



Cush Wind Farm
Phase II

Environmental Impact Assessment Report

Chapter 5: Biodiversity

Cush Wind Limited

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5.1 INTRODUCTION

SLR Environmental Consulting (Ireland) Ltd was commissioned to carry out an ecological impact assessment of the project as part of this Biodiversity chapter.

This chapter presents an assessment of the likely significant effects of the project and associated infrastructure on the receiving environment.

This chapter outlines -:

- A baseline study of the receiving ecological environment, including survey methodology and results;
- An assessment of the likely significant effects of the project during construction, operation and decommissioning phases;
- An assessment of likely significant cumulative effects;
- Mitigation measures to avoid or reduce the likely significant effects anticipated;
- Residual effects; and
- Enhancement measures.

5.1.1 DESCRIPTION OF THE PROJECT

The project assessed in this EIAR comprises a 3 no. wind turbine extension to the permitted Cush Wind Farm Phase I, together with all associated and ancillary infrastructure and works. The on-site elements of the project comprise:-

- 3 no. wind turbines with the following dimensional ranges:
 - An overall turbine tip height of 199.1 m to 200 m;
 - A rotor diameter of 158 m to 175 m; and
 - A hub height of 111.6 m to 120.9 m.
- All associated turbine foundations and crane hardstanding areas;
- All associated internal underground electrical and communications cabling;
- Construction of approximately 1.7km of wind farm access tracks;
- Use of 1 no. permitted construction phase site vehicular entrance from the N62 national road and 1 no. permitted operation phase vehicular entrance from the L300321 local road;
- 1 no. proposed electrical switch room building, enclosed within a switch room compound and 1 no. new vehicular entrance onto the L300321 local road; and
- All associated and ancillary site development, excavation, construction, spoil deposition, landscaping and reinstatement works, including provision of site drainage infrastructure and environmental mitigation measures.

The off-site elements of the project comprise:

- Accommodation works along the Turbine Delivery Haul Route, and
- Approximately 5 km of 33 kV underground electricity line to connect the proposed wind farm to the proposed Mullanafawnia 110kV substation¹.

¹ The proposed Mullanafawnia 110kV substation is currently the subject of Strategic Infrastructure Development Pre-Application Consultation with An Coimisiún Pleanála (Reference: ACP-324608-26). The substation is being proposed by a separate developer and does not form part of the project assessed in this EIAR. However, it is assessed cumulatively, where relevant, in this EIAR.

Node Number	Summary of Required Works	Location (ITM)	
		ITM Easting	ITM Northing
7.2.1	<ul style="list-style-type: none"> None required 	530141	724849
7.2.2	<ul style="list-style-type: none"> None required 	530364	725196
7.2.3	<ul style="list-style-type: none"> None required 	530976	726087
7.2.4	<ul style="list-style-type: none"> Street furniture removal 	531085	726268
7.2.5	<ul style="list-style-type: none"> Pruning of overhanging trees Street furniture removal Oversail will require going into third-party land which will require removal of wall and fence 	531752	726705
7.2.6	<ul style="list-style-type: none"> Widening of road on offside of junction and pavement Street furniture removal 	531806	727014
7.2.7	<ul style="list-style-type: none"> Street furniture removal One tree to be removed 	532015	727188
7.2.8	<ul style="list-style-type: none"> Street furniture removal 	534701	726617
7.3.1	<ul style="list-style-type: none"> Street furniture removal Utilise the existing widening on the offside of the entry slip road. Additional road widening may be required 	633585	734437
7.3.2	<ul style="list-style-type: none"> Street furniture removal Utilise existing road widening, and additional road widening may be required 	633618	734255
7.4.1	<ul style="list-style-type: none"> Street furniture removal Road widening may be required on central island 	634434	726567
7.4.2	<ul style="list-style-type: none"> Street furniture removal Road widening may be required on central island 	635536	725314
7.4.3	<ul style="list-style-type: none"> Street furniture removal Road widening may be required on central island 	635830	724161
7.4.4	<ul style="list-style-type: none"> Street furniture removal Road widening may be required on central island 	634808	722774
7.4.5	<ul style="list-style-type: none"> Street furniture removal Road widening may be required on central island 	633217	722531
7.4.6	<ul style="list-style-type: none"> Street furniture removal Road widening may be required on central island 	632330	722462
7.4.7	<ul style="list-style-type: none"> Street furniture removal Road widening may be required on 	631983	722719

Node Number	Summary of Required Works	Location (ITM)	
		ITM Easting	ITM Northing
	central island		
7.4.8	<ul style="list-style-type: none"> Street furniture removal Road widening may be required on central island 	630919	722857
7.5.1	<ul style="list-style-type: none"> Street furniture removal Tree removal (urban landscaping) Road widening may be required on footpath 	618410	714039
7.5.2	<ul style="list-style-type: none"> Street furniture removal 	618024	714006
7.5.3	<ul style="list-style-type: none"> Street furniture removal Trees and fence removal Loading of third-party land to allow manoeuvring Road widening may be required on central island 	607347	707469
7.5.4	<ul style="list-style-type: none"> None required 	607174	707965
7.5.5	<ul style="list-style-type: none"> Widening of site entrance to accommodate all loaded components 	607564	710080

Table 5.1: Turbine haul route Nodes – Description of Accommodation Works

Each element of the project is discussed in turn below and all relevant technical plans, drawings and other particulars are included with the accompanying planning application. This EIAR should therefore be read in conjunction with the plans and particulars of the planning application, and with the definition of the project set out in **Chapter 1 (Section 1.3)**.

5.1.2 SITE LOCATION

The project site is located in rural Co. Offaly, approximately 4km north of the town of Birr and c. 28km south-west of Tullamore, Co. Offaly (see Figure 5-1-1 to 5-1-7). The proposed wind farm will be located in the townlands of Galros East, Whigborough, Ballycolin, and Eglis, Co. Offaly. The proposed grid connection will be located in the townlands of Eglis, Ballynaguilsha, Shanacloon, Cloncarban, Clonbeale Beg Glebe, and Mullanafawnia, Co. Offaly.

The project site and surrounding topography are typical of the midlands region and comprise a generally flat landscape with occasional gentle undulations. Ground elevations range from between approximately 45m and 65m OD (Ordnance Datum) across the project site. The most elevated section of the project site is found at its most eastern point where agricultural grassland rises up to 65m OD (at the point where the proposed underground electricity line connects to the proposed Mullanafawnia 110kV substation).

According to the Corine 2018 database, land use at the project site varies throughout. The western side of the project site, where the 3 no. turbines are proposed, is located, primarily, on peat bog, whilst the proposed internal cable route as well as the

underground electricity line are located on areas which include small pockets of agricultural pasture/grassland, and scrub. Short sections of the proposed underground electricity line cross over the public road, whilst the remainder is located on private lands.

The primary drainage feature within the project site is the Rapemills River which flows in a westerly direction partially abutting the central section of underground electricity line. The Rapemills River is deep (approximately 2m) with steep banks and up to 5m in width.

A tributary stream of Rapemills River, referred to as the West Galros Stream by the EPA emerges from forestry on the eastern portion of the project site before crossing the N62.

The underground electricity line (c. 5km in length) crosses public roads at the N52 national road, where it will be placed under the carriageway, and at the L7006 local road at Clonbeale Beg Glebe, where it will cross the carriageway. The remainder of the underground electricity line will be situated in private lands (off road).

A full description of the project is presented in **Chapter 3**.

5.1.3 TERMINOLOGY

For the purposes of the EIA Directive, the term 'project' is used to encompass all of the various forms of development, works and activities, including processes, development and operations, which are subject to EIA requirements as set out in the Planning Act and Planning Regulations, and as understood by the EIA Directive.

Within this EIAR, the terms 'project', 'proposed project', 'development', 'proposed development', 'project site', 'proposed development site', 'site', and any variation thereof, may be used interchangeably and, unless otherwise stated, refer to the full project assessed in this EIAR. This is described in full in **Chapter 3** and summarised in **Section 5.1.1**.

The EIAR also assesses, where relevant, secondary and off-site works and activities associated with the construction, operation and decommissioning of the project. These include, inter alia, construction material haulage, turbine component delivery, temporary or localised accommodation works along the turbine component haul route, and related traffic and transport activity. Such works and activities are assessed within the relevant chapters of this EIAR to ensure that the likely significant effects of the project are considered in full.

For clarity, where individual components of the project are referred to separately within this EIAR, such references are used only to assist the reader in understanding the particular element under assessment. They do not alter the overall definition of the project assessed in this EIAR. These include:-

- Wind Farm or Main Project Site – Refers to that within the red line boundary only;
- Underground electricity line – Refers to the proposed underground electricity line; and
- Haul route – Refers to the turbine delivery route.

For clarity, certain secondary and off-site works and activities are considered as part

of the project for the purposes of EIA, insofar as they are necessary to assess the likely significant effects of the project in full; however, not all such works form part of the planning application for which permission is sought. In this regard, the precise extent of the development for which planning permission is sought is identified in the plans and particulars accompanying the planning application.

5.1.4 STATEMENT OF AUTHORITY

The report has been written by **Sinéad Clifford**. Sinéad has worked in the environmental sector since 2015 and joined SLR Consulting in 2021. She holds a BSc in Wildlife Biology from Institute of Technology Tralee, and a Certificate (Distinction) in Ecological Consultancy from Ecology Training UK (formerly Acorn Ecology). Sinéad has strong field skills, and regularly carries out bat, ornithological, botanical and mammalian surveys. In addition, she has extensive experience managing bat surveys for large scale projects, including wind energy developments. She is also an experienced GIS user, having produced multiple maps and species distribution models. She is proficient in using ArcGIS, QGIS, and Arc Field Maps software. Sinéad has prepared a wide variety of ecological reports, including biodiversity chapters for Environmental Impact Assessment Reports (EIAR), Ecological Impact Assessments (EclA), Appropriate Assessment (AA) screening reports, Natura Impact Statements (NIS), and bat reports.

Dr Jonathon Dunn coordinated the bird surveys, and authored the ornithological elements in this EIAR, including the collision risk modelling report. Jonathon has worked in the environmental sector since 2014 and joined SLR Consulting in 2021. Prior to working in environmental consultancy, he used to undertake research at Newcastle University on avian ecology and conservation. He holds a PhD in avian ecology from Newcastle University, an MSc in Ecology, Evolution and Conservation from Imperial College London and a MA (Cantab.) in Natural Sciences from the University of Cambridge. Jonathon has extensive experience managing bird surveys. He also has a strong analytical background and is experienced in experimental design, data presentation, statistical analysis and modelling (including avian collision risk modelling). Jonathon has both completed a wide variety of ornithological surveys and has project-managed bird surveys for wind farms both pre- and post-construction. He has experience of vantage point viewshed analysis, ground-truthing VPs and identifying height bands required for collision risk modelling. In addition to VP surveys, Jonathon has undertaken surveys for hen harriers (including roost watches), red grouse (tape lure under licence from NPWS), breeding bird transect surveys, IWeBS, barn owl, kingfisher, breeding wader (upland and lowland) and breeding raptor surveys. Jonathon has prepared a wide variety of ecological reports, including Environmental Impact Assessment Report (EIAR) chapters, Ecological Impact Assessment (EclA) reports, Natura Impact Statements (NIS), reports to inform Appropriate Assessment (AA) screenings, bird and bat reports, and collision risk modelling reports. Jonathon has worked on a wide variety of projects with a focus on wind farms.

Ross Macklin PhD (in preparation) B.Sc. (Hons) MCIEEM., MIFM, HDip GIS, PDip IPM (Principal ecologist with **Triturus Environmental Ltd.**) is an ecologist with over 16 years' professional experience in Ireland. He specialises in freshwater fisheries ecology, biology and water quality. He has considerable experience in a wide range of

ecological and environmental projects including EIAR, EclA, AA/NIS, CEMP reporting, as well as biodiversity, water quality monitoring, invasive species and fisheries management. He also has expert identification skills in macrophytes, freshwater invertebrates, protected aquatic habitats and protected aquatic species including freshwater pearl mussel. His diverse project list includes work on renewable energy developments, flood relief schemes, road schemes, blueways/greenways, biodiversity projects, fisheries management projects and catchment wide water quality management. He is currently completing his Ph.D. on the ecology and impact of common carp (*Cyprinus carpio*) in Irish waters. Triturus Environmental Ltd. have completed over 100 renewable energy projects that have been granted planning. As a company Triturus specialise in aquatic ecology and fisheries and provide in-depth catchment wide knowledge on the key aquatic and fisheries constraints associated with each renewable energy project completed. Their skills in aquatic ecology include invertebrates, fish, macrophytes, Annex I aquatic habitats and aquatic invasive species. They also have expert knowledge in project design, planning and the merging of interdisciplinary chapters as part of EIAR preparation.

This Chapter has been reviewed by Dr Andrew Torsney MCIEEM. Andrew is Technical Director of Ecology and Biodiversity at SLR Consulting and leads the Irish ecology team. He holds a PhD in Zoology from Trinity College Dublin and has over 14 years' experience in ecological survey, assessment and consultancy. His expertise includes habitat classification and evaluation, Annex I habitat assessment, protected species surveys, Ecological Impact Assessment and Appropriate Assessment. He has extensive experience in preparing and reviewing biodiversity chapters for Environmental Impact Assessment Reports and Natura Impact Statements for energy, infrastructure and other development projects. Andrew has also co-authored the EPA's EIA guidelines, contributing to guidance on the preparation of Environmental Impact Assessment Reports. His review of this chapter has focused on the adequacy of the ecological baseline, the robustness of the assessment of likely significant effects, and the suitability of the proposed mitigation and monitoring measures.

5.2 RELEVANT GUIDANCE

Guidance documents consulted include the following²:-

- All-Ireland Pollinator Plan 2026-2030. National Biodiversity Data Centre Series No. 42, Waterford. June 2026;
- Appropriate Assessment of Plans and Projects in Ireland – Guidance for Local Authorities. Department of Environment Heritage and Local Government (2010);
- OPR Practice Note PN01 Appropriate Assessment Screening for Development Management. Office of the Planning Regulator. Dublin (2021);
- Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal (2018, version 1.3 updated 2024. Chartered Institute of Ecology and Environmental Management (CIEEM));
- Bat Surveys for Professional Ecologists: Good Practice Guidelines 4th edition (Collins, 2023);
- Bats and onshore wind turbines - survey, assessment and mitigation.

² A complete list of references is included at the end of this chapter.

NatureScot (2021);

- Guidelines on the information to be contained in Environmental Impact Assessment Reports Environmental Protection Agency. (2022).;
- Disturbance Distances Review: An updated literature review of disturbance distances of selected bird species. A report from Natural Research (Projects) Ltd to Scottish Natural Heritage. Goodship, N.M. and Furness, R.W. (2022).;
- Ireland's Butterflies Series No. 1: Habitat Management for the Marsh Fritillary. Phelan, N., Nelson, B., Harding, J. & Lysaght, L. (2021) National Biodiversity Data Centre, Waterford;
- Recommended bird survey methods to inform impact assessment of onshore windfarms (NatureScot, 2025c);
- Assessing Connectivity with Special Protection Areas (SPAs)(NatureScot, 2016);
- Guidance Note - Assessing the Significance of Impacts from Onshore Wind Farms on Bird Populations that do not Affect Protected Areas (NatureScot, 2025b);
- Assessing the Cumulative Impact of Onshore Wind Energy Developments. Scottish Natural Heritage (NatureScot, 2025a);
- Guidance on using an updated collision risk model to assess bird collision risk at onshore wind farms (NatureScot, 2024);
- Wind farm impacts on birds - Use of Avoidance Rates in the NatureScot Wind Farm Collision Risk Model (NatureScot, 2025d);
- Bat Conservation Ireland (2026) Bat Survey, Assessment and Mitigation Guidelines for Onshore Wind Farms in Ireland. Bat Conservation Ireland, Ireland³.

5.2.1 LEGISLATION & POLICY

This chapter has been prepared in accordance with guidance contained in the following:-

- Control of Water Pollution from Construction Sites: Guidance for Consultants and Contractors. CIRIA Report C532 (2001).
- Control of Water Pollution from Linear Construction Projects. CIRIA Report C648 (2006).
- Draft Revised Wind Energy Development Guidelines. Department of Housing, Planning and Local Government (2019).
- Environmental Impact Assessment of Projects: Guidance on the Preparation of the EIA Report (Directive 2011/92/EU as amended by Directive 2014/52/EU). European Commission (2017).
- Forest Road Manual: Guidelines for the Design, Construction and Management of Forest Roads. COFORD (2004).
- Forestry and Freshwater Pearl Mussel Requirements – Site Assessment and Mitigation Measures. Forest Service (2008).
- Forestry Standards Manual. Department of Agriculture, Food and the Marine

³ Surveys were designed and completed in 2025 following NatureScot 2021 guidelines, before BCI (2026) was published. The majority of the guidelines are the same and have not been formally endorsed by NPWS (as confirmed by email 02nd April 2026), so NatureScot 2021 is still considered best practice.

(July 2024, as amended).

- Forests and Water Guidelines. Department of Agriculture, Food and the Marine (Forestry Programme 2023-2027 suite of standards and guidance).
- Forests and Water: Achieving Objectives under Ireland's River Basin Management Plan. Forest Service (2018).
- Good Practice During Wind Farm Construction. NatureScot (Version July 2024).
- GPP 1: Understanding Your Environmental Responsibilities; and
- GPP 5: Works and Maintenance in or Near Water.
- Guidance Document on Wind Energy Developments and EU Nature Legislation. European Commission (2020).
- Guidance for Pollution Prevention (GPP) Series, replacing the withdrawn Pollution Prevention Guidelines (PPGs), including:
- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment. Department of Housing, Planning and Local Government (2018).
- Guidelines for Preparation of Soils, Geology and Hydrogeology Chapters in Environmental Impact Statements. Institute of Geologists of Ireland (2013).
- Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes. National Roads Authority (2008) [updated version of the 2005 guidance].
- Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters. Inland Fisheries Ireland (2016).
- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EIAR). Environmental Protection Agency (2022).
- Ireland's Forest Strategy 2023-2030. Department of Agriculture, Food and the Marine (2023).
- National Planning Framework (revised 2024).
- Offaly County Development Plan 2021-2027.
- The SuDS Manual. CIRIA C753 (latest update version).
- Water Quality, Pollution Prevention and Construction
- Wind Energy Development Guidelines for Planning Authorities. Department of the Environment, Heritage and Local Government (2006) (currently still in force pending completion of the review process).
- Wind Farms and Groundwater Impacts: Guidelines for Environmental Impact Assessment and Planning. Department of the Environment / Northern Ireland Environment Agency (2015).
- Wind Farms and Groundwater Impacts – A guide to EIA and Planning Considerations. DOE/NIEA (2015).

5.2.1.1 International Legislation

- The UN Convention on Biological Diversity (CBD);
- The Berne Convention on the Conservation of European Wildlife and Natural Habitats;
- The Bonn Convention on the Conservation of Migratory Species of Wild Animals;

- The Ramsar Convention on Wetlands of International Importance;

5.2.1.2 *European Legislation*

- The Environmental Liability Directive (2004/35/EC);
- EU Nature Restoration Regulation (EU) 2024/1991
- European Communities (Environmental Liability) Regulations, 2008;
- EIA Directive 2011/92/EU, as amended by Directive 2014/52/EU
- European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018, as amended;
- EU Habitats Directive (92/43/EEC)
- EU Birds Directive (2009/147/EC);
- European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477 of 2011);
- European Union (Water Policy) (Amendment) Regulations 2022;
- S.I. No. 272/2009: European Communities Environmental Objectives (Surface Waters) Regulations 2009 (as amended)
- EU Water Framework Directive 2000/60/EC;
- Regulation (EU) No 1143/2014 of the European Parliament and of the Council of 22 October 2014 on the prevention and management of the introduction and spread of invasive alien species, as amended, together with Commission Implementing Regulation (EU) 2016/1141 and Implementing Regulation (EU) 2019/1262;
- S.I. No. 293/1988 - European Communities (Quality of Salmonid Waters) Regulations, 1988;
- S.I. No. 477/ 2011 - Regulation 49 and 50 of European Communities (Birds and Natural Habitats) Regulations 2011; and,
- European Union Environmental Objectives (Freshwater Pearl Mussel) (Amendment) Regulations 2009 to 2018.

5.2.1.3 *National Legislation*

- The Wildlife Acts 1976 (as amended);
- The Flora (Protection) Order 2022;
- The Heritage Act 2018;
- Planning and Development Regulations 2001 (S.I. No. 600 of 2001);
- Planning and Development Act, 2000; and
- Planning and Development Act 2024 (as amended).

5.2.1.4 *National Policy*

- National Heritage Plan 2030;
- National Biodiversity Action Plan 2023-2030;
- Project Ireland 2040 - National Planning Framework (first revision, 2025); and,
- Regional and Spatial Economic Strategy (RSES) – Eastern and Midland Regional Assembly.

