directive. Species present in regionally important numbers (>1% of regional population). Other species on BirdWatch Ireland's red list of Birds of Conservation Concern	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	Any other species of conservation interest, including species on BirdWatch Ireland's amber list of Birds of Conservation Concern not covered above.	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 (e.g. BoCCI green listed)	Local Importance (Low Value)	n/a	Species that remain common and widespread (e.g. BoCCI green listed).

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 . Species evaluated to be of negligible value are not considered as KERs.

7.5.7 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 .

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 has been developed by Percival (2003) to determine the magnitude of potential effects on a species.

Table 7-8: Determination of 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 7-9: 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 () against bird ecological value () 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 7-10: 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	High	Medium
High	Very High	Very High	Medium	Low
Medium	Very High	High	Low	Very Low
Low	Medium	Low	Low	Very Low
Negligible	Low	Very Low	Very Low	Very Low

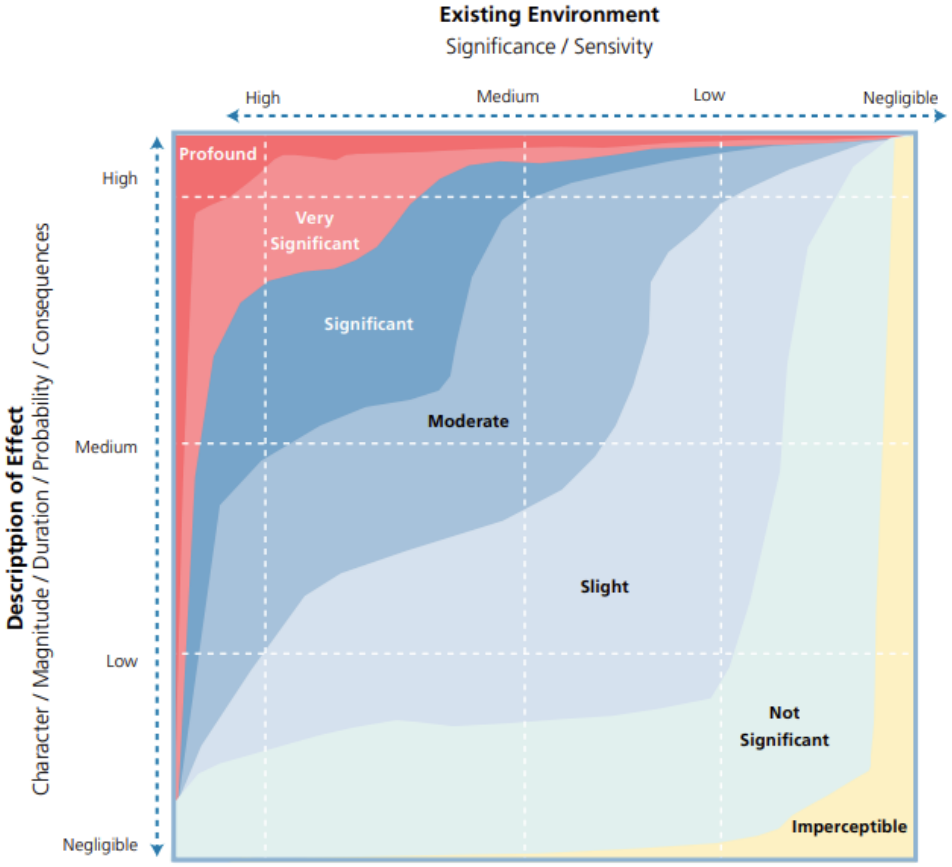
Percival (2003) recommends the following interpretation of the significance ratings: are interpreted as follows:

- 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 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 (see Plate 7-1).

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].)

Plate 7-1: Chart Showing Typical Classifications of the Significance of Effects (EPA, 2022)

7.5.8 Assessment of Emerging Trends

The assessment considers the emerging trends and potential future development of habitats arising from the rehabilitation implemented within the Site and the associated ongoing revegetation and rewetting of the cutaway bogs.

7.6 Description of the Existing Environment

The ecology of the existing environment is described within this section. The proposed wind farm comprises of 11 turbines and associated infrastructure. The wind farm site is situated c. 9km east of Thurles, County Tipperrary and c. 4km north of Killenaule, County Tipperary. The site is located within townlands: Longfordpass North, Longfordpass South, Bawnreagh, Clonoura, Leigh, Derrycoogh, Norad Derryhogan, Lanespark and Ballybeg.

The Proposed development is located within a rural setting and land use within the site is mainly comprised of historic peat extraction. Residential property density in the area is low with one-off housing dominating the residential development in the area.

The Proposed Development is predominantly located within cutover bog (PB4) which often occurs in mosaics with areas of scrub (WS1) of grey willow/downy birch or gorse, immature woodland (WS2), and wet grassland (GS4). Raised bog (PB1) occurs around the edges of the Site. Calcareous and neutral grassland (GS1) occurs in patches along the existing bog railway along the northern site access route and also in the southern part of Lanespark Bog, establishing respectively on imported material associated with the bog railway and on dry cutover bog. Various woodland types occur in small areas, such as (mixed) broadleaved woodland (WD1), (mixed) conifer woodland (WD3), oak-birch-holly woodland (WN1), and bog woodland (WN7).

Waterbodies within the Site include a network of drainage ditches (FW4), dystrophic lakes (FL1), and acid oligotrophic lakes (FL2), which has been established by flooding of drainage ditches and cutover bog. Reed and large sedge swamps (FS1) occurs, vegetating ditches and surrounding lakes. The hedgerows and treelines within the Site are associated with the agricultural lands in the proposed borrow pit footprint; a linear Scrub (WS1) formation also occurs in association with dystrophic lakes (FL1).

Habitats of note in the wider study area, in relation to their potential to support bird assemblages, include cutover, cutaway and intact raised bog, rivers, wetlands, woodland, quarries and agricultural habitat mosaics.

For further information, please refer to Chapter 6 - Biodiversity, and Chapter 4 – Project Description. A habitat map of the proposed wind farm lands is provided in Figure 6-7, Volume IV.

7.6.1 Peatland Rehabilitation

The Phase 1 peatland rehabilitation completed is represented within the existing baseline, and as such forms an inherent component of the baseline environment and is assessed in detail herein (see assessment of habitat effects in Section 6.9 and ornithological assessments in Chapter 7 Sections 7.8.3 to 7.8.5).

Phase 1 rehabilitation works were completed in Littleton, Longfordpass and Lanespark bogs between 2018-2021. The measures completed included the blocking of drains which has resulted in the presence of areas of standing water within the Site. It is noted that no drain blocking has been carried out in the small area of Longfordpass Bog overlapped by the site.

The current baseline in the peatland areas is variable in terms of progress of rehabilitation/revegetation; areas where peat extraction and ancillary activities ceased earlier are at more advanced stages of revegetation/rehabilitation, while areas where peat extraction ceased later are in the earlier stages of revegetation.

As such, certain parts of the site where more advanced revegetation occurs are likely to be indicative of the habitats which will develop at the more advanced stages of rehabilitation. It is noted that while areas with more advanced stages of revegetation are likely to more closely represent the habitats which will ultimately develop, they are likely to develop further, i.e. wetland habitats are likely to get wetter and continue to expand where suitable conditions exist, and woodland habitats are likely to increase in structural and species diversity as they mature.

As such, the areas with longer-stablished revegetation processes are considered to be indicative of the habitats which will ultimately develop across the cutaway bogs within the site, i.e. a mosaic of wetland areas characterised by lakes and high-sphagnum areas of regenerating bog, woodland, and intermediate habitats with open scrub and grassy heath-type vegetation. While habitat types are likely to stabilise eventually, some level of dynamism is likely to persist even at the stage where habitats have become relatively stable (e.g. mature woodland and regenerating bog).

While a relatively uniform approach to rehabilitation was undertaken. i.e. drain blocking across the site, existing topography and hydrology have also influenced the character and pace of revegetation/rewetting, with some areas having achieved a greater extent and faster pace of re-wetting than others.

In summary, while trends indicative of the future ecological development of the site are well established, the habitats at the site are expected to develop further and increase in extent.

It is noted that ecological and hydrological surveys for the proposed development have been ongoing since 2021, facilitating an in-depth understanding of the existing and emerging baseline based on repeated observations of how revegetation is progressing since implementation of rehabilitation measures.

7.6.2 Desktop Study

7.6.2.1 Designated Sites

The OPR (2021) guidelines[5] 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

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:

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

"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".

7.6.2.1.1 Sites of International Importance

An Appropriate Assessment (AA) Screening Report and Natura Impact Statement (NIS) has 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 6-1 indicates the locations of European Sites relative to the Proposed Development, while Figure 6-2 indicates National Sites. 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.

7.6.2.1.1.1 Special Protection Areas (SPAs)

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).

A number of SPAs (River Nore SPA, Slieve Bloom Mountains SPA, and Slievefelim to Silvermines Mountains SPA) were assessed for S-P-R connectivity to the Proposed Wind Farm.

The River Nore SPA has potential hydrological S-P-R connectivity to the Proposed Development via the GC (grid connection). The proposed GC crosses under the River Nore SPA via HDD, and also crosses a number of tributaries of the Nore (also via HDD). The proposed Grid Connection (GC) route extends from the proposed onsite 110kV electrical substation in the north of Littleton Bog to the existing Ballyragget 110/220kV substation within the townland of Ballyragget, Co. Kilkenny. The proposed GC route measures 30.9 km in length and is located primarily within the curtilage of the public road corridor (28.4 km), running along the Longfordpass local road, R639, R693 and R694 regional roads. The proposed wind farm is located within the Suir waterbody catchment Suir_SC_040 sub catchment. Within the River Suir Catchment, there is 1 no. grid connection watercourse crossing proposed over an EPA mapped watercourse. This is situated at an existing crossing where a local road passes over the Black River (Drish River) within the Drish_020 WFD river sub-basin. The potential pathway for connectivity is via this proposed GC crossing.

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 surrounding the proposed wind farm was adopted (based on the largest documented core foraging range for SPA bird species). No SPAs are present within this initial study area, however three SPAs slightly outside this range (21-30km) that were considered include River Nore SPA (004233) (crossed by proposed GC as noted above), Slievefelim to Silvermines Mountains SPA (004165) and Slieve Bloom Mountains SPA (004160).

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 three SPAs between 20-30km from the Proposed Development (as per Scottish Natural Heritage guidance on Assessing Connectivity with Special Protection Areas, 2016):

- River Nore SPA is designated for the protection of Kingfisher (*Alcedo atthis*).
- Slievefelim to Silvermines Mountains SPA is designated for the protection of Hen Harrier (*Circus cyaneus*).

- Slieve Bloom Mountains SPA is designated for the protection of Hen Harrier (*Circus cyaneus*). This SPA is also designated a RAMSAR site.

The proposed GC crosses under the River Nore SPA (004233) via HDD. A functional ecological connection exists via the proposed grid connection, due to proximity of the proposed HDD crossing at the Nore, and crossing points on tributaries of the Nore.

The proposed development is c. 26.9 km from the nearest SPA designated for hen harrier (Slievefelim to Silvermines Mountains SPA (004165) and c. 27.7 km from the Slieve Bloom Mountains SPA (004160). Hen harrier are known to have ranges that spans wide, landscape-scale areas >30km (O'Donoghue, 2021; O'Donoghue, 2010; Clarke & Watson, 1990). Studies (O'Donoghue, 2021; O'Donoghue, 2010) have shown that Hen Harriers in Ireland are mostly short-distance migrants, with many individuals remaining within 10–50 km of their breeding sites during winter. In Ireland, about 24% of winter roosts are located within 500 meters of breeding sites, indicating strong site fidelity, while others move modest distances to nearby lowlands. Juvenile harriers typically disperse over 25 km from their natal sites in their first autumn, often exploring multiple temporary wintering areas before settling.

Hen harrier have been recorded roosting and hunting on site, confirming use of the site in winter. The proposed wind farm lies within the potential foraging and roosting range of wintering hen harrier.

7.6.2.1.2 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.

The following pNHAs within 20km of the Proposed Development were assessed as having potential ornithological S-P-R connectivity:

Cabragh Wetlands pNHA (001934), Kilcooly Abbey Lake pNHA (000958), The Loughans pNHA (000407) Killough Hill pNHA (000959), Curragh and Goul river Marsh pNHA (000420) and Inchbeg pNHA (000836).

Due to the absence of accommodation works proposed at or near any of the water crossings in the Suir and Nore catchments, there is no hydrological connection between any NHA/pNHA and the TDR (turbine delivery route).

There are no NPWS-designated wildfowl sanctuaries in close proximity to the proposed development, with the closest, WFS-64 Marlfield Lake being located 29km south at Clonmel. Wildfowl Sanctuaries are areas that have been excluded from the 'Open Season Order' so that game birds can rest and feed undisturbed.

It is noted that Kilcooly Abbey Lake pNHA is managed as a wildfowl sanctuary (see below), but is not an NPWS-designated wildfowl sanctuary.

The locations of these sites relative to the Proposed Development are detailed in .

Table 7-11: 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)
River Nore SPA	0004233	A229 Kingfisher (Alcedo atthis)	0 m (grid connection)
The Loughans pNHA (also an SAC)	000407	Turloughs [3180] Although the site synopsis does not mention birds, the Loughans is known to host wintering waterbirds, and there are also breeding records for species such as lapwing	0 m (grid connection) pNHA boundary overlaps public road[6].
Kilcooly Abbey Lake pNHA	000958	This small lake lies about 6km south-east of Urlingford in the estate grounds of an old abbey in Co. Tipperary. Breeding birdlife on the lake includes Mallard, Moorhen, Coot and a colony of Herons. The site is managed as a waterfowl sanctuary with a 'no shooting' policy. Kilcooly Abbey Lake is of interest due to the varied lake vegetation and the use of the site by breeding waterfowl.	5 km E (proposed wind farm)
Inchbeg pNHA	000836	Wetland Habitats Woodland Golden Plover Lapwing Whooper Swan	5.5 km (instream distance from grid connection Nore crossing)
Killough Hill pNHA	000959	This site surrounds a mounting quarry between Thurles and Cashel in Co. Tipperary. Although the pNHA's designation is based on its geological and botanical value, there is potential for peregrine falcon nesting habitat to occur in quarried areas.	8.4 km W (proposed wind farm)

[6] The presence of the R693 within the pNHA boundary arises from inaccurate mapping of the pNHA. The southern boundary of the Loughans is delineated by the R693, as acknowledged by the SAC mapping which is more reliable, being subject to regular checks, updates and corrections where required.

Designated Site	Site code	Features of Interest (Birds)	Distance from the Proposed Development (km)
Cabragh Wetlands pNHA	001934	Site containing mosaic of wetland habitats, reedbeds, wet grasslands calcareous fen and alluvial woodland. Regionally important site for wintering waterbirds, regularly exceeding 1000 individuals, and including species such as teal, wigeon, mallard, as well as red-listed waders such as Pintail, Shoveler, Lapwing, Golden Plover and Curlew.	9.4 km W (proposed wind farm)
Curragh and Goul river Marsh pNHA	000420	The site synopsis notes the meadowland is an important winter feeding site for Greenland White-fronted Geese (Mean winter max. 66, l985/86 to l989/90).	20.5 km NE (proposed wind farm) 7.7 km NW (grid connection)
Slievefelim to Silvermines Mountains SPA	0004165	A082 Hen Harrier (Circus cyaneus)	26.9 km W (proposed wind farm)
Slieve Bloom Mountains SPA	0004160	A082 Hen Harrier (Circus cyaneus)	27.7 km N (wind farm)

7.6.2.2 Avifauna

A desktop study was conducted by Fehily Timoney and Company on the avifauna recorded within the Proposed Development and surrounding lands. A summary of the desktop study findings is described below, and the full dataset can be found in Appendix 7.1. This desktop study was further updated in March 2026 by Fehily Timoney and Company, and findings are incorporated into the below summary.

The Proposed Development is situated within the 10km grid squares S25. Examination of the NBDC Biodiversity Maps website indicates there are 88 birds recorded within the S25 hectad. Of which, 45 are of conservation concern. The full list of birds recorded within the NBDC database is documented in Appendix 7.1.

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 S25 that overlaps the site, as per McGuinness et al. (2015). There is no data available for the western and south portion of the Site. However, this tool indicated that the north and eastern portion of the site has low sensitivity. This result was driven by close proximity to areas identified as suitable for barn owl.

An Irish Wetland Bird Survey (I-WeBS) data request for data on wetland areas in the vicinity of the Proposed Development was issued in December 2025 and reviewed in February 2026. The full list of birds recorded within the I-WeBS information request can be found in Appendix 7.1, and peak count data is also presented in Appendix 7.1. Datasets for the following wetlands were sourced from I-WeBS and analysed: Cabragh Wetlands - 0J307, Lyonstown Stud Farm - 0J004, River Suir Middle - 0J301, River Suir Upper - 0J302 and Walsh's Sandpit Rathcool - 0J201.

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 (see Appendix 7.1).

In addition to the general desktop studies described above, detailed examination of breeding curlew, peregrine falcon and Greenland white-fronted goose records was undertaken due to the conservations status and sensitivity of these species. For all other species, sufficient information for completion of assessments is available from the standard desktop study and baseline data.

7.6.2.2.1 Curlew Desktop Study

The NPWS publication '*Status and Distribution of Breeding Eurasian Curlew in Ireland 2021*' (Colhoun et. al, 2022) indicates the distribution of breeding curlew in 2021 overlapped the proposed wind farm site, indicating one possible and one probable breeding territory in this area (Hectad S25).

NPWS data obtained by request indicated the following records of nest locations or estimated centres of territory:

- Hectad S25: two records in 2015
- Hectad S25: one record in 2019
- Hectad S25: one record in 2021
- Hectad S25: recorded in 2022 (number not specified)

The NBDC data search returned two records of possible breeding territories within S25 at S25G and S25L. Both were records of possible breeding, noted in the Bird Atlas 2007 – 2011.

Consultation with NPWS further confirmed the presence of breeding curlew records in this area, with a breeding territory persisting up to the present.

7.6.2.2.2 Peregrine Desktop Study

NPWS data obtained by request indicated the following records of Peregrine falcon (as recorded during the 2017 National Peregrine Survey) (with information as to whether sites were recorded as nest sites in the previous National Survey in 2002):

- Hectad S25: One occupied nest site (not known in 2002).
- Hectad S26: One occupied nest site (not known in 2002).
- Hectad S46: One occupied nest site (known in 2002).

The NBDC data search indicated the possible presence of breeding peregrine in two of the 2 km grid squares overlapping the Site in the 2007-2011 period. Further afield, the presence of breeding peregrine has been confirmed in a number of locations in the wider region during the 2007-2011 period, and also more recently.

Table 7-12: NBDC Records Breeding Peregrine

Grid Square	Status	Data Source	Date	Distance to the Site
S25N	Possible Breeding	Bird Atlas 2007-11	2007-2011	Overlapping
S25G	Possible Breeding	Bird Atlas 2007-11	2007-2011	Overlapping
S26D	Confirmed Breeding	Bird Atlas 2007-11	2007-2011	5.8 km
S16D	Confirmed Breeding	Bird Atlas 2007-11	2007-2011	13.3 km
S27E	Confirmed Breeding	Bird Atlas 2007-11	2007-2011	18.5 km
S27I	Occupied Nest	Birds of Ireland	05/05/2023	18.3 km
S27M	Occupied Nest	Birds of Ireland	05/05/2023	14.2 km
S27X	Occupied Nest	Birds of Ireland	21/07/2021	14.9 km
S37	Confirmed Breeding	Bird Atlas 2007-11	2007-2011	11.2 km

7.6.2.2.3 Greenland White-fronted Goose Desktop Study

In order to adequately assess the potential occurrence of this migratory species in the region, the desktop search was expanded to encompass the surrounding hectads adjacent to the proposed wind farm, GC and TDR (S14, S15, S16, S24, S25, S26, S34, S35, S36,S37, S46, S47, S48 and S57).

The status and distribution of wintering waterbirds in Ireland in 2023: results from the Irish Wetland Bird Survey (I-WeBS) (Burke et al., 2025) was consulted to determine the location of known wintering sites used by this species, and information on migration routes available from the migration atlas (www.migrationatlas.org) and (Fox et al, 2003) was examined.

It is noted that while the Curragh and Goul river Marsh pNHA appears to have been used previously as a feeding ground by wintering Greenland white-fronted goose (pNHA site synopsis notes a Mean winter max. of 66 geese across l985/86 to l989/90).

The NBDC search yielded one record of Greenland white-fronted goose dating from the 2007-2011 Bird Atlas indicating this species was present during winter in Hectad S15. This record did not specify numbers observed. The 2007-2011 Bird Atlas also noted the presence of this species in Hectad S37, and indicated the record comprised a sighting of an individual in winter during the period 2007-2011 in 2 km grid square S37U. The S37U2 km grid square partially overlaps the Curragh and Goul river Marsh pNHA.

The migration atlas and (Fox et al, 2003) indicates this species migrates along a northwest-southeast axis running between Sligo Town and the Wexford Slobs, with the migration corridor located c. 40 km north-east of the proposed wind farm.

The majority of routes used by geese on return migration indicated in Fox et al. (2003) fan out across a broad north-northwest axis, traversing a number of areas ranging from west of Tullamore to East of Edenderry as they pass through the midlands. One goose tracked in this study headed almost due north and flew over Maynooth.

Point to point mapping of migratory journeys based on recovery of ringed birds provides more reliable information on geographical trends based on a richer dataset built up over years of ringing studies. The migration routes traversing Ireland mapped in the migration atlas are densely clustered along a corridor running between Sligo town and Wexford Slobs. Outside of this concentration along the primary flight corridor, a low number of migration routes of individual birds occur only sporadically further north-east.

As such, it is clear that the migration corridor used by Greenland White-fronted Goose is located c. 40 km north-east of the proposed development.

Examination of the distribution of wintering sites mapped in Burke et al. (2025) confirms the absence of habitual Greenland White-fronted Goose wintering sites in the area in which the proposed wind farm is located; the closest wintering site is at the Little Brosna Callows located c. 57 km north-west of the proposed wind farm.

The historical status of the Curragh and Goul river Marsh pNHA observations of wintering geese (recorded during winter l985/86 to l989/90), when considered in conjunction with current I-WeBS data (Burke et al., 2025) which indicates there is no wintering site at this pNHA, and the 2007-2011 Bird Atlas record being indicative of an individual goose making a stopover on migration, collectively confirm that the Curragh and Goul river Marsh pNHA is no longer used as a wintering site by this species.

Similarly, based on the absence of migration routes and wintering sites within Hecatd S15, the unquantified observation of Greenland White-fronted Goose within S15 noted in the 2007-2011 Bird Atlas does not represent a regularly occurring migration or wintering pattern and is likely to be representative of an individual or small numbers of geese deviating from the main migration route and stopping over in S15 due to weather conditions or other factors.

7.6.3 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 7.1. 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.

7.6.3.1 Red-listed Species

7.6.3.1.1 Bar-tailed Godwit *Limosa lapponica*

Four bar-tailed godwit were identified on one occasion during a breeding bird survey in June 2021 along Breeding Bird Transect 5.

7.6.3.1.2 Barn Owl *Tyto alba*

Barn owl have been identified during breeding wader surveys and specialised barn owl surveys. An individual was heard calling during breeding wader surveys in July 2022 near the Derryhogan Lakes.

Targeted barn owl surveys were carried out during the breeding season over a four-year period (2021-2024) within a 5 km buffer of the proposed wind farm and included surveys of abandoned and semi-derelict farmhouses, stone barns, historic structures and other potentially suitable sites for barn owls. Sites were assessed for suitability, nesting opportunity and activity, and revisited where historical or current use was suspected. Surveys were carried out across the months of April-July inclusive.

The survey examined 42 sites, of which 23 were deemed highly suitable roosts, with one showing strong evidence of territorial occupancy and potential nesting, and another showing evidence of breeding. Site 12A-3 (c. 400m south of Lanespark Bog) was noted to have strong evidence of territorial occupancy and potential nesting and Site 20 (c. 15m from the site boundary) was confirmed as an active breeding site with juvenile calls and adults recorded from 2021-2023. There were no records of barn owl at Site 20 during multiple visits in 2024 and the site was determined to be abandoned, or the individuals may have died.

7.6.3.1.3 Black-tailed Godwit *Limosa limosa*

There was one observation of 15 black-tailed godwit during VP surveys in April 2024. These birds were commuting through Lanespark Bog though no specific activity was noted.

7.6.3.1.4 Curlew *Numenius Arquata*

Curlew were identified during numerous surveys including VP, breeding birds, and breeding wader/waterbird surveys. They were observed on Site during the winter months of 2020-2021, 2021-2022, and 2024-2025, and the summer months of 2021, 2022, 2023, and 2024.

A pair of Curlew were noted to occupy territory located in a wetland mosaic within cutaway bog (Derryhogan Lakes) during the 2021 breeding season. This area is located outside the outside the 500m turbine buffer, but inside the 500m noise/visual disturbance buffer. The nest was not pinpointed. The surveyor considered this pair was likely to have bred successfully, based on activity observed.

In 2022, similarly to 2021, a pair of Curlew were noted to occupy territory located in the Derryhogan Lakes wetland mosaic within cutaway bog outside the 500m turbine buffer. The surveyor again assessed this pair was likely to have bred successfully, based on activity observed

Curlew was again recorded occupying territory in the Derryhogan Lakes wetland mosaic in the 2023 breeding season outside the 500m turbine buffer. This area includes a number of lakes. The nest location was not pinpointed, but the surveyor noted based on activity observed that the pair was likely to be nesting in vegetation around the margins of a lake. Based on activity observed, the surveyor assessed that breeding success could not be determined in 2023.

In the 2024 breeding season, curlew were again recorded as occupying territory in the Derryhogan Lakes wetland mosaic outside the 500m turbine buffer in the west of the site, with much of the activity observed focused on the lakes in this area. Based on activity observed, the surveyor assessed that breeding success could not be determined in 2024.

The surveyor noted the arrival of post-breeding curlew from other parts of the country at the site including the Derryhogan Lakes wetland mosaic in July, making determination of breeding success for the local pair more difficult due to the increased numbers and activity levels for curlew dispersed across this area during July.

7.6.3.1.5 Dunlin *Calidris alpina*

Dunlin was observed at Derryvella Bog during VP surveys in September 2022.

7.6.3.1.6 Golden Plover *Pluvialis apricaria*

Golden plover were identified during numerous surveys including VP and winter transect surveys. They were observed on Site during the winter months of 2021-2022, 2022-2023, 2023-2024, and 2024-2025, and the summer months of 2021, 2023, and 2024.

Golden plover were observed on 31 occasions throughout the VP surveys where flocks of up to 300 individuals have been noted. They primarily overwinter within the Northen Bogs to the north of the proposed wind farm site.

7.6.3.1.7 Kestrel *Falco tinnunculus*

Kestrel were identified during numerous surveys including VP, breeding birds, winter transect, breeding waders and water birds surveys. They were observed in the winter months of 2020-2021, 2021-2022, 2022-2023, 2023-2024, and 2024-2025, and summer 2021, 2022, 2023, and 2024.

A kestrel nest was identified during the VP surveys in June 2024 to the southwest of the Derryhogan Lakes, outside the site boundary.

7.6.3.1.8 Lapwing *Vanellus vanellus*

Lapwing were identified during numerous surveys including VP, breeding birds, winter transect, and breeding waders and water birds surveys. They were observed in the winter months of 2020-2021, 2021-2022, 2022-2023, 2023-2024, and 2024-2025 and summer months of 2021, 2022, 2023, and 2024.

Lapwing activity is concentrated to the wetland mosaics and are typically observed in pairs with some flocks of up to 50 individuals and, on one occasion, a flock of 250 individuals commuting through the site in December 2020.

7.6.3.1.9 Redshank *Tringa totanus*

Redshank were identified during VP surveys in August 2022 and June and August 2024. They were primarily observed in pairs and were commuting through the proposed wind farm.

7.6.3.1.10 Shoveler *Anas clypeata*

Shoveler were identified during numerous surveys including VP, breeding birds, and breeding waders and water birds surveys. They were observed in the winter months of 2024-2025 and summer months of 2022 and 2023.

7.6.3.1.11 Snipe *Gallinago gallinago*

Snipe were identified during numerous surveys including VP, breeding birds, and breeding waders and water birds surveys. They were observed in the winter months of 2020-2021, 2021-2022, 2022-2023, 2023-2024, and 2024-2025, and summer months of 2021, 2022, 2023, and 2024. Snipe records are abundant throughout the proposed wind farm site.

7.6.3.1.12 Stock Dove *Columba oenas*

Stock dove were identified during numerous surveys including VP and breeding birds surveys. They were observed during the winter months of 2024-2025 and summer months of 2021.

7.6.3.1.13 Swift *Apus apus*

Swift were identified during numerous surveys including VP and breeding birds surveys during the summer months of 2022, 2023, and 2024.

7.6.3.1.14 Woodcock *Scolopax rusticola*

Woodcock were identified during numerous surveys including VP, breeding bird, and breeding waders and water birds surveys. They were observed in the winter months of 2020-2021, 2021-2022, 2022-2023, and 2024-2025 and the summer months of 2021, 2022, 2023, and 2024.

7.6.3.1.15 Red-listed Passerines

Red-listed passerines, including meadow pipit, redwing, and yellowhammer were observed within the proposed wind farm during numerous surveys.

7.6.3.2 Amber-listed Species

7.6.3.2.1 Black-headed Gull *Larus ridibundus*

Black-headed gull were identified during numerous surveys including VP, breeding birds, and breeding waders and water birds surveys. They were observed during the winter months of 2020-2021, 2021-2022, 2022-2023, and 2024-2025, and the summer months of 2021, 2022, 2023, 2024.

Black-headed gull colony breeding activity was recorded between 2021-2025, from data collected during multiple ornithology surveys. Breeding colony locations were determined through reconnaissance surveys and point counts, supported by incidental observations obtained during vantage point surveys, breeding bird and breeding wader transects, and point counts.

Overall, seven colony locations were recorded during 2021-2025 (see Figure 3-10 In Appendix 7.1).

During 2021 black-headed gull colony count surveys, five active colonies were noted within the site and hinterlands. Four active colonies were recorded in 2022, two active colonies in 2023, four active colonies in 2024 and one active colony in 2025. Three of these colonies were noted within the site, located at VP4/Colony 1 (active in 2021, 2022 and 2023), VP7/Colony 3 (Active in 2021 only) and VP14/Colony 7 (active in 2021, 2022 and 2024). The remaining colonies (2, 4, 5 and 6) were located outside the site in the surrounding hinterland.

A total of three locations within the site were occupied intermittently during the survey period (Derryhogan, Bawnreagh and Longfordpass Lakes), with maximum counts of 228, 207 and 289 gulls respectively.

7.6.3.2.2 Common Sandpiper *Actitus hypoleucos*

Common Sandpiper were identified during VP surveys in the summer months of 2021 and 2022.

