7. ORNITHOLOGY

7.1 Introduction

This chapter assesses the likely significant effects that the Coole Wind Farm Development (the 'Proposed Development') may have on avian receptors. Particular attention has been paid to species of ornithological importance. These include species with national and international protection under the Wildlife Acts 1979-2012 and the EU Birds Directive2009/147/EC among other relevant legislation. Where potential effects are identified, mitigation is described and residual impacts on avian receptors are assessed.

This chapter is supported by Technical Appendices 7-1 to 7-4, which contain data from the surveys undertaken including full details of the survey times, weather conditions, and other relevant information together with the bird records themselves. Appendix 7-5 contains the CRA document which illustrates how the Collision Risk Modelling was undertaken for this Site. Appendix 7-6 contains the Bird Monitoring Programme. The Proposed Development, core EIAR Site boundary and areas surveyed are provided in Figures 7-1 to 7-5.

The chapter is structured as follows:

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

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

- "Zones of Influence" (ZOI) for individual ornithological receptors refers to the zone within which potential effects are anticipated ZOIs were assigned following best available guidance (SNH 2016 and McGuinness et.al 2015).
- "Key Ornithological Receptor" (KOR) is defined as a species occurring within the zone of influence of the development upon which likely significant effects are anticipated and assessed.
- "Proposed Development area" is defined as everything within the EIAR site boundary, including turbines, borrow pits, cable route and all other associated infrastructures.
- "Wind farm site" or "Site" are defined as the Proposed Development area and all associated infrastructure with the exception of the underground cable route south of the Site.

7.1.1 Description of the Proposed Development

A full description of the Proposed Development is included in Chapter 4 of this EIAR. The application is seeking a10-year planning permission, that is that the planning consent would remain valid for 10 years following a final grant of planning permission. The Proposed Development will have an operational life of 30 years from the date of commissioning of the wind farm.

7.1.2 Legislation, Guidance and Policy Context

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

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

- Irish Wildlife Acts 1976 to 2012 as amended.
- The European Communities (Birds and Natural Habitats) Regulations 2011 (transposes EU Birds Directive2009/147/EC and EU Habitats Directive 2009/147/EC, 92/43/EC).
- The International Convention on Wetlands of International Importance 1971.

In the absence of specific National Irish Ornithological Survey Guidance, the guidance documents published by Scottish Natural Heritage (SNH) have been followed to inform this assessment:

- SNH (2017). *Recommended bird survey methods to inform impact assessment of onshore wind farms.* Scottish Natural Heritage.
- SNH (2018) *Avoidance rate information & guidance note: Use of avoidance rates in the SNH wind farm collision risk model.* Scottish Natural Heritage, Edinburgh, UK. http://www.snh.gov.uk/docs/B721137.pdf.
- SNH (2016). *Assessing Connectivity with Special Protection Areas (SPAs).* Scottish Natural Heritage.
- SNH (2012). *Assessing the Cumulative Impact of Onshore Wind Energy Developments.* Scottish Natural Heritage.
- SNH (2006). *Assessing Significance of Impacts from Onshore Windfarms on Birds Outwith Designated Sites.* Scottish Natural Heritage.
- SNH (2009). *Monitoring the impact of onshore wind farms on birds.* Scottish Natural Heritage.
- SNH (2000). *Wind farms and birds: calculating a theoretical collision risk assuming no avoidance action.* SNH Guidance Note.

The following Irish Guidance documents were also consulted:

- Percival, S.M. (2003). *Birds and wind farms in Ireland: A review of potential issues and impact assessment.* Ecological Consulting.
- McGuinness, D., Muldoon, C., Tierney, N., Cummins, S., Murray, A., Egan, S. & Crowe, O. (2015). *Bird Sensitivity Mapping for Wind Energy Developments and Associated Infrastructure in the Republic of Ireland.* Guidance Document. Birdwatch Ireland.
- Birds of Conservation Concern in Ireland 2014-2019 (Colhoun, K. and Cummins, S. 2013).

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

- Planning and Development Acts 2000 – 2019.

- Westmeath County Development Plan 2014-2020, Longford County Development Plan 2015-2021.
- EPA (2017). *Draft revised guidelines on the information to be contained in Environmental Impact Statements.* Environmental Protection Agency.
- EPA (2015) 'Revised Guidelines on the Information to be contained in Environmental Impact Statements – Draft September 2015'
- EPA (2015) 'Advice Notes for Preparing Environmental Impact Statements – Draft September 2015'.
- EPA (2003). *Advice notes on current practice (in the preparation of Environmental Impact Statements* (where relevant).
- EPA (2002). *Guidelines on the information to be contained in Environmental Impact* DoEHLG (2013). *Guidelines for Planning Authorities and An Bord Pleanála on Carrying out Environmental Impact Assessment.* Department of the Environment, Community and Local Government (where relevant).
- European Commission (2011). *Wind energy development and Natura 2000.* Guidance document.
- *Statements.* Environmental Protection Agency (where relevant).
- NRA (2009). *Guidelines for Assessment of Ecological Impacts of National Road Schemes (Revision 2).* National Roads Authority.
- European Commission (2002). *Assessment of plans and projects significantly affecting Natura 2000 sites.*
- European Commission (2017). Environmental Impacts Assessment of Projects. Guidance on the preparation of the Environmental Impact Assessment Report.
- CIEEM (2017) Guideline for Ecological Report Writing

7.1.3 Statement of Authority and Competence

This ornithology chapter has been prepared by Ms. Margaux Pierrel (BSc. MSc., Eng.), Ecologist/Ornithologist, of McCarthy Keville O'Sullivan Ltd. (MKO). The chapter has been reviewed by Mr. Padraig Cregg (BSc., MSc.), Senior Ornithologist who has over eight years' experience in field surveying, management and ecological assessment. Both are suitably qualified, competent, professional ecologists with extensive experience of completing avifaunal assessments and are competent experts for the purposes of the preparation of this EIAR.

The scope of works and survey methodology was devised by Senior Ornithologist, Mr. Alex Ash (BSc.) and is fully compliant with recent SNH guidance. Field surveys were undertaken by John Carey, Lee Dark (BSc. MSc.), Eric Dempsey (BSc.), Declan Manley (BSc.), Patrick Manley (BSc.), Andrew O'Donoghue (BSc.) and Paul Troake (BSc.). All of the above surveyors are competent experts in the field of ornithology.

7.2 Assessment Approach and Methodology

7.2.1 Desk Study

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

- Review of online web-mappers: National Parks and Wildlife Service (NPWS), National Biodiversity Data Centre (NBDC), Irish Wetland Bird Survey I-WeBS.
- Review of Bird Atlases: (Sharrock, 1976; Lack, 1986; Gibbons et al., 1993; Balmer et al., 2013).
- Review of Birds of Conservation Concern (BoCCI) in Ireland 2014-2019 (Colhoun & Cummins, 2013).

- Review of specially requested records from the NPWS Rare and Protected Species Database.
- Review of impact assessments associated with nearby developments including wind farms.

7.2.2 Consultation

7.2.2.1 Scoping and Consultation

Consultation was undertaken with the relevant statutory and non-statutory organisations as part of the EIAR scoping to inform the current assessment. Full details can be found in Section 2.5 of Chapter 2.

Table 7-1 provides a list of the organisations consulted with regard to ornithology during the scoping process and notes where scoping responses were received.

Copies of all scoping responses are included in Appendix 2-1 of this EIAR. The recommendations of the consultees have informed the EIAR preparation process and the contents of this chapter. Table 2-3 in Chapter 2 of this EIAR describes where the comments raised in the scoping responses received have been addressed in this assessment.

Table 7-1 Consultation Responses

	Consultee	Response
01	An Taisce	No response received to date
02	BirdWatch Ireland	No response received to date
03	Department of Agriculture, Food and the Marine	Response Received on 5th November 2020
04	Department of Culture, Heritage, and the Gaeltacht	No response received to date
05	Irish Peatland Conservation Council	No response received to date
06	Irish Red Grouse Association	No response received to date
07	Irish Raptor Study Group	No response received to date
08	Irish Wildlife Trust	No response received to date
09	Longford County Council	No response received to date
10	Meath County Council	Response received 25th September 2020
11	National Parks and Wildlife Service	Response received on 2nd of November 2020
12	Westmeath County Council	No response received to date

7.2.3 Identification of Target Species and Key Ornithological Receptors

This section of the report describes the criteria used for the selection of target species. The methodology for assessment followed a precautionary screening approach with regard to the identification of Key Ornithological Receptors. Following a comprehensive desk study, initial site visits and consultation, a list of "Target species" potentially susceptible to impacts from this type of development and likely to occur in the zone of influence of the Proposed Development was derived. The observation/survey work carried out on the Site was specifically designed to survey for these identified target species in accordance with SNH guidance (2017). The target species list (Appendix 7-1) was drawn from:

- Annex I of the EU Birds Directive.
- Special Conservation Interests (SCI) of Special Protection Areas (SPA) within the zone of likely significant effects.
- Red and Amber-listed birds of Conservation Concern.
- Species protected under the fourth schedule of the Wildlife Acts 1976-2017.

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

7.2.4 Field Surveys

Field surveys were undertaken during two survey periods: April 2015 – March 2017 and April 2018 - March 2020. The data provided in this report is robust and allows clear, precise and definitive conclusions to be made on the avian receptors identified within the subject site. Field survey methodologies have been devised to survey for the bird species composition and assemblages that occur within the study area. The study area varied with the target species and type of survey.

7.2.4.1 Initial Site Assessment

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

7.2.4.2 Survey Methodologies

The survey work undertaken between October 2015 and September 2017 and April 2018 and March 2020 forms the core dataset for the assessment of effects on ornithology. Separate sections to distinguish the two sets of surveys are clearly distinguished in this assessment.

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

The various survey types undertaken are described below.

7.2.4.2.1 *Vantage Point Surveys*

Flight activity data was collected from three vantage point locations (VPs 3, 4 and 5) (see Figure 7-1) to inform a collision risk analysis and identify areas of ornithological importance within the wind farm site. The southern and eastern sections of the Site were surveyed between 2018 and 2020. While the

northern section of the Site was surveyed before this, between 2015 and 2017. In total three fixed vantage points (VP3, VP5 in 2018-2020 and VP3, VP4 in 2015-2017) were required to provide adequate coverage of the proposed turbine layout. Further details are provided below.

Survey work 2018-2020

Vantage point surveys were undertaken in accordance with SNH guidance from April 2018 to March 2020. Surveys were conducted monthly throughout this survey period from four fixed vantage points (VP1, VP2, VP3 and VP5) to allow comprehensive coverage of a larger study area. The vantage point locations were selected by undertaking a viewshed analysis, as described below, and confirmed by a recce visit and initial field surveys in April 2018. Following a contraction of the Proposed Development area and turbine layout, only two of these four VPs have view sheds that overlap with the proposed turbine layout: VP3 and VP5.

Survey work 2015-2017

Vantage point surveys were previously undertaken to SNH guidance between October 2015 and September 2017. Surveys were conducted monthly throughout this survey period from two fixed vantage points (VP3 and VP4). Vantage point 4 provides coverage of the northern section of the wind farm site.

Figure 7-1 shows the locations of all vantage points relative to the development Site.

Viewshed Analysis

Viewshed analysis was carried out to show the coverage of the study area from three fixed vantage point locations (i.e. VPs 3, 4 and 5). Viewsheds were calculated using Resoft Wind Farm ZTV (Zone of Theoretical Visibility) software in combination with Mapinfo Professional (Version 10.0) using a notional layer suspended at 20 metres, which is representative of the minimum height considered for the Potential Collision Risk Area based on a worst-case scenario turbine model. While the relevance of being able to view as much of the site to ground level is acknowledged, the SNH guidance emphasizes the importance of visibility of the 'collision risk volume' when the data is to be used to estimate the risk of collisions with turbines by birds.

The viewshed analysis involved testing each VP location for its visibility coverage by creating a viewshed point 1.5 meters in height (to represent the height of observer) on a map using 10 metre contours terrain data. The relative height of forestry and its effects on visibility is also accounted for in the analysis. Using the ZTV software, a viewshed of 360 degrees was produced calculating an area 20 metres from ground level up to a 2km radius. The resulting viewshed image was then cropped to 180 degrees to give the viewshed from each VP location in line with SNH (2017). A 500m buffer was applied to the outer most turbines of the Proposed Development in line with SNH (2017). The aim of the viewshed analysis is to establish whether the selected vantage points offer adequate coverage of the proposed turbine layout. The visible area within the view sheds at 20m are provided in Figures 7-2, 7-2-1, 7-2-2 and 7-2-3.

Vantage points should provide the best views of potential turbine locations. Although there is a small gap in the view shed, as detailed in Figure 7-2, the coverage of the site in general is considered adequate to inform the collision risk analysis, i.e. the Band Model (2007) presumes random movement of target species within the view shed, therefore given sufficient coverage of the site, the Band Model can account for gaps in the view shed.

Data Recording and Digitisation

Data on bird observations and flight activity was collected from a scanning arc of 180° and a 2km radius by an observer at each fixed location for six hours per month. Surveys were scheduled to provide a spread over the full daylight period including dawn and dusk watches to coincide with the highest peaks of bird activity. Target species were as listed in Appendix 7-1, Table 1-1.

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

Table 7-2 Vantage Point Survey Effort

Survey Season	Months	Minimum Effort per VP
2015/2016 Non-Breeding Season (VP3, VP4)	Oct - Mar	36 hours/VP
2016 Breeding Season (VP3, VP4)	Apr - Sep	36 hours/VP
2016/2017 Non-Breeding Season (VP3, VP4)	Oct - Mar	36 hours/VP
2017 Breeding Season (VP3, VP4)	Apr - Sep	36 hours/VP
2018 Breeding Season (VP3, VP5)	Apr - Sep	36 hours/VP
2018/2019 Non-Breeding Season (VP3, VP5)	Oct - Mar	36 hours/VP
2019 Breeding Season (VP3, VP5)	Apr - Sep	36 hours/VP
2019/2020 Non-Breeding Season (VP3, VP5)	Oct - Mar	36 hours/VP

Observed flight activity was recorded as per defined flight bands which were chosen in relation to the dimensions of potential turbine models for the Site. Bands were split into 0-10m, 10-25m, 25m-175m and >175m. All recorded flight activity within the height bands 10-25m and 25-175m is considered to be within the Potential Collision Height (PCH) with regard to the rotor swept area, based on a worst-case scenario rotor swept area.

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

7.2.4.2.2 *Breeding Bird Surveys (Adapted Brown & Shepherd Survey)*

Breeding walkover surveys were undertaken to determine the presence of bird species of high conservation concern and identify areas of possible, probable or confirmed breeding territories within the study area. The survey methodology followed the adapted Brown and Shepherd method as outlined in Gilbert et al. (1998) and SNH (2017) ('adapted Brown and Shepherd surveys').

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

Walkover surveys were carried out between daylight hours during the core breeding season months between April and June/July (in 2016, 2017, 2018 and 2019). The timing of visits followed the recommendations of Calladine et al. (2009). Following all survey visits, the field maps were analysed to

determine the number and location of breeding territories. All non-breeding individuals and species encountered were also recorded.

Survey effort is presented in Appendix 7-2, Table 1-2. This includes full details of dates, times, survey locations, survey duration and weather conditions for each survey. Figure 7-3 shows the area surveyed.

7.2.4.2.3 Breeding Raptor Surveys

Breeding raptor surveys (i.e. birds of prey and owls) were undertaken within the study area and its immediate surrounds. Survey methodology was as outlined in Hardey et al. (2013), as per SNH (2017) recommendations. The aim of these surveys was to identify occupied territories and monitor their breeding success within the study area. Raptor surveys were undertaken onsite and to a 2km radius from the planning/development boundary, in the form of short VP watches and walked transects. These surveys were undertaken on a monthly basis during the core breeding season period (April to July, in 2016, 2017, 2018 & 2019). All areas of suitable habitat within 2km of the Site boundary were surveyed for the presence of raptor species.

Survey effort details are provided in Appendix 7-2, Table 1-3. Figure 7-4 shows the areas surveyed.

7.2.4.2.4 Winter Transect Surveys

Winter transect surveys were undertaken to record the presence of bird species of high conservation concern within areas of potential suitable habitat in the study area and within 500m of same.

Transect routes, devised to ensure coverage of different habitat complexes, were visited within the study area during winter months. Methodology was broadly based on adapted Brown and Shepherd methods. Target species included raptors, waterbirds, gulls and ground birds of conservation interest. Along with target species, all additional species observed were recorded to inform the evaluation of supporting habitat.

Survey effort, including details of survey duration and weather condition, is presented in Appendix 7-2, Table 1-4. Figure 7-5 shows the surveyed area.

7.2.4.2.5 Waterfowl Surveys

Significant wetland sites and waterbodies within five kilometres of the study area were surveyed for waterbird populations during the 2018/19 and 2019/20 migratory/winter seasons. The area surveyed exceeded the requirements of SNH (SNH, 2017), i.e., 500m for foraging wildfowl and one kilometre for roosting wildfowl. In addition, the Lough Iron waterbird population situated approximately 12.8km to the south-west of the Proposed Development Site was monitored one day per month during the same period, with a particular focus on Greenland white-fronted goose. The count methodology was in line with survey guidelines issued by SNH (2017) and BirdWatch Ireland (2015). Counts were undertaken during daylight hours from suitable vantage points at the wetland sites.

Survey effort, including details of survey duration and weather condition, is presented in Appendix 7-2, Table 1-5. Figure 7-5 shows the surveyed area.

7.2.4.2.6 Breeding Woodcock Surveys

Breeding woodcock surveys were undertaken in accordance with Gilbert et al. (1998). Survey visits were undertaken in June 2016 and June 2017. The survey area extended 500m beyond the Site boundary and was focused in areas of suitable habitat. Surveys commenced one hour before sunset and continued for one hour after sunset or until it was too dark to see. Transects were slowly walked through areas of suitable woodland habitat onsite and to a 500m radius of the development area. All observations of woodcock (as well as the areas covered) are recorded on to a map. The aim of the survey was to record the presence of roding (displaying) male woodcock and thereby establish the

distribution and abundance of the species in the study area. This survey method also allowed the observer to survey for owls, i.e. barn owls and long-eared owls.

Survey effort is presented in Appendix 7-2, Table 1-6. This includes full details of dates, times, survey locations, survey duration and weather conditions for each survey. Figure 7-6 shows the transect routes surveyed.

7.2.4.2.7 *Grid Connection Route*

Ornithological surveys were conducted as part of the multidisciplinary surveys along the proposed grid connection route carried out by MKO in 2017, 2019 and 2020. These surveys were undertaken in addition to the dedicated bird surveys carried out between 2015 and 2017 as part of the permitted Coole Wind Farm. The grid connection works will be confined to the existing road corridor, conifer plantation and Mullingar substation.

Map Legend

- EIAR Site Boundary
- Turbine Location
- 500m Buffer of Turbine Location
- Vantage Point Location

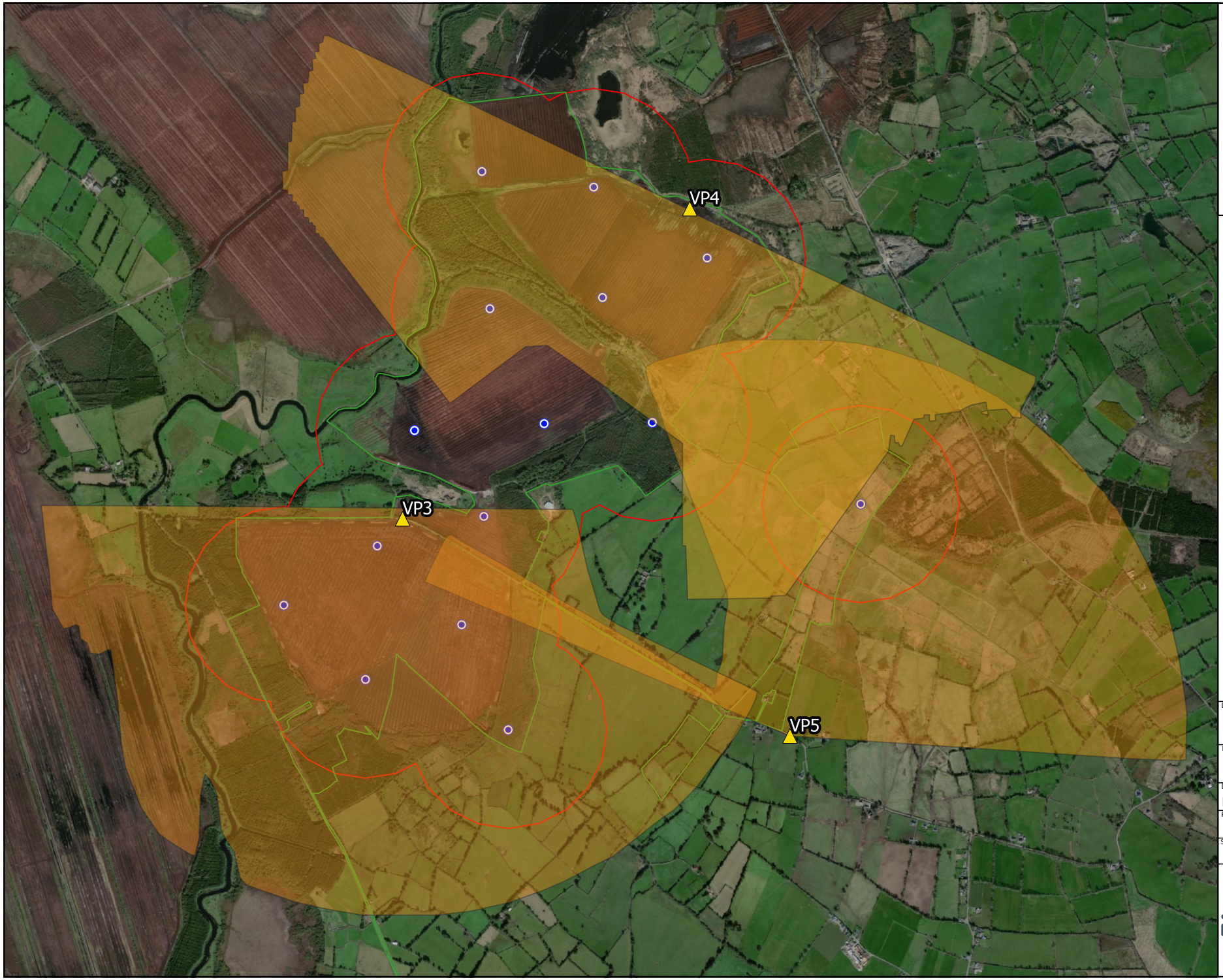
N

Drawing Title
Vantage Point Survey Locations

Project Title
Coole Wind Farm

Drawn By	Checked By
Margaux Pierrel	Padraig Cregg
Project No.	Drawing No.
200445	Fig 7-1
Scale	Date
1:25000	25.01.2021

MKO
Planning and Environmental Consultants
Tuam Road, Galway
Ireland, H91 VW84
+353 (0) 91 735611
email:info@mkoireland.ie
Website: ww.mkoireland.ie



Map Legend

- EIAR Site Boundary
- Turbine Location
- 500m Buffer of Turbine Location
- Vantage Point Location
- Viewshed Coverage

N

Drawing Title

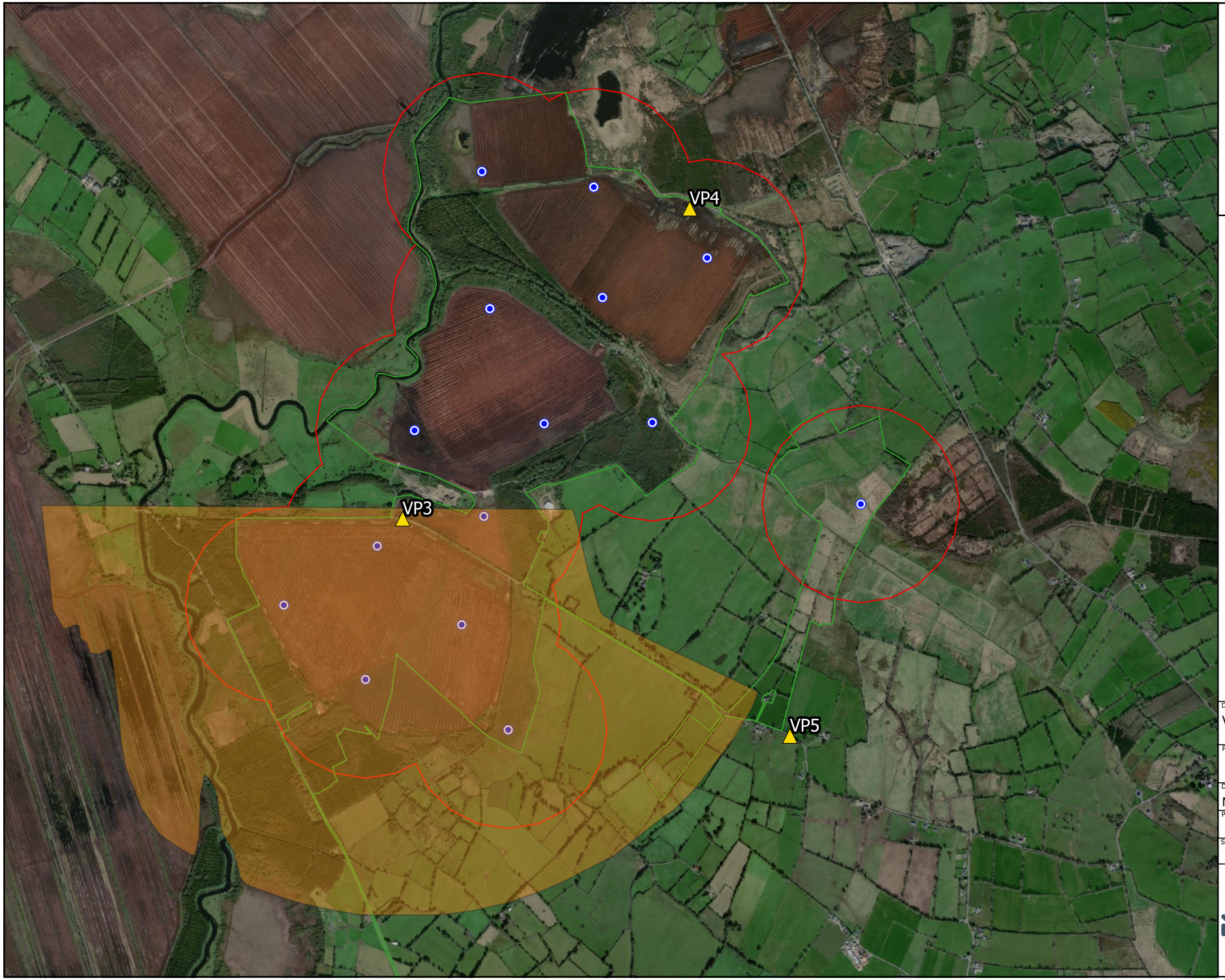
Viewshed Analysis Coverage at 20m

Project Title

Coole Wind Farm

Drawn By	Checked By
Margaux Pierrel	Padraig Cregg
Project No.	Drawing No.
200445	Fig 7-2
Scale	Date
1:25000	11.03.2021

MKO
Planning and Environmental Consultants
Tuam Road, Galway
Ireland, H91 VW84
+353 (0) 91 735611
email:info@mkoireland.ie
Website: ww.mkoireland.ie



Map Legend

- EIAR Site Boundary
- Turbine Location
- 500m Buffer of Turbine Location
- Vantage Point Location
- Viewshed Coverage