5.2.1.5 *Local Policy*

- Offaly County Development Plan 2021-2027, Wind Energy Strategy;

- Chapter 4 (Biodiversity and Landscape) of the Offaly County Development Plan 2021 – 2027;
- Laois County Development Plan 2021 – 2027; and,
- Tipperary County Development Plan 2022-2028

5.2.1.6 Limitations

The survey and assessment are subject to a number of limitations and uncertainties as set out below.

Bats

Automated Survey (Ground-Level): Weather: In all the deployment sessions, it was not possible to collect 10 consecutive nights of static bat data in suitable weather conditions. However, there were 10, 9, and 7 suitable nights for the spring, summer and autumn sessions, respectively. All 10 nights of the spring season met the optimal weather conditions. In summer, 9 nights met these criteria. However, there was one additional night that exceeded the threshold for appropriate weather conditions by 0.1m/s where average nightly wind speed was 5.1m/s rather than the recommended 5m/s. However, the BCT (2023) guidelines also allow for up to 5.4 m/s. In the autumn deployment session, there were seven nights that met these criteria. However, there was one additional night that exceeded the threshold for appropriate weather conditions by 0.3m/s where average nightly wind speed was 5.3m/s rather than the recommended 5m/s. However, the BCT (2023) guidelines also allow for up to 5.4 m/s.

However, all survey dates were retained for analysis, as bat calls were still recorded in sub-optimal weather conditions, suggesting that the conditions recorded did not significantly reduce bat activity. Furthermore, nights with suitable weather conditions sometimes had lower levels of bat activity than those with unsuitable weather conditions.

Birds

Weather: Although some surveys were completed in weather conditions (i.e., visibility during VP watches falling to between 1-3km), in most cases all of the relevant 2km viewing arc was visible and this is not considered to significantly affect the validity of the data collected. It is also noted that during such an extensive series of surveys it is inevitable that some surveys were completed in suboptimal conditions; and Not all areas of potentially suitable raptor habitat within the 2 km search area could be viewed from public roads due to lack of access; however, the areas closest to the Project Site could be and so the areas potentially most likely to be affected by the Project could be surveyed.

None of the limitations outlined above are considered to significantly affect the validity of the data on which the assessment is based.

5.2.1.7 Consultations

Consultation requests were issued to the following consultees. **Table 5.2** details the response received, to-date.

Consultee	Date of Consultation	Response	Response within EIAR
An Taisce	20 th January 2026	No response	None required
Bat Conservation Ireland	20 th January 2026	Unfortunately, as Bat Conservation Ireland is a very small organisation, with limited resources, we do not have the capacity to get involved in planning issues.	None required
Birdwatch Ireland	20 th January 2026	No response	None required
Offaly County Council	20 th January 2026	No response	None required
Department of Agriculture, Food and the Marine	20 th January 2026	No response	None required
Department of Environment, Climate and Communications	20 th January 2026	No response	None required
Department of Housing, Local Government & Heritage	20 th January 2026	No response	None required
Environmental Protection Agency	20 th January 2026	No response	None required
Inland Fisheries Ireland	20 th January 2026	No response	None required
Irish Peatland Conservation Council	20 th January 2026	No response	None required
Irish Raptor Study Group	20 th January 2026	No response	None required
Irish Wildlife Trust	20 th January 2026	No response	None required
National Parks and Wildlife Service	20 th January 2026	<p>The site lies approx. 5km from Dovegrove Callows SPA and 8 km from River Little Brosna Callows SPA, whose qualifying interests include Greenland white-fronted goose <i>Anser albifrons flavirostris</i> and whooper swan <i>Cygnus cygnus</i>.</p> <p>Given typical core foraging ranges</p>	<p>European Sites are considered within the NIS.</p> <p>A suite of bird surveys, including flight activity surveys, nocturnal migration</p>

Consultee	Date of Consultation	Response	Response within EIAR
		<p>(5–8km for Greenland white-fronted geese; ~5 km for whooper swan), there is potential for both species to forage or transit within the site's zone of influence.</p> <p>The Department recommends submitting a data request to NPWS for historical records of Greenland white-fronted goose to clarify whether the site falls within any known core foraging area.</p> <p>Both Greenland white-fronted goose and whooper Swan should be target species for distribution and abundance surveys, following NatureScot (2025) guidance.</p> <p>Because disturbance/displacement effects may extend up to 600m from construction/operational activities, surveys should cover at least a 600m buffer around the site, focusing on suitable foraging habitats (grasslands, wetlands).</p> <p>If these species are recorded, the EIAR should assess potential collision, disturbance/displacement, and barrier effects in the context of SPA populations first, and subsequently national populations.</p>	<p>surveys and winter swan and goose feeding distribution surveys (extending at least 600 m from the Project site) were undertaken. Greenland white-fronted goose was not recorded during any of these surveys.</p> <p>A data request was made to NPWS for information including records of Greenland white-fronted goose (received 03/09/2026).</p>
Office of Public Works	20 th January 2026	No response	None required
Eastern and Midland Regional Assembly	20 th January 2026	No response	None required
Sustainable Energy Authority of Ireland	20 th January 2026	No response	None required
The Heritage Council	20 th January 2026	No response	None required
Waterways Ireland	20 th January 2026	Waterways Ireland is the navigation body responsible for the management of the inland waterways including the Lower	None required

Consultee	Date of Consultation	Response	Response within EIAR
		Bann, Erne System, Shannon-Erne Waterway, Shannon Navigation, Royal Canal, Grand Canal and the Barrow Navigation. We do not have jurisdiction over this area.	
Development Applications Unit (DAU)	20 th January 2026	<p>The proposed application site occurs approximately 5 km from the Dovegrove Callows Special Protected Area (SPA), and approximately 8 km from the River Little Brosna Callows SPA. Greenland white-fronted goose and Whooper swans are a qualifying interests of both SPAs. The core foraging range for these species from their winter roosts is between 5 -8 km, and 5 km, respectively. Consequently, there is some potential for the population of Greenland white-fronted goose, associated with both the Dovegrove Callows SPA and the River Little Brosna Callows SPA to forage and transit within the zone of influence of the application site.</p> <p>Similarly, there is some potential for the population of Whooper swan associated with the Dovegrove Callows SPA to forage and transit within the zone of influence of the application site. The Department recommends that a data request should be submitted to the National Parks and Wildlife Service of this Department for any historical data for the winter population of Greenland White-fronted goose to facilitate characterisation of their presence in the wider area and to help determine more accurately whether the application site occurs within the core foraging area of any known roost sites. Similarly, both Greenland White-fronted Goose and Whooper Swan should be target species for the distribution and abundance surveys with the zone of influence of the application site following best practice (see NatureScot 2025)¹. As disturbance, and displacement, effects may occur up to 600 m from relevant construction or operation stage activities, it is recommended that an area of a minimum of 600 m</p>	<p>European Sites are considered within the NIS. A suite of bird surveys, including flight activity surveys, nocturnal migration surveys and winter swan and goose feeding distribution surveys (extending at least 600 m from the Project site) were undertaken. Greenland white-fronted goose was not recorded during any of these surveys. Whooper swan were recorded and collision, disturbance and displacement, and barrier effects have been assessed in the context of the SPA populations in this NIS. A data request was made to NPWS for information including records of Greenland white-fronted goose (received 03/09/2026).</p>

Consultee	Date of Consultation	Response	Response within EIA
		<p>around the application site boundary is surveyed for these species to determine their presence or absence, and should they be present, their distribution and abundance. A particular focus</p> <p>should be on habitats that are suitable foraging habitat for this species within this area, such as grasslands and wetlands.</p> <p>If surveys determine the presence of Greenland White-fronted Goose and Whooper swan within the zone of influence of the application, the significance of any potential collision mortality effects, disturbance and displacement effects, or barrier effects, should be contextualised in terms of the populations associated with the Dovegrove Callows SPA and the River Little Brosna Callows SPA accordingly, before then being contextualised in terms of the national population.</p>	

Table 5.2: Consultations

5.3 METHODOLOGY

5.3.1 SURVEY AREA

'Study area' hereafter refers to the entirety of the areas studied from both desk and field for the Project.

'Survey area' hereafter refers to the areas surveyed specifically for field surveys. Survey areas for each ecological feature are described below.

5.3.1.1 Habitats, Flora, Terrestrial Mammals (Excluding Bats) & Other Protected Fauna

The survey area for habitats, flora, terrestrial mammals (excluding bats) and other protected fauna were all areas (access permitting) within:-

- Within red-line boundary and 150m of proposed wind farm infrastructure;
- 50m of the UGL; and
- At the nodes of the haul route where works are required.

In addition to the above survey areas, marsh fritillary surveys also included the entire planning boundary.

5.3.1.2 Bats

The study areas used for bat impact assessment were as recommended by relevant good practice survey guidance (NatureScot, 2021). These are summarised below and are described in more detail within the baseline bat report (**Annex 5.6**).

The spatial extent of the bat surveys varied according to the survey type and the component of the Project being assessed. The survey areas are shown in **Figure 2 of Annex 5.6**.

Preliminary Ecological Appraisal – Daytime Bat Walkover (DBW)

Wind Farm Site

NatureScot (2021) guidance states that key features that could support maternity roosts (i.e. summer) and significant hibernation (i.e. winter) and / or swarming sites within 200m plus rotor radius of the proposed turbines and of the site boundary should be subject to further investigation. For the purpose of the DBW, the study areas for the wind farm site followed NS guidance of 200m plus rotor radius. For the two turbine models being considered these were:

- Maximum Design Permutation (Enercon E175): 287.5m (i.e. 200m plus rotor radius 87.5m) buffer of the wind farm boundary;
- Minimum Design Permutation (General Electric GE158) 279m (i.e. 200m plus rotor radius 79m) buffer of the wind farm boundary

Underground electricity line (UGL)

The study area for the underground electricity line was a 50m radius of the proposed route where permissible.

Turbine Haul Route (THR)

The study area for the turbine haul route was the footprint of works at nodes.

Preliminary Roost Assessment (PRA)

Wind Farm Site

The study area for PRA of the wind farm site followed NS guidance (i.e. 200m plus rotor radius of the proposed turbines). This focussed on any features identified during the DBW. For the two turbine models being considered these were:

- Maximum Design Permutation (Enercon E175): 287.5m (i.e. 200m plus rotor radius 87.5m) buffer of the proposed turbine locations;
- Minimum Design Permutation (General Electric GE158) 279m (i.e. 200m plus rotor radius 79m) buffer of the proposed turbine locations.

Underground electricity line (UGL)

The study areas for the underground electricity line was 50m radius of the proposed route where permissible.

Turbine Delivery Haul Route (THR)

The study areas for the turbine haul route was the footprint of works at nodes.

Activity Survey – Static Detector Surveys (Ground-Level)

NS guidance states that survey effort should be focused in areas of the development site where turbines are likely to be located. Detectors should be placed at or close to all known turbine locations at wind farms containing fewer than ten proposed turbines. Where there are more than ten proposed turbines, detectors should be placed at ten turbine locations plus a third of additional potential turbine sites for up to a maximum of 40 detectors for the largest developments. As the project comprises

three turbines, a detector was placed at each of the proposed turbines.

5.3.1.3 Birds

The study areas used for the ornithological impact assessment differ according to receptor as recommended by relevant good practice survey guidance (NatureScot, 2025c). These are summarised in **Table 5.3** below and are described in more detail within the baseline survey reports (**Annex 5.8**).

Note that for the 2024 breeding bird and 2024/25 non-breeding bird surveys, an underground electricity line and amenity trail were surveyed that is no longer under consideration as part of the current project; however, it is currently included in the baseline bird reports.

For the assessment of effects on bird species, a variety of buffer distances have been applied to each turbine location and around all other infrastructure, where appropriate. These buffers are in accordance with current guidance and evidence-based research.

5.3.1.4 Fisheries & Aquatic Ecology

The survey areas used for the fisheries and aquatic ecology impact assessment followed a catchment-level approach. All freshwater watercourses which could be affected directly or indirectly by the project were considered with a total of 14 no. aquatic sites targeted for detailed aquatic assessment. These sites were both within the project site boundary and along the proposed grid connection. The surveys are summarised below and are described in more detail within the baseline survey report in **Annex 5.3**. Plate 5-1 outlines where streams and rivers are located.



Plate 5.1: Aquatic Survey Locations

5.3.1.5 Desk Study

A desk study was carried out to inform the biodiversity input for the project. The desk study involved using online resources to collate information on areas designated for nature conservation and previous ecological studies undertaken for other projects in the wider local area.

The following online and other resources were accessed as part of the desk study, searching for all relevant records up to 20km radius of the site boundary:-

- Satellite imagery⁴;
- Environmental Protection Agency (EPA) maps⁵;
- Geological Survey Ireland (GSI) Spatial Resources⁶;
- National Biodiversity Data Centre (NBDC) database⁷;
- National Parks and Wildlife Services (NPWS)⁸;
- NPWS data request (data received on 03/09/2026);
- A review of Greenland white-fronted geese in Ireland 1982/83 – 2011/12 (Burke et al., 2014);
- I-WeBS Data Request (Request received on 16/07/2026);
- Bat Conservation Ireland (BCI) data request (Results accurate as of 12/03/2026);
- The Irish Wetland Bird Survey (I-WeBS)⁹; and
- Birds of Conservation Concern in Ireland 4 (BoCCI4): 2020-2026 (Gilbert, Stanbury, & Lewis, 2021);

Additional sources specific to bats are included in section 2.1 of the Bat Report (**Annex 5.6**)

Designated Sites

The following websites were accessed for information on designated sites in the vicinity of the project:

- NPWS; and,
- NBDC.

As a starting point, all European and national sites within 20 km surrounding the project were identified. For international sites, this included SACs, candidate SACs, proposed SPAs, SPAs, Important Bird Areas (IBAs) and Ramsar sites. For national sites, this included NHAs, pNHAs and nature reserves. The rationale for this search distance is explained later in **Section 5.3.5.2**.

5.3.2 FIELD SURVEYS

Ecological surveys were carried out to yield sufficient data to support this assessment. A brief description of the surveys undertaken, and survey dates are presented in **Table**

⁴ www.google.ie/maps Last accessed 27/10/2026

⁵ <https://gis.epa.ie> Last accessed 27/10/2026

⁶ <https://dcenr.maps.arcgis.com/apps/MapSeries/index.html?appid=a30af518e87a4c0ab2fbde2aaac3c228>, Last accessed 27/10/2026

⁷ <https://maps.biodiversityireland.ie/> Last accessed 27/10/2026

⁸ www.npws.ie/ Last accessed 27/10/2026

⁹ www.birdwatchireland.ie/our-work/surveys-research/research-surveys/irish-wetland-bird-survey/ Last accessed 27/10/2026. Data were supplied by the Irish Wetland Bird Survey (I-WeBS), a scheme coordinated by BirdWatch Ireland under contract to the National Parks and Wildlife Service of the Department of Housing, Local Government and Heritage

5.3 below.

Survey	Brief Description	Timing
Site Walkover	Two walkover surveys were undertaken to identify any major constraints such as invasive non-native species, birds, mammal signs/sightings, reptiles/amphibians and legally protected invertebrates.	06 th March 2026 (excluding habitats) 30 th June – 1 st July 2026
Habitats	Survey to determine habitats present. Habitats were mapped according to the Fossitt (2000) habitat classification. Potential for Annex I habitats was also noted.	30 th June – 1 st July 2026
Invasive Species	Recording non-native invasive species observed during habitat surveys, and on an ad-hoc basis during other surveys. The location and area covered by invasive plant species (i.e. area or length(m ²)/(m)) of plant species was also noted.	30 th June – 1 st July 2026 (UGL)
Aquatic Surveys	Undertaken on a catchment-wide scale, the baseline surveys focused on aquatic habitats in relation to fisheries potential (including both salmonid and lamprey habitat), white-clawed crayfish (<i>Austropotamobius pallipes</i>), freshwater pearl mussel (<i>Margaritifera margaritifera</i>) (eDNA only), macro-invertebrates (biological water quality), macrophytes and aquatic bryophytes, aquatic invasive species, and species of conservation value which may use the watercourses in the vicinity of the project. Full details of the survey methodology are included in section 2 of Annex 5.3 .	14 th , 15 th and 16 th August 2025
Invertebrate, Amphibian and Reptile Suitability Assessment	Invertebrate species observed were noted throughout the entirety of ecological surveys on an ad-hoc basis. Suitability for and evidence of amphibians and reptiles also noted during surveys.	31 st – 1 st July 2026 (proposed UGL) 06 th March 2026
Marsh Fritillary	Habitat assessment to determine potential and suitability for marsh fritillary. Larval web survey followed in August.	10 th – 11 th July 2025 (habitat condition assessment) 25 th – 26 th August 2025 (larval web survey)
Bird Surveys Full details of survey dates are contained within Annex 5.8 .	Vantage point (VP) surveys covering each turbine location plus a 500m radius around the same. One VP x 36 hours/VP/season (minimum)	Breeding season 22: May – August 2022 (36 hours)
		Non-breeding season 22/23: October 2022 – March 2023 (36 hours)

Survey	Brief Description	Timing
	over two years.	hours)
		Breeding season 23: April – August 2023 (36 hours)
		Non-breeding season 23/24: October 2023 – March 2024 (36 hours)
	Nocturnal migration surveys within the wind farm site plus a 500m buffer zone	Spring 24: April 2024 (18 hours)
		Autumn 24: November 2024 (2 hours)
		Spring 25: March 2025 (2 hours)
	Breeding wader (lowland) surveys within the wind farm site plus a 500m buffer zone (all seasons) and the UGL and amenity trail as originally proposed (breeding 24 season only); these two elements are no longer part of the application in their surveyed form (the amenity trail has been removed and the underground electricity line has been realigned).	Breeding season 22: May – June 2022 (3 visits)
		Breeding season 23: April – June 2023 (3 visits)
		Breeding season 24: April – June 2024 (3 visits)
	Breeding woodcock surveys within the wind farm site, the UGL and amenity trail as originally proposed (these two elements are no longer part of the application in their surveyed form (the amenity trail has been removed and the underground electricity line has been realigned)), plus a 500m buffer zone.	Breeding season 24: May – June 2024 (3 visits)
	Common kingfisher habitat suitability assessment within watercourses within the wind farm site plus a 500m buffer zone.	Breeding season 23: April 2023 (1 visit)
	Breeding raptor surveys within the wind farm site plus a 2km buffer zone (all seasons) and the amenity trail and UGL as originally proposed (breeding 24 season only); these two elements are no longer part of the application in their surveyed form (the amenity trail has been removed and the underground electricity line has been realigned).	Breeding season 22: May – July 2022 (4 visits)
		Breeding season 23: April – July 2023 (4 visits)
		Breeding season 24: April – July 2024 (4 visits)
	Barn owl nesting / roost appraisal within the wind farm site plus a 1km buffer zone.	Breeding season 23: April 2023 (1 visit)
	Winter swan and goose feeding distribution surveys within the wind farm site plus at least a 600m buffer zone (all non-breeding	Non-breeding season 22/23: October 2022 – March 2023 (12 visits)

Survey	Brief Description	Timing
	seasons) and the UGL and amenity trail as originally proposed (non-breeding 23/24 – 24/25 seasons only); these two elements are no longer part of the application in their surveyed form (the amenity trail has been removed and the underground electricity line has been realigned).	Non-breeding season 23/24: October 2023 – March 2024 (12 visits)
		Non-breeding season 24/25: October 2024 – March 2025 (12 visits)
	Nocturnal wader surveys at suitable habitat within the wind farm site plus a 500m buffer (all seasons) and the amenity trail and UGL as originally proposed (non-breeding 24/25 season only); these two elements are no longer part of the application in their surveyed form (the amenity trail has been removed and the underground electricity line has been realigned).	Non-breeding season 22/23: January and March 2023 (2 visits)
		Non-breeding season 24/25: October 2024 – March 2025 (6 visits)
Terrestrial Mammals (excluding bats)	<p>Surveys for otter also extended 150m upstream/downstream of water crossings (i.e. 300m total).</p> <p>In-stream surveys were included within the Aquatic Surveys, while terrestrial surveys were undertaken during the Site Walkover surveys.</p>	<p>30th June – 1st July 2026 (UGL)</p> <p>06th March 2026</p> <p>14th, 15th and 16th August 2025 (i.e. otter during aquatic surveys)</p>
Bats	Preliminary ecological appraisal of project site to determine presence of potential commuting, foraging, and roosting habitat.	<p>06th March 2026</p> <p>April 04th 2026</p>
	Preliminary roost assessment targeting (trees and structures):	<p>06th March 2026</p> <p>April 04th 2026</p>
	Ground-level Static Detectors:	<p>Spring: 06th May 2025 – 15th May 2025</p> <p>Summer: 04th June 2025 – 16th June 2025</p> <p>Autumn: 16th September 2025 – 26th September 2025</p>
	Survey of Trees along underground electricity lines	30 th June – 1 st July 2026 (UGL)

Table 5.3: Overview of the survey types, brief scope and survey dates

5.3.2.1 Habitats & Flora

Terrestrial habitats and flora (including invasive plant species) were mapped according to the good practice measures outlined in Heritage Council guidance (Smith, O'Donoghue, O'Hora, & Delaney, 2011) following the Fossitt (2000) habitat

classification system. The locations of any rare or invasive plant species were recorded using a hand-held GPS.