7.6.3.2.3 Coot *Fulica atra*

Coot were identified during breeding birds and breeding wader and water birds surveys. They were observed in the summer months of 2021 and 2022.

7.6.3.2.4 Cormorant *Phalacrocorax carbo*

Cormorant were identified during VP surveys in the winter months of 2021-2022 and 2024-2025, and summer months of 2021, 2022, and 2024.

7.6.3.2.5 Great Crested Grebe *Podiceps cristatus*

Great crested grebe were identified during numerous surveys including breeding birds, winter transects, and breeding waders and water birds surveys. They were observed in the winter months of 2021-2022 and the summer months of 2021, 2022, and 2023.

7.6.3.2.6 Greylag Goose *Anser anser*

Greylag goose were identified during numerous surveys including VP, breeding birds, and breeding waders and water birds surveys. They were observed in the winter months of 2021-2022, 2022-2023, 2023-2024, and 2024-2025 and summer months of 2021, 2022, 2023, and 2024.

Greylag Goose were observed on 47 occasions and are noted to commute through the Site. There are additional observations of breeding pairs (1-2 pairs per year) in the Longfordpass South Lakes, Bawnreagh Lakes, and Derryhogan Lakes.

7.6.3.2.7 Hen Harrier *Circus cyaneus*

Hen harrier were identified during numerous surveys including VP, winter transect, and hen harrier roost watch surveys. They were identified in the winter months of 2020-2021, 2021-2022, 2022-2023, 2023-2024, and 2024-2025, and the summer months of 2021, 2022, 2023, and 2024.

Across all non-breeding seasons, Hen Harrier were recorded on 29 occasions.

During winter 2021-2022 roost searches, Hen Harriers were recorded on three occasions. A ringtail was observed flying below 20m before going to ground, 7.4km to the north of the proposed wind farm in the hinterland. Two ringtails were observed in Bruckana Windfarm hinterland site (c. 7km from the proposed wind farm), one seen in dropping flight over suitable roost habitat and another going to ground.

During winter 2022-2023 roost searches, Hen Harrier were recorded on 19 occasions. 16 of these observations were noted to be ringtail, seen hunting on five occasions and recorded flying mostly within the 0-20m height band. There was one observation of a hen harrier ringtail going to roost in a location on the margin of Littleton Bog (outside 500m turbine buffer). Hen Harrier were noted foraging throughout the season just outside the 500m turbine buffer but within the site. It is noted that Hen Harrier were observed within the 550m buffer during VP surveys.

During winter 2023-2024, Hen Harrier were noted on four occasions (solitary ringtails and one juvenile), flying low over cutover and raised bog within the 500m turbine buffer.

During winter 2024-2025, Hen Harrier were noted on four occasions and seen engaging in a number of activities such as hunting, flying, being flushed, mobbed by other bird species to the west of the site, with one record of a Hen Harrier flying towards the location on the margin of Littleton Bog outside the 500m turbine buffer previously used for roosting on one occasion in winter 2022-2023.

Across all surveys, Hen Harrier was confirmed to use the roost location on the margin of Littleton Bog on one occasion and was seen flying towards this area around dusk on one occasion. Surveyors noted that Hen Harrier were also seen in this general area around dawn/dusk on several occasions, but observations did not confirm use of the roost. Historical surveys (BnM, 2014a & 2014b) prior to the current baseline surveys had recorded ahigher use of this location as a roost; as such, the current activity pattern observed indicates this location was historically used as a regular roost but is now only used occasionally.

The targeted Hen Harrier roost searches confirmed that Hen Harrier roost occasionally on the margins of the Site, outside the 500m turbine buffer. Hen Harrier were confirmed to utilise multiple habitats across the site for low level flight, foraging and commuting, including areas within the 500m turbine buffer.

7.6.3.2.8 Kingfisher *Alcedo atthis*

Kingfisher were identified during VP, and breeding waders and water birds surveys.

Kingfisher were identified during VP surveys in the winter months of 2021-2022, 2022-2023, 2023-2024, and 2024-2025, and the summer months of 2022, 2023, and 2024.

Kingfisher were identified during breeding wader and water birds surveys in the summer of 2022, occupying a territory within 500m from turbine locations c. 470m northwest from T02 and c. 500m southwest from T01.

Kingfisher habitat suitability surveys were carried out to determine if there were suitable habitats within the site and surrounding environment for kingfisher. Surveys focused on suitable watercourses where potential impacts from the proposed wind farm could occur, extending 500m upstream and 500m downstream along watercourses within the ZoI. Over all four breeding seasons, kingfisher were recorded on six occasions, and two kingfisher nests were observed within the proposed wind farm site.

During the 2021 targeted kingfisher surveys, kingfisher were detected along the Black River holding a territory, and kingfisher activity and a nest hole were identified at point of interest K29 (c. 780m outside the proposed site boundary). During the 2022 targeted Kingfisher surveys, the kingfisher nest hole identified at K29 in 2021, was occupied by nesting pied wagtail. No further kingfisher sightings were recorded at K29 in targeted surveys in 2023 and 2024.

During the 2022 targeted kingfisher surveys, kingfisher were identified along the River Drish, River Breagagh and a drain leading from the southeast lake of Longfordpass South toward T02.

A kingfisher was observed flying downstream from a low perch at K16 along River Breagagh (within the site boundary, c. 720m south of T11). No further kingfisher sightings were recorded at K16 in targeted surveys in 2023 and 2024.

A kingfisher was recorded at a culvert northeast of T01 at K17 (c. 780m from the proposed site boundary) along River Drish and was observed flying downstream to K18 (c. 310m from the proposed site boundary), where there was a poplar root plate with a potential nest hole. During the 2024 targeted kingfisher surveys, a kingfisher was recorded on a suitable perch 100m downstream from K18. Both male and female kingfisher were observed perched together and flying back over the culvert bridge and upstream.

During 2022 targeted kingfisher surveys, kingfisher activity was observed at KF31 (c. 200m west of T02), KF31a (c. 420m northwest of T02) and KF31b (c. 220m west of T02). A nest was observed in May 2022 at KF31a, located c. 190m from a proposed access track and c. 420m from T02. During the second visit to this site (June 2022), the water levels in the drain were nearly depleted and pied wagtail adults and juveniles were investigating the nest hole. Further survey in July 2022 revealed the drain to have been deepened and water levels had increased. The kingfisher pair was noted to have relocated their nest 60m north of KF31b and high activity levels, including parent birds bringing in food to the nest, were observed.

In 2023 and 2024, there were no records of kingfisher on site. It was noted that the banks of the drain at KF31a had eroded during winter 2022-23.

Overall, it was noted that kingfisher occupied territory within the 500m turbine buffer; however, these nests were no longer active or present in 2023 and 2024. Kingfisher were noted to be occupying territory along the Black River and River Breagagh outside the site.

7.6.3.2.9 Lesser Black-backed Gull *Larus fuscus*

Lesser black-backed gull were identified during numerous surveys including VP, breeding birds, winter transects, and breeding waders and water birds surveys. They were observed during the winter months of 2020-2021, 2021-2022, 2022-2023, 2023-2024, and 2024-2025, and the summer months of 2021, 2022, 2023, and 2024.

7.6.3.2.10 Mallard *Anas platyrhynchos*

Mallard were identified during numerous surveys including VP, breeding birds, winter transect, and breeding waders and water birds surveys. They were observed during the winter months of 2020-2021, 2021-2022, 2022-2023, 2023-2024, and 2024-2025 and the summer months of 2021, 2022, 2023, and 2024. They were noted to be breeding within 500m of turbine locations in 2021 and 2022 and breeding within the site in 2023 and 2024.

7.6.3.2.11 Marsh Harrier *Circus aeruginosus*

Marsh harrier were identified during numerous surveys including VP, and breeding waders and water birds surveys. They were observed during the winter months of 2020-2021 and 2022-2023, and the summer months of 2021 and 2022.

7.6.3.2.12 Mediterranean Gull *Ichthyaetus melanocephalus*

Mediterranean gull were identified during numerous surveys including breeding birds and breeding waders and water birds surveys. They were observed during the summer months of 2021.

7.6.3.2.13 Merlin *Falco columbarius*

Merlin were identified during VPsurveys in the winter months of 2020-2021, 2021-2022, 2022-2023, 2023-2024, and 2024-2025, and the summer months of 2021, 2022, 2023, and 2024.

Targeted merlin surveys were centred on suitable habitat for the species and methods used were based on previous surveys in Ireland (Lusby et al. and Fernandez et al.); developed in association with Dr. John Lusby of BirdWatch Ireland.

During the 2021 breeding season, no Merlin observations were made during the targeted search. However, suitable habitat such as perches and hummocks were identified. General evidence of raptor species were present, such as pellets (unidentified species) along transects one to four, and a plucking post with many feathers of a small passerine.

The surveys conducted during the 2021 breeding season observed an absence of suitable breeding habitat for merlin. Considering this, and the coverage provided by VP surveys, targeted Merlin surveys were not repeated during subsequent breeding seasons.

It is noted that merlin are present at the site primarily during winter as indicated by VP surveys. There are a limited number of records occurring in spring and autumn and no records during the core breeding season nor any evidence of breeding at the site.

7.6.3.2.14 Mute Swan *Cygnus olor*

Mute swan were identified during numerous surveys including VP, breeding birds, and winter transect surveys. They were observed during the winter months of 2020-2021, 2021-2022, 2022-2023, 2023-2024, 2024-2025, and the summer months of 2021, 2022, 2023, and 2024.

7.6.3.2.15 Pintail *Anas acuta*

Pintail were observed during VP surveys in the winter months of 2023-2024 and 2024-2025.

7.6.3.2.16 Ringed Plover *Charadrius hiaticula*

Ringed plover were observed during numerous surveys including VP, breeding birds, winter transects, and breeding waders and water birds surveys. They were observed during the winter months of 2021-2022, and 2024-2025 and summer months of 2021, 2022, and 2024.

7.6.3.2.17 Short-eared Owl *Asio flammeus*

Short-eared owl were observed during VP surveys in the winter months of 2023-2024.

7.6.3.2.18 Teal *Anas crecca*

Teal were observed during numerous surveys including VP, breeding birds, winter transect, and breeding waders and water birds surveys. They were observed during the winter months of 2020-2021, 2021-2022, 2022-2023, 2023-2024, and 2024-2025, and the summer months of 2021, 2022, 2023, and 2024.

7.6.3.2.19 Tufted Duck *Aythya fuligula*

Tufted duck were observed during numerous surveys including VP, winter transects, and breeding waders and water birds surveys. They were observed during the winter months of 2021-2022 and summer months of 2021, 2022, and 2023.

7.6.3.2.20 Whooper Swan *Cygnus cygnus*

Whooper swan were observed during numerous surveys including VP and winter transect surveys. They were observed during the winter months of 2020-2021, 2021-2022, 2022-2023, 2023-2024, and 2024-2025, and the summer months of 2023 and 2024.

Whooper Swan is listed on Annex I of the EU Birds Directive. A total of 12 roosting sites were recorded (encompassing potential and confirmed sites) within the lakes and ponds throughout the site. Observations of whooper swan include sightings of individuals leaving roost sites, dusk watch observations, and multiple sites where signs of Whooper Swan i.e. preened feathers were noted. Numbers of birds observed varied from three to 50 individuals at roost sites. Five roosting sites were confirmed based on observations of swans leaving or arriving at roosts, with two of these located inside the 500m turbine buffer, within a dystrophic lake west of T04 and an acid oligotrophic lake north of T03. The primary roost site (Locations 1 and 2 on Figure 3.11/Appendix 7.1) is located to the north of the proposed turbines.

7.6.3.2.21 Wigeon *Anas penelope*

Wigeon were observed during numerous surveys including VP, breeding birds, winter transect, and breeding waders and water birds surveys. They were observed during the winter months of 2020-2021, 2021-2022, 2022-2023, 2023-2024, and 2024-2025, and the summer months of 2022 and 2023.

7.6.3.2.22 Amber-listed Passerines

Amber-listed passerines, including goldcrest, greenfinch, house martin, house sparrow, linnet, sand martin, skylark, starling, swallow, wheatear, and willow warbler were observed within the proposed wind farm during numerous surveys.

7.6.3.3 Green-listed Species

7.6.3.3.1 Brent Goose Branta *bernicla hrota*

Brent goose were observed during VP surveys in the summer months of 2023.

7.6.3.3.2 Buzzard *Buteo buteo*

Buzzard were observed during numerous surveys including VP, breeding birds, winter transect, and breeding wader and water birds surveys. They were observed during the winter months of 2020-2021, 2021-2022, 2022-2023, 2023-2024, and 2024-2025, and the summer months of 2021, 2022, 2023, and 2024.

7.6.3.3.3 Collared Dove *Streptopelia decaocto*

Collared dove were observed during breeding birds surveys in the summer months of 2021, 2023, and 2024.

7.6.3.3.4 Common Crane *Grus grus*

Crane were observed during breeding waders and water birds surveys in the summer months of 2024.

7.6.3.3.5 Cuckoo *Cuculus canorus*

Cuckoo were observed during breeding birds surveys in the summer months of 2021, 2022, 2023, and 2024.

7.6.3.3.6 Feral Pigeon *Columba livia f. domestica*

Feral pigeon were observed during breeding birds surveys in the summer months of 2021, 2022, 2023, and 2024.

7.6.3.3.7 Great White Egret *Ardea alba*

Great white egret were observed during VP surveys in the summer months of 2021.

7.6.3.3.8 Great Spotted Woodpecker *Dendrocopos major*

Great spotted woodpecker were observed during breeding birds surveys in the summer months of 2021, 2022, and 2023.

7.6.3.3.9 Green Sandpiper *Tringa ochropus*

Green sandpiper were observed during numerous surveys including VP, and breeding waders and water birds surveys. They were observed during the winter months of 2022-2023 and 2024-2025, and summer months is 2021, 2023, and 2024.

7.6.3.3.10 Greenshank *Tringa nebularia*

Greenshank were observed during VP surveys in the summer months of 2022.

7.6.3.3.11 Grey Heron *Ardea cinerea*

Grey heron were identified during numerous surveys including VP, breeding birds, winter transects, and breeding waders and water birds surveys. They were observed during the winter months of 2020-2021, 2021-2022, 2022-2023, 2023-2024, and 2024-2025, and the summer months of 2021, 2022, 2023, and 2024.

7.6.3.3.12 Jack Snipe *Lymnocryptes minimus*

Jack snipe were identified during numerous surveys including winter transect, and breeding waders and water birds surveys. They were observed during the winter months of 2021-2022 and summer months of 2023.

7.6.3.3.13 Little Egret *Egretta garzetta*

Little egret were identified during numerous surveys including VP, breeding birds, winter transect, and breeding waders and water birds surveys. They were observed during the winter months of 2020-2021, 2021-2022, 2022-2023, 2023-2024, and 2024-2025, and the summer months of 2021, 2022, 2023, and 2024.

7.6.3.3.14 Little Grebe *Tachybaptus ruficollis*

Little grebe were identified during numerous surveys including breeding birds, winter transect, and breeding waders and water birds surveys. They were observed during the winter months of 2021-2022, 2022-2023, and 2023-2024 and summer months of 2021, 2022, 2023, and 2024.

7.6.3.3.15 Long-eared Owl *Asio otus*

Long-eared owl were identified on site near the Derryhogan Lakes during breeding waders and water birds in the summer of 2024. The two observations report their successful breeding with the presence of adults and juveniles.

7.6.3.3.16 Moorhen *Gallinula chloropus*

Moorhen were identified during numerous surveys including VP, breeding birds, winter transects, and breeding waders and water birds surveys. They were observed during the winter months of 2021-2022, 2022-2023, and 2023-2024 and summer months of 2021, 2022, 2023, and 2024.

7.6.3.3.17 Peregrine *Falco peregrinus*

Peregrine were identified during numerous surveys including VP, breeding birds, and breeding waders and water birds surveys. They were observed during the winter months of 2020-2021, 2021-2022, 2022-2023, 2023-2024, and 2024-2025, and the summer months of 2021, 2022, 2023, and 2024.

7.6.3.3.18 Pheasant *Phasianus colchicus*

Pheasant were observed during numerous surveys including breeding birds, and winter transects surveys. They were observed during the winter months of 2021-2022 and 2022-2023 and summer months of 2021, 2022, 2023, and 2024.

7.6.3.3.19 Sparrowhawk *Accipiter nisus*

Sparrowhawk were identified during numerous surveys including VP and winter transect surveys. They were observed during the winter months of 2020-2021, 2021-2022, 2022-2023, 2023-2024, and 2024-2025, and the summer months of 2021, 2022, 2023, and 2024.

7.6.3.3.20 Water *Rail Rallus aquaticus*

Water rail were identified during numerous surveys including breeding birds, winter transect, and breeding wader and water birds surveys. They were observed during the winter months of 2020-2021 and 2022-2023 and summer months of 2022 and 2024.

7.6.3.3.21 Woodpigeon *Columba palumbus*

Woodpigeon were identified during numerous surveys including breeding birds, and winter transects surveys. They were observed during the winter months of 2021-2022, 2022-2023, and 2023-2024 and summer months of 2021, 2022, 2023, and 2024.

7.6.3.3.22 Green-listed Passerines

Green-listed passerines, including blackbird, blackcap, blue tit, bullfinch, chaffinch, chiffchaff, coal tit, common crossbill, dunnock, fieldfare, goldfinch, great tit, hooded crow, jackdaw, jay, lesser redpoll, long-tailed tit, magpie, mistle thrush, parrot crossbill, pied wagtail, raven, reed bunting, robin, rook, sedge warbler, siskin, song thrush, stonechat, whitethroat, and wren were observed within the proposed wind farm during numerous surveys.

7.6.4 Avifauna Habitat Associations within the Study Area

The habitats at the application site were the subject of a detailed survey and assessment by Fehily Timoney and Company ecologists between July and October 2025. A habitat map of the Proposed Development lands is provided in Figure 6-7, Volume IV. All habitats described below have been classified in accordance with Fossitt (2000).

The Proposed Development is predominantly located within cutover bog (PB4) which often occurs in mosaics with areas of scrub (WS1) of grey willow/downy birch or gorse, immature woodland (WS2) and wet grassland (GS4). Raised bog (PB1) occurs around the edges of the Site. Calcareous and neutral grassland (GS1) occurs along the existing bog railway along the northern site access route and also in the southern part of Lanespark Bog, establishing respectively on imported material associated with the bog railway and on dry cutover bog. Various woodland types occur in small areas, such as (mixed) broadleaved woodland (WD1), (mixed) conifer woodland (WD3), oak-birch-holly woodland (WN1) and bog woodland (WN7).

Waterbodies within the Site include a network of drainage ditches (FW4), dystrophic lakes (FL1) and acid oligotrophic lakes (FL2), which have been established by flooding of drainage ditches and cutover bog. Reed and large sedge swamps (FS1) occur, vegetating some ditches and surrounding some lakes. The hedgerows and treelines within the Site are associated with the agricultural lands in the proposed borrow pit footprint; a linear Scrub (WS1) formation also occurs in association with dystrophic lakes (FL1).

Artificial habitats within the Site include earth banks (BL2), buildings and artificial surfaces (BL3), spoil and bare ground (ED2) and recolonising bare ground (ED3).

7.6.4.1 Key Habitat Areas

Interrogation of field survey results indicates specific habitat associations for certain species within the study (Figure 7-1). There are a number of areas throughout the Site where bird activity is focused, located in areas which consist primarily of Dystrophic Lakes (FL1) and the surrounding wetland habitats - largely Cutover Bog (PB4) at varying stages of recolonisation. These areas are listed below, and mapped in Figures 7-2 to 7-6. Figure 7-1 provides an overview map of these areas.

1. Longfordpass South Lakes (634485, 658168; Figure 7-2): The northern lakes are the largest lakes on Site - they are surrounded by areas of scrub, immature woodland, cutover bog, raised bog, and smaller areas of bog woodland and reed/sedge swamps;
2. Bawnreagh Lakes (623953, 656819; Figure 7-3): The lakes around Turbine 1 to Turbine 4, where the habitat is dominated by cutover bog and raised bog. There are also sheltered areas such as immature woodland and scrub;
3. Derryhogan Lakes (621093, 654488; Figure 7-4): The southwest lakes are a series of smaller lakes, surrounded by cutover bog, raised bog, scrub, immature woodland, mixed broadleaved woodland, and a small area of earth banks;

4. Lanespark Bog (620997, 651521; Figure 7-5): The southern parcel, where cutover bog dominates, has frequent lakes and immature woodland throughout, and;
5. Clonoura Bog (623004, 653857; Figure 7-6): The cutover bog, conifer plantation, and surrounding area south of Turbine 8.

Additionally, there are some habitats outside the Site, in the hinterland, which are further areas where bird activity was recorded:

6. Northern Bogs, consisting of Pope's Bog (622520, 661346), Derryfadda/Inchirourke/Baunmore Bog (624170, 664482): The parcels of cutover bog north of the site boundary and north of the M8;
7. Ballybeg Bog (619125, 653015): The cutover bogs west of the south parcel, in the Ballybeg area, and;
8. Derryvella Bog (622778, 651952): The cutover bogs and conifer plantation to the east of the south parcel in the Glengoole and Derryvella townlands.

7.6.4.2 Habitat Associations

7.6.4.2.1 Raptor Activity

Seven key raptors were considered target species: Barn Owl, Buzzard, Kestrel, Peregrine, Merlin, Hen Harrier, and Sparrowhawk

- Buzzard, a green-listed species, were observed throughout the site, with high levels of activity in all key habitats and additional areas of non-forested land and the perimeter of the cutover bogs where there is high prey visibility. No nest sites were observed within the site. Buzzard commute and hunt throughout the Proposed Wind Farm Site.
- Kestrel, a red-listed species, have high levels of activity throughout the Site, all year round. Kestrels typically hunt over the Dystrophic Lakes (FL1) and Cutover Bog (PB4) where waterfowl frequent. They have been noted to breed on Site near the southern lakes (Area 3).
- Peregrine, a green-listed/Annex I species, like most other raptors on Site, hunt over the Dystrophic Lakes (FL1) and Cutover Bogs (PB4) where wader species occur in all key habitat areas.
- Merlin, an amber-listed and Annex I species, has been observed hunting in various habitats across the site during winter, with occasional observations during spring and autumn. No observations of breeding activity were observed. Hen Harrier, an amber-listed and Annex I species, was recorded in all key habitat areas throughout the Site with activity concentrated at the Bawnreagh Lakes, Derryhogan Lakes, and the Northern Bogs. One location on the edge of Littleton Bog was observed to be used intermittently as a winter roost during current surveys, and another suspected winter roost was identified in the northern bogs. Hen Harrier were observed to hunt over the Dystrophic Lakes (FL1) typically preying on waterfowl.
- Barn Owl, a red-listed species, were identified calling and breeding within the surrounding area of the proposed wind farm. They were not observed utilising the site for hunting.
- Sparrowhawk, a green-listed species, were observed primarily commuting around various habitats within the site and hunting over the cutover bog habitat. The highest levels of activity were observed around Clonoura Bog and north of Longfordpass South.

7.6.4.2.2 Waterbird Activity

The wetlands and lakes within the Site host numerous species of waterbirds, including ducks, gulls, herons and cormorant.

- Duck species, including amber-listed Mallard, Teals, Tufted Duck, and Wigeon are typically associated with the Dystrophic Lakes (FL1) and adjacent Cutover Bog (PB4) habitats around the Proposed Wind Farm. These species are found either breeding or roosting within the lakes or on the lakeshore with flight activity centred around their territories or flying to and from their roost sites.
- Cormorant (amber-listed) and Little Egret (green-listed) are typically associated with the Dystrophic Lakes (FL1) throughout the Site. These species are typically found commuting through the Site with Little Egret noted breeding near the Derryhogan Lakes. Grey heron are also active throughout the site. No heronries were observed on site; surveyors noted that a heronry is likely to be present outside the site in the hinterland west of Derryhogan lake.
- Two species of Gull were considered target species, Lesser Black-backed Gull and Black-headed Gull. The colonies of Gull species were noted in opposing months with Lesser Black-backed Gull using the Site for roosting, and Black-headed Gull using the Site for breeding.
    - Lesser Black-backed Gull, an amber-listed species, were observed in the winter months roosting in the hinterland around the Proposed Wind Farm site. They typically fly over the Longfordpass South Lakes on their way to their roost location in the Northern Bogs where roosting flocks of up to 300 birds have been recorded. They have been observed using the Longfordpass South Lakes on three occasions though have not been observed breeding there.
- Black-headed Gulls, an amber-listed species, have three known breeding colonies in the site, including one at the Derryhogan Lakes (maximum of 228 gulls), one at Longfordpass Lakes (maximum of 289 gulls) and one at Bawnreagh (maximum of 207 gulls). The colony at the Longfordpass Lakes was active in the summer of 2021 and 2022, but has not been used since that time. They are recorded commuting to and from their colony sites and have been observed breeding within the Site across multiple years of ornithological surveys. Breeding sites for Black-headed Gulls are predominantly located at Dystrophic Lakes (FL1) and the immediate surrounding areas (Cutover Bog - PB4).

7.6.4.2.3 Waders

The Dystrophic Lake (FL1) habitats throughout the Site are utilised by Waders and their activity has been noted in all eight key habitat areas. These areas are populated with breeding, roosting, and foraging birds which use the lakes and lakeshore (typically Cutover Bog (PB4) with varying degrees of vegetation) for resources and shelter.

- Curlew, a red-listed species, were observed in five of the key habitat areas (Longfordpass South Lakes, Bawnreagh Lakes, Derryhogan Lakes, Northern Bogs, and Derryvella Bogs). They are noted to breed on site, primarily at the Dystrophic Lake (FL1) habitats and the adjacent Cutover Bogs (PB4). The Derrhyogan Lakes have been home to a breeding pair of Curlew in the summers of 2021, 2022, 2023 and 2024; a breeding pair were observed in each survey season and are likely to be the same pair each year. Flocks of post-breeding Curlew have been noted commuting through and stopping over at the site after breeding elsewhere.

- Golden Plover, a red-listed species, are present in winter in the Northern Bogs. Golden Plover were noted to roost here in the winters of 2022-2023, 2023-2024, and 2024-2025, with a notable colony of 385 birds wintering in this hinterland area outside the site north of the M8. Roosts were observed on the Dystrophic Lakes (FL1) and Improved Agricultural Grassland (GA1) in nearby lands. Flightlines on Site show Golden Plover commuting through the site to and from the northern bogs in the hinterland or on limited occasion potentially indicate some migration through the site.
- Lapwing, a red-listed species, were observed primarily around the Dystrophic Lakes (FL1) and Cutover Bog (PB4) habitats at the Longfordpass South Lakes, Derryhogan Lakes, Northern Bogs, and Derryvella Bogs. They were recorded nesting in pairs and roosting on the banks of the lakes in post-breeding flocks of up to 28 birds.
- Ringed Plover, an amber-listed species, typically breed in the Dystrophic Lake (FL1) habitats in the Northern Bogs. They are infrequently found breeding within the Proposed Wind Farm Site.
- Woodcock, a red-listed species, typically breed around the Clonoura Bog area where there were high levels of roding activity recorded throughout the survey periods. Woodcock are typically associated with the Raised Bog (PB1), Cutover Bog (PB4), Immature Woodland (WS2), and Conifer Plantation (WD4) outside the Site.
- Snipe, a red-listed species, were observed throughout all key habitats on Site, within all Dystrophic Lakes (FL1) and their surrounding wetlands (Cutover Bogs (PB4), Poor Fen and Flush (PF2), and Raised Bog (PB1)). Numerous breeding pairs were observed throughout the Site, with small groups of up to 10 birds.

7.6.4.2.4 Swan and Goose Activity

Brent Geese, Greylag Geese, Mute Swan, and Whooper Swan were recorded within the Proposed Wind Farm and are all associated with the Dystrophic Lake (F1) habitats in the key habitat areas.

- Greylag geese, an amber-listed species, had relatively low activity levels but have been recorded breeding on the Site at the Longfordpass South Lakes, Bawnreagh Lakes, and Derryhogan Lakes. A breeding pair has been observed each time over each summer season with two breeding pairs observed in 2021 and 2023. The breeding pairs rely on the Dystrophic Lakes (FL1) in these areas for nesting. Greylag goose typically commute through the Proposed Wind Farm over the Cutover Bog (PB4) habitats.
- Mute Swan, an amber-listed species, are found throughout the year on Site and potentially use the area to roost, though they are not noted to nest. They were typically observed in small groups of up to 8 birds, with one occurrence in January 2022 of 125 birds flying in from the north before veering south-west over the Longfordpass South lakes. The flight paths of Mute Swan indicate their passage through the site from south to north along the pathway of Turbine 3 to Turbine 1. They were observed leaving from Dystrophic Lakes (FL1) and or adjacent Cutover Bog (PB4) and travel between lakes.
- Whooper Swan, an amber-listed species, are active across the site (largest recorded flock was 56 swans observed roosting at Longfordpass lakes) and have been recorded roosting in all known Dystrophic Lake (FL1) habitat and surrounding areas throughout the Proposed Wind Farm Site. Activity patterns observed indicate Whooper Swans in flight to and from their primary roost in the Longfordpass South Lakes and their primary grazing field in adjacent Improved Agricultural Grassland (GA1; 622696, 657598) (Hinterland Site 11: Two Churches/Cheese factory) (maximum of 138 swans observed grazing at this location) .

7.7 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 2018). Outlined below in Table 7-1 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 (2003) is also illustrated.

A highly precautionary approach was taken regarding inclusion of species in the CRM; all species flying within the 500 m turbine buffer were assessed within the CRM, and as such are also identified as KERs (key ecological receptors).

All other ecological receptors are dealt with in Chapter 6 - Biodiversity.

Table 7-13: Key Ecological Receptor Assessment

Species		NRA Evaluation	Receptor Evaluation for Impact Assessment (Sensitivity)	Inclusion in CRM	Activity	Collision Risk Zone (<500 m of Turbines)	Construction Noise Disturbance Zones (<500 m)
Species Selected as Key Receptors							
Red & Amber-listed Passerines		Local Importance (Higher value)	Low-Medium	☐	Commuting	☐	☐
Tyto alba					Foraging	☒	☒
BoCCI	Red/ Amber				Breeding	☒	☒
Annex I	No				Roosting	☒	☒
					Rationale		
					Species in this grouping may potentially be subject to direct effects arising from habitat loss and indirect disturbance/displacement effects during construction. As such, they are assessed to be key ecological receptors.		
Barn Owl			Medium	☐	Commuting	☐	☐

Species		NRA Evaluation	Receptor Evaluation for Impact Assessment (Sensitivity)	Inclusion in CRM	Activity	Collision Risk Zone (<500 m of Turbines)	Construction Noise Disturbance Zones (<500 m)
Tyto alba		County Importance			Foraging	☐	☐
BoCCI	Red				Breeding	☐	☐
Annex I	No				Roosting	☐	☐
					Rationale		
					Dedicated Barn Owl surveys identified the presence of Barn Owl on private lands in Longfordpass South where successful breeding had occurred in 2022, and adults were present until 2023. The resident Barn Owls of this location were not observed in 2024, and the site was considered abandoned. Additionally, an individual Barn Owl was heard calling south the Derryhogan Lakes (Figure 7-4) on one occasion but not observed here in later survey years. Although the recorded nest site at Longfordpass South is considered abandoned, it continues to provide suitable habitat for barn owl. As this nest site is located within the noise disturbance zone, Barn Owl are considered to be a key receptor.		
Black-headed Gull		Local Importance (Higher value)	Low	☒	Commuting	☒	☒
Chroicocephalus ridibundus					Foraging	☐	☐
BoCCI	Amber				Breeding	☐	☒
Annex I	No				Roosting	☐	☐
					Rationale		
					This species was recorded within the Proposed Wind Farm during all surveyed breeding (2020-2024) and winter seasons (2020-2025). Black-headed gulls were recorded for a total flight time of 47,536 seconds during Vantage Point watches. A total of three locations within the site were occupied intermittently during the survey period (Derryhogan, Bawnreagh and Longfordpass Lakes), with maximum counts of 228, 207 and 289 gulls respectively.		