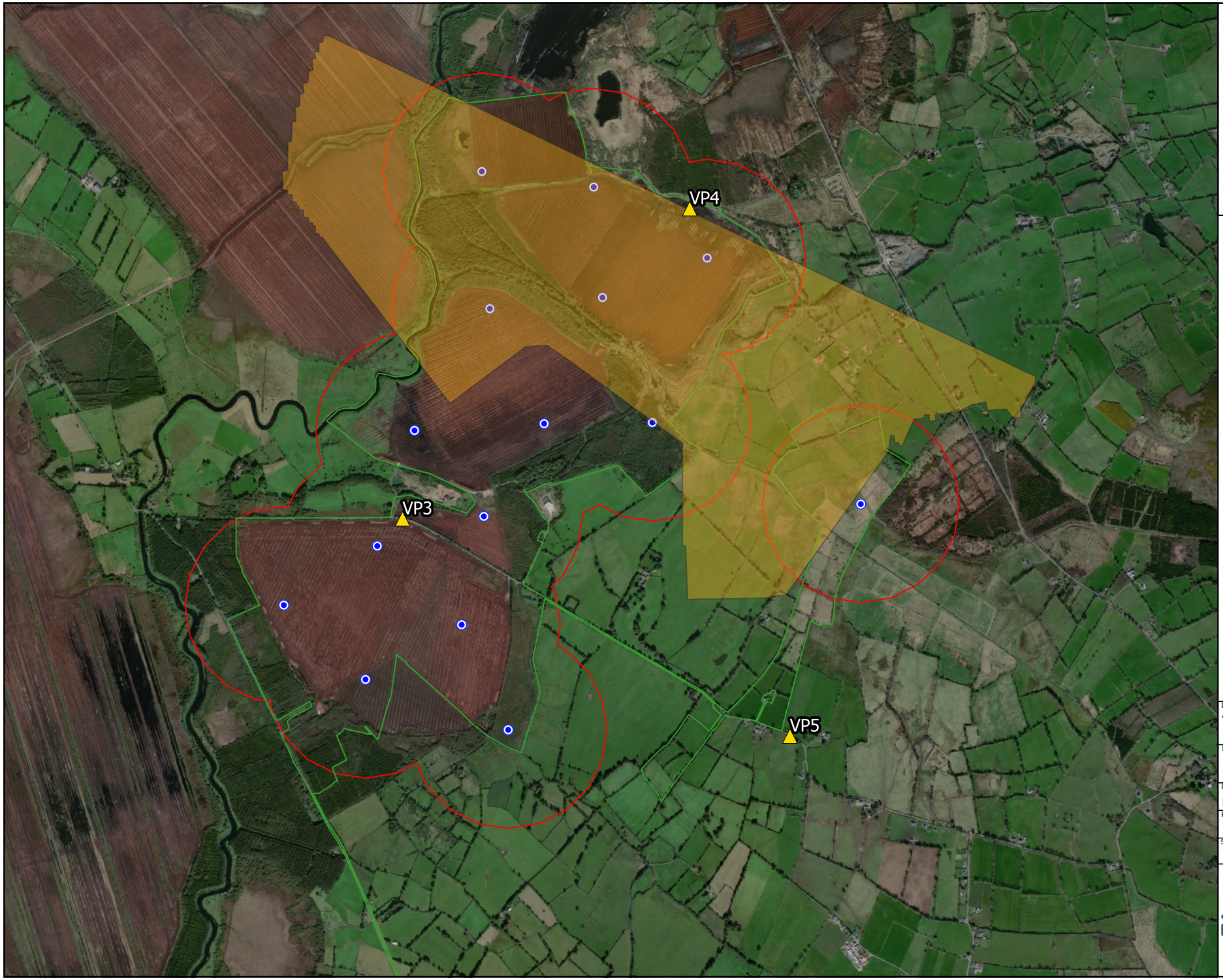
N

Drawing Title
VP3 Viewshed Analysis Coverage at 20m

Project Title
Coole Wind Farm

Drawn By	Checked By
Margaux Pierrel	Padraig Cregg
Project No.	Drawing No.
200445	Fig 7-2-1
Scale	Date
1:25000	11.03.2021

MKO
Planning and Environmental Consultants
Tuam Road, Galway
Ireland, H91 VW84
+353 (0) 91 735611
email:info@mkoireland.ie
Website: ww.mkoireland.ie



Map Legend

- EIAR Site Boundary
- Turbine Location
- 500m Buffer of Turbine Location
- Vantage Point Location
- Viewshed Coverage

N

Drawing Title

VP4 Viewshed Analysis Coverage at 20m

Project Title

Coole Wind Farm

Drawn By	Checked By
Margaux Pierrel	Padraig Cregg
Project No.	Drawing No.
200445	Fig 7-2-2
Scale	Date
1:25000	11.03.2021

MKO
Planning and Environmental Consultants
Tuam Road, Galway
Ireland, H91 VW84
+353 (0) 91 735611
email:info@mkoireland.ie
Website: ww.mkoireland.ie

Map Legend

- EIAR Site Boundary
- Turbine Location
- 500m Buffer of Turbine Location
- Vantage Point Location
- Viewshed Coverage

N

Drawing Title

VP5 Viewshed Analysis Coverage at 20m

Project Title

Coole Wind Farm

Drawn By	Checked By
Margaux Pierrel	Padraig Cregg
Project No.	Drawing No.
200445	Fig 7-2-3
Scale	Date
1:25000	11.03.2021

MKO
Planning and Environmental Consultants
Tuam Road, Galway
Ireland, H91 VW84
+353 (0) 91 735611
email:info@mkoireland.ie
Website: ww.mkoireland.ie

Map Legend

- EIAR Site Boundary
- 500m Survey Radius (2015/17)
- 500m Survey Radius (2018/20)
- Turbine Location

N

Drawing Title

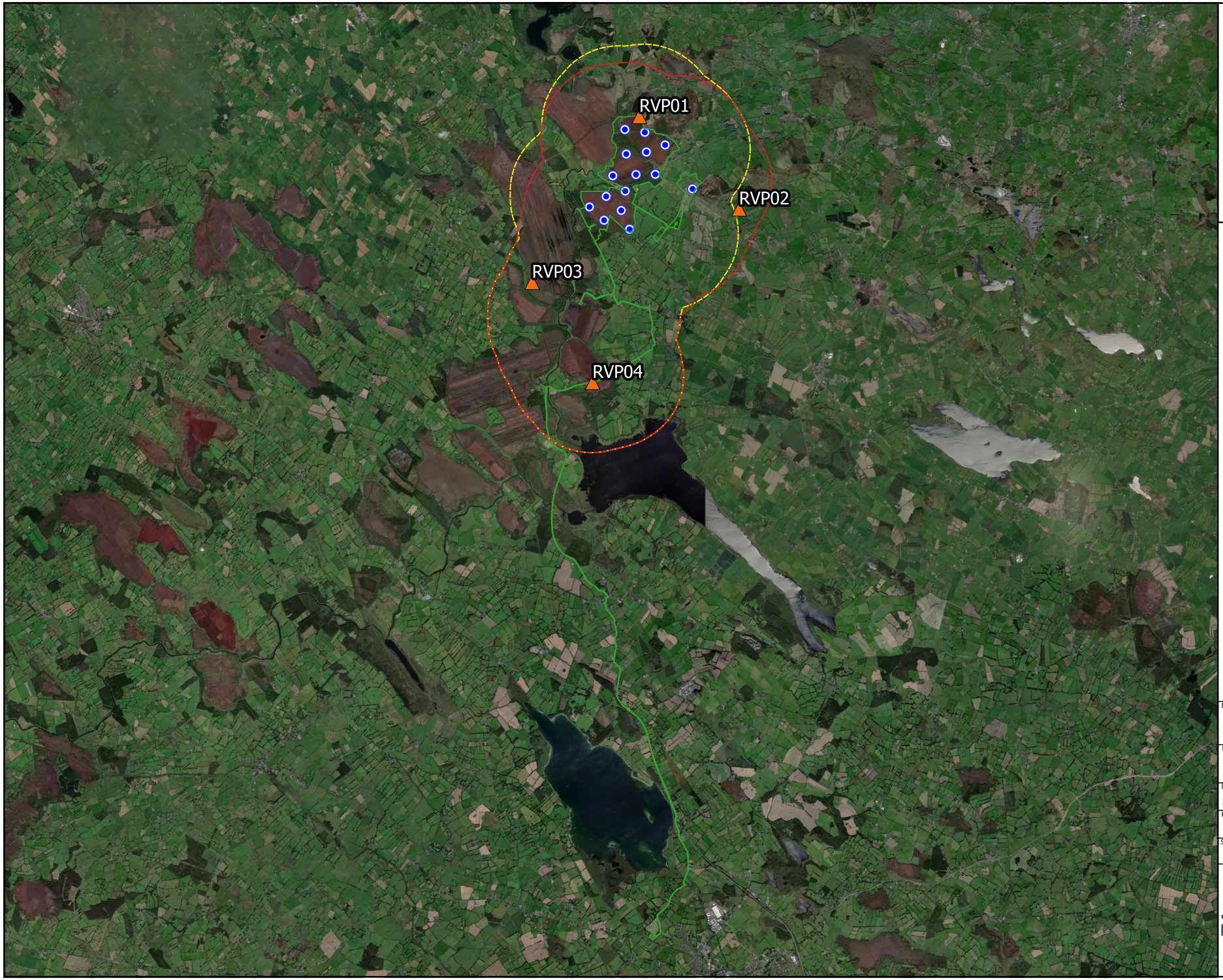
Breeding Bird Survey Area (500m radius)

Project Title

Coole Wind Farm

Drawn By	Checked By
Margaux Pierrel	Padraig Cregg
Project No.	Drawing No.
200445	Fig 7-3
Scale	Date
1:45000	26.01.2020

MKO
Planning and Environmental Consultants
Tuam Road, Galway
Ireland, H91 VW84
+353 (0) 91 735611
email:info@mkoireland.ie
Website: ww.mkoireland.ie



Map Legend

- EIAR Site Boundary
- 2km Survey Radius (2015/17)
- 2km Survey Radius (2018/20)
- Turbine Location
- Breeding Raptor Vantage Point

N

Drawing Title
Breeding Raptor Survey Area (2km radius)

Project Title
Coole Wind Farm

Drawn By	Checked By
Margaux Pierrel	Padraig Cregg
Project No.	Drawing No.
200445	Fig 7-4
Scale	Date
1:140000	26.01.2021

MKO
Planning and Environmental Consultants
Tuam Road, Galway
Ireland, H91 VW84
+353 (0) 91 735611
email:info@mkoireland.ie
Website: ww.mkoireland.ie

Map Legend

- EIAR Site Boundary
- Turbine Location
- Winter Transect Survey Area (500m) (2015/17)
- Winter Transect Survey Area (500m) (2018/20)
- Wildfowl Survey Site
- Wildfowl Survey Area (5km)

N

Drawing Title
Winter Transect/Waterfowl Survey Areas

Project Title
Coole Wind Farm

Drawn By	Checked By
Margaux Pierrel	Padraig Cregg
Project No.	Drawing No.
200445	Fig 7-5
Scale	Date
1:140000	26.01.2021

MKO
Planning and Environmental Consultants
Tuam Road, Galway
Ireland, H91 VW84
+353 (0) 91 735611
email:info@mkoireland.ie
Website: ww.mkoireland.ie

Map Legend

- EIAR Site Boundary
- Turbine Location
- Woodcock Survey Transect

N

Drawing Title

Woodcock Survey Area

Project Title

Coole Wind Farm

Drawn By	Checked By
Margaux Pierrel	Padraig Cregg
Project No.	Drawing No.
200445	Fig 7-6
Scale	Date
1:20000	26.01.2020

MKO
Planning and Environmental Consultants
Tuam Road, Galway
Ireland, H91 VW84
+353 (0) 91 735611
email:info@mkoireland.ie
Website: ww.mkoireland.ie

7.2.5 Ornithological Evaluation Criteria and Impact Assessment Methodology

7.2.5.1 Potential Effects Associated with the Proposed Development

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

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

For each of these three risks, the detailed knowledge of bird distribution and flight activity within and surrounding the site has been utilised to predict the potential effects of the Proposed Development on birds. Effects are assessed with regard to the construction phase, the operational phase and the decommissioning phase. They are also assessed cumulatively with other projects.

7.2.5.2 Geographical Framework

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

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

Locally Important (lower value) receptors contain habitats and species that are widespread and of low ecological significance and of importance only in the local area. Internationally Important sites are designated for conservation as part of the Natura 2000 Network (SAC or SPA) or provide the best examples of habitats or internationally important populations of protected flora and fauna.

7.2.5.3 Receptor Evaluation and Impact Assessment (Percival 2003)

Percival's (2003) methodology for assessing the effects of wind farms on birds has been applied to assess the sensitivity of a species to the development type, the magnitude of the effect and the significance of the potential impact. The following tables (Table 7-3 - Sensitivity,

Table 7-4 – Magnitude of effect,

Table 7-5 – Determination of significance) outline the assessment criteria for each stage.

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

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

Table 7-4 Determination of Magnitude of Effects (Percival 2003)

Sensitivity	Description
Very High	Total loss or very major alteration to key elements/ features of the baseline conditions such that the post development character/ composition/ attributes will be fundamentally changed and may be lost from the site altogether. Guide: < 20% of population / habitat remains
High	Major loss or major alteration to key elements/ features of the baseline (pre-development) conditions such that post development character/ composition/ attributes will be fundamentally changed. Guide: 20-80% of population/ habitat lost
Medium	Loss or alteration to one or more key elements/features of the baseline conditions such that post development character/composition/attributes of baseline will be partially changed. Guide: 5-20% of population/ habitat lost

Sensitivity	Description
Low	Minor shift away from baseline conditions. Change arising from the loss/alteration will be discernible but underlying character/composition/attributes of baseline condition will be similar to pre-development circumstances/patterns. Guide: 1-5% of population/ habitat lost
Negligible	Very slight change from baseline condition. Change barely distinguishable, approximating to the "no change" situation. Guide: < 1% population/ habitat lost

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

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

7.2.5.4 Impact Assessment – EPA Criteria (2017 Draft)

EPA impact assessment criteria are described below and outlined in Table 7-6 and Table 7-7.

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

- Momentary – effects lasting from seconds to minutes
- Brief – effects lasting less than a day
- Temporary – effects lasting less than a year
- Short-term – effects lasting 1 to 7 years
- Medium term – effects lasting 7 to 15 years
- Long term – effects lasting 15 to 60 years
- Permanent – effects lasting over 60 years
- Reversible – effects that can be undone, for example through remediation or restoration
- Frequency – How often the effect will occur. (once, rarely, occasionally, frequently, constantly – or hourly, daily, weekly, monthly, annually)

Table 7-6 Criteria for assessing impact significance based on (EPA, 2017)

Impact Magnitude	Definition
No change	No discernible change in the ecology of the affected feature
Imperceptible Effect	An effect capable of measurement but without significant consequences

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

Table 7-7 Criteria for assessing impact quality based on (EPA, 2017)

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

EPA impact assessment criteria have been used in this assessment for consistency between the biodiversity and ornithology chapters. Percival (2003) has also been followed in the assessment of potential impacts given its specific focus on the interactions between wind farms and birds. The two assessment criteria have been used to independently characterise impacts to inform a robust assessment of potential impacts on local avian communities resulting from the Proposed Development.

7.2.5.5 Collision Risk Assessment

Collision risk is calculated using a mathematical model to predict the numbers of individual birds, of a particular species, that may be killed by collision with moving wind turbine rotor blades. The modelling method used in this collision risk calculation follows Scottish Natural Heritage (SNH) guidance which is sometimes referred to as the Band Model (Band et al. (2007).

Two stages are involved in the model:

- Stage 1: Determination of the number of birds or flights passing through the air space swept by the rotor blades of the wind turbines.
- Stage 2: Calculation of the probability of a bird strike occurring.

Please see Appendix 7-5 for full details on the collision risk modelling method.

7.2.6 Survey Justification

A comprehensive suite of bird surveys has been undertaken at the Proposed Development site. Surveying was undertaken between October 2015 and September 2017 and April 2018 and March 2020.

Results are derived from four years of surveying undertaken in line with SNH Guidance. These are the results that are analysed to inform this assessment.

The surveys undertaken provide the information necessary to allow a complete, comprehensive and robust assessment of the potential impacts of the Proposed Development on avian receptors.

7.2.6.1 Mitigation

The development has been designed to specifically avoid, reduce and minimise effects on all Key Ornithological Receptors. Where potential effects on KORs are predicted, mitigation has been prescribed to avoid, reduce and remove such effects.

Proposed best practice design and mitigation measures are specifically set out and are realistic in terms of cost and practicality. They have been subject to detailed design and will effectively address the effects on the identified KORs.

The potential effects of the Proposed Development were considered and assessed to ensure that all effects on KORs are adequately addressed and no significant residual effects are likely to remain following the implementation of mitigation measures / best practice.

7.2.6.2 Limitations

The information provided in this EIAR chapter accurately and comprehensively describes the baseline environment; provides an accurate prediction of the likely effects of the Proposed Development; prescribes mitigation as necessary; and describes the predicted residual impacts. The specialist studies, analysis and reporting have been undertaken in accordance with the appropriate guidelines.

No significant limitations in the scope, scale or context of the assessment have been identified.

7.3 Baseline Conditions and Receptor Evaluation

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

A screening assessment and Natura Impact Statement were prepared to provide the competent authority with the information necessary to complete an Appropriate Assessment for the Proposed Development in compliance with Article 6(3) of the Habitats Directive.

As per EPA draft Guidance 2017, “a biodiversity section of an EIAR, should not repeat the detailed assessment of potential effects on European sites contained in a Natura Impact Statement” but should “incorporate their key findings as available and appropriate”. This section provides a summary of the key screening assessment findings with regard to Special Protection Areas. A summary of key assessment findings with regard to Special Areas of Conservation is provided in Chapter 6 of this EIAR. Potential impacts for Special Protection Areas are assessed in detail in the Appropriate Assessment and Natura Impact Statement associated with Chapter 6 of this EIAR.

Using GIS software, sites designated for nature conservation within the potential ZOI of the Proposed Development were identified. The ZOI was derived utilising a precautionary approach. Initially, sites within a 15-kilometer radius of the proposed works were identified. Then designated sites located outside the 15km buffer zone were taken into account and assessed. In this case, no potential for direct or indirect impacts for species listed as Special Conservation Interest of SPAs more than 15km from the development Site was identified.

In addition, and in the absence of any specific European or Irish guidance, the Scottish Natural Heritage (SNH) Guidance, 'Assessing Connectivity with Special Protection Areas (SPA)' (2016) was consulted. This document provides guidance in relation to the identification of connectivity between the Proposed Development and Special Protection Areas. The guidance takes into consideration the distances some species may travel beyond the boundary of their SPAs and outlines information on dispersal and foraging ranges of bird species which are frequently encountered when considering projects. Potential effects on wetlands and supporting habitats associated with Special Protection Areas and indirect potential pathways in the form of surface water pollution are considered in the Appropriate Assessment and Natura Impact Statement, see the NIS of this EIAR for further details.

Seven SPAs were located within the Likely Zone of Influence of the development, which are listed below in Table 7-8 and illustrated on Figure 2-1 of the NIS.

Table 7-8 Designated Sites in the Zone of Influence

European Site	Distance from proposed works (km)	Qualifying Interests/Special Conservation Interests for which the European Site has been designated (https://www.npws.ie, 21/02/2018)	Conservation Objectives	Zone of Influence Determination & Identification of Pathways for Effect
Special Protection Area				
Lough Kinale and Derragh Lough SPA (004061)	1.8km from the windfarm site 4.7km from the proposed grid connection route	› Pochard *(Aythya ferina)* [A059] › Tufted Duck *(Aythya fuligula)* [A061] › Wetland and Waterbirds *[A999]*	This site has the generic conservation objective: "To maintain the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA." This site also has a second conservation objective: "To maintain or restore the favourable conservation condition of the wetland habitat at Lough Kinale and Derragh Lough SPA as a resource for the regularly-occurring migratory waterbirds that utilise it." (NPWS (2020) Conservation objectives for Lough Kinale and Derragh Lough SPA [004061].	The wind farm site is located outside the potential foraging range of SCI species associated with the SPA. It is also located outside the zone of sensitivity of any species that is listed as particularly sensitive to wind energy development in Mc Guinness et al. (2015). Consequently, the potential for direct and indirect impacts on populations of SCI species associated with the SPA can be discounted. No complete impact source-pathway receptor chain was identified between the proposed works and this SPA. This SPA is not identified as occurring

European Site	Distance from proposed works (km)	Qualifying Interests/Special Conservation Interests for which the European Site has been designated (https://www.npws.ie, 21/02/2018)	Conservation Objectives	Zone of Influence Determination & Identification of Pathways for Effect
Special Protection Area				
			Generic Version 7.0. Department of Culture, Heritage and the Gaeltacht)	within the Likely Zone of Impact.
Lough Sheelin SPA (004065)	3.9km from windfarm site 7.8km from the proposed grid connection route	› Great Crested Grebe *(Podiceps cristatus)* [A005] › Pochard *(Aythya ferina)* [A059] › Tufted Duck *(Aythya fuligula)* [A061] › Goldeneye *(Bucephala clangula)* [A067] › Wetland and Waterbirds [A999]	This site has the generic conservation objective: "To maintain the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA." This site also has a second conservation objective: "To maintain or restore the favourable conservation condition of the wetland habitat at Lough Sheelin SPA as a resource for the regularly-occurring migratory waterbirds that utilise it." (NPWS (2020) Conservation objectives for Lough Sheelin SPA [004065]. Generic Version 7.0.	The wind farm site is located outside the potential foraging range of SCI species associated with the SPA. It is also located outside the zone of sensitivity of any species that is listed as particularly sensitive to wind energy development in Mc Guinness et al. (2015). Consequently, the potential for direct and indirect impacts on populations of SCI species associated with the SPA can be discounted. No complete impact source-pathway receptor chain was identified between the proposed works and this SPA. This SPA is not identified as occurring

European Site	Distance from proposed works (km)	Qualifying Interests/Special Conservation Interests for which the European Site has been designated (https://www.npws.ie, 21/02/2018)	Conservation Objectives	Zone of Influence Determination & Identification of Pathways for Effect
Special Protection Area				
			Department of Culture, Heritage and the Gaeltacht.)	within the Likely Zone of Impact.
Lough Derravaragh SPA (004043)	4.9km from the windfarm site 0.07km from the proposed grid connection route	› Whooper Swan (*Cygnus cygnus*) [A038] › Pochard (*Aythya ferina*) [A059] › Tufted Duck (*Aythya fuligula*) [A061] › Coot (*Fulica atra*) [A125] › Wetland and Waterbirds [A999]	This site has the generic conservation objective: "To maintain or restore the favourable conservation condition of the wetland habitat at Lough Derravarragh SPA as a resource for the regularly-occurring migratory waterbirds that utilise it." (NPWS (2020) Conservation objectives for Lough Derravarragh SPA [004043]. Generic Version 7.0. Department of Culture, Heritage and the Gaeltacht.)	The wind farm site is located at the edge of the potential foraging range of Whooper Swan, an SCI species associated with the SPA (5km). However, it is located outside the zone of sensitivity of any species that is listed as particularly sensitive to wind energy development in Mc Guinness et al. (2015). Consequently, the potential for direct and indirect impacts on populations of SCI species associated with the SPA can be discounted.
Garriskil Bog SPA (004102)	7.2km from the windfarm site	› Greenland White-fronted Goose (*Anser albifrons flavirostris*) [A395]	This site has the generic conservation objective:	The wind farm site is located at the edge of the potential foraging range of the SCI species associated with the SPA

European Site	Distance from proposed works (km)	Qualifying Interests/Special Conservation Interests for which the European Site has been designated (https://www.npws.ie, 21/02/2018)	Conservation Objectives	Zone of Influence Determination & Identification of Pathways for Effect
Special Protection Area				
	1.4km from the proposed grid connection route		"To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA." (NPWS (2020) Conservation objectives for Garriskil Bog SPA [004102]. Generic Version 7.0. Department of Culture, Heritage and the Gaeltacht.)	(5-8km). However, it is located outside the zone of sensitivity of any species that is listed as particularly sensitive to wind energy development in Mc Guinness et al. (2015). No complete impact source-pathway receptor chain was identified between the proposed works and this SPA. This SPA is not identified as occurring within the Likely Zone of Impact.
Lough Iron SPA (004046)	11.4km from the windfarm site 3km from the proposed grid connection route	› Whooper Swan (*Cygnus cygnus*) [A038] › Wigeon (*Anas penelope*) [A050] › Teal (*Anas crecca*) [A052] › Shoveler (*Anas clypeata*) [A056]	This site has the generic conservation objective: "To maintain the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA."	The wind farm site is located outside the potential foraging range of SCI species associated with the SPA. It is also located outside the zone of sensitivity of any species that is listed as particularly sensitive to wind energy development in Mc Guinness et al. (2015).

European Site	Distance from proposed works (km)	Qualifying Interests/Special Conservation Interests for which the European Site has been designated (https://www.npws.ie, 21/02/2018)	Conservation Objectives	Zone of Influence Determination & Identification of Pathways for Effect
Special Protection Area				
		› Coot (*Fulica atra*) [A125] › Golden Plover (*Pluvialis apricaria*) [A140] › Greenland White-fronted Goose (*Anser albifrons flavirostris*) [A395] › Wetland and Waterbirds [A999]	This site also has a second conservation objective: "To maintain or restore the favourable conservation condition of the wetland habitat at Lough Iron SPA as a resource for the regularly-occurring migratory waterbirds that utilise it." (NPWS (2020) Conservation objectives for Lough Iron SPA [004046]. Department of Culture, Heritage and the Gaeltacht.)	Consequently, the potential for direct and indirect impacts on populations of SCI species associated with the SPA can be discounted.
Lough Owel SPA (004047)	13.4km from the windfarm site Grid connection route is located within the existing N4 corridor along the boundary of the European Site.	› Shoveler (*Anas clypeata*) [A056] › Coot (*Fulica atra*) [A125] › Wetland and Waterbirds [A999]	This site has the generic conservation objective: "To maintain the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA."	The wind farm site is located outside the potential foraging range of SCI species associated with the SPA. It is also located outside the zone of sensitivity of any species that is listed as particularly sensitive to wind energy development in Mc Guinness et al. (2015).

European Site	Distance from proposed works (km)	Qualifying Interests/Special Conservation Interests for which the European Site has been designated (https://www.npws.ie, 21/02/2018)	Conservation Objectives	Zone of Influence Determination & Identification of Pathways for Effect
Special Protection Area				
			This site also has a second conservation objective: "To maintain or restore the favourable conservation condition of the wetland habitat at Lough Owel SPA as a resource for the regularly-occurring migratory waterbirds that utilise it." (NPWS (2020) Conservation objectives for Lough Owel SPA [004047]. Department of Culture, Heritage and the Gaeltacht.)	The proposed grid connection works will be short -term in duration and restricted to the existing N4 road corridor. There will be no loss of potential supporting habitat for any SCI species. The proposed grid connection works will be similar in nature, scale and duration to road maintenance works and will not result in any adverse effects as a result of disturbance. There is no potential for the Proposed Development to adversely affect the population trend within the SPA. Consequently, the potential for direct and indirect impacts on populations of SCI species associated with the SPA can be discounted.

European Site	Distance from proposed works (km)	Qualifying Interests/Special Conservation Interests for which the European Site has been designated (https://www.npws.ie, 21/02/2018)	Conservation Objectives	Zone of Influence Determination & Identification of Pathways for Effect
Special Protection Area				
Glen Lough SPA (004045)	13.5 from the windfarm site 3.3km from the proposed grid connection route	› Whooper Swan (*Cygnus cygnus*) [A038]	This site has the generic conservation objective: "To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA." (NPWS (2020) Conservation objectives for Glen Lough SPA [004045]. Generic Version 7.0. Department of Culture, Heritage and the Gaeltacht.)	The wind farm site is located outside the potential foraging range of SCI species associated with the SPA. It is also located outside the zone of sensitivity of any species that is listed as particularly sensitive to wind energy development in Mc Guinness et al. (2015). Consequently, the potential for direct and indirect impacts on populations of SCI species associated with the SPA can be discounted. No complete impact source-pathway receptor chain was identified between the proposed works and this SPA. This SPA is not identified as occurring

European Site	Distance from proposed works (km)	Qualifying Interests/Special Conservation Interests for which the European Site has been designated (https://www.npws.ie, 21/02/2018)	Conservation Objectives	Zone of Influence Determination & Identification of Pathways for Effect
Special Protection Area				
				within the Likely Zone of Impact.
Nationally Designated Sites				
Other than sites, which are encompassed by the above listed of SPAs, no nationally designated sites of ornithological significance occur within the potential ZOI.				

7.3.2 Breeding and Wintering Bird Atlas Records

Bird Atlas 2007-11: The breeding and wintering birds of Britain and Ireland' (Balmer et al., 2013) is the most recent comprehensive work on wintering and breeding birds in Ireland.