All habitat surveys were conducted during optimal times of year.

5.3.2.2 Fisheries & Aquatic Ecology

Baseline surveys were carried out in 14th, 15th and 16th August 2025. Full data are presented in **Annex 5.3** of this EIAR with a summary provided below. Surveys focused on the detection of freshwater habitats and species of high conservation value. A strict biosecurity protocol was used following guidance and the 'Check-Clean-Dry' approach with further details in **Annex 5.3**.

Physical Surveys

All survey sites were assessed in terms of physical watercourse characteristics, substrate and flow.

Fish Stock Assessment

To collate a more accurate baseline, a catchment-wide approach was adopted and the electro-fishing survey was undertaken across 10 no. riverine sites. A single anode Smith-Root LR24 backpack (12V DC input; 300V, 100W DC output) was used to electro-fish riverine sites on Thursday 14th, Friday 15th and Saturday 16th August 2025 following notification to Inland Fisheries Ireland and under the conditions of a Department of Climate, Energy and the Environment (DCEE) licence. The survey was undertaken in accordance with best practice (CFB, 2008; CEN, 2003) and Section 14 licencing requirements.

Furthermore, a fisheries habitat appraisal of all aquatic survey sites was undertaken to establish their importance for salmonid, lamprey, European eel (*Anguilla anguilla*) and other fish species. The baseline assessment also considered the quality of fisheries habitats within the vicinity of the survey sites. For detailed survey methodology, please refer to accompanying fisheries assessment report in

White Clawed-crayfish Survey

Surveys were undertaken under a NPWS open licence (C164/2025) to capture and release crayfish at their site of capture. Hand searching and sweep netting was undertaken following Reynolds et al. (2010). An appraisal of crayfish habitat was undertaken.

eDNA Analysis

At each site, a composite sample of 20 x 25 ml subsamples was collected from the Rapemills River and West Galros Stream and analysed for Atlantic salmon, brown trout, white-clawed crayfish, European eel and freshwater pearl mussel eDNA.

Otter Survey

Searches were made for otter signs and sightings within 150m of each aquatic survey site and mapped using a hand-held GPS. Notes were made on the quantity and visible constituents of spraint.

Biological Water Quality (Q-sampling)

Biological water quality was assessed via Q-sampling at all riverine survey sites (10 no.

sample sites). Methodology followed Feeley et al. (2020) and samples were converted into Q-ratings per Toner et al. (2005). Any rare invertebrate species were identified.

Lacustrine Macro-invertebrate Communities

Lacustrine sites L1, L2, P1 and P2 were sampled for macro-invertebrates via sweep netting in August 2025. A standard pond net (250mm width, mesh size 500µm) was used to sweep macrophytes and submerged vegetation to capture macro-invertebrates. The net was also moved along the lakebed to collect epibenthic and epiphytic invertebrates from the substratum (as per Cheal et al., 1993). A 3-minute sampling period was employed. To ensure appropriate habitat coverage, the sampling period was also divided amongst the range of meso-habitats present at the survey sites to get a representative sample for sub-habitats.

Macrophytes & Aquatic Bryophytes

Botanical surveys were conducted via instream wading at all riverine sites. Specimens were collected for on-site identification. Any rare macrophyte or bryophyte species were recorded, and the aquatic vegetation community assessed for correspondence with Annex I habitat types. Links with Annex I lake habitats were also assessed at lacustrine sites.

5.3.2.3 Other Protected Fauna

General ecological walkover surveys included an assessment of habitat suitability for amphibians, reptiles and invertebrates, with particular attention to protected species, together with searches for these species and evidence of their presence within suitable habitats. Searches for reptiles included direct observation, identified as an effective survey technique in NRA (2009) guidance. Important ecological resources for these groups, including breeding, sheltering and foraging habitats, were also identified and recorded. Additional species observations and ecological resources were recorded during subsequent ecological surveys to supplement the walkover findings.

In addition, amphibians were also surveyed for during aquatic ecology surveys.

5.3.2.4 Marsh Fritillary

Dedicated surveys for marsh fritillary butterfly were undertaken in July and August 2025. An assessment of habitat suitability was undertaken. The habitat suitability assessment and larval web survey was based upon the methodology outlined in the National Biodiversity Data Centre's monitoring scheme (NBDC, 2023).

5.3.2.5 Bird Surveys

Baseline ornithology surveys were conducted during the period May 2022 to March 2025. Full data are presented within **Annex 5.8**.

Target Species

NatureScot guidance (NatureScot, 2025c) recommends that species targeted for surveys are split into two groups: primary and secondary species. During field surveys, recording of secondary target species is subsidiary to recording primary target species. This approach is explained in more detail below.

Passerine (relating to the largest order of birds, *Passeriformes*, which includes over half

of all living birds and consists chiefly of altricial songbirds of perching habits) populations are generally not considered to be significantly impacted by wind farms (NatureScot, 2025c) so were not included as primary or secondary target species. However, amber- and red-listed passerine species were recorded as incidentals to provide a full picture of ornithology at the project site.

Primary Target Species

Current NatureScot guidelines (NatureScot, 2025c) state that “in most circumstances the target species will be limited to those species which are afforded a higher level of legislative protection”.

Primary target species were specifically limited to species upon which effects are most likely to be potentially significant in EIA terms, e.g. breeding and non-breeding species forming qualifying features (sometimes termed 'special conservation interests' or SCIs) for nearby SPAs, or species listed on Annex I of the Birds Directive. In addition, some species red-listed under the BoCCI scheme (Gilbert et al., 2021) were also included as primary targets. While being red-listed does not afford species a higher level of legislative protection, it does reflect an unfavourable conservation status, meaning that any additional mortality or displacement could have greater consequences for the population. All red-listed non-passerine species were included as primary target species.

This approach to identifying primary target species enabled recording to focus on the species of greatest importance without the distraction of having to record detailed flight data for a larger number of more common species.

Breeding Season

The recorded primary target species for VP surveys during the breeding season included:-

- Black-headed gull *Chroicocephalus ridibundus*;
- Common kestrel *Falco tinnunculus*;
- Common snipe *Gallinago gallinago*;
- Eurasian teal *Anas crecca*;
- Little egret *Egretta garzetta*;
- Mallard *Anas platyrhynchos*; and,
- Northern lapwing *Vanellus vanellus*.

Non-Breeding Season

The recorded primary target species for VP surveys during the non-breeding season included:-

- Common kestrel;
- Common snipe;
- European golden plover *Pluvialis apricaria*;
- Great cormorant *Phalacrocorax carbo*;
- Great white egret *Ardea alba*;
- Greylag goose *Anser anser*;
- Hen harrier *Circus cyaneus*;

- Mallard;
- Merlin *Falco columbarius*;
- Northern lapwing;
- Peregrine falcon *Falco peregrinus*; and,
- Whooper swan *Cygnus cygnus*.

Secondary Target Species

Secondary target species were limited to species that may be affected by wind farms but either lack a higher level of legislative protection (not listed on Annex I of the Birds Directive or listed as SCIs) and/or are not red-listed under the latest BoCCI4 scheme.

Secondary target species included the following:

- any other wildfowl and wader species not recorded as primary target species;
- common buzzard *Buteo buteo*;
- Eurasian sparrowhawk *Accipiter nisus*;
- Grey heron *Ardea cinerea*; and,
- Gulls *Larus* spp. (where not recorded as primary target species).

Mallard was treated as a primary target for the 2022/23 non-breeding season and 2023 breeding season, but as a secondary target for the 2022 breeding season and 2023/24 non-breeding season.

Baseline Survey Methodologies

Surveys were carried out following NatureScot (2025c). Although the surveys originally followed an earlier version of the guidance, the methodological requirements have not materially changed. Accordingly, the most recent guidance is referenced throughout this report. Further details are provided in **Annex 5.8** with a summary provided below.

Flight Activity Surveys

Surveys first commenced in May 2022 and ended in March 2024. As per current guidance, a minimum of 36 hours of flight activity surveys per season (72 hours per year) were completed from the single VP location over two years (144 hours in total).

The number of hours completed at each VP, in each season, is summarised in **Table 5.4**.

VP Number	Hours of Survey Completed (hh:mm)				
	May - Aug 2022	Oct 2022 - Mar 2023	Apr - Aug 2023	Oct 2023 - Mar 2024	Total
3	36:00	36:00	36:00	36:00	144

Table 5.4 VP Surveys Undertaken at Cush

Nocturnal Migration Surveys

Surveys were undertaken in spring and autumn 2024 and spring 2025 within the wind farm site plus a 500 m buffer zone (22 hours of survey effort in total). The methodology broadly followed that for diurnal flight activity surveys except that they were

completed in darkness during the main spring and autumn migration periods for Co. Offaly, which were obtained from the BTO bird track website (BTO, 2026b). A thermal monocular was used during periods of darkness to search for evidence of nocturnal migration movements.

Full details are provided in **Annex 5.8**.

Breeding Wader Surveys

Surveys were undertaken in 2022, 2023 and 2024 within suitable habitat in the wind farm site plus a 500m buffer zone beyond as recommended by NatureScot (2025c) guidance, using the methodology described in O'Brien & Smith (1992) which is suitable for lowland grassland sites. Surveys were also undertaken along the UGL and amenity route in 2024; these two elements are no longer part of the application in their surveyed form (the amenity trail has been removed, and the underground electricity line has been realigned). Three survey visits were undertaken in each year from mid-April to June inclusive, at least one week apart.

Full details are provided in **Annex 5.8**.

Breeding Woodcock Surveys

Surveys were undertaken in 2024 within suitable woodland habitat in the wind farm site, along the UGL and along the amenity route (these two elements are no longer part of the application in their surveyed form (the amenity trail has been removed and the underground electricity line has been realigned)) plus a 500m buffer zone, using the UCC methodology (UCC, 2026). Three survey visits were undertaken between May and June inclusive.

Full details are provided in **Annex 5.8**.

Common Kingfisher Habitat Appraisal

Surveys were undertaken in 2023 within suitable riparian habitat within the wind farm site using an adapted version of the Cummins et al. (2010a) methodology. Watercourses were evaluated by their ability to support breeding and foraging kingfisher.

Full details are provided in **Annex 5.8**.

Breeding Raptor Surveys

The survey methodology for breeding raptors in 2022, 2023 and 2024 used short watches of potentially suitable habitat from appropriate viewpoints and walkover surveys where appropriate to identify potential nesting territories for raptors within the wind farm site plus a 2km buffer. This included surveys at Loughnane Quarry in 2022, and along the UGL and amenity route in 2024; these two elements are no longer part of the application in their surveyed form (the amenity trail has been removed, and the underground electricity line has been realigned).

Survey timings followed those in Hardey et al. (2013), as per current NatureScot (2025c) guidelines. At least four survey visits were undertaken between April to August, inclusive.

Full details are provided in **Annex 5.8**.

Barn Owl Nest and Roost Site Appraisal

Surveys were undertaken in 2023 to search for suitable nest and roost sites up to 1 km from the wind farm site following the methodology described in Hardey et al. (2013).

Full details are provided in **Annex 5.8**.

Swan & Goose Feeding Distribution Surveys

Feeding distribution surveys were carried out fortnightly from October to March inclusive in the 2022/23, 2023/24 and 2024/25 non-breeding seasons to surveys for swans and geese using fields within the wind farm site and at least a 600m buffer, as recommended by NatureScot (2025c) guidance. Surveys were also undertaken along the UGL in the 2023/24 and 2024/25 non-breeding seasons and along the amenity route in the 2024/25 non-breeding season; these two elements are no longer part of the application in their surveyed form (the amenity trail has been removed, and the underground electricity line has been realigned). These surveys were undertaken by driven and walked transects, stopping on a regular basis to check all fields for swan and goose feeding activity.

Full details are provided in **Annex 5.8**.

Nocturnal Wader Surveys

Nocturnal surveys were undertaken in the 2022/23 and 2024/25 non-breeding seasons to investigate whether flocks of golden plover (and other nocturnal bird species) recorded during diurnal surveys were also foraging within suitable grassland habitat within the wind farm site plus surrounding 500m at night, broadly following the nocturnal winter bird survey methodology given in Bird Survey & Assessment Steering Group (2026) guidelines. Surveys were also conducted along the amenity route in the 2024/25 non-breeding season; these two elements are no longer part of the application in their surveyed form (the amenity trail has been removed, and the underground electricity line has been realigned). A thermal monocular was used to detect and identify the presence of target species.

Full details are provided in **Annex 5.8**.

5.3.2.6 Terrestrial Mammals (Excluding Bats)

Dedicated mammal surveys were carried out August 2025 (otter, during aquatic surveys), 30th June – 1st July 2026, and March 2026. The focus of these surveys was to search for mammal resting/breeding places, which are most vulnerable to disturbance and habitat loss. In addition, any other signs/sightings were recorded and mapped using a hand-held GPS during both dedicated mammal surveys and opportunistically, during other ecological surveys. Survey methodology followed that outlined in Cresswell et al. (2012), with a particular focus on badger *Meles meles*, pine marten *Martes martes*, and red squirrel *Sciurus vulgaris*.

Otters *Lutra lutra* were searched for during the aquatic surveys (see **Section 5.3.2.2**). Signs were recorded during other surveys also, if observed.

5.3.2.7 Bats

Baseline bat surveys were conducted during the period May 2025 to April 2026.

Surveys were carried out following the relevant NatureScot guidance (NatureScot,

2021). Further details are provided in **Annex 5.6** with a summary provided below.

Preliminary Ecological Appraisal – Daytime Bat Walkover

A Daytime Bat Walkover (DBW) was undertaken on 06th March 2026, and 30th June – 1st July 2026 (UGL) . The study area, as identified in Section 2.2.1.1 of **Annex 5.6**, was walked during daylight hours to characterise the habitats present and assess their suitability for bats. Consideration was given to the availability and distribution of potential foraging habitat, linear features that could facilitate commuting, and connectivity between the Project site and the wider landscape. This data informed an initial site risk assessment following NS guidance, assigning the habitat within the survey area to a risk category (low, moderate or high) as reproduced in Appendix B.1 of **Annex 5.6**.

Preliminary Roost Assessment

Trees, structures and other features identified during the DBW as having potential to support roosting bats were subject to a Preliminary Roost Assessment (PRA) to assess the characteristics of identified Potential Roost Features (PRFs), determine their suitability to support roosting bats and identify any requirement for further survey.

PRFs were inspected externally from ground level, where accessible and visible, using binoculars and a high-powered torch as appropriate. The assessment considered the type and characteristics of each PRF, its accessibility and suitability for bats, and any evidence indicative of bat use, including droppings, staining, feeding remains or other field signs.

Trees were classified according to their suitability to support roosting bats using the categories set out in the BCT Guidelines (Collins, 2023), as reproduced in Table 4 of **Annex 5.6**.

If structures were present, an external bat survey was undertaken. This involved a thorough and systematic inspection of the outside of a structure to identify potential or existing bat access points, roosting locations, and any signs of bat activity. Surveyors looked for evidence such as live or dead bats, droppings, urine staining, fur-oil marks, and audible squeaking, with bat specimens and droppings providing the most reliable confirmation of presence. The inspection covered all accessible external features, including the ground beneath likely entry points, windowsills, walls, peeling paint, damaged render, hanging tiles, weatherboarding, eaves, fascias, soffits, flashing around chimneys, roof felt, tiles, slates, bat boxes, and any gaps in brickwork or stonework that could have provided access to cavities.

Activity Survey – Static Bat Detector Survey (Ground-Level)

Ground-level full spectrum bat detectors (Song Meter SM4BAT FS, Wildlife Acoustics) were deployed at 3 no. turbine locations for the spring, summer, and autumn 2025 seasons, following methodology from NatureScot (2021).

5.3.3 COLLISION RISK MODELLING

The latest NatureScot-recommended, standard Band 'random flights' CRM (NatureScot, 2024) was used to estimate collision risk based on recorded target species activity levels and flight behaviour, proposed turbine numbers and specifications, and the relevant species biometrics and flight characteristics.

Modelling collision risk under the Band CRM is a two-stage process:-

- Stage 1 estimates the number of birds that fly through the rotor swept disc; and
- Stage 2 predicts the proportion of these birds that have the potential to be hit by a rotor blade.

Combining both stages produces an estimate of collision mortality in the absence of any avoidance action/behaviour by birds. Avoidance rates are then applied to generate predicted rates of collision mortality. Further details of the CRM methodology are provided in **Annex 5.9**.

In line with the latest NatureScot CRM guidance, nocturnal flight activity has been incorporated using the recommended species-specific correction factors. These factors adjust observed daytime activity to reflect the proportion of additional flight activity expected to occur during low light or nighttime periods, ensuring that total activity levels used in the CRM represent a full 24-hour period rather than daylight surveys alone. This approach aligns the assessment with current best practice and provides a precautionary estimate of potential collision risk.

CRM is based on several assumptions, such as flight speeds and the distribution of flights (both spatially and within height bands), which generally offer a worst-case estimate of collision risk. This should be considered when interpreting the results.

5.3.4 APPROACH TO DESIGN FLEXIBILITY

The final turbine model has not yet been selected and will be chosen from within the turbine dimension range assessed for the project.

The proposed turbines will be selected from within the turbine dimension range assessed in the EIAR, comprising:-

- an overall tip height of 199.1m to 200m;
- a hub height of 111.6m to 120.9m; and
- a rotor diameter of 158m to 175m.

For the purposes of this report, the maximum and minimum rotor diameter permutations within that range were considered, as these represent the outer limits of the potential rotor-swept area. These survey extents ensure that the full turbine dimension range has been taken into account for the purposes of the EIAR. The corresponding survey radii were calculated as follows:-

- Maximum rotor diameter permutation – 175m rotor diameter (87.5m rotor radius); and
- Minimum rotor diameter permutation – 158m rotor diameter (79m rotor radius).

The impact assessment, including the CRM was run for both the maximum and minimum rotor diameter permutations.

5.3.5 EVALUATION CRITERIA FOR ECOLOGICAL ASSESSMENT

5.3.5.1 Assessing Impact Significance

CIEEM guidelines state that ecological receptors which are important (i.e., Important Ecological Features or 'IEFs') and potentially affected by the project should be subject

to detailed assessment. It is not necessary to carry out detailed assessment of receptors that are sufficiently widespread, unthreatened and resilient to project effects and would remain viable and sustainable. However, the EU Biodiversity Strategy for 2030 (adopted 2020) and National Biodiversity Action Plan 2023-2030 emphasise the need to achieve no net loss and enhancement of biodiversity.

5.3.5.2 Determining the Zone of Influence

Determining whether an IEF has the potential to be affected by the project relates to the concept of the Zone of Influence (Zol). The Zol relates to the nature of the project, its likely effects and the presence of connections or pathways between ecological receptors and the project. Thus, ecological receptors that lack a connection to the project are considered outside the Zol, even if they are directly within the project site. Conversely, receptors that are considerably removed from the project can still be considered within the Zol if a pathway for effects exists.

All connections (ecological, hydrological and hydrogeological) which provide pathways for effects between the project and ecological receptors in the surrounding area are identified and described in **Annex 5.4** and **Section 5.4.8**.

For all receptors that are not designated nature conservation sites, the initial Zol for the construction and decommissioning phase is as follows:-

- Direct effects: within the red-line boundary and up to a 150m buffer surrounding permanent and temporary proposed site infrastructure for the project (wind farm) site, within 50m of the UGL, and at the turbine haul route nodes; and,
- Indirect effects: dependent on the type of works and the published sensitivities of the ecological receptor.

For all receptors that are not designated nature conservation sites, the Zol for the operation phase is dependent on the published sensitivities of the ecological receptor.

Regarding designated nature conservation sites, the Office of the Planning Regulator (OPR)¹⁰ defines the zone of influence of a proposed development as the geographical area over which it could affect the receiving environment in a way that could have significant effects on the Qualifying Features of a European site. This should be established on a case-by-case basis using the Source-Pathway-Receptor framework and not by arbitrary distances as the Zol could be smaller or greater depending on whether there is hydrological, hydrogeological or ecological connectivity. The Zol was informed by an appraisal of the surrounding landscape, the ecological baseline and the potential interactions between the proposed works and ecological receptors. Given the nature and scale of the works, direct effects and disturbance are expected to be largely confined to the local environment. However, mobile species may connect the site with designated sites over greater distances, while effects transmitted through hydrological pathways may extend further downstream. A 20km study area has been used initially, in recognition that 20km is the maximum distance SPA Special Conservation Interests (SCI) bird species travel (NatureScot, 2016), alongside a whole-catchment approach to assessing aquatic

¹⁰ <https://www.opr.ie/environment-and-climate-glossary-list/>

connectivity, including pathways beyond 20km. These complementary approaches were considered sufficient to identify the designated sites potentially within the project's Zone of Influence, with their relevance subsequently assessed through examination of individual source–pathway–receptor relationships.