Species		NRA Evaluation	Receptor Evaluation for Impact Assessment (Sensitivity)	Inclusion in CRM	Activity	Collision Risk Zone (<500 m of Turbines)	Construction Noise Disturbance Zones (<500 m)
					Flight paths to and from breeding/roosting sites overlap with the noise disturbance zone of the construction phases of Proposed Wind Farm, thus Black-headed Gull are considered a key receptor.		
Black-tailed Godwit		Local Importance (Higher value)	Medium	☒	Commuting	☒	☐
Limosa limosa					Foraging	☐	☐
BoCCI	Red				Breeding	☐	☐
Annex I	No				Roosting	☐	☐
					Rationale		
					This species was observed once within the Proposed Wind Farm during four years of surveys, flying through the 500 m turbine buffer in the summer of 2024 (April). The recorded flightline was within 500 m of T9-11 in the southern parcel. Due to proximity of the observed flight activity to the proposed turbines, this migratory species was assessed within the CRM and as such is classified as a key ecological receptor.		
Buzzard		Local Importance (Higher value)	Low	☒	Commuting	☒	☒
Buteo buteo					Foraging	☒	☒
BoCCI	Green				Breeding	☒	☒
Annex I	No				Roosting	☐	☐
					Rationale		
					Over 106,785s of flight time was observed for Buzzards across all seasons over the four-and-a-half-year study period. Breeding and territorial behaviour was also recorded within the Proposed Wind Farm in each summer surveyed. Buzzards were observed commuting, hunting, and breeding within the collision risk and disturbance zones and are therefore considered a key receptor.		

Species		NRA Evaluation	Receptor Evaluation for Impact Assessment (Sensitivity)	Inclusion in CRM	Activity	Collision Risk Zone (<500 m of Turbines)	Construction Noise Disturbance Zones (<500 m)
Cormorant		Local Importance (Higher value)	Low	☒	Commuting	☒	☒
Phalacrocorax carbo					Foraging	☐	☐
BoCCI	Amber				Breeding	☐	☐
Annex I	No				Roosting	☐	☐
					Rationale		
					This species was observed on six occasions within the study area during summer 2021, 2022, and 2024 and winter 2021-22, and 2024-25. Their total recorded flight time was 530s and they were observed commuting through the site. Cormorant flight lines show their presence within the collision risk and disturbance zones, though they were not observed traversing the site. Their flight patterns are primarily along watercourses within the Site. A pair of cormorant was observed flying for 178 seconds within the collision risk zone; as such, they are evaluated in the CRM and considered a key receptor.		
Curlew		National Importance	High	☒	Commuting	☒	☒
Numenius arguata					Foraging	☐	☒
BoCCI	Red				Breeding	☐	☒
Annex I	No				Roosting	☐	☐
					Rationale		

<table>
<tr><th>Species</th><th>NRA Evaluation</th><th>Receptor Evaluation for Impact Assessment (Sensitivity)</th><th>Inclusion in CRM</th><th>Activity</th><th>Collision Risk Zone (<500 m of Turbines)</th><th>Construction Noise Disturbance Zones (<500 m)</th></tr>
<tr><td colspan="3"></td><td></td><td colspan="3">There was a total of 55 observations of Curlew during the four-year VP survey period, primarily during the summer. They have also been recorded on numerous occasions breeding on site outside the 500m turbine buffer during each year of breeding wader surveys. Non- or post-breeding season records observed curlew moving through the Site, primarily during the month of July. Curlew activity during the breeding season consisted of a single pair active in each survey year, with an influx of post-breeding birds in July. The surveyor noted the arrival of post-breeding birds into the territory of the breeding pair each year made ascertaining the breeding success of the local pair difficult.
Observations of Curlew flight show their presence within the collision risk and disturbance zone. Due to the presence of a breeding pair at Derryhogan Lakes (closest area used by curlew located c. 70m from a section of proposed amenity trail), use of the site as a stopover by post-breeding birds, and their presence within the collision risk and disturbance zones, Curlew are considered a key receptor.</td></tr>
<tr><td colspan="2" rowspan="4">Golden Plover
Pluvialis apricaria
BoCCI Red
Annex I Yes</td><td rowspan="5">County Importance</td><td rowspan="5">Medium</td><td rowspan="5">☒</td><td>Commuting</td><td>☒</td><td>☒</td></tr>
<tr><td>Foraging</td><td>☐</td><td>☐</td></tr>
<tr><td>Breeding</td><td>☐</td><td>☐</td></tr>
<tr><td>Roosting</td><td>☐</td><td>☐</td></tr>
<tr><td colspan="3">Rationale</td></tr>
<tr><td colspan="2"></td><td colspan="3">Golden Plover were recorded across multiple surveys during the winter months. The largest recorded flock within the 500m turbine buffer was 300 birds, with a median flock size of 40 birds. Flight activity within the study area was primarily recorded during the non-breeding season (one record occurred in April) and known roost locations have been noted in the hinterland. Flight activity for Golden Plover has been observed within the collision risk and disturbance zones; thus, the species is a key receptor.</td></tr>
</table>

Species	NRA Evaluation	Receptor Evaluation for Impact Assessment (Sensitivity)	Inclusion in CRM	Activity	Collision Risk Zone (<500 m of Turbines)	Construction Noise Disturbance Zones (<500 m)
Great Crested Grebe	County Importance	Low	☐	Commuting	☐	☒
Podiceps cristatus				Foraging	☐	☐
BoCCI Amber				Breeding	☐	☒
Annex I No				Roosting	☐	☐
				Rationale		
				Great crested grebe were observed breeding in the Longfordpass Lakes area across multiple summer seasons and may be subject to disturbance from construction activities.		
Great White Egret	Local Importance (Higher Value)	Low	☒	Commuting	☒	☐
Ardea alba				Foraging	☐	☐
				Breeding	☐	☐
				Roosting	☐	☐
				Rationale		
				Great White Egret was observed flying through the 500m turbine buffer in June 2021. Due to its occurrence in the collision risk zone, this species is considered a key receptor.		
Green Sandpiper	Local Importance (Higher value)	Low	☒	Commuting	☒	☒
Tringa ochropus				Foraging	☐	☐
BoCCI Green				Breeding	☐	☐
Annex I No				Roosting	☐	☐
				Rationale		
				This species was recorded on seven occasions during the late summer and early winter months. Records are sporadic and were observed in June, July, August, and September of 2021, October 2022, July 2023 and September and October 2024.		

Species		NRA Evaluation	Receptor Evaluation for Impact Assessment (Sensitivity)	Inclusion in CRM	Activity	Collision Risk Zone (<500 m of Turbines)	Construction Noise Disturbance Zones (<500 m)
					These records are typically of commuting Green Sandpiper and on one occasion were noted to be post-breeding birds from elsewhere. Due to their occurrence in the collision risk zone, Green Sandpiper are considered a key receptor.		
Grey Heron		Local Importance (Higher value)	Low	☒	Commuting	☒	☒
Ardea cinerea					Foraging	☐	☒
BoCCI	Green				Breeding	☐	☐
Annex I	No				Roosting	☐	☐
					Rationale		
					Grey Heron were recorded 432 times during the four-year survey period and were present in both summer and winter months. They have been observed foraging within the Site in the Longfordpass South Lakes and Derryhogan Lakes and roosting in the surrounding hinterland and in Lanespark Bog. Grey Heron were observed within the construction noise disturbance zone and within the collision risk zone. The activity and demographic patterns observed indicate Grey Heron breed in the wider area, and forage within the site. No nest sites were observed in the site but are considered likely to be present in the hinterland. Observations indicate that Grey Heron commute frequently across the site and are therefore considered a key receptor.		
Greylag Goose		Local Importance (Higher value)	Low	☒	Commuting	☒	☒
Anser anser					Foraging	☐	☐
BoCCI	Amber				Breeding	☒	☒
Annex I	No				Roosting	☐	☐
					Rationale		

Species	NRA Evaluation	Receptor Evaluation for Impact Assessment (Sensitivity)	Inclusion in CRM	Activity	Collision Risk Zone (<500 m of Turbines)	Construction Noise Disturbance Zones (<500 m)
				Greylag Goose were observed on 47 occasions and are noted to commute through the Site. There are additional observations of breeding pairs (1-2 pairs per year) in the Longfordpass South Lakes, Bawnreagh Lakes, and Derryhogan Lakes. As the species has been observed breeding and commuting within the potential noise disturbance zone and the collision risk zone, they are considered a key receptor.		
Hen Harrier	County Importance	Very High	☒	Commuting	☒	☒
Circus cyaneus				Foraging	☒	☒
BoCCI Amber				Breeding	☐	☐
Annex I Yes				Roosting	☐	☐
				Rationale		
				Hen Harrier were observed on 103 occasions across all winter seasons surveyed. An occasional winter roost was identified on the margins of Littleton Bog, with an additional potential roost in the surrounding hinterland (Northern Bogs). The activity of Hen Harrier is focused on areas with higher prey availability - particularly at the Longfordpass South Lakes, Bawnreagh Lakes, and Derryhogan Lakes, where there are high numbers of wading birds. As Hen Harrier commuting corridors, hunting grounds and a roost site occur within/near the potential noise disturbance zone and the collision risk zone, they are considered to be a key receptor.		
Kestrel	Local Importance (Higher value)	Medium	☒	Commuting	☒	☒
Falco tinnunculus				Foraging	☒	☒
BoCCI Red				Breeding	☐	☒
Annex I No				Roosting	☐	☐
				Rationale		
				Kestrel were observed on 655 occasions and are noted to hunt, breed, and commute through the Site. They have been recorded using the Site throughout all seasons and years with highest		

Species	NRA Evaluation	Receptor Evaluation for Impact Assessment (Sensitivity)	Inclusion in CRM	Activity	Collision Risk Zone (<500 m of Turbines)	Construction Noise Disturbance Zones (<500 m)
				levels of activity around open areas where there are high densities of breeding / roosting birds and large insects (all key habitat areas). A Kestrel nest was recorded in summer 2024 on the periphery of the Site which is within in the potential noise disturbance zone (c. 420m from proposed amenity trail). Kestrel activity is frequent within both the potential noise disturbance zone and the collision risk zone, thus they are considered to be a key receptor.		
Kingfisher ***Alcedo atthis*** **BoCCI** Amber **Annex I** Yes	County Importance	Medium	☐	Commuting	☒	☒
				Foraging	☐	☐
				Breeding	☒	☒
				Roosting	☐	☐
				Rationale		
				Kingfisher have been noted commuting and breeding near the Longfordpass South Lakes, with a nest hole observed within a drain north-west of T02 in summer 2022. This nest was established in a vertical bank excavated in 2021 to manage water levels in the cutaway bog to the north. This location was not used in subsequent years, and it is considered that erosion of the recently exposed soil in winter 2022-23 made the location unsuitable for nesting in subsequent years. Although they are infrequently recorded, and they have not been noted to breed on site since 2022, they may use the site to forage and are present within the wider receiving catchment and as such could be indirectly affected by changes in water quality. Kingfisher is an SCI for the River Nore SPA. Suitable foraging habitat is present on the section of the Nore crossed via HDD by the proposed GC. The banks on this section of the Nore are sub-optimal for breeding. Based on their presence within the wider catchment, potential for foraging at the Site and occurrence of foraging habitat in the area of the proposed Nore GC crossing Kingfisher are identified as a key receptor.		

Species		NRA Evaluation	Receptor Evaluation for Impact Assessment (Sensitivity)	Inclusion in CRM	Activity	Collision Risk Zone (<500 m of Turbines)	Construction Noise Disturbance Zones (<500 m)
Lapwing		Local Importance (Higher value)	Medium	☒	Commuting	☒	☒
Vanellus vanellus					Foraging	☐	☐
BoCCI	Red				Breeding	☒	☒
Annex I	No				Roosting	☐	☐
					Rationale		
					Lapwing were observed primarily around the Dystrophic Lakes (FL1) and Cutover Bog (PB4) habitats in the Longfordpass South Lakes and Derryhogan Lakes. They were recorded nesting in pairs and roosting on the banks of the lakes in post-breeding flocks of up to 28 birds. There was a breeding pair in the collision risk zone of Turbines 9-11, however, they were only present in the summer of 2021. Lapwing primarily breed at the Longfordpass South Lakes and Derryhogan Lakes. They were noted to be within the potential noise disturbance zone and collision risk zone of the Proposed Wind Farm. As such, lapwing are considered to be a key receptor.		
Lesser Black-backed Gull		Local Importance (Higher Value)	Low	☒	Commuting	☒	☐
Larus fuscus					Foraging	☐	☐
BoCCI	Amber				Breeding	☐	☐
Annex I	No				Roosting	☐	☐
					Rationale		
					Lesser Black-backed Gull are frequent visitors to the Proposed Wind Farm site. They are noted to roost within the northern hinterland (bogs north of the M8). They frequently commute through the Site towards their roost in the Northern Bogs. The pathway frequently taken by this species is within the potential collision risk zone; thus, they are considered to be a key receptor.		

Species		NRA Evaluation	Receptor Evaluation for Impact Assessment (Sensitivity)	Inclusion in CRM	Activity	Collision Risk Zone (<500 m of Turbines)	Construction Noise Disturbance Zones (<500 m)
Little Egret		Local Importance (Higher Value)	Medium	☒	Commuting	☒	☒
Egretta garzetta					Foraging	☐	☐
BoCCI	Green				Breeding	☐	☐
Annex I	Yes				Roosting	☐	☐
					Rationale		
					The activity and demographic patterns observed indicate little egret breed in the wider area, and forage within the site. No nest sites were observed in the site but are considered likely to be present in the hinterland. They were frequently recorded commuting through the Site with the majority of activity around the Longfordpass South Lakes, Derryhogan Lakes, and Lanespark Bog. Their activity was within the potential disturbance zone for construction noise and the potential collision risk zone. Due to this, Little Egret are considered a key receptor.		
Mallard		Local Importance (Higher Value)	Low	☒	Commuting	☒	☒
Anas platyrhynchos					Foraging	☐	☐
BoCCI	Amber				Breeding	☐	☒
Annex I	No				Roosting	☐	☐
					Rationale		
					Mallard have been recorded within the Site throughout the summer and winter seasons during every year of survey. They were observed on 711 occasions and are noted to breed at the Longfordpass South Lakes and Derryhogan Lakes. They frequently commute around key lake habitats and the bogs of Bawnreagh Lakes and Lanespark Bog. Their activity was primarily within the potential disturbance zone for construction noise and less frequently within the collision risk zone. Due to this, Mallard are considered a key receptor.		
Marsh Harrier			Medium	☐	Commuting	☒	☒

Species		NRA Evaluation	Receptor Evaluation for Impact Assessment (Sensitivity)	Inclusion in CRM	Activity	Collision Risk Zone (<500 m of Turbines)	Construction Noise Disturbance Zones (<500 m)
Circus aeruginosus		County Importance			Foraging	☒	☒
BoCCI	Amber				Breeding	☐	☐
Annex I	Yes				Roosting	☐	☐
					Rationale		
					Marsh Harrier was observed on 24 occasions throughout the survey period with activity in the summer and winter months of 2020, 2021, and 2022. They were recorded attempting to hunt within the Site near T02 and commuting through the wider area. They are not noted to be roosting or breeding on site. As they were observed within the collision risk zone, they are considered to be a key receptor.		
Merlin		County Importance	Medium	☒	Commuting	☒	☒
Flaco columbarius					Foraging	☒	☒
BoCCI	Amber				Breeding	☐	☐
Annex I	Yes				Roosting	☐	☐
					Rationale		
					Merlin were recorded on 47 occasions over the survey period. They were typically observed hunting during the winter months, with occasional records in spring and autumn. No breeding activity was recorded. Their activity was recorded mainly over the cutover bogs at the Longfordpass South Lakes, Bawnreagh Lakes, Derryhogan Lakes, and Lanespark Bog (Figure 7-4). As Merlin activity is within the potential construction noise disturbance zone and the collision risk zone, this species is considered a key receptor.		
Mute Swan		County Importance	Low	☒	Commuting	☒	☒
Cygus olor					Foraging	☐	☐
BoCCI	Amber				Breeding	☒	☒

Species		NRA Evaluation	Receptor Evaluation for Impact Assessment (Sensitivity)	Inclusion in CRM	Activity	Collision Risk Zone (<500 m of Turbines)	Construction Noise Disturbance Zones (<500 m)
Annex I	No				Roosting	☐	☐
					Rationale		
					Mute Swan were found throughout the year on Site and potentially use the area to roost, though their activity is not noted. They were observed primarily in small groups of up to 8 birds, with one occurrence of 125 birds. The flight paths of Mute Swan indicate their passage through the site from south to north along the pathway of T03 to T01 and along the Longfordpass South Lakes. They are noted to be nesting on one occasion between VP5 and VP6 near the Longfordpass South Lakes and Bawnreagh Lakes. Due to their proximity to the potential construction noise disturbance zone and the collision risk zone, Mute Swan are considered a key receptor.		
Peregrine		County Importance	Medium	☒	Commuting	☒	☒
Falco peregrinus					Foraging	☒	☒
BoCCI	Green				Breeding	☐	☐
Annex I	Yes				Roosting	☐	☐
					Rationale		
					Peregrine have been recorded within the Proposed Wind Farm and hinterland on 226 occasions. They were observed commuting and hunting throughout the potential construction noise disturbance zone and the collision risk zone. A number of confirmed breeding locations in the surrounding hinterland were noted in the hinterland survey (closest is 1.6 km from the site). As Peregrine frequently hunt around the key habitats within the Proposed Wind Farm, they are considered to be a key receptor.		
Redshank		Local Importance (Higher Value)	Medium	☒	Commuting	☒	☒
Tringa totanus					Foraging	☐	☐
BoCCI	Red				Breeding	☐	☐

Species		NRA Evaluation	Receptor Evaluation for Impact Assessment (Sensitivity)	Inclusion in CRM	Activity	Collision Risk Zone (<500 m of Turbines)	Construction Noise Disturbance Zones (<500 m)
Annex I	No				Roosting	☐	☐
					Rationale		
					Redshank were observed on four occasions within disturbance and collision risk zones; however, they were not recorded to be breeding or roosting on the Site. They have been noted as a post-breeding pair on migration. As redshank activity was observed within the 500m buffer, they were assessed in the CRM and as such are identified as a key receptor.		
Ringed Plover		Local Importance (Higher Value)	Low	☒	Commuting	☒	☒
Charadrius hiaticula					Foraging	☐	☐
BoCCI	Amber				Breeding	☐	☐
Annex I	No				Roosting	☐	☐
					Rationale		
					Ringed Plover were infrequently recorded within the Proposed Wind Farm and are more commonly identified in the Northern Bogs where they typically breed. There are two occasions in which Ringed Plover were observed commuting and resting in the Site: once in the Lanespark Bog and once at the Longfordpass South Lakes. Otherwise, Ringed Plover activity is limited to the surrounding hinterland. As ringed plover activity was observed within the 500m buffer at potential collision height, they are considered a key receptor.		
Short-eared Owl		County Importance	Medium	☒	Commuting	☒	☒
Asio flammeus					Foraging	☐	☐
BoCCI	Amber				Breeding	☐	☐
Annex I	Yes				Roosting	☐	☐

Species		NRA Evaluation	Receptor Evaluation for Impact Assessment (Sensitivity)	Inclusion in CRM	Activity	Collision Risk Zone (<500 m of Turbines)	Construction Noise Disturbance Zones (<500 m)
					Rationale		
					Short-eared Owl were identified on two occasions near Turbine 8 in February 2024. They were not noted to be breeding or roosting on the Site. Short-eared Owl were observed commuting within the collision risk and disturbance zones; as such, they are considered a key receptor.		
Snipe		County Importance	Medium	☒	Commuting	☒	☒
Gallinago gallinago					Foraging	☐	☐
BoCCI	Red				Breeding	☒	☒
Annex I	No				Roosting	☐	☐
					Rationale		
					Snipe are an abundant resident of the Proposed Wind Farm. They have been observed throughout the Site displaying territorial / breeding behaviour during the summer months and were frequently flushed during the winter months. The central area of Littleton Bog was noted to have high levels of breeding activity, particularly near proposed T02, T03, T06 and the proposed access tracks linking these turbines. They were observed throughout all key habitats on the Site. There are numerous breeding pairs around the Site, with small groups of up to 10 birds. Due to this, they are considered a key receptor.		
Sparrowhawk		Local Importance (Higher Value)	Low	☒	Commuting	☒	☒
Accipiter nisus					Foraging	☒	☒
BoCCI	Green				Breeding	☐	☐
Annex I	No				Roosting	☐	☐

Species	NRA Evaluation	Receptor Evaluation for Impact Assessment (Sensitivity)	Inclusion in CRM	Activity	Collision Risk Zone (<500 m of Turbines)	Construction Noise Disturbance Zones (<500 m)
				Rationale		
				Sparrowhawk were recorded on 290 occasions throughout the survey period. They were noted to be hunting, displaying, and commuting within the Site. Their highest level of activity was at the Clonoura Bog on the southern margin of Littleton Bog, with fewer observations in other key habitats. Due to their activity within the potential noise disturbance zone and the collision risk zone, they are considered a key receptor.		
Stock Dove	Local Importance (Higher Value)	Medium	☐	Commuting	☒	☒
Columba oenas				Foraging	☐	☐
BoCCI Red				Breeding	☐	☐
Annex I No				Roosting	☐	☐
				Rationale		
				Stock dove were infrequently recorded during surveys, with activity limited to two flyovers within the 500m turbine buffer and one flyover during breeding bird surveys. Due to the flight activity observed within the 500m turbine buffer, stock dove are considered a key ecological receptor.		
Starling	Local Importance (Higher Value)	Low	☒	Commuting	☒	☐
Sturnus vulgairs				Foraging	☐	☐
BoCCI amber				Breeding	☐	☐
Annex I No				Roosting	☒	☐
				Rationale		
				A large flock of 1,000 starlings was observed flying within the 500m turbine buffer during winter 2020-21 VP surveys. As such, this species is included as a key receptor. There is no suitable breeding habitat for starling within the site.		

Species		NRA Evaluation	Receptor Evaluation for Impact Assessment (Sensitivity)	Inclusion in CRM	Activity	Collision Risk Zone (<500 m of Turbines)	Construction Noise Disturbance Zones (<500 m)
Swift		Local Importance (Higher Value)	Medium	☒	Commuting	☒	☒
Apus apus					Foraging	☒	☒
BoCCI	Red				Breeding	☐	☐
Annex I	No				Roosting	☐	☐
					Rationale		
					There are 86 total observations of Swift across the summer seasons of 2021-2024. They were noted to be commuting and foraging within the potential construction noise disturbance zones and turbine collision risk zones. Due to this, and the typical high flight height of Swift, they are considered a key receptor.		
Teal		Local Importance (Higher Value)	Low	☒	Commuting	☒	☒
Anas crecca					Foraging	☐	☐
BoCCI	Amber				Breeding	☒	☒
Annex I	No				Roosting	☐	☐
					Rationale		
					Teal were recorded at the Proposed Wind Farm site during every year of surveys (total of 170 observations) with breeding observations within the Longfordpass South Lakes and the Derryhogan Lakes. Their flightlines typically show them commuting around their breeding sites and are typically within the potential construction noise disturbance zone and the turbine collision risk zone. Due to this, they have been selected as a key receptor.		
Tufted Duck		Local Importance (Higher Value)	Low	☒	Commuting	☒	☒
Aythya fuligula					Foraging	☐	☐
BoCCI	Amber				Breeding	☐	☐
Annex I	No				Roosting	☐	☐

Species		NRA Evaluation	Receptor Evaluation for Impact Assessment (Sensitivity)	Inclusion in CRM	Activity	Collision Risk Zone (<500 m of Turbines)	Construction Noise Disturbance Zones (<500 m)
					Rationale		
					Tufted Duck were observed on six occasions throughout the survey period. They were observed primarily commuting through the potential construction noise disturbance zone and the turbine collision risk zone and were not noted to breed or roost on the Site. As Tufted Duck were observed within the potential noise disturbance and collision zones, they are considered a key receptor.		
Whooper Swan		County Importance	High	☒	Commuting	☐	☒
Cygnus cygnus					Foraging	☐	☐
BoCCI	Amber				Breeding	☐	☐
Annex I	Yes				Roosting	☒	☒
					Rationale		
					Whooper Swan are a common roosting species observed within the Site. They have been present throughout the winter months of every surveyed season (total of 381 observations) and frequently forage in neighbouring agricultural grassland. The primary roosting location was noted to be the Longfordpass South lakes, with lower numbers occasionally roosting at smaller lakes across the site. They commute to and from the roost and foraging sites and pass through the potential construction noise disturbance zone and the turbine collision risk zones. As such, they have been selected as a key receptor.		
Wigeon		Local Importance (Higher Value)	Low	☒	Commuting	☒	☒
Anas penelope					Foraging	☐	☐
BoCCI	Amber				Breeding	☐	☒
Annex I	No				Roosting	☐	☐
					Rationale		
					Wigeon have been observed within the Site on 35 occasions and were present on the Site during all		

Species	NRA Evaluation	Receptor Evaluation for Impact Assessment (Sensitivity)	Inclusion in CRM	Activity	Collision Risk Zone (<500 m of Turbines)	Construction Noise Disturbance Zones (<500 m)
				surveyed winter periods (2020/21to 2024/25). They are noted to commute through the site, stopping in the Derryhogan Lakes, and on one occasion were found to be breeding at this location. As the Derryhogan Lakes are within the potential zone of disturbance for the construction period, and Wigeon are noted to commute through the turbine collision zone, they are considered a key receptor.		
Woodcock	Local Importance (Higher Value)	Medium	☐	Commuting	☒	☒
Scolopax rusticola				Foraging	☐	☐
BoCCI Red				Breeding	☒	☒
Annex I No				Roosting	☐	☐
				Rationale		
				Woodcock were frequently observed within the Proposed Wind Farm, typically towards the Clonoura Bog area, south of T8, where they were noted to be roding (breeding display behaviour). This frequented breeding site is located both in the collision risk zone and the construction disturbance zone, thus the species is considered to be a key receptor.		
Species Not Selected as Key Receptors						
Brent Goose	County Importance	Low	☐	Commuting	☒	☐
Branta bernicla				Foraging	☐	☐
BoCCI Green				Breeding	☐	☐
Annex I No				Roosting	☐	☐
				Rationale		
				This species was observed once among the hinterlands of the Site during Spring Migration in 2023. The recorded flight time was 56s and was not within the collision risk or disturbance zones of the Proposed Wind Farm. Due to absence of activity within the collision risk or disturbance		

Species	NRA Evaluation	Receptor Evaluation for Impact Assessment (Sensitivity)	Inclusion in CRM	Activity	Collision Risk Zone (<500 m of Turbines)	Construction Noise Disturbance Zones (<500 m)
				zones and limited occurrence they are not considered to be a key receptor.		
Crane	County Importance	Medium	☐	Commuting	☐	☒
Grus grus				Foraging	☐	☒
BoCCI N/A				Breeding	☐	☐
Annex I Yes				Roosting	☐	☐
				Rationale		
				An individual crane was observed feeding and flying north-east at Derryhogan Lakes in summer 2024. Since observations are limited to a single individual on one occasion and no breeding occurred at the site, this species has been confirmed not to reside at the site and as such is not considered to be a key receptor.		
Common Sandpiper	Local Importance (Higher Value)	Low	☐	Commuting	☐	☐
Actitis hypoleucos				Foraging	☐	☐
BoCCI Amber				Breeding	☐	☐
Annex I No				Roosting	☐	☐
				Rationale		
				This species was observed on six occasions within the study area during Summer 2021 (five times) and Summer 2022 (one time). Their recorded flight time was 100s and the observations were not within the collision risk or disturbance zones of the Proposed Wind Farm. Therefore, they are not considered a key receptor.		
Dunlin		Medium	☐	Commuting	☐	☐

Species		NRA Evaluation	Receptor Evaluation for Impact Assessment (Sensitivity)	Inclusion in CRM	Activity	Collision Risk Zone (<500 m of Turbines)	Construction Noise Disturbance Zones (<500 m)
Calidris alpina		Local Importance (Higher Value)			Foraging	☐	☐
BoCCI	Red				Breeding	☐	☐
Annex I	No				Roosting	☐	☐
					Rationale		
					There was one observation of Dunlin during the summer 2022 season, which shows a bird in flight for 23s. The observation was not within the collision risk or disturbance zone of the Proposed Wind Farm; thus, Dunlin are not considered to be a key receptor.		
Greenland White-fronted Goose		County Importance	Medium	☐	Commuting	☐	☐
Anser albifrons *flavirostris*					Foraging	☐	☐
BoCCI	Amber				Breeding	☐	☐
Annex I	Yes				Roosting	☐	☐
					Rationale		
					Not recorded during surveys; migration corridor is located 40 km north-east of proposed wind farm. The very limited number of records in the surrounding region, historical nature of wintering records at Curragh and Goul river Marsh pNHA and contemporary information on distribution of wintering sites (Burke et al., 2025) indicate this species does not occur habitually in the area of the proposed wind farm and the surrounding region, with records limited to infrequent incidental occurrence of low numbers of birds.		
Greenshank		Local Importance (Higher Value)	Low	☐	Commuting	☐	☒
Tringa nebularia					Foraging	☐	☐
BoCCI	Green				Breeding	☐	☐
Annex I	No				Roosting	☐	☐

Species	NRA Evaluation	Receptor Evaluation for Impact Assessment (Sensitivity)	Inclusion in CRM	Activity	Collision Risk Zone (<500 m of Turbines)	Construction Noise Disturbance Zones (<500 m)
				Rationale		
				Greenshank were observed on three occasions during August and September 2022, with only one observation within the potential noise disturbance zone of the Proposed Wind Farm at the Longfordpass South Lakes. They are not noted to be roosting or breeding within the Site. Due to infrequency of occurrence, Greenshank are not considered a key receptor.		
Jack Snipe	Local Importance (Higher Value)	Low	☐	Commuting	☐	☒
Lymnocryptes minimus				Foraging	☐	☐
BoCCI Green				Breeding	☐	☐
Annex I No				Roosting	☐	☐
				Rationale		
				Jack Snipe were recorded on three occasions during the survey period. They were not noted to breed on the Site but noted to be overwintering birds passing through on migration. As this species is infrequently recorded within the Site, they are not considered a key receptor.		
Pintail	Local Importance (Higher Value)	Low	☐	Commuting	☐	☐
Anas acuta				Foraging	☐	☐
BoCCI Amber				Breeding	☐	☐
Annex I No				Roosting	☐	☐
				Rationale		
				Pintail were observed on two occasions and were not noted in the disturbance or collision risk zones. Additionally, Pintail were not noted to be breeding or roosting on the Site. As such, they are not considered a key receptor.		