Previous Bird Atlases have been the primary source of information on the distribution and abundance of British and Irish birds prior to Bird Atlas 2007–11. The three previously published atlases were:

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

The entire development Site lies within hectads N37 and N47. Table 7-9 presents a list of species of conservation interest species recorded from the relevant hectads:

Table 7-9 Breeding Bird Atlas Data (Hectads N37 and N47)

Species Name	Breeding Atlas 68-72		Breeding Atlas 88-91		Breeding Atlas 07-11		Conservation Status
	N37	N47	N37	N47	N37	N47	
Hen Harrier *(Circus cyaneus)*	-	Conf	-	-	-	-	BD
Corncrake (*Crex crex*)	Conf	Prob	-	-	-	-	BD
Kingfisher (*Alcedo atthis*)	Prob	Conf	-	-	Poss	Poss	BD
Grey Partridge (*Perdix perdix*)	Conf	-	-	-			RL
Red Grouse *(Lagopus lagopus)*	Prob	Prob	-	-	-	-	RL
Lapwing *(Vanellus vanellus)*	Conf	Conf	Seen	Seen	Prob	-	RL
Curlew *(Numenius arquata)*	Conf	Conf	Breed	Seen	-	-	RL
Pintail (*Anas acuta*)	-	Poss	-	-	-	-	RL
Tufted Duck (*Aythya fuligula*)	Conf	Conf	-	-	Prob	-	RL
Woodcock *(Scolopax rusticola)*	Prob	Conf	-	-	-	Conf	RL
Black-headed Gull *(Chroicocephalus ridibundus)*	Poss	Conf	Seen	Seen	Prob	Conf	RL
Meadow Pipit *(Anthus pratensis)*	Conf	Conf	Breed	Breed	Conf	Poss	RL
Grey Wagtail *(Motacilla cinereal)*	Conf	Conf	Breed	-	-	-	RL
Yellowhammer *(Emberiza cintrinella)*	Prob	Conf	-	-	-	-	RL

Seen = recorded; Possible = possible breeding; Probable = probable breeding; Confirmed = confirmed breeding; - = not-recorded

Table 7-10 shows those species recorded in the relevant hectads (N37 and N47) in the wintering birds' atlases that are also protected under the EU Birds Directive or mentioned on the Birds of Conservation Concern in Ireland (BoCCI) Red List.

Table 7-10 Wintering Bird Atlas Data (Hectads N37 and N47)

Species Name	Wintering Atlas 81-84		Wintering Atlas 07-11		Conservation Status
	N37	N47	N37	N47	
Whooper Swan *(Cygnus cygnus)*	Pres	Pres	Pres	Pres	BD
Golden Plover (*Pluvialis apricaria*)	-	-	-	Pres	BD
Peregrine Falcon (*Falco peregrinus*)	-	-	Pres	-	BD
Kingfisher (*Alcedo atthis*)	Pres	-	-	Pres	BD
Barn Owl (*Tyto alba*)	-	-	-	Pres	RL
Wigeon *(Anas penelope)*	Pres	-	-	Pres	RL
Tufted Duck *(Aythya fuligula)*	Pres	Pres	Pres	Pres	RL
Pochard (*Aythya farina*)	Pres	-	Pres	Pres	RL
Goldeneye (*Bucephala clangula*)	Pres	Pres	-	-	RL
Lapwing *(Vanellus vanellus)*	Pres	Pres	-	Pres	RL
Woodcock *(Scolopax rusticola)*	Pres	-	-	Pres	RL
Black-headed Gull *(Chroicocephalus ridibundus)*	Pres	Pres	Pres	Pres	RL
Curlew *(Numenius arquata)*	Pres	Pres	-	-	RL

Present = recorded; - = not-recorded

7.3.3 Bird Sensitivity Mapping Tool

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

The wind farm Site is not located within a zone of sensitivity to windfarm development. Turbine 15 to the east of the Proposed Development is situated approximately 200m from an area of *Low* sensitivity to windfarm development area, as per McGuinness (2015) criteria.

7.3.4 Irish Wetland Bird Survey (I-WeBS) Records

The study area does not contain an I-WeBS site and the nearest site is located approximately 2km from the development Site boundary. Data from I-WeBS sites in County Westmeath has been used to

estimate County populations of wintering waterbirds identified as KORs. Datasets for the following sites were downloaded from www.birdwatchireland.ie and reviewed:

Westmeath I-WeBS Sites

- Ballinlough (Westmeath)
- Crowinstown Lough
- Glen Lough
- Lough Derravaragh
- Lough Drin
- Lough Ennell
- Lough Glore
- Lough Iron
- Lough Lene
- Lough Owel
- Lough Sheever
- Plunkett's Quarry, Castletown
- Royal Canal
- Slevin's Lake
- Tang River
- Walshestown South Turlough
- White/Annagh Lough

7.3.5 NPWS Rare and Protected Species Dataset

An information request was sent to the NPWS requesting records from the Rare and Protected Species Database. The sections below provide the records obtained from the NPWS (2nd of November 2020) regarding rare and protected bird species.

Peregrine Falcon

NPWS holds the following data on peregrine falcon nest sites from the National Survey in 2017:

- Hectad N46: four occupied breeding sites recorded.
- Hectad N47: two occupied breeding sites recorded.

Curlew

The NPWS holds two records for breeding curlew recorded from 2016 for hectad N37.

7.4 Field Survey Results

A comprehensive list of all bird species recorded during surveys is provided in Table 1-1 of Appendix 7-1. The target species listed below were recorded within the zone of influence of the Proposed Development during the ornithological surveys. The list is ordered in accordance with conservation significance: Annex I species, SCIs of designated sites, Red and Amber-listed species and raptors.

- Whooper Swan (Annex I species and SCI of designated sites)
- Greenland White-fronted Goose (Annex I species and SCI of designated sites)
- Golden Plover (Annex I species and SCI of designated sites)
- Hen Harrier (Annex I species)
- Merlin (Annex I species)
- Peregrine Falcon (Annex I species)

- White-tailed Eagle (Annex I species)
- Osprey (Annex I species)
- Red Kite (Annex I species)
- Shoveler (SCI of designated sites and Red-listed with regard to Wintering populations)
- Wigeon (SCI of designated sites and Red-listed with regard to Wintering populations)
- Pochard (SCI of designated sites and Red-listed with regard to Wintering populations)
- Goldeneye (SCI of designated sites and Red-listed with regard to Wintering populations)
- Tufted Duck (SCI of designated sites and Red-listed with regard to Wintering populations)
- Teal (SCI of designated sites and Red-listed with regard to Breeding and Wintering populations)
- Coot (SCI of designated sites and Amber-listed Breeding and Wintering populations)
- Great-crested Grebe (SCI of designated sites and Amber-listed with regard to Wintering populations)
- Black-headed Gull (Red-listed with regard to Breeding populations)
- Curlew (Red-listed with regard to Breeding and Wintering populations)
- Lapwing (Red-listed with regard to Breeding and Wintering populations)
- Redshank (Red-listed with regard to Breeding and Wintering populations)
- Woodcock (Red-listed with regard to Breeding populations)
- Barn Owl (Red-listed with regard to Breeding populations)
- Buzzard (Raptor, Schedule IV of the Wildlife Act; 1976)
- Sparrowhawk (Raptor, Schedule IV of the Wildlife Act; 1976)
- Kestrel (Raptor, Schedule IV of the Wildlife Act; 1976)
- Common Snipe (Amber-listed with regard to Breeding & Wintering populations)

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

- Summary of seasonal Vantage Point Survey Effort.
- Summary of the monthly distribution of flight activity recorded for the target species during the vantage point watches.
- Summary of observations at Potential Collision Height for target species during vantage point watches.
- Summary of the monthly distribution of flight activity recorded for the non-target species during the vantage point watches.
- Summary of monthly distribution of target species during Breeding Bird Surveys.
- Summary of monthly distribution of non-target species during Breeding Bird Surveys.
- Summary of monthly distribution of Breeding Raptor Survey results.
- Summary of monthly distribution of target species during Winter Transect Surveys.
- Summary of monthly distribution of target species during Waterfowl Surveys.

7.4.1 Whooper Swan

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

Vantage Point Surveys

- 2015-2017 surveys

Whooper swan were observed on four occasions during the 2015-2017 Vantage Point Surveys at VP4 (see Appendix 7-4, Figure 7-1-1). Flights were recorded between the periods of November-March. Numbers recorded ranged from 1 to 7 birds. All flights were recorded within, or partially within, the potential collision risk zone. All observations were recorded within 500m of the wind farm site.

- 2018-2020 surveys

Whooper swan were observed on five occasions during the 2018-2020 Vantage Point Surveys at VP3 and VP5 (see Appendix 7-4, Figure 7-1-1). Flights were recorded between the periods of October-March. Numbers recorded ranged from 1 to 14 birds. All flights were recorded within the potential collision risk zone. All observations were recorded within, or partially within, 500m of the wind farm site.

Winter Transect Surveys

- 2015-2017 surveys

Whooper swan were observed on two occasions during the 2015-2017 Winter Transect Surveys (see Appendix 7-4, Figure 7-5-1). On the 30th of October 2016, a flock of twelve birds was observed on a flooded area approximately 2.6km south-west of the Site. On the 28th of January 2017, a flock of eight birds was observed within the Site boundary.

- 2018-2020 surveys

Whooper swan were observed on only one occasion during the 2018-2020 Winter Transect Surveys (see Appendix 7-4, Figure 7-5-1). On the 20th of March 2020, three birds were observed travelling over cutover bog and improved agricultural grassland, approximately 1.7km south-west of the proposed wind farm site.

Waterfowl Surveys

- 2015-2017 surveys

Whooper swan were recorded on twenty-three occasions during Waterfowl Surveys (see Appendix 7-4, Table 1-3). Seven observations occurred during the 2016/2017 winter season with a maximum flock number of 40 birds recorded feeding at Lough Derravaragh, approximately 5.4km south of the Site. Sixteen observations occurred during the 2016/2017 winter season with numbers of birds ranging from 3 to 18. Whooper swan were observed at Lough Bane, Lough Kinale and Derragh Lough, Lough Sheelin and Lough Derravaragh.

- 2018-2020 surveys

Whooper swan were recorded on ninety-five occasions during Waterfowl Surveys (see Appendix 7-4, Table 1-3). Eighty-nine of these observations were recorded at Lough Iron, approximately 12.8km to the south-west of the proposed wind farm site. Those observations correspond to birds travelling or feeding on the lough. Numbers ranged from 2 to 96 birds. The remaining five observations were recorded at Lough Bane, Sheeling Lough SPA and Lough Derravaragh SPA. A maximum of 7 birds were recorded within 500m of the wind farm site at Lough Bane on a single occasion.

There were no additional observations of this species during any of the other comprehensive surveys.

Multidisciplinary Walkover Surveys

Whooper Swan was recorded on the River Inny approximately 56m from the road corridor and 1km from the boundary of Lough Derravarragh SPA.

7.4.2 Greenland White-fronted Goose

Raw survey data for Greenland white-fronted goose is provided in Appendix 7-4. Results summary tables are present in Appendix 7-3.

Vantage Point Surveys

- 2018-2020 surveys

Greenland white-fronted goose were observed on two occasions during the 2018-2020 Vantage Point Surveys (see Appendix 7-4, Figure 7-1-2). Flights were recorded in October 2018 and in February 2019. Numbers recorded ranged from 12 to 15 birds. Both flights were recorded within the potential collision risk zone. Both observations were recorded within 500m of the wind farm site.

Waterfowl Surveys

- 2018-2020 surveys

Greenland white-fronted goose were recorded on twenty-six occasions during specific Waterfowl Surveys at Lough Iron (see Appendix 7-4, Table 1-5). Flock numbers were comprised between 4 and 238 birds, with an average flock composed of 75 individuals.

There were no additional observations of this species during any of the other comprehensive surveys.

7.4.3 Golden Plover

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

Vantage Point Surveys

- 2015-2017 surveys

Golden plover were recorded on sixty-six occasions during Vantage Point Surveys (see Appendix 7-4, Figure 7-1-3). Forty-six of these flight observations occurred within, or partially within, the Potential Collision Height. The majority of observations of birds in flight were within 500m of the proposed turbine layout. All observations of this species occurred during winter months. Twenty-nine of the sixty-three flights were recorded during the 2015/2016 winter season (October – April) with flocks between 1 and 125 birds recorded in flight and landing on areas of cutover bog. Thirty-seven flights were recorded during the 2016/2017 winter season with flocks ranging from individuals to 140 birds.

- 2018-2020 surveys

Golden plover were recorded on fifteen occasions during Vantage Point Surveys at VP3 and VP5 (see Appendix 7-4, Figure 7-1-3). Only seven of these flight observations occurred within, or partially within, the Potential Collision Height. Most observations of birds in flight were within 500m of the proposed turbine layout.

Fourteen observations of this species occurred during winter months. Seven of these fourteen flights were recorded during the 2018/2019 winter season (October – March) with flocks between 5 and 46 birds recorded in flight and landing on areas of cutover bog. Seven flights were recorded during the 2019/2020 winter season (September-March) with flocks ranging from individuals to 48 birds. The remaining flight occurred in April 2018 when 5 birds were observed travelling over cutover bog, conifer plantation and improved agricultural grassland. This flock is considered to be a migratory population.

Winter Transect Surveys

- 2015-2017 surveys

Golden plover were recorded on nine occasions during the 2015-2017 Winter Transect Surveys (see Appendix 7-4, Figure 7-5-2). Seven observations occurred during the 2015/2016 winter season with a maximum flock number of 30 birds. Two observations occurred during the 2016/2017 winter season with numbers of birds ranging from 1 to 4. Five of the total nine observations were recorded within the Site boundary.

- 2018-2020 surveys

Golden plover were recorded on eleven occasions during Winter Transect Surveys (see Appendix 7-4, Figure 7-5-2). Four observations occurred during the 2018/2019 winter season with a maximum flock number of 140 birds recorded flying over cutover bog. Seven observations occurred during the 2019/2020 winter season with numbers of birds ranging from 2 to 50.

Waterfowl Surveys

- 2015-2017 surveys

Golden plover were recorded on eight occasions during Waterfowl Surveys in 2015/2017 (see Appendix 7-4, Table 1-8). Three observations occurred during the 2015/2016 winter season with a maximum flock number of 85 birds recorded feeding at Lough Derravaragh, approximately 5.4km south of the Site. Five observations occurred during the 2016/2017 winter season with numbers of birds ranging from 18 to 500. Golden plover were observed at Lough Kinale and Derragh Lough, Lough Derravaragh and Garriskil Bog.

- 2018-2020 surveys

Golden plover were recorded on two occasions during Waterfowl Surveys in 2018/2020 (see Appendix 7-4, Table 1-8). On the 20th of November 2018, 16 birds were observed roosting at Lough Bane. On the 3rd of January 2020, 58 birds were observed feeding at Lough Sheelin.

Incidental Observations

Incidental observations were also recorded during VPs watches (see Appendix 7-4, Table 1-9). These included evidences of roosting, from areas of cutover milled peat, on dates between 2015-2017 and 2018-2020 and non-visual records of calling birds.

There were no additional observations of this species during any of the other comprehensive surveys.

7.4.4 Hen Harrier

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

Vantage Point Surveys

- 2015-2017 surveys

Hen Harrier were recorded on a single occasion during Vantage Point Surveys (see Appendix 7-4, Figure 7-1-4). On the 16th of January 2017, a male was observed hunting over cutover bog and semi-

natural woodland approximately 600m from the turbine layout. The flight was recorded below Potential Collision Height.

Breeding Raptor Surveys

- 2018-2020 surveys

Hen harrier was observed only once during Breeding Raptor Surveys (see Appendix 7-4, Figure 7-4-1). On the 9th of April 2018, an individual bird was observed travelling low over an area of bog and woodland, approximately 160m from the grid connection route and 4km from the wind farm site.

There were no additional observations of this species during any of the other comprehensive surveys.

7.4.5 Merlin

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

Vantage Point Surveys

- 2015-2017 surveys

Merlin were only recorded on seven occasions during Vantage Point Surveys at VP3 & 4 between October 2015 and September 2017 (see Appendix 7-4, Figure 7-1-5). Two observations occurred during the 2015/16 winter season, four observations during the 2016 breeding season and one observation during the 2016/17 winter season. All seven observations were recorded within 500m of the turbine layout. Two observations were recorded at Potential Collision Height.

Winter Transect Surveys

- 2015-2017 surveys

Merlin was recorded on a single occasion during Winter Transect Surveys (see Appendix 7-4, Figure 7-5-3). On the 24th of December 2015, an individual bird was recorded hunting near Lough Bane within the Site boundary.

There were no additional observations of this species during any of the other comprehensive surveys.

7.4.6 Peregrine Falcon

Raw survey data for peregrine falcon is provided in Appendix 7-4. Results summary tables are present in Appendix 7-3.

Vantage Point Surveys

- 2015-2017 surveys

Peregrine falcon were recorded on nineteen occasions during Vantage Point Surveys at VP3 & 4 in 2015/17 (see Appendix 7-4, Figure 7-1-6). Five observations occurred during winter season 2015/2016; eight during breeding season 2016; five during winter season 2016/2017 and the remaining one during breeding season 2017. All observations were of birds flying/travelling within the proposed wind farm site. Observed numbers ranged from one individual to a pair. Fifteen of these nineteen observations

were recorded at potential collision height. No roosting or breeding evidence was recorded on Site or within 500m of same.

- 2018-2020 surveys

Peregrine falcon were recorded on seven occasions during the 2018-2020 Vantage Point Surveys at VP3 and VP5 (see Appendix 7-4, Figure 7-1-6). One observation occurred during breeding season 2018; three during winter season 2018-2019; one during breeding season 2019 and two during winter season 2019/2020. All observations were of individual birds flying/hunting within the proposed wind farm site. Most observations were recorded within, or partially within, potential collision height.

Breeding Bird Surveys

- 2015-2017 surveys

Peregrine falcon was recorded on a single occasion during Breeding Bird Surveys (see Appendix 7-4, Figure 7-3-1). On the 10th of June 2016, an individual bird was observed carrying prey within the wind farm site.

Breeding Raptor Surveys

- 2015-2017 surveys

Peregrine falcon were observed on nine occasions during Breeding Raptor Surveys (see Appendix 7-4, Figure 7-4-2). Eight observations occurred during breeding season 2016 while the remaining one observation was recorded during breeding season 2017. Individual birds and pairs were recorded hunting and circling/travelling east of the development Site. A nesting site was confirmed in April 2016 and fledged two chicks in June 2016. This nesting area is located approximately 1.2km east of the wind farm site. There was no evidence to confirm the nesting site was used during the 2017 breeding season.

- 2018-2020 surveys

Peregrine falcon were observed on thirteen occasions during Breeding Raptor Surveys (see Appendix 7-4, Figure 7-4-2). Eight observations occurred during breeding season 2018 while the remaining five observations were recorded during breeding season 2019. Individual birds were recorded hunting and circling/travelling in two distinct areas, one north of the development Site, the second approximately 900m east of the proposed wind farm site. As per 2018 and 2019 surveys, the nesting territory recorded in 2016 continued to be occupied however no activity that would have confirmed breeding was recorded.

Winter Transect Surveys

- 2015-2017 surveys

Peregrine falcon was recorded on a single occasion during Winter Transect Surveys (see Appendix 7-4, Figure 7-5-4). On the 15th of December 2015, an individual bird was recorded settling on cutover bog within the proposed wind farm site.

Waterfowl Surveys

- 2015-2017 surveys

Peregrine falcon were recorded twice during the 2015/17 Waterfowl Surveys (see Appendix 7-4, Table 1-18). On the 28th of November 2016, an individual bird was recorded at Lough Derragh approximately

2km north-west of the proposed wind farm site. On the 12th of March 2017, a bird was observed at Lough Sheelin approximately 4km north-east of the Site.

- 2018-2020 surveys

Peregrine falcon was only recorded once during 2018-2020 Waterfowl Surveys (see Appendix 7-4, Table 1-18). On the 20th of November 2018, an individual bird was observed perched at the forestry edge nearby Lough Bane situated within 500m of the proposed wind farm site.

Incidental Observations

There was one incidental observation of peregrine falcon between April 2018 and March 2020 (see Appendix 7-4, Table 1-19). On the 9th of October 2018, an individual bird was observed flying near a lough during a Waterfowl Survey at Lough Iron.

There were no additional observations of this species during any of the other comprehensive surveys.

7.4.7 White-tailed Eagle

Raw survey data for white-tailed eagle is provided in Appendix 7-4. Results summary tables are present in Appendix 7-3.

Vantage Point Surveys

- 2015-2017 surveys

During the 2015-2017 surveys, a single white-tailed eagle was recorded on one date in November 2016 (see Appendix 7-4, Figure 7-1-7). The individual bird was observed perching and moving between perches but was not recorded at potential collision height. These observations occurred within the proposed wind farm site.

There were no additional observations of this species during any of the other comprehensive surveys.

7.4.8 Osprey

Raw survey data for osprey is provided in Appendix 7-4. Results summary tables are present in Appendix 7-3.

Vantage Point Surveys

- 2015-2017 surveys

During the 2015-2017 surveys, a single osprey was recorded flying on three occasions on one date in May 2016 (see Appendix 7-4, Figure 7-1-8). All observations were recorded at potential collision height within the proposed wind farm site.

Waterfowl Surveys

- 2015-2017 surveys

Osprey was recorded on a single occasion during the 2015/17 Waterfowl Surveys (see Appendix 7-4, Table 1-22). On the 15th of September 2016, an individual bird was observed at Lough Bracklagh, approximately 4.7km from the proposed wind farm site.

There were no additional observations of this species during any of the other comprehensive surveys.

7.4.9 Red Kite

Raw survey data for red kite is provided in Appendix 7-4. Results summary tables are present in Appendix 7-3.

Vantage Point Surveys

- 2018-2020 surveys

Red kite was observed only once during Vantage Point Surveys (see Appendix 7-4, Figure 7-1-9). On the 29th of May 2018, an individual bird was observed travelling over an area of improved agricultural grassland, within the proposed wind farm site. This flight was partially recorded at potential collision height.

There were no additional observations of this species during any of the other comprehensive surveys.

7.4.10 Shoveler

Raw survey data for shoveler is provided in Appendix 7-4. Results summary tables are present in Appendix 7-3.

Winter Transect Surveys

- 2015-2017 surveys

Shoveler was recorded on a single occasion during Winter Transect Surveys (see Appendix 7-4, Figure 7-5-5). On the 28th of January 2017, a shoveler was flushed from Lough Bane, north of the Site.

Waterfowl Surveys

- 2015-2017 surveys

Shoveler were recorded on six occasions during the 2015/17 Waterfowl Surveys (see Appendix 7-4, Table 1-25). One observation occurred during the 2015/2016 winter season with a flock of 3 birds recorded feeding at Lough Derravaragh, situated approximately 5.4km to the south of the Site. The other five observations occurred during the 2016/17 winter season with numbers of birds ranging from 1 to 3. Shoveler were observed at Lough Bane, Derragh Lough, Bracklagh Lough, Lough Sheelin and Lough Derravaragh. Shoveler were recorded at Lough Bane within 500m of the wind farm site on a single occasion with one bird observed.

- 2018-2020 surveys

Shoveler was only recorded once during Waterfowl Surveys (see Appendix 7-4, Table 1-25). On the 7th of February 2020, an individual bird was observed feeding at Lough Derravaragh situated within 5.4km to the south of the proposed wind farm site and 1.9km east of the grid connection route.

There were no additional observations of this species during any of the other comprehensive surveys.

7.4.11 Wigeon

Raw survey data for wigeon is provided in Appendix 7-4. Results summary tables are present in Appendix 7-3.

Winter Transect Surveys

- 2015-2017 surveys

Wigeon was recorded on five occasions during Winter Transect Surveys (see Appendix 7-4, Figure 7-5-6). Two observations occurred during the 2015/16 winter season with numbers ranging from 1 to 7 birds, the remaining three observations occurred during the 2016/17 winter season with numbers up to 17 birds. All observations were recorded at Lough Bane, north of the wind farm site.

Waterfowl Surveys

- 2015-2017 surveys

Wigeon were recorded on twenty-four occasions during the 2015/17 Waterfowl Surveys (see Appendix 7-4, Table 1-27). Six observations occurred during the 2015/16 winter season with a maximum flock number of 39 birds recorded feeding/roosting at Lough Derravaragh, approximately 5.4km to the wind farm site. Eighteen observations occurred during the 2016/17 winter season with numbers of birds ranging from 1 to 78. Wigeon were observed at Lough Bane, Lough Kinale and Derragh Lough, Bracklagh Lough, Lough Sheelin and Lough Derravaragh. Wigeon were recorded at Lough Bane within 500m of the wind farm site on seven occasions with a maximum of 78 birds observed.

- 2018-2020 surveys

Wigeon were recorded on twenty-two occasions during Waterfowl Surveys (see Appendix 7-4, Table 1-27). Twelve observations occurred during the 2018/2019 winter season with a maximum flock number of 51 birds recorded feeding at Lough Bane, adjacent to the proposed Site boundary. Ten observations occurred during the 2019/2020 winter season with numbers of birds ranging from 2 to 44. Wigeon were observed at Lough Bane, Derragh Lough, Lough Kinale and Derragh Lough, Bracklagh Lough, Lough Sheelin and Lough Derravaragh. Wigeon were recorded at Lough Bane within 500m of the wind farm site on thirteen occasions with a maximum of 51 birds observed.

There were no additional observations of this species during any of the other comprehensive surveys.

7.4.12 Pochard

Raw survey data for pochard is provided in Appendix 7-4. Results summary tables are present in Appendix 7-3.

Waterfowl Surveys

- 2015-2017 surveys

Pochard were recorded on thirty-two occasions during the 2015/17 Waterfowl Surveys (see Appendix 7-4, Table 1-28). Thirteen observations occurred during the 2015/16 winter season with a maximum flock number of 483 birds recorded feeding at Lough Sheelin, approximately 4km north-east of the Proposed Development Site. Nineteen observations occurred during the 2016/17 winter season with numbers of birds ranging from 2 to 211. Pochard were observed at Lough Kinale and Derragh Lough, Lough Sheelin, Bracklagh Lough and Lough Derravaragh.

- 2018-2020 surveys

Pochard were recorded on thirty occasions during Waterfowl Surveys (see Appendix 7-4, Table 1-28). Fourteen observations occurred during the 2018/2019 winter season with a maximum flock number of 142 birds recorded feeding at Lough Sheelin, approximately 4km north-east of the Proposed Development Site. Sixteen observations occurred during the 2019/2020 winter season with numbers of birds ranging from individuals to 225. Pochard were observed at Lough Bane, Derragh Lough, Lough Kinale and Derragh Lough, Lough Sheelin, Bracklagh Lough and Lough Derravaragh. Pochard were recorded at Lough Bane within 500m of the wind farm site on a single occasion with one bird observed.

There were no additional observations of this species during any of the other comprehensive surveys.

7.4.13 Goldeneye

Raw survey data for goldeneye is provided in Appendix 7-4. Results summary tables are present in Appendix 7-3.

Waterfowl Surveys

- 2015-2017 surveys

Goldeneye were recorded on thirty occasions during the 2015/17 Waterfowl Surveys (see Appendix 7-4, Table 1-29). Thirteen observations occurred during the 2015/16 winter season with a maximum flock number of 16 birds recorded feeding at Lough Sheelin, approximately 4km north-east of the Proposed Development Site. Seventeen observations occurred during the 2016/17 winter season with numbers of birds ranging from individuals to 13. Goldeneye were observed at Derragh Lough, Lough Kinale and Derragh Lough, Lough Sheelin and Lough Derravaragh.

- 2018-2020 surveys

Goldeneye were recorded on seven occasions during Waterfowl Surveys (see Appendix 7-4, Table 1-29). Three observations occurred during the 2018/2019 winter season with a maximum flock number of 10 birds recorded feeding at Lough Derravaragh, approximately 5.4km south of the proposed wind farm site. Four observations occurred during the 2019/2020 winter season with numbers of birds ranging from individuals to 4. Goldeneye were observed at Lough Sheelin and Lough Derravaragh.

There were no additional observations of this species during any of the other comprehensive surveys.

7.4.14 Tufted Duck

Raw survey data for tufted duck is provided in Appendix 7-4. Results summary tables are present in Appendix 7-3.