5.3.5.3 Determining Importance

The EIA should demonstrate how a project will comply with statutory requirements and policy objectives for biodiversity. European, national and local governments and specialist organisations have identified a large number of sites, habitats and species that provide the key focus for biodiversity conservation in Ireland, supported by policy and legislation. These include:-

- Designated sites;
- International;
- European;
- National;
- Local;
- National biodiversity lists;
- Red-listed, rare, threatened, and protected species;
- Protected and rare species in Ireland;
- National biodiversity action plans;
- Local area plans; and
- County/Local authority development plans.

Ecological features (EF) can be important for a variety of reasons, so expert judgement should be used. EF may also be important due to the key functional role as ecological stepping stones.

The importance of ecological receptors should be considered within a defined geographical context and for this Project the following geographic frame of reference is used:-

- International (i.e. Europe);
- national (i.e. Ireland);
- regional/county (i.e. County Offaly);
- local (i.e. the townlands containing the project); and,
- site (i.e. the project).

Based on the above, key ecological receptors (for assessment) are those deemed to be above the 'Local' Importance (lower value) evaluation. Evaluation criteria are outlined below in **Table 5.5** based on NRA (2009) with consideration to CIEEM (2024).

Resource Evaluation	Defining Criteria (NRA, 2009, and adapted from CIEEM, 2024)
International Importance	<p>'European Site' including Special Area of Conservation (SAC), Site of Community Importance (SCI), Special Protection Area (SPA), candidate Special Area of Conservation (cSAC) or proposed Special Protection Area (pSPA).</p> <p>Sites that fulfil the criteria for designation as a 'European Site' (see Annex III of the Habitats Directive, as amended). Features essential to maintaining the</p>

Resource Evaluation	Defining Criteria (NRA, 2009, and adapted from CIEEM, 2024)
	<p>coherence of the Natura 2000 Network.</p> <p>Site containing 'best examples' of the habitat types listed in Annex I of the Habitats Directive.</p> <p>Resident or regularly occurring populations (assessed to be important at the national level) of the following: Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; and/or Species of animal and plants listed in Annex II and/or IV of the Habitats Directive.</p> <p>Ramsar Site (Convention on Wetlands of International Importance Especially Waterfowl Habitat 1971). World Heritage Site (Convention for the Protection of World Cultural and Natural Heritage, 1972).</p> <p>Biosphere Reserve (UNESCO Man and The Biosphere Programme). Site hosting significant species populations under the Bonn Convention (Convention on the Conservation of Migratory Species of Wild Animals, 1979).</p> <p>Site hosting significant populations under the Berne Convention (Convention on the Conservation of European Wildlife and Natural Habitats, 1979).</p> <p>Biogenetic Reserve under the Council of Europe. European Diploma Site under the Council of Europe.</p> <p>Salmonid water designated pursuant to the European Communities (Quality of Salmonid Waters) Regulations, 1988, (S.I. No. 293 of 1988).</p>
National Importance	<p>Site designated or proposed as a Natural Heritage Area (NHA) or proposed natural heritage area (pNHA).</p> <p>Statutory Nature Reserve.</p> <p>Refuge for Fauna and Flora protected under the Wildlife Acts.</p> <p>National Park.</p> <p>Undesignated site fulfilling the criteria for designation as a Natural Heritage Area (NHA).</p> <p>Refuge for Fauna and Flora protected under the Wildlife Act;</p> <p>Resident or regularly occurring populations (assessed to be important at the national level) of the following: Species protected under the Wildlife Acts; and/or Species listed on the relevant Red Data list. Site containing 'viable areas' of the habitat types listed in Annex I of the Habitats Directive.</p>
County Importance	<p>Area of Special Amenity.</p> <p>Area subject to a Tree Preservation Order.</p> <p>Area of High Amenity, or equivalent, designated under the County Development Plan.</p> <p>Resident or regularly occurring populations (assessed to be important at the County level) of the following: Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; Species of animal and plants listed in Annex II and/or IV of the Habitats Directive; Species protected under the Wildlife Acts; and/or Species listed on the relevant Red Data list.</p> <p>Site containing area or areas of the habitat types listed in Annex I of the Habitats Directive that do not fulfil the criteria for valuation as of International or National importance.</p> <p>County important populations of species, or viable areas of semi-natural habitats or natural heritage features identified in the National or Local BAP, if this has been prepared.</p> <p>Sites containing semi-natural habitat types with high biodiversity in a county</p>

Resource Evaluation	Defining Criteria (NRA, 2009, and adapted from CIEEM, 2024)
	<p>context and a high degree of naturalness, or populations of species that are uncommon within the county.</p> <p>Sites containing habitats and species that are rare or are undergoing a decline in quality or extent at a national level.</p>
Local Importance (higher value)	<p>Locally important populations of priority species or habitats or natural heritage features identified in the Local BAP, if this has been prepared.</p> <p>Resident or regularly occurring populations (assessed to be important at the Local level) of the following: Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; Species of animal and plants listed in Annex II and/or IV of the Habitats Directive; Species protected under the Wildlife Acts; and/or Species listed on the relevant Red Data list.</p> <p>Sites containing semi natural habitat types with high biodiversity in a local context and a high degree of naturalness, or populations of species that are uncommon in the locality.</p> <p>Sites or features containing common or lower value habitats, including naturalised species that are nevertheless essential in maintaining links and ecological corridors between features of higher ecological value.</p>
Local Importance (lower value)	<p>Sites containing small areas of semi natural habitat that are of some local importance for wildlife.</p> <p>Sites or features containing non-native species that are of some importance in maintaining habitat links.</p>

Table 5.5: Evaluation Criteria

5.3.5.4 Impact Assessment

The main purpose of an EIAR is to identify, describe and present an assessment of the likely significant effects of a project on the environment.

The *CIEEM Guidelines for Ecological Impact Assessment in the UK and Ireland* (CIEEM, 2018, updated 2024) (hereafter referred to as 'the CIEEM guidelines') form the basis of the impact assessment presented in this chapter. Reference has also been made to other relevant guidance, as appropriate.

The impact assessment process involves the following steps:-

- Identifying and characterising potential impacts and their effects;
- Incorporating measures to avoid and mitigate negative impacts and effects;
- Assessing the significance of any residual effects after mitigation;
- Identifying appropriate compensation measures to offset significant residual effects; and,
- Identifying opportunities for ecological enhancement.

The description of the likely significant effects on the receiving environment should cover the direct effects and any indirect, secondary, cumulative, transboundary, short-term, medium-term and long-term, permanent and temporary, positive and negative effects of the project. This description should take into account the environmental protection objectives established at EU or Member State level which are relevant to the project.

When describing effects, reference has been made to specific characteristics, as

appropriate. Following CIEEM (2018, updated 2024) and EPA (2022) guidelines, impacts and effects have been described in terms of:-

- Quality e.g. Positive/neutral/negative;
- Extent e.g. Spatial area;
- Context e.g. Conform/contrast with baseline conditions;
- Magnitude e.g. Size/amount/intensity/volume;
- Probability e.g. Likely/unlikely;
- Duration e.g. Temporary/short-term/medium-term/long-term/permanent;
- Frequency e.g. Once/rarely/occasionally/frequently/constantly;
- Timing e.g. Critical life-stage or season; and,
- Reversibility e.g. Reversible/irreversible.

The assessment will describe those characteristics that are relevant to understanding the ecological effect and determining the significance, and as such does not need to incorporate all stated effects.

Cumulative Effects

Cumulative effects can result from individually insignificant but collectively significant actions taking place over a period of time or concentrated in a location. Cumulative effects can occur where a project results in individually insignificant effects that, when considered in-combination with effects of other proposed or permitted plans and projects, can result in significant effects.

Other plans and projects (refer to **Chapter 1**) that should be considered when establishing cumulative effects include:-

- Proposals for which consent has been applied but which are awaiting determination;
- Projects which have been granted consent, but which have not yet been started or which have been started but are not yet completed (i.e. under construction);
- Proposals which have been refused permission, but which are subject to appeal, and the appeal is undetermined.
- Constructed developments whose full environmental effects are not yet felt and therefore cannot be accounted for in the baseline; or,
- Developments specifically referenced in a national policy, a national plan or a local plan.

Significant Effects

The concept of ecological significance is addressed in paragraphs 5.24 through to 5.28 of the CIEEM guidelines. Significance is a concept related to the weight that should be attached to effects when decisions are made. For the purpose of Ecological Impact Assessment (EclA), a 'significant effect' is an effect that is sufficiently important to require assessment and reporting so that the competent authority is adequately informed of the environmental consequences of permitting a project. Effects can be considered significant at a wide range of scales from international to site, and the scale of significance of an effect may or may not be the same as the geographic context in which the feature is considered important.

The nature of the identified effects on each assessed feature is characterised in accordance with the process at **Section 5.5**. This is considered alongside available research and professional judgement about the sensitivity of the feature affected; and professional judgement about how the impact is likely to affect the site, habitat, or population's structure and continued function. Where it is concluded that an effect would be likely to reduce or increase the importance of an assessed feature, it is described as significant.

NatureScot (2025b) also provides guidance for assessing the significance of impacts on bird populations from onshore wind farms that do not affect protected areas. NatureScot guidance is widely recognised as the industry-standard for assessing wind farm impacts on birds in the UK and Ireland and broadly follows the latest CIEEM guidance described above. (NatureScot, 2025b) guidance states that:

"The EIA report should set out the consequences for the integrity of the species population in terms of its size, trend, distribution (where known) and the area of suitable habitat. The assessment should identify whether the impact is likely to negatively affect the conservation status of the species, by:

- *Preventing a recovering or reintroduced species from reaching favourable conservation status, at a national or international level; or*
- *Changing a species' status from favourable to unfavourable; or*
- *For a species that is already in decline, the assessment should focus on whether the proposal would undermine the potential for halting its decline and allowing it to recover to favourable conservation status."*

Precautionary Principle

CIEEM (2024) states:

"The evaluation of significant effects should always be based on the best available scientific evidence proportionate to the severity of those effects. If sufficient information is not available further survey or additional research may be required. In cases of reasonable doubt, where it is not possible to robustly justify a conclusion of no significant effects, mitigation/compensation measures should be applied in accordance with the precautionary principle. Where uncertainty exists, it must be acknowledged in the EclA".

Avoidance, Mitigation, Compensation & Enhancement

Where likely significant effects have been identified, the mitigation hierarchy has been applied, as recommended in the CIEEM Guidelines. The mitigation hierarchy sets out a sequential approach beginning with the avoidance of effects where possible, the application of mitigation measures to minimise unavoidable effects and then compensation for any remaining effects. Once avoidance and mitigation measures have been applied, residual effects are then identified along with any necessary compensation measures, and incorporation of opportunities for enhancement.

It is important to clearly differentiate between avoidance mitigation, compensation and enhancement and these terms are defined here, as follows:-

- Avoidance is used where an impact has been avoided, e.g. through changes

- in scheme design;
- Mitigation is used to refer to measures to reduce or remedy a specific negative impact in situ;
- Compensation describes measures taken to offset residual effects, i.e. where mitigation in situ is not possible; and
- Enhancement is the provision of new benefits for biodiversity that are additional to those provided as part of mitigation or compensation measures, although they can be complementary.

Residual Effects

Where likely significant effects have been identified, the mitigation hierarchy has been applied, as recommended in the CIEEM guidelines. The mitigation hierarchy sets out a sequential approach beginning with the avoidance of effects where possible and followed by the application of mitigation measures to minimise unavoidable effects. The remaining effects are termed 'residual effects'. If significant residual effects remain, then compensation for any remaining effects may be undertaken.

5.4 DESCRIPTION OF THE EXISTING ENVIRONMENT

This section presents a description of the general context of the receiving (baseline) environment associated with the project.

For all receptors, other than designated nature conservation sites, the results of both the desktop studies and field surveys are presented together. Full details of the field surveys (including when the surveys were made) are shown in **Section 5.3.2**.

5.4.1 DESIGNATED SITES

European sites are assessed in the Appropriate Assessment (AA) Screening and Natura Impact Statement (NIS) which accompanies the relevant planning applications for the project. Nationally designated sites are discussed in the following sections.

5.4.1.1 International Sites

There are 28 no. internationally designated sites within 20km of the project (i.e. 19 no. SACs, 7 no. SPAs, and 2 no. Ramsar sites which overlap with European Sites. The project is not situated within any internationally designated site. These are presented in **Figures 5.3 to 5-5-5**.

Annex 5.4 provides a list of the designated sites and identifies any source-receptor pathways. These can be considered within the Zol. Qualifying interests with connectivity to the project are highlighted in bold. The NIS concluded:

"With the identified mitigation measures in place, it can be concluded, beyond all reasonable scientific doubt that the Project, either alone or in combination with other plans or projects will not undermine the conservation objectives of any European sites. It can therefore be concluded that the Project would not have an adverse effect on the integrity of any European site."

5.4.1.2 National Sites

The rationale for identifying ecological connectivity to SACs, cSACs and SPAs has also been extended to NHAs and pNHAs. Sites beyond 20 km were also considered if there was hydrological or ecological connectivity.

The project does not overlap with any designated site boundary. There are 59 no. nationally designated sites within 20km of the project (i.e. 11 no. NHAs, and 48 no. pNHAs). These are presented in **Figures 5-6 to 5-8-5**.

There are 18 no. pNHAs within 20 km of the project that overlap with European sites and for which no site synopsis is available. As such, there is no information available to inform an impact assessment for these sites. Therefore, the European site designation supersedes that of the pNHA, and effects on these have been assessed in the NIS and are not considered in the current chapter. A summary of these pNHAs, the European site with which they overlap, and the Source – Pathway – Receptor (SPR) identified in the NIS is presented in **Annex 5.4**.

For all of the European sites presented in **Annex 5.4**, the NIS concluded *“with the identified mitigation measures in place, it can be concluded, beyond all reasonable scientific doubt that the Project, either alone or in combination with other plans or projects will not undermine the conservation objectives of any European sites. It can therefore be concluded that the Project would not have an adverse effect on the integrity of any European site”*. As such, the same conclusion is assumed for these pNHAs.

Annex 5.4 provides a list of the designated sites and identifies any source-receptor pathways. These can be considered within the Zol. Qualifying interests with connectivity to the project are highlighted in bold.

There are two nature reserves, both of which overlap with designated sites of the same names; Mongan Bog Nature Reserve, and Slieve Bloom Mountains Nature Reserve.

5.4.2 HABITATS & FLORA

5.4.2.1 Desktop Study

There are no previously mapped Annex I habitats (NPWS, 2019¹¹), Flora (Protection) Order species, Irish Semi-Natural Grassland (ISNG) sites, nor ancient woodland (Perrin & Daly, 2010) present within the project site.

Habitat contribution to ecological networks has been assessed by Parker et al. (2016). Those areas that contribute most to ecological networks (i.e. those that contribute to three ecological networks) are considered to have the highest biodiversity value. The project site is predominantly classified as having ‘ecosystem services provision’ while some areas along the margins are classified as ‘strong ecosystem services provision’.

The area along the underground electricity line is predominantly classified as having ‘ecosystem services provision’, and ‘some provision’, while some areas closest to the wind farm site are classified as ‘strong ecosystem services provision’.

Twenty-one records of rare and/or protected plant species were yielded from the data search. These are presented in **Annex 5.10**.

5.4.2.2 Field Survey

No rare or protected flora were recorded within the study area during surveys.

The following describes the habitats recorded within the footprint of the Project.

¹¹ While the most recent Article 17 report was published in 2025 the most recent shapefiles available are those from 2019.

These, along with other habitats recorded in the wider survey area, are also presented in **Figures 5-9 to – 5-10-20**.

Table 5.8 outlines the total area (hectare) and/or length (metres) for each habitat type within the planning boundary (proposed wind farm site), and underground electricity line (1.0m wide trench).

Wind Farm Site

Buildings and artificial surfaces (BL3)

There are tracks leading through the south of the Project site.

Recolonising bare ground (ED3)

There are tracks leading through the south of the Project site comprised of recolonising bare ground. The only vegetation present grows along the centre of the tracks and is comprised primarily of annual meadow grass *Poa annua*, yarrow *Achillea millefolium*, and daisy.

Depositing/lowland rivers FW2

The West Galros stream runs south-west through the project site. Conifer plantation is situated adjacent. The stream (FW2) had been extensively straightened and over-deepened historically to accommodate peat drainage and represented a canalised habitat throughout with no perceptible flow. The stream was 4-5m wide and 1-1.8m deep with a bed composed entirely of clay and silt (often up to 0.3m in depth). The sloping banks were composed of clay and peat. Clay agglomerations (from bank slumping) were frequent instream. Due to riparian shading and depths, macrophyte cover was low with rare bladderwort *Utricularia* sp. and water horsetail. The steep banks were fringed by abundant common reed *Phragmites australis* with scattered water mint. The liverwort *Pellia endiviifolia* was abundant on the sloping clay banks. The riparian zone supported abundant herbaceous vegetation including bramble, purple loosestrife, meadowsweet, hedge bindweed, common knapweed *Centaurea nigra* and abundant bracken. To the west, the channel was lined by very dense scrubby woodland of downy birch, guelder rose *Viburnum opulus*, alder *Alnus glutinosa* and grey willow.

Drainage ditch (FW4)

Drainage ditches are present in the south-west of the Project site. The water was stagnant and silty owing to the influx of the adjacent peat.

Improved Agricultural Grassland (GA1)

Improved agricultural grassland is present in the southern section of the Project site and survey area. This area is a highly-modified habitat and is species-poor.

The dominant species present is *Lolium pereene*, with annual meadow grass *Poa annua*, and common mouse ear *Cerastium fontanum* also abundant. Daisy *Bellis perennis* and dandelion *Taraxacum officinale* agg. were also recorded frequently throughout this habitat.

Cutover Bog (PB4)

The dominant habitat within the Project site and survey area is PB4 cutover bog. This has been subject to industrial peat extraction historically. The habitat comprises

exposed, extensively drained peat, with the original raised bog structure removed.

The habitat was devoid of vegetation, namely there was an absence of decaying/peat-forming vegetation such as bog-mosses *Sphagnum* spp., cottongrasses *Eriophorum* spp., purple moor-grass *Molinia caerulea*, heather *Calluna vulgaris*, nor other ericaceous species.

Potential Correspondence with Annex I Habitat

There are several Annex I habitats that have the potential to correlate with habitats classified as PB4 Cutover Bog under Fossitt (2000). In the context of cutover raised bog, these are *bog woodland (91D0), *active raised bog (7110), Depressions on Peat Substrates of the Rhynchosporion (7150), and Degraded Raised Bogs Still Capable of Natural Regeneration (7120). The habitat does not correspond to any of these Annex I habitats¹², the criteria are set out below in **Table 5.6**.