Species		NRA Evaluation	Receptor Evaluation for Impact Assessment (Sensitivity)	Inclusion in CRM	Activity	Collision Risk Zone (<500 m of Turbines)	Construction Noise Disturbance Zones (<500 m)
Shoveler		Local Importance (Higher Value)	Medium	☐	Commuting	☐	☒
Anas clypeata					Foraging	☐	☐
BoCCI	Red				Breeding	☐	☐
Annex I	No				Roosting	☐	☐
					Rationale		
					Shoveler were infrequently recorded within the Proposed Wind Farm with seven occurrences noted throughout the survey period. They were typically observed using the Longfordpass South Lakes with the initial observation in summer 2021. Numbers of Shoveler have increased on the Site as four observations were noted in winter 2024-2025. Their activity is not in the collision risk zone and is on the outskirts of the potential noise disturbance zone. Considering these factors, in addition to infrequency of records, Shoveler are not considered a key receptor.		
White-tailed Eagle		County Importance	High	☐	Commuting	☐	☐
Haliaeetus albicilla					Foraging	☐	☐
BoCCI	Red				Breeding	☐	☐
Annex I	Yes				Roosting	☐	☐
					Rationale		
					White-tailed Eagle was observed on two occasions on the same day in the Northern Bogs. These observations were the same individual recorded in March 2024. As the individual was not noted to breed or roost on the Site, was absent from the 500m turbine buffer and site, and was not observed again in the Northern Bogs, they are unlikely residents in the area. As such, they are not considered a key receptor.		

7.8 Potential Effects

All elements of the Proposed Wind Farm have been considered in assessing effects on ecological receptors, including: 11 no. wind turbines with a blade tip height of 200 m, a hub height of 119 m and a rotor diameter of 162 m, the substation, and all ancillary infrastructure, plus electrical infrastructure and turbine delivery accommodation works.

7.8.1 Do Nothing Scenario

Whether the Proposed Development were to proceed or not, the remaining measures outlined in the Rehabilitation Plans will continue to be implemented by BnM in agreement with the EPA. The site would continue to be managed as it has been, i.e. continuing revegetation and expansion of wet areas following implementation of Phase 1 rehabilitation (drain blocking and decommissioning of pumps implemented between 2018 and 2021) in peatland habitats, and intensive grassland and hedgerow management within the borrow pit area.

Phase 1 rehabilitation works were completed in Littleton, Longfordpass and Lanespark bogs between 2018-2021. The measures completed included the blocking of drains which has resulted in the presence of areas of standing water within the Site. It is noted that no drain blocking has been carried out in the small area of Longfordpass Bog overlapped by the site.

The current baseline in the peatland areas is variable in terms of progress of rehabilitation/revegetation; areas where peat extraction and ancillary activities ceased earlier are at more advanced stages of revegetation/rehabilitation, while areas where peat extraction ceased later are in the earlier stages of revegetation. As such, certain parts of the site such as the Derryhogan Lakes (see Figure 7-1) and some areas of marginal bog woodland are at more advanced stages of rehabilitation which are likely to be indicative of the habitats which will develop at the more advanced stages of rehabilitation. It is noted that while areas with more advanced stages of revegetation are likely to more closely represent the habitats which will ultimately develop, they are likely to develop further, i.e. wetland habitats are likely to get wetter and continue to expand where suitable conditions exist, and woodland habitats are likely to increase in structural and species diversity as they mature.

As such, the areas with longer-stablished revegetation processes are considered to be indicative of the habitats which will ultimately develop across the bogs within the site, i.e. a mosaic of wetland areas characterised by lakes and high-sphagnum areas of regenerating bog, woodland, and intermediate habitats with open scrub and grassy heath-type vegetation. While habitat types are likely to stabilise eventually, some level of dynamism is likely to persist and stochasticity is likely to influence habitat development and to maintain some level of flux even at the stage where habitats have become relatively stable (e.g. mature woodland and regenerating bog).

While a relatively uniform approach to rehabilitation was undertaken. i.e. drain blocking across the site, existing topography and hydrology have also played roles in the character and pace of revegetation/rewetting. For example, the Longfordpass Lakes developed relatively rapidly after pumping ceased, while other areas such as the north-eastern extremity of Littleton Bog are flooding much more gradually and at a more limited scale following drain blocking. Variability is also evident at Lanespark Bog, characterised by large flooded areas in the south, contrasting with dense scrub and grassland established in drier conditions south-west of T09, and relatively bare peat in many other parts of this bog where revegetation/re-wetting is at a less advanced stage.

The presence of feral horses is also noted to form part of the current baseline at Littleton Bog, with associated effects on vegetation in drier areas, and also potential effects on scrub and woodland development.

In terms of use of the site by birds, it is assessed that the current baseline provides a good indication of how bird life at the site will ultimately develop, i.e. use of wetland areas by breeding waders, waterbirds, swans etc. and use of the wider habitat mosaic by raptors and passerines. A key ecological relationship appears to be the hunting resource for wintering hen harrier provided by the wetland bird population. The Derryhogan Lakes are likely to continue to provide suitable breeding habitat for curlew.

While strongly indicative trends of bird use are already established, it is likely that the availability of suitable habitat for waders and waterbirds is likely to increase as revegetation and re-wetting continues, potentially leading to increases in numbers of species such as snipe.

Variability in use of the site by bird species has also been observed, with breeding Black-headed gull behaviour indicating opportunistic and variable use of both emerging and existing suitable habitats at the site and across the wider complex of cutaway bogs in which the site is located. It is considered likely that as the resource of suitable habitats increases with revegetation and re-wetting, numbers of birds will increase, and opportunism and adaptability will also continue to occur as birds take advantage of an expanding and variable landscape-scale habitat resource.

In summary, while trends indicative of the future ecological development of the site are well established, the habitats at the site are expected to develop further, increase in extent, and be utilised by increasing numbers of birds while also providing increased opportunities for variability in habitat use and increased extent of displacement habitats. These changes will occur irrespective of whether the Proposed Development proceeds or not.

It is noted that the primary wetland/waterbird areas, i.e. large-scale wetlands (Derryhogan and Longfordpass Lakes) are located away from the proposed wind farm, and the majority of proposed wind farm infrastructure is located within drier areas where woodland and scrub/heath-type vegetation will develop, rather than potential wetland/waterbird habitats.

In the do-nothing scenario, the land associated with the proposed borrow pit is likely to continue to be managed as improved agricultural grassland for silage production as it currently is.

The lands traversed by the proposed grid connection and TDR would continue to be used for travel/transport and agriculture.

7.8.2 Potential Effects on Designated Sites with Ornithological Interest

A total of seven designated sites within the potential zone of influence have ornithological interests.

These are:

A total of seven designated sites within the potential zone of influence have ornithological interests.

These are:

- River Nore SPA (0004233) (ornithological interest: Kingfisher)(0 m);
- Kilcooly Abbey Lake pNHA (000958) (ornithological interests: Mallard, Moorhen, Coot and a colony of Herons) (5 km);
- Inchbeg pNHA (000836) (ornithological interests: Golden Plover, Lapwing, Whooper Swan) (5.5 km from grid connection; 22 km from proposed wind farm);
- Cabragh Wetlands pNHA (001934) (ornithological interests: wintering waterbirds including Teal, Wigeon, Mallard, Pintail, Shoveler, Lapwing, Golden Plover and Curlew) (9.4 km);

- Curragh and Goul river Marsh pNHA (000420) (ornithological interest: historical presence of wintering Greenland white-fronted geese; mean winter max. 66, l985/86 to l989/90) (7.7 km);
- Slievefelim to Silvermines Mountains SPA (0004165) (ornithological interest: hen harrier) (26.9 km);
- Slieve Bloom Mountains SPA (0004160) (27.7 km).

A further two pNHAs which do not formally cite ornithological interests are known to be utilised by birds:

- Killough Hill pNHA (000959) (suitable breeding habitat for peregrine)
- The Loughans pNHA (also an SAC) (000407)(known to host wintering waterbirds)

7.8.2.1 Potential Construction Phase Effects

No construction stage effects are predicted for Kilcooly Abbey Lake pNHA due to distance and lack of downstream hydrological connectivity with the proposed development.

Similarly, there is no downstream hydrological connectivity between Curragh and Goul river Marsh pNHA with the proposed development, and distance precludes disturbance effects. Contemporary data also indicates that wintering Greenland white fronted gees no longer occur at this pNHA.

No construction stage effects are predicted for Killough Hill pNHA due to absence of effect pathways linking potential peregrine breeding habitat at this pNHA and the proposed development.

There is potential for effects arising from changes in water quality to affect aquatic habitats in Inchbeg pNHA, Cabragh Wetlands pNHA and The Loughans pNHA prior to mitigation.

There is also potential for temporary disturbance of wintering waterbirds to occur at the Loughans pNHA, although potential effects are likely to be of low magnitude due to suitable wetland areas being set back from the road. It is also noted that this pNHA is not designated for any ornithological interests.

In summary, it is assessed that construction phase effects on National sites will be **Short-term Imperceptible.**

The assessment of European sites is detailed within the accompanying NIS.

The NIS concluded that, in the light of the conclusions of the assessment on the implications for the European sites concerned (River Nore SPA, Slievefelim to Silvermines Mountains SPA and Slieve Bloom Mountains SPA) that the proposed project will not adversely affect the integrity of any European site either individually or in combination with other plans or projects.

7.8.2.2 Potential Operational Phase Effects

Kilcooly Abbey Lake pNHA is noted to support Mallard, Moorhen, Coot and Grey Heron; Inchbeg pNHA is noted to support Golden Plover, Lapwing and Whooper Swan; Cabragh Wetlands pNHA is noted to support Teal, Wigeon, Mallard, Pintail, Shoveler, Lapwing, Golden Plover and Curlew. Suitable breeding habitat for Peregrine falcon is known to occur at Killough Hill pNHA.

Coot was recorded during transect surveys but not during VP surveys; Moorhen, Pintail and Shoveler were recorded during VP surveys but no flight activity was observed within the potential collision risk zone (500m turbine buffer). The potential collision risk for Mallard, Grey Heron, Golden Plover, Lapwing, Whooper Swan, Teal, Wigeon, Curlew and Peregrine has been assessed within the CRM (Appendix 7.2) and Section 7.8.2.2 below.

The predicted effect of collision risk at the national scale was identified as Long-term Imperceptible for Mallard, Grey Heron, Golden Plover, Lapwing, Whooper Swan, Teal, Wigeon, Peregrine, and Long-term Moderate for Curlew.

The predicted barrier effect for Mallard, Grey Heron, Golden Plover, Lapwing, Teal, Wigeon, Curlew and Peregrine ranges from Imperceptible to Not significant; The predicted barrier effect for Whooper Swan was identified as Long-term Not significant to Slight.

Predicted displacement effects for Mallard, Grey Heron, Golden Plover, and Peregrine range from Imperceptible to Not significant; displacement effect for Wigeon was identified as Not Significant to Slight, while displacement effect for Lapwing and Teal was identified as Long-term Slight to Moderate.

Predicted displacement effects for Whooper Swan was identified as a Short-term Moderate to Significant effect, followed by a Long-term Not Significant effect with acclimation.

A Long-term Significant displacement effect was identified for the local breeding Curlew population; however, this is a localised affect at the site and as such is not applicable to Curlew associated with Cabragh Wetlands pNHA.

Potential effects identified for Mallard, Grey Heron, Teal, Wigeon, Lapwing, Golden Plover and Curlew relate primarily to the local populations occurring in and around the site, and as such there is no tangible pathway for effects with Kilcooly Abbey Lake pNHA or Cabragh Wetlands pNHA. Breeding curlew are known to have a maximum foraging range of 2 km during breeding season (SNH, 2016). No effects were identified for the remaining species associated with these pNHAs (Moorhen, Coot, Pintail and Shoveler).

A study examining wintering Curlew in the Humber Estuary (Mander et al., 2022) observed an average home range of 555 ha, with occasional foraging trips to areas 3.5 km from roost sites. Considering the distance between the proposed wind farm and Cabragh Wetlands pNHA is 9.4 km, there is unlikely to be an effect pathway between the site and this pNHA for wintering curlew.

Whooper swans are noted to have a core foraging range of 5 km during winter (SNH, 2016), and as such there is no effect pathway linking the proposed wind farm and Inchbeg pNHA which is located c. 22 km from the proposed wind farm.

In summary, it is assessed that operational phase effects on National sites will be **Long-term Imperceptible** due to primary effects being focused in the vicinity of the proposed wind farm, absence of tangible ecological connectivity, and absence of direct effects or disturbance at pNHAs with ornithological interests.

The assessment of European sites is detailed within the accompanying NIS.

The assessment of European sites is detailed within the accompanying NIS. The NIS concluded that, in the light of the conclusions of the assessment on the implications for the European sites concerned (River Nore SPA, Slievefelim to Silvermines Mountains SPA and Slieve Bloom Mountains SPA) that the proposed project will not adversely affect the integrity of any European site either individually or in combination with other plans or projects.

7.8.2.3 Potential Decommissioning Phase Effects

During decommissioning of the proposed wind farm, effects similar to those associated with construction are predicted, but at reduced magnitude. No decommissioning phase effects will arise from the TDR. The proposed grid connection would be left in situ as part of the national grid and as such there are no potential decommissioning effects associated with the grid connection.

7.8.3 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 (Drewit and Langston, 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, 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 construction 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.

7.8.3.1 Peatland Rehabilitation

The conditions and associated habitats created by the Phase 1 rehabilitation measures which have been implemented form part of the ecological baseline and as such form an inherent component of the baseline environment considered in the impact assessment. The impact assessment fully considers existing and emerging trends associated with the peatland rehabilitation measures that have been implemented at the Site. The rehabilitation measures relevant to the bogs within the site; Littleton (BnM, 2026a), Longfordpass (2026b) and Lanespark (BnM, 2025a) have already been implemented, and no enhanced rehabilitation measures are proposed. Phase 2 enhanced (PCAS) measures are proposed only for nearby bogs outside the site (Ballybeg and Derryvella) (BnM, 2025a).

Construction of the Proposed Project will take place within the context of continued implementation of the Rehabilitation Plans (BnM 2026a, 2026b & 2025a) which consists of monitoring of the Littleton, Longfordpass and Lanespark Phase 1 measures and enhanced measures at nearby Ballybeg and Derryvella bogs. There will be localised effects arising from habitat loss and drainage as detailed in Section 6.9; however, the proposed wind farm will not interfere with the rehabilitation or compromise re-wetting and revegetation/regeneration at the site scale. The proposed development footprint is limited (proposed infrastructure occupies c.1.9% of the Site; PDAs occupy c. 1.6%) and will result in localised effects only – it will not interfere with key drainage management implemented for rewetting and as such is compatible with rewetting at the site scale. It is noted that wind farm projects compatible with peatland rehabilitation have previously been delivered, e.g. Cloncreen, Derrinlough, Bruckana and Mountlucas.

*7.8.3.2 **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 habitat such as scrub, raised bog and woodland. The road alignment, hardstand orientation and locations of turning heads seek to minimise scrub and tree 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 agricultural grassland. These habitats are heavily disturbed and managed thus having 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 detailed in EIAR Chapter 6 (Section 6.9.2.2.1). The highest amount of habitat loss relates to cutover bog, which encompasses a number of sub-types ranging from bare peat to various stages and types of recolonisation including grassy vegetation, dry heather dominated vegetation and wetland mosaics characterised by pools/drains with reed swamps and sphagnum. The areas of cutover bog subject to loss are predominantly bare peat of low ecological value which do not provide suitable habitat for the majority of bird species (golden plover are a notable exception; however, this species has not been observed using the site).

After cutover bog, wooded habitats such as bog woodland , scrub and immature woodland are the habitats subject to the next highest levels of loss. In addition, sections of hedgerow within the proposed borrow pit are subject to loss. These habitats are primarily of value to small passerines, and may occasionally also be used by raptors, although it is noted that the woodland habitats onsite within the proposed development footprint are immature and do not contain trees which provide optimal habitat for nesting or roosting raptors.

7.8.3.3 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 11 – 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:

- Tracked excavators and disc cutters from cable trenching (0.8 mm/s at 4m) Pneumatic breakers for cable trenching (0.7 mm/s at 10 m)
- Rock breaking at the borrow pit (0.03 mm/s at 100 m)
- Excavation of turbine foundations (0.06 mm/s at 100 m)
- HGV traffic on normal road surfaces (0.01 to 0.5 mm/s) at footings of buildings located 20 m from roadway.

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

7.8.3.4 Effects on Key Ornithological Receptors During Construction

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

Please note that the two assessment frameworks utilised (Percival, 2003 and EPA, 2022) do not represent parallel assessments; the Percival (2003) assessment which is designed specifically for ornithological impact assessment is carried out first, and the Percival significance is then translated into the EPA significance framework in order to align the ornithological assessment with the EPA (2022) significance levels utilised across all chapters of the EIAR.

Table 7-14: Potential Construction Effects Key Ornithological Receptors

Key Receptor (Sensitivity)	Direct Effect (Habitat Loss/Alteration)	Indirect Effect (Disturbance/Displacement)
Barn Owl (Medium)	Barn Owl were previously identified breeding on private lands east of the proposed borrow pit location and are considered no longer present at this location. As the area remains suitable for Barn Owl, there is a possibility of effects due to the construction phase of the Proposed Wind Farm. However, habitat loss / alteration is unlikely to affect Barn Owl as their roost / nest site is outside the footprint of the borrow pit and the habitat is not suitable hunting / foraging ground.	The Barn Owl nest / roost site is approximately 50 m from the proposed borrow pit location. Construction-related disturbances are likely at this location and disturbance/displacement of Barn Owl is likely if they return to this location prior to construction.
	Significance without Mitigation	**Significance without Mitigation**
	Percival (2003) Sensitivity Medium; Magnitude Negligible; Very Low Significance **EPA (2022)** Short-term Imperceptible Effect	**Percival (2003)** Sensitivity Medium; Magnitude High; Medium Significance **EPA (2022)** Short-term Moderate to Significant Effect
Black-headed Gull (Low)	Black-headed Gulls consistently breed within the Site with colonies recorded during every surveyed breeding season. The habitats associated with both breeding and roosting Black-headed Gulls are outside the area of habitat loss thus direct habitat alteration is not expected. General habitat loss throughout the Site is unlikely to affect the local population of Black-headed Gull.	The construction of the amenity trail in the southwest will result in the disturbance to a Black-headed Gull breeding colony in the cutover bog lakes at Derryhogan in the south-west of Littleton Bog.

Key Receptor (Sensitivity)	Direct Effect (Habitat Loss/Alteration)	Indirect Effect (Disturbance/Displacement)
	Significance without Mitigation	**Significance without Mitigation**
	Percival (2003) Sensitivity Low; Magnitude Negligible; Very Low Significance **EPA (2022)** Short-term Imperceptible Effect	**Percival (2003)** Sensitivity Low; Magnitude High; Low Significance **EPA (2022)** Short-term Slight Effect
Black-tailed Godwit (Medium)	Black-tailed Godwit were only observed on one occasion, with a flock of 15 birds passing through the site. As such this species is not associated with any specific location or habitat at the site. Habitat loss caused by the proposed construction phase is unlikely to result in effects to Black-tailed Godwit.	Black-tailed Godwit are not noted to use any particular habitat on site and do not roost or breed on any of the habitats within the Proposed Wind Farm, thus, there is no expected disturbance or displacement effect.
	Significance without Mitigation	**Significance without Mitigation**
	Percival (2003) Sensitivity Medium; Magnitude Negligible; Very Low Significance **EPA (2022)** Short-term Imperceptible Effect	**Percival (2003)** Sensitivity Medium; Magnitude Negligible; Very Low Significance **EPA (2022)** Short-term Imperceptible Effect

Key Receptor (Sensitivity)	Direct Effect (Habitat Loss/Alteration)	Indirect Effect (Disturbance/Displacement)
Buzzard (Low)	This site provides abundant suitable open foraging habitat (open bog and grasslands) and breeding habitat with conifer plantation and treelines within the site boundary and bordering the site boundary; buzzard was observed hunting, displaying, possibly breeding and showing territorial behaviour within the Site (Derryhogan Lakes). Some habitat loss affecting potential foraging habitats is expected; however the level of loss will be low relative to the overall habitat resource onsite.	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. There are no confirmed nests within the disturbance zone of the Proposed Wind Farm and disturbance to breeding Buzzards is unlikely. Construction related disturbance is not anticipated to cause a significant effect on Buzzard.
	Significance without Mitigation	**Significance without Mitigation**
	Percival (2003) Low sensitivity, Low magnitude, Very Low Significance **EPA (2022)** Long-term Imperceptible Effect	**Percival (2003)** Low sensitivity, Low magnitude, Very Low Significance **EPA (2022)** Short-term Imperceptible Effect
Curlew (High)	Curlew are known to breed within the Proposed Wind Farm, particularly at the Derryhogan Lakes. There is no expected habitat loss in the areas utilised by Curlew for foraging, breeding, or roosting. Thus, there are no direct effects anticipated.	Noise disturbance from the construction activity has potential to cause some displacement and/or disturbance to breeding Curlew at the Derryhogan Lakes. Curlew are sensitive to visual disturbances within 300m and the amenity track bordering the Derryhogan Lakes is area c. 70m from areas where curlew activity was recorded; thus, disturbance to Curlew at this lake could occur during construction. As Derryhogan Lakes is inhabited by a breeding curlew pair and has high levels of Curlew activity, there are expected effects to the local breeding curlew population.

Key Receptor (Sensitivity)	Direct Effect (Habitat Loss/Alteration)	Indirect Effect (Disturbance/Displacement)
		This area has also been noted to be used as a stopover by post-breeding curlew from other regions migrating towards the south coast (peak activity in July).
	Significance without Mitigation	**Significance without Mitigation**
	Percival (2003) High sensitivity, Negligible magnitude, Very low Significance **EPA (2022)** Long-term Imperceptible Effect	**Percival (2003)** High sensitivity, Very high magnitude, Very high Significance **EPA (2022)** Short-term Significant Effect
Golden Plover (Medium)	Golden Plover were recorded roosting in the hinterlands around the Site. Flightlines throughout the Site indicate Golden Plover wintering in the area commute through the site to reach their roost location to the north, in addition to limited occurrences of potential migratory movements. However, they have not been observed to utilise any of the habitats present onsite, either for roosting, foraging or as stopover locations. As such, there are no direct effects anticipated.	Golden Plover commute through the site to their roosting areas in the bogs to the north of the M8. The flight paths to the roost site, frequently taken from south to north, overlap with the potential construction noise disturbance zone and are within 500m of Turbines 6 and 8. However, since observed activity is limited to flyovers and since this species does not roost at or use the habitats at the site, no disturbance to areas utilised by golden plover will occur.
	Significance without Mitigation	**Significance without Mitigation**
	Percival (2003) Medium sensitivity, Low magnitude, Low Significance **EPA (2022)** Long-term Not significant Effect	**Percival (2003)** Medium sensitivity, Low magnitude, Low Significance **EPA (2022)** Short-term Not significant Effect

Key Receptor (Sensitivity)	Direct Effect (Habitat Loss/Alteration)	Indirect Effect (Disturbance/Displacement)
Great Crested Grebe (Low)	This species will not be subject to direct effects from direct habitat loss.	Great crested grebe was observed nesting in the Longfordpass Lakes across multiple breeding seasons and as such could be subject to disturbance from construction activities (primarily noise).
	Significance without Mitigation	**Significance without Mitigation**
	Percival (2003) Low sensitivity, Negligible magnitude, Very low Significance **EPA (2022)** Long-term Imperceptible Effect	**Percival (2003)** Low sensitivity, High magnitude, Low Significance **EPA (2022)** Short-term Slight Effect
Great White Egret (Low)	This species will not be subject to direct effects from direct habitat loss.	Great white egret was observed infrequently at the site and as such there is limited potential for this rare (non-breeding) visitor to experience disturbance from construction activities (primarily noise).
	Significance without Mitigation	**Significance without Mitigation**
	Percival (2003) Low sensitivity, Negligible magnitude, Very low Significance **EPA (2022)** Long-term Imperceptible Effect	**Percival (2003)** Low sensitivity, Low magnitude, Very low Significance **EPA (2022)** Short-term Imperceptible Effect

Key Receptor (Sensitivity)	Direct Effect (Habitat Loss/Alteration)	Indirect Effect (Disturbance/Displacement)
Grey Heron (Low)	Grey Heron were active throughout the Site, which contains suitable habitat for this species. They were typically recorded commuting, and also feeding in flooded cutover bog lakes. Juveniles were also recorded at Longfordpass South Lakes and Derryhogan Lakes, indicating breeding in the wider area. No nest sites or breeding colonies were recorded during surveys. Habitat loss affecting foraging areas will be negligible.	Commuting flight paths of Grey Heron were recorded throughout the potential construction noise disturbance zones, though breeding records were not. There is potential for foraging birds to be disturbed by human presence and construction activates. Herons are known to acclimate well to disturbance.
	Significance without Mitigation	**Significance without Mitigation**
	Percival (2003) Low sensitivity, Low magnitude, Very Low Significance **EPA (2022)** Long-term Imperceptible Effect	**Percival (2003)** Low sensitivity, Medium magnitude, Low Significance **EPA (2022)** Short-term Not significant Effect
Green Sandpiper (Low)	Green sandpiper have not been observed to use the habitats at the site, and as such are not subject to any potential habitat loss effects.	Green sandpiper have not been observed to use the habitats at the site, only occurring infrequently as flyovers. As such, this species will not be subject to any potential disturbance/displacement effects.
	Significance without Mitigation	**Significance without Mitigation**
	Percival (2003) Low sensitivity, Negligible magnitude, Very Low Significance **EPA (2022)** Long-term Imperceptible Effect	**Percival (2003)** Low sensitivity, Negligible magnitude, Very Low Significance **EPA (2022)** Short-term Imperceptible Effect

Key Receptor (Sensitivity)	Direct Effect (Habitat Loss/Alteration)	Indirect Effect (Disturbance/Displacement)
Greylag Goose (Low)	Greylag Geese were active throughout the site from 2021 to 2024 and were noted to breed on site in the summers of 2021-2024 in the Longfordpass South Lakes, Bawnreagh Lakes, and Derryhogan Lakes. No direct habitat loss will affect greylag goose breeding habitat. It is noted that the amber-listed status applies specifically to the wintering population from Iceland. The birds observed breeding at the site are assessed to be from the resident feral population. Burke et. al (2022) notes the presence of graylag geese of unknown origin in the area of Littleton; however, since the wintering population would be absent during the breeding season, all records of breeding graylag goose at the site are birds from the feral population.	Noise disturbance is expected to cause indirect effects to greylag geese as breeding locations are found within the potential construction noise disturbance zone.
	Significance without Mitigation	**Significance without Mitigation**
	Percival (2003) Low sensitivity, Low magnitude, Very Low Significance **EPA (2022)** Long-term Imperceptible Effect	**Percival (2003)** Low sensitivity, Medium magnitude, Very Low Significance **EPA (2022)** Short-term Imperceptible Effect

Key Receptor (Sensitivity)	Direct Effect (Habitat Loss/Alteration)	Indirect Effect (Disturbance/Displacement)
Hen Harrier (Very High)	Hen Harrier were observed using the site during non-breeding seasons for hunting and roosting. Activity levels were highest among the Bawnreagh Lakes and Derryhogan Lakes. They are noted to hunt in areas of high wader activity, particularly at the Derryhogan Lakes and the area of Bawnreagh Lakes between proposed turbines T02 and T03. Habitat loss due to the proposed construction phase is expected to result in limited loss of hunting habitat for hen harrier where more established recolonising vegetation suitable for prey species occurs. However, since the proposed infrastructure footprint is minimal relative to the overall terrestrial hunting habitat resource at the site, predicted effects in this category remain negligible. More importantly, based on observations, the primary hunting habitats used by hen harrier at the site are lakes with wader and waterbird activity, with Bawnreagh Lakes, Derryhogan Lakes and Longfordpass South lakes noted as focal points for hen harrier hunting activity. Since these areas will not be lost within the proposed infrastructure footprint, predicted effects in this category remain negligible. Roosting behaviour was occasionally observed on the margins of Littleton Bog to the south of T08 (general area of Clonoura bog). This are will not be subject to habitat loss arising from the proposed wind farm footprint. No other areas with potential roosting suitability will be subject to habitat loss. As such , predicted effects in all categories relating to habitat loss remain negligible.	Hen Harrier have been noted to roost within the Site, in the Clonoura Bog area. They are not known to breed in the Site and the habitats present onsite are not representative of the habitats utilised by breeding hen harrier in Ireland (upland heat/bog and 2nd rotation forestry plantation). The Hen Harrier feeding and roosting locations within the Project as noted in the adjacent column are within the potential disturbance zone of the proposed construction works. As such there is potential for short-term displacement of Hen Harrier from these areas during construction. During the 24-month construction stage for the Project, it is likely that Hen Harrier will be disturbed from various areas of the bogs. However, the construction will be carried out progressively (i.e. not all turbines are constructed at the same time), as such displacement will not occur throughout the entirety of the bogs at the same time. Access to adequate hunting ground would likely continue for Hen Harrier during construction. Depending on the level of habituation to disturbance, a buffer zone of 300-750m is suggested to protect both breeding and non-breeding hen harrier (NPWS, 2022); habituation to disturbance influences the size of the buffer and the lower end of the range may be sufficient to protect individuals with higher habituation to disturbance. T08 is approximately 600m from the known roost area, thus indirect effects caused by construction noise could occur. Construction noise in the area of the proposed turbine T08 and associated sections of access track located north of Clonoura Bog may result in the disturbance, and thus displacement, of winter-roosting hen harrier.