Waterfowl Surveys

- 2015-2017 surveys

Tufted duck were recorded on eighty-eight occasions during the 2015/17 Waterfowl Surveys (see Appendix 7-4, Table 1-30). Thirty-five observations occurred during the 2015/16 winter season with a maximum flock number of 552 birds recorded feeding at Lough Kinale, approximately 2km north-west of the proposed wind farm site. Fifty-three observations occurred during the 2016/17 winter season with numbers of birds ranging from individuals to 668 birds. Tufted duck were observed at Derragh Lough, Lough Kinale and Derragh Lough. Lough Sheelin, Bracklagh Lough and Lough Derravaragh.

- 2018-2020 surveys

Tufted duck were recorded on ninety-nine occasions during Waterfowl Surveys (see Appendix 7-4, Table 1-30). Fifty observations occurred during the 2018/2019 winter season with a maximum flock number of 384 birds recorded feeding at Lough Sheelin, approximately 4km north-east of the proposed wind farm site. Forty-nine observations occurred during the 2019/2020 winter season with numbers of birds ranging from individuals to 408 birds. Tufted duck were observed at Derragh Lough, Lough Kinale and Derragh Lough. Lough Sheelin, Bracklagh Lough and Lough Derravaragh.

There were no additional observations of this species during any of the other comprehensive surveys.

7.4.15 Teal

Raw survey data for teal is provided in Appendix 7-4. Results summary tables are present in Appendix 7-3.

Vantage Point Surveys

- 2015-2017 surveys

Teal were observed only once during Vantage Point Surveys (see Appendix 7-4, Figure 7-1-10). On the 18th of December 2016, seven birds were observed travelling over an area of cutover bog and woodland, within the proposed wind farm site. This flight was partially recorded at potential collision height.

Winter Transect Surveys

- 2015-2017 surveys

Teal were recorded on nine occasions during the 2015/17 Winter Transect Surveys (see Appendix 7-4, Figure 7-5-7). Seven observations occurred during the 2015/16 winter season with numbers of birds ranging from 1 to 50. Two observations occurred during the 2016/17 winter season with a maximum flock number of 3 birds recorded in drainage ditches. Six observations were recorded within the proposed wind farm site.

- 2018-2020 surveys

Teal were recorded on seven occasions during Winter Transect Surveys (see Appendix 7-4, Figure 7-5-7). Three observations occurred during the 2018/2019 winter season with a maximum flock number of 9 birds recorded flushed from areas of drainage ditch and cutover bog. Four observations occurred during the 2019/2020 winter season with numbers of birds ranging from 1 to 3. All seven observations were recorded along the grid connection route.

Waterfowl Surveys

- 2015-2017 surveys

Teal were only recorded on twenty-five occasions during the 2015/17 Waterfowl Surveys (see Appendix 7-4, Table 1-33). Ten observations occurred during the 2015/16 winter season with a maximum flock number of 54 birds recorded feeding at Lough Derravaragh, approximately 5.4km south of the proposed wind farm site. Fifteen observations occurred during the 2016/17 winter season with numbers of birds ranging from individuals to 84 birds. Teal were observed at Lough Bane, Derragh Lough, Lough Kinale and Derragh Lough. Lough Sheelin, Bracklagh Lough and Lough Derravaragh. Teal

were recorded at Lough Bane within 500m of the wind farm site on five occasions with a maximum of 22 birds observed.

- 2018-2020 surveys

Teal were only recorded on three occasions during Waterfowl Surveys (see Appendix 7-4, Table 1-33). All observations occurred during the 2018/2019 winter season with a maximum flock number of 122 birds recorded feeding at Lough Derravaragh, approximately 5.4km south of the proposed wind farm site. In addition, teal were observed at Lough Bane and Lough Kinale and Derragh Lough SPA. Teal were recorded at Lough Bane within 500m of the wind farm site on a single occasion with 6 birds observed.

There were no additional observations of this species during any of the other comprehensive surveys.

7.4.16 Coot

Raw survey data for coot is provided in Appendix 7-4. Results summary tables are present in Appendix 7-3.

Breeding Bird Surveys

Coot were only recorded on a single occasion during Breeding Bird Surveys (see Appendix 7-4, Figure 7-3-2). On the 26th of June 2019, an individual bird was recorded on a flooded area in bog, approximately 300m north of the proposed grid connection route.

Winter Transect Surveys

- 2015-2017 surveys

Coot were only recorded twice during the 2015-2017 Winter Transect Surveys (see Appendix 7-4, Figure 7-5-8). On the 14th of March 2016, two birds were observed along the cable route approximately 4km south of the Site. On the 27th of March 2017, four birds were observed at Lough Bane, adjacent to the Site boundary.

- 2018-2020 surveys

Coot were only recorded on a single occasion during Winter Transect Surveys (see Appendix 7-4, Figure 7-5-8). On the 20th of March 2020, an individual bird was recorded on a bog pond, approximately 180m north of the proposed grid connection route.

Waterfowl Surveys

- 2015-2017 surveys

Coot were recorded on one hundred and thirty-eight occasions during Waterfowl Surveys (see Appendix 7-4, Table 1-36). The species was recorded from the following sites: Lough Bane, Derragh Lough, Lough Kinale and Derragh Lough, Lough Sheelin, Bracklagh Lough and Lough Derravaragh. A maximum number of 1,565 coot was recorded at Lough Sheelin located approximately 4km from the Proposed Development Site. Coot were recorded at Lough Bane within 500m of the wind farm site on two occasions with a maximum of one bird observed.

- 2018-2020 surveys

Coot were recorded on one hundred and eighty-nine occasions during Waterfowl Surveys (see Appendix 7-4, Table 1-36). The species was recorded from the following sites: Lough Bane, Derragh Lough, Lough Kinale and Derragh Lough, Lough Sheelin and Lough Derravaragh. A maximum number of 760 coot was recorded at Lough Sheelin located approximately 4km from the Proposed Development Site. Coot were recorded at Lough Bane within 500m of the wind farm site on a single occasion with one bird observed.

There were no additional observations of this species during any of the other comprehensive surveys.

7.4.17 Great-crested Grebe

Raw survey data for great-crested grebe is provided in Appendix 7-4. Results summary tables are present in Appendix 7-3.

Waterfowl Surveys

- 2015-2017 surveys

Great-crested grebe were recorded on one hundred and twenty-nine occasions during the 2015/17 Waterfowl Surveys (see Appendix 7-4, Table 1-37). The species was recorded from the following sites: Derragh Lough, Lough Kinale and Derragh Lough, Lough Sheelin, Bracklagh Lough and Lough Derravaragh. A maximum number of 49 birds was recorded at Lough Derravaragh located approximately 5.4km from the Proposed Development Site.

- 2018-2020 surveys

Great-crested grebe were recorded on one hundred and seventy-seven occasions during Waterfowl Surveys (see Appendix 7-4, Table 1-37). The species was recorded from the following sites: Derragh Lough, Lough Kinale and Derragh Lough, Lough Sheelin and Lough Derravaragh. A maximum number of 36 great-crested grebe was recorded at Lough Sheelin located approximately 4km from the Proposed Development Site.

There were no additional observations of this species during any of the other comprehensive surveys.

7.4.18 Black-headed Gull

Raw survey data for black-headed gull is provided in Appendix 7-4. Results summary tables are present in Appendix 7-3.

Vantage Point Surveys

- 2015-2017 surveys

During the 2015-2017 surveys, two birds were recorded on one occasion in May 2016 (see Appendix 7-4, Figure 7-1-11). The flights were recorded partially within potential collision height and within 500m of the turbine layout.

- 2018-2020 surveys

Black-headed gull were recorded on three occasions during Vantage Point Surveys between April 2018 and March 2020 (see Appendix 7-4, Figure 7-1-11). All flights were recorded within, or partially within the proposed wind farm site. These three flights were recorded at potential collision height. A maximum of three birds was recorded.

Breeding Bird Surveys

- 2015-2017 surveys

Black-headed gull were recorded on three occasions during the 2015/17 Breeding Bird Surveys (see Appendix 7-4, Figure 7-3-3). Most observations occurred north and east of the proposed wind farm site with numbers ranging from individuals to two birds together.

- 2018-2020 surveys

Black-headed gull were recorded on five occasions during Breeding Bird Surveys (see Appendix 7-4, Figure 7-3-23. Most observations occurred north and east of the proposed wind farm site.

Winter Transect Surveys

- 2015-2017 surveys

Black-headed gull were recorded on three occasions during the 2015-2017 Winter Transect Surveys (see Appendix 7-4, Figure 7-5-9). Two observations occurred during the 2015/16 winter season with a maximum flock number of 27 birds recorded south of the Site. The remaining observation occurred in March 2017 and was composed of 5 birds recorded near Lough Bane, adjacent to the proposed wind farm site.

Waterfowl Surveys

- 2015-2017 surveys

Black-headed gull were recorded on sixty-five occasions during the 2015/17 Waterfowl Surveys (see Appendix 7-4, Table 1-41). The species was recorded from the following sites: Lough Bane, Derragh Lough, Lough Kinale and Derragh Lough, Lough Sheelin, Bracklagh Lough and Lough Derravaragh. A maximum number of 489 birds was recorded at Lough Derravaragh located approximately 5.4km from the Proposed Development Site. Black-headed gull were recorded at Lough Bane within 500m of the wind farm site on four occasions with a maximum of 65 birds observed.

- 2018-2020 surveys

Black-headed gull were recorded on eighty-six occasions during Waterfowl Surveys (see Appendix 7-4, Table 1-41). The species was recorded from the following sites: Lough Bane, Derragh Lough, Lough Kinale and Derragh Lough, Lough Sheelin, Bracklagh Lough, Lough Derravaragh and Lough Iron. A maximum number of 285 black-headed gull was recorded at Lough Bracklagh located approximately 4.7km from the proposed wind farm site. Black-headed gull were recorded at Lough Bane within 500m of the wind farm site on six occasions with a maximum of 129 birds observed.

There were no additional observations of this species during any of the other comprehensive surveys.

7.4.19 Curlew

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

Waterfowl Surveys

- 2015-2017 surveys

Curlew were recorded on seven occasions during the 2015/17 Waterfowl Surveys (see Appendix 7-4, Table 1-42). The species was recorded from Lough Derravaragh and Garriskil Bog. A maximum number of 35 birds was recorded at Garriskil Bog located approximately 7.5km south-west of the Proposed Development Site.

- 2018-2020 surveys

Curlew was only recorded on a single occasion during Waterfowl Surveys (see Appendix 7-4, Table 1-42). On the 3rd of March 2020, 13 birds were recorded feeding in a field beside Lough Derravaragh, approximately 5.4km south of the proposed wind farm site.

There were no additional observations of this species during any of the other comprehensive surveys.

7.4.20 Lapwing

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

Vantage Point Surveys

- 2015-2017 surveys

During the 2015-2017 surveys, flocks of 40 lapwing were recorded on three occasions during the winter seasons (see Appendix 7-4, Figure 7-1-12). All flights were recorded within, or partially within, potential collision height. All observations were recorded within the proposed wind farm site.

Breeding Bird Surveys

- 2018-2020 surveys

Lapwing were recorded on four occasions during Breeding Bird Surveys (see Confidential Appendix 7-7, Figure 7-3-4). A potential breeding pair was recorded calling, displaying and mobbing predators during the core breeding season of April – June 2019. The birds were recorded in an area of suitable breeding habitat that contained a mosaic of bare ground, exposed gravel, revegetating ground, and shallow pools (see Confidential Appendix 7-7, Figure 7-8-1-2). All observations were recorded off site, approximately 3.8km south of the wind farm site and 100m from the proposed grid connection route.

Winter Transect Surveys

- 2015-2017 surveys

Lapwing were recorded on a single occasion during the 2015-2017 Winter Transect Surveys (see Appendix 7-4, Figure 7-5-10). On the 19th of January 2016, an individual bird was observed flying over an area of cutover bog approximately 2.6km south of the proposed wind farm site.

Waterfowl Surveys

- 2015-2017 surveys

Lapwing were recorded on twenty-seven occasions during the 2015/17 Waterfowl Surveys (see Appendix 7-4, Table 1-46). On the 26th of May 2017, an individual bird was observed roosting at Lough Bane, adjacent to the Site. All other observations were recorded during the winter seasons: ten observations during winter 2015/16 and the remaining sixteen during the winter 2016/17. The species was recorded at Lough Bane, Lough Kinale and Derragh Lough, Lough Sheelin and Lough

Derravaragh. A maximum number of 290 birds was recorded at Lough Kinale and Derragh Lough located approximately 2km north-west of the Proposed Development Site. Lapwing were recorded at Lough Bane within 500m of the wind farm site on a single occasion with one bird observed.

- 2018-2020 surveys

Lapwing were recorded on seventeen occasions during the 2018/20 Waterfowl Surveys (see Appendix 7-4, Table 1-46). The species was recorded feeding/roosting from the following sites: Lough Bane, Lough Sheelin and Lough Derravaragh. A maximum number of 73 lapwing was recorded at Lough Derravaragh, approximately 5.4km south of the proposed wind farm site. Lapwing were recorded at Lough Bane within 500m of the wind farm site on ten occasions with a maximum of 44 birds observed in November 2019. Four lapwing were observed displaying to the north west of Lough Bane in March 2020.

Incidental Observations

There were three incidental observations of lapwing between April 2018 and March 2020 (see Appendix 7-4, Table 1-47 and Confidential Appendix 7-7, Figure 7-8-1-1). On the 8th of May 2019, 6 individuals were recorded on a flooded area, approximately 100m from the wind farm site. On the 13th of June 2019, 3 birds were observed in the same area. On the 26th of July 2019, a juvenile bird was observed in the same location to the north west of Lough Bane.

There were no additional observations of this species during any of the other comprehensive surveys.

7.4.21 Redshank

Raw survey data for redshank is provided in Appendix 7-4. Results summary tables are present in Appendix 7-3.

Vantage Point Surveys

- 2018-2020 surveys

Redshank were recorded on a single occasion during the 2018-2020 Vantage Point Surveys (see Appendix 7-4 Figure 7-1-13). On the 7th of August, a pair was recorded travelling over the proposed wind farm site. This flight was below the potential collision height.

Waterfowl Surveys

- 2015-2017 surveys

Redshank were recorded on three occasions during the 2015/17 Waterfowl Surveys (see Appendix 7-4, Table 1-49). All observations were recorded at Derravaragh Lough, approximetaly 5.4km of the Site. All observations were recorded during the winter season 2015/16. A maximum number of 5 birds was recorded.

- 2018-2020 surveys

Redshank was recorded on a single occasion during Waterfowl Surveys (see Appendix 7-4, Table 1-49). On the 20th of August 2019, an individual bird was recorded feeding by Lough Derravaragh, approximately 5.4km south of the proposed wind farm site.

There were no additional observations of this species during any of the other comprehensive surveys.

7.4.22 Woodcock

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

Vantage Point Surveys

- 2015-2017 surveys

During the 2015-2017 surveys, three flights were recorded along the fringes of the Site (see Appendix 7-4, Figure 7-1-14). In April 2016, a minimum of two males were observed roding in areas of cutover bog, recently felled woodland and scrub. Two of these three flights were recorded within, or partially within potential collision height.

Winter Transect Surveys

- 2015-2017 surveys

Woodcock were only recorded on a single occasion during Winter Transect Surveys in 2015/17 (see Appendix 7-4, Figure 7-5-11). On the 15th of December 2015, an individual bird was recorded in an area of cutover bog and woodland.

- 2018-2020 surveys

Woodcock were only recorded on two occasions during Winter Transect Surveys (see Appendix 7-4, Figure 7-5-11). On the 14th of January 2019, an individual bird was flushed from an area of conifer plantation within the proposed wind farm site. On the 6th of January 2020, an individual bird was flushed from a hedge in wet grassland, within the proposed wind farm site.

Woodcock Surveys

Woodcock were recorded on twenty-nine occasions during specific Woodcock Surveys conducted in June 2016 and 2017 (see Appendix 7-4, Figure 7-6-1). Numbers ranged from individuals to a pair. Five of these twenty records correspond to birds heard but not seen. Recorded flights were outside the potential collision height and activity was positively associated with the afforested fringes of the Site and with vegetation corridors within the wind farm and link road sites. Only one flight was recorded over bare peat. There were eight males recorded roding/croaking in June 2016. There were a further eight records of roding males in June 2017. Four territories have been identified for breeding woodcock, three in 2016 and the remaining one in 2017.

The species was assigned probable breeding status, (as per Gilbert el al., 1998) based on the observation of roding males.

Incidental Observations

There was one incidental observation of woodcock between April 2018 and March 2020 (see Appendix 7-4, Table 1-53). On the 7th of August 2019, an individual bird was flushed while the surveyor was accessing the Site, near VP3.

There were no additional observations of this species during any of the other comprehensive surveys.

7.4.23 Barn Owl

Raw survey data for barn owl is provided in Appendix 7-4. Results summary tables are present in Appendix 7-3.

Incidental Observations

There were two incidental recordings of barn owl between April 2018 and March 2020 (see Appendix 7-4, Table 1-54 and Confidential Appendix 7-7, Figure 7-7-1). On the 8th of August 2019, barn owl was heard but not seen during a Vantage Point Survey at VP5. An adjacent building has been identified as a probable breeding site for the species. It is situated approximately 1.2km from the closest turbine (T15) and 100m from the Site boundary.

There were no additional observations of this species during any of the other comprehensive surveys.

7.4.24 Long-eared Owl

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

Incidental Observations

There were three incidental recordings of long-eared owl between April 2018 and March 2020 (see Appendix 7-4, Table 1-55). On the 11th of January 2019, a bird was heard in a tree near VP5. On the 4th of February 2020, a bird was heard calling from a tree in a farmyard. On the 24th of March 2020, a bird was heard calling at dawn from a conifer plantation. All birds were heard calling from VP5 and were therefore assumed to have been present within the wind farm site boundary.

There were no additional observations of this species during any of the other comprehensive surveys.

7.4.25 Buzzard

Raw survey data for buzzard is provided in Appendix 7-4. Results summary tables are present in Appendix 7-3.

Vantage Point Surveys

- 2015-2017 surveys

Buzzard were observed on one hundred and fifty-three occasions during Vantage Point Surveys at VP3 and VP4 (see Appendix 7-4, Table 1-56[1]). One hundred and thirty-six of these observations were of individual birds hunting/circling, while seventeen flights were of two to four birds circling/travelling over the proposed wind farm site. Flight activity was primarily associated with areas of cutover bog, improved agricultural grassland and woodland. One hundred and thirty-four flights were recorded within, or partially within, potential collision height. Eight incidental records of perched and calling birds were also recorded during the VP surveys.

- 2018-2020 surveys

[1] *No flight lines for buzzard were mapped for surveys between October 2015 – September 2017. Observation locations were identified by using the surveyors' locations and notes.*

Buzzard were observed on eighty-seven occasions during Vantage Point Surveys at VP3 and VP5 (see Appendix 7-4, Figure 7-1-13). Sixty of the eighty observations were of individual birds hunting/circling, six flights were of two to four birds circling over the proposed wind farm site, the remaining fourteen flights were of birds travelling through the Site. Flight activity was primarily associated with areas of improved agricultural grassland, conifer plantation and woodland. Forty-one flights were recorded within, or partially within, potential collision height. There were eleven additional recordings of buzzard heard calling but not seen.

Breeding Bird Surveys

- 2015-2017 surveys

Buzzard were recorded on ten occasions during Breeding Bird Surveys (see Appendix 7-4, Figure 7-3-5). A confirmed nest site was recorded outside the study area.

- 2018-2020 surveys

Buzzard were recorded on eighteen occasions during Breeding Bird Surveys (see Appendix 7-4, Figure 7-3-5). Fourteen observations occurred during the 2018 breeding season while the remaining four were recorded during the 2019 breeding season. Most observations occurred in areas of improved agricultural grassland east of the proposed wind farm site.

Breeding Raptor Surveys

- 2015-2017 surveys

Buzzard were recorded on fifty-nine occasions during Breeding Raptor Surveys (see Appendix 7-4, Figure 7-4-3). There were forty-eight observations during breeding season 2016 and eleven observations during breeding season 2017. Most of the observations correspond to birds hunting/travelling over the Site. Juvenile birds were recorded in June and July 2016. The species was assigned confirmed breeding status.

- 2018-2020 surveys

Buzzard were observed on seventy-eight occasions during Breeding Raptor Surveys (see Appendix 7-4, Figure 7-4-3). Fifty-one observations occurred during the 2018 breeding season while the remaining twenty-seven observations occurred during the 2019 breeding season. Most observations were of birds hunting, soaring and circling over improved agricultural grassland, woodland and conifer plantation.

Winter Transect Surveys

- 2015-2017 surveys

Buzzard were recorded on fourteen occasions during the 2015/17 Winter Transect Surveys (see Appendix 7-4, Figure 7-5-12). Most of the observations correspond to birds hunting/travelling over the Site.

- 2018-2020 surveys

Buzzard were observed on eleven occasions during Breeding Raptor Surveys (see Appendix 7-4, Figure 7-5-12). Seven observations occurred during the 2018/2019 winter season while the remaining four observations occurred during the 2019-2020 winter season. Most observations were of birds hunting over improved agricultural grassland and conifer plantation.

Waterfowl Surveys

- 2015-2017 surveys

Buzzard was observed on eleven occasions during the 2015/17 Waterfowl Surveys (see Appendix 7-4, Table 1-60). Observations were recorded at Lough Bane, Lough Kinale and Derragh Lough, Bracklagh Lough and Derravaragh Lough.

- 2018-2020 surveys

Buzzard was observed on four occasions during Waterfowl Surveys (see Appendix 7-4, Table 1-60). These observations were individual birds recorded flying/circling at Lough Kinale and Derragh Lough and Lough Iron.

There were no additional observations of this species during any of the other comprehensive surveys.

7.4.26 Sparrowhawk

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

Vantage Point Surveys

- 2015-2017 surveys

Sparrowhawk were observed on twenty-two occasions during Vantage Point Surveys at VP3 and VP4 (see Appendix 7-4, Table 1-61[2]). Most flight activity was associated with birds hunting over areas of cutover bog, improved agricultural grassland and woodland. Fifteen of these flights were recorded within, or partially within, potential collision height.

- 2018-2020 surveys

Sparrowhawk were observed on eleven occasions during Vantage Point Surveys at VP3 and VP5 (see Appendix 7-4, Figure 7-1-16). Most flight activity was associated with birds hunting/flying over areas of cutover bog, improved agricultural grassland and woodland. Six of these flights were recorded within, or partially within, potential collision height. There were two displaying flights recorded in March 2020 within the wind farm site. The species is given probable breeding status.

Breeding Bird Surveys

- 2015-2017 surveys

Sparrowhawk were observed on a single occasion during the 2015/17 Breeding Bird Surveys (see Appendix 7-4, Figure 7-3-6). On the 29th May 2016, a pair of sparrowhawk was observed.

- 2018-2020 surveys

Sparrowhawk were observed on three occasions during Breeding Bird Surveys (see Appendix 7-4, Figure 7-3-6). One observation occurred during the 2018 breeding season while the remaining two occurred during the 2019 breeding season. Most observations were of birds calling/circling with a juvenile sparrowhawk observed in July 2019. This confirms breeding within the wind farm site.

[2] *No flight lines for sparrowhawk were mapped for surveys between October 2015 – September 2017. Observation locations were identified by using the surveyors' locations and notes.*

Breeding Raptor Surveys

- 2015-2017 surveys

Sparrowhawk were observed on five occasions during the 2015/17 Breeding Raptor Surveys (see Appendix 7-4, Figure 7-4-4). Recorded behaviour included hunting and perching. Suitable breeding habitat was recorded and the species was assigned possible breeding status.

- 2018-2020 surveys

Sparrowhawk were recorded on four occasions during Breeding Raptor Surveys (see Appendix 7-4, Figure 7-4-4). Two observations occurred during the 2018 breeding season with an individual recorded travelling carrying prey approximately 600 north of the wind farm site. The remaining two observations occurred during the 2019 breeding season with individual birds carrying food along the grid connection route, south of the proposed wind farm site. This confirms breeding within/in the vicinity the wind farm site.

Winter Transect Surveys

- 2015-2017 surveys

Sparrowhawk were observed on seven occasions during the 2015/17 Winter Transect Surveys (see Appendix 7-4, Figure 7-5-13). All observations correspond to individual or pairs of birds recorded flying/hunting on site.

- 2018-2020 surveys

Sparrowhawk was observed on a single occasion during Winter Transect Surveys (see Appendix 7-4, Figure 7-5-13). On the 10th October 2019, an individual bird was observed in hunting flight over cutover bog, approximately 3.7km south of the proposed wind farm area.

Incidental Observations

There were two incidental observations of sparrowhawk during Waterfowl Surveys between October 2015 – September 2017 and April 2018 - March 2020 (see Appendix 7-4, Table 1-65). On the 15th of September 2016, an individual bird was observed at Derravaragh Lough, approximately 5.4km to the Site. On the 23rd of October 2018, an individual was recorded flying onto Lough Iron.

There were no additional observations of this species during any of the other comprehensive surveys.

7.4.27 Kestrel

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

Vantage Point Surveys

- 2015-2017 surveys

Kestrel were observed on fifty-four occasions during Vantage Point Surveys at VP3 and VP4 between October 2015 and September 2017 (see Appendix 7-4, Table 1-66[3]). Observations were distributed

[3] *No flight lines for kestrel were mapped for surveys between October 2015 – September 2017. Observation locations were identified by using the surveyors' locations and notes.*

across all seasons, ranging from individual to pairs of kestrel. Most observations occurred with birds hunting over cutover bog. Forty-seven of the total observations were recorded at potential collision height.

- 2018-2020 surveys

Kestrel were observed on eighteen occasions during Vantage Point Surveys between April 2018 and March 2020 (see Appendix 7-4, Figure 7-1-17). Observations were distributed across all seasons, with individual birds hunting over cutover bog and improved grassland. Most observations were recorded at potential collision height.

Breeding Bird Surveys

- 2015-2017 surveys

Kestrel were observed on a single occasion during the 2015/17 Breeding Bird Surveys (see Appendix 7-4, Figure 7-3-7). On the 30th of May 2016, an individual bird was recorded hunting over Site.

- 2018-2020 surveys

Kestrel were observed on a single occasion during Breeding Bird Surveys (see Appendix 7-4, Figure 7-3-7). On the 18th of June 2018, an individual was recorded flying over cutover big, approximately 3.5km south of the proposed wind farm site.

Breeding Raptor Surveys

- 2015-2017 surveys

Kestrel were observed on thirteen occasions during the 2015/17 Breeding Raptor Surveys (see Appendix 7-4, Figure 7-4-5). There were ten observations during the 2016 breeding season while the remaining three were recorded during the 2017 breeding season. All observations correspond to birds hunting/circling. Suitable breeding habitat was recorded, and the species was assigned possible breeding status.

- 2018-2020 surveys

Kestrel were observed on seventeen occasions during Breeding Raptor Surveys (see Appendix 7-4, Figure 7-4-5). Only five of these observations occurred within 500m of the proposed wind farm.

Winter Transect Surveys

- 2015-2017 surveys

Kestrel were only recorded on six occasions during the 2015/17 Winter Transect Surveys (see Appendix 7-4, Figure 7-5-14). All observations correspond to birds hunting/flying.

- 2018-2020 surveys

Kestrel were only recorded on three occasions during Winter Transect Surveys (see Appendix 7-4, Figure 7-5-14). Only one of these observations was recorded within the proposed wind farm.

Incidental Observations

There were one incidental observations of kestrel during Waterfowl Surveys between October 2015 – September 2017 and April 2018 - March 2020 (see Appendix 7-4, Table 1-70). On the 13th of October, a bird was observed at Lough Kinale, approximately 2km form the proposed wind farm.

There were no additional observations of this species during any of the other comprehensive surveys.

7.4.28 Common Snipe

Raw survey data for common snipe is provided in Appendix 7-4. Results summary tables are present in Appendix 7-3.

Vantage Point Surveys

- 2018-2020 surveys

Common snipe were observed on five occasions during Vantage Point Surveys between April 2018 and March 2020 (see Appendix 7-4, Figure 7-1-18). There were observations in December 2018, February 2019 and June 2019, consisting of 1 to 3 birds. All observations occurred to the east of the proposed wind farm site over improved agricultural grassland, within, or partially within, potential collisions height.