Annex I Habitat	Criteria	Present / Absent	Conclusion
*Bog woodland (91D0)	Native woodland established on peat.	Absent	Does not meet criteria for this Annex I habitat.
	Permanently wet peat soils.	Absent	
	Woodland structure driven by bog hydrology rather than mineral soils.	Absent	
	Naturally developing bog woodland, not planted forestry	Absent	
	Tree species include: Downy birch (<i>Betula pubescens</i>), Scots pine (<i>Pinus sylvestris</i>) where native, and Willow spp. in places	Absent	
	Ground flora include Extensive <i>Sphagnum</i> cover, Bog moss communities, heather, bog rosemary, cranberry (<i>Vaccinium oxycoccos</i>).	Absent	
*Active raised bog (7110)	Presence of an intact raised bog peat body.	Absent	Does not meet criteria for this Annex I habitat.
	Active peat formation occurring.	Absent	
	High water table maintained by rainwater (ombrotrophic conditions).	Absent	

¹² <https://rm.coe.int/interpretation-manual-of-the-habitats-listed-in-resolution-no-4-1996-/168098c68c>

Annex I Habitat	Criteria	Present / Absent	Conclusion
	Well-developed bog microtopography including hummocks, lawns, pools and hollows.	Absent	
	Abundant peat-forming Sphagnum mosses.	Absent	
	Typical indicator species: <i>Sphagnum papillosum</i> , <i>Sphagnum magellanicum</i> agg., <i>Sphagnum cuspidatum</i> , <i>Sphagnum capillifolium</i> , <i>Eriophorum vaginatum</i> (hare's-tail cottongrass), <i>Calluna vulgaris</i> (heather), <i>Andromeda polifolia</i> (bog rosemary), <i>Drosera rotundifolia</i> (round-leaved sundew)	Absent	
Depressions on Peat Substrates of the Rhynchosporion (7150)	Wet peat depressions.	Absent	Does not meet criteria for this Annex I habitat.
	Periodically exposed peat surfaces.	Absent (Constantly exposed)	
	Pioneer vegetation.	Absent	
	Often associated with active or recovering raised bog systems.	Absent	
	Common indicators include: <i>Rhynchospora alba</i> (white beak-sedge), <i>Rhynchospora fusca</i> (brown beak-sedge), <i>Drosera intermedia</i> , <i>Drosera rotundifolia</i> , <i>Sphagnum auriculatum</i> , <i>Sphagnum cuspidatum</i> .	Absent	
	Shallow muddy hollows.	Absent	
	Pool margins.	Absent	
	Recently exposed wet peat.	Absent	
	Narrow wet slacks within larger bog systems	Absent	
Degraded Raised	Former active raised bog	Present	While there is bare

Annex I Habitat	Criteria	Present / Absent	Conclusion
Bogs Still Capable of Natural Regeneration (7120)	that has been degraded.		peat, The peat body and hydrology are not sufficiently intact for natural regeneration or restoration of active raised bog to be achievable, and there is a lack of peat-forming vegetation.. This habitat does not meet the criteria of Annex I habitat.
	Peat formation is no longer fully active.	Present	
	Hydrology has been altered but restoration remains feasible.	Absent	
	Reasonable expectation that peat-forming vegetation could be restored, generally within about 30 years following rehabilitation	Absent	
	Residual bog vegetation.	Absent	
	Heather-dominated bog.	Absent	
	<i>Molinia</i> dominated bog.	Absent	
	<i>Eriophorum</i> -dominated vegetation.	Absent	
	Bare peat.	Present	
	Scrub or forestry on peat.	Present at periphery	
	The peat body and hydrology are sufficiently intact that natural regeneration or restoration of active raised bog remains achievable	Absent	

Table 5.6: Assessment of Potential for Annex I Habitat

Cutover bog x Recently-felled woodland (PB4 x WS5)

In the south-west of the survey area, is a section of recently-felled woodland (conifer plantation) on PB4 cutover bog. Vegetation is very sparse, with brash throughout the areas. This is situated within the survey area and along the southern boundary of the Project site.

Conifer Plantation (WD4)

Conifer plantation is dominated Sitka spruce. The plantation is grown on peat. However, the lower layers of vegetation within the plantation are sparse and comprised of wood sorrel and *Polytrichum commune* where present.

This is situated within the survey area and along the southern boundary of the Project site.

Hedgerow (WL1)

This habitat is present along the tracks in the south of the Project site and survey area. The dominant species were hawthorn *Crateagus monogyna* and blackthorn *Prunus spinosa*. Other species recorded include willow *Salix* sp., and alder *Alnus glutinosa*.

Hedgerow x Treeline (WL1 x WL2)

This habitat is present within the southern section of the Project. The dominant species were hawthorn and blackthorn, with ash *Fraxinus excelsior* the dominant mature tree species.

Scrub (WS1)

There are stands of scrub to the south of the Project site on the margins of the cutover bog. It is dominated by gorse with abundant bramble also present.

Underground Electricity Cable

Arable crops (BC1)

This habitat is comprised of arable crops such as barley and wheat.

Buildings and artificial surfaces (BL3)

The road network, buildings, and walls are present within the adjacent to the UGL. Most of the underground electricity line will be confined to the existing road network which also comprises this habitat type.

Depositing/lowland rivers (FW2)

The Rapemills river runs parallel to most of the underground electricity line, intersecting it in three locations. There was evidence of historical deepening and straightening but good instream recovery in many areas. The profile comprised heavily vegetated glide and pool with occasional riffle areas only. Siltation was evident with organic rich soft sediment deposits on meanders and in depositing areas. The site supported profuse growth of macrophytes with abundant fool's watercress *Helosciadium nodiflorum* and watercress *Nasturtium officinale*. Yellow iris *Iris psuedacorus* and branched bur-reed *Sparganium erectum* stands were also frequent. The river meandered along buffers of reed canary grass *Phalaris arundinacea*, and meadowsweet *Filipendula ulmaria*. Scattered grey willow, hawthorn and ash *Fraxinus excelsior* provided valuable shading to the narrow channel. Tunnelling due to steeper banks was present downstream of the survey reach.

Drainage ditch (FW4)

This habitat is present on the western boundary of the Project site.

Improved Agricultural Grassland (GA1)

Improved agricultural grassland is the dominant habitat within the grid connection survey area. This area is highly-modified and species-poor. The dominant species present is *Lolium perenne*, with annual meadow grass *Poa annua*, and mouse ear *Cerastium fontanum* also abundant. Daisy *Bellis perennis* and dandelion *Taraxacum officinale* agg. were also recorded frequently throughout this habitat.

Amenity Grassland (GA2)

This habitat is present adjacent to the survey area (but outside the underground

electricity line) within a residential property. The dominant species present was annual meadow grass *Poa annua*.

[Dry meadows and grassy verges \(GS2\)](#)

Dry meadows and grassy verges are located parallel to the road network. The dominant species recorded include bush vetch *Vicia sepium*, hedge bindweed *Calystegia sepium*, cocksfoot *Dactylis glomerata*, cleavers *Galium aparine*, and herb robert *Geranium robertianum*. Other species recorded occasionally include bracken, bramble, and spear thistle *Cirsium vulgare*.

[Conifer Plantation \(WD4\)](#)

Conifer Plantation is dominated Sitka spruce. The plantation is situated adjacent to the road network but does not intersect the underground electricity line.

[Hedgerow \(WL1\)](#)

This habitat is present throughout the underground electricity line survey area, primarily along field boundaries and along roads. The dominant species were hawthorn *Crateagus monogyna* and blackthorn *Prunus spinosa*. Other species recorded include willow *Salix* sp., oak *Quercus* sp., alder *Alnus glutinosa*, downy birch.

[Treeline \(WL2\)](#)

This habitat is present along the roadways and field boundaries. The dominant species present are hawthorn, goat willow, oak, and ash.

[Scrub \(WS1\)](#)

There are sections of scrub throughout the underground electricity line survey area, dominated by gorse with abundant bramble also present.

[Turbine haul route Nodes](#)

Table 5.7 lists habitats recorded at turbine haul route nodes where other than street furniture removal are required.

[Stone walls and other stonework \(BL1\)](#)

There is one section of stone wall at node 7.2.5. This bounds urban landscaping.

[Buildings and artificial surfaces \(BL3\)](#)

This habitat is represented by the existing road network, kerbing, and footpaths.

[Improved Agricultural Grassland \(GA1\)](#)

Improved agricultural grassland is situated at nodes 7.5.3 and 7.5.5 area. These areas are highly-modified and species-poor. The dominant species present is *Lolium perenne*, with annual meadow grass *Poa annua*, and common mouse ear *Cerastium fontanum* also abundant.

[Amenity Grassland \(GA2\)](#)

This habitat is represented primarily by urban landscaping at roundabouts, and adjacent to pathways. The dominant species present was annual meadow grass *Poa annua*.

Dry meadows and grassy verges (GS2)

There is a section of GS2 habitat at node 7.5.5. The dominant species recorded include bush vetch *Vicia sepium*, hedge bindweed *Calystegia sepium*, cocksfoot *Dactylis glomerata*, and cleavers *Galium aparine*. Other species recorded occasionally include bramble, and bracken.

Conifer plantation (WD4)

There is a section of Sitka spruce plantation at node 7.5.5.

Scattered trees and parkland (WD5)

This is represented by urban landscaping. The largest area is at node 7.2.5. Species present are beech, sycamore, horse chestnut, and ash.

Hedgerow (WL1)

There is hedgerow at nodes 7.5.3 and 7.5.5. The majority is located at node 7.5.3 and is dominated by hawthorn, with abundant willow.

Scrub (WS1)

There is a section of scrub at the site entrance, node 7.5.5. This is dominated by immature willow and bramble.

Node No.	Distribution of Habitats Recorded (Fossitt, 2000)	Area (ha) / Length (m)
7.2.5	WD5 Scattered trees and parkland	0.001ha
	BL1 Stone walls and other stonework	6m ¹³
	BL3 Buildings and artificial surfaces	0.01ha
	GA2 Amenity grassland	0.001ha
7.2.6	BL3 Buildings and artificial surfaces	0.01ha
	GA2 Amenity grassland	0.014ha
7.2.7	WD5 Scattered trees and parkland	0.001ha
	BL3 Buildings and artificial surfaces	0.01ha
	GA2 Amenity grassland	0.02ha
7.3.1	BL3 Buildings and artificial surfaces	0.03ha
	GA2 Amenity grassland	0.07ha
7.3.2	BL3 Buildings and artificial surfaces	0.009ha
	GA2 Amenity grassland	0.03ha
7.4.1	BL3 Buildings and artificial surfaces	0.01ha
	GA2 Amenity grassland	0.06ha
7.4.2	BL3 Buildings and artificial surfaces	0.001ha
	GA2 Amenity grassland	0.02ha
7.4.3	BL3 Buildings and artificial surfaces	0.004ha
	GA2 Amenity grassland	0.01ha
7.4.4	BL3 Buildings and artificial surfaces	0.003ha

¹³ Wall to be replaced with fence

Node No.	Distribution of Habitats Recorded (Fossitt, 2000)	Area (ha) / Length (m)
	GA2 Amenity grassland	0.03ha
7.4.5	BL3 Buildings and artificial surfaces	0.005ha
	GA2 Amenity grassland	0.008ha
7.4.6	BL3 Buildings and artificial surfaces	0.001ha
	GA2 Amenity grassland	0.01ha
7.4.7	BL3 Buildings and artificial surfaces	0.01ha
	GA2 Amenity grassland	0.04ha
7.4.8	BL3 Buildings and artificial surfaces	0.005ha
	GA2 Amenity grassland	0.003ha
7.5.1	WD5 Scattered trees and parkland	1m
	BL3 Buildings and artificial surfaces	0.007ha
7.5.3	BL3 Buildings and artificial surfaces	0.01ha
	GA2 Amenity grassland	0.24ha
	WL1 Hedgerow	49.1m
7.5.5	GA1 Improved agricultural grassland	0.01ha
	WD4 Conifer plantation	0.188ha
	BL3 Buildings and artificial surfaces	0.036ha
	WL1 Hedgerow	7m
	WS1 Scrub	0.02ha
	GS2 Dry meadows and grassy verges	0.03ha

Table 5.7: Habitats recorded at turbine haul route node where accommodation works are proposed

Fossitt Code	Fossitt Name	Potential EU Annex I or PAW ¹⁴ Affiliation?	Baseline Area (ha) / Length (m)			
			Main Project Site (planning boundary)	Underground electricity line (1.0m wide trench, total area: 0.5ha)	THR (nodes)	Total Baseline
BC1	Arable crops	No	0ha	0.03ha	0ha	0.03ha
BL1	Stone walls and other stonework	No	0m	0.00m	14m	14.00m
BL3	Buildings and artificial surfaces	No	0.36ha	0.04ha	0.16ha	0.56ha
ED3	Recolonising bare ground	No	0.06ha	0ha	0ha	0.06ha
FW2	Depositing/lowland rivers	No	66.15m	0m	0m	66.15m
FW4	Drainage ditch	No	0.05ha	0ha	0ha	0.05ha
			0m	0m	0m	0.00m
GA1	Improved agricultural grassland	No	12.53ha	0.41ha	0.01ha	12.95ha
GA2	Amenity grassland	No	0ha	0ha	0.56ha	0.56ha
GS2	Dry meadows and grassy verges	No	0ha	0ha	0.03ha	0.03ha
PB4	Cutover bog	No	82.44ha	0ha	0ha	82.44ha
PB4 x WS5	Cutover bog x Recently-felled woodland	No	4.83ha	0ha	0ha	4.83ha
WD4	Conifer plantation	No	0.92ha	0ha	0.19ha	1.11ha

¹⁴ Potential ancient woodland (PAW)

Fossitt Code	Fossitt Name	Potential EU Annex I or PAW ¹⁴ Affiliation?	Baseline Area (ha) / Length (m)			
			Main Project Site (planning boundary)	Underground electricity line (1.0m wide trench, total area: 0.5ha)	THR (nodes)	Total Baseline
WD5	Scattered trees and parkland	No	0ha	0ha	0.002ha	0.002ha
			0m	0m	1m	1m
WL1	Hedgerow	No	0.07ha	0ha	0ha	0.07ha
			0m	5.39m	56.1m	61.49m
WL1 x WL2	Hedgerow x Treeline	No	280.06m	0m	0m	280.06m
WL2	Treeline	No	0.03ha	0.02ha	0ha	0.05ha
			0m	5.41m	0m	5.41m
WS1	Scrub	No	2.04ha	0ha	0.02ha	2.06ha
			0m	15.57m	0m	15.57m

Table 5.8: Habitat Types Within Planning Boundary, UGL trench area, and at THR nodes

5.4.3 BIRDS

5.4.3.1 Desktop Study

BirdWatch Ireland has created a sensitivity mapping tool, which assesses the potential sensitivity of at-risk bird populations to wind energy developments (Mc Guinness et al., 2015). The areas of the project site all lacked data i.e. there is no prior information to suggest that avian populations in the general area are thought to be particularly sensitive to wind farm developments.

The data search yielded records of 88 no. species which are rare, declining, restricted to a few sites, or have a large proportion of the European population occurring in Ireland (breeding or wintering) (red- or amber-listed) and/or specially protected (Annex I) birds at the project site and surrounding area (see **Annex 5.8** for details on data sources). This included opportunistic data and data collected for other purposes.

The Bord na Móna Galros Draft Decommissioning and Rehabilitation Plan (2026) was also consulted. Most of the survey results presented in this Plan are populated using the results of the surveys undertaken for the Project. However, the Plan also reports an independent survey undertaken by Bord na Móna in December 2024, during which common snipe, mallard and whooper swan were recorded; no specific location information was provided for these records. These findings are independent of, but consistent with, the dedicated bird survey results undertaken for the Project, which also recorded all three species. Whooper swan were additionally recorded at Galros Bog during the Project's own 2023/24 non-breeding season surveys, apparently in response to localised flooding.

In response to the DAU consultation response (see **Table 5.2**), 1km grid squares with Greenland white-fronted goose records provided by the NPWS data request were examined. There were 642 records of geese within 8km (the core winter foraging range for this species) of the proposed project within 33 no. 1km grid squares. The overwhelming majority of records were collected prior to the year 2000. Squares N0911 and N0809 adjoin the project site; however, the records are from 1983/4 and 1984/85, respectively. There are no records collected after 1985 within c.4km, well beyond the precautionary 600m required to avoid disturbance to this species (Goodship et al., 2022).

Burke et al. (2014) was also consulted to help characterise the presence of the wintering Greenland white-fronted goose population in the wider area and to determine whether the project lies within the core foraging area of any known roost sites.

According to Burke et al. (2014), the nearest currently¹⁵ used roost of the Little Brosna flock lies approximately 8.5km from the nearest proposed turbine, and approximately 8.7km from the UGL. The Little Brosna flock is of international importance and historically used several feeding areas, including the callows at Gortskeha, Clongowna and Dovegrove, as well as former bog-feeding sites at Redwood Bog and Ballyea Bog, now abandoned due to peat extraction and afforestation.

¹⁵ Current at the time of the report publication i.e. 2014.

At the time of Burke et al. (2014), feeding activity for this flock is centred mainly on callow grasslands, particularly at Annagh and Gortskeha, with Annagh being the most heavily used area and lying immediately adjacent to the main roost site. Agricultural grasslands along the Rapemills River were formerly used but have not been used in recent years, with more intensively managed grasslands elsewhere now favoured.

Taken together, this information suggests that it is unlikely that the wind farm site and UGL fall within the core foraging range (5-8 km) of geese from the nearest known roost. Current¹⁵ feeding activity is focused at Annagh, located approximately 7.5km from the wind farm site, and 7.8km from the UGL.

Burke et al. (2014) also identified Dovegrove Callows, approximately 3.8km from the wind farm site, 4.2km from the UGL as a feeding area used historically by the Little Brosna flock; no roost is associated with this location. More recent monitoring reported in the Conservation Objectives document for Dovegrove Callows SPA (NPWS, 2025) indicates continued and sustained use of the site, stating that *"More recent data showed a population of 180 Greenland White-fronted Goose used the Dovegrove Callows SPA and the River Little Brosna Callows SPA (5 year mean of peak counts from NPWS monitoring for period 2018/19 - 2022/23; see Fox et al., 2019, 2020, 2021, 2022 and 2023)"*.

On this basis, while the wind farm site, and UGL are unlikely to fall within the core foraging range of geese from the nearest known roost, Dovegrove Callows SPA represents an actively used feeding area for the Little Brosna flock within closer proximity to the site (3.8km) than Annagh. This is considered in the accompanying AA Screening Report and NIS, where Dovegrove Callows SPA is screened out at screening stage, as no Greenland white-fronted geese were recorded during surveys and no hydrological pathway exists (Annex 5.4).

The NPWS and DAU consultation responses (**Table 5.2**) describe the site as approximately 5km from Dovegrove Callows SPA. The distances given in this section are the shortest straight-line distances measured in GIS from the SPA boundary to the wind farm site boundary and the UGL, which accounts for the difference. On either figure, Dovegrove Callows SPA lies closer to the Project than Annagh (7.5km), and the conclusion above is unaffected.

5.4.3.2 Field Survey

Flight Activity Surveys

Full details of the flight activity survey results (including figures showing flight lines for primary target species) are provided in **Annex 5.8**. The following sections present seasonal summaries of 'at risk' flight activity within the Collision Risk Zones (CRZ), defined as the areas encompassed by the relevant Wind Farm Polygon (WP) (i.e. the area within 500m of the outermost turbine blades). 'At risk' flights are defined as those crossing the relevant WP at Potential Collision Height (PCH), i.e. within each rotor-swept area (between 24.1 - 41.9m above ground level (AGL) and 199.1 - 200m AGL).

Fourteen no. primary target species were recorded during flight activity surveys.

In general, there were very few 'at risk' flight events for any primary target species; the main exception was for northern lapwing.

Table 5.9 summarises the cumulative numbers of birds recorded passing through the CRZ during baseline surveys undertaken during May 2022 to March 2024 inclusive, and those potentially at risk of turbine collision.

Species	Number of Flight Lines per Season				Peak Count in Any Single Flight Line	Cumulative No. of Birds	Any Time Spent at PCH?	Any Time Spent within CRZ?
	B22	NB22/23	B23	NB23/24				
Black-headed gull	68	-	8	-	34	253	Yes	Yes
Common kestrel	31	12	9	8	2	61	Yes	Yes
Common snipe	27	7	13	-	2	54	Yes	Yes
Eurasian teal	-	-	4	-	3	8	Yes	Yes
European golden plover	-	9	-	-	56	178	Yes	Yes
Great cormorant	-	2	-	-	1	2	Yes	Yes
Great white egret	-	1	-	-	1	1	No	Yes
Hen harrier	-	5	-	2	1	7	Yes	Yes
Little egret	-	-	2	-	1	2	Yes	Yes
Northern lapwing	95	11	17	6	17	255	Yes	Yes
Mallard	-	1	3	-	5	11	Yes	Yes
Merlin	-	4	-	-	1	4	Yes	Yes
Peregrine falcon	4	1	-	1	1	6	Yes	Yes
Whooper swan	-	1	-	-	2	2	Yes	Yes

Table 5.9: Summary of Flight Activity Survey Results for Primary Target Species

An overview of flight activity data for secondary target species is given below.