Key Receptor (Sensitivity)	Direct Effect (Habitat Loss/Alteration)	Indirect Effect (Disturbance/Displacement)
		Should works be carried out during the non-breeding season near the winter roost location on Clonoura Bog, then the effects of displacement from habitat would be significant as wintering hen harrier could be displaced from the bogs in the locality due to disturbance of this roost.
	Significance without Mitigation	**Significance without Mitigation**
	Percival (2003) Very High sensitivity, Negligible magnitude, Low Significance **EPA (2022)** Long-term Not Significant Effect	**Percival (2003)** Very High sensitivity, High magnitude, Very High Significance **EPA (2022)** Long-term Very Significant Effect
Kestrel (Medium)	Kestrel activity was recorded during all seasons within the site and surrounding hinterland. They have been noted to breed to the southwest of the northern parcel, south of Derryhogan Lakes; this location is not subject to any habitat loss. Kestrel were observed hunting primarily over cutover bog areas, particularly around the Bawnreagh Lakes, Lanespark Bog, Clonoura Bog, and in the surrounding hinterland. The proposed construction phase will result in the loss of some cutover bog (and associated variable vegetation communities) in these areas; however, the amount of habitat loss is negligible and abundant suitable hunting habitat is present outside the proposed footprint.	As Kestrel activity was frequent throughout the Site and within the potential construction noise disturbance zone, there is potential for temporary disturbance/displacement to Kestrel during construction, particularly for birds hunting at the Bawnreagh Lakes. A Kestrel nest was recorded c. 420m from the southwestern amenity track near the Derryhogan Lakes, which may result in the disturbance of breeding Kestrel and thus their displacement.

Key Receptor (Sensitivity)	Direct Effect (Habitat Loss/Alteration)	Indirect Effect (Disturbance/Displacement)
		Goodship and Furness (2022) note that kestrel is considered a human-tolerant species, occurring in a variety of human-dominated environments including urban, suburban and agricultural habitats, and therefore able to habituate to at least some degree of human presence. While the recommended buffer of 100-200m for breeding kestrel is based on pedestrian disturbance, the distance of 420m between the nest site and proposed works, in addition to the presence of existing wooded habitats and raised bog forming noise and visual barriers between the proposed amenity track and the kestrel nest makes significant disturbance unlikely.
	Significance without Mitigation	**Significance without Mitigation**
	Percival (2003) Medium sensitivity, Low magnitude, Low Significance **EPA (2022)** Long-term Not significant Effect	**Percival (2003)** Medium sensitivity, Medium magnitude, Low Significance **EPA (2022)** Temporary Not significant Effect

Key Receptor (Sensitivity)	Direct Effect (Habitat Loss/Alteration)	Indirect Effect (Disturbance/Displacement)
Kingfisher (Medium)	Kingfisher were identified as being active within the Site in 2022. They have been previously noted to breed on site, with a confirmed nest and occupied territory in July 2022, located in a recently excavated drain bank approximately 400m NNW of Turbine 2. The nest at this location was noted to have been abandoned during surveys in subsequent years, and surveyors noted the bank were the nest was located had eroded during winter 2022-23. Since the loss of this habitat through natural processes, no suitable nesting habitat is present at the site. The lakes and drains within Littleton Bog provide some suitable foraging habitat for kingfisher. Habitat loss due to the proposed construction phase will not result in the loss of suitable habitat for Kingfisher which typically use the drains, treelines, and lakes around the Longfordpass South Lakes. Although they were infrequently observed in more recent surveys (2023-2024 breeding seasons), Kingfisher are known to be a territorial species with a foraging range of 2 km, indicating they are likely residing in the surrounding area. Considering the absence of suitable breeding habitat from at the site, there is no potential for breeding habitat loss. There will be limited loss of drains and lakes which have established on cutover bog; however, these losses are negligible relative to the overall habitat resource at the site.	While kingfisher previously held a territory approximately 450m from Turbine 2, suitable nesting habitat is no longer present in this area, and is also absent from the wider site. As such, it is unlikely that nesting kingfisher will be present at the site during construction. Although they were infrequently observed in more recent surveys (2023-2024 breeding seasons), Kingfisher are known to be a territorial species with a foraging range of 2 km, indicating they are likely residing in the surrounding area. The closest kingfisher nest in the surrounding hinterland (active in 2021 only) is located over 900m from proposed infrastructure, and as such will not be subject to effects from noise disturbance. While potential noise effects are assessed as negligible, there is potential for displacement of kingfisher in the wider catchment prior to mitigation, arising from potential reductions in water quality/prey abundance indirectly affecting kingfisher.

Key Receptor (Sensitivity)	Direct Effect (Habitat Loss/Alteration)	Indirect Effect (Disturbance/Displacement)
	Significance without Mitigation	**Significance without Mitigation**
	Percival (2003) Medium sensitivity, Negligible magnitude, Very low Significance **EPA (2022)** Long-term Imperceptible Effect	**Percival (2003)** Medium sensitivity, High magnitude, Medium Significance **EPA (2022)** Short-term Moderate Effect
Lapwing (Medium)	Lapwing were identified frequently within the Site and are known to breed around wetlands in the Longfordpass South Lakes, Derryhogan Lakes, and Lanespark Bog. Though habitat loss is not expected to affect the Lapwing breeding in the Longfordpass South Lakes and Derryhogan Lakes, construction of access roads through the southern parcel, Lanespark Bog, will result in some loss of cutover bog habitat through Lapwing territories. Lapwing were noted to breed here on one occasion in 2021, but did not return to breed at this location in subsequent year. As such, it is assessed that while limited localised loss of sub-optimal lapwing habitat will occur, habitat loss in this area is unlikely to affect the lapwing population at the site scale, and an abundant resource of suitable habitat will remain across the site after construction.	Longfordpass South Lakes and Derryhogan Lakes support consistently used Lapwing territories. These areas will encounter some noise disturbance due to proposed construction activities. This would likely result in disturbance and displacement of the Lapwing population in these locations. Thus, disturbance to Lapwing is likely to occur prior to mitigation.

Key Receptor (Sensitivity)	Direct Effect (Habitat Loss/Alteration)	Indirect Effect (Disturbance/Displacement)
	Significance without Mitigation	**Significance without Mitigation**
	Percival (2003) Medium sensitivity, Medium magnitude, Low Significance **EPA (2022)** Long-term Not significant Effect	**Percival (2003)** Medium sensitivity, Very High magnitude, High Significance **EPA (2022)** Short-term Significant Effect
Lesser Black-backed Gull (Low)	Lesser Black-backed Gulls were frequently recorded roosting in the surrounding hinterland (Northern Bogs) and have been observed using the Longfordpass South Lakes. These areas will not be subject to habitat loss arising from the proposed development and Lesser Black-backed Gulls are not associated with other habitats within the Site. Thus, the population of Lesser Black-backed Gulls are not expected to be affected by habitat loss.	Lesser Black-backed Gulls roost and commute within the potential construction noise disturbance zone. Therefore, there is potential for construction-related disturbance to this species. Disturbance of Lesser Black-backed Gulls may result in their displacement from the Site and result in relocation of roosting birds. There are numerous suitable roosting habitats present outside the Site where other roosting Lesser Black-backed Gulls have previously been identified.
	Significance without Mitigation	**Significance without Mitigation**
	Percival (2003) Low sensitivity, Negligible magnitude, Very low Significance **EPA (2022)** Long-term Imperceptible Effect	**Percival (2003)** Low sensitivity, Medium magnitude, Low Significance **EPA (2022)** Short-term Slight Effect

Key Receptor (Sensitivity)	Direct Effect (Habitat Loss/Alteration)	Indirect Effect (Disturbance/Displacement)
Little Egret (Medium)	Little Egret were recorded occupying areas around wetland habitats and the local breeding population (surveyors noted a heronry is likely to be present outside the site to the west of Littleton Bog) have been observed to frequent Derryhogan Lakes. Habitat alteration will result in the general loss of cutover bogs and some lakes habitats within the Site in addition to the loss of cutover bog habitat south of Derryhogan Lakes. Direct effects on habitats used by little egret will be negligible however, and an abundant resource of suitable habitat is present outside the proposed development footprint.	Little Egret activity was limited to commuting and foraging throughout the Site. The species typically utilises wetland/lakes and cutover bog habitats for foraging. As the species is not breeding or roosting on site, construction disturbance may result in the temporary displacement of foraging Little Egret and deter them from areas within the construction noise disturbance areas. However, this disturbance is expected to be of a negligible magnitude as the foraging locations are typically at the lakes outside the construction noise disturbance zone.
	Significance without Mitigation	**Significance without Mitigation**
	Percival (2003) Medium sensitivity, Negligible magnitude, Very low Significance **EPA (2022)** Long-term Imperceptible Effect	**Percival (2003)** Medium sensitivity, Low magnitude, Low Significance **EPA (2022)** Short-term Not significant Effect

Key Receptor (Sensitivity)	Direct Effect (Habitat Loss/Alteration)	Indirect Effect (Disturbance/Displacement)
Mallard (Low)	Mallard activity was primarily recorded around the lake habitats and the surrounding wetlands, primarily at the Longfordpass South Lakes and Derryhogan Lakes. Habitat loss will result in the general loss of cutover bog and limited areas of semi-natural lake habitat within the Site. Habitat alteration at the Derryhogan Lakes caused by the amenity track will not result in the loss of breeding, foraging, or roosting habitats for Mallard. As such, potential direct effects in terms of habitat loss are negligible for mallard.	There is potential for construction-related disturbance to affect Mallard activity during the breeding season particularly at their breeding locations in Longfordpass South Lakes and Derryhogan Lakes. Although this species is known to be highly adaptable and tolerant of predictable human disturbance, there is frequent activity within 500m of all turbine locations and a primary breeding lake is within 150m from the southwest amenity track. Therefore, the potential for effects during the breeding season cannot be excluded and the magnitude of effect is considered to be medium.
	Significance without Mitigation	**Significance without Mitigation**
	Percival (2003) Low sensitivity, Negligible magnitude, Very low Significance **EPA (2022)** Long-term Imperceptible Effect	**Percival (2003)** Low sensitivity, Medium magnitude, Low Significance **EPA (2022)** Short-term Not significant Effect
Marsh Harrier (Medium)	Marsh harrier were infrequently observed hunting at the site during both winter and summer. No breeding activity was observed. This species occasionally occurs as both a winter and summer visitor to Ireland, and breeding is rare.	Hunting marsh harrier could potentially be subject to temporary localised disturbance, particularly at Derryhogan Lakes where a proposed amenity trail traverses the southern margin of this area.

Key Receptor (Sensitivity)	Direct Effect (Habitat Loss/Alteration)	Indirect Effect (Disturbance/Displacement)
	The primary hunting habitat used by this species is wetlands, which are abundant across the site. The primary wetlands are located outside the proposed development footprint, and habitat loss within the footprint is limited to the margins of smaller semi-natural lakes.	
	Significance without Mitigation	**Significance without Mitigation**
	Percival (2003) Medium sensitivity, Low magnitude, Low Significance **EPA (2022)** Long-term Not significant Effect	**Percival (2003)** Medium sensitivity, Medium magnitude, Low Significance **EPA (2022)** Short-term Not significant Effect
Merlin (Medium)	Merlin activity was primarily recorded around the lake habitats at Longfordpass South Lakes, Bawnreagh Lakes, Derryhogan Lakes, and Lanespark Bog where they were noted to be hunting. Habitat alteration will result in limited loss of hunting habitat for Merlin within the Site (recolonising cutover bog and limited areas of semi-natural lake margins). Considering that merlin activity was infrequent and scattered throughout the Site, in addition to the limited area of suitable habitat subject to loss and an abundant resource of suitable habitat outside the proposed development footprint, potential habitat alteration / loss affecting merlin is likely to be low magnitude.	Merlin were observed perched and commuting but not breeding or roosting within the Site; as such, there is potential for construction-related disturbance to affect non-breeding, hunting merlin. There is some evidence to suggest merlin have a medium sensitivity to human disturbance during the breeding season, though activity on site is limited to the winter months and spring/autumn. Disturbance/displacement affecting wintering merlin which hunt at the site could occur; however, potential effects in this category are offset by the abundant resource of suitable habitat outside the area subject to construction disturbance.

Key Receptor (Sensitivity)	Direct Effect (Habitat Loss/Alteration)	Indirect Effect (Disturbance/Displacement)
	Significance without Mitigation	**Significance without Mitigation**
	Percival (2003) Medium sensitivity, Low magnitude, Low Significance **EPA (2022)** Long-term Not significant Effect	**Percival (2003)** Medium sensitivity, Medium magnitude, Low Significance **EPA (2022)** Short-term Not significant to Slight Effect
Mute Swan (Low)	Mute Swan were noted to roost on two occasions within the Longfordpass South Lakes. Their records show foraging and commuting activity through the Site. The expected habitat loss due to the Proposed Wind Farm is unlikely to affect the populations of Mute Swan within the Site as their associated habitats are unaffected by the proposed construction phase.	Mute Swan were not observed utilising the Site for breeding and were infrequently observed roosting. They are mainly noted to be commuting through the Site towards the northern hinterland (Northern Bogs) where they are known to roost frequently. They were noted to occur within the Site year-round. Potential construction noise is expected to cause disruption to commuting pathways for Mute Swan and may result in the displacement of roosting Mute Swan within the site boundary. As the most frequently used roost site is located in the northern hinterland rather than at the site, the displacement effect caused by noise disturbance will be low.
	Significance without Mitigation	**Significance without Mitigation**
	Percival (2003) Low sensitivity, Negligible magnitude, Very low Significance **EPA (2022)** Long-term Imperceptible Effect	**Percival (2003)** Low sensitivity, Low magnitude, Very low Significance **EPA (2022)** Short-term Imperceptible Effect

Key Receptor (Sensitivity)	Direct Effect (Habitat Loss/Alteration)	Indirect Effect (Disturbance/Displacement)
Peregrine (Medium)	Peregrine use the Site for hunting, and seven nest sites have been recorded in the surrounding area during hinterland surveys (closest is 1.6 km from the Site). Peregrine were noted to hunt in areas with cutover bog and lakes, mainly at the Longfordpass South Lakes, Derryhogan Lakes, Lanespark Bog, and in the surrounding hinterland. Loss of cutover bog will result in limited loss of hunting/foraging habitat for Peregrine; however, an abundant resource of suitable habitat is present within the landscape-scale mosaic of agricultural land, bogs and woodland outside the proposed development footprint. As such, potential habitat alteration / loss affecting peregrine is likely to be low magnitude.	Peregrine activity within the site primarily comprises hunting. Their main food source is smaller birds, and their areas of activity on site reveal their tendencies to hunt within the Longfordpass South Lakes, Derryhogan Lakes, and Lanespark Bog, with higher activity levels in the hinterland. As construction stage disturbance associated with the proposed development has the potential to temporarily displace prey species hunted by peregrine at the local scale, changes in prey distribution and hunting availability may affect the peregrine population using the Site. Additionally, disturbance and noise during the construction phase is likely to result in the temporary localised displacement of hunting peregrine. Similarly to potential effects from direct habitat loss, an abundant resource of suitable habitat is present within the landscape-scale mosaic of agricultural land, bogs and woodland outside the proposed development footprint and associated zone of disturbance. Goodship and Furness (2022) note that distances of 800 m to 1,000 m are typically used as buffers to avoid disturbance to breeding peregrine, where noisy activities such as forestry operations and quarrying are undertaken. As such, the closest nest site (1.6 km from the Site) is outside the potential disturbance zone.
	Significance without Mitigation	**Significance without Mitigation**
	Percival (2003) Medium sensitivity, Low magnitude, Low Significance **EPA (2022)** Long-term Not significant Effect	**Percival (2003)** Medium sensitivity, Medium magnitude, Low Significance **EPA (2022)** Short-term Not significant to Slight Effect

Key Receptor (Sensitivity)	Direct Effect (Habitat Loss/Alteration)	Indirect Effect (Disturbance/Displacement)
Redshank (Medium)	Redshank have not been observed to use the habitats at the site, and as such are not subject to any potential habitat loss effects.	Redshank have not been observed to use the habitats at the site, only occurring infrequently as flyovers. As such, this species will not be subject to any potential disturbance/displacement effects.
	Significance without Mitigation	**Significance without Mitigation**
	Percival (2003) Medium sensitivity, Negligible magnitude, Very low Significance **EPA (2022)** Long-term Imperceptible Effect	**Percival (2003)** Medium sensitivity, Negligible magnitude, Very low Significance **EPA (2022)** Short-term Imperceptible Effect
Ringed Plover (Low)	Ringed plover have not been observed to use the habitats at the site (breeding activity occurs in the northern bogs north of the M8) and as such are not subject to any potential habitat loss effects.	Ringed plover have not been observed to use the habitats at the site. As such, this species will not be subject to any potential disturbance/displacement effects.
	Significance without Mitigation	**Significance without Mitigation**
	Percival (2003) Low sensitivity, Negligible magnitude, Very low Significance **EPA (2022)** Long-term Imperceptible Effect	**Percival (2003)** Low sensitivity, Negligible magnitude, Very low Significance **EPA (2022)** Short-term Imperceptible Effect

Key Receptor (Sensitivity)	Direct Effect (Habitat Loss/Alteration)	Indirect Effect (Disturbance/Displacement)
Short-eared Owl (Medium)	Short-eared owl activity was observed to be limited to infrequent commuting through the site during winter. As such, this species is not subject to any potential habitat loss effects.	Short-eared owl activity was observed to be limited to infrequent commuting through the site during winter. As such, this species is not subject to any potential disturbance/displacement effects.
	Significance without Mitigation	**Significance without Mitigation**
	Percival (2003) Medium sensitivity, Negligible magnitude, Very low Significance **EPA (2022)** Long-term Imperceptible Effect	**Percival (2003)** Medium sensitivity, Negligible magnitude, Very low Significance **EPA (2022)** Short-term Imperceptible Effect
Snipe (Medium)	Snipe were noted as being abundant throughout the Site with evidence of breeding during the summer months and roosting during the winter months. Their activity was recorded on the cutover bogs around lake habitats in all key habitat areas. Habitat loss/alteration is expected to affect the populations of Snipe on the Site, primarily in the areas where Turbines 1-4, 6, and 9-11 are proposed. Proposed infrastructure in these areas overlap with known breeding areas for Snipe. As such, direct effects on the snipe population using the site are likely. While a proportion of suitable habitat will be lost, the proposed infrastructure footprint is limited relative to the areas observed to be used by breeding snipe. In addition, potentially suitable habitat occurs across the wider site outside the proposed development footprint.	This species is known to be susceptible to disturbance with evidence of Snipe population density reducing during the construction phase of wind farms (Pearse-Higgins et al., 2012). Snipe were active throughout the Site with breeding activity noted within the proposed footprint of works in the areas where Turbines 1-4, 6, 8, and 9-11 are proposed. Disturbance from the construction phase is likely to cause displacement of breeding Snipe prior to mitigation.

Key Receptor (Sensitivity)	Direct Effect (Habitat Loss/Alteration)	Indirect Effect (Disturbance/Displacement)
	Significance without Mitigation	**Significance without Mitigation**
	Percival (2003) Medium sensitivity, Medium magnitude, Low Significance **EPA (2022)** Long-term Slight to Moderate Effect	**Percival (2003)** Medium sensitivity, Very high magnitude, High Significance **EPA (2022)** Short-term Significant Effect
Sparrowhawk (Low)	Sparrowhawk were primarily recorded at Clonoura Bog which has been noted as their typical territory. Habitat loss in this area due to the construction of Turbine 8 would alter the character of habitats at a localised scale and result in some loss of hunting habitat. This may result in direct effects to the Sparrowhawk population, although the limited scale of potential effects will retain the ecological integrity of this area.	The lands within the Site were utilised regularly by Sparrowhawk for hunting. There is the potential for construction-related activities to disturb this species within the Site. However, Sparrowhawk are adaptable and can live in close proximity to human disturbance. Displacement of Sparrowhawk is unlikely to be significant and suitable hunting habitats are available within the surrounding areas of the Site, thus significant effects are not anticipated.
	Significance without Mitigation	**Significance without Mitigation**
	Percival (2003) Low sensitivity, Low magnitude, Very low Significance **EPA (2022)** Long-term Imperceptible Effect	**Percival (2003)** Low sensitivity, Low magnitude, Very low Significance **EPA (2022)** Short-term Imperceptible Effect

Key Receptor (Sensitivity)	Direct Effect (Habitat Loss/Alteration)	Indirect Effect (Disturbance/Displacement)
Swift (Medium)	Swift were observed through the summer seasons of 2021-2024 and were noted to commute and forage within the Site. No nesting swift were observed during surveys, and there are no suitable structures for swift nesting within the proposed development footprint or surrounding areas. Habitat loss due to the Proposed Wind Farm is not expected to affect swift populations. Swift forage for insects which are abundant throughout the Site.	Due to the absence of breeding habitat within or near the proposed development footprint, and abundance of suitable foraging habitat in the site outside the proposed development footprint, swift are unlikely to be subject to indirect effects during construction.
	Significance without Mitigation	**Significance without Mitigation**
	Percival (2003) Medium sensitivity, Negligible magnitude, Very low Significance **EPA (2022)** Long-term Imperceptible Effect	**Percival (2003)** Medium sensitivity, Negligible magnitude, Very low Significance **EPA (2022)** Short-term Imperceptible Effect
Teal (Low)	Teal were noted to breed within the Proposed Wind Farm, particularly at the lake habitats in Longfordpass South Lakes and Derryhogan Lakes. General habitat loss throughout the Site is not expected to affect the population of Teal as their primary territories are outside the footprint of the proposed construction works.	Teal are present throughout the Longfordpass South Lakes and Derryhogan Lakes where they were consistently observed breeding. These habitats are located within the potential construction noise disturbance zone. Disturbance caused to breeding Teal is likely to result in the displacement of this duck species and have an effect on the population of breeding Teal in the Site. As such, disturbance to Teal due to construction activities could be of high magnitude.

Key Receptor (Sensitivity)	Direct Effect (Habitat Loss/Alteration)	Indirect Effect (Disturbance/Displacement)
	Significance without Mitigation	**Significance without Mitigation**
	Percival (2003) Low sensitivity, Negligible magnitude, Very low Significance **EPA (2022)** Long-term Imperceptible Effect	**Percival (2003)** Low sensitivity, High magnitude, Low Significance **EPA (2022)** Short-term Slight Effect
Tufted Duck (Low)	Tufted duck activity was observed to be limited to infrequent commuting through the site during winter. As such, this species is not subject to any potential habitat loss effects.	Tufted duck activity was observed to be limited to infrequent commuting through the site during winter. As such, this species is not subject to any potential disturbance/displacement effects.
	Significance without Mitigation	**Significance without Mitigation**
	Percival (2003) Low sensitivity, Negligible magnitude, Very low Significance **EPA (2022)** Long-term Imperceptible Effect	**Percival (2003)** Low sensitivity, Negligible magnitude, Very low Significance **EPA (2022)** Short-term Imperceptible Effect

Key Receptor (Sensitivity)	Direct Effect (Habitat Loss/Alteration)	Indirect Effect (Disturbance/Displacement)
Whooper Swan (Medium)	Whooper Swans are a common roosting species observed within the Site during the winter months. While they are known to roost in lakes throughout the Site, the Longfordpass South Lakes are their primary roosting area. Evidence of roosting at the Derryhogan Lakes and the lake west of T4 was also recorded, with surveys indicating infrequent use of the remaining lakes. Habitat loss/alteration is not expected to directly impact the associated habitats for Whooper Swan and the Proposed Wind Farm infrastructure is outside of their roosting and foraging sites.	Whooper Swan frequently roost within the lakes of the Site and are known to forage in the neighbouring agricultural fields to the west of the Longfordpass South Lakes. These lakes are within and bordering the potential construction noise disturbance zone. Their commute from the more widely dispersed and infrequently used roosts to the foraging site frequently overlaps with the potential construction noise disturbance zone. Additionally, Whooper Swan were noted to roost in all lakes within the Site with higher activity at the Longfordpass South Lakes and the northern hinterlands (Northern Bogs). Considering noise disturbance from the proposed construction phase, there is potential for the displacement of this species. There are numerous other roosting and foraging habitats which represent suitable displacement habitats available, including the western-most lake in the Longfordpasss lakes group (located outside 500m construction disturbance buffer), and within the Northern Bogs outside the Site, which can accommodate whooper swan potentially displaced from areas subject to disturbance. Although suitable displacement habitat is available, potential for displacement effects remains, with potential for high magnitude effects.
	Significance without Mitigation	**Significance without Mitigation**
	Percival (2003) Medium sensitivity, Negligible magnitude, Very low Significance **EPA (2022)** Long-term Imperceptible Effect	**Percival (2003)** Medium sensitivity, Medium magnitude, Low Significance **EPA (2022)** Short-term Slight to Moderate Effect

Key Receptor (Sensitivity)	Direct Effect (Habitat Loss/Alteration)	Indirect Effect (Disturbance/Displacement)
Wigeon (Low)	Wigeon were infrequently observed on the Site but were noted to be breeding at the Derryhogan Lakes. They do not have associations with other locations within the Site and are not expected to be affected by habitat loss / alteration due to the Proposed Wind Farm.	Wigeon were infrequent visitors to the Site and were noted to have bred and roost in the Derryhogan Lakes. This area is susceptible to construction noise disturbance due to its proximity to the southwest amenity track and construction compound. Thus, disturbance from the construction phase may cause potential displacement of wigeon in this area.
	Significance without Mitigation	**Significance without Mitigation**
	Percival (2003) Low sensitivity, Negligible magnitude, Very low Significance **EPA (2022)** Long-term Imperceptible Effect	**Percival (2003)** Low sensitivity, High magnitude, Low Significance **EPA (2022)** Short-term Slight Effect
Woodcock (Medium)	Woodcock were frequently observed roding (breeding / territorial behaviour) in the Clonoura Bog key habitat. There were rare occurrences of Woodcock outside of this habitat. The areas of wooded habitat loss in this area associated with the proposed development are limited, and do not intersect with the primary Woodcock habitat/territory south of Turbine 8. Thus, there are no expected effects caused by habitat loss or alteration.	Woodcock were known to inhabit a breeding territory south of Turbine 8, within the potential construction noise disturbance zone. As construction of the proposed development may result in disturbance to breeding woodcock in this area, there is potential for a high magnitude of effect.

Key Receptor (Sensitivity)	Direct Effect (Habitat Loss/Alteration)	Indirect Effect (Disturbance/Displacement)
	Significance without Mitigation	**Significance without Mitigation**
	Percival (2003) Medium sensitivity, Low magnitude, Low Significance **EPA (2022)** Long-term Not significant Effect	**Percival (2003)** Medium sensitivity, Medium magnitude, Low Significance **EPA (2022)** Short-term Moderate 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. Locaslised disturbance/displacement could also occur prior to mitigation.

The vantage point survey results recorded one red-listed passerine species - Yellowhammer (*Emberiza citrinella*) - on one occasion during the survey period in May 2022. This species was identified during a vantage point survey at VP1 overlooking Derryvella Bog, with the yellowhammer record being located outside the potential habitat loss areas and displacement/disturbance zones.

Table 7-3 details the assessed status and potential effects on breeding and non-breeding passerines recorded during surveys.

Table 7-15: Passerines/Non-target Species – construction phase effects

Species	BoCCI 2020-2026	Breeding	Wintering	Notes
Grey Wagtail	Red	✓	✓	Observed at VPs 6, 8 & 14. No breeding locations recorded; foraging birds potentially subject to disturbance.
Meadow Pipit	Red	✓	✓	Potential to breed in habitats subject to direct and indirect effects.
Redwing	Red	x	✓	Numbers observed ranged from individuals to flocks of up to 37. Potential for disturbance to wintering birds.
Yellowhammer	Red	✓	x	Yellowhammer was recorded on one occasion at VP1 in May 2022. This record is located outside the potential habitat loss areas and displacement/disturbance zones, and potentially suitable habitat within the site for yellowhammer is limited.
Brambling	Amber	✓	x	Observed on one occasion during VP surveys (VP8) in September 2021. Winter visitor on passage.
Goldcrest	Amber	✓	✓	Potential to breed in habitats subject to direct and indirect effects.
Greenfinch	Amber	✓	✓	Potential to breed in habitats subject to direct and indirect effects.

Species	BoCCI 2020-2026	Breeding	Wintering	Notes
House Martin	Amber	✓	x	No breeding habitat within ZoI; foraging habitat only.
House Sparrow	Amber	✓	✓	Primary nesting habitat (buildings) are absent from the ZoI. Likely to forage within the site.
Linnet	Amber	✓	✓	Potential to breed in habitats subject to direct and indirect effects.
Linnet	Amber	✓	✓	Potential to breed in habitats subject to direct and indirect effects.
Sand Martin	Amber	✓	x	Potential breeding noted in cutover bog face banks near VP4. No proposed infrastructure in or near this area. Likely to forage in areas within ZoI.
Skylark	Amber	✓	✓	Potential to breed in habitats subject to direct and indirect effects.
Starling	Amber	✓	✓	No breeding habitat within ZoI; foraging habitat only.
Swallow	Amber	✓	✓	No breeding habitat within ZoI; foraging habitat only. Winter season records from early October only.
Wheatear	Amber	✓	✓	This summer visitor was observed a total of 10 times during VP surveys (VPs 5, 6, 7 & 14). Observations occurred during the spring, summer and autumn seasons. No breeding activity was recorded.
Willow Warbler	Amber	✓	x	Potential to breed in habitats subject to direct and indirect effects.

7.8.4 Potential Effects on Key Receptors during the Operational Phase

7.8.4.1 Peatland Rehabilitation

The impact assessment fully considers existing and emerging trends associated with the peatland rehabilitation plans being implemented at the site. The conditions and associated habitats created by the re-wetting measures which have been implemented form part of the ecological baseline and as such form an inherent component of the baseline environment considered in the impact assessment. The rehabilitation measures relevant to the bogs within the site; Littleton (BnM, 2026a), Longfordpass (2026b) and Lanespark (BnM, 2025a) have already been implemented, and no further interventions are proposed. Additional measures are proposed only for adjacent bogs outside the site (Ballybeg and Derryvella) (BnM, 2025a).

Operation of the Proposed Project will take place within the context of continued implementation of the Rehabilitation Plans (BnM 2026a, 2026b & 2025a). There will be localised effects arising from habitat loss and drainage as detailed in Section 6.9; however, the proposed wind farm will not interfere with the rehabilitation plan or compromise re-wetting and revegetation/regeneration at the site scale. The proposed development footprint is limited (proposed infrastructure occupies c.1.9% of the Site; PDAs occupy c. 1.6%) and will result in localised effects only – it will not interfere with key drainage management requirements for rewetting and as such is compatible with rewetting at the site scale. It is noted that wind farm projects compatible with peatland rehabilitation have previously been delivered, e.g. Cloncreen, Derrinlough, Bruckana and Mountlucas.

7.8.4.2 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 some groups, suggesting 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 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 higher 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., 1993, 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). The turbine dimensions specified for the proposed development will have a hub height of 119m and a rotor diameter of 162m with a tip height of 200m. As such, the collision risk zone (CRZ, defined as the height between the minimum and maximum swept height of the turbine rotor within 500 m of turbines) is 38-200 m.

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 7.1) presents the results of collision risk modelling for the proposed Littleton Wind Farm. Flightline data for selected target species were collected from eight VPs between November 2020 and March 2025. The survey covered four breeding bird seasons and five non-breeding seasons of VP watches. This amounted to 2,970 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) and NatureScot (Band, 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.