There were a further seven records of common snipe heard calling during Vantage Point Surveys but not seen. These observations occurred within the Proposed Development area.

Breeding Bird Surveys

- 2015-2017 surveys

Common Snipe were observed on only three occasions during the 2015/17 Breeding Bird Surveys (see Appendix 7-4, Figure 7-3-8). On the 28th of April 2016, a possible breeding individual was flushed from an area of sparse juncus. On the 10th of June 2016, two birds were flushed while calling. On the 29th of May 2016, a bird was observed approximately 1.6km south of the wind farm site. Two observations were recorded within the Proposed Development area.

- 2018-2020 surveys

Common Snipe were observed on sixteen occasions during Breeding Bird Surveys (see Appendix 7-4, Figure 7-3-8). Eleven observations occurred during the 2018 breeding season while the remaining five observations occurred during the 2019 breeding season. The maximum number of common snipe encountered in a single day was eight in April 2019. Most observations were of birds flushed from the ground in areas of blanket bog, while some observations were of birds heard calling. Ten observations occurred within the proposed wind farm site. On the 29th of May 2016, a bird was heard drumming in an area of wet grassland within the Site boundary. The species is given probable breeding status within the wind farm site.

Winter Transect Surveys

- 2015-2017 surveys

Common Snipe were recorded on seven occasions during the 2015/17 Winter Transect Surveys (see Appendix 7-4, Figure 7-5-15). Six observations occurred during the 2015/16 winter season while the

remaining one occurred during the 2016/17 winter season. Most observations were of birds flushed from the ground. Most observations occurred within the Proposed Development area.

- 2018-2020 surveys

Common Snipe were recorded on fifty-three occasions during Winter Transect Surveys (see Appendix 7-4, Figure 7-5-15). Twenty-eight observations occurred during the 2018/2019 winter season while the remaining twenty-five occurred during the 2019/2020 winter season. Most observations were of birds flushed from the ground. Most observations occurred within the Proposed Development area.

Incidental Observations

There were twenty-one incidental observations of the species during Waterfowl Surveys in 2015-2017 and 2018-2020 (see Appendix 7-4, Table 1-74). The species was recorded from the following sites: Lough Bane, Lough Bracklagh, Garriskil Bog Lough Sheelin and Lough Derravaragh. A maximum number of 5 snipe was recorded at Lough Derravaragh, approximately 5.4km of the proposed wind farm site.

There were no additional observations of this species during any of the other comprehensive surveys.

7.4.29 Passerines (Red-listed)

The BoCCI Red-listed species meadow pipit were recorded as a regular sighting during the surveys undertaken. This species was recorded to be common residents within the Proposed Development area.

7.5 Evaluation

A determination of population importance of birds within the likely zone of influence is provided in the sections below following criteria described in Section 7.2.5. Estimates of National population sizes were obtained from the NPWS Article 12 Reporting (2008-2012) which details the status and trends of Ireland's bird species. The development Site is fully located within County Westmeath. Where relevant, estimates for mean county populations has been derived following a review of I-WeBS sites in County Westmeath.

7.5.1 Whooper Swan

Wintering

As per the latest national wintering estimates provided in Burke et al. (2018), the national wintering population of whooper swan in the Republic of Ireland is 11,852. Using these latest I-WeBS figures, 1% of the National population of whooper swans is 119. Therefore, as per NRA 2009, a regularly occurring population of 119 whooper swans is required for classification as Nationally Important. The maximum number of birds recorded from the winter season was 96 birds. This maximum number does not correspond with the classification criteria for National or International Importance (Burke et al. 2018).

The Swan Census 2015 (Crowe et al., 2015) was consulted regarding the population data for whooper swans in County Westmeath. Based on the 2015 Swan Census data, in January 2015 the County Westmeath population was 389 individuals. Based on the above, a population of 3-4 whooper swans is required for County Importance classification in the Westmeath area.

Whooper swan is an SCI of Lough Derravaragh SPA (004043), Lough Iron SPA (004046) and Glen Lough SPA (004045) with respect to wintering populations. The whooper swan population associated with Lough Derravaragh SPA is 44 birds, the population associated within Lough Iron SPA is 94 birds, while the population at Glen Lough SPA is estimated at 126 birds (I-WeBS 5-year mean peak counts 2011/12 - 2015/16). Based on survey results, no regular commuting/migratory flights were recorded that would constitute evidence of connectivity between the SPAs and the Proposed Development area.

During the 2015-2017 and 2018-2020 surveys, whooper swan flocks of county importance, as per NRA criteria (Crowe et al., 2015), were observed on 123 occasions. Flocks of National importance, as per NRA criteria (Burke et al, 2018), were not observed during the extensive survey work. However, no roosting/foraging areas for whooper swan were recorded within one kilometre of the wind farm site. Large flocks of 50-90 birds were observed roosting at the Lough Iron SPA, approximately 12.8km from the wind farm site, during the 2018/19 and 2019/20 winter seasons.

The vast majority of observations involved flocks of no greater than county importance, the population recorded at the development Site was assigned **County Importance** on a precautionary basis.

Breeding

The species is not dependent of the development Site for breeding.

7.5.2 Greenland White-fronted Goose

Wintering

As per the latest national wintering estimates provided in Burke et al. (2018), the national wintering population of Greenland white-fronted goose in the Republic of Ireland is 9,500. Using these latest I-

WeBS figures, 1% of the National population of Greenland white-fronted goose is 95. Therefore, as per NRA 2009, a regularly occurring population of 95 Greenland white-fronted goose is required for classification as Nationally Important.

Greenland white-fronted goose is an SCI of Garriskil Bog SPA (004102) and Lough Iron SPA (004046) with respect to wintering populations. Garriskil Bog SPA is located approximately 7.5km of the development Site, to the south-west, while Lough Iron SPA is situated approximately 12.8km south-west of the Proposed Development. The core foraging range of Greenland white-fronted goose is 5-8km (SNH, 2016). The Greenland white-fronted goose population associated with Garriskil Bog SPA is 0 bird (last record in 1986/87 as per Garriskil SPA site synopsis), while the population associated within the Lough Iron SPA is 291 birds (I-WeBS 5-year mean peak counts 2011/12 - 2015/16).

To estimate the county population, a review of Westmeath I-WeBS sites was conducted. The following mean count values have been recorded for Westmeath I-WeBS sites over the most recent 5-season period, i.e. for the period 2011/12 – 2015/16:

Westmeath I-WeBS Sites

- Ballinlough (Westmeath) (mean 0)
- Crowinstown Lough (mean 0)
- Glen Lough (mean 0)
- Lough Derravaragh (mean 0)
- Lough Drin (mean 0)
- Lough Ennell (mean 0)
- Lough Glore (mean 0)
- Lough Iron (mean 291)
- Lough Lene (mean 0)
- Lough Owel (mean 0)
- Lough Sheever (mean 0)
- Plunkett's Quarry, Castletown (mean 0)
- Royal Canal (mean 0)
- Slevin's Lake (mean 0)
- Tang River (mean 0)
- Walshestown South Turlough (mean 0)
- White/Annagh Lough (mean 0)

Based on the above, the wintering population for Greenland white-fronted goose from Westmeath, is 291. Therefore, a regularly occurring population of 2-3 birds (1% of the county population) is considered of County Importance in the context of the development Site.

During the winter survey months, a maximum number of 15 birds were observed in flight while the species was observed on only another occasion with 12 birds travelling over the proposed wind farm.

However, taking a precautionary approach, it is assumed that the flocks recorded during wintering season are associated with a **County** important population from the wider area.

Breeding

The species is not dependent of the development Site for breeding.

7.5.3 Golden Plover

Wintering

The estimated national wintering population of golden plover in Ireland is 80,707 for the Republic of Ireland (ROI) (Burke et al. 2018). 1% of the ROI National wintering population of golden plover is 807 birds. As per NRA 2009, a regularly occurring population of 807 golden plover is required for classification as Nationally Important. The maximum number of birds recorded from the winter season was 140 birds. This maximum number does not correspond with the classification criteria for National or International Importance (Burke et al., 2018).

Golden plover is an SCI of Lough Iron SPA (004046) with respect to wintering populations. This SPA is located approximately 12.8km southwest of the development Site. The golden plover population associated with Lough Iron SPA is 589 birds (I-WeBS 5-year mean peak counts 2011/12 -2015/16). No regular commuting/migratory flights were recorded that would constitute evidence of connectivity between the SPA and the Proposed Development area. The evidence of surveys was that the local population was largely resident during the winter months in local areas of cutover bog.

To estimate the county population, a review of Westmeath I-WeBS sites was conducted. It should be noted that wintering golden plover will utilise agricultural grasslands and other habitats not typically surveyed during I-WeBS counts. Therefore, the population estimate provided based on I-WeBS figures below is likely to be an underestimate of the county population. The following mean count values have been recorded for Westmeath, I-WeBS sites over the most recent 5-season period, i.e. for the period 2011/12 – 2015/16:

Westmeath I-WeBS Sites

- Ballinlough (Westmeath) (mean 0)
- Crowinstown Lough (mean 0)
- Glen Lough (mean 55)
- Lough Derravaragh (mean 187)
- Lough Drin (mean 0)
- Lough Ennell (mean 1,000)
- Lough Glore (mean 40)
- Lough Iron (mean 589)
- Lough Lene (mean 0)
- Lough Owel (mean 1)
- Lough Sheever (mean 700)
- Plunkett's Quarry, Castletown (mean 2)
- Royal Canal (mean 0)
- Slevin's Lake (mean 0)
- Tang River (mean 0)
- Walshestown South Turlough (mean 3)
- White/Annagh Lough (mean 33)

Based on the above, the mean wintering population for golden plover from Westmeath I-WeBS sites is 2,610. Therefore, a regularly occurring population of 26 birds (1% of the county population) is considered of County Importance in the context of the development Site.

During the survey months (October-March), a maximum number of 140 birds were observed in flight while the species was observed on one hundred and nine occasions, of which ninety-one occurred within the development Site. Forty-six observations contained flocks of county importance. Flocks of county importance are therefore considered to have regularly occurred within the wind farm site.

The golden plover recorded during surveys are therefore considered to be associated with a population of **County Importance** from the wider surroundings.

Breeding

The species is not dependent on the development Site for breeding.

7.5.4 Hen Harrier

Wintering

The estimated national wintering population of Hen Harrier in Ireland is 269-349 therefore 1% of the ROI National wintering population is 2-3 birds. As per NRA 2009, a regularly occurring wintering population of 2-3 Hen Harrier is required for classification as Nationally/Internationally Importance.

The species was recorded on a single occasion during an extensive four years of surveying. No indication of roosting behaviour was observed on Site.

The species is not dependent on the development Site for wintering.

Breeding

Based on the latest Breeding Hen Harrier Survey (NPWS, 2015), the ROI National breeding population is in the range of 108-157 pairs. Therefore, a single breeding pair in Ireland conforms to National/International Importance as per NRA criteria.

This species was recorded on a single occasion during the breeding season, approximately 4km from the wind farm site. No indication of breeding behaviour was observed either on Site or within 2km of same.

The species is not dependent on the development Site for breeding.

7.5.5 Merlin

As per the latest NPWS Article 12 reporting document, the estimated population of Merlin is between 200 – 400 pairs based on Hardy et al. (2009).

Merlin populations are widespread but have a patchy distribution in Ireland therefore the merlin recorded during surveys requires further consideration. The species was recorded infrequently during Vantage Point Surveys and Winter Transect Surveys between 2015 and 2017. However, the species was not recorded between April 2018 and March 2020.

Taking a highly precautionary approach, the population recorded was assigned **Local Importance (Higher Value)**.

7.5.6 Peregrine Falcon

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

Peregrine falcon are recovering from a severe population decline in Ireland (BoCCI) therefore, the observation of this species requires further consideration. The species was frequently recorded within the wind farm site and to a 2km buffer during Breeding Raptor Surveys. In 2016, a nesting site was

confirmed on cliffs, approximately 1.3km east of the proposed wind farm site. In 2019, there was a possible nest recorded in the same area.

On a precautionary basis, birds recorded during the extensive surveys undertaken are likely to be associated with a population of **County Importance** from the wider area.

7.5.7 White-tailed Eagle

White-tailed eagle have been reintroduced to Ireland between 2007 and 2011 in Killarney, Co. Kerry. There are an estimated 12 active territories of white-tailed eagle in the country, as well as several unpaired individuals. This species was recorded on a single day between October 2015 and September 2017 and on no occasions between April 2018 and March 2020. There was no observation of the species during any breeding seasons surveyed.

The species is not dependent on the development Site with respect to breeding or wintering populations.

7.5.8 Osprey

This species is rarely encountered in Ireland, with only a small number of migrating osprey passing through the country (typically along the east coast) each year.

Osprey was reported on only one date throughout an extensive four-year survey period between October 2015 and September 2017 and April 2018 and March 2020. The bird recorded on three occasions on the one date north of the wind farm site is likely a vagrant passing through the area and is unlikely to be encountered at the Site again. This species is an obligate piscivore, that is reliant on large water bodies for foraging. The species was not observed between April 2018 and March 2020.

The development Site is not of significance to this species.

7.5.9 Red Kite

Red Kite were recently re-introduced to Ireland. Breeding is currently still confined to the east coast, close to the original reintroduction sites in counties Wicklow, Dublin and Down.

This species was recorded on a single occasion throughout an extensive four-year survey period between October 2015 and September 2017 and April 2018 and March 2020. The flight was limited to an area of improved agricultural grassland, south-east of the proposed wind farm site.

The development Site is not of significance to this species.

7.5.10 Shoveler

Shoveler is a Special Conservation Interest (SCI) of designated sites and Red-listed with regard to Wintering populations.

This species was not recorded at the proposed wind farm site (including 500m buffer). The Proposed Development has no potential to result in direct habitat loss, displacement or barrier effect on this species. No pathways for direct or indirect effects exist. Therefore, this species is not considered further in this assessment.

The development Site is not of significance to this species.

7.5.11 Wigeon

Wigeon is an SCI of designated sites and Red-listed (BoCCI) with regard to Wintering populations.

The estimated national wintering population of wigeon in Ireland is 50,452 for the Republic of Ireland (ROI) (Burke et al. 2018). 1% of the ROI National wintering population of wigeon is 505 birds. As per NRA 2009, a regularly occurring population of 505 wigeon is required for classification as Nationally Important. The maximum number of birds recorded from the winter season was 51 birds. This maximum number does not correspond with the classification criteria for National or International Importance (Burke et al., 2018).

Wigeon is an SCI of Lough Iron SPA (004046) with respect to wintering populations. This SPA is located approximately 12.8km southwest of the development Site. The wigeon population associated with Lough Iron SPA is 295 birds (I-WeBS 5-year mean peak counts 2011/12 -2015/16). Lough Iron SPA is outside the core foraging range (c. 2.6km) of wintering wigeon (Johnson et al., 2014). Furthermore, no regular commuting/migratory flights were recorded that would constitute evidence of connectivity between the SPA and the Proposed Development area. The evidence of surveys was that the local population was largely resident during the winter months in local areas north of the Site, nearby Lough Bane.

To estimate the county population, a review of Westmeath I-WeBS sites was conducted. The following mean count values have been recorded for Westmeath I-WeBS sites over the most recent 5-season period, i.e. for the period 2011/12 – 2015/16:

Westmeath I-WeBS Sites

- Ballinlough (Westmeath) (mean 44)
- Crowinstown Lough (mean 0)
- Glen Lough (mean 58)
- Lough Derravaragh (mean 50)
- Lough Drin (mean 0)
- Lough Ennell (mean 18)
- Lough Glore (mean 70)
- Lough Iron (mean 295)
- Lough Lene (mean 10)
- Lough Owel (mean 36)
- Lough Sheever (mean 0)
- Plunkett's Quarry, Castletown (mean 0)
- Royal Canal (mean 0)
- Slevin's Lake (mean 0)
- Tang River (mean 0)
- Walshestown South Turlough (mean 38)
- White/Annagh Lough (mean 13)

Based on the above, the mean wintering population for wigeon from Westmeath I-WeBS sites is 632. Therefore, a regularly occurring population of 6-7 birds (1% of the county population) is considered of County Importance in the context of the development Site.

This species was frequently recorded feeding and roosting at Lough Bane, just north of the Site boundary, during the winter seasons. Numbers ranged from 2 to 78 birds.

The wigeon recorded during surveys are therefore considered to be associated with a population of **County Importance** from the wider surroundings.

7.5.12 Pochard

Pochard is an SCI of designated sites and Red-listed (BoCCI) with regard to Wintering populations.

The estimated national wintering population of pochard in Ireland is 4,729 for the Republic of Ireland (ROI) (Burke et al. 2018). 1% of the ROI National wintering population of pochard is 47 birds. As per NRA 2009, a regularly occurring population of 47 pochard is required for classification as Nationally Important. The maximum number of birds recorded from the winter season was 483 birds at Lough Sheelin, approximately 4km north-west of the wind farm site. However, there was only one record of an individual bird within 500m of the Site boundary. Therefore, the maximum number on Site does not correspond with the classification criteria for National or International Importance (Burke et al., 2018).

The Proposed Development has no potential to result in direct habitat loss, displacement or barrier effect on this species. No pathways for direct or indirect effects exist.

Given the very low level of activity recorded on Site for pochard during an extensive four-year period survey, it is concluded that the development Site is not of significance to this species.

7.5.13 Goldeneye

Goldeneye is an SCI of designated sites and Red-listed (BoCCI) with regard to Wintering populations.

This species was not recorded at the proposed wind farm site (including 500m buffer). The Proposed Development has no potential to result in direct habitat loss, displacement or barrier effect on this species. No pathways for direct or indirect effects exist. Therefore, this species is not considered further in this assessment.

The development Site is not of significance to this species.

7.5.14 Tufted Duck

Tufted duck is an SCI of designated sites and Red-listed (BoCCI) with regard to Wintering populations.

This species was not recorded at the proposed wind farm site (including 500m buffer). The Proposed Development has no potential to result in direct habitat loss, displacement or barrier effect on this species. No pathways for direct or indirect effects exist. Therefore, this species is not considered further in this assessment.

The development Site is not of significance to this species.

7.5.15 Teal

Teal is an SCI of designated sites and Red-listed (BoCCI) with regard to Breeding and Wintering populations.

Wintering

The estimated national wintering population of teal in Ireland is 27,644 for the Republic of Ireland (ROI) (Burke et al. 2018). 1% of the ROI National wintering population of teal is 276 birds. As per NRA 2009, a regularly occurring population of 276 teal is required for classification as Nationally Important. The maximum number of birds recorded from the winter season was 122 birds at Lough Derravaragh, approximately 5.4km south-east of the proposed wind farm. This maximum number does not correspond with the classification criteria for National or International Importance (Burke et al., 2018).

Teal is an SCI of Lough Iron SPA (004046) with respect to wintering populations. This SPA is located approximately 12.8km southwest of the development Site. The teal population associated with Lough Iron SPA is 120 birds (I-WeBS 5-year mean peak counts 2011/12 -2015/16). Lough Iron SPA is outside the core foraging range (c. 3km) of teal during winter (Johnson et al., 2014). Furthermore, no regular commuting/migratory flights were recorded that would constitute evidence of connectivity between the SPA and the Proposed Development area. The evidence of surveys was that the local population was largely resident during the winter months in local areas north of cutover bog.

To estimate the county population, a review of Westmeath I-WeBS sites was conducted. The following mean count values have been recorded for Westmeath I-WeBS sites over the most recent 5-season period, i.e. for the period 2011/12 – 2015/16:

Westmeath I-WeBS Sites

- Ballinlough (Westmeath) (mean 18)
- Crowinstown Lough (mean 0)
- Glen Lough (mean 62)
- Lough Derravaragh (mean 51)
- Lough Drin (mean 20)
- Lough Ennell (mean 18)
- Lough Glore (mean 4)
- Lough Iron (mean 120)
- Lough Lene (mean 11)
- Lough Owel (mean 12)
- Lough Sheever (mean 2)
- Plunkett's Quarry, Castletown (mean 5)
- Royal Canal (mean 0)
- Slevin's Lake (mean 7)
- Tang River (mean 0)
- Walshestown South Turlough (mean 92)
- White/Annagh Lough (mean 28)

Based on the above, the mean wintering population for teal from Westmeath I-WeBS sites is 450. Therefore, a regularly occurring population of 4-5 birds (1% of the county population) is considered of County Importance in the context of the development Site.

Numbers of county importance were recorded within 500m of the wind farm on seven occasions.

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

Breeding

There were no records of the species during breeding season. The species is not dependent on the development Site for breeding.

7.5.16 Coot

Coot is an SCI of designated sites and Amber-listed (BoCCI) Breeding and Wintering populations.

Coot is an SCI of Lough Derravaragh SPA (004043), Lough Iron SPA (004046) and Lough Owel (004047) with respect to breeding and wintering populations. These SPAs are located respectively 5.4km south of the development Site, 12.8km southwest and 13.4km south. No regular commuting/migratory flights were recorded that would constitute evidence of connectivity between the SPA and the Proposed Development area. The evidence of surveys was that the small local population was largely resident during the winter months in local wetlands.

This species was recorded within 500m of the wind farm site on only three occasions when birds were observed on water at Lough Bane (adjacent to the Site boundary). The maximum number of birds recorded was one.

The development Site is not of significance to this species.

7.5.17 Great-crested Grebe

Great-crested grebe is an SCI of designated sites and Amber-listed (BoCCI) with regard to wintering populations.

This species was not recorded at the proposed wind farm site (including 500m buffer). The Proposed Development has no potential to result in direct habitat loss, displacement or barrier effect on this species. No pathways for direct or indirect effects exist. Therefore, this species is not considered further in this assessment.

The development Site is not of significance to this species.

7.5.18 Black-headed Gull

Black-headed gull is BoCCI Red-listed during the breeding season in Ireland. As per the NPWS Article 12, the national population of breeding black-headed gull is estimated at 9,318 pairs. Therefore, a regularly occurring population of 93 pairs (1% of the county population) is considered of National Importance in the context of the development Site. Numbers of national importance were not recorded on Site.

The species was infrequently recorded within 500m of the wind farm site during breeding season (11 occasions). In April 2018, 129 birds were observed roosting at Lough Bane, north of the wind farm site. In May 2018, 53 birds were recorded roosting in the same location. No breeding was recorded on Site.

Given the two flocks recorded roosting at Lough Bane on two occasions and on a highly precautionary basis, the population was assigned **Local Importance (Higher Value).**

7.5.19 Curlew

Curlew is Red-listed (BoCCI) with regard to breeding and wintering populations.

On the 3rd of March 2020, 13 birds were recorded feeding in a field beside Lough Derravaragh, approximately 5.4km south of the proposed wind farm site. This species was not recorded at the proposed wind farm site (including 500m buffer). The Proposed Development has no potential to result in direct habitat loss, displacement or barrier effect on this species. No pathways for direct or indirect effects exist. Therefore, this species is not considered further in this assessment.

The development Site is not of significance to this species.

7.5.20 Lapwing

Lapwing is Red-listed (BoCCI) with regard to breeding and wintering populations.

Wintering

Flocks of 40 birds were recorded on Site on two dates in January and February 2015. There were seven observations of birds roosting at Lough Bane, adjacent to the Site boundary, between the 2018/19 and 2019/20 winters with a maximum number of 44 birds in November 2019.

Taking a precautionary approach, the population recorded on Site and its vicinity was assigned **Local Importance (Higher Value).**

Breeding

As per article 12 of the NPWS, the breeding population is estimated at 2,000 pairs. Therefore, twenty pairs of lapwing (1% of the county population) is considered of National Importance in the context of the development Site. Numbers of national importance were not recorded on Site.

Lapwing breeding behaviour and juvenile birds were recorded to the north west of Lough Bane during the 2019 breeding season. Display flights were again recorded in this location in March 2020. As per the Breeding Bird Atlas 2007/11, the status of lapwing is *probable* for the hectad that overlaps with this area.

A pair of lapwing was observed during the 2019 season, calling, displaying and defending their territory against corvids. This nesting area is located approximately 3.9km south of the wind farm Site and adjacent to the grid connection route. Please refer to Confidential Appendix 7-7, Figures 7-8-1, 7-8-1-1 and 7-8-1-2 for location details.

Taking a precautionary approach, the population recorded on Site and its vicinity was assigned **County Importance.**

7.5.21 Redshank

Redshank is Red-listed (BoCCI) with regard to breeding and wintering populations.

The species was recorded on Site on a single occasion throughout an extensive four-year period survey. No pathways for direct or indirect effects were identified.

The development Site is not of significance to this species.

7.5.22 Woodcock

Woodcock is Red-listed (BoCCI) during the breeding season in Ireland but is not Red-listed with regard to wintering populations.

This species was occasionally recorded on Site during breeding season with a minimum of two males roding in April 2016. The species was assigned probable breeding status.

The population recorded was assigned **Local Importance (Higher Value)**.

7.5.23 Barn Owl

Barn Owl is BoCCI Red-listed during the breeding season in Ireland.

This species was identified as probably breeding within a farmyard, along the eastern margin of the wind farm site. However, there was no sighting of the species as birds were only heard calling.

Given the difficulty to observe this nocturnal species and on a highly precautionary basis, the population was assigned **County Importance.**

7.5.24 Long-eared Owl

Long-eared owl is not listed on Annex I of the Birds Directive. The species is Green-listed in Ireland (BoCCI). There was no sighting of the species as birds were only heard calling. The population recorded was assigned **Local Importance (Higher Value)** on the basis of a resident/regularly occurring population assessed to be important at the local level.

7.5.25 Buzzard

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

7.5.26 Sparrowhawk

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

7.5.27 Kestrel

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

7.5.28 Common Snipe

Common Snipe are Amber-listed in Ireland during both the breeding and winter seasons (BoCCI). The population recorded within the development Site was assigned **Local Importance (Higher Value)** on the basis of a resident/regularly occurring population assessed to be important at the local level.

7.5.29 Passerines (Red-listed)

Meadow pipit and grey wagtail are Red-listed in Ireland during the breeding season. The species were frequently encountered within the Proposed Development area. Populations recorded were deemed to be of no greater than **Local Importance (Lower Value)**.