Species	Season	Number of 5 Minute Periods Recorded	Peak Count in Any 5-Minute Period	Summary of Activity
Common buzzard	Breeding 2022	56	4	Activity in all months within wind farm site, survey buffer and beyond
	Non-breeding 2022/23	17	3	Activity in all months except February, within wind farm site and survey buffer
	Breeding 2023	21	2	Activity in all months except June within wind farm site, buffer and beyond
	Non-breeding 2023/24	1	1	Activity in March within 500 m survey buffer and beyond

Species	Season	Number of 5 Minute Periods Recorded	Peak Count in Any 5-Minute Period	Summary of Activity
Common gull	Breeding 2022	1	1	Activity in May within wind farm site
	Breeding 2023	5	8	Activity in July within wind farm site and buffer
Eurasian sparrowhawk	Breeding 2022	6	1	Activity in all months within the wind farm site and survey buffer
Great black-backed gull	Breeding 2022	3	2	Activity in August within wind farm site and survey buffer
Great cormorant	Non-breeding 2023/24	1	1	Activity in March inside wind farm site, buffer and beyond
Grey heron	Breeding 2022	5	2	Activity in all months except August within wind farm site
	Non-breeding 2022/23	15	2	Activity in October, November, January and March within wind farm site, survey buffer and beyond
	Breeding 2023	15	2	Activity in all months within wind farm site, buffer and beyond
	Non-breeding 2023/24	1	1	Activity in December within wind farm site, buffer and beyond
Greylag goose	Non-breeding 2023/24	1	9	Activity in March within wind farm survey buffer
Herring gull	Breeding 2022	4	8	Activity in May and June within wind farm site and survey buffer
	Breeding 2023	3	5	Activity in July within wind farm site and buffer
Lesser black-backed gull	Breeding 2022	10	4	Activity in all months within the wind farm site and survey buffer
	Breeding 2023	2	4	Activity in April within wind farm site and buffer
Mallard	Breeding 2022	6	19	Activity in all months except

Species	Season	Number of 5 Minute Periods Recorded	Peak Count in Any 5-Minute Period	Summary of Activity
				July within the wind farm site, survey buffer and beyond
	Non-breeding 2023/24	1	4	Activity in February within wind farm site, buffer and beyond
Northern raven	Breeding 2022	14	4	Activity in May and August within wind farm site, survey buffer and beyond
	Non-breeding 2022/23	4	3	Activity between October and January inclusive, within wind farm site, survey buffer and beyond
	Breeding 2023	4	2	Activity in July and August within wind farm site, buffer and beyond
	Non-breeding 2023/24	9	3	Activity in October and November in wind farm site, buffer and beyond
Ringed plover	Breeding 2023	5	3	Activity in May and June within wind farm site

Table 5.10: Summary of Flight Activity Survey Results for Secondary Target Species

No evidence of nocturnal migrants overflying the main wind farm site was identified during autumn and spring migration surveys carried out in the non-breeding 2024/25 season. A single mallard was heard but there was no evidence to suggest it was an individual migrating.

Distribution and Abundance Surveys

A holistic summary of species recorded during all non-flight activity (i.e. distribution and abundance) survey types from the 2022 breeding season onwards is given below in **Table 5.11**. Further details are provided in **Annex 5.8**. Note that only primary and secondary target species and any other BoCCl4 red- or amber-listed non-primary or non-secondary target species have been presented in the below summary table.

Species	Survey Types Where Recorded	Peak Count Across All Surveys	Where Recorded	Site Usage	Breeding Status
Barn owl	Bat transect (incidental; B22); nocturnal migration survey (NB24/25)	1 (B) 1 (NB)	B: off-site (>500m from infrastructure) NB: heard not seen, so precise location not identified	B: forages in surrounding area; no breeding or roosting locations identified during dedicated surveys NB: forages in surrounding area; no roosting locations identified during dedicated surveys	B22 - B24: non-breeding
Barn swallow	Breeding wader surveys (incidental; B24)	20 (B)	B: within 500m of infrastructure	B: likely forages locally	B22 - B23: not recorded B24: non-breeding
Black-headed gull	Breeding raptor, wader, and woodcock surveys (all incidental; B24); feeding distribution surveys (NB24/25)	80 (B) 8 (NB)	B: lake c. 1.7km north of project NB: lake c. 1.7km north of project	B: uses off-site lake for foraging and probably breeding; no site usage NB: no site usage	B22 - B23: not recorded B24: probable breeding
Black-tailed godwit	Feeding distribution surveys (NB23/24)	375 (NB)	NB: Dovegrove Callows SPA c. 4km southwest of project	NB: no site usage	N/A – winter migrant
Common buzzard	Breeding raptor surveys (B22 - B24); breeding wader surveys (incidental; B24); feeding distribution surveys (NB22/23 – NB24/25)	3 (B) 2 (NB)	B: over wind farm site; 600m SW of same; within 2km of wind farm site NB: near wind farm; within 2km of wind farm site	B: occasional hunting within/near wind farm site; no regular site usage NB: occasional flyovers or perching	B22: two possible breeding territories in wider area B23: possible breeding; territories likely in wider area B24: possible breeding
Common gull	Feeding distribution surveys (NB23/24)	3 (NB)	NB: near Dovegrove Callows SPA c.4km southwest	NB: no site usage	B22 – B24: not recorded

Species	Survey Types Where Recorded	Peak Count Across All Surveys	Where Recorded	Site Usage	Breeding Status
			of project		
Common kestrel	Breeding raptor surveys (B22 - B24); feeding distribution surveys (incidental; NB22/23 - NB24/25)	1 (B) 1 (NB)	B: 1km SW of wind farm site near Loughnane Quarry (c. 2.2km from proposed infrastructure) NB: c. 2km northwest of wind farm site	B: hunting mainly in surrounding area; no regular site usage NB: occasional hunting over wind farm site and surrounds	B22: non-breeding B23: confirmed breeding near quarry B24: possible breeding
Common kingfisher	Habitat surveys (incidental; B22)	1 (B)	B: c. 1.8km from wind farm site, along Rapemills River.	B: habitat suitability survey in B23 identified limited foraging potential but no suitable breeding habitat at nearby watercourses; no recorded site usage; only incidental observation was offsite	B22: non-breeding B23 - B24: not recorded
Common snipe	Breeding wader surveys (B22 - B24); breeding raptor and woodcock surveys incidental (B24); feeding distribution surveys (NB22/23 - NB24/25); nocturnal wader surveys (NB22/24, NB24/25)	2 (B) 2 (NB)	B: within wind farm site; off-site near met mast (B23); off-site >500m from infrastructure (B22) NB: SE of wind farm site (mostly >500m) at night; Dovegrove Callows SPA in day (c.4km southwest of wind farm site)	B: occasional foraging and breeding within and nearby site in low numbers NB: no on-site usage at night or recorded during day	B22: non-breeding B23: confirmed breeding >500m from proposed infrastructure B24: Possible breeding c. 500m southwest of proposed infrastructure
Eurasian curlew	Breeding wader surveys (B22); breeding raptor surveys (incidental; B24); nocturnal wader surveys	2 (B) 1 (NB)	B: off-site (>500m from any infrastructure). NB: heard not seen, so precise location not identified	B: no site usage NB: likely no site usage (heard only)	B22: non-breeding B23 - B24: not recorded on-site (1.7km from site in B24)

Species	Survey Types Where Recorded	Peak Count Across All Surveys	Where Recorded	Site Usage	Breeding Status
	(NB22-23)				
Eurasian sparrowhawk	Breeding raptor surveys (B22); feeding distribution surveys (incidental; NB22/23 – NB24/25)	1 (B) 1 (NB)	B: within 2km of wind farm site NB: near wind farm site	B: no regular site usage NB: no regular site usage	B22: non-breeding B23 - B24: not recorded
Eurasian teal	Feeding distribution surveys (NB24/25)	35 (NB)	NB: within lake c.1.7km from wind farm site	NB: no site usage	B22-B24: not recorded
Eurasian whimbrel	Breeding woodcock surveys (incidental; B24)	1 (B)	B: flying north c. 1.7km of wind farm site	B: single flyover likely a migrating bird; no site usage	B22 - B23: not recorded B24: non-breeding
Eurasian wigeon	Feeding distribution surveys (NB23/24)	26 (NB)	NB: Dovegrove Callows SPA c.4km southwest of wind farm site	NB: no site usage	N/A – winter migrant
Eurasian woodcock	Breeding woodcock surveys (B24)	5 (B)	B: c.700m west, c.1.7km north and c.1.9km southwest of wind farm site, respectively	B: no site usage	B22 - B23: not recorded (no dedicated surveys) B24: probable breeding (three territories; closest is c.700 m to the wind farm site)
Great cormorant	Feeding distribution surveys (NB 24/25)	2 (NB)	NB: Dovegrove Callows SPA c.4km southwest of wind farm site	NB: no site usage	B22 - B24: not recorded
Great crested grebe	Breeding raptor surveys (incidental; B24)	2 (B)	B: lake in an area c.1.7km northwest of wind farm site	B: no site usage	B22 - B23: not recorded B24: probable breeding
Great white egret	Breeding wader and woodcock surveys (incidental;)	1 (B) 1 (NB)	B: lake c. 1.7km northwest of wind farm site NB: same location	B: no site usage NB: no site usage	B22 - B23: not recorded B24: non-breeding

Species	Survey Types Where Recorded	Peak Count Across All Surveys	Where Recorded	Site Usage	Breeding Status
	B24); feeding distribution surveys (NB24/25)		as above		
Grey heron	Feeding distribution surveys (NB22/23 – NB24/25)	1 (NB)	NB: mostly in lake c. 1.7km northwest of wind farm site; also, Dovegrove Callows SPA c.4km southwest of wind farm site	NB: no site usage	B22 – B24: not recorded
House martin	Breeding wader surveys (incidental; B24)	30 (B)	B: near turbine location	B: occasional foraging over site	B22 - B23: not recorded B24: non-breeding (suitable buildings c. 900 m north of proposed infrastructure)
Lesser black-backed gull	Breeding raptor surveys (incidental; B24); nocturnal wader and feeding distribution surveys (incidental; NB24/25)	46 (B) 50 (NB)	B: lake c. 1.7km northwest of wind farm site NB: same as above	B: no regular site usage NB: no regular site usage	B22 - B23: not recorded B24: non-breeding
Linnet	Breeding wader surveys (incidental; B24)	3 (B)	B: within wind farm site near turbine location	B: suitable breeding habitat present nearby; likely uses site perimeter for foraging and breeding	B22 and B23: not recorded B24: probable breeding
Little egret	Breeding wader surveys (B24); breeding raptor surveys (incidental; B22); feeding distribution surveys (NB23/24)	1 (B) 2 (NB)	B: offsite (>500m from proposed infrastructure) NB: Dovegrove Callows SPA c.4km southwest of wind farm site	B: no site usage NB: no site usage	B22: non-breeding B23: not recorded B24: possible breeding
Mallard	Breeding	7 (B)	B: lake c.1.7km	B: no site usage	B22: non-

Species	Survey Types Where Recorded	Peak Count Across All Surveys	Where Recorded	Site Usage	Breeding Status
	raptor and wader surveys (incidental; B24); feeding distribution surveys (NB22/23 – NB24/25); nocturnal wader surveys (NB24/25); nocturnal migration surveys (NB24/25)	22 (NB)	northwest of wind farm site and >2km from same NB: Dovegrove Callows SPA c.4km southwest of wind farm site; c. 1.7 km northwest of wind farm site (22 birds in day; small numbers flying c. 1.7km from project at night); single bird heard during migration survey c. 350m from proposed infrastructure; c.200m from proposed infrastructure in day	NB: occasional diurnal foraging seen within wind farm site; no evidence of regular nocturnal migration or foraging	breeding B23: not recorded B24: confirmed breeding at lake
Mute swan	Feeding distribution surveys (NB23/24 – NB24/25); nocturnal wader surveys (incidental; NB24/25)	5 (NB)	NB: Dovegrove Callows SPA c.4km southwest of wind farm site; lake c.1.7km north of wind farm site	NB: no site usage	B23 – B24: not recorded
Northern lapwing	Breeding wader surveys (B22 – B24), breeding raptor surveys (incidental; B22, B24); feeding distribution surveys (NB23/24 – NB24/25); nocturnal wader surveys (NB22/23, NB24/25)	3 (B) 400 (NB)	B: within main wind farm site; probable territory c. 500m from proposed infrastructure footprint in B24 season NB: large flocks at Dovegrove Callows SPA c.4km southwest of wind farm site; 27 birds at lake c. 1.7km northwest of wind farm site; 13 birds foraging at night c. 880m from proposed infrastructure	B: repeated use of suitable habitat for breeding and foraging within wind farm site; territorial behaviour in B22 – B23 NB: no site usage	B22 – B24: probable breeding (single territory B22; likely same territory across years but moving slightly westwards each year)

Species	Survey Types Where Recorded	Peak Count Across All Surveys	Where Recorded	Site Usage	Breeding Status
			(handful in day in same location)		
Northern raven	Feeding distribution surveys (NB22/23 – NB24/25)	1 (NB)	NB: wind farm site	NB: no site usage (flyovers)	B22 – B24: not recorded
Peregrine falcon	Breeding raptor surveys (B22 – B23); feeding distribution surveys (incidental; NB22/23, NB23/24)	1 (B) 1 (NB)	B: Loughnane Quarry (c.2.2km from proposed infrastructure) NB: wind farm site; Dovegrove Callows SPA c.4km southwest of wind farm site	B: courtship displays at quarry; no site usage NB: no site usage (single flyover)	B22: possible breeding B23: probable breeding B24: not recorded
Ringed plover	Breeding wader surveys (B23)	3 (B)	B: main wind farm site c. 350m from proposed infrastructure	B: mating observed, so uses site for breeding and foraging	B22 and B24: not recorded B23: confirmed breeding
Sandwich tern	Breeding raptor surveys (incidental; B22)	1 (B)	B: off-site (>500m from proposed infrastructure; heard only)	B: passage migrant; no site usage	B22, B23 and B24: non-breeding
Whooper swan	Feeding distribution surveys (NB23/24 – NB24/25)	5 (NB)	NB: Dovegrove Callows SPA c.4km southwest of wind farm site; within wind farm site	NB: single sighting of 3 birds within wind farm site c. 465m from proposed infrastructure (no regular site usage; suspected presence due to flooding conditions); other observations within Dovegrove Callows SPA or elsewhere (although only seen on two occasions here and in low numbers)	N/A – winter migrant
Willow warbler	Breeding wader surveys (incidental;	4 (B)	B: c.1.7km from wind farm site	B: suitable nesting habitat present, so likely uses habitats off-site for breeding and	B22 – B23: not recorded B24: possible breeding

Species	Survey Types Where Recorded	Peak Count Across All Surveys	Where Recorded	Site Usage	Breeding Status
	B24)			foraging	
Yellowhammer	VP surveys (incidental; B23)	1 (B)	B: off-site, c. 500m from proposed infrastructure	B: no site usage; associated with off-site hedgerows	B22 - B24: not recorded B23: probable breeding

Table 5.11: Summary of Distribution and Abundance Survey Type Results

5.4.4 TERRESTRIAL MAMMALS (EXCLUDING BATS)

5.4.4.1 Desktop Study

The data search yielded records of 16 species of rare and/or protected mammals (see **Annex 5.10**) namely Badger *Meles meles*, Hedgehog *Erinaceus europaeus*, Pygmy Shrew *Sorex minutus*, Red Deer *Cervus elaphus*, Red Squirrel *Sciurus vulgaris*, Pine Marten *Martes martes*, Brown Long-eared Bat *Plecotus auritus*, Common Pipistrelle *Pipistrellus pipistrellus sensu stricto*, Daubenton's Bat *Myotis daubentonii*, Leisler's Bat *Nyctalus leisleri*, Nathusius's Pipistrelle *Pipistrellus nathusii*, Natterer's Bat *Myotis nattereri*, Pipistrelle *Pipistrellus pipistrellus sensu lato*, Soprano Pipistrelle *Pipistrellus pygmaeus*, Whiskered Bat *Myotis mystacinus*, and Otter *Lutra lutra*.

There is the potential for these species to be present within the project site.

There are also records of ten species of invasive or non-native mammals: Fallow Deer *Dama dama*, Bank Vole *Myodes glareolus*, Feral Goat *Capra hircus*, Greater White-toothed Shrew *Crocidura russula*, Rabbit *Oryctolagus cuniculus*, Brown Rat *Rattus norvegicus*, House Mouse *Mus musculus*, Irish hare *Lepus timidus hibernicus*, Sika Deer *Cervus nippon*, American Mink *Neovison vison*, and Grey Squirrel *Sciurus carolinensis*.

5.4.4.2 Field Survey

No protected mammal species (i.e. either live sightings or evidence of) were recorded during the surveys. Note that Eurasian otter results are discussed in **Section 5.4.7.2** under aquatic ecology and, thus, are not included in this section.

In addition, while they were not recorded by field surveys, it is likely that the following species are also present based on desktop data and the availability of suitable foraging/breeding habitats: Irish hare, pygmy shrew, and west European hedgehog.

5.4.5 BATS

5.4.5.1 Desktop Study

Potential Roost Feature Assessment

Online satellite images identified no structures/buildings that could be used by roosting bats within 287.5m (maximum turbine permutation) or 279m (minimum turbine rotation) of the proposed turbines during the desk study. Similarly, there were no trees identified from satellite imagery within these two search areas.

Bat Landscapes

For the proposed wind farm site and the third of the proposed underground electricity line closest to the wind farm, the score is 26.56 (out of a maximum score of 100). For the remainder of the proposed UGL the score is 33.78 (out of a maximum score of 100). A full breakdown is provided in Table 8 of **Annex 5.6** with an explanation provided below.

The area within which T9, T10, T11 are located has a high bat landscapes suitability index for soprano pipistrelle, brown long-eared bat, common pipistrelle, and Leisler's bat. There is moderate suitability for whiskered bat, Daubenton's bat, and Natterer's bat. The bat landscapes suitability index is classified as low for lesser horseshoe bat, and Nathusius' pipistrelle.

The area within which the remainder of the UGL is located has a high bat landscapes suitability index for soprano pipistrelle, brown long-eared bat, common pipistrelle, Leisler's bat, and Natterer's bat. There is moderate suitability for Daubenton's bat, and whiskered bat. The bat landscapes suitability index is classified as low for lesser horseshoe bat, and Nathusius' pipistrelle

NBDC Data

NBDC has records for five bat species recorded within the 10 km grid squares (N01, N10, N11) that overlaps the project site as shown in Table 9. The type of record (i.e. roost, flying, call) is not stated. A full list of the records is shown in Table 9 of the Baseline Bat Report (**Annex 5.6**).

Bat Conservation Ireland Data

Bat Conservation Ireland data (confidential Appendix D and Appendix E of **Annex 5.6**) show that 12 recorded bat roosts are located within 10km from the project site.

The closest roost (ca. 4.43km north-east of the nearest turbine (T11)) is a brown long-eared bat roost. The remaining roosts are for soprano pipistrelle (two separate roosts), Leisler's bat (five separate roosts), Daubenton's bat (two separate roosts), whiskered bat (one separate roost), common pipistrelle (one separate roost), and a mixed roost for brown long-eared bat and whiskered bat.

None of the recorded roosts have ecological connectivity to the project site i.e., the core sustenance zones (CSZ) as measured from the roost, do not overlap with the project site.

The BCI data showed there were no roosts adjacent to the grid connection.

Seven species were recorded by transects or as ad-hoc observations: *Myotis daubentonii*, *Myotis nattereri*, *Plecotus auritus*, *Nyctalus leisleri*, *Pipistrellus nathusii*, *Pipistrellus pipistrellus*, *Pipistrellus pygmaeus*, and additionally *Myotis* spp., and *Pipistrellus* spp.

National & Designated Sites within 10km of the Project Site

There are 19 pNHAs and two NHAs within 10 km of the Project Site. None of the NHAs are designated for bats; however, there are five pNHAs designated for bats.

There are 6 SACs within 10 km of the Project Site, but none are designated for bats.

These are presented in **Annex 5.6**.

Location of Project Site Relative to Bat Range Edges

The location of the project site is at the range edge (the definition of range used here is the Extent of Occurrence²⁵) for Nathusius' pipistrelle, Natterer's bat, and whiskered bat. The 10km square (N01) that contains the proposed wind farm site is within the range of these species, but the next 10km square to the east (N11) which contains the UGL is immediately outside the range of Nathusius' pipistrelle and whiskered bat. According to NS guidance², the potential for negative impact is likely to increase where there are high risk bat species on the edge of their range. This applies to Nathusius' pipistrelle (high risk) but not for whiskered bat or Natterer's bat (both low risk). However, the range data comes from the latest Article 17 report¹⁵. That report acknowledged that there is much uncertainty surrounding its range and could be reflective of survey effort rather than true presence.

Other Wind Energy Developments or Projects

Annex 5.6 outlines wind farms have been granted planning consent located within 10km of the project site. There are six operational wind farms within 10km of the project site. Apart from the consented wind farms named in **Annex 5.6**, there are no other operational or consented projects located within 10km from the project site boundary that could give rise to cumulative effects on bat populations located within the project site.

5.4.5.2 Field Survey

The results of the bat surveys are summarised below. Full details are provided in the baseline bat survey report in **Annex 5.6**.

Preliminary Ecological Appraisal – Daytime Bat Walkover (DBW) Survey

Potential Commuting/Foraging Habitat

There were no habitats that could be used by foraging and/or commuting bats within 200m plus rotor radii of T10 and T11. Suitable habitats were limited within 200m plus rotor radii of T9, with a linear section of disconnected scrub noted on the southern extent of the search area. This habitat is poorly connected to the wider landscape.

Approximately 2.5km of the Rapemills river runs along the underground electricity line route. There were also hedgerows and treelines noted which were classified as FAR, as per Table 3 of **Annex 5.6**.