The turbine dimensions specified for the proposed development will have a hub height of 119m and a rotor diameter of 162m with a tip height of 200m. As such, the collision risk zone (CRZ, defined as the height between the minimum and maximum swept height of the turbine rotor within 500 m of turbines) is 38-200 m.

A total of 34 species were selected for initial assessment within the CRM, based on the occurrence of flight activity within the 500m turbine buffer (SNH Buffer). Within these, a total of six target species, namely Kingfisher, Redshank, Short-eared Owl, Stock Dove and Woodcock were not recorded within the rotor-swept height band and as such did not occur within the CRZ and therefore have an effective collision risk of zero. The remaining 29 target species listed below did exhibit flight activity within the CRZ and as such proceeded into the detailed modelling stages: Black-headed Gull, Black-tailed Godwit, Buzzard, Cormorant, Curlew, Golden Plover, Great White Egret, Green Sandpiper, Grey Heron, Greylag Goose, Hen Harrier, Kestrel, Lapwing, Lesser Black-backed Gull, Little Egret, Mallard, Marsh Harrier, Merlin, Mute Swan, Peregrine, Ringed Plover, Snipe, Sparrowhawk, Starling, Swift, Teal, Tufted Duck, Whooper Swan and Wigeon.

A permanent met mast is proposed to be installed at the site. While there is some level of collision risk associated with this, potential effects are negligible in comparison to the operational wind turbines which are the focus of the collision risk assessment. As such, the proposed met mast represents an imperceptible level of collision risk in addition to the effects arising from operation of the proposed turbines, and does not in any case elevate the significance of potential collision risk identified for any species arising from the CRM.

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 7-4 below. The assessment of effects combining magnitude and sensitivity to assess significance (Percival, 2003) has determined that the proposed Littleton Wind Farm will have effects ranging from Imperceptible to Moderate-Significant at national level, Imperceptible at county/SPA level and Imperceptible to Very Significant at local level.

7.8.4.3 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 7-4. For example, a German study found no effect on numbers or spatial distribution of skylarks within 1km of turbines (Langston and Pullan, 2004).

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

7.8.4.4 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 circumnavigate 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 7-4.

Table 7-16: Potential Operational Effects to non-passerine target species

Key Receptor (Sensitivity)	Direct Effect (Collision Risk)	Indirect Effect (Barrier Effect)	Indirect Effect (Displacement)
Barn Owl (Medium)	No collision risk due to absence of records within potential collision height (PCH). Barn owl typically fly at low altitude, reducing potential for collision risk.	There is no expected barrier effect during the operational phase due to the wide spacing between proposed turbines, and characteristically low altitude flight patterns of barn owl.	Possible disturbance would be noise or visual intrusion leading to effective habitat loss of e.g. foraging areas within the wind farm boundary. Barn owl breeding success has shown no declines in areas of high disturbance levels in the UK, such as near to military activity (Shawyer, 2011); it is unlikely that noise from turbines would significantly affect birds utilising the site. There are no nesting sites or suitable nesting habitats in close proximity to the proposed wind farm.
	Significance without Mitigation	**Significance without Mitigation**	**Significance without Mitigation**
	Percival (2003) Sensitivity Medium; Magnitude Negligible; Very Low Significance **EPA (2022)** Long-term Imperceptible Effect	**Percival (2003)** Sensitivity Medium; Magnitude Negligible; Very Low Significance **EPA (2022)** Long-term Imperceptible Effect	**Percival (2003)** Sensitivity Medium; Magnitude Low; Low Significance **EPA (2022)** Long-term Not significant Effect

Key Receptor (Sensitivity)	Direct Effect (Collision Risk)	Indirect Effect (Barrier Effect)	Indirect Effect (Displacement)
Black-headed Gull (Low)	Assuming avoidance, the predicted number of annual fatalities is 0.07 with an avoidance rate of 99.2%. The population consequences to Black-headed Gulls were further investigated due to their activity on the Site. The predicted number of annual fatalities will result in a negligible effect to both national and local populations of Black-headed Gull (<1% of local and national populations potentially affected by collision mortality).	For gull species such as Lesser Black-backed, Herring and Great Black-backed gull, some studies indicate evidence for attraction, whereas others indicate displacement, with the remainder indicating no significant response (Cook et al., 2014. Humphreys et al., 2015). The large spacing between the proposed turbines (ranging from 460 m to 793 m) makes the occurrence of significant barrier effects unlikely.	A Black-headed Gull colony was identified within the Derryhogan Lakes which is c. 70 m from the southwestern amenity track. During the operational phase, where there may be an increase in human activity along this amenity track, there is the potential for disturbance to breeding birds. Frequent disturbance to these birds could potentially result in displacement from this area. The widespread availability of suitable displacement habitats has been observed, in addition to variable and opportunistic use of habitats in the wider area by breeding black-headed gull. As such, potential effect magnitude is limited to medium.
	Significance without Mitigation	**Significance without Mitigation**	**Significance without Mitigation**
	Percival (2003) Sensitivity Low; Magnitude Negligible; Very Low Significance **EPA (2022)** Long-term, Imperceptible effect	**Percival (2003)** Sensitivity Low; Magnitude Negligible; Very Low Significance **EPA (2022)** Long-term, Imperceptible effect	**Percival (2003)** Sensitivity Low; Magnitude Medium; Very Low Significance **EPA (2022)** Long-term, Not significant effect
Black-tailed Godwit (Medium)	Assuming avoidance, the predicted number of annual fatalities is 0.01 with an avoidance rate of 98.00%. This will result in a negligible effect on the populations of Black-tailed Godwit.	Black-tailed Godwit were an infrequent visitor to the Site and were not recorded breeding or roosting in the area; therefore, they are unlikely to experience barrier effects.	Black-tailed Godwit were an infrequent visitor to the Site and were not recorded breeding or roosting in the area; therefore, they are unlikely to experience displacement effects.
	Significance without Mitigation	**Significance without Mitigation**	**Significance without Mitigation**

Key Receptor (Sensitivity)	Direct Effect (Collision Risk)	Indirect Effect (Barrier Effect)	Indirect Effect (Displacement)
	Percival (2003) Sensitivity Medium; Magnitude Negligible; Very Low Significance **EPA (2022)** Long-term Imperceptible effect	**Percival (2003)** Sensitivity Medium; Magnitude Negligible; Very Low Significance **EPA (2022)** Long-term Imperceptible effect	**Percival (2003)** Sensitivity Medium; Magnitude Negligible; Very Low Significance **EPA (2022)** Long-term Imperceptible effect
Buzzard (Low)	Assuming avoidance, the predicted number of annual fatalities is 5.29 with an avoidance rate of 98.00%. This predicted number of annual fatalities would result in a negligible effect on the national populations (<1% of the population potentially affected by collision mortality) and a high magnitude of effect on the local population (41% of the local population potentially affected by collision mortality).	There is potential for localised barrier effects on buzzard flight movements in the vicinity of individual turbines, considering the high level of activity recorded within the 500m turbine buffer. 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 the presence of windfarms. In studies that found buzzard do alter their flight paths 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). The large spacing between the proposed turbines (ranging from 460 m to 793 m) makes the occurrence of significant barrier effects unlikely. Therefore, no significant effect is anticipated.	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 wind farm avoidance, their preferred habitats (breeding in tall trees and hunting in open areas) are abundant in the surrounding hinterland. As such there is adequate displacement habitat in the surrounding area. Therefore, a significant effect is not envisaged.
	Significance without Mitigation	**Significance without Mitigation**	**Significance without Mitigation**

Key Receptor (Sensitivity)	Direct Effect (Collision Risk)	Indirect Effect (Barrier Effect)	Indirect Effect (Displacement)
	Percival (2003) Local scale: Sensitivity Low; Magnitude High; Low Significance National scale: Sensitivity Low; Magnitude Negligible; Very Low Significance **EPA (2022)** Local scale: Long-term, Slight effect National scale: Long-term, Imperceptible effect	**Percival (2003)** Sensitivity Low; Magnitude Low; Very Low Significance **EPA (2022)** Long-term, Imperceptible effect	**Percival (2003)** Sensitivity Low; Magnitude Low; Very Low Significance **EPA (2022)** Long-term, Imperceptible effect
Cormorant (Low)	Assuming avoidance, the predicted number of annual fatalities is 0.01 with an avoidance rate of 98.00%. As such, the magnitude of effect is negligible for cormorant.	Barrier effects on either migration or regular flights of Cormorant has been shown for 2 out of 6 studies to date (2004) in a European context (Hötker et al., 2006), with the overall effect significance being non-significant. The limited number of cormorants observed flying over the site indicates the magnitude of this effect is low.	In a review of the published impacts of wind farms on birds (Hötker et al., 2006), there was no information available on Cormorant populations post-construction. The limited number of Cormorants observed flying over site and absence of observation of birds using the habitats within the site indicates the magnitude of potential displacement effects is negligible.
	Significance without Mitigation	**Significance without Mitigation**	**Significance without Mitigation**
	Percival (2003) Sensitivity Low; Magnitude Negligible; Very Low Significance **EPA (2022)** Long-term, Imperceptible effect	**Percival (2003)** Sensitivity Low; Magnitude Low; Very Low Significance **EPA (2022)** Long-term, Not significant effect	**Percival (2003)** Sensitivity Low; Magnitude Negligible; Very Low Significance **EPA (2022)** Long-term, Imperceptible effect

Key Receptor (Sensitivity)	Direct Effect (Collision Risk)	Indirect Effect (Barrier Effect)	Indirect Effect (Displacement)
Curlew (High)	Assuming avoidance, the predicted number of annual fatalities based on all curlew activity observed within the 500m turbine buffer is 0.08 with an avoidance rate of 98.00%. Due to the regular occurrence of post-breeding curlew in the area, the predicted collision rate detailed above does not accurately characterise potential effects on the local breeding population. As such, an alternative scenario was modelled for the local breeding population. The alternative scenario conservatively omitted just one observation: a flock of 31 curlew observed at VP6 on 31/07/2024, which can reasonably be assumed to be a post-breeding flock separate from the local breeding pair. This alternative calculation indicates a lower (yet still conservative due to inclusion of smaller flocks and two winter records) collision rate of 0.03 per year (assuming 98% avoidance) for the local population.	There may be some localised barrier effect for foraging curlew from the local population, particularly around Bawnreagh Lakes where higher flight activity levels were recorded; however, this would be minor due to the large spacing between turbines and absence of proposed turbines from large sections of the site. The same is applicable to the post-breeding population which stops over at the site in July. In addition, the majority of the post breeding population would approach from the north and have been observed to stop over at Derryhogan Lakes. The proposed turbine layout does not present a barrier to this approach route.	Breeding Curlew were recorded within the Derryhogan Lakes area which is c. 70m from the southwestern amenity track at its closest point. During the operational phase, an increase in human activity along this amenity track could result in potential disturbance to breeding birds. Frequent disturbance to these birds would be likely to result in their displacement from this area, which has been observed to be consistently favoured across multiple breeding seasons. There is some potential for relocation to suitable displacement habitats in the hinterland; however, the Derryhogan Lakes area is considered to provide optimal breeding habitat for curlew. As such, a high magnitude effect is predicted prior to mitigation.

Key Receptor (Sensitivity)	Direct Effect (Collision Risk)	Indirect Effect (Barrier Effect)	Indirect Effect (Displacement)
	Based on observed curlew activity at the site, assessment of population-level effects is required in three categories: local (one pair); national (210 birds) and the local post-breeding population which inhabits the site briefly during July (avg. of 20 birds). In assessing population effects based on the predicted collision rate, the Percival (2003) assessment framework indicates negligible effect magnitude for the national (0.04%) and transient post-breeding (0.40%) populations, and low magnitude for the local population (1.5%). However, considering this species' tendency to habitually return to the same breeding site each year (arising from philopatry), and the fact that only one breeding pair is present, the loss of one breeding adult could in reality lead to the loss of the local population and as such, a single collision involving a breeding adult must be considered as a very high magnitude effect on the local population.		

Key Receptor (Sensitivity)	Direct Effect (Collision Risk)	Indirect Effect (Barrier Effect)	Indirect Effect (Displacement)
	Similarly for the national and local transient post-breeding population, the effect magnitude arising from loss of a breeding adult is likely to be higher than that indicated by Percival (2003). It is noted that the national population is on a downward trajectory based on the most recent monitoring (Colhoun et al., 2022). While the loss of a breeding pair would likely result in some acceleration of this trend, it is unlikely the overall magnitude would be highly significant on a national level. Nonetheless, it is considered that the negligible magnitude indicated by Percival (2003) (<1% of population affected) is too low considering the poor conservation status of this species, and a magnitude of low is considered to be more appropriate.		

Key Receptor (Sensitivity)	Direct Effect (Collision Risk)	Indirect Effect (Barrier Effect)	Indirect Effect (Displacement)
	Significance without Mitigation	**Significance without Mitigation**	**Significance without Mitigation**
	Percival (2003) Local scale: Sensitivity High; Magnitude Very High; Very High Significance National scale: Sensitivity High; Magnitude Low; Low Significance **EPA (2022)** Local scale: Long-term, Very Significant effect National scale: Medium-term, Moderate effect	**Percival (2003)** Sensitivity High; Magnitude Low; Low Significance **EPA (2022)** Long-term, Not Significant effect	**Percival (2003)** Sensitivity High; Magnitude High; Very High Significance **EPA (2022)** Long-term, Significant effect

Golden Plover (Medium)	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% ". However, the review study based on 3 years of post-construction monitoring sites included in the CRM (Appendix 7-4 and Gittings, 2022) indicates a much higher avoidance rate should be applied for non-breeding Golden Plover populations. 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. Assuming avoidance, the predicted number of annual fatalities is 0.23 with an avoidance rate of 99.80% The predicted number of annual fatalities will result in a negligible effect to both national and local populations of golden plover (<1% of local and national populations potentially affected by collision mortality).	High published avoidance rates of wind farms (Krijgsveld et al., 2009) and changes in densities within wind farms post construction (Pearce-Higgins et al., 2012) suggests wind farms can act as significant barriers to Golden Plover. Considering the regular occurrence of Golden Plover flocks during the non-breeding season, there is potential for this species to be affected by barrier effect. However, since activity is focused primarily to the north of the Site, with only occasional commuting and potential migratory movements through the area in which the site is located, potential for barrier effect is diminished. Considering these factors, the predicted magnitude for barrier effect is Low.	Literature suggests differences in densities pre-and post-construction of wind farms is significant (Pearce-Higgins et al., 2012). displacement is not significant but may occur up to 400m (Sansom et al. 2016). Pearce-Higgins et al. (2009) recorded a reduced occurrence of Golden Plovers within 200m of turbines across 12 upland wind farms. However, Fielding and Haworth (2010) and Douglas et al. (2011) suggest that under some circumstances, Golden Plovers may be more tolerant of wind farm infrastructure. At Farr wind farm, Fielding and Haworth (2010) showed that the median distance of 16 Golden Plover nests to the nearest turbine was 168.8m, with nine nests being less than 200m and three less than 100m from the nearest turbine. At Beinn Tharsuinn wind farm, Douglas et al. (2011) found that the distribution of breeding Golden Plovers appeared to be unaffected by proximity to turbines or tracks, with no evidence for this lack of association changing through time Depending on the level of habituation to disturbance, a buffer zone of 200-500m is suggested in Goodship and Furness (2022) to protect nesting Golden Plover as well as foraging and roosting birds during the nonbreeding season from pedestrian disturbance. However, the proposed development is outside the established range of breeding golden plover in Ireland. While some golden plover flight activity overlapped with the Proposed Wind Farm Site, the majority was located in the Northern Bogs.

Key Receptor (Sensitivity)	Direct Effect (Collision Risk)	Indirect Effect (Barrier Effect)	Indirect Effect (Displacement)
			The observations of Golden Plover activity recorded during VP surveys confirm this species winters in the locality, but that roosting and foraging does not occur at the site and golden plover activity is focused on the bogs to the north of the Site. As such, the predicted magnitude for disturbance is low.
	Significance without Mitigation	**Significance without Mitigation**	**Significance without Mitigation**
	Percival (2003) Sensitivity Medium; Magnitude Negligible; Very Low Significance **EPA (2022)** Long-term, Imperceptible effect	**Percival (2003)** Sensitivity Medium; Magnitude Low; Low Significance **EPA (2022)** Long-term, Not significant effect	**Percival (2003)** Sensitivity Medium; Magnitude Negligible; Low Significance **EPA (2022)** Long-term, Not significant effect
Great Crested Grebe (Low)	No great crested grebe flight activity was observed within the 500m turbine buffer. As such, the effective collision risk for this species is zero.	Due to absence of observed flight activity within the 500m turbine buffer and location of breeding activity away from proposed turbine locations, barrier effects are unlikely to occur.	Breeding in the Longfordpass Lakes area was observed across multiple summer seasons and as such this species may be subject to disturbance from recreational users.
	Significance without Mitigation	**Significance without Mitigation**	**Significance without Mitigation**
	Percival (2003) Sensitivity Low; Magnitude Negligible; Very Low Significance **EPA (2022)** Long-term Imperceptible Effect	**Percival (2003)** Sensitivity Low; Magnitude Negligible; Very Low Significance **EPA (2022)** Long-term Imperceptible Effect	**Percival (2003)** Sensitivity Low; Magnitude High; Low Significance **EPA (2022)** Long-term Slight to Moderate Effect

Key Receptor (Sensitivity)	Direct Effect (Collision Risk)	Indirect Effect (Barrier Effect)	Indirect Effect (Displacement)
Great White Egret (Low)	This species which occurs as a rare non-breeding visitor was infrequently observed, and was recorded commuting through the site on one occasion. The predicted number of fatalities for this species is very low (0.00 collisions per year/one collision every 2,480 years). As such, the effect magnitude for collision risk is negligible.	Due to the limited number of observations, surveys indicate great white egret activity at the proposed wind farm is low, and as such indicates low potential for barrier effects. The activity observed aligns with the acknowledged status of this species as a rare visitor to wetlands. As such, the effect magnitude for barrier effect is negligible.	Based on observations, this species may occur infrequently at the proposed wind farm and surrounding areas. Considering the observed low levels of activity, widespread availability of displacement habitats in the locality and non-breeding status of this species, the effect magnitude for displacement is negligible.
	Significance without Mitigation	**Significance without Mitigation**	**Significance without Mitigation**
	Percival (2003) Sensitivity Low; Magnitude Negligible; Very Low Significance **EPA (2022)** Long-term Imperceptible Effect	**Percival (2003)** Sensitivity Low; Magnitude Negligible; Very Low Significance **EPA (2022)** Long-term Imperceptible Effect	**Percival (2003)** Sensitivity Low; Magnitude Negligible; Very Low Significance **EPA (2022)** Long-term Imperceptible Effect
Green Sandpiper (Low)	This species was infrequently observed, primarily recorded commuting through the site, and on one occasion the birds observed were noted to be post-breeding birds from elsewhere.	Due to the limited number of observations, surveys indicate green sandpiper activity at the proposed wind farm is low, and as such indicates low potential for barrier effects. The activity observed aligns with the acknowledged status of this species as a scarce passage migrant and winter visitor to wetlands.	Based on observations, low numbers of green sandpiper may winter at the proposed wind farm and surrounding areas. Considering the observed low levels of activity, widespread availability of displacement habitats in the locality and non-breeding status of this species, the effect magnitude for displacement is negligible.

Key Receptor (Sensitivity)	Direct Effect (Collision Risk)	Indirect Effect (Barrier Effect)	Indirect Effect (Displacement)
	The predicted number of fatalities for this species is very low (0.00 collisions per year/one collision every 451 years). As such, the effect magnitude for collision risk is negligible.	As such, the effect magnitude for barrier effect is negligible.	
	Significance without Mitigation	**Significance without Mitigation**	**Significance without Mitigation**
	Percival (2003) Sensitivity Low; Magnitude Negligible; Very Low Significance **EPA (2022)** Long-term Imperceptible Effect	**Percival (2003)** Sensitivity Low; Magnitude Negligible; Very Low Significance **EPA (2022)** Long-term Imperceptible Effect	**Percival (2003)** Sensitivity Low; Magnitude Negligible; Very Low Significance **EPA (2022)** Long-term Imperceptible Effect
Grey Heron (Low)	Assuming avoidance, the predicted number of annual fatalities is 0.04 with an avoidance rate of 98.00%. This will result in a negligible effect on Grey Heron.	Hötker et al., 2006 found evidence of a barrier effect in four out of seven cases, with the remaining three showing no barrier effect. Results were deemed not significant. Due to the large spacing between turbines and absence of proposed turbines from large sections of the site, significant barrier effects are unlikely.	In a review of the published impacts of wind farms on birds (Hötker et al., 2006), it was noted that birds of open habitats typically avoided turbines by several hundred metres. Grey Herons were an exception to this rule and were frequently found close to or within wind farm sites, suggesting habituation.

Key Receptor (Sensitivity)	Direct Effect (Collision Risk)	Indirect Effect (Barrier Effect)	Indirect Effect (Displacement)
	Significance without Mitigation	**Significance without Mitigation**	**Significance without Mitigation**
	Percival (2003) Sensitivity Low; Magnitude Negligible; Very Low Significance **EPA (2022)** Long-term, Imperceptible effect	**Percival (2003)** Sensitivity Low; Magnitude Low; Very Low Significance **EPA (2022)** Long-term, Not Significant effect	**Percival (2003)** Sensitivity Low; Magnitude Low; Very Low Significance **EPA (2022)** Short-term, Not significant effect
Greylag Goose (Low)	Assuming avoidance, the predicted number of fatalities is 0.01 with an avoidance rate of 99.50%. This will result in a negligible effect on Greylag Goose.	Greylag geese in flight prefer to avoid turbines by gaining height to pass over the turbines or by altering their course to fly around them - thus, the presence of turbines can result in increased energetic costs to geese and forces them to change their flight path. As the greylag geese observed at the proposed development site are not migratory and are present during the breeding season, changes to their migration pathway is not expected. A localised barrier effect may affect resident greylag geese.	This species is noted to commute through this site and breed in several wetland locations surrounding lakes (FL1). Changes in habitat quality during the non-breeding season can have detrimental effects on the breeding success and migration dates of geese. There is potential for displacement of low numbers of local breeding pairs doe to disturbance form operational turbines and/or recreational use. Considering the abundance of suitable displacement habitats at the site and in the surrounding hinterland, the magnitude of potential effects is not predicted to be significant.

Key Receptor (Sensitivity)	Direct Effect (Collision Risk)	Indirect Effect (Barrier Effect)	Indirect Effect (Displacement)
	Significance without Mitigation	**Significance without Mitigation**	**Significance without Mitigation**
	Percival (2003) Sensitivity Low; Magnitude Negligible; Significance Very Low **EPA (2022)** Long-term, Imperceptible effect	**Percival (2003)** Sensitivity Low; Magnitude Medium; Very Low Significance **EPA (2022)** Long-term, Not significant effect	**Percival (2003)** Sensitivity Low; Magnitude Medium; Very Low Significance **EPA (2022)** Long-term, Not significant effect
Hen Harrier (High)	Hen harrier have been assessed in the collision risk model due to the proximity to the two SPAs and the small population present. Collision risk modelling indicated an annual collision rate of 0.01 for hen harrier with a 99% avoidance rate. The associated population consequences at national, SPA, county, and local levels were determined to be negligible (<1% of population affected at all levels assessed).	Hen harrier commute through the site to reach their foraging grounds (Longfordpass South Lakes, Derryhogan Lakes, and Bawnreagh Lakes); with the presence of turbines, their flight path to these areas may be disrupted. Noise disturbance and visual intrusion are unlikely to deter foraging hen harrier, as evidence suggests birds may continue to utilise wind farms post construction (Robinson et al., 2012). Thus, a barrier effect due to the proposed wind farm is unlikely. Although barrier effect has been documented in at least one study in the European context (Hötker et al., 2006), recent evidence suggests that birds continue to use wind farms post construction (Whitfield and Madders, 2006);(Robinson et al., 2012) indicating wind farms may not be significant barriers.	Considering that the primary hunting areas used by hen harrier are either located away from proposed turbines (Derryhogan & Longfordpass Lakes) or located between widely spaced turbines (Bawnreagh Lakes), displacement of hunting birds is unlikely. Goodship (2022) notes that 'Hen Harrier will nest at 200 to 300m from an operational wind turbine'. It is assumed that they would therefore also roost at this distance. As such, the proposed turbine array layout would be unlikely to affect winter roost locations during operation. Noise disturbance and visual intrusion are unlikely to deter foraging hen harrier, as evidence suggests birds may continue to utilise wind farms post construction (Robinson et al., 2012). As such, a displacement effect due to the proposed wind farm is unlikely.

Key Receptor (Sensitivity)	Direct Effect (Collision Risk)	Indirect Effect (Barrier Effect)	Indirect Effect (Displacement)
	Significance without Mitigation	**Significance without Mitigation**	**Significance without Mitigation**
	Percival (2003) Sensitivity Very High; Magnitude Negligible; Low Significance **EPA (2022)** Long-term, Not Significant effect	**Percival (2003)** Sensitivity Very High; Magnitude Low; Medium Significance **EPA (2022)** Short-term, Slight effect	**Percival (2003):** Sensitivity Very High; Magnitude Low; Medium Significance **EPA (2022):** Short-term, Slight effect
Kestrel (Medium)	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 (Hötker et al., 2006). The published avoidance rate is 95% (SNH, 2016). Assuming avoidance, the predicted number of annual fatalities is 2.94 with an avoidance rate of 95.00%. This will result in a negligible effect on national and county populations of kestrel (<1% of these populations potentially affected by collision mortality) and a high magnitude of effect for the local populations (23% of the local population potentially affected by collision mortality).	Barrier effects have been shown to a degree in either migrating or regular kestrel flight paths within the European context (3 of 5 studies; Hötker et al., 2006). Due to the large spacing between turbines and absence of proposed turbines from large sections of the site, significant barrier effects are unlikely.	Disturbance (in terms of minimal distance to wind farm) has been recorded in 14 studies on wind farms in Europe (Hötker et al., 2006). Habituation to wind farms has been recorded in one case, however the only other case recorded the opposite (Hötker et al., 2006). A case study on the impacts of wind farms on birds conducted in southern Spain (Farfán et al., 2009), found that raptors utilise the space around the wind farm with lower frequency than prior to its existence, which represented a displacement of the home range of these species. In particular, Kestrel was noted to decline sharply in the second year of operation, with other raptor species showing a decline in the first year. Other studies found less evidence of displacement; Madders and Whitfield (2006) rated kestrel as having a 'low' sensitivity to displacement.

Key Receptor (Sensitivity)	Direct Effect (Collision Risk)	Indirect Effect (Barrier Effect)	Indirect Effect (Displacement)
			The related American kestrel (Falco sparverius) was also given a rating of 'low' sensitivity. Pearce-Higgins et al. (2009) found equivocal evidence for weak avoidance of turbines by kestrel. (Quote below) 'Previous analyses for raptors have generally found only low levels of turbine avoidance (Hötker 2006; Hötker et al. 2006; Madders & Whitfield 2006), with some species, such as kestrels, known to continue foraging activity close to turbines and to be susceptible to collision (Barrios & Rodríguez 2004, 2007). We found hen harrier and buzzard showed reduced flight activity around turbines, with equivocal evidence for weak avoidance by kestrel, broadly reflecting the sensitivity of these species anticipated by Madders & Whitfield (2006). Raptors did not appear to alter their flight height in response to turbine proximity, at least at the gross scale examined.'
	Significance without Mitigation	**Significance without Mitigation**	**Significance without Mitigation**
	Percival (2003) <u>National and County Populations:</u> Sensitivity Medium; Magnitude Negligible; Very Low Significance <u>Local Population:</u> Sensitivity Medium; Magnitude High; Medium Significance	**Percival (2003)** Sensitivity Medium; Magnitude Medium; Low Significance **EPA (2022)** Long-term, Not Significant effect	**Percival (2003)** Sensitivity Medium; Magnitude High; Medium Significance **EPA (2022)** Long-term, Moderate effect

Key Receptor (Sensitivity)	Direct Effect (Collision Risk)	Indirect Effect (Barrier Effect)	Indirect Effect (Displacement)
	EPA (2022) National and County Populations: Long-term, Imperceptible effect Local Population: Long-term, Moderate effect		
Kingfisher (Medium)	There is assessed to be no collision risk for kingfisher due to absence of records within potential collision height (PCH).	Barrier effects on either migration or regular flights of Kingfisher has not been shown to date (2004) in a European context (Hötker et al., 2006). Kingfisher fly low when commuting and mainly follow watercourses, making it unlikely that turbines would represent a barrier to movement.	In a review of the published impacts of wind farms on birds (Hötker et al., 2006), there was no information available on Kingfisher populations post-construction. The species was not frequently recorded using the Site after summer 2021, so any effects are likely to be of low magnitude.
	Significance without Mitigation	**Significance without Mitigation**	**Significance without Mitigation**
	Percival (2003) Sensitivity Medium; Magnitude Negligible; Very Low Significance **EPA (2022)** Long-term, Imperceptible effect	**Percival (2003)** Sensitivity Medium; Magnitude Negligible; Very Low Significance **EPA (2022)** Long-term, Imperceptible effect	**Percival (2003)** Sensitivity Medium; Magnitude Negligible; Very Low Significance **EPA (2022)** Long-term, Imperceptible effect

Key Receptor (Sensitivity)	Direct Effect (Collision Risk)	Indirect Effect (Barrier Effect)	Indirect Effect (Displacement)
Lapwing (Medium)	Assuming avoidance, the predicted number of annual fatalities is 0.20 with an avoidance rate of 98.00%. This will result in a negligible effect on Lapwing.	Barrier effects have been shown to a degree in either migrating or commuting lapwing flight paths within the European context (5 of 6 studies; Hötker et al., 2006). Due to the large spacing between turbines, potential for significant barrier effects is reduced.	Disturbance (in terms of minimal distance to wind farm) has been recorded for lapwing 13 studies (breeding season)/32 studies (non-breeding season) on wind farms in Europe. Habituation to wind farms has been recorded in three out of five cases (non-breeding season) and two out six cases (breeding season). The height of turbines was found to have a statistically significant relationship with distance from wind farms for non-breeding lapwing (distance from wind turbines increased with turbine height) (Hötker et al., 2006). The operational phase of the wind farm may affect the breeding locations of Lapwing in the Longfordpass South Lakes and Derryhogan Lakes. Additionally, the southwest amenity track may lead to disturbance of breeding lapwing at Derryhogan Lakes and the presence of turbines could contribute to localized displacement of breeding Lapwing in the Lanespark Bog.
	Significance without Mitigation	**Significance without Mitigation**	**Significance without Mitigation**
	Percival (2003) Sensitivity Medium; Magnitude Negligible; Very Low Significance **EPA (2022)** Long-term, Imperceptible effect	**Percival (2003)** Sensitivity Medium; Magnitude Medium; Low Significance **EPA (2022)** Long-term, Slight effect	**Percival (2003)** Sensitivity Medium; Magnitude High; Medium Significance **EPA (2022)** Long-term, Slight to Moderate effect

Key Receptor (Sensitivity)	Direct Effect (Collision Risk)	Indirect Effect (Barrier Effect)	Indirect Effect (Displacement)
Lesser Black-backed Gull (Low)	Assuming avoidance, the predicted number of annual fatalities is 0.07 with an avoidance rate of 99.50%. This will result in a negligible effect on Lesser Black-backed Gull.	For gull species such as Lesser Black-backed, Herring and Great Black-backed, some studies indicate evidence for attraction, whereas others for displacement, with the remainder indicating no significant response (Cook et al., 2014. Humphreys et al., 2015).	A literature review, carried out by Percival (2003), all studies which indicated gull species being significantly affected or being a species found to have collided, were identified at wind farms on coastal habitats. It is uncertain that disturbance may affect gull species inland. Gulls will be more at risk from collision impacts as a result of their flight behaviour, but less sensitive to disturbance and displacement effects (Humphreys et al., 2015).
	Significance without Mitigation	**Significance without Mitigation**	**Significance without Mitigation**
	Percival (2003) Sensitivity Low; Magnitude Negligible; Very Low Significance **EPA (2022)** Long-term, Imperceptible effect	**Percival (2003)** Sensitivity Low; Magnitude Negligible; Very Low Significance **EPA (2022)** Short-term, Imperceptible effect	**Percival (2003)** Sensitivity Low; Magnitude Low; Very Low Significance **EPA (2022)** Short-term, Imperceptible effect

Key Receptor (Sensitivity)	Direct Effect (Collision Risk)	Indirect Effect (Barrier Effect)	Indirect Effect (Displacement)
Little Egret (Medium)	Assuming avoidance, the predicted number of annual fatalities is 0.02 with an avoidance rate of 98.00%. This will result in a negligible effect on Little Egret.	Hötker et al., 2006 found evidence of a barrier effect for grey heron (also applicable to little egret) in four out of seven cases, with the remaining three showing no barrier effect. Results were deemed not significant. Due to the large spacing between turbines, potential for significant barrier effects is reduced.	Little egret is a member of the heron genus (Ardea) and as such will have similar characteristics and sensitivities to grey heron. A review of the published impacts of wind farms on birds (Hötker et al., 2006) found that typically, birds of open habitats avoided turbines by several hundred metres. Grey Herons were an exception to this rule and were frequently found close to or within wind farm sites, suggesting habituation. Considering the close genetic, ecological and behavioural relationships between grey heron and little egret, this tendency towards habituation is similarly applicable for little egret.
	Significance without Mitigation	**Significance without Mitigation**	**Significance without Mitigation**
	Percival (2003) Sensitivity Medium; Magnitude Negligible; Very Low Significance **EPA (2022)** Long-term, Imperceptible effect	**Percival (2003)** Sensitivity Medium; Magnitude Negligible; Very Low Significance **EPA (2022)** Long-term, Imperceptible effect	**Percival (2003)** Sensitivity Medium; Magnitude Negligible; Very Low Significance **EPA (2022)** Long-term, Imperceptible effect
Mallard (Low)	Assuming avoidance, the predicted number of annual fatalities is 2.23 with an avoidance rate of 98.00%. This will result in a negligible effect on the national population of Mallard (<1% of population potentially affected by collision mortality), and a low magnitude	Barrier effects on either migration or regular flights of Mallard have been shown for three out of five studies in a European context (Hötker et al. 2006). The overall barrier effect was not shown to be significant.	In a review of the published effects of wind farms on Mallard populations (Hötker et al. 2006), it was found that habituation to wind farms occurred across both winter and breeding seasons.