7.6 Identification of Key Ornithological Receptors

Table 7-11 Avifaunal Receptor Evaluation and Selection Criteria Rational

Species	Conservation Status	NRA Evaluation (NRA, 2009)	Rational for inclusion/exclusion as KOR	KOR Yes/No
Whooper Swan	Annex I, EU Birds Directive; SCI of designated sites; BoCCI Amber List & Irish Wildlife Act.	**Wintering** County Importance	This species was occasionally recorded flying/feeding within the development Site and within 500m of same during winter months. The potential for habitat loss cannot be excluded. **An assessment of direct habitat loss is required.** Birds were recorded within the development Site boundary, **the potential for displacement exists**. This species was recorded flying over the development Site within the potential collision risk zone. **A collision risk assessment is required.**	**Yes**
Greenland White-fronted Goose	Annex I, EU Birds Directive; SCI of designated sites; BoCCI Amber List & Irish Wildlife Act.	**Wintering** County Importance	This species was rarely recorded flying within the development Site and within 500m of same during winter months. However, the potential for habitat loss cannot be excluded. **An assessment of direct habitat loss is required.** Birds were recorded within the development Site boundary. Taking a precautionary approach, **the potential for displacement exists**. This species was recorded flying over the development Site within the potential collision risk zone. **A collision risk assessment is required.**	**Yes**

Species	Conservation Status	NRA Evaluation (NRA, 2009)	Rational for inclusion/exclusion as KOR	KOR Yes/No
Golden Plover	Annex I, EU Birds Directive; BoCCI Red List & Irish Wildlife Act.	**Wintering** County Importance	This species was occasionally recorded flying/feeding within the development Site and within 500m of same during winter months. The potential for habitat loss cannot be excluded. **An assessment of direct habitat loss is required.** Birds were recorded within the development Site boundary, **the potential for displacement exists**. This species was recorded flying over the development Site within the potential collision risk zone. **A collision risk assessment is required.**	**Yes**
Hen Harrier	Annex I, EU Birds Directive; BoCCI Amber List & Irish Wildlife Act.	**All Seasons** No population of ecological significance recorded	This species was only recorded on two occasions during the extensive suite of surveys undertaken within the four-year survey period. Numbers of ecological significance as per NRA criteria were not recorded. No breeding or roosting evidence was recorded during the extensive surveys undertaken. There is no evidence to suggest that the development Site is of significance to this species. No pathways for significant effects were identified. Please refer to Section 7.5.4 for further details.	**No**
Merlin	Annex I, EU Birds Directive; BoCCI Amber List & Irish Wildlife Act.	**All Seasons** Local Importance (Higher Value)	This species was infrequently recorded within the Proposed Development area during surveys between October 2015 and September 2017. No evidence of breeding or roosting activity was recorded. However, the potential for direct habitat loss cannot be excluded. **An assessment of direct habitat loss is required.** This species was recorded within the development Site boundary. Taking a highly precautionary approach, **an assessment of displacement effects is required.**	**Yes**

Species	Conservation Status	NRA Evaluation (NRA, 2009)	Rational for inclusion/exclusion as KOR	KOR Yes/No
			This species was recorded flying over the development Site within the potential collision risk zone. **A collision risk assessment is required.**	
Peregrine Falcon	Annex I, EU Birds Directive; BoCCI Green List & Irish Wildlife Act.	**All Seasons** County Importance	This species was frequently recorded within the proposed wind farm Site. The potential for habitat loss cannot be excluded. **An assessment of direct habitat loss is required.** This species was recorded within the development Site boundary, **an assessment of displacement effects is required.** This species was recorded flying over the development Site within the potential collision risk zone. **A collision risk assessment is required.**	**Yes**
White-tailed Eagle	Annex I, EU Birds Directive; BoCCI Red List & Irish Wildlife Act.	**All Seasons** No population of ecological significance recorded	This species was only recorded on one date during the extensive suite of surveys undertaken. Numbers of ecological significance as per NRA criteria were not recorded. No breeding or roosting evidence was recorded during the extensive surveys undertaken. There is no evidence to suggest that the development Site is of significance to this species. No pathways for significant effects were identified. Please refer to Section 7.5.7 for further details.	**No**
Osprey	Annex I, EU Birds Directive & Irish Wildlife Act.	**N/A**	This species is an obligate piscivore, that is reliant on large water bodies for foraging. Direct or indirect habitat are unlikely to result from the Proposed Development. This species was recorded flying over the development Site within the potential collision risk zone. **A collision risk assessment is required.**	**Yes**
Red Kite	Annex I, EU Birds Directive; BoCCI	**Breeding**	The species breeding distribution is limited to the east of the country in Co. Wicklow, Down and Dublin. Nests are usually built high above ground in	**Yes**

Species	Conservation Status	NRA Evaluation (NRA, 2009)	Rational for inclusion/exclusion as KOR	KOR Yes/No
	Amber List & Irish Wildlife Act	No population of ecological significance recorded	deciduous trees. This species was recorded on a single occasion during the extensive suite of surveys undertaken. Numbers of ecological significance as per NRA criteria were not recorded. No breeding or roosting evidence was recorded during the extensive surveys undertaken. There is no evidence to suggest that the development Site is of significance to this species. However, this species was recorded flying over the development Site within the potential collision risk zone. **A collision risk assessment is required.**	
Shoveler	SCI of designated sites; BoCCI Red List & Irish Wildlife Act.	**Wintering** No population of ecological significance recorded	This species was not recorded on site during the extensive suite of surveys undertaken. No roosting evidence was recorded. There is no evidence to suggest that the development Site is of significance to this species. No pathways for significant effects were identified. Please refer to Section 7.5.10 for further details.	**No**
Wigeon	SCI of designated sites; BoCCI Red List & Irish Wildlife Act.	**Wintering** County Importance	This species was frequently recorded within the proposed wind farm Site. The potential for habitat loss cannot be excluded. **An assessment of direct habitat loss is required.** This species was recorded within the development Site boundary. Taking a highly precautionary approach, **an assessment of displacement effects is required.** No flights were recorded at PCH during VP surveys. Collision risk is unlikely to significantly impact this species.	**Yes**

Species	Conservation Status	NRA Evaluation (NRA, 2009)	Rational for inclusion/exclusion as KOR	KOR Yes/No
Pochard	SCI of designated sites; BoCCI Red List & Irish Wildlife Act.	**Wintering** No population of ecological significance recorded	This species was recorded on a single occasion during the extensive suite of surveys undertaken. No roosting evidence was recorded during the extensive surveys undertaken. There is no evidence to suggest that the development Site is of significance to this species. No pathways for significant effects were identified. Please refer to Section 7.5.12 for further details.	**No**
Goldeneye	SCI of designated sites; BoCCI Red List & Irish Wildlife Act.	**Wintering** No population of ecological significance recorded	This species was not recorded on Site during the extensive suite of surveys undertaken. No roosting evidence was recorded. There is no evidence to suggest that the development Site is of significance to this species. No pathways for significant effects were identified. Please refer to Section 7.5.13 for further details.	**No**
Tufted Duck	SCI of designated sites; BoCCI Red List & Irish Wildlife Act.	**Wintering** No population of ecological significance recorded	This species was not recorded on Site during the extensive suite of surveys undertaken. No roosting evidence was recorded. There is no evidence to suggest that the development Site is of significance to this species. No pathways for significant effects were identified. Please refer to Section 7.5.14 for further details.	**No**
Teal	SCI of designated sites; BoCCI Red List & Irish Wildlife Act.	**Wintering** Local Importance (Higher Value)	This species was occasionally recorded flying/feeding within the development Site and within 500m of same during winter months. The potential for habitat loss cannot be excluded. **An assessment of direct habitat loss is required.** Birds were recorded within the development Site boundary, **the potential for displacement exists**.	**Yes**

Species	Conservation Status	NRA Evaluation (NRA, 2009)	Rational for inclusion/exclusion as KOR	KOR Yes/No
			This species was recorded flying over the development Site within the potential collision risk zone. **A collision risk assessment is required.**	
Coot	SCI of designated sites; BoCCI Amber List & Irish Wildlife Act.	**All Seasons** No population of ecological significance recorded	This species was recorded within 500m of the wind farm site on only three occasions during the extensive suite of surveys undertaken. There is no evidence to suggest that the development Site is of significance to this species. No pathways for significant effects were identified. Please refer to Section 7.5.16 for further details.	**No**
Great-crested Grebe	SCI of designated sites; BoCCI Amber List & Irish Wildlife Act.	**Wintering** No population of ecological significance recorded	This species was not recorded within 500m of the wind farm site during the extensive suite of surveys undertaken. No roosting evidence was recorded. There is no evidence to suggest that the development Site is of significance to this species. No pathways for significant effects were identified. Please refer to Section 7.5.17 for further details.	**No**
Black-headed Gull	BoCCI Red List & Irish Wildlife Act.	**Breeding** No population of ecological significance recorded	This species was infrequently recorded flying/feeding within the development Site and within 500m of same during winter months. The potential for habitat loss, while minimal, cannot be excluded. **An assessment of direct habitat loss is required.** Birds were recorded within the development Site boundary, **the potential for displacement exists**. This species was recorded flying over the development Site within the potential collision risk zone. **A collision risk assessment is required.**	**Yes**

Species	Conservation Status	NRA Evaluation (NRA, 2009)	Rational for inclusion/exclusion as KOR	KOR Yes/No
Curlew	BoCCI Red List & Irish Wildlife Act.	**All Seasons** No population of ecological significance recorded	This species was not recorded within 500m of the wind farm site during the extensive suite of surveys undertaken. No roosting evidence was recorded. There is no evidence to suggest that the development Site is of significance to this species. No pathways for significant effects were identified. Please refer to Section 7.5.19 for further details.	**No**
Lapwing	BoCCI Red List & Irish Wildlife Act.	**Wintering** Local Importance (Higher Value)	This species was recorded within 500m of the wind farm site on only two dates during the extensive suite of surveys undertaken. There is no evidence to suggest that the development Site is of significance to this species. However, this species was recorded flying over the development Site within the potential collision risk zone. On a highly precautionary basis, **a collision risk assessment is required.**	**Yes**
		Breeding County Importance	This species was occasionally recorded feeding/roosting within the development Site and within 500m of same during breeding months. Evidence of breeding was identified along the grid connection route. The potential for habitat loss cannot be excluded. **An assessment of direct habitat loss is required.** Birds were recorded within the development Site boundary, **the potential for displacement exists**. No flights were recorded at PCH during VP surveys. Collision risk is unlikely to significantly impact this species.	**Yes**
Redshank	BoCCI Red List & Irish Wildlife Act.	**Breeding**	This species was recorded on a single occasion during the extensive suite of surveys undertaken. No roosting evidence was recorded during the extensive	**No**

Species	Conservation Status	NRA Evaluation (NRA, 2009)	Rational for inclusion/exclusion as KOR	KOR Yes/No
		No population of ecological significance recorded	surveys undertaken. There is no evidence to suggest that the development Site is of significance to this species. No pathways for significant effects were identified. Please refer to Section 7.5.21 for further details.	
Woodcock	BoCCI Red-Listed & Irish Wildlife Act.	**Breeding** Local Importance (Higher Value)	This species was occasionally recorded flying within the development Site and within 500m of same. The potential for habitat loss cannot be excluded. **An assessment of direct habitat loss is required.** Birds were recorded within the development Site boundary. Taking a precautionary approach, **the potential for displacement exists**. This species was recorded flying over the development Site partially within the potential collision risk zone. **A collision risk assessment is required.**	**Yes**
Barn Owl	BoCCI Red List & Irish Wildlife Act	**Breeding** County Importance	This species was not directly observed but presence was identified by calls in close proximity of the proposed wind farm site. The potential for habitat loss, while minimal, cannot be excluded. **An assessment of direct habitat loss is required.** Birds were recorded within the development Site boundary. Taking a precautionary approach, **the potential for displacement exists**. No flights were recorded at PCH during VP surveys. Collision risk is unlikely to significantly impact this species.	**Yes**
Long-eared Owl	BoCCI Green List & Irish Wildlife Act.	**All Seasons**	This species was not directly observed but its presence was identified by calls in close proximity of the proposed wind farm site. The potential for habitat	**Yes**

Species	Conservation Status	NRA Evaluation (NRA, 2009)	Rational for inclusion/exclusion as KOR	KOR Yes/No
		Local Importance (Higher Value)	loss, while minimal, cannot be excluded. **An assessment of direct habitat loss is required.** Birds were recorded within the development Site boundary. Taking a precautionary approach, **the potential for displacement exists**. No flights were recorded at PCH during VP surveys. Collision risk is unlikely to significantly impact this species.	
Buzzard	BoCCI Green List & Irish Wildlife Act.	**All Seasons** Local Importance (Higher Value)	The potential for habitat loss, while minimal, cannot be excluded. **An assessment of direct habitat loss is required.** The species was recorded within the Site boundary. **An assessment of displacement effect is required.** This species was recorded flying over the Site within the potential collision risk zone. **A collision risk assessment is required.**	**Yes**
Sparrowhawk	BoCCI Amber List & Irish Wildlife Act.	**All Seasons** Local Importance (Higher Value)	The potential for habitat loss, while minimal, cannot be excluded. **An assessment of direct habitat loss is required.** The species was recorded within the Site boundary. **An assessment of displacement effect is required.** This species was recorded flying over the Site within the potential collision risk zone. **A collision risk assessment is required.**	**Yes**
Kestrel	BoCCI Amber List & Irish Wildlife Act.	**All Seasons**	The potential for habitat loss, while minimal, cannot be excluded. **An assessment of direct habitat loss is required.**	**Yes**

Species	Conservation Status	NRA Evaluation (NRA, 2009)	Rational for inclusion/exclusion as KOR	KOR Yes/No
		Local Importance (Higher Value)	The species was recorded within the Site boundary. **An assessment of displacement effect is required.** This species was recorded flying over the Site within the potential collision risk zone. **A collision risk assessment is required.**	
Common Snipe	BoCCI Amber List & Irish Wildlife Act.	**All Seasons** Local Importance (Higher Value)	The potential for habitat loss, while minimal, cannot be excluded. **An assessment of direct habitat loss is required.** The species was recorded within the Site boundary. **An assessment of displacement effect is required.** This species was recorded flying over the Site within the potential collision risk zone. **A collision risk assessment is required.**	**Yes**
Passerines (Red-Listed)	Irish Wildlife Act	**All Seasons** Local Importance (Lower Value)	As per SNH guidance, it is generally considered that passerine species are not significantly impacted by wind farms.	**No**

7.7 KOR Sensitivity Determination

Criteria developed by Percival (2003) is presented in Table 7-3 (Section 7.2.5.3) for assessing bird sensitivity within the study area. The sensitivity of KOR as per Percival are listed below and include the rationale for their respective sensitivity classification included in brackets.

Very High Sensitivity KORs include:

- Greenland White-fronted Goose (Annex I; EU Birds Directive, SCI of nearby SPAs)

Medium Sensitivity KORs include:

- Whooper Swan (Annex I; EU Birds Directive)
- Golden Plover (Annex I; EU Birds Directive)
- Merlin (Annex I; EU Birds Directive)
- Peregrine Falcon (Annex I; EU Birds Directive)
- Osprey (Annex I; EU Birds Directive)
- Red Kite (Annex I; EU Birds Directive)
- Wigeon (BoCCI; Red-Listed)
- Teal (BoCCI; Red-Listed)
- Black-headed Gull (BoCCI; Red-Listed)
- Lapwing (BoCCI; Red-Listed)
- Woodcock (BoCCI; Red-Listed)
- Barn Owl (BoCCI; Red-Listed)

The remaining KORs identified in the study area were classified as **Low Sensitivity**:

- Long-eared Owl
- Buzzard
- Sparrowhawk
- Kestrel
- Common Snipe

7.8 Likely and Significant Effects

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

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

All elements of the Proposed Development have been considered in assessing effects on ecological receptors, including:

- Site preparation works, upgrades to existing roads and tracks, construction of new site roads.
- Drainage works.
- Machinery access to the turbine locations.
- Excavation of turbine base foundations and borrow pits.
- Erection of turbines.
- Laying of grid connection cables.
- Construction of other site infrastructure including substations and control buildings, met mast and temporary construction compound.

7.8.1 Do-Nothing Effect

An alternative land-use option to developing the Proposed Development would be to leave the site as it is under its current planning permission. As detailed in Section 2.5.1 in Chapter 2 of this EIAR, a wind energy project comprising of 13 turbines and all associated infrastructure has current planning permission on the Proposed Development site. Where the land-use practices of commercial peat-harvesting and forestry can continue in conjunction with the permitted wind energy project, it was designed to co-exist and operate independently of these land-uses to minimise impacts. Whilst there would be a change of land use within the footprint of the Proposed Development, to facilitate the wind turbines and infrastructure, this was found to be an acceptable part of the permitted development.

A second potential Do-Nothing scenario exists for this project i.e. assuming that the permitted development is not constructed. In this scenario the existing baseline environment will evolve in one of two potential ways, either the peat extraction ceases and a rehabilitation plan is developed or the peat extraction continues and then a rehabilitation plan is developed.

7.8.2 Effects on Key Ornithological Receptors during Construction and Operation

7.8.2.1 Whooper Swan (*Wintering*)

Table 7-12 Impact Characterisation for Whooper Swan based on Percival (2003) & EPA (2017).

Analysis of potential effects during construction and operational phases of the Proposed Development		Magnitude and Significance of potential effect (Percival 2003)	Significance of potential effect (EPA 2017)
Construction Phase			
Direct Habitat Loss	Most observations were of flocks recorded at Lough Iron, approximately 12.8km from the development Site, during specific Waterfowl Surveys. The species was infrequently recorded on Site or within 500m of the proposed turbine layout. The three largest flocks (numbered 14, 9 and 7) were recorded flying over areas of cutover bog. There was no evidence of roosting within 1km of the Proposed Development Site. The Proposed Development Site is dominated by cutover bog. This is not considered suitable for wintering whooper swan. The unfavourable nature of most onsite habitats (i.e. cutover bog) limits the potential for construction activities to result in ecologically significant habitat loss for whooper swan. Significant effects with regard to direct habitat loss are not predicted.	The magnitude of the effect is assessed as *negligible*. The cross tablature of a *Medium* sensitivity species and *Negligible* Impact corresponds to a ***Very Low*** effect significance.	**Long-term Slight Negative Effect**
Displacement & Barrier Effect	This species was rarely recorded utilising habitats within the Site boundary/within 500m of the Site boundary during the winter season. The frequency of observations and numbers per observation were both low.	The magnitude of the effect is assessed as *negligible*. The cross tablature of a *Medium* sensitivity species and *Negligible* Impact corresponds	**Short-term Slight Negative Effect**

	Given low numbers recorded and the abundance of similar suitable habitat in the wider surroundings of the Proposed Development significant impacts are not predicted. Significant effects with regard to displacement are not predicted.	to a ***Very Low*** effect significance.	
Operational Phase			
Direct Habitat Loss	Direct or indirect effects are not anticipated.	**No Effect**	**No Effect**
Displacement & Barrier Effect	No regular feeding grounds were recorded on Site or within 500m of the same. No evidence of roosting was recorded within the Site boundary or to a 1km radius of the Site. Whooper swan were rarely recorded flying over the Proposed Development area. Survey results indicates that the development Site does not lie on a migratory corridor for whooper swan. Therefore, no barrier effect is predicted. Based on the dataset there is no potential for significant displacement effects given that whooper swan were not dependant on the habitats of the Site for roosting or feeding. Furthermore, it is unlikely that any significant displacement impact will result during the operational phase, given the low level of activity on Site. No significant displacement effects are predicted.	The magnitude of the effect is assessed as *negligible*. The cross tablature of a *Medium* sensitivity species and *Negligible* Impact corresponds to a ***Very Low*** effect significance.	**Long-term Slight Negative Effect**
Collision	The species was recorded flying within the potential collision risk zone during Vantage Point surveys. A "Random" collision risk analysis has been undertaken and full details are provided in Appendix 7-5. The collision risk has been calculated at a ratio of 0.14 collisions per year, or one bird every 7 years. Annual mortality of adult whooper swan has been	The magnitude of the effect is assessed as *negligible*. The cross tablature of a *Medium* sensitivity species and *Negligible* Impact corresponds	**Long-term Imperceptible Negative Effect**

	calculated at 20% per annum (Brazil, 2003). If 0.14 collisions were to occur per year, it would mean that the losses at the proposed wind farm would increase the annual mortality of the county population (i.e. 389) by 0.18%. The predicted collision risk is therefore negligible (<1%) in the context of recorded population. No significant effects are predicted.	to a ***Very Low*** effect significance.	

7.8.2.2 Greenland White-fronted Goose (*Wintering*)

Table 7-13 Impact Characterisation for Greenland White-fronted Goose based on Percival (2003) & EPA (2017).

Analysis of potential effects during construction and operational phases of the Proposed Development		Magnitude and Significance of potential effect (Percival 2003)	Significance of potential effect (EPA 2017)
Construction Phase			
Direct Habitat Loss	Most observations were of flocks recorded at Lough Iron, approximately 12.8km from the development Site, during specific Waterfowl Surveys. In four years of surveying the species was recorded flying over the proposed Site on only two occasions. There was no evidence of roosting or foraging within 1km of the Proposed Development Site. Significant effects with regard to direct habitat loss are not predicted.	The magnitude of the effect is assessed as *negligible*. The cross tablature of a *Very High* sensitivity species and *Negligible* Impact corresponds to a ***Low*** effect significance.	**Long-term Imperceptible Negative Effect**
Displacement & Barrier Effect	This species was not recorded utilising habitats within the Site boundary/within 500m of the Site boundary during the winter season. The species was observed flying over the Site on only two occasions. The frequency of observations and numbers per observation were both low. Given low numbers recorded and the abundance of suitable habitats in the wider surroundings of the Proposed Development, significant impacts are not predicted.	The magnitude of the effect is assessed as *negligible*. The cross tablature of a *Very High* sensitivity species and *Negligible* Impact corresponds to a ***Low*** effect significance.	**Short-term Imperceptible Negative Effect**

Analysis of potential effects during construction and operational phases of the Proposed Development		Magnitude and Significance of potential effect (Percival 2003)	Significance of potential effect (EPA 2017)
	Significant effects with regard to displacement are not predicted.		
Operational Phase			
Direct Habitat Loss	Direct or indirect effects are not anticipated.	**No Effect**	**No Effect**
Displacement & Barrier Effect	In four years of surveying, the species was recorded on two occasions flying across the Site. No foraging was recorded on Site or within 500m of the same. No evidence of roosting was recorded within the Site boundary or to a 1km radius of the Site. No significant displacement effects are predicted.	The magnitude of the effect is assessed as *negligible*. The cross tablature of a *Very High* sensitivity species and *Negligible* Impact corresponds to a ***Low*** effect significance.	**Long-term Imperceptible Negative Effect**
Collision	The species was recorded flying within the potential collision risk zone during Vantage Point surveys. A "Random" collision risk analysis has been undertaken and full details are provided in Appendix 7-5. The collision risk has been calculated at a ratio of 0.027 collisions per year, or one bird every 38 years. The predicted collision risk is insignificant.	The magnitude of the effect is assessed as *negligible*. The cross tablature of a *Very High* sensitivity species and *Negligible* Impact corresponds to a ***Low*** effect significance.	**Long-term Imperceptible Negative Effect**

7.8.2.3 Golden Plover (*Wintering*)

Table 7-14 Impact Characterisation for Golden Plover based on Percival (2003) & EPA (2017).

Analysis of potential effects during construction and operational phases of the Proposed Development		Magnitude and Significance of potential effect (Percival 2003)	Significance of potential effect (EPA 2017)
Construction Phase			
Direct Habitat Loss	Most observations recorded were of flocks roosting/feeding within the proposed wind farm site on cutover bog. Flocks of county importance were recorded on forty-six occasions. These observations occurred on Site and within 500m of the proposed turbine layout. The development infrastructure is confined to a narrow corridor, therefore direct habitat loss will be minimal. Furthermore, the habitats within the Site are not of particular high quality and there is an abundance of similar habitat in the surrounding area. Significant effects with regard to direct habitat loss are not predicted.	The magnitude of the effect is assessed as *low*. The cross tablature of *Medium* sensitivity species and *Low* Impact corresponds to a ***Low*** effect significance.	**Long-term Slight Negative Effect**
Displacement & Barrier Effect	As per McGuinness et al. (2015) the zone of sensitivity for the species is 800m during the breeding season only. The species is not identified as being particularly sensitive to wind farm developments during the wintering period. This species was regularly recorded utilising habitats within the Site boundary/within 500m of the Site boundary during the winter season. However, given the abundance of similar suitable habitats in the wider surroundings of the Proposed Development significant impacts are not predicted.	The magnitude of the effect is assessed as *low*. The cross tablature of *Medium* sensitivity species and *Low* Impact corresponds to a ***Low*** effect significance.	**Short-term Slight Negative Effect**
Operational Phase			

Analysis of potential effects during construction and operational phases of the Proposed Development		Magnitude and Significance of potential effect (Percival 2003)	Significance of potential effect (EPA 2017)
Direct Habitat Loss	Direct or indirect effects are not anticipated.	**No Effect**	**No Effect**
Displacement & Barrier Effect	A review of 29 studies suggests golden plover will approach wind turbines to an average distance of 175m in non-breeding season (Hötker et al., 2006). There were forty-three observations of golden plover within 200m of the proposed turbine layout during surveys between October 2015 and September 2017. There were twelve additional observations of the species within 200m of the propose turbine layout between April 2018 and March 2020. In the event of displacement, there are sufficient areas of suitable habitat in the wider area to render such an effect inconsequential. Furthermore, habitats within the wind farm site (e.g. cutover bog) are not of particularly high quality. There is no evidence to suggest that the development Site lies on a migratory/ regular commuting route for the species therefore barrier effect is not anticipated. Significant displacement effects are not predicted.	The magnitude of the effect is assessed as *low.* The cross tablature of *Medium* sensitivity species and *Low* Impact corresponds to a ***Low*** effect significance.	**Long-term Slight Negative Effect**
Collision	The species was recorded flying within the potential collision risk zone during Vantage Point surveys. A "Random" collision risk analysis has been undertaken and full details are provided in Appendix 7-5. The collision risk has been calculated at a rate of 34 collisions per year. Annual mortality of adult golden plover has been calculated at 27% per annum (Sandercock, 2003). If 34 collisions were to occur per year, it would mean that the losses at the proposed wind farm would increase the annual mortality of	The magnitude of the effect is assessed as *low.* The cross tablature of a *Medium* sensitivity species and *Low* Impact corresponds to a ***Low*** effect significance.	**Long-term Slight Negative Effect**

Analysis of potential effects during construction and operational phases of the Proposed Development		Magnitude and Significance of potential effect (Percival 2003)	Significance of potential effect (EPA 2017)
	the county population (i.e. 2,610 birds) by 4.82%. The predicted collision risk is therefore low in the context of the county population.		

7.8.2.4 Merlin (*All Seasons*)

Table 7-15 Impact Characterisation for Merlin based on Percival (2003) & EPA (2017).

Analysis of potential effects during construction and operational phases of the Proposed Development		Magnitude and Significance of potential effect (Percival 2003)	Significance of potential effect (EPA 2017)
Construction Phase			
Direct Habitat Loss	This species was not recorded utilising habitat within the Site boundary for roosting or breeding. Significant effects are not anticipated particularly given the low levels of activity recorded. The species was recorded hunting onsite on only seven occasions over four years of surveys. Extensive areas of suitable foraging habitat will remain post-construction and there is an abundance of suitable habitats in the surrounding area. Significant effects are not predicted.	The magnitude of the effect is assessed as *negligible*. The cross tablature of *Medium* sensitivity species and *Negligible* Impact corresponds to a ***Very Low*** effect significance.	**Long-term Imperceptible Negative Effect**
Displacement & Barrier Effect	No breeding sites were recorded within the study area. Significant displacement effects are not anticipated, given how infrequently the Site was visited. In addition, the habitats that are present onsite are not considered to be of particularly high quality or unique to the wind farm site. Significant displacement effects are not predicted.	The magnitude of the effect is assessed as *negligible*. The cross tablature of *Medium* sensitivity species and *Negligible* Impact corresponds to a ***Very Low*** effect significance.	**Short-term Imperceptible Negative Effect**
Operational Phase			

Analysis of potential effects during construction and operational phases of the Proposed Development		Magnitude and Significance of potential effect (Percival 2003)	Significance of potential effect (EPA 2017)
Direct Habitat Loss	Direct or indirect effects are not anticipated.	**No Effect**	**No Effect**
Displacement	Significant effects are not anticipated particularly given the low levels of activity recorded. In addition, the habitats that are present onsite are not considered to be of particularly high quality or unique to the wind farm site. Significant displacement effects are not predicted.	The magnitude of the effect is assessed as *negligible*. The cross tablature of *Medium* sensitivity species and *Negligible* Impact corresponds to a ***Very Low*** effect significance.	**Long-term Imperceptible Negative Effect**
Collision	The species was infrequently recorded flying with the potential collision risk zone during Vantage Point surveys. A "Random" collision risk analysis has been undertaken on a precautionary basis and full details are provided in Appendix 7-5. The collision risk has been calculated at a ratio of 0.008 collisions per year, or approximately one bird every 127 years. The predicted collision risk is insignificant.	The magnitude of the effect is assessed as *negligible*. The cross tablature of *Medium* sensitivity species and *Negligible* Impact corresponds to a ***Very Low*** effect significance.	**Long-term Imperceptible Negative Effect**

7.8.2.5 Peregrine Falcon (*All Seasons*)

Table 7-16 Impact Characterisation for Peregrine Falcon based on Percival (2003) & EPA (2017).