Potential Roosting Habitat

The DBW identified no structures/buildings or trees that could be used by roosting bats within 287.5m or 279m of the proposed turbines.

There were no structures with roosting potential identified along the underground electricity line route. There were treelines and watercourses along the underground electricity line route that could provide potential commuting and/or foraging habitat.

Potential Roost Feature Survey

A map showing the locations of potential roost features is shown in **Figure 4** in Confidential Appendix E and a full description of each potential roost feature is provided in Confidential Appendix D. What follows is a summary of the potential roost

feature survey.

Structures

The DBW identified no structures with roosting suitability within the 287.5m or 279m search radii or along the proposed UGL search radius. Thus, no further investigation was required.

Trees

The DBW identified no tree with roosting suitability within the 287.5m or 279m search radii of the proposed turbines. Thus, no further investigation was required.

Most of the trees along the underground electricity line route were assessed as having no roosting potential above 'low potential', consisting predominantly of scrub, conifer or broadleaved species lacking potential roosting features. One PRF-I tree was recorded ca. 11m from the proposed UGL. This was a mature, ash with light ivy cover and some minor areas of peeling bark. However, it lacked sufficient shelter and the appropriate conditions to support larger numbers or for maternity and/or winter roosts. Most of the hedgerows along the proposed UGL are quite low, having been regularly cut back or consisting of low-growing disconnected scrub. As a result, there are limited potential roosting features present along the route.

Activity Survey – Static Detector Surveys (Ground-Level)

Eight bat species were recorded during the ground-level automated activity surveys conducted in 2025: brown long-eared bat, common pipistrelle, Daubenton's bat, Leisler's bat, Nathusius' pipistrelle, Natterer's bat, soprano pipistrelle and whiskered bat.

Bat activity was highest in spring (a mean of 381 bat passes per night) and lowest in summer (a mean of 35 bat passes per night). The difference in activity between the highest and lowest season was 346 bat passes per night on average.

Bats were recorded at all detector locations, but generally location T9 and T10 had the greatest number of bat passes per night, across all seasons (161 and 198 mean bat passes per night, respectively). Location T11 had the lowest number of bat passes per night across all seasons (mean of 59 bat passes per night).

5.4.5.3 Habitat Risk Assessment

The majority of the proposed wind farm site comprises PB4 cutover bog habitat (proposed wind farm site) and agricultural grassland habitats (proposed UGL), which are generally considered to be of lower value for foraging bats (BCT, 2023). The PB4 cutover bog has been subject to industrial peat harvesting historically. The absence of prominent linear features mean there is a lack of connectivity to the wider landscape which reduces commuting and foraging suitability, and further reduces the likelihood of roosting bats due to habitat fragmentation.

The habitats at the project site are therefore considered to be of moderate risk for bats according to table 3a of NS guidance² and reproduced below (the risk assessment category is provided for each point and the overall category is the mean of these categories):

- No potential roost features of low quality present within the proposed wind farm

site (low).

- Low quality foraging habitat that could be used by small numbers of foraging bats (low);
- Isolated site not connected to the wider landscape by prominent linear features (low); and
- Project Site is located at the edge of the ranges for Nathusius' pipistrelle, Natterer's bat, and whiskered bat (high).

The Project is judged as being of medium size according to table 3a of NS guidance² and reproduced below (the size assessment category is provided for each point and the overall category is the mean of these categories):

- Small scale development (3 turbines) (small);
- Six other consented wind developments are located within 5 km of Project Site (medium); and
- Project comprises turbines >100 m in height (large).

Overall, the Project Site is judged to pose a medium (3) risk to bats.

5.4.6 OTHER PROTECTED FAUNA

5.4.6.1 Desktop Study

51 records of two no. protected species of amphibian were yielded from the data search, namely common frog and smooth newt.

8 records of common lizard *Zootoca vivipara* were yielded from the data search. However, the species can utilise a variety of habitats. As such, south-facing habitats within the project site could support common lizard.

30 records of protected invertebrate species (marsh fritillary) were yielded from the data search. As such, there may be potential for this species to be present within the project site.

18 records of protected mollusc species (Desmoulin's Whorl Snail (*Vertigo (Vertigo) moulinsiana*, and Geyer's whorl snail (*Vertigo (Vertigo) geyeri*)) were yielded from the data search.

5.4.6.2 Field Survey

Reptiles

No reptiles were recorded during other ecological surveys.

Amphibians

Neither common frog nor smooth newt was recorded during surveys. However, suitable habitat was noted as being present.

Marsh Fritillary

The survey results are summarised below. The baseline survey report is presented in **Annex 5.11** and outlines the survey details in full.

Habitat Suitability

Habitats within the survey area are described in **Section 5.4.2.2**. As the survey area is dominated by PB4 cutover bog, it is largely absent of vegetation namely devils bit scabious *Succisa pratensis*. Devil's-bit scabious was limited to a single isolated occurrence near the south-western boundary of the project site. This occurrence was outside the footprint of proposed infrastructure. The UGL is dominated by GA1 improved agricultural grassland, and devil's bit scabious was absent. The haul nodes were also absent of devil's bit scabious and dominated by artificial habitats. The Project site was assessed as 'unsuitable'

Larval Web Survey

The area surrounding this isolated devil's-bit scabious occurrence was surveyed for larval webs as a precautionary measure. No larval webs, larvae or evidence of feeding by marsh fritillary were recorded.

Other Invertebrates

Invertebrate species recorded during surveys are listed below. Of these, none are protected or considered threatened. Note, aquatic invertebrates recorded during Q sampling are detailed in **Annex 5.3**.

- Common blue butterfly *Polyommatus icarus*;
- Common frog hopper *Philaenus spumarius*;
- Meadow brown butterfly *Maniola jurtina*;
- Orange tip butterfly *Anthocharis cardamines*;
- Peacock butterfly *Inachis io*;
- Red admiral butterfly *Vanessa atalanta*;
- Small white butterfly *Pieris rapae*; and
- Speckled wood butterfly *Pararge aegeria*

5.4.7 FISHERIES AND AQUATIC ECOLOGY

5.4.7.1 Desktop Study

The desktop data available for fisheries and aquatic ecology is shown in full in **Annex 5.3**. A summary is provided below.

There are 22 no. records Annex II white-clawed crayfish *Austropotamobius pallipes* within hectads N00, N10, N11. White-clawed crayfish remains were recorded in otter spraint on both the Rapemills River and West Galros Stream during previous surveys (Triturus, 2022).

1 no. record of Atlantic salmon and 1 record of brook lamprey were yielded in N11.

No contemporary NPWS records for macrophytes or aquatic bryophytes protected under the Flora (Protection) Order, 2022 or Red listed (Wyse-Jackson et al., 2016; Lockhart et al., 2012) were available for the respective grid squares.

5.4.7.2 Field Survey

See **Annex 5.3** of this EIAR for the full fisheries and aquatic ecology survey results. A summary is provided below.

Habitats

The surveyed watercourses in the vicinity of the proposed Cush wind farm development were typically small lowland channels draining areas of peatland that had been extensively straightened and deepened historically. In addition to hydromorphological impacts, siltation, eutrophication and low summer flows had significantly impacted fisheries habitat.

Q-sampling

No rare or protected macro-invertebrate species (according to national red lists) were recorded in the biological water quality samples taken from 10 no. riverine or composite sweep samples collected at 2 no. lake sites. However, whilst not protected, the nationally uncommon backswimmer *Notonecta obliqua* was recorded from the impounded peat channel at site B1. This species occupies a restricted and mostly coastal distribution in Ireland but is known to inhabit small pools in heathland and peatlands (Nelson, 2022).

The non-native amphipod crustacean *Crangonyx* sp. was recorded in low numbers from lake site L2. Whilst *Crangonyx pseudogracilis* has been known in Ireland since 1969, its Irish range has expanded in recent years (Minchin et al., 2013) and it is now well established (Baars et al., 2021). Furthermore, *Crangonyx floridanus* has recently been confirmed in the Liffey and Barrow catchments (Baars et al., 2021). Speciation within the *Crangonyx* genus has proven difficult (Mauvisseau et al. 2018) and could not be determined in the current survey. Although the ecological impacts of either *Crangonyx* species in Ireland remains uncertain (Baars et al., 2021) the species has been shown to be an important dietary component in brown trout in the River Liffey (Delanty et al., 2022).

All sampling sites failed to meet the target good status ($\geq Q4$) requirements of the European Union Environmental Objectives (Surface Waters) (Amendment) Regulations 2019 and the Water Framework Directive (2000/60/EC). Rapemills River at site A1 and A4 was Q3 (poor status) in August 2025. All other sampling sites ranged from Q2-3 to Q3 (poor status) with several ratings tentative due to poor flows and an absence of suitable riffle areas for sampling. Alongside eutrophication, hydromorphological modifications (land/peatland drainage) and peat harvesting (leading to siltation) have been identified as the major pressures impacting water quality in the Brosna_SC_080 and the Shannon (Lower)_SC_040 river sub-catchments (EPA data) and this was supported by observations made during the surveys.

Salmonids

Salmonids were restricted in the survey area, primarily given poor habitat suitability. Brown trout were recorded throughout the Rapemills River at sites A1, A4, A7 and A8, with site A7 offering particularly valuable spawning and nursery habitat. Much of the river had been heavily modified and suffered from considerable siltation pressures, reducing the quality of salmonid habitat. Bed calcification (colmation) in this alkaline river further limited the availability of salmonid spawning habitat but it was still the most valuable salmonid watercourse in the survey area. Salmonid suitability elsewhere was low, although brown trout eDNA was detected in the West Galros Stream (site A6). Notably, Atlantic salmon was detected at site A8 on the Rapemills River (Lusmagh Bridge), indicating their presence at or (likely) upstream of the sampling point. Given significant downstream barriers in the Shannon catchment (e.g. Ardnacrusha hydro-

electric dam)¹⁶ the occurrence of salmon this far up the Shannon catchment is very limited and highly sporadic.

Lamprey

Lamprey (*Lampetra* sp.) also occupied a limited distribution in the survey area, with organic rich soft sediment accumulations at sites A1 and A4 on the Rapemills River supporting low densities of ammocoetes, respectively (3.5 & 2.3 per m²). Environmental DNA sampling also detected *Lampetra* sp. at site A8 in the lower reaches and the species is likely distributed throughout the watercourse. Nevertheless, the quality of lamprey habitat was generally poor across the survey area.

European Eel

Despite habitat suitability across much of the survey area, no European eel were recorded in the electro-fishing survey. There was some suitability detected from eDNA sampling downstream at location A6.

Other fish species

Other fish species recorded were gudgeon, minnow, stone loach, pike and three-spined stickleback.

White-clawed crayfish

No live white-clawed crayfish were recorded during the current targeted surveys and environmental DNA sampling of the Rapemills River (2 sites) and West Galros Stream failed to detect the species. However, white-clawed crayfish remains were recorded in otter spraint on both these watercourses during the previous survey (Triturus, 2022). Crayfish burrows were frequent in the steep clay banks of the West Galros Stream (sites A5 & A6) as well as connected former peat settlement ponds (sites P1 & P2) and suitability was high overall.

Otter

Otter signs were recorded within a 150m radius of the survey sites in August 2025.

Otter signs (typically spraints) were identified at a total of 4 no. sites on the Rapemills River at sites A1, A4, A7 and near site A3.

No breeding (holts) or resting (couch) areas were identified in the vicinity of the survey sites in August 2025.

Invasive aquatic species

Canadian pondweed *Elodea canadensis* was recorded at site A8 on the Rapemills River. The species is very widespread in Ireland and listed on the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations 2011-2021 (S.I. 477/2011). It is considered a high-risk invasive species in Ireland (O' Flynn et al., 2014).

5.4.8 EVALUATION OF ECOLOGICAL FEATURES

An evaluation of ecological features within the ZOI is provided in **Table 5.12**.

Only those evaluated as an 'Important Ecological Feature' (IEF) are brought forward

¹⁶ Due to downstream migration barriers (such as hydroelectric dams and weirs), Atlantic salmon distribution is highly restricted in the upper Shannon catchment and the river is only achieving 5% of its conservation limit above Parteen weir in recent years (e.g. TEGOS, 2025a)

for impact assessment. These include those protected by law or policy. Note that all habitats have been brought forward for assessment, to facilitate a fuller assessment of any net changes to biodiversity because of the project, c.f the EU Biodiversity Strategy for 2030 and Irish 4th National Biodiversity Action Plan 2023-2030, which emphasise the need to achieve no net loss of biodiversity.

Feature Type	Feature	Feature Information	Value	Justification for Evaluation	Important Ecological Feature? Y/N
Designated Nature Conservation Sites	River Shannon Callows SAC 000216	Protected under the Habitats Directive, derived domestic legislation, and national, regional and local planning policy. NIS determined potential hydrological and ecological connectivity.	International	Part of European Natura 2000 network.	Y but assessed in the NIS
	Lough Derg, North-east Shore SAC 002241	Protected under the Habitats Directive, derived domestic legislation, and national, regional and local planning policy. NIS determined potential hydrological connectivity	International	Part of European Natura 2000 network.	Y but assessed in the NIS
	River Little Brosna Callows SPA 004086	Protected under the Birds Directive, derived domestic legislation, and national, regional and local planning policy. The NIS determined a potential ecological connection (collision risk to golden plover, lapwing and black-headed gull) and an indirect pathway via potential ex-situ use of hydrologically connected wetland habitat within Middle Shannon Callows SPA. There is no direct hydrological connection.	International	Part of European Natura 2000 network.	Y but assessed in the NIS
	Middle Shannon Callows SPA 004096	Protected under the Birds Directive, derived domestic legislation, and national, regional and local planning policy. The NIS determined there is hydrological, and ecological connectivity to this SPA.	International	Part of European Natura 2000 network.	Y but assessed in the NIS

Feature Type	Feature	Feature Information	Value	Justification for Evaluation	Important Ecological Feature? Y/N
	Slieve Bloom Mountains SPA 004160	Protected under the Birds Directive, derived domestic legislation, and national, regional and local planning policy. The NIS determined potential ecological connectivity to this SPA.	International	Part of European Natura 2000 network.	Y but assessed in the NIS
	Lough Derg (Shannon) SPA 004058	Protected under the Birds Directive, derived domestic legislation, and national, regional and local planning policy. The NIS determined potential hydrological connectivity to this SPA.	International	Part of European Natura 2000 network.	Y but assessed in the NIS
	River Suck Callows SPA 004097	Protected under the Birds Directive, derived domestic legislation, and national, regional and local planning policy. Screened out at AA screening stage (Annex 5.4 and NIS): no hydrological connectivity, and the SPA (17.8 km) lies beyond the core winter foraging range of the SCI species recorded at the Project.	International	Part of European Natura 2000 network.	N

Feature Type	Feature	Feature Information	Value	Justification for Evaluation	Important Ecological Feature? Y/N
	Dovegrove Callows SPA 004137	Protected under the Birds Directive, derived domestic legislation, and national, regional and local planning policy. Screened out at AA screening stage (Annex 5.4 and NIS): no hydrological connectivity, and no Greenland white-fronted geese recorded during surveys.	International	Part of European Natura 2000 network.	N
	All Saints Bog SPA 004103	Protected under the Birds Directive, derived domestic legislation, and national, regional and local planning policy. Screened out at AA screening stage (Annex 5.4 and NIS): Greenland white-fronted goose has not been recorded using the SPA since 1993/94 and none were recorded during surveys; the raised bog habitat is ombrotrophic and functionally separated from the downstream hydrological and groundwater linkage.	International	Part of European Natura 2000 network.	N
	All Saints Bog and Esker SAC 000566	Protected under the Habitats Directive, derived domestic legislation, and national, regional and local planning policy. Screened out at AA screening stage (Annex 5.4 and NIS): although there is downstream hydrological and groundwater linkage, the raised bog habitats are ombrotrophic and functionally separated from it, so no viable impact pathway exists.	International	Part of European Natura 2000 network.	N

Feature Type	Feature	Feature Information	Value	Justification for Evaluation	Important Ecological Feature? Y/N
	Suck River Callows NHA 000222	Protected under the Wildlife Amendment Act (2000) and local planning policy. There is no pathway to this site.	National	Statutory designated Irish conservation site.	N
	Woodville Woods pNHA 000927	Protected under local planning policy. There is a potential connection between the Project Site and this pNHA.	National	Non-statutory designated Irish conservation site.	Y
	Birr (Domestic Dwelling No. 2, Occupied) pNHA 000569	Protected under local planning policy. There is no connectivity to this site.	National	Non-statutory designated Irish conservation site.	N

Feature Type	Feature	Feature Information	Value	Justification for Evaluation	Important Ecological Feature? Y/N
	Birr (Domestic Dwelling No.1, Occupied) pNHA 002058	Protected under local planning policy. There is no connectivity to this site.	National	Non-statutory designated Irish conservation site.	N
	River Shannon Callows pNHA 000216	Protected under local planning policy. There is a potential ecological connection between the Project Site and this pNHA. This overlaps with River Shannon Callows SAC and Middle Shannon Callows SPA. As such, this ecological connection is considered under the SAC and SPA in the NIS.	National	Non-statutory designated Irish conservation site. This ecological connection is considered under the SAC and SPA in the NIS.	Y but assessed in the NIS
	Slieve Bloom Mountains pNHA 000412	Protected under local planning policy. There is a potential ecological connection via hen harrier, between the Project Site and this pNHA. This pNHA overlaps with the Slieve Bloom Mountains SPA.	National	Non-statutory designated Irish conservation site. This ecological connection is considered under the SPA in the NIS.	Y but assessed in the NIS

Feature Type	Feature	Feature Information	Value	Justification for Evaluation	Important Ecological Feature? Y/N
	Lough Nahinch (Tipperary) pNHA 000936	Protected under local planning policy. There is a potential ecological connection between the Project Site and this pNHA	National	Non-statutory designated Irish conservation site.	Y
	Lough Derg pNHA 000011	Protected under local planning policy. There is hydrological connectivity between the Project Site and this pNHA. This overlaps with Lough Derg, North-east Shore SAC and is assessed in the NIS.	National	Non-statutory designated Irish conservation site.	Y but assessed in the NIS
	Clorhane Wood pNHA 000894	Protected under local planning policy. There is no connectivity between the Project Site and this pNHA.	National	Non-statutory designated Irish conservation site.	N

Feature Type	Feature	Feature Information	Value	Justification for Evaluation	Important Ecological Feature? Y/N
	Roscrea Bog pNHA 000583	Protected under local planning policy. There is ecological connectivity between the Project Site and this pNHA.	National	Non-statutory designated Irish conservation site.	Y
Ramsar Sites	Slieve Bloom Mountains Ramsar Site 335	There is a potential ecological connection via hen harrier.	International	The population of hen harrier overlap with Slieve Bloom Mountains SPA. As such, this ecological connection is considered under the SPA in the NIS.	Y but assessed in the NIS
	Mongan Bog Ramsar Site 416	There is a lack of ecological or hydrological connection between the Ramsar site and the project site.	International	There is an absence of an impact pathway.	N
Birds	Barn owl	BoCCI 4: Red list (breeding). ROI population: 562 pairs (EIONET, 2025). No reliable county population estimate available. Single incidental bat-transect record (B22, off-site >500 m) and one heard-only nocturnal migration record (NB24/25). No breeding or roosting locations identified on or near site during dedicated surveys.	Local (breeding and non-breeding)	Peak count of one individual is <1% of ROI population (0.088%). No confirmed site usage and no breeding / roosting evidence. Based on this, the site for this species is evaluated as being of local importance (both seasons).	N
	Barn swallow	BoCCI 4: Amber list (breeding). ROI population: 4,936,488 individuals (Lewis et al., 2019). No reliable county population estimate available. 20 individuals recorded incidentally during breeding wader surveys (B24), within 500 m of infrastructure. Likely forages locally; not recorded as breeding on site.	Local (breeding)	Peak count of 20 individuals is <1% of ROI population (0.0004%). Incidental foraging use of the site environs only. Based on this, the site for this species is evaluated as being of local importance (breeding season).	N