Key Receptor (Sensitivity)	Direct Effect (Collision Risk)	Indirect Effect (Barrier Effect)	Indirect Effect (Displacement)
	effect on the local population (1.3% of population potentially affected by collision mortality).		
	Significance without Mitigation	**Significance without Mitigation**	**Significance without Mitigation**
	Percival (2003) Local scale: Sensitivity Low; Magnitude Low; Very Low Significance National scale: Sensitivity Low; Magnitude Negligible; Very Low Significance **EPA (2022)** Long-term, Imperceptible effect	**Percival (2003)** Sensitivity Low; Magnitude Negligible; Very Low Significance **EPA (2022)** Short-term, Imperceptible effect	**Percival (2003)** Sensitivity Low; Magnitude Negligible; Very Low Significance **EPA (2022)** Short-term, Imperceptible effect
	Percival (2003) Local scale: Sensitivity Low; Magnitude High; Low Significance National scale: Sensitivity Low; Magnitude Negligible; Very Low Significance **EPA (2022)** Local scale: Long-term, Slight effect National scale: Long-term, Imperceptible effect	**Percival (2003)** Sensitivity Low; Magnitude Low; Very Low Significance **EPA (2022)** Long-term, Imperceptible effect	**Percival (2003)** Sensitivity Low; Magnitude Low; Very Low Significance **EPA (2022)** Long-term, Imperceptible effect

Key Receptor (Sensitivity)	Direct Effect (Collision Risk)	Indirect Effect (Barrier Effect)	Indirect Effect (Displacement)
Marsh Harrier (Medium)	The predicted number of fatalities for this species is very low (0.00 collisions per year/one collision every 1,143 years assuming 98% avoidance rate). Since breeding does not occur, flight activity is limited to lower level commuting and hunting flights. As such, the effect magnitude for collision risk is negligible.	As a harrier species, marsh harrier would habitually hunt and commute at low altitudes, with the majority of flights remaining below the rotor-swept height band. This, in combination with the wide spacing of proposed turbines reduces potential for barrier effect to negligible levels.	Marsh harrier may vary in their response to disturbance, with some studies finding no evidence of disturbance caused by human presence but other studies which did note a link between disturbance and human presence. Disturbance effects were noted to apply primarily to breeding birds, but also to roosting and foraging non-breeding birds. Habituation was also observed in some studies (Goodship & Furness, 2022). Considering the absence of breeding activity, potential for habituation, large size of the site and abundant displacement habitats, the effect magnitude for disturbance is assessed as medium.
	Significance without Mitigation	**Significance without Mitigation**	**Significance without Mitigation**
	Percival (2003) Sensitivity Medium; Magnitude Negligible; Very Low Significance **EPA (2022)** Long-term Imperceptible Effect	**Percival (2003)** Sensitivity Medium; Magnitude Negligible; Very Low Significance **EPA (2022)** Long-term Imperceptible Effect	**Percival (2003)** Sensitivity Medium; Magnitude Medium; Low Significance **EPA (2022)** Long-term Not significant to Slight Effect
Merlin (Medium)	The predicted number of fatalities for this species is very low (0.00 collisions per year/one collision every 4,936 years assuming 98% avoidance rate). As such, the effect magnitude for collision risk is negligible.	Hötker et al., 2006 found evidence of a barrier effect for merlin in a single study. Given the low volume of activity recorded, in addition to the wide spacing between proposed turbines a significant barrier effect is not anticipated.	Merlin activity was relatively infrequent within the site, with a total of 40 records across the four-year period. It is likely that merlin will continue to use the site to forage during the operational phase as part of a wider landscape-scale mosaic of hunting grounds.

Key Receptor (Sensitivity)	Direct Effect (Collision Risk)	Indirect Effect (Barrier Effect)	Indirect Effect (Displacement)
			Limited disturbance may arise from recreational use and operation of the proposed turbines; however, potential effects are anticipated to remain at low magnitude.
	Significance without Mitigation	**Significance without Mitigation**	**Significance without Mitigation**
	Percival (2003) Sensitivity Medium; Magnitude Negligible; Very Low Significance **EPA (2022)** Long-term, Imperceptible effect	**Percival (2003)** Sensitivity Medium; Magnitude Negligible; Very Low Significance **EPA (2022)** Short-term, Imperceptible effect	**Percival (2003)** Sensitivity Medium; Magnitude Low; Very Low Significance **EPA (2022)** Short-term, Not significant effect
Mute Swan (Low)	Assuming avoidance, the predicted number of annual fatalities is 0.01 with an avoidance rate of 99.50%. This will result in a negligible effect on Mute Swan.	There are two types of barrier effect: those to migrating birds along migration routes and daily barrier effects due to placement of turbines between feeding and roosting sites. Barrier effect can be related to perceived collision risk (SNH, 2014). Barrier effects along migration routes of wildfowl have been shown to cause only small effects on total migration distance (Masden, 2009). Swans have been shown to exhibit horizontal avoidance as they fly past the outer edge of wind farms (Fijn et al., 2012) and distances of up to 200m have been noted for whooper swans (Rees, 2012). In the Netherlands, Bewicks Swans have been recorded adjusting their flight paths to the presence of turbines during both light and	Literature suggests possible short-term displacement of 200- 400m (Fijn et al., 2012) (Rees, 2012) followed by habituation (Fijn et al., 2012) with little evidence of permanent post construction displacement (Rees, 2012). There were two records (2021 & 2022) of mute swan nesting within the 500m turbine buffer (located in the central areas of Littleton Bog). While displacement could potentially occur, surveys do not indicate habitual use of the site for breeding. The absence of regular breeding or roosting activity, in conjunction with abundant displacement habitats in the wider landscape and capacity for habituation indicates the effect

Key Receptor (Sensitivity)	Direct Effect (Collision Risk)	Indirect Effect (Barrier Effect)	Indirect Effect (Displacement)
		darkness, with no large deflections or panic reactions recorded and birds were recorded flying around and between rows of turbines (Fijn et al., 2012). Distances between turbines at the referenced site (300-400m) (Fijn et al., 2012) are lower than those at Littleton (460-790m). 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 macro-avoidance rates are comparable to those in periods of lower visibility (Desholm, and Kahlert, 2005).	magnitude is medium, reducing to low over the long term.
	Significance without Mitigation	**Significance without Mitigation**	**Significance without Mitigation**
	Percival (2003) Sensitivity Low; Magnitude Negligible; Very Low Significance **EPA (2022)** Long-term, Imperceptible effect	**Percival (2003)** Sensitivity Low; Magnitude Medium; Low Significance **EPA (2022)** Long-term, Slight effect	**Percival (2003)** Sensitivity Low; Magnitude Medium, reducing to Low with habituation; Very Low Significance **EPA (2022)** Short-term, Slight effect, reducing to Long-term Imperceptible effect

Key Receptor (Sensitivity)	Direct Effect (Collision Risk)	Indirect Effect (Barrier Effect)	Indirect Effect (Displacement)
Peregrine (Medium)	Assuming avoidance, the predicted number of annual fatalities is 0.37 with an avoidance rate of 98.00%. Potential effects on peregrine at local and national population scales were examined. The national population is assumed to be 1,030 birds (NPWS, 2012). A local population of 14 adults is estimated based on the presence of seven breeding sites identified in the hinterland during the 2024 breeding season. Based on these population estimates, the predicted annual collision rate will result in a negligible effect to the national population (<1% of the population potentially affected by collision mortality) and a low effect on the local population (2.7% of local population potentially affected by collision mortality).	Hötker et al., 2006 report one case of barrier effect on Peregrines arising from an operational wind farm. Observed flight path distribution indicating higher activity in primary waterbird areas away from proposed turbines, in addition to the large distance between proposed turbines mean the wind farm is unlikely to act as a significant barrier to a high-flying and far-ranging species such as Peregrine.	Possible disturbance to foraging birds through noise, visual intrusion. No displacement from breeding sites is likely due to none being recorded within the Site (closest is 1.6 km from the site). Goodship and Furness (2022) note that distances of 800 m to 1,000 m are typically used as buffers to avoid disturbance to breeding peregrine, where noisy activities such as forestry operations and quarrying are undertaken. As such, the closest nest site located 1.6 km from the Site is outside the potential disturbance zone. Peregrine are known to nest in urban areas often in cathedrals with loud ringing bells, as well as quarries where regular rock-breaking works are undertaken. For example, Moore et al. (1997), estimated that 65 quarries were occupied in Ireland between 1991 and 1993. Thus, there is evidence to suggest that the species is tolerant of noise and human activity.
	Significance without Mitigation	**Significance without Mitigation**	**Significance without Mitigation**
	Percival (2003) <u>National Population:</u> Sensitivity Medium; Magnitude Negligible; Very Low Significance	**Percival (2003)** Sensitivity Medium; Magnitude Low; Low Significance	**Percival (2003)** Sensitivity Medium; Magnitude Low; Low Significance

Key Receptor (Sensitivity)	Direct Effect (Collision Risk)	Indirect Effect (Barrier Effect)	Indirect Effect (Displacement)
	Local Population: Sensitivity Medium; Magnitude Low; Low Significance **EPA (2022)** National Population: Long-term, Imperceptible effect Local Population: Long-term, Slight effect	**EPA (2022)** Long-term, Not Significant effect	**EPA (2022)** Short-term, Not Significant effect
Redshank (Medium)	While redshank was observed within the 500m turbine buffer, there was no flight activity within the rotor-swept height band (38 m – 200 m). As such the effective collision risk for this species is zero.	In a review of the impacts of wind farms on birds in a European context, Hötker et al. (2006) did not record any instances of barrier effect for redshank. Considering the low level of activity observed with the 500m turbine buffer, in addition to the large spacing between proposed turbines, the magnitude of barrier effect is predicted to be negligible for redshank.	Hötker et al. (2006) noted three cases without habitation, and one case with habituation for redshank, indicating this species may be subject to displacement effects from operational wind farms. Based on the low number of observations at the site, and absence of roosting or breeding activity from the site, the predicted magnitude remains low for redshank.
	Significance without Mitigation	**Significance without Mitigation**	**Significance without Mitigation**
	Percival (2003) Sensitivity Medium; Magnitude Negligible; Very Low Significance **EPA (2022)** Long-term, Imperceptible effect	**Percival (2003)** Sensitivity Medium; Magnitude Negligible; Very Low Significance **EPA (2022)** Long-term, Imperceptible effect	**Percival (2003)** Sensitivity Medium; Magnitude Low; Low Significance **EPA (2022)** Long-term, Not Significant effect

Key Receptor (Sensitivity)	Direct Effect (Collision Risk)	Indirect Effect (Barrier Effect)	Indirect Effect (Displacement)
Ringed Plover (Low)	Ringed plover were only recorded once within the 500m turbine buffer, with a single individual seen flying for 15 seconds in the 50-100m height band. Based on this, the CRM indicated that no ringed plover collisions would occur.	Based on the low level of flight activity observed within the 500m turbine buffer, in addition to the wide spacing of proposed turbines, indicates potential for barrier effect is negligible.	Ringed plover have not been observed breeding at the proposed wind farm site. They are known to breed in the hinterland, in the bogs north of the M8. As such, they are assessed as being unlikely to be subject to operational disturbance.
	Significance without Mitigation	**Significance without Mitigation**	**Significance without Mitigation**
	Percival (2003) Sensitivity Low; Magnitude Negligible; Very Low Significance **EPA (2022)** Long-term Imperceptible Effect	**Percival (2003)** Sensitivity Low; Magnitude Negligible; Very Low Significance **EPA (2022)** Long-term Imperceptible Effect	**Percival (2003)** Sensitivity Low; Magnitude Negligible; Very Low Significance **EPA (2022)** Long-term Imperceptible Effect
Short-eared Owl (Medium)	No effective collision risk due to absence of records within potential collision height (PCH).	Given the low population/activity levels indicated by surveys, avoidance of the proposed wind farm is unlikely to induce significant energetic expenditure on either flight daily patterns of birds or birds undertaking longer journeys such as migration. It is also noted the turbine layout features large gaps (minimum of 460m) between individual turbines, avoiding a 'wall' or barrier effect.	A review of the published impacts of wind farms on birds (Hötker et al., 2006) did not note any studies which identified operational disturbance or displacement effects for short-eared owl. A study examining barn owl breeding success has shown no declines in areas of high disturbance levels in the UK, such as near military activity (Shawyer, 2011). It is unlikely that noise from turbines would significantly affect the foraging activities of wintering short-eared owl.

Key Receptor (Sensitivity)	Direct Effect (Collision Risk)	Indirect Effect (Barrier Effect)	Indirect Effect (Displacement)
	Significance without Mitigation	**Significance without Mitigation**	**Significance without Mitigation**
	Percival (2003) Sensitivity Medium; Magnitude Negligible; Very Low Significance **EPA (2022)** Short-term, Imperceptible effect	**Percival (2003)** Sensitivity Medium; Magnitude Negligible; Very Low Significance **EPA (2022)** Short-term, Imperceptible effect	**Percival (2003):** Sensitivity Medium; Magnitude Negligible; Very Low Significance **EPA (2022):** Short-term, Imperceptible effect
Snipe (Medium)	Assuming avoidance, the number of annual fatalities is calculated to be 0.03, with an avoidance rate of 98.00%. The predicted effect of collision risk is expected to be negligible for this species.	Barrier effect has been observed in one study in a European context (Hötker et al., 2006). Due to they typically low commuting flight height of snipe, in addition to the large spacing between proposed turbines, the operational wind farm is unlikely to act as a significant barrier to snipe.	Literature suggests differences in densities pre- and post-construction of wind farms has a significant impact upon Snipe within an area (Pearce-Higgins et al., 2012). Snipe were also shown by Pearce-Higgins et al. (2009) to use areas of habitat within 400m of turbines less than expected, leading to an expected 48% decline in abundance within 500m of the turbines. Breeding snipe are present within the 500m turbine buffer, with higher activity noted in the areas around T02 – T03, T06 and associated access tracks, and Lanespark Bog. Due to potential disturbance of the local breeding snipe population by both operational turbines and recreational users, the predicted effect magnitude is high.

Key Receptor (Sensitivity)	Direct Effect (Collision Risk)	Indirect Effect (Barrier Effect)	Indirect Effect (Displacement)
	Significance without Mitigation	**Significance without Mitigation**	**Significance without Mitigation**
	Percival (2003) Sensitivity Medium; Magnitude Negligible; Very Low Significance **EPA (2022)** Long-term, Imperceptible effect	**Percival (2003)** Sensitivity Medium; Magnitude Low; Medium Significance **EPA (2022)** Long-term, Slight to Moderate effect	**Percival (2003)** Sensitivity Medium; Magnitude High; Medium Significance **EPA (2022)** Long-term, Significant effect
Sparrowhawk (Low)	Assuming avoidance, the number of annual fatalities is 0.02 with an avoidance rate of 98.00%. This will result in a negligible effect on Sparrowhawk.	Sparrowhawk is considered to be less sensitive or less willing to change their original migration direction when approaching wind farms (Hötker et al., 2006). Three cases of no barrier effect are reported by Hötker et al., 2006, with one case of barrier effect.	In a review of the published impacts of wind farms on Sparrowhawk populations (Hötker et al., 2006), it was found that overall, effects on Sparrowhawk populations post-construction, across both winter and breeding season was not significant. Sparrowhawk do show habituation to the presence of wind farms (Hötker et al., 2006). Breeding was not proven although the regular occurrence of sparrowhawk indicates that this species likely breeds locally outside the site. There is potential for occasional disturbance from recreational users. The predicted magnitude for disturbance is Low.

Key Receptor (Sensitivity)	Direct Effect (Collision Risk)	Indirect Effect (Barrier Effect)	Indirect Effect (Displacement)
	Significance without Mitigation	**Significance without Mitigation**	**Significance without Mitigation**
	Percival (2003) Sensitivity Low; Magnitude Negligible; Very Low Significance **EPA (2022)** Long-term, Imperceptible effect	**Percival (2003)** Sensitivity Low; Magnitude Negligible; Very Low Significance **EPA (2022)** Long-term, Imperceptible effect	**Percival (2003)** Sensitivity Low; Magnitude Low; Very Low Significance **EPA (2022)** Long-term, Imperceptible effect
Starling (Low)	A large flock of 1,000 starlings was observed flying within the 500m turbine buffer during winter 2020-21 VP surveys and as such this species was added to the CRM. The predicted annual collision rate for starling is 0.12. This results in a negligible effect magnitude at both local and national level.	Due to the infrequency of startling flight activity observed within the 500m turbine buffer (one flock of 1,000), the proposed wind farm is assessed to pose a low magnitude barrier effect.	Due to an absence of breeding habitat, displacement is unlikely to affect breeding starlings. The individual observation of 1,000 birds is likely to be linked to winter roosting; however, this activity was only observed on one occasion. It is unlikely that starlings potentially using the site for roosting would be deterred by the proposed development, and the majority of suitable wetland roosting areas are located away from the proposed wind farm.
	Significance without Mitigation	**Significance without Mitigation**	**Significance without Mitigation**
	Percival (2003) Sensitivity Low; Magnitude Negligible; Very Low Significance **EPA (2022)** Long-term Imperceptible Effect	**Percival (2003)** Sensitivity Low; Magnitude Negligible; Very Low Significance **EPA (2022)** Long-term Imperceptible Effect	**Percival (2003)** Sensitivity Low; Magnitude Low; Very Low Significance **EPA (2022)** Long-term Imperceptible Effect

Key Receptor (Sensitivity)	Direct Effect (Collision Risk)	Indirect Effect (Barrier Effect)	Indirect Effect (Displacement)
Stock Dove (Medium)	While stock dove was observed within the 500m turbine buffer, there was no flight activity within the rotor-swept height band (38 m – 200 m). As such the effective collision risk for this species is zero.	Hötker et al., 2006 found evidence of a barrier effect for stock dove in two studies. Considering the low level of activity observed with the 500m turbine buffer, in addition to the large spacing between proposed turbines, the magnitude of barrier effect is predicted to be negligible for redshank.	A review of the published impacts of wind farms on birds (Hötker et al., 2006) did not note any disturbance/displacement effects applicable to stock dove. Stock dove breed in lowland agricultural landscapes in the east and south of Ireland, utilising tree holes for nesting (Birdwatch Ireland, 2026). No potential nesting features were identified within or near the Proposed Development during surveys. In the event of a nesting site occurring (outside) near the Proposed Wind Farm, there is limited potential for disturbance to occur. Based on the low number of observations at the site, and absence of roosting or breeding activity from the site, the predicted magnitude remains low for stock dove.
	Significance without Mitigation	**Significance without Mitigation**	**Significance without Mitigation**
	Percival (2003) Sensitivity Medium; Magnitude Negligible; Very Low Significance **EPA (2022)** Long-term, Imperceptible effect	**Percival (2003)** Sensitivity Medium; Magnitude Negligible; Very Low Significance **EPA (2022)** Long-term, Imperceptible effect	**Percival (2003)** Sensitivity Medium; Magnitude Low; Low Significance **EPA (2022)** Long-term, Not Significant effect

Key Receptor (Sensitivity)	Direct Effect (Collision Risk)	Indirect Effect (Barrier Effect)	Indirect Effect (Displacement)
Swift (Medium)	Assuming avoidance, the number of annual fatalities is 0.44 with an avoidance rate of 98.00%. This will result in a negligible magnitude of effect on the national population (<1% of population affected by collision mortality) and a low magnitude of effect on the local population (3.4 % of local population affected by collision mortality).	Hötker et al., 2006 found evidence of a barrier effect in Swift in two cases. Attraction of insects to turbines may further attract insectivorous bird species, which would reduce/preclude barrier effect.	Evidence suggests that flying insects are attracted to turbines (Long, et. al, 2011. Scholz & Voigt, 2021) which in turn, attracts insectivorous birds, especially hirundines and Swifts (Ahlén, 2002). This evidence further suggests that construction of wind farms, instead of disturbing birds, may in fact actually lure such bird species into the rotor sweep zone, thus significantly increasing collision risk. Swift activity observed during surveys was primarily at the Bawnreagh Lakes and there is no swift nesting habitat within or in close proximity to the Proposed Wind Farm. The predicted magnitude for disturbance is low.
	Significance without Mitigation	**Significance without Mitigation**	**Significance without Mitigation**
	Percival (2003) <u>National Population:</u> Sensitivity Medium; Magnitude Negligible; Very Low Significance <u>Local Population:</u> Sensitivity Medium; Magnitude Low; Low Significance **EPA (2022)** <u>National Population:</u> Long-term, Imperceptible effect	**Percival (2003)** Sensitivity Medium; Magnitude Low; Low Significance **EPA (2022)** Long-term, Not Significant effect	**Percival (2003)** Sensitivity Medium; Magnitude Low; Low Significance **EPA (2022)** Long-term, Not Significant effect

Key Receptor (Sensitivity)	Direct Effect (Collision Risk)	Indirect Effect (Barrier Effect)	Indirect Effect (Displacement)
	Local Population: Long-term, Not Significant effect		
Teal (Low)	Assuming avoidance, the number of annual fatalities is 0.05 with an avoidance rate of 98.00%. This will result in a negligible effect on Teal.	Hötker et al., 2006 found no evidence of a barrier effect in teal in one case.	Teal were recorded at the Proposed Wind Farm site during every year of surveys with breeding observations within the Longfordpass South Lakes and the Derryhogan Lakes. Their flightlines typically show them commuting around the site and their breeding sites and are typically within the potential disturbance zone. There is potential for areas used by breeding teal to be subject to disturbance from both operational turbines and recreational users.
	Significance without Mitigation	**Significance without Mitigation**	**Significance without Mitigation**
	Percival (2003) Sensitivity Low; Magnitude Negligible; Very Low Significance **EPA (2022)** Long-term Imperceptible Effect	**Percival (2003)** Sensitivity Low; Magnitude Low; Very Low Significance **EPA (2022)** Long-term Imperceptible Effect	**Percival (2003)** Sensitivity Low; Magnitude High; Low Significance **EPA (2022)** Long-term Slight to Moderate Effect

Key Receptor (Sensitivity)	Direct Effect (Collision Risk)	Indirect Effect (Barrier Effect)	Indirect Effect (Displacement)
Tufted Duck (Low)	Assuming avoidance, the number of annual fatalities is 0.00 (one collision every 3,985 years) with an avoidance rate of 98.00%. This will result in a negligible effect on Tufted Duck.	Considering the low level of activity observed with the 500m turbine buffer, in addition to the large spacing between proposed turbines, the magnitude of barrier effect is predicted to be negligible.	Tufted Duck were observed on six occasions throughout the survey period. They were observed primarily commuting through the potential construction noise disturbance zone and the turbine collision risk zone and were not noted to breed or roost on the Site. As such, the predicted effect magnitude is low.
	Significance without Mitigation	**Significance without Mitigation**	**Significance without Mitigation**
	Percival (2003) Sensitivity Low; Magnitude Negligible; Very Low Significance **EPA (2022)** Long-term Imperceptible Effect	**Percival (2003)** Sensitivity Low; Magnitude Negligible; Very Low Significance **EPA (2022)** Long-term Imperceptible Effect	**Percival (2003)** Sensitivity Low; Magnitude Low; Very Low Significance **EPA (2022)** Long-term Imperceptible Effect

Key Receptor (Sensitivity)	Direct Effect (Collision Risk)	Indirect Effect (Barrier Effect)	Indirect Effect (Displacement)
Whooper Swan (High)	Assuming avoidance, the number of predicted annual collision rate is 0.40 with an avoidance rate of 99.50%. This will result in a negligible magnitude of effect at both national and local population levels (<1% of the local and national populations affected by collision mortality).	There are two types of barrier effect; those to migrating birds along migration routes and daily barrier effects due to placement of turbines between feeding and roosting sites. Barrier effect can be related to perceived collision risk (SNH, 2014). Barrier effects along migration routes of wildfowl have been shown to cause only small effects on total migration distance (Masden, 2009). Swans have been shown to exhibit horizontal avoidance as they fly past the outer edge of wind farms (Fijn et al., 2012) and distances of up to 200m have been noted for whooper swans (Rees, 2012). In the Netherlands, Bewicks Swans have been recorded adjusting their flight paths to the presence of turbines during both light and darkness, with no large deflections or panic reactions recorded and birds were recorded flying around and between rows of turbines (Fijn et al., 2012).	Literature suggests possible short-term displacement of 200- 400m (Fijn et al., 2012) (Rees, 2012) followed by habituation (Fijn et al., 2012) with little evidence of permanent post construction displacement (Rees, 2012). A wintering flock of whooper swans has been recorded at the Site with roosting flocks returning every year of surveys. The primary roosting areas are located away from proposed turbines; however opportunistic roosting of smaller numbers of swans at smaller lakes near proposed turbine locations has also been observed. The primary feeding area in the locality is c. 1.3 km from the closest proposed turbine locations. Based on observed behaviour during surveys, The Whooper Swan grazing resource is primarily in an agricultural field to the west of the Longfordpass South Lakes. No displacement is predicted to affect foraging whooper swans.

Key Receptor (Sensitivity)	Direct Effect (Collision Risk)	Indirect Effect (Barrier Effect)	Indirect Effect (Displacement)
		Distances between turbines at the referenced site (300-400m) (Fijn et al., 2012) are smaller than those between the proposed turbines (460-790m). 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 macro-avoidance rates are comparable to those in periods of lower visibility (Desholm, and Kahlert, 2005).	Considering the potential for short-term displacement followed by habituation, in addition to an abundance of suitable displacement habitat in the local area and the small proportion of the local population potentially affected, there is potential for a medium magnitude effect on roosting whooper swans, reducing to low with habituation.
	Significance without Mitigation	**Significance without Mitigation**	**Significance without Mitigation**
	Percival (2003) Sensitivity High; Magnitude Negligible; Very Low Significance **EPA (2022)** Long-term, Imperceptible effect	**Percival (2003)** Sensitivity High; Magnitude Low; Low Significance **EPA (2022)** Long-term, Not Significant to Slight effect	**Percival (2003)** Sensitivity High; Magnitude Medium, reducing to Low; High Significance (short-term) reducing to Low Significance (Long-term) **EPA (2022)** Short-term Moderate to Significant effect, followed by Long-term Not Significant effect

Key Receptor (Sensitivity)	Direct Effect (Collision Risk)	Indirect Effect (Barrier Effect)	Indirect Effect (Displacement)
Wigeon (Low)	Assuming avoidance, the annual number of predicted collisions is 0.01 birds, with an avoidance rate of 98.00%. This will result in a negligible effect on Wigeon.	Hötker et al., 2006 found evidence of a barrier effect for wigeon in one case.	Hötker et al., 2006 noted potential for displacement of wigeon, but also noted habituation to an operational wind far for wigeon in one case .
	Significance without Mitigation	**Significance without Mitigation**	**Significance without Mitigation**
	Percival (2003) Sensitivity Low; Magnitude Negligible; Very Low Significance **EPA (2022)** Long-term Imperceptible Effect	**Percival (2003)** Sensitivity Low; Magnitude Low; Very Low Significance **EPA (2022)** Long-term Not Significant Effect	**Percival (2003)** Sensitivity Low; Magnitude Medium; Low Significance **EPA (2022)** Long-term Not Significant to Slight Effect

Key Receptor (Sensitivity)	Direct Effect (Collision Risk)	Indirect Effect (Barrier Effect)	Indirect Effect (Displacement)
Woodcock (Medium)	Woodcock were typically observed in the 500m buffer around T08 where they were noted to be roding. The predicted collision risk is effectively zero due to absence of flight activity observed within potential collision height (PCH).	Home ranges are small with birds recorded flying up to 1km from nests sites to forage (Hoodless and Hirons 2007). No published evidence of barrier effect to migrating birds is available (Hötker et al., 2006).	There is potential for displacement arising from habitat alteration (turbine felling buffers) and from disturbance caused by operational turbines, and to a lesser extent occasional human presence associated with maintenance activities and recreational use. A study of the impacts of wind turbines on woodcock undertaken in Kilkenny (Gittings, 2019) indicated that 'a displacement effect may occur within 250m of wind turbines, although there are confounding factors that affect the interpretation of the results. The surveys did not find any evidence of a displacement effect extending over the 250-500m distance band'. The potential displacement within the 0-250m distance band is in line with the results of a similar study carried out in Germany (Dorka et al., 2014). Based on observed woodcock breeding display behaviour, the potential for this species to nest within 250m of the proposed T8 location must be considered. The potential for intra-species audibility of roding calls to be affected by noise from operational turbines must also be considered.