Analysis of potential effects during construction and operational phases of the Proposed Development	Magnitude and Significance of potential effect (Percival 2003)	Significance of potential effect (EPA 2017)
Construction Phase		

Analysis of potential effects during construction and operational phases of the Proposed Development		Magnitude and Significance of potential effect (Percival 2003)	Significance of potential effect (EPA 2017)
Direct Habitat Loss	This species was occasionally recorded flying/soaring over the Proposed Development area. Most observations occurred approximately 1.3km east of the proposed wind farm site associated with nesting habitat (i.e. a cliff). There is no suitable breeding habitat for this species within the Proposed Development area. Extensive areas of suitable foraging habitat will remain post-construction and there is an abundance of suitable habitats in the surrounding area. Significant effects are not predicted.	The magnitude of the effect is assessed as *low*. The cross tablature of *Medium* sensitivity species and *Low* Impact corresponds to a ***Low*** effect significance.	**Long-term Slight Negative Effect**
Displacement & Barrier Effect	No breeding or roosting territories were recorded within the Proposed Development area. In 2016, breeding was confirmed approximately 1.3km east of the wind farm site. The nesting site was again active in both 2017 and 2019. Disturbance impacts are not predicted at this nesting site given the significant separation distance involved. Peregrine were occasionally recorded foraging within the Proposed Development area. However, the Proposed Development area does not contain habitats that are of particularly high quality or unique to the local area. Therefore, were displacement to occur it would not result in the loss of a scarce resource for the local population. Significant displacement effects are not predicted.	The magnitude of the effect is assessed as *low*. The cross tablature of *Medium* sensitivity species and *Low* Impact corresponds to a ***Low*** effect significance.	**Short-term Slight Negative Effect**
Operational Phase			
Direct Habitat Loss	Direct or indirect effects are not anticipated.	**No Effect**	**No Effect**

Analysis of potential effects during construction and operational phases of the Proposed Development		Magnitude and Significance of potential effect (Percival 2003)	Significance of potential effect (EPA 2017)
Displacement & Barrier Effect	Disturbance impacts are not predicted for the nest site identified 1.6km from the nearest proposed turbine, given the significant separation distance involved. As previously discussed, the species was occasionally recorded foraging on Site or within 500m of the proposed wind farm site. However, the Proposed Development area does not contain habitats that are of particularly high quality or unique to the local area. Therefore, were displacement to occur it would not result in the loss of a scarce resource for the local population. Significant displacement effects are not predicted.	The magnitude of the effect is assessed as *low*. The cross tablature of *Medium* sensitivity species and *Low* Impact corresponds to a ***Low*** effect significance.	**Long-term Slight Negative Effect**
Collision	The species was recorded flying within the potential collision risk zone during VP surveys. A "Random" collision risk analysis has been undertaken and full details are provided in Appendix 7-5. The collision risk has been calculated at a ratio of 0.127 collisions per year or one bird every 8 years. Annual mortality of adult peregrine has been calculated at 20% per annum (Craig, 2004). If 0.127 collisions were to occur per year, it would mean that the losses at the proposed wind farm would increase the annual mortality of the National population (i.e. c.850 birds) by 0.07%. The predicted collision risk is therefore negligible in the context of the National peregrine population. While the county population is not available, the calculated rate of collision risk is not predicted to be significant at the county level. Significant effects are not predicted for a rate of one potential collision every eight years.	The magnitude of the effect is assessed as *low*. The cross tablature of a *Medium* sensitivity species and *Low* Impact corresponds to a ***Low*** effect significance.	**Long-term Slight Negative Effect**

7.8.2.6 Osprey (*N/A*)

Table 7-17 Impact Characterisation for Osprey based on Percival (2003) & EPA (2017).

Analysis of potential effects during construction and operational phases of the Proposed Development		Magnitude and Significance of potential effect (Percival 2003)	Significance of potential effect (EPA 2017)
Construction Phase			
Direct Habitat Loss	Osprey is reliant on large waterbodies for foraging. The Proposed Development is located within terrestrial habitats (e.g. improved agricultural grassland and peatland habitats) which do not provide optimal habitat for this species. This therefore limits the potential for ecologically significant effects to result. In four years of surveying this species was recorded flying across the Proposed Development area on only one date in May 2016. Significant effects are not anticipated at any geographical scale.	The magnitude of the effect is assessed as *negligible*. The cross tablature of *Medium* sensitivity species and *Negligible* Impact corresponds to a ***Very Low*** effect significance.	**Long-term Imperceptible Negative Effect**
Displacement & Barrier Effect	No breeding or roosting sites were recorded within the study area. As previously discussed, this species was only recorded on a single date in four years of surveying the Proposed Development area. Osprey are reliant on large water bodies for foraging. The Proposed Development area does not contain osprey foraging habitat. Significant displacement effects are not anticipated.	The magnitude of the effect is assessed as *negligible*. The cross tablature of *Medium* sensitivity species and *Negligible* Impact corresponds to a ***Very Low*** effect significance.	**Short-term Imperceptible Negative Effect**
Operational Phase			
Direct Habitat Loss	Direct or indirect effects are not anticipated.	**No Effect**	**No Effect**
Displacement & Barrier Effect	The Proposed Development is located within commercial forestry, peatland habitat and improved agricultural grassland which does not provide optimal	The magnitude of the effect is assessed as *negligible*.	**Long-term Imperceptible Negative Effect**

Analysis of potential effects during construction and operational phases of the Proposed Development		Magnitude and Significance of potential effect (Percival 2003)	Significance of potential effect (EPA 2017)
	habitat for this species. The large waterbodies that osprey are reliant on for foraging are not present within the Proposed Development area. Significant displacement effects are not anticipated.	The cross tablature of *Medium* sensitivity species and *Negligible* Impact corresponds to a ***Very Low*** effect significance.	
Collision	The species was recorded flying within the potential collision risk zone during VP surveys. A "Random" collision risk analysis has been undertaken and full details are provided in Appendix 7-5. The collision risk has been calculated at a ratio of 0.017 collision per year or one bird every 61 years. The predicted collision risk is insignificant.	The magnitude of the effect is assessed as *negligible*. The cross tablature of *Medium* sensitivity species and N*egligible* Impact corresponds to a ***Very Low*** effect significance.	**Long-term Imperceptible Negative Effect**

7.8.2.7 Red Kite (*Breeding*)

Table 7-18 Impact Characterisation for Red Kite based on Percival (2003) & EPA (2017).

Analysis of potential effects during construction and operational phases of the Proposed Development		Magnitude and Significance of potential effect (Percival 2003)	Significance of potential effect (EPA 2017)
Construction Phase			
Direct Habitat Loss	In four years of surveying this species was recorded flying across the Proposed Development area on only one date in May 2018. No breeding or roosting sites were recorded within the study area. Significant effects are not predicted.	The magnitude of the effect is assessed as *negligible*. The cross tablature of *Medium* sensitivity species and *Negligible* Impact corresponds to a ***Very Low*** effect significance.	**Long-term Imperceptible Negative Effect**

Displacement & Barrier Effect	No breeding or roosting sites were recorded within the study area. As previously discussed, this species was only recorded on a single date in four years of surveying the Proposed Development area. Significant displacement effects are not anticipated.	The magnitude of the effect is assessed as *negligible*. The cross tablature of *Medium* sensitivity species and *Negligible* Impact corresponds to a ***Very Low*** effect significance.	**Short-term Imperceptible Negative Effect**
Operational Phase			
Direct Habitat Loss	Direct or indirect effects are not anticipated.	**No Effect**	**No Effect**
Displacement & Barrier Effect	No breeding or roosting sites were recorded within the study area. As previously discussed, this species was only recorded on a single date in four years of surveying the Proposed Development area. Significant displacement effects are not anticipated.	The magnitude of the effect is assessed as *negligible*. The cross tablature of *Medium* sensitivity species and *Negligible* Impact corresponds to a ***Very Low*** effect significance.	**Long-term Imperceptible Negative Effect**
Collision	The species was recorded flying within the potential collision risk zone during VP surveys. A "Random" collision risk analysis has been undertaken and full details are provided in Appendix 7-5. The collision risk has been calculated at a ratio of 0.0007 collision per year or one bird every 1,386 years. The predicted collision risk is insignificant.	The magnitude of the effect is assessed as *negligible*. The cross tablature of *Medium* sensitivity species and N*egligible* Impact corresponds to a ***Very Low*** effect significance.	**Long-term Imperceptible Negative Effect**

7.8.2.8 Wigeon (*Wintering*)

Table 7-19 Impact Characterisation for Wigeon based on Percival (2003) & EPA (2017).

Analysis of potential effects during construction and operational phases of the Proposed Development		Magnitude and Significance of potential effect (Percival 2003)	Significance of potential effect (EPA 2017)
Construction Phase			
Direct Habitat Loss	During winter season surveys, the species was regularly recorded feeding/roosting at Lough Bane, approximately 300m from the closest turbine, north of the proposed wind farm site. Wigeon activity was confined to this area locally. No infrastructure is proposed in this location. Significant direct habitat loss effects are not predicted.	The magnitude of the effect is assessed as *low*. The cross tablature of *Medium* sensitivity species and *Low* Impact corresponds to a ***Low*** effect significance.	**Long-term Slight Negative Effect**
Displacement & Barrier Effect	Disturbance from construction activities could result in the loss of wigeon wintering habitat at Lough Bane, 300m north of the wind farm site. However, impacts at this location will be limited due to the screening provided by scrub/woodland between the wind farm site and the lough and given the habitats of the lough are not of particularly high quality or unique to the local area. It is noted that the majority of Proposed Development infrastructure will be sited in cutover bog, a habitat of very limited ecological value to this species. Should any potential displacement effect occur, there are extensive areas of suitable habitat in the wider area, to render this potential impact inconsequential. Significant displacement effects are not anticipated at county, national of international scale.	The magnitude of the effect is assessed as *low*. The cross tablature of *Medium* sensitivity species and *Low* Impact corresponds to a ***Low*** effect significance.	**Short-term Slight Negative Effect**
Operational Phase			

Analysis of potential effects during construction and operational phases of the Proposed Development		Magnitude and Significance of potential effect (Percival 2003)	Significance of potential effect (EPA 2017)
Direct Habitat Loss	Direct or indirect effects are not anticipated.	**No Effect**	**No Effect**
Displacement & Barrier Effect	Wigeon activity within 500m of the proposed turbines was confined to Lough Bane. A 500m buffer of the proposed turbines would overlap with approx. 50% of the lough. However, impacts at this location will be limited due to the screening provided by scrub/woodland between the wind farm site and the lough and given the habitats of the lough are not of particularly high quality or unique to the local area. It is noted that the majority of the Proposed Development site is located in cutover bog. A habitat not favoured by this species. Furthermore, there are large areas of suitable habitat in the wider surroundings to render any potential displacement impact insignificant. Significant displacement effects are not anticipated at the county, national or international scale.	The magnitude of the effect is assessed as *low.* The cross tablature of *Medium* sensitivity species and *Low* Impact corresponds to a ***Low*** effect significance.	**Long-term Slight Negative Effect**
Collision	The species was not recorded during Vantage Point Surveys. Collision related mortality is not likely to significantly impact this species.	**No Effect**	**No Effect**

7.8.2.9 Teal (*Wintering*)

Table 7-20 Impact Characterisation for Teal based on Percival (2003) & EPA (2017).

Analysis of potential effects during construction and operational phases of the Proposed Development	Magnitude and Significance of potential effect (Percival 2003)	Significance of potential effect (EPA 2017)
Construction Phase		

Direct Habitat Loss	Teal was rarely recorded on Site or within 500m of the wind farm site. The Site is dominated by cutover bog which provides unsuitable wintering habitat for the species. Extensive areas of suitable roosting and foraging habitat will remain post-construction and there is an abundance of suitable habitat in the surrounding area. Significant effects are not predicted.	The magnitude of the effect is assessed as *low*. The cross tablature of *Medium* sensitivity species and *Low* Impact corresponds to a ***Low*** effect significance.	**Long-term Slight Negative Effect**
Displacement & Barrier Effect	In four years of surveying this species was infrequently recorded onsite or within 500m of the wind farm site. The majority of onsite habitats (e.g. cutover bog, forestry and grassland) are unsuitable for this species. Furthermore, the Proposed Development Site does not contain habitats that are unique to the local area. Therefore, were displacement to occur it would not result in the loss of a scarce resource for the local teal population. Significant displacement effects are not predicted.	The magnitude of the effect is assessed as *low*. The cross tablature of *Medium* sensitivity species and *Low* Impact corresponds to a ***Low*** effect significance.	**Short-term Slight Negative Effect**
Operational Phase			
Direct Habitat Loss	Direct or indirect effects are not anticipated.	**No Effect**	**No Effect**
Displacement & Barrier Effect	As previously discussed, the Proposed Development Site does not contain habitats that are of a particularly high quality or unique to the local area. Therefore, were displacement to occur it would not result in the loss of a scarce resource for the local teal population. Furthermore, this species was infrequently recorded onsite or within 500m of the wind farm site. Significant displacement effects are not predicted.	The magnitude of the effect is assessed as *low*. The cross tablature of *Medium* sensitivity species and *Low* Impact corresponds to a ***Low*** effect significance.	**Long-term Slight Negative Effect**
Collision	The species was recorded flying within the potential collision risk zone during VP surveys. A "Random" collision risk analysis has been undertaken and full details are provided in Appendix 7-5.	The magnitude of the effect is assessed as *negligible*.	**Long-term Imperceptible Negative Effect**

	The collision risk has been calculated at a ratio of 0.010 collisions per year or one bird every 97 years. The predicted collision risk is insignificant.	The cross tablature of *Medium* sensitivity species and N*egligible* Impact corresponds to a ***Very Low*** effect significance.	

7.8.2.10 Black-headed Gull (*Breeding*)

Table 7-21 Impact Characterisation for Black-headed Gull based on Percival (2003) & EPA (2017).

Analysis of potential effects during construction and operational phases of the Proposed Development		Magnitude and Significance of potential effect (Percival 2003)	Significance of potential effect (EPA 2017)
Construction Phase			
Direct Habitat Loss	The species was rarely recorded on Site or within 500m of same during breeding season. This species was only recorded within the Proposed Development area on eleven occasions. No evidence of breeding was recorded within the Proposed Development area. The majority of the habitat within the Site is cutover bog, this is suboptimal habitat for this species. This species will forage in the grassland habitats, however there is only one turbine sited in this habitat type. Habitat loss will therefore not be significant. This species was recorded to infrequently utilise Lough Bane, the nearest proposed infrastructure is 300m south of this lough. Therefore, no direct habitat loss is predicted at this location. Significant effects are not predicted.	The magnitude of the effect is assessed as *low*. The cross tablature of *Medium* sensitivity species and *Low* Impact corresponds to a ***Low*** effect significance.	**Long-term Slight Negative Effect**
Displacement & Barrier Effect	No evidence of breeding was recorded within the development Site. This species was only rarely recorded within the Proposed Development area. There is potential for displacement of bird utilising Lough Bane 300m north of proposed turbines. However, the habitats here are not of a particularly high quality or unique locally.	The magnitude of the effect is assessed as *low*. The cross tablature of *Medium* sensitivity species and *Low* Impact corresponds to a ***Low*** effect significance.	**Short-term Slight Negative Effect**

	Significant effects are not anticipated particularly given the low levels of activity recorded. In addition, extensive areas of suitable foraging habitat will remain post-construction. Significant displacement effects are not predicted.		
Operational Phase			
Direct Habitat Loss	Direct or indirect effects are not anticipated.	**No Effect**	**No Effect**
Displacement & Barrier Effect	As previously discussed, the Proposed Development Site does not contain habitats that are of a particularly high quality or unique to the local area. Therefore, were displacement to occur it would not result in the loss of a scarce resource for the local black-headed gull population. Furthermore, this species was infrequently recorded onsite or within 500m of the wind farm site. Significant displacement effects are not predicted.	The magnitude of the effect is assessed as *low*. The cross tablature of *Medium* sensitivity species and *Low* Impact corresponds to a ***Low*** effect significance.	**Long-term Slight Negative Effect**
Collision	The species was recorded flying within the potential collision risk zone during VP surveys. A "Random" collision risk analysis has been undertaken and full details are provided in Appendix 7-5. The collision risk has been calculated at a ratio of 0.09 collisions per year, or one bird every 11 years. The predicted collision risk is insignificant in the context of the county, national and international population.	The magnitude of the effect is assessed as *low*. The cross tablature of *Medium* sensitivity species and *Low* Impact corresponds to a ***Low*** effect significance.	**Long-term Slight Negative Effect**

7.8.2.11 Lapwing (*All Seasons*)

Table 7-22 Impact Characterisation for Lapwing based on Percival (2003) & EPA (2017).

Analysis of potential effects during construction and operational phases of the Proposed Development		Magnitude and Significance of potential effect (Percival 2003)	Significance of potential effect (EPA 2017)
Construction Phase			
Direct Habitat Loss	During both winter and breeding season surveys lapwing was infrequently recorded on Site or within 500m of same. In 2019, a nesting area was located approximately 3.9km south of the wind farm site and adjacent to the grid connection. Additionally, breeding lapwing were recorded 380m north of the nearest proposed infrastructure to the north west of Lough Bane. No development infrastructure is proposed in the areas of bog where breeding was recorded. Significant effects with regard to direct habitat loss are not predicted.	The magnitude of the effect is assessed as *low.* The cross tablature of *Medium* sensitivity species and *Low* Impact corresponds to a ***Low*** effect significance.	**Long-term Slight Negative Effect**
Displacement & Barrier Effect	Construction works can result in disturbance impacts within 350m of lapwing breeding habitat (Hotker et al. 2006). The species was rarely encountering within the wind farm site. Breeding activity was recorded c. 3.9km south of the wind farm site. There is little similar suitable habitat available locally (i.e. a mosaic of revegetating bog, with exposed shale and pools). Construction works adjacent to this nesting area associated with the grid connection route has the potential to cause disturbance of breeding lapwing. Furthermore, this species was recorded breeding adjacent to the Site boundary and to the north west of Lough Bane. Taking a highly precautionary approach, it is assumed that construction works could occur anywhere within the EIAR Site boundary. Therefore, construction works adjacent to this nesting area has the potential to cause disturbance of breeding lapwing.	The magnitude of the effect is assessed as *medium.* The cross tablature of *Medium* sensitivity species and *medium* Impact corresponds to a ***Low*** effect significance.	**Short-term Moderate Negative Effect**

Analysis of potential effects during construction and operational phases of the Proposed Development		Magnitude and Significance of potential effect (Percival 2003)	Significance of potential effect (EPA 2017)
	Please refer to Figures 7-8-1, 7-8-1-1 and 7-8-1-2 in Confidential Appendix 7-7 for the location of the breeding territories in relation to nearby infrastructure.		
Operational Phase			
Direct Habitat Loss	Direct or indirect effects are not anticipated.	**No Effect**	**No Effect**
Displacement & Barrier Effect	Hotker et al. (2006) undertook a meta-analysis of existing literature on disturbance distances from turbines. This review reported from the 13 studies examined the disturbance distance could occur up to 350m for breeding lapwing. This species was recorded displaying to the north west of Lough Bane, the nearest proposed infrastructure is 380m south of this breeding territory. Based on the separation distance, significant disturbance displacement of the breeding birds to the north west of Lough Bane is not predicted. No significant operational phase disturbance/displacement impacts are predicted for the identified nesting habitat along the grid connection route. As previously discussed, this species was rarely recorded within the Proposed Development area. Significant effects are not predicted particularly given the low levels of activity recorded within the Proposed Development area. Significant displacement effects are not anticipated.	The magnitude of the effect is assessed as *low.* The cross tablature of *Medium* sensitivity species and *Low* Impact corresponds to a ***Low*** effect significance.	**Long-term Slight Negative Effect**
Collision	The species was recorded flying within the potential collision risk zone during VP surveys. A "Random" collision risk analysis has been undertaken and full details are provided in Appendix 7-5.	The magnitude of the effect is assessed as *low.*	**Long-term Slight Negative Effect**

Analysis of potential effects during construction and operational phases of the Proposed Development		Magnitude and Significance of potential effect (Percival 2003)	Significance of potential effect (EPA 2017)
	The collision risk has been calculated at a ratio of 0.17 collisions per year, or one bird every 6 years. The predicted collision risk is therefore insignificant.	The cross tablature of *Medium* sensitivity species and *Low* Impact corresponds to a ***Low*** effect significance.	

7.8.2.12 Woodcock (*Breeding*)

Table 7-23 Impact Characterisation for Woodcock based on Percival (2003) & EPA (2017).

Analysis of potential effects during construction and operational phases of the Proposed Development		Magnitude and Significance of potential effect (Percival 2003)	Significance of potential effect (EPA 2017)
Construction Phase			
Direct Habitat Loss	Direct loss of habitat will be minimal. The majority of the study area is bare peat which does not provide optimal habitat for the species. The felling of forestry may temporarily reduce the distribution and availability of suitable habitat. However significant areas of forestry with will remain within the Site and surrounding area. Significant effects are not anticipated.	The magnitude of the effect is assessed as *low.* The cross tablature of *Medium* sensitivity species and *Low* Impact corresponds to a ***Low*** effect significance.	**Long-term Slight Negative Effect**
Displacement & Barrier Effect	This species was frequently recorded during dedicated woodcock surveys. Disturbance from construction activities could result in the loss of woodcock breeding habitat locally. However, habitat loss will be restricted to the small areas of forestry onsite and its immediate surroundings. It is noted that the majority of Proposed Development infrastructure will be sited in cutover bog, a habitat of very limited ecological value to this species.	The magnitude of the effect is assessed as *low.* The cross tablature of *Medium* sensitivity species and *Low* Impact corresponds to a ***Low*** effect significance.	**Short-term Slight Negative Effect**

	Should any potential displacement effect occur, there are extensive areas of suitable habitat in the wider area, to render this potential impact inconsequential. Significant impacts are not predicted.		
Operational Phase			
Direct Habitat Loss	Direct or indirect effects are not anticipated.	**No Effect**	**No Effect**
Displacement & Barrier Effect	There is potential for displacement of breeding woodcock in areas of forestry adjacent to proposed turbines. However, habitat loss will be restricted to the small areas of forestry onsite and its immediate surroundings. Furthermore, the Proposed Development Site does not contain habitats that are unique to the local area nor are commercial forestry plantation of particularly high-quality breeding habitat for this species. Significant effects are not predicted.	The magnitude of the effect is assessed as *low.* The cross tablature of *Medium* sensitivity species and *Low* Impact corresponds to a ***Low*** effect significance.	**Long-term Slight Negative Effect**
Collision	The species was recorded flying within the potential collision risk zone during VP surveys. A "Random" collision risk analysis has been undertaken and full details are provided in Appendix 7-5. The collision risk has been calculated at a ratio of 0.006 collisions per year or one bird every 166 years. The predicted collision risk is insignificant in the context of the county, national and international population.	The magnitude of the effect is assessed as *negligible.* The cross tablature of *Medium* sensitivity species and *Negligible* Impact corresponds to a ***Very Low*** effect significance.	**Long-term Imperceptible Negative Effect**

7.8.2.13 Barn Owl (*Breeding*)

Table 7-24 Impact Characterisation for Barn Owl based on Percival (2003) & EPA (2017).

Analysis of potential effects during construction and operational phases of the Proposed Development		Magnitude and Significance of potential effect (Percival 2003)	Significance of potential effect (EPA 2017)
Construction Phase			
Direct Habitat Loss	The species was not directly observed but was recorded calling from a building located approximately 200m from the Site boundary and 1.2km from the closest turbine. For the purposes of the assessment these records are considered to indicate a probable breeding site. The habitats of the wind farm site (i.e. predominantly cutover bog) are considered sub-optimal foraging habitat for barn owl. Barn owl favour rough grassland for foraging. One turbine is proposed in agricultural grassland. However, habitat loss in this area is likely to be insignificant given the availability of similar habitat in the wider surroundings. Significant effects with regard to direct habitat loss are not anticipated.	The magnitude of the effect is assessed as *low.* The cross tablature of *Medium* sensitivity species and *Low* Impact corresponds to a ***Low*** effect significance.	**Long-term Slight Negative Effect**
Displacement & Barrier Effect	As previously discussed, the habitats of the wind farm site (i.e. predominantly cutover bog) are considered sub-optimal foraging habitat for barn owl. Barn owl favour rough grassland for foraging. One turbine is proposed in agricultural grassland. However, habitat loss in this area is likely to be insignificant given the availability of similar habitat in the wider surroundings. Barn owl were heard calling from a nearby building, indicating a probable breeding site. On a precautionary basis, it is noted that construction works within 500m of this building associated with the internal road route has the potential to cause disturbance of breeding barn owl locally. Please refer to Confidential Appendix 7-7, Figure 7-8-2 for location details.	The magnitude of the effect is assessed as *medium.* The cross tablature of *Medium* sensitivity species and *medium* Impact corresponds to a ***Low*** effect significance.	**Short-term Moderate Negative Effect**

Analysis of potential effects during construction and operational phases of the Proposed Development		Magnitude and Significance of potential effect (Percival 2003)	Significance of potential effect (EPA 2017)
Operational Phase			
Direct Habitat Loss	Direct or indirect effects are not anticipated	**No Effect**	**No Effect**
Displacement & Barrier Effect	Significant operational phase disturbance impacts are not predicted at the barn owl breeding site, given the c. 1.2km separation distance from the nearest proposed turbine. Furthermore, significant loss of the foraging habitat is not predicted given the area of grassland within the wind farm site is confined to a small marginal area and there is an abundance of similar suitable habitat in the wider surroundings. Significant displacement effects are not anticipated.	The magnitude of the effect is assessed as *low.* The cross tablature of *Medium* sensitivity species and *Low* Impact corresponds to a ***Low*** effect significance.	**Long-term Slight Negative Effect**
Collision	The species was not recorded flying at Potential Collision Height during Vantage Point Surveys. Collision related mortality is not likely to significantly impact this species, particularly given this species fly at low elevation when hunting.	**No Effect**	**No Effect**

7.8.2.14 Long-eared Owl

Table 7-25 Impact Characterisation for Long-eared Owl based on Percival (2003) & EPA (2017).

Analysis of potential effects during construction and operational phases of the Proposed Development		Magnitude and Significance of potential effect (Percival 2003)	Significance of potential effect (EPA 2017)
Construction Phase			
Direct Habitat Loss	The species was not directly observed but was recorded calling from trees/conifer plantation located close to VP5, within the Site boundary (along	The magnitude of the effect is assessed as *low.*	**Long-term Slight Negative Effect**

	the internal road route) and 1.2km from the closest turbine. The habitats of the wind farm site (i.e. predominantly cutover bog) are considered sub-optimal foraging habitat for long-eared owl. Long-eared owl favour open grassland for foraging. One turbine is proposed in agricultural grassland. However, habitat loss in this area is likely to be insignificant given the availability of similar habitat in the wider surroundings. Significant effects with regard to direct habitat loss are not predicted.	The cross tablature of *Low* sensitivity species and *Low* Impact corresponds to a ***Very Low*** effect significance.	
Displacement & Barrier Effect	As previously discussed, the habitats of the wind farm site (i.e. predominantly cutover bog) are considered sub-optimal foraging habitat for long-eared owl. Long-eared owl favour open grassland for foraging. One turbine is proposed in agricultural grassland. However, habitat loss in this area is likely to be insignificant given the availability of similar habitat in the wider surroundings. Significant displacement effects are not predicted.	The magnitude of the effect is assessed as *low.* The cross tablature of *Low* sensitivity species and *Low* Impact corresponds to a ***Very Low*** effect significance.	**Short-term Slight Negative Effect**
Operational Phase			
Direct Habitat Loss	Direct or indirect effects are not anticipated	**No Effect**	**No Effect**
Displacement & Barrier Effect	Significant loss of foraging habitat is not predicted given the area of grassland within the wind farm site is confined to a small marginal area and there is an abundance of similar suitable habitat in the wider surroundings. Significant displacement effects are not predicted.	The magnitude of the effect is assessed as *low.* The cross tablature of *Low* sensitivity species and *Low* Impact corresponds to a ***Very Low*** effect significance.	**Long-term Slight Negative Effect**
Collision	The species was not recorded flying at Potential Collision Height during Vantage Point Surveys. Collision related mortality is not likely to significantly impact this species.	**No Effect**	**No Effect**

7.8.2.15 Buzzard (*All Seasons*)

Table 7-26 Impact Characterisation for Buzzard based on Percival (2003) & EPA (2017).