Key Receptor (Sensitivity)	Direct Effect (Collision Risk)	Indirect Effect (Barrier Effect)	Indirect Effect (Displacement)
			While displacement of nesting and roding birds could occur closer to proposed turbines located in wooded habitats, the availability of abundant displacement habitat in the local area reduces the magnitude of these effects. Disturbance/displacement of breeding birds at construction stage are of higher concern than operational disturbance/displacement. As such, a Low magnitude effect is predicted in this regard.
	Significance without Mitigation	**Significance without Mitigation**	**Significance without Mitigation**
	Percival (2003) Sensitivity Medium; Magnitude Negligible; Very Low Significance **EPA (2022)** Short-term, Imperceptible effect	**Percival (2003)** Sensitivity Medium; Magnitude Negligible; Very Low Significance **EPA (2022)** Short-term, Imperceptible effect	**Percival (2003)** Sensitivity Medium; Magnitude Medium; Low Significance **EPA (2022)** Long-term, Not Significant to Slight Effect

7.8.5 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 7-2.

7.8.6 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 were assessed as per Nature Scot guidance (NatureScot, 2025b) 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 20 km of the Proposed Development was conducted and available EIAs including Ornithology assessments were considered (Table 7-5). The planning search was conducted using the following sources:

- An Coimisiún Pleanála
- Tipperary County Council Planning Search
- Kilkenny County Council Planning Search
- Geohive datasets – Planning Application Sites
- EIA Portal

7.8.6.1 Wind Energy

One wind farm within 20 km is awaiting a planning decision, namely Brisklagh Wind Farm. A further four consented wind farms are also present within 20 km: Brittas Wind Farm, Borrisbeg Wind Farm, Knockroe Wind Farm and Kyleballyoughter Wind Farm. Within these consented wind farms, the one within the Nore catchment (Kyleballyoughter) has potential to contribute to in-combination effects on the River Nore SPA. A fifth consented wind farm, Farranrory, is currently under construction (with a 24 month construction programme) and as such there is no potential for construction of this wind farm to overlap with construction of the Proposed Development.

A further 11 operational wind farms are also present within 20 km of the proposed wind farm, as detailed in Table 7-5.

Table 7-17: Wind Energy Applications within 20 km of the Proposed Development

Development	Distance/Direction	Catchment	(No. of Turbines)	Current Status
Brisklagh Wind Farm ACP Ref. 322154	15 km E (T1); Grid connection overlaps part of proposed GC	Nore	7	Unconsented
Brittas Wind Farm ACP Ref. 321454	12 km NW (T4)	Suir	12	Consented
Borrisbeg Wind Farm ACP Ref. 318704	21 km NW (T1) – within 20km of site boundary.	Suir	10	Consented
Knockroe Wind Farm ACP Ref. 211502	14 km S (T11)	Suir	7	Consented
Farranrory Wind Farm TCC Ref. 20972; subsequently amended by TCC Ref. 2360803	10 km E (T6)	Nore	9	Consented - under construction
Farranrory Wind Farm Grid Connection KCC Ref. 21627; 2360248	Overlaps part of proposed GC	Nore	N/A	Consented
Kyleballyoughter Wind Farm KCC Ref. 16666; extension of duration KCC Ref.2433	13 km E (T1)	Nore	2	Consented
Lisheen Wind Farm 1 TCC Ref. 06/510773	11 km N (T1)	Suir	18	In Operation

Development	Distance/Direction	Catchment	(No. of Turbines)	Current Status
Lisheen Wind Farm 3 KCC Ref. 14//202, 15/629, 19/787, and 20/459. LCC Ref. 14/139 and 19/597. TCC Ref. 12/510275, 14/510138 and 15/6000924	13 km N (T1)	Suir & Nore	8	In Operation
Bruckana Wind Farm TCC Ref. 10/510118 and KCC Ref. 10/145	14 km N (T1)	Suir & Nore	14	In Operation
Lisdowney Wind Farm KCC Ref. 12/172	19 km NE (T1)	Nore	4	In Operation
Ballybay Wind Farm KCC Ref. 20281	9 km E (T1)	Nore	5	In Operation
Foyle/Foyleature Wind Farm KCC Ref. 1617	13 km E (T1)	Nore	4	In Operation
Knocknamuck/Cnoc Wind Farm TCC Ref. 09801 as extended by 15600723	8 km E (T1)	Nore	5	In Operation
Ballincurry Wind Farm TCC Ref. 13/231 and 15600561. ACP Ref. 243357 and 245874	5 km SE (T11)	Suir	2	In Operation
Gurteen Wind Farm TCC Ref. 09801 as extended by 15600723	4 km E (T6)	Suir	1	In Operation
Kill Hills Wind Farm TCC Ref. 06/1695 amended by TCC Ref. 12466	10 km SW (T11)	Suir	16	In Operation
Lisheen Wind Farm 2 TCC Ref. 09/510100	7 km N (T1)	Suir	12	In Operation

7.8.6.2 Assessment of Cumulative Effects (Wind Energy)

7.8.6.2.1 Construction Phase

Considering the turbines for all the wind farms assessed cumulatively are likely to be constructed in a phased approach because the ports can only accommodate a certain number of turbine imports at any given time, significant cumulative effects in terms of habitat loss or disturbance/displacement are not anticipated during construction.

Based on assessment of recent aerial imagery, none of the proposed/consented wind farms are located in areas containing suitable hen harrier roosting or breeding habitat. As such, no cumulative effects in this category are predicted.

There is potential for cumulative effects on water quality in the surrounding catchments from the construction phases for the wind farms listed above, prior to mitigation. Any potential effects in this category would be limited to species which utilise riverine habitats such as kingfisher, little egret, grey heron and duck species.

7.8.6.2.2 Operational Phase

Potential for cumulative effects associated with collision risk, disturbance/displacement and barrier effect arising from all wind farms within 20 km, both proposed/consented and operational have also been considered.

Due to the large distances separating these wind farms, in addition to the large distances separating individual turbines at wind farms, potential cumulative barrier effects are assessed as ***Long-term Imperceptible, Reversible*** for all species. Due to the absence of SPAs designated for waterbirds in the locality of the proposed wind farm and also the wider hinterland, potential cumulative disturbance/displacement effects are assessed as ***Long-term Imperceptible*** for this grouping.

Due to the large distances separating these wind farms, low susceptibility of commuting/hunting hen harrier to turbine collisions (predicted collision rate of 0.01 per year) and absence of suitable roosting or breeding habitat, no cumulative effects in terms of collision risk, barrier effect and disturbance/displacement are predicted for hen harrier.

Two raptor species, namely buzzard and kestrel, have relatively higher predicted annual collision rates, respectively 6.05 and 3.54. The associated population effects (Percival, 2003) are High at local level, but remain Negligible when evaluated against their respective national populations. As such, it is assessed that cumulative effects on these species are unlikely to exceed Low magnitude (***Long-term Not significant, Reversible***), assuming a highly conservative scenario where all existing and proposed wind farms within 20 km have the same collision rates as Littleton.

The predicted annual collision rate for peregrine is 0.46; this results in Negligible magnitude effects at national level and Low magnitude at local level. Similarly to buzzard and kestrel, cumulative effects on this species is unlikely to exceed Low magnitude (***Long-term Not significant, Reversible***).

After buzzard and kestrel, the next highest predicted annual collision rate is for mallard (1.68). The associated population effects (Percival, 2003) remain Negligible at all levels including national; as such, potential cumulative effects are assessed to be ***Long-term Imperceptible, Reversible*** for this species.

The predicted annual collision rate for curlew (0.09) results in a Negligible effect magnitude at national level and also for the local post-breeding passage population, and Low effect magnitude at the local level. However, due to the small population size and poor conservation status of the national curlew population, a single collision fatality must be considered to have the potential to result in a ***Long-term Very Significant*** effect. However, considering the absence of other breeding curlew pairs within 20 km, this potential effect does not fall within the category of cumulative effects. Curlew are unlikely to be subject to cumulative disturbance/displacement effects for the same reason.

The remainder of species assessed within the CRM have predicted annual collision rates of 0.55 or under, and all equate to Negligible effect magnitude at all population levels including national. As such, potential cumulative effects are assessed to be ***Long-term Imperceptible*** and ***Reversible*** for these species.

Snipe are likely to be subject to displacement and disturbance within the 500m turbine buffer during operation. There is potential for cumulative effects in this category to occur in conjunction with the existing Bruckana and Lisheen I wind farms to the north both of which are located within/adjacent to cutaway bogs which offer potentially suitable habitat for snipe. Considering the widespread availability of suitable displacement habitats occurring on bogs in the wider hinterland, potential cumulative effects are assessed to be ***Long-term Slight to Moderate*** and ***Reversible*** for snipe.

Similarly to snipe, woodcock could be subject to disturbance from operational turbines; however, due to the relatively lower levels of breeding activity recorded and widespread availability of suitable displacement habitats, potential cumulative effects in this category are assessed as being limited to ***Long-term Not significant Reversible*** for woodcock.

7.8.6.3 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 20 km 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.

7.8.6.4 Peatland Rehabilitation

Phase 1 rehabilitation measures including drain blocking and decommissioning of pumps have already been implemented for Littleton and Lanespark Bogs. Phase 1 rehabilitation works were completed in Littleton bog between 2018-2021, and have also been completed at Lanespark and Longfordpass. These measures included the blocking of drains which has resulted in the presence of areas of standing water within the Site. No enhanced rehabilitation measures are proposed by BnM for these bogs. Ongoing revegetation and associated monitoring are part of Phase 1 rehabilitation measures, although as noted above, measures to initiate rehabilitation have been completed.

The Phase 1 rehabilitation currently in progress is represented within the existing baseline, and as such is assessed in detail therein (see assessment of habitat effects in Chapter 6 Section 6.9 and ornithological assessments above in Sections 7.8.3 to 7.8.5). There will be localised effects arising from habitat loss and drainage as detailed in Chapter 6 Section 6.9; however, the proposed wind farm will not interfere with the rehabilitation plan or compromise re-wetting and revegetation/regeneration at the site scale. The proposed development footprint is limited (proposed infrastructure occupies c.1.9% of the Site; PDAs occupy c. 1.6%) and will result in localised effects only – it will not interfere with key drainage management requirements for rewetting and as such is compatible with rewetting at the site scale. It is noted that wind farm projects compatible with peatland rehabilitation have previously been delivered, e.g. Cloncreen, Derrinlough, Bruckana and Mountlucas.

Peatlands Climate Action Scheme (PCAS) measures are proposed to be implemented in Ballybeg, Derryvella, Killeen, Inch, and Bawnmore Bogs respectively (BnM, 2025a,b,c,d). PCAS is enhanced rehabilitation which focuses on optimising suitable hydrological conditions (stable water levels close to the surface) by blocking production field drains, re-profiling peat fields and forming low bunds and other wetland measures. These measures will contribute to accelerating of re-wetting, regeneration and restoration of carbon sequestration.

There is no potential for the proposed PCAS measures at Ballybeg and Derryvella Bogs to interact with construction of the proposed development since there is no effect pathway in this category. PCAS will focus on the bogs subject to these measures (located outside the site) and comprise measures to optimise suitable hydrological conditions as described above; as such there is no mechanism by which construction or decommissioning phase cumulative effects could occur.

There is potential for the increased areas of surface water at Ballybeg and Derryvella Bogs associated with PCAS to provide suitable habitat for bird species, potentially increasing bird activity at these bogs and altering activity patterns at the landscape scale. However, as noted in Section 7.8.1, increasing habitat opportunities and potential associated increases in variability and opportunism in how birds use the wider grouping of cutover bogs in the area is likely to occur in the 'do-nothing scenario'. The emerging trends and variability in habitat use which are predicted are unlikely to be significantly different from the existing baseline in which widespread and variable utilisation by birds of existing habitats at the site and across surrounding bogs already occurs. As such, a ***Long-term Not significant*** effect is predicted in this regard.

No other cumulative effects are predicted to arise in conjunction with enhanced rehabilitation (PCAS) measures implemented at the bogs outside the site (Ballybeg, Derryvella, Killeen, Inch, and Bawnmore).

7.8.6.5 Recreational Trail

Bord na Móna (BNM) recreational cycle and walkway - Bord na Móna (BNM) has proposed the construction of a recreational cycle and walkway to connect into the existing Loch Dhoire Bhile Loop which will include the repurposing of existing former rail bed, existing bog headlands / former high fields, and along pre-existing machine access routes (Tipperary County Council Planning Application: 2560154, appeal to ACP, with grant permission with revised conditions issued on 27/01/2026, ref PL92.323662). The cycle/walkway route is located within the Ballybeg-Lanespark-Derryvilla bog group and within the Black (Twomileborris) River catchment. In the event that construction of the proposed development overlapped with construction of the recreational cycle and walkway, cumulative effects associated with water quality changes and disturbance of bird species could potentially occur, prior to mitigation.

7.8.6.6 Afforestation

Afforestation application by BNM (CN90049) in 2022 – For the establishment of 203.39 hectares of native broadleaf woodland on industrial cutaway bog areas at Ballybeg and Lanespark. These bogs are within the Black (Twomileborris) River catchment. The afforestation works will be required to be carried out in accordance with the Department of Agriculture, Food & the Marine's (DAFM) Environmental Requirements for Afforestation (June 2024). These Environmental Requirements include the obligation "To create at the outset, a buffer of natural ground vegetation positioned between defined water features and the forest crop and associated operations, in order to protect water quality and aquatic ecosystems from possible sediment and nutrient runoff from the site at afforestation and throughout the remainder of the forest rotation". As such no impacts on the local watercourses are likely. The seeding and planting of native trees will stabilise exposed bogs, reduce wind and water erosion, and enhance biodiversity, which will have a positive effect on local watercourses.

This afforestation proposal would encourage the establishment of native woodland in drier areas of cutaway bog, and as such aligns with the existing emerging trends whereby scrub and immature woodland are establishing in drier areas of cutaway bog. The afforestation proposal would simply accelerate these trends and expand the extent of areas covered by wooded habitats more rapidly. No significant cumulative effects in conjunction with this proposal are anticipated.

7.8.6.7 Designated Sites

Potential cumulative effects on National sites are assessed to align with the **Long-term Imperceptible** level identified for the proposed wind farm.

The assessment of European sites is detailed within the accompanying NIS. The NIS concluded that, in the light of the conclusions of the assessment on the implications for the European sites concerned (River Nore SPA, Slievefelim to Silvermines Mountains SPA and Slieve Bloom Mountains SPA) that the proposed project will not adversely affect the integrity of any European site either individually or in combination with other plans or projects.

7.9 Mitigation Measures

7.9.1 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 and to avoid direct habitat loss or disturbance of primary areas used by waders and waterbirds.

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 habitat utilising natural gaps in existing vegetation to minimise vegetation and breeding habitat loss.

7.9.2 Mitigation Measures during the Construction Phase of the Project

7.9.2.1 Introduction

Construction of this project is expected to cause temporary (disturbance) adverse effects on local ecological receptors, as outlined in Section 7.8.3 above. The mitigation measures described below will reduce these effects significantly.

7.9.2.2 Project Ecologist/ ECoW

A Project Ecologist/Ecological Clerk of Works (ECoW) with appropriate experience and expertise (in implementing ecological mitigation measures 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.

7.9.2.3 Avifauna

1. The turbines will be constructed in a phased approach to limit areas of disturbance.

2. The removal of vegetation and scrub at the Site as well as trimming of trees along the TDR 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 NPWS (2025) guidance on hedgerow management.
3. Construction operations will take place primarily during the hours of daylight to minimise disturbances to roosting birds, or active nocturnal bird species. Limited operations generally consisting of but not limited to concrete pours, turbine erection and installation of the grid connection may occasionally require night-time operating hours; these works will be agreed with and supervised by the project ecologist/ECoW, with suitable additional mitigation also being implemented.
4. In the event that construction related disturbance to areas used by breeding waders and waterbirds (see Figure 7-7) cannot be avoided during breeding season, mobile visual screens will be put in place between the works and breeding wader/waterbird habitats in locations where existing vegetation is absent to minimise disturbance to birds within 500m.
5. 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).
6. 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).
7. A re-confirmatory pre-construction survey (March/April) will be conducted to assess any evidence of target species activity or occupation of new territories (e.g. in the case of breeding snipe and barn owl). 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). In the event of barn owl returning to the abandoned roost/nest site, an ECoW must be present to assess the potential for disturbance to the individuals. If barn owl are present, all construction works will be halted within 250m of the nest until breeding is complete.
8. 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. Turbines will be illuminated with medium intensity fixed red obstacle lights of 2000 candelas where required by the Irish Aviation Authority / Irish Air Corps. Lighting will be fitted with baffles to ensure that the light is directed skywards and will not be discernible from the ground.
9. Construction works within 500m of Derryhogan Lakes will occur outside the breeding season (March 1st to August 31st) due to the potential disturbance caused by construction noise disturbance and visual disturbance for curlew and other species utilising this area for breeding. Works in this area will be limited to daylight hours as these lakes are also important roosting habitats for wintering birds. A permanent 2m high berm will be installed along the alignment shown in Figure 7-7 during the non-breeding season in order to prevent noise and visual disturbance to curlew and other bird species breeding at Derryhogan Lakes. The embankments will be covered with turves/vegetation removed from the adjacent amenity trail/access track footprints. Site traffic will be permitted to travel on access tracks within 500m of Derryhogan lakes once the 2m berm is in place.
10. The construction compound adjacent to the Derryhogan Lakes is just under 500 m from the nearest significant breeding/roosting bog lake. The 2m berm will extend around the western boundaries of the construction compound to reduce the noise and visual disturbance to the key habitat area of Derryhogan Lakes.

11. Where construction works are required within 500m of Longfordpass Lakes and Bawnreagh Lakes in areas where existing vegetation screening is absent, mobile visual screening will be positioned to prevent visual disturbance to breeding and non-breeding birds utilising these areas. Disturbance from construction noise is anticipated to occur; however, this would be a low magnitude effect relative to potential effects from visual disturbance caused by human presence (presence of pedestrians) and birds are anticipated to acclimate to the presence of machinery and associated noise which will be similar to typical agricultural machinery noise or noise associated with historical peat harvesting operations.
12. Turbine T08 and the section of internal access track between T06 and T08 will not be constructed during the non-breeding season (September 1st to February 28th) in order to avoid effects on roosting hen harrier.
13. A bird hide constructed to RSPB specifications will be incorporated within the embankment protecting Derryhogan Lakes (see Figure 7-7).
14. Mammal fencing as per TII specification CC-SCD-00324 will be installed along all amenity trail and access track sections where barriers are required to prevent dogs and walkers from accessing key habitat areas for breeding birds (see Figure 7-7).
15. 2m high willow fence screening will be installed where access tracks and amenity trails are adjacent to key bird habitats to prevent visual disturbance arising from recreational use (see Figure 7-7).
16. Temporary screening will be installed along the northern access track west of the proposed substation in the areas indicated in Figure 7-7. Tree planting will also be provided outside the temporary screening. These measures will provide screening of existing gaps and prevent visual disturbance to Longfordpass Lakes from recreational users.
17. Signage will be installed to ensure recreational users understand the requirement to remain on the trails and maintain control over dogs near key bird habitats, and are aware of the location of these habitats.
18. The placement of barriers and hides has taken 'desire lines' into account, and the fencing and barriers have been designed to discourage recreational users from deviating from the trails in key areas.

7.9.2.4 Water Quality

Chapter 9- Water Quality and Hydrology prescribes best practice mitigation measures for the protection of the aquatic receiving environment during the construction phase. These measures will prevent indirect effects on bird species associated with the aquatic receiving environment.

7.9.3 Mitigation Measures during the Operation Phase of the Project

7.9.3.1 Standard Post-construction Avian Monitoring

A post construction monitoring programme will be implemented at Littleton 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 recommends the implementation of an agreed post-development monitoring programme as a key 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, 15, 20 and 30 post construction)- A comprehensive fatality monitoring programme will be undertaken following published best practice (Smallwood 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 (Smallwood 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, 15, 20 and 30 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, 15, 20 and 30 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)/NatureScot (2025a) guidance:
    a) 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.
    b) 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, 15, 20 and 30 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, 15, 20 and 30 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:
    a) Assess displacement levels (if any) of wildfowl such as swans post construction
    b) 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, 15, 20 and 30 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, 15, 20 and 30 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:
   a) 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, 15, 20 and 30 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, 15, 20 and 30 post construction to allow for annual variation and cumulative effects. Dependant on results further monitoring requirements will be agreed with NPWS.

7.9.3.2 Monitoring of Potential Recreational Effects & Adaptive Mitigation

Monitoring of potential recreational effects on breeding and wintering waders and waterbirds will be undertaken in each monitoring year (years 1, 2, 3, 5, 10, 15, 20 and 30 post construction) to monitor the effectiveness of mitigation measures and to identify any emerging patterns of disturbance and recreational user behaviour in order to inform adaptive mitigation.

Adaptive mitigation will include temporary/seasonal closure of trails to recreational users where evidence of significant disturbance to breeding waders/waterbirds is observed.

It will also include identification of areas and points where recreational users habitually stray towards breeding or wintering wader/waterbird habitats, which will trigger measures such as additional fencing and signage.

In parallel with the monitoring detailed above, annual breeding season surveys of breeding curlew using the site will be undertaken in all years during the operational phase, and will similarly feed back into the adaptive mitigation regime as required.

7.9.3.3 Predator Exclusion and Control

In order to mitigate potential population level effects on curlew arising from potential collisions, a number of measures to reduce predator pressure are proposed to offset potential effects and improve the conservation status and breeding success of the local breeding curlew population. These measures will also benefit other breeding wader and waterbird species.

7.9.3.3.1 Effect of Predator Pressure on Curlew Breeding Success

Predation of eggs and/or chicks is the most commonly identified cause of reduced productivity in waders. The most significant predator may vary between sites, but species such as red fox, American mink, and crow species are frequently identified as key meso-predators affecting wader productivity in an Irish context. A key factor in the abundance of meso-predators is known as ‘meso-predator release’, whereby these mid-sized predators which would usually inhabit the middle of the food chain are no longer kept in check by natural predators due to human-induced extinction of larger predators arising from habitat destruction, competition or direct persecution.

As such, in the absence of further human intervention, meso-predator populations can thrive and reach inflated levels where suitable conditions are present.

Nest productivity for curlew averages c. 4 eggs per pair (BTO, 2026); however, when predator pressure is high, the realised productivity or breeding success reduces, resulting in fewer or no fledglings per breeding pair. Colhoun et al. (2022) cite a study by Cook et al. (2021) which estimated the productivity of curlew pairs in Britain and Ireland is as low as 0.25 fledgelings per pair on average due to predator pressure. Cook et al. (2021) recommend that breeding productivity needs to be increased to 0.43 fledgelings per pair in order to stabilise declining curlew populations.

While it is evident that predator pressure has a drastic negative effect on curlew breeding success, the opposite can be true where effective predator control is implemented.

7.9.3.3.2 Effect of Predator Control on Breeding Success

Predation of eggs and chicks is widely recognised as the primary driver of low breeding productivity in waders, including Curlew, with key predators varying by site but often involving red foxes, corvids, stoats and large gulls (Berg 1992; Grant 1997; Grant et al. 1999; Valkama & Currie 1999; Brown et al., 2015).

Experimental work has shown that lethal predator control can substantially improve outcomes: on English moorland, reducing red fox and carrion crow numbers produced a more than threefold increase in Curlew breeding success and enabled annual population growth, whereas unmanaged sites saw only 15% of pairs fledge young (Fletcher et al. 2010). In contrast to lethal control, non-lethal methods such as habitat manipulation, nest exclosures and particularly predator exclusion fencing offer practical alternatives, especially for localised populations (Malpas et al., 2013).

Fencing can deter large mammalian predators either physically or through mild aversive stimuli and has been shown to increase avian hatching success by 92% (Smith et al. 2011), enhance overall wader productivity in farmland systems habitats (Rickenbach et al., 2011, Schifferli et al., 2009), and raise Lapwing fledging rates from unsustainable pre fence levels (~0.23 chicks/pair) to levels consistent with population stability (~0.79 chicks/pair) (Malpas et al., 2013) . Although the Malpas (2013) study focused on Lapwing, similar predation pressures on other waders, including Curlew, suggest they too are likely to benefit from exclusion fencing where mammalian predation is a limiting factor.

Other measures including vegetation and water level management are also noted to be useful actions which can make conditions less favourable for predators (BnM, 2026).

7.9.3.3.3 Proposed Enhancement Measures

The primary measure proposed to reduce predator pressure on breeding curlew (and other breeding waders and waterbirds) is the installation of permanent predator fencing around Derryhogan Lakes. The fencing will be incorporated into the alignment of the barrier to prevent recreational user and dog access along proposed tracks and trails, and will also extend around the northern and western margins, fully encircling the wetland mosaic at Derryhogan Lakes (See Figure 7-7).

In addition, mink and crow trapping will be regularly undertaken in this area.

Management of scrub and other long vegetation will be undertaken in the areas within and adjoining Derryhogan Lakes. This will reduce perching opportunities and cover for predators, and prevent scrub from encroaching the predator fencing.

Collectively, these measures will contribute to reduced predator pressure and are likely to result in stabilisation, and over the longer term, growth of the local breeding population. If realised, improvements in the conservation status of the local population would lead to increased resilience, and would contribute to offsetting any potential population level effects associated with collision mortality during the operational phase.

7.9.3.4 Water Quality

Chapter 9- Water Quality and Hydrology prescribes best practice mitigation measures for the protection of the aquatic receiving environment during the operational phase. These measures will prevent indirect effects on bird species associated with the aquatic receiving environment.

7.9.4 Mitigation Measures during the Decommissioning Phase of the Project

The same mitigation measures will apply for the decommissioning phase as for the construction phase.

Turbine foundations and hardstands will be left in place and covered with local soil/topsoil to revegetate at decommissioning stage. It is considered that leaving the turbine foundations, access tracks and hardstand areas in-situ will cause less environmental damage than removing them. Grid connection infrastructure including the on-site substation and ancillary electrical equipment shall form part of the national grid and will be left in situ (as outlined in Chapter 4 – Project Description).

Decommissioning operations will take place during the hours of daylight to minimise disturbances to roosting birds, or active nocturnal bird species. This 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. & Langston, R. H., 2006). Turbines components will be broken up onsite prior to removal, and as such vegetation trimming requirements to facilitate turbine removal will be minimal (reduced in comparison to construction stage) or not required.

Toolbox talks shall be held with construction staff on disturbance to key species during decommissioning. This will help minimise disturbance. Any re-instated habitats will include native species where possible to enhance diversity of birds.

Turbine T08 and the section of internal access track between T06 and T08 will not be decommissioned during the non-breeding season (September 1st to February 28th). This will avoid effects during the non-breeding season on roosting hen harrier.

7.10 Residual Effects on Avifauna

Following the implementation of construction and decommissioning phase mitigation, no significant negative effects will remain for avifauna. As noted in Section 7.9.2, disturbance from construction noise is anticipated to occur. However, this would be a low magnitude effect relative to potential visual effects from human presence (which have been avoided/reduced through mitigation) and birds are anticipated to acclimate to the presence of machinery and associated noise which will be similar to typical agricultural machinery noise or noise associated with historical peat harvesting operations. As such, there will be a **Short-term Slight** residual effect in terms of disturbance from construction noise.

Regarding the operational phase, the following residual effects have been identified;

While the predicted collision rate is relatively low (0.03 per year/one every 33.33 years based on local population flight activity only, and 0.08 per year/one every 12.5 years based on all observed curlew activity), potential for residual effects remains for curlew due to their poor conservation status and vulnerability of the population arising in large part due to limited recruitment to the breeding adult cohort caused by predation pressure which is considered applicable across all population levels. Since only a single pair is present at Littleton (and within the wider region), potential loss of one breeding adult from the local population through collision could result in loss of the local breeding population. The implementation of measures to reduce predator pressure on the local curlew population will reduce the potential for loss of a breeding adult to result in loss of the local breeding population by increasing breeding success and recruitment to the breeding adult cohort.

With the implementation of measures to reduce predator pressure, potential population-level effects will be offset, resulting in **Long-term Moderate** residual effects at the scale of the local breeding population, and **Long-term Slight** effects at the scale of the transient post-breeding and national populations.

It is noted that nationwide conservation efforts are underway to reverse the decline of curlew, which, if successful, would reduce the vulnerability and therefore residual effect significance over the lifetime of the proposed development. However, general improvements in the conservation status of the national breeding curlew population have not yet been realised and as such the assessment must adhere to current baseline conditions.

For snipe, operational disturbance arising from recreational use will be reduced to a **Long-term Moderate** effect through the implementation of mitigation. Disturbance/displacement caused by operational turbines (**Long-term Significant**) is more difficult to mitigate; however, the realised effect is likely to be lower (i.e. **Moderate**) due to the abundance of suitable habitat for breeding snipe present further from the proposed development within the surrounding cutaway bog complex.

A **Short-term Moderate to Significant** effect arising from operational displacement of whooper swan was identified; however, this will reduce to a **Long-term Not Significant** effect during the operational phase with habituation.

It is noted that habituation over the lifetime of the Proposed Wind Farm is likely to reduce the magnitude of all of the above residual operational effects identified. A comprehensive operational monitoring regime is proposed to ensure that any changes to the baseline environment during operation can be identified, allowing for the implementation of mitigation measures if required.

Residual effects associated with the Proposed Grid Connection and Proposed TDR are assessed as **Long-term Imperceptible.**

7.11 Enhancement Measures

7.11.1 Nest Boxes

One barn owl nest box and one kestrel nest box will be installed on suitable trees in the north-eastern part of the BEMP area under ecological supervision. These can be installed on poles if suitable trees are not available.

These nest boxes will be maintained and replaced as required during the lifespan of the wind farm. Any maintenance work may only be carried out from October to February inclusive under the supervision of a qualified ecologist to ensure nesting season is avoided.

Nest boxes for these species are commercially available or can alternatively be constructed onsite. Plans for barn owl and kestrel boxes are included in the BEMP (see Volume III Appendix 6.1).

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