Analysis of potential effects during construction and operational phases of the Proposed Development		Magnitude and Significance of potential effect (Percival 2003)	Significance of potential effect (EPA 2017)
Construction Phase			
Direct Habitat Loss	This species was frequently recorded foraging within the wind farm site during the breeding and winter seasons. Direct loss of foraging habitat relative to its availability onsite, will be minimal. Substantial areas of undisturbed suitable breeding and foraging habitat will remain post construction. Significant effects are not predicted.	The magnitude of the effect is assessed as *low*. The cross tablature of a *Low* sensitivity species and a *Low* Impact corresponds to a ***Very Low*** effect significance.	**Long-term Slight Negative Effect**
Displacement & Barrier Effect	This species was frequently recorded within the wind farm site during the breeding and winter seasons. The majority of observations involve foraging birds. The Proposed Development area does not contain habitats that are of particularly high quality (e.g. cutover bog) or unique to the local area. Therefore, were displacement to occur it would not result in the loss of a scarce resource for the local buzzard population. Significant displacement effects are not predicted.	The magnitude of the effect is assessed as *low*. The cross tablature of *Low* sensitivity species and *low* Impact corresponds to a ***Very Low*** effect significance.	**Short-term Slight Negative Effect**
Operational Phase			
Direct Habitat Loss	Direct or indirect effects are not anticipated	**No Effect**	**No Effect**
Displacement	Significant effects are not anticipated, given that extensive areas of suitable foraging habitat exist and will remain in the wider area. In addition, onsite	The magnitude of the effect is assessed as *low*.	**Long-term Slight Negative Effect**

Analysis of potential effects during construction and operational phases of the Proposed Development		Magnitude and Significance of potential effect (Percival 2003)	Significance of potential effect (EPA 2017)
	habitats are not considered of particularly high quality (e.g. cutover bog) or unique to the wind farm site. Significant effects are not anticipated at any geographical scale.	The cross tablature of *Low* sensitivity species and *Low* Impact corresponds to a ***Very Low*** effect significance.	
Collision	The species was recorded flying with the potential collision risk zone during VP surveys. A "Random" collision risk analysis has been undertaken and full details are provided in Appendix 7-5. The collision risk has been calculated at a ratio of 2.68 collisions per year. The favourable conservation status of this species (Green-listed BoCCI) limits the potential for ecologically significant effects to result. The predicted collision risk is insignificant in the context of the county, national and international population.	The magnitude of the effect is assessed as *low.* The cross tablature of *Low* sensitivity species and *Low* Impact corresponds to a ***Very Low*** effect significance.	**Long-term Slight Negative Effect**

7.8.2.16 Sparrowhawk (*All Seasons*)

Table 7-27 Impact Characterisation for Sparrowhawk based on Percival (2003) & EPA (2017).

Analysis of potential effects during construction and operational phases of the Proposed Development		Magnitude and Significance of potential effect (Percival 2003)	Significance of potential effect (EPA 2017)
Construction Phase			
Direct Habitat Loss	This species was frequently recorded foraging within the wind farm site during the breeding and winter seasons. Direct loss of foraging habitat relative to its availability onsite will be minimal.	The magnitude of the effect is assessed as *low.* The cross tablature of a *Low* sensitivity species and a *Low*	**Long-term Slight Negative Effect**

Analysis of potential effects during construction and operational phases of the Proposed Development		Magnitude and Significance of potential effect (Percival 2003)	Significance of potential effect (EPA 2017)
	Substantial areas of undisturbed suitable breeding and foraging habitat will remain post construction. Significant effects are not predicted.	Impact corresponds to a ***Very Low*** effect significance.	
Displacement & Barrier Effect	This species was frequently recorded within the wind farm site during the breeding and winter seasons. The majority of observations involved foraging birds. The Proposed Development area does not contain habitats that are of particularly high quality (e.g. cutover bog) or unique to the local area. Therefore, were displacement to occur it would not result in the loss of a scarce resource for the local sparrowhawk population. Significant displacement effects are not predicted.	The magnitude of the effect is assessed as *low*. The cross tablature of *Low* sensitivity species and *low* Impact corresponds to a ***Very Low*** effect significance.	**Short-term Slight Negative Effect**
Operational Phase			
Direct Habitat Loss	Direct or indirect effects are not anticipated.	**No Effect**	**No Effect**
Displacement & Barrier Effect	Significant effects are not anticipated, given that extensive areas of suitable foraging habitat exist and will remain in the wider area. In addition, onsite habitats are not considered of particularly high quality (e.g. cutover bog) or unique to the wind farm site. Significant effects are not predicted.	The magnitude of the effect is assessed as *low*. The cross tablature of *Low* sensitivity species and *Low* Impact corresponds to a ***Very Low*** effect significance.	**Long-term Slight Negative Effect**
Collision	The species was recorded flying with the potential collision risk zone during VP surveys. A "Random" collision risk analysis has been undertaken and full details are provided in Appendix 7-5.	The magnitude of the effect is assessed as *negligible*.	**Long-term Slight Negative Effect**

Analysis of potential effects during construction and operational phases of the Proposed Development		Magnitude and Significance of potential effect (Percival 2003)	Significance of potential effect (EPA 2017)
	The collision risk has been calculated at a ratio of 0.106 collisions per year, equating to one bird every 9 years. The predicted collision risk is insignificant in the context of the county, national and international population.	The cross tablature of *Low* sensitivity species and *Negligible* Impact corresponds to a ***Very Low*** effect significance.	

7.8.2.17 Kestrel (*All Seasons*)

Table 7-28 Impact Characterisation for Kestrel based on Percival (2003) & EPA (2017).

Analysis of potential effects during construction and operational phases of the Proposed Development		Magnitude and Significance of potential effect (Percival 2003)	Significance of potential effect (EPA 2017)
Construction Phase			
Direct Habitat Loss	This species was frequently recorded foraging within the wind farm site during the breeding and winter seasons. Direct loss of foraging habitat relative to its availability onsite, will be minimal. Substantial areas of undisturbed suitable breeding and foraging habitat will remain post construction. Significant effects are not predicted.	The magnitude of the effect is assessed as *low.* The cross tablature of a *Low* sensitivity species and a *Low* Impact corresponds to a ***Very Low*** effect significance.	**Long-term Slight Negative Effect**
Displacement & Barrier Effect	This species was frequently recorded within the wind farm site during the breeding and winter seasons. The majority of observations involve foraging birds. The Proposed Development area does not contain habitats that are of particularly high quality (e.g. cutover bog) or unique to the local area. Therefore, were displacement to occur it would not result in the loss of a scarce resource for the local kestrel population.	The magnitude of the effect is assessed as *low.* The cross tablature of *Low* sensitivity species and *low*	**Short-term Slight Negative Effect**

Analysis of potential effects during construction and operational phases of the Proposed Development		Magnitude and Significance of potential effect (Percival 2003)	Significance of potential effect (EPA 2017)
	Significant displacement effects are not predicted.	Impact corresponds to a ***Very Low*** effect significance.	
Operational Phase			
Direct Habitat Loss	Direct or indirect effects are not anticipated.	**No Effect**	**No Effect**
Displacement & Barrier Effect	Raptor studies have generally found only low levels of turbine avoidance (Hötker et al., 2006; Madders & Whitfield, 2006), with some species, such as kestrels, known to continue foraging activity close to turbines (Pearce Higgins et al., 2009). Significant effects are not anticipated, given that extensive areas of suitable foraging habitat exist and will remain in the wider area. In addition, onsite habitats are not considered of particularly high quality (e.g. cutover bog) or unique to the wind farm site. Significant effects are not predicted.	The magnitude of the effect is assessed as *low*. The cross tablature of *Low* sensitivity species and *Low* Impact corresponds to a ***Very Low*** effect significance.	**Long-term Slight Negative Effect**
Collision	The species was recorded flying within the potential collision risk zone during VP surveys. A "Random" collision risk analysis has been undertaken and full details are provided in Appendix 7-5. The collision risk has been calculated at a ratio of 1.17 collision per year. The predicted collision risk is insignificant in the context of the county, national and international population.	The magnitude of the effect is assessed as *low*. The cross tablature of *Low* sensitivity species and *Low* Impact corresponds to a ***Very Low*** effect significance.	**Long-term Slight Negative Effect**

7.8.2.18 Common Snipe (*All Seasons*)

Table 7-29 Impact Characterisation for Common Snipe based on Percival (2003) & EPA (2017).

Analysis of potential effects during construction and operational phases of the Proposed Development		Magnitude and Significance of potential effect (Percival 2003)	Significance of potential effect (EPA 2017)
Construction Phase			
Direct Habitat Loss	Common snipe were recorded regularly during surveys, during both the summer and winter months. Snipe favour open habitats for foraging and breeding. It is likely that there will be a partial loss of snipe breeding and wintering habitat within the Proposed Development Site as a result of construction works (e.g. including resulting from the new Site drainage). However, the (direct) loss of breeding and foraging habitat will be minimal as the infrastructure is confined to a narrow corridor. Significant effects are not anticipated at the county, national or international scale.	The magnitude of the effect is assessed as *low.* The cross tablature of a *Low* sensitivity species and a *Low* Impact corresponds to a ***Very Low*** effect significance.	**Long-term Slight Negative Effect**
Displacement & Barrier Effect	Common snipe were regularly recorded during surveys, with observations primarily relating to birds flushed by the surveyor. The majority of recorded snipe were flushed from the areas around the grid connection route. Disturbance from construction activities could result in the loss of snipe breeding and wintering habitat locally. Pearce Higgins et. al (2009), found a 50% reduction in breeding density of snipe within 500m of turbines. The majority of the open habitat onsite is located within 500m of turbines. There is therefore potential for a measurable reduction in breeding density of snipe within the development and its immediate surroundings. However, the Proposed Development area does not contain habitats that are of particularly high quality or unique to the local area. Therefore, were displacement to occur	The magnitude of the effect is assessed as *low.* The cross tablature of *Low* sensitivity species and *Low* Impact corresponds to a ***Very Low*** effect significance.	**Short-term Slight Negative Effect**

Analysis of potential effects during construction and operational phases of the Proposed Development		Magnitude and Significance of potential effect (Percival 2003)	Significance of potential effect (EPA 2017)
Construction Phase			
	it would not result in the loss of a scarce resource for the local snipe population. Significant displacement effects are not predicted to occur at the county, national and international scale.		
Operational Phase			
Direct Habitat Loss	Direct or indirect effects are not anticipated.	**No Effect**	**No Effect**
Displacement & Barrier Effect	The majority of observations occurred south of the wind farm site and close to turbine T15. As previously discussed, Pearce Higgins et. al (2009), found a 50% reduction in breeding density of snipe within 500m of turbines. A 500m buffer around the turbines would cover the majority of the open habitat onsite, therefore it is likely that there will be a measurable reduction in breeding density of snipe within the development and its immediate surroundings. However, the Proposed Development Site does not contain habitats that are unique to the local area nor are cutover bogs of particularly high-quality breeding habitat for this species. Significant effects are not predicted to occur at the county, national and international scale.	The magnitude of the effect is assessed as *low*. The cross tablature of *Low* sensitivity species and *Low* Impact corresponds to a ***Very Low*** effect significance.	**Long-term Slight Negative Effect**
Collision	It is acknowledged that the predicted number of transits, and hence predicted rate of collision for common snipe may be underestimated, as flight activity for this species is predominantly crepuscular in nature while the Vantage Point surveys are largely diurnal (Table 1.4, SNH (2017)).	The magnitude of the effect is assessed as *low*.	**Long-term Slight Negative Effect**

Analysis of potential effects during construction and operational phases of the Proposed Development		Magnitude and Significance of potential effect (Percival 2003)	Significance of potential effect (EPA 2017)
Construction Phase			
	The species was recorded flying with the potential collision risk zone during VP surveys. A "Random" collision risk analysis has been undertaken and full details are provided in Appendix 7-5. The collision risk has been calculated at a ratio of 0.19 collisions per year, or one bird every 5 years. The predicted collision risk is low in the context of the county, national and international population.	The cross tablature of *Low* sensitivity species and *Low* Impact corresponds to a ***Very Low*** effect significance.	

7.8.3 Effects on Key Ornithological Receptors during Decommissioning

7.8.3.1 All Species

Table 7-30 Impact Characterisation for Ecological Receptors based on Percival (2003) & EPA (2017).

Analysis of potential effects during construction and operational phases of the Proposed Development		Magnitude and Significance of potential effect (Percival 2003)	Significance of potential effect (EPA 2017)
Construction Phase			
Direct Habitat Loss	Direct or indirect effects are not anticipated	**No Effect**	**No Effect**
Displacement & Barrier Effect	As above for construction phase for each species listed as a KOR.	As above for construction phase for each KOR	As above for construction phase for each KOR

7.8.4 Effects Associated with the Grid Connection and Turbine Delivery Route

The proposed grid connection route measures approximately 26km from the proposed wind farm site to the existing substation near Mullingar. The grid connection route would comprise underground cabling located primarily within the public road corridor, with a short section of underground cabling (approximately 700m) across private lands at the northernmost end. In addition, it is proposed to construct a link road which measures approximately 1.2 kilometres in length and will traverse land currently occupied by commercial cutover peat and agricultural grassland. There are relatively minor works proposed at ten junctions on the proposed turbine haul route. The works comprise: hardsurfacing at the N4 in the vicinity of its junction with the L1927 Local road in the townland of Joanstown; Temporary removal of the existing hedgerow and hardsurfacing before the railway line level crossing on the L1927; hardsurfacing and widening of the L1927 and L5828 junction in the townland of Boherquill; clearing of existing verge and vegetation and hardsurfacing at the gentle right turn from the L5828 onto the R395; hardsurfacing including clearance of vegetation and road verge to provide access and egress at proposed link road; hardsurfacing including clearance of vegetation and road verge at site access points off the R396, and at four points along the L5755 .

Construction works associated with the grid connection route and turbine delivery route has the potential to impact breeding lapwing and barn owl. Without mitigation, this impact was assessed to potentially result in a Short-term moderate negative effect (EPA 2017) for both species. Please refer to Tables 7-22 and 7-24 respectively for further details. The potential for this grid connection route to impact other bird species is discussed below.

The majority of onsite habitats are of low ecological value (i.e. cutover bog and agricultural grassland) and are not unique to the Proposed Development area. Along the grid connection route or turbine delivery route no nest sites were identified at any of bridges that were surveyed. On a precautionary basis, it is assumed that some minor habitat loss and temporary displacement may occur during construction works. However, given the extent of suitable habitat in the wider area, significant displacement effects are not predicted. The grid connection and turbine delivery route does not have the potential to result in any significant habitat loss or displacement of any KOR species.

As per Percival (2003) the magnitude of the effect on KOR is assessed as Negligible. The cross tablature of a Very High sensitivity species (e.g. Greenland white-fronted goose) and Negligible Impact corresponds to a Low effect significance. Greenland white-fronted goose was used as an example as it is the highest sensitivity species identified as a KOR at this Site. The significance of the potential impact is classed as a short-term slight negative effect following EPA criteria (2017).

7.8.5 Effects on Designated Areas

7.8.5.1 Effects on Nationally Designated Sites

The proposed grid connection traverses the Royal Canal pNHA to the southern section of the route. Works will be restricted to the existing road at this location and will not directly impact the Royal Canal pNHA. Although the proposed grid connection occurs adjacent to the boundary of a number of designated sites, works will be carried out within the existing road corridor at these locations. As a result, there will be no direct effects on any nationally designated site as a result of the construction, operation and decommissioning of the Proposed Development. However, taking a precautionary approach, there is potential for indirect effects on these sites via water pollution and they have been included as KERs.

Six nationally designated sites were identified as being within the zone of influence as listed below:

- Lough Derravarragh NHA

- Ballynafid Lake and Fen pNHA
- Royal Canal pNHA
- Lough Owel pNHA
- Lough Iron pNHA
- Lough Ennell pNHA

The boundaries of four of these nationally designated sites, namely; Lough Derravaragh NHA, Lough Owel pNHA, Lough Ennell pNHA and Lough Iron pNHA also share a boundary with a respectively named European designated site, namely Lough Derravaragh SPA, Lough Owel SAC/SPA, Lough Ennell SAC/SPA and Lough Iron SPA. As a result, any mitigation measures implemented for the protection of these European sites will also apply to the concurrently designated national site.

Of the six nationally designated sites listed above, two of these occur as designated sites in their own right and have been assessed further below:

- Ballynafid Lake and Fen pNHA. The proposed grid connection occurs within the national N4 road along the boundary of the pNHA. It is a site that contains peatland and fen habitats and the potential for hydrological connection was considered as a pathway for effect. As described in Chapter 9 of this EIAR, the extents of the pNHA boundary extend out past the N4 road, however this is considered a GIS oversight, as the road and surrounding made ground does not constitute the habitat described under the NHA description.
- Royal Canal pNHA is traversed by the proposed grid connection route where it crosses the Lough Owel feeder via the existing road bridge. Potential for impacts in relation to surface water run-off are assessed in full in the Hydrology Chapter and the CEMP.

Following the implementation of mitigation, there is no potential for significant effects on these Nationally Designated Sites. All best practice measures will be adhered to throughout the Proposed Development phases as described in the Hydrology Chapter and the CEMP.

7.8.5.2 Effects on European Designated Sites

With regard to European Sites, a Screening assessment was carried out to provide An Bord Pleanala with the information necessary to complete a Screening for Appropriate Assessment for the Proposed Development in compliance with Article 6(3) of the Habitats Directive. As part of this assessment, the potential for the Proposed Development to have an effect on any European sites in the ZOI was considered. The Screening for Appropriate Assessment concluded as follows:

> *"It cannot be excluded beyond reasonable scientific doubt, in view of best scientific knowledge, on the basis of objective information and in light of the conservation objectives of the relevant European sites, that the Proposed Development, individually or in combination with other plans and projects, would have a significant effect on the following European Sites:*
>
> - *Lough Owel SAC (000688)*
> - *Lough Ennell SAC (000685)*
> - *Lough Owel SPA (004047)*
> - *Lough Ennell SPA (004044)*
> - *Lough Derravaragh SPA (004043)*
> - *Lough Iron SPA (004046)"*

As a result, an Appropriate Assessment of the Proposed Development is required and a Natura Impact Statement (NIS) has been prepared.

The NIS concludes the following:

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

Due to close proximity and/or potential hydrological pathways with the Proposed Development the following European sites have been included as KERs:

- *Lough Owel SAC (000688)*
- *Lough Ennell SAC (000685)*
- *Lough Owel SPA (004047)*
- *Lough Ennell SPA (004044)*
- *Lough Derravaragh SPA (004043)*
- *Lough Iron SPA (004046)"*

7.9 Mitigation and Best Practice Measures

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

- Design of the Proposed Development.
- Management of the development phases.

7.9.1 Mitigation by Design

During the site surveys, it was noted that all works will be undertaken in the road, will be short term and typical of road maintenance works. No works are proposed outside the confines of the road corridor and given the nature and scale of the temporary cable laying works no adverse effects relating to disturbance are anticipated.

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

- The grid connection route has been selected to utilise built infrastructure for the majority of its length (i.e. cables to be laid within public roads). Cables will be laid underground to avoid effects on roadside hedgerows and disturbance to nesting birds.

7.9.2 Mitigation During Construction, Operation and Decommissioning

The following section describes the mitigation measures to be implemented during each phase of the Proposed Development.

7.9.2.1 Construction Phase Mitigation

The following measures are proposed for the construction phase:

- A Construction and Environmental Management Plan (CEMP) has been prepared. The CEMP will be in place prior to the start of the construction phase. Best practice

measures which form part of the design of the project are included in Chapter 4 of the EIAR. The CEMP is included as an Appendix to Chapter 4.

- All removal of woody vegetation will be undertaken in accordance with Section 40 of the Wildlife Act 1976 as amended.
- The removal of woody vegetation will be undertaken outside the bird breeding season which runs from the 1st of March to the 31st of August inclusive. Where sections of woody vegetation are removed for the purposes of the junction and road upgrades, these will be replaced with suitable hedge/tree species which are common in the local context.
- In line with best practise, no construction works are permitted 1st of March to the 31st of August inclusive within a 350m radius of the lapwing breeding territories, as provided in Confidential Appendix 7-7. The presence of this breeding territory will be resurveyed pre-Construction, as per Section 7.10.1.
- In line with best practise, no construction works are permitted 1st of March to the 31st of August inclusive within a 500m radius of the barn owl breeding site, as provided in Confidential Appendix 7-7. The presence of this breeding site will be resurveyed pre-Construction, as per Section 7.10.1.
- During the construction phase, noise limits, noise control measures, hours of operation (i.e. dusk and dawn is high faunal activity time) and selection of plant items will be considered in relation to disturbance of birds.
- Plant machinery will be turned off when not in use.
- All plant and equipment for use will comply with the industry best practise Construction Plant and Equipment Permissible Noise Levels Regulations and other relevant legislation.
- An Ecological Clerk of Works (ECoW) will be appointed. Duties will include:
    - Undertake a pre-construction transect/walkover bird survey to ensure that significant effects on breeding birds will be avoided.
    - Inform and educate on-site personnel of the ornithological and ecological sensitivities within the Proposed Development site.
    - Oversee management of ornithological and ecological issues during the construction period and advise on ornithological issues as they arise.
    - Provide guidance to contractors to ensure legal compliance with respect to protected species onsite.
    - Liaise with officers of consenting authorities and other relevant bodies with regular updates in relation to construction progress.

7.9.2.2 Operational Phase Mitigation

No operational phase impacts requiring mitigation were identified.

7.9.2.3 Decommissioning Phase Mitigation

The following measures are proposed for the decommissioning phase:

- During the decommissioning phase, disturbance limitation measures will be as per the construction phase.
- Plant machinery will be turned off when not in use.
- All plant and equipment for use will comply with industry best practise Construction Plant and Equipment Permissible Noise Levels Regulations.

7.10 Monitoring

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

7.10.1 Commencement and Pre-Construction Monitoring

Pre-commencement surveys will be undertaken prior to the initiation of works at the wind farm. The survey will include a thorough walkover survey to a 500m radius of the development footprint and/or all works areas, where access allows. In the specific case of the identified lapwing breeding sites and probable barn owl nest, these would be visited (pre-construction) on a minimum of three occasions during the breeding season to confirm their continued occupancy.

If winter roosting or breeding activity of birds of high conservation concern is identified, the roost or nest site will be located, and earmarked for monitoring at the beginning of the first winter or breeding season of the construction phase. If it is found to be active during the construction phase no works shall be undertaken within a disturbance buffer (Forestry Commission Scotland, 2006; Ruddock & Whitfield, 2007) in line with industry best practise. No works shall be permitted within the buffer until it can be demonstrated that the roost/nest is no longer occupied.

7.10.2 Post-Construction Monitoring

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

- Flight activity surveys: vantage point surveys
- Breeding bird walkover survey: adapted Brown and Shepherd
- Targeted bird collision surveys (corpse searches) will be undertaken with trained dogs. The surveys will include detection and scavenger trials, to correct for these two biases and ensure the resulting data is robust.

7.11 Residual Effects

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

- Whooper Swan
- Greenland White-fronted Goose
- Golden Plover
- Merlin
- Peregrine Falcon
- Osprey
- Red Kite
- Wigeon
- Teal
- Black-headed Gull
- Lapwing
- Woodcock
- Barn Owl
- Long-eared Owl
- Buzzard
- Sparrowhawk
- Kestrel
- Common Snipe

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

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

As per EPA 2017 criteria, effect significance of greater than ***Slight*** was not identified for any KOR.

7.12 Cumulative Effects

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

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

7.12.1 Other Plans and Projects

Assessment material for this in combination impact assessment was compiled on the relevant developments within the vicinity of the proposed project and was verified on the 23rd of November 2020. The material was gathered through a search of relevant online Planning Registers, reviews of relevant EIS/EIAR documents, planning application details and planning drawings, and served to identify past and future projects, their activities and their environmental impacts. The projects considered in relation to the potential for in combination effects and for which all relevant data was reviewed (e.g. individual EIS/EIAR, layouts, drawings etc.) include those listed below.

7.12.1.1 Plans Considered in the Cumulative Impact Assessment

The following plans were considered in the cumulative impact assessment:

- Westmeath County Development Plans 2014-2020 and 2021-2027
- Longford County Development Plan 2015-2021
- National Biodiversity Action Plan 2017-2021

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

7.12.1.2 Projects Considered in the Cumulative Impact Assessment

A review of the Planning Register for Westmeath County Council shows that there has been a number of planning applications lodged within the vicinity of the EIAR study area. While planning applications lodged within the EIAR study area primarily relate to one-off housing or are agricultural in nature, there are a number of previous applications for wind farm development and associated infrastructure. Further details on these applications are available below.

Peat Extraction

This EIAR assesses the potential for peat extraction works on the site to continue as a worst-case scenario. The Proposed Development has been designed to operate on this site in conjunction with any peat extraction activities. Should peat extraction cease, a site rehabilitation plan will be required which would be likely to encourage revegetation of bare peat areas, with targeted active management being

used to enhance re-vegetation and the creation of small wetland areas. Due to the small footprint of the Proposed Development in the context of the entirety of the commercial peat extraction area, a rehabilitation plan where required would take account of the wind farm infrastructure. In doing so, the environmental effects in terms of emissions are likely to be neutral.

Forestry, and Agricultural Practices

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

The remaining land use within the Site and surrounding area is predominantly agriculture in the form of livestock grazing.

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

Other Developments

The review of the Westmeath County Council planning registers documented relevant general development planning applications in the vicinity of Proposed Development Site, most of which relate to the provision and/or alteration of one-off rural housing and agriculture-related structures. Owing to the nature and scale of these developments, significant cumulative or in-combination effects are not anticipated. More details can be found in Chapter 2, Section 2.4.

Other Wind Farms

The wind farm projects within a 20-kilometre radius of Coole Wind Farm proposal are provided in Table 7-29 below and are presented in terms of their proximity to the Proposed Development and whether the projects are permitted/operational or pending/under appeal. A total of 2 existing/proposed wind farms, and 2 existing/proposed turbines fall within a 20-kilometre radius of the proposal. The density of turbines within a 20-kilometre radius of the proposal is considered low as shown in Chapter 2 Figure 2-10.

Table 7-31 Wind Farms Within 20km of the development Site

Wind Farm	Status	No. of Turbines	Distance from development Site (km)
Co. Longford			
Grandardkill (Ref. 20/105)	Proposed	1	10.2
Co. Cavan			
Ballyjamesduff (Ref. 11296)	Existing	1	16.2
TOTAL EXISTING		**0**	
TOTAL PROPOSED		**1**	

SNH guidance on *Assessing the Cumulative Impacts of onshore Wind Energy Developments* (2012 and 2018) was consulted when undertaking cumulative assessment. SNH (2012 and 2018) emphasises that the main concern of SNH is to 'maintain the conservation status of the species population at the national level.' However, it is acknowledged that consideration should also be allowed for impacts at the regional level, 'where regional impacts have national implications (e.g. where a specific region holds

the majority of the national population)'. A 12km radius of the Proposed Development was considered an appropriate regional scale given the foraging range of the key ornithological receptors identified within the Proposed Development area. For example, the core foraging range of Greenland white-fronted goose is 5-8km (SNH 2016) and golden plover have been recorded to regularly fly 12km between winter foraging areas (Gillings and Fuller, 1999). The wind farms that have been considered in further details in relation to the potential for cumulative impacts and for which all relevant data was reviewed (e.g. individual EIAR, layouts, drawings, etc) are listed below.

Only one proposed wind farm falls within the 12-kilometre radius of the proposal.

- **Grandardkill, Co. Longford**

Proposed Grandardkill Wind Farm is the closest and only wind farm to the Proposed Development situated 10.2km, to the north-west. The EIAR was consulted to determine cumulative impacts from the development Site. The EIAR outlined that "the species noted during the Site visit, either flying overhead or within the Site boundary, are green listed and occur commonly within a wide range of habitats in the Irish landscape." There were records of buzzard and passerines. The EIAR concluded that "the effect of the single turbine development on the bird assemblage of the Site is not considered likely to be significant."

No significant residual effects on avian receptors were identified.

Based on the information available in the Proposed Grandardkill Wind Farm EIAR, significant cumulative impacts are not anticipated.

7.12.1 Assessment of Cumulative Effects

Following consideration of the residual effects (post-mitigation) it is noted that the Proposed Development on its own, will not result in any significant effects on any of the identified KORs. No significant effects on receptors of International, National or County Importance were identified.

Important migratory routes for any species were not identified in any of the assessments undertaken. Therefore, significant cumulative barrier effect is not anticipated.

No residual additive, antagonistic or synergistic effects have been identified with regard to habitat loss, displacement or collision mortality for any KOR.

No potentially significant cumulative habitat loss, disturbance, displacement or collision risk effects on any of the KORs has been identified with regard to the development proposal.

7.13 Conclusion

Following consideration of the residual effects (post-mitigation), it is concluded that the Proposed Development will not result in any significant effects on any of the identified KORs. No significant effects on receptors of International, National or County Importance were identified.

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