Feature Type	Feature	Feature Information	Value	Justification for Evaluation	Important Ecological Feature? Y/N
	Black-headed gull	<p>BoCCI 4: Amber list (breeding and non-breeding).</p> <p>ROI and county non-breeding populations: 48,821 individuals (EIONET, 2025) and 278.35 individuals (Bird Watch Ireland, 2026), respectively.</p> <p>ROI breeding population: 7,810 pairs (EIONET, 2025). No reliable county population estimate available for breeding population.</p> <p>River Little Brosna Callows NHA population: 145.6 individuals (figure taken from Little Brosna Callows IWeBS counts) (Bird Watch Ireland, 2026).</p> <p>Flight activity confined to the breeding season, time spent at PCH and within the CRZ. Recorded incidentally on breeding wader/raptor/woodcock surveys (B24) and on NB24/25 feeding distribution surveys; uses an off-site lake c. 1.7km north of wind farm site for foraging and probable breeding - no confirmed site usage.</p>	County (breeding and non-breeding)	<p>Peak count of 8 individuals is <1% of ROI population (0.016%), >1% of county population (2.87%) and >1% of River Little Brosna Callows NHA population (5.49%) (non-breeding).</p> <p>For the breeding season, a peak count of 80 individuals is <1% of the ROI population (0.51%). Breeding-season CRZ flight activity is notable, but the confirmed foraging/breeding location is off-site.</p> <p>Based on the above, the site for this species is evaluated as being of county importance (both seasons).</p>	Y
	Black-tailed godwit	<p>BoCCI 4: Amber list (non-breeding).</p> <p>ROI and county non-breeding populations: 22,900 individuals (Burke et al., 2025) and 3,231.95 individuals (Bird Watch Ireland, 2026), respectively.</p> <p>River Little Brosna Callows NHA population: 3,201.2 birds (figure taken from Little Brosna Callows IWeBS counts) (Bird Watch Ireland, 2026).</p> <p>375 individuals recorded at Dovegrove Callows SPA during NB23/24 feeding distribution surveys only. No site usage recorded.</p>	Local (non-breeding)	<p>Peak count of 375 individuals is >1% of ROI population (1.64%) and >1% of River Little Brosna Callows NHA population (11.7%) (non-breeding).</p> <p>The only observation was made c.4km off-site and the site lacks habitat capable of supporting foraging or roosting godwit.</p>	N

Feature Type	Feature	Feature Information	Value	Justification for Evaluation	Important Ecological Feature? Y/N
				Thus, the site itself is evaluated as being of local importance to this species (non-breeding).	
	Common buzzard	<p>BoCCI 4: Green list.</p> <p>ROI population: 1,938 pairs (EIONET, 2025). No reliable county population estimate available.</p> <p>Regular but low-level activity in all seasons (activity in all months within site, buffer and beyond). Two possible breeding territories identified in the wider area (B22), possible breeding B23/B24; occasional hunting within/near site, no confirmed on-site breeding.</p>	Local (breeding and non-breeding)	<p>Peak count of 4 birds is <1% of ROI population (0.1%).</p> <p>Widespread, Green-listed species with regular but non-breeding use of the site for hunting. Based on the above, the site is evaluated as being of local importance to this species (both seasons).</p>	N
	Common gull	<p>BoCCI 4: Amber list (breeding and non-breeding).</p> <p>ROI breeding population: 1,948 pairs (EIONET, 2025). No reliable county estimates for breeding population available as IWeBS data focuses on non-breeding season.</p> <p>ROI and county non-breeding populations: 21,438 (EIONET, 2025) and 0.8 (Bird Watch Ireland, 2026) individuals, respectively. County population estimate likely a massive underestimate.</p> <p>Low-level breeding-season activity only within site/buffer; separately, 3 individuals recorded near Dovegrove Callows SPA in NB23/24 with no site usage. Not recorded breeding B22–B24.</p>	Local (breeding and non-breeding)	<p>Peak count of 8 individuals is <1% of ROI population (0.2%; breeding).</p> <p>Incidental activity only, no confirmed breeding. Based on the above, the site is evaluated as being of local importance for the species (both seasons).</p>	N
	Common kestrel	<p>BoCCI 4: Red list (breeding).</p> <p>ROI population: 13,500 individuals (EIONET, 2025). No reliable county population estimate available.</p>	County (breeding and non-breeding)	<p>Peak count of 2 and 1 individuals is <1% of ROI population (0.02% and 0.007% for breeding and non-</p>	Y

Feature Type	Feature	Feature Information	Value	Justification for Evaluation	Important Ecological Feature? Y/N
		<p>Flight activity recorded in all four survey periods, time spent at PCH and within the CRZ.</p> <p>Confirmed breeding recorded near a quarry c. 2.2 km from the site (B23); possible breeding B24; non-breeding on site in B22. No confirmed on-Site breeding.</p>		<p>breeding seasons, respectively).</p> <p>Consistent multi-season collision risk zone (CRZ) presence by a Red-listed species, known to be susceptible to collision with wind turbines.</p> <p>Based on the above, the site is evaluated as being of county importance for this species (both seasons).</p>	
	Common kingfisher	<p>Annex I and BoCCI 4: Amber list (breeding).</p> <p>ROI population: 368-1,031 pairs (EIONET, 2025). No reliable county population estimate available.</p> <p>Single incidental record (B22) c. 1.8km from the site along the Rapemills River. A dedicated B23 habitat suitability survey found limited foraging potential and no suitable breeding habitat at nearby watercourses. No site usage recorded.</p>	County (breeding)	<p>Peak count of 1 individual is <1% of ROI population (0.14%).</p> <p>No confirmed site usage and unsuitable breeding habitat confirmed by survey.</p> <p>Downstream hydrological connectivity from site to Rapemills River, so potential pathway for water-quality related impacts.</p> <p>Based on the above, the site is evaluated as being of county importance to this species, as a precaution (breeding).</p>	Y
	Common ringed plover	<p>BoCCI 4: Amber list (breeding and non-breeding).</p> <p>ROI population: 11,420 individuals (Burke et al., 2025) and 1,045 pairs (EIONET, 2025) (non-breeding and</p>	County (breeding)	<p>Peak count of 3 individuals is <1% of ROI breeding population (0.14%).</p>	Y

Feature Type	Feature	Feature Information	Value	Justification for Evaluation	Important Ecological Feature? Y/N
		breeding, respectively). County population: two individuals (Bird Watch Ireland, 2026) (likely to be massive underestimate and only relates to non-breeding season, with no reliable breeding season estimate available). Recorded as a secondary target species with breeding-season activity in B23 only. Confirmed breeding on site in B23 (mating observed, 3 individuals, c. 350 m from infrastructure) - direct evidence of breeding and foraging use of the site; not recorded B22 or B24.		Confirmed on-site breeding, albeit low numbers and a single breeding season of record. Based on the above, the site is evaluated as being of county importance (breeding) for this species on a precautionary basis given the confirmed breeding evidence.	
	Common snipe	BoCCI 4: Red list (breeding and non-breeding). ROI population: 4,275 pairs (EIONET, 2025) and 8,550 individuals (Burke et al., 2025) (breeding and non-breeding seasons). No reliable county population estimates available (IWeBS surveys massively underestimate snipe). River Little Brosna Callows NHA: no reliable population estimates available (IWeBS surveys give a mean peak count of one bird and these survey types are known to underestimate snipe) Woodville Woods pNHA population: no estimate given in site synopsis; not an IWeBS count site. Majority of pNHA is woodland; the lake has shrunk considerably since the site synopsis so likely not suitable for snipe anymore. Lough Nahinch (Tipperary) pNHA population: no estimate given in site synopsis and IWeBS data request did not show any snipe records present.	County (breeding and non-breeding)	Peak count of 5 and 2 individuals is <1% of ROI non-breeding and breeding populations, respectively (0.058% and 0.02%). No population estimates available for Woodville Woods pNHA and Lough Nahinch (Tipperary) pNHA. Confirmed on-site breeding, repeated low-level use across multiple seasons, and regular CRZ/PCH flight activity, combined with Red List status. Based on the above, the site is evaluated as being of county importance for this species (both seasons).	Y

Feature Type	Feature	Feature Information	Value	Justification for Evaluation	Important Ecological Feature? Y/N
		<p>Roscrea Bog pNHA: no population estimate given in site synopsis and not an IWeBS site so no information available.</p> <p>Regular CRZ flight activity across three seasons, time spent at PCH and within the CRZ. Confirmed breeding on site in B23 >500m from proposed infrastructure; possible breeding offsite with closest c. 500m from proposed infrastructure in B24; occasional low-numbers foraging within/near site in the breeding season; non-breeding-season use confined to off-site locations with no on-site usage at night.</p>			
	Eurasian curlew	<p>BoCCI 4: Red list (breeding and non-breeding).</p> <p>ROI population: 138 pairs (EIONET, 2025) and 31,710 (Burke et al., 2025) individuals (breeding and non-breeding, respectively). County population: 239.9 individuals (Bird Watch Ireland, 2026) (non-breeding). No reliable breeding season county population estimate available.</p> <p>2 individuals off-site (>500 m) and a flyover off-site (B22); one heard-only, unlocated non-breeding record (NB22-23). No site usage recorded either season. Offsite observation made in B23 c.1.7km from proposed infrastructure.</p>	Local (breeding and non-breeding)	<p>Peak count of 2 individuals <1% of ROI breeding population (0.72%).</p> <p>Despite Red List status, no confirmed site usage is recorded for this species (off-site/flyover/heard-only records only, well beyond any potential disturbance distance).</p> <p>Based on the above, it is evaluated that the site is of local importance for this species (both seasons).</p>	N
	Eurasian sparrowhawk	<p>BoCCI 4: Green list.</p> <p>ROI population: 11,859 individuals (breeding and non-breeding) (EIONET, 2025). No reliable county population estimate available.</p> <p>Regular low-level incidental activity in both seasons. No confirmed breeding; not recorded B23–B24.</p>	Local (breeding and non-breeding)	<p>Peak count of 1 individual is <1% of ROI population (0.008%).</p> <p>Common, Green-listed species with no confirmed on-site breeding. Based on the above, the site is evaluated as</p>	N

Feature Type	Feature	Feature Information	Value	Justification for Evaluation	Important Ecological Feature? Y/N
				being of local importance for this species (both seasons).	
	Eurasian teal	<p>BoCCI 4: Amber list (breeding and non-breeding).</p> <p>ROI and county non-breeding populations: 37,480 (Burke et al., 2025) and 1,962.75 individuals (Bird Watch Ireland, 2026), respectively.</p> <p>ROI breeding population: 531 pairs (EIONET, 2025). No reliable breeding season county population estimates available.</p> <p>River Little Brosna Callows NHA population: 1,809 individuals (Bird Watch Ireland, 2026).</p> <p>Minimal, single-season flight activity, time spent at PCH and within the CRZ in breeding season. 35 individuals recorded during feeding distribution surveys (NB24/25) c.1.7km northwest of site.</p>	County (breeding and non-breeding)	<p>Peak count of 35 individuals is <1% of ROI non-breeding population (0.093%) and >1% of county non-breeding population (1.78%).</p> <p>Peak count of 3 individual is <1% of ROI breeding population (0.282%).</p> <p>Peak count of 35 individuals is >1% of River Little Brosna Callows NHA population (1.9%) but recorded off-site.</p> <p>Very low-volume, breeding season activity with no evidence of breeding or regular foraging use on site. The higher peak count was off-site in the non-breeding season.</p> <p>Based on the above, the site is evaluated as being of county importance for this species (both seasons) as a precaution due to presence of a collision impact pathway.</p>	Y
	Eurasian whimbrel	BoCCI 4: Green-listed.	Local (migration season)	Peak count of 1 individual is <% of ROI population (0.59%) but ROI population likely to be an underestimate.	N

Feature Type	Feature	Feature Information	Value	Justification for Evaluation	Important Ecological Feature? Y/N
		ROI population: 169 individuals (Burke et al., 2025) (non-breeding/migratory). No reliable county population estimate available. Single incidental record (B24), 1 individual flying c.1.7km northwest of site - a single flyover, likely a migrating individual. No site usage.		Single passage record only, no site usage. Based on the above, the site is evaluated as being of local importance to this species (migration).	
	Eurasian wigeon	BoCCI 4: Amber list (breeding and non-breeding). ROI and county populations: 60,890 (Burke et al., 2025) and 5,250.8 (Bird Watch Ireland, 2026) individuals, respectively. River Little Brosna Callows NHA population: 4,935.8 individuals (Bird Watch Ireland, 2026). Suck River Callows NHA population: 1,251.2 individuals (Bird Watch Ireland, 2026). 26 individuals recorded at Dovegrove Callows SPA during NB23/24 feeding distribution surveys only. No site usage.	Local (non-breeding)	Peak count of 26 individuals off-site is <1% of ROI (0.0427%) and <1% county (0.49%) populations, respectively. Peak count is <1% of River Little Brosna Callows NHA population (0.527%) and >1% of Suck River Callows NHA population (2.08%). Off-site wintering flock with no site usage. Based on the above, the site is evaluated as being of local importance for this species (non-breeding).	N
	Eurasian woodcock	BoCCI 4: Red list (breeding). ROI breeding population: 27,434 males (so assumed 54,868 individuals) (O'Neill, 2024). No reliable county population estimate available. 5 individuals recorded during dedicated B24 breeding woodcock surveys (no dedicated surveys B22–B23),	Local (breeding)	Peak count of 2 individuals is <1% of ROI population (0.0036%). Probable breeding >700m from site infrastructure (three territories) by a Red-listed,	N

Feature Type	Feature	Feature Information	Value	Justification for Evaluation	Important Ecological Feature? Y/N
		between 700m to >1.7 km from site. Probable breeding off-site (three territories, the closest is 700m from wind farm site).		declining species. No flight activity recorded in CRZ. Based on the above, the site is evaluated as being of local importance for this species (breeding).	
	European golden plover	Annex I and BoCCI 4: Red list (breeding and non-breeding). ROI and county population: 81,190 (Burke et al., 2025) and 8,490.3 (Bird Watch Ireland, 2026) individuals, respectively. River Little Brosna Callows NHA population: 6,934.8 individuals (Bird Watch Ireland, 2026). Time spent at PCH and within the CRZ. Likely birds on migration.	County (non-breeding / migratory)	Peak count of 56 individuals is <1% of ROI (0.068%) and <1% of county (0.66%) populations, respectively. Peak count is <1% of River Little Brosna Callows NHA (0.44%). CRZ/PCH presence by an Annex I, Red-listed species. On the basis of the above, the site is evaluated as being of county importance for the species as a precaution (non-breeding / migratory).	Y
	Great black-backed gull	BoCCI 4: Green list. ROI population: 3,081 pairs (EIONET, 2025). No reliable county population estimates available. Minor incidental activity only (3 periods, B22, within Site and buffer).	Local (breeding)	Peak count of 2 individuals is <1% of ROI population (0.03%). Common, Green-listed species with negligible site use. Based on the above, the site is evaluated as being of local importance for this species (breeding).	N
	Great cormorant	BoCCI 4: Amber list (breeding and non-breeding).	County (non-breeding)	Peak count of 2 individuals is <1% of ROI population (0.02%)	Y

Feature Type	Feature	Feature Information	Value	Justification for Evaluation	Important Ecological Feature? Y/N
		<p>ROI and county population: 8,670 (Burke et al., 2025) and 14.75 (Bird Watch Ireland, 2026) individuals, respectively.</p> <p>Minimal non-breeding flight activity, time spent at PCH and within the CRZ; a single further NB23/24 record (1 period). Separately recorded at Dovegrove Callows SPA (NB24/25, peak 2) with no site usage.</p>		<p>and >1% of county population (13.56%), respectively.</p> <p>Very low-volume, non-breeding activity, sometimes associated with the nearby SPA; however, a potential collision-related impact pathway exists.</p> <p>Based on the above, the site is evaluated as being of county importance for this species (non-breeding).</p>	
	Great crested grebe	<p>BoCCI 4: Amber list (breeding and non-breeding).</p> <p>ROI population: 2,000 breeding individuals (EIONET, 2025). No reliable county population estimate available.</p> <p>Single incidental record (B24, peak 2) at a lake c. 1.7km northwest of site; probable breeding, but off-site. No site usage; not recorded B22–B23.</p>	Local (breeding)	<p>Peak count of 2 individuals is <1% of ROI population (0.1%).</p> <p>No site usage; breeding is off-site. Based on the above, the site is evaluated as being of local importance.</p>	N
	Great white-egret	<p>Annex I – not assessed under BoCCI 4.</p> <p>ROI population: 5 individuals (Burke et al., 2025); likely an underestimate as number relates to number of records and not a population estimate). No reliable county population estimate available.</p> <p>Single low-level record through the CRZ, time spent within the CRZ but not at PCH. Separately recorded on B24 incidental surveys and NB24/25 feeding distribution surveys at the same off-site location (lake c. 1.7km</p>	Local (breeding and non-breeding)	<p>As no reliable population estimates available, no percentage calculation of ROI and county populations possible.</p> <p>Single, low-volume record with no PCH presence and no confirmed site usage; associated off-site location. Local importance despite Annex I status.</p>	N

Feature Type	Feature	Feature Information	Value	Justification for Evaluation	Important Ecological Feature? Y/N
		northwest of site). No confirmed site usage in any season.			
	Grey heron	<p>BoCCI 4: Green list.</p> <p>ROI and county non-breeding populations: 1,930 (Burke et al., 2025) and 26.15, respectively (Bird Watch Ireland, 2026).</p> <p>ROI breeding population: 3,087 pairs (EIONET, 2025). No reliable county breeding estimates available.</p> <p>Regular but low-level flight activity across all survey seasons.</p> <p>Regular but very low-level non-breeding activity (NB22/23–NB24/25 feeding distribution surveys, peak 1; a further single NB23/24 record) associated mostly with the lake c. 1.7km m northwest of the site and Dovegrove Callows SPA. No site usage; not recorded breeding.</p>	Local (non-breeding)	<p>Peak count of 2 individuals is <1% of ROI (0.104%) and >1% of county non-breeding populations (7.65%), respectively. Peak count is <1% of ROI breeding population (0.03%).</p> <p>Records are associated with an off-site lake and SPA c. 1.7km from the site, with no site usage or breeding recorded; activity on site is limited to low-level, infrequent flight records.</p> <p>On this basis the site itself is considered of local importance to this population, notwithstanding the county-level population threshold met by the wider non-breeding population</p>	N
	Greylag goose	<p>BoCCI 4: Amber list (non-breeding population).</p> <p>ROI and county population: 3,480 (Burke et al., 2025) and 292.4 individuals, respectively (Bird Watch Ireland, 2026).</p> <p>Non-breeding season activity; seen in a single month and single season only. Considered most likely to be of resident/naturalised origin, consistent with regional I-WeBS data (Burke et al., 2025), which shows no sites supporting the Icelandic-breeding population within</p>	Local (non-breeding)	<p>Peak count of 9 individuals is <1% of ROI population (0.259%) and >1% of county population (3.078%).</p> <p>Notwithstanding the county population threshold met by the peak count, this single transit record, without evidence of site usage, feeding or loafing, is not</p>	N

Feature Type	Feature	Feature Information	Value	Justification for Evaluation	Important Ecological Feature? Y/N
		the wider Offaly/Tipperary/Laois/Kildare area, but several resident populations in the wider area.		<p>considered sufficient to demonstrate functional reliance on the site by this population.</p> <p>The resident / naturalised population is common, Amber-listed, and increasing regionally and nationally (Burke et al., 2025), so there is no basis for raising this evaluation on conservation status grounds.</p> <p>The site is therefore considered to be of local importance to this species (non-breeding)</p>	
	Hen harrier	<p>Annex I and BoCCI 4: Amber list (breeding).</p> <p>ROI population: 170 (Ruddock et al., 2024) and 373 individuals (EIONET, 2025) for the breeding and non-breeding populations, respectively. No reliable county population estimate available.</p> <p>Non-breeding-season CRZ/PCH activity recorded in both winters (5 flight lines NB22/23, 2 flight lines NB23/24; cumulative 7 birds); no breeding-season flight activity and no confirmed breeding or roosting recorded on distribution/abundance surveys.</p>	County (non-breeding)	<p>Peak count of 1 individual is <1% of ROI population (0.27%).</p> <p>Repeated non-breeding CRZ/PCH presence across two winters by an Annex I species.</p> <p>On the basis of the above, the site is evaluated as being of county importance for the species (non-breeding).</p>	Y
	Herring gull	<p>BoCCI 4: Amber list (breeding and non-breeding).</p> <p>ROI and county population: 10,333 individuals (EIONET, 2025) and 1.2 individuals (Bird Watch Ireland, 2026), respectively. The county estimate is unlikely to be</p>	Local (breeding)	<p>Peak count of 8 individuals is <1% of ROI population (0.077%).</p> <p>Incidental activity only, no confirmed breeding.</p>	N

Feature Type	Feature	Feature Information	Value	Justification for Evaluation	Important Ecological Feature? Y/N
		reliable as gulls are not consistently recorded under the IWeBS scheme. Regular breeding-season incidental activity only (4 periods B22, peak 8, May–June; 3 periods B23, peak 5, July), within site and buffer. No confirmed on-site breeding.		Based on the above, the site is evaluated as being of local importance for this species.	
	House martin	BoCCI 4: Amber list (breeding). ROI population: 606,043 individuals (Lewis et al., 2019). No reliable county population estimate available. 30 individuals recorded incidentally (B24) foraging over the site near a turbine location. Non-breeding at this location; nearest suitable nesting buildings identified c. 900 m north of infrastructure.	Local (breeding)	Peak count of 30 individuals is <1% of ROI population (0.00495%). Occasional foraging use only, nesting off-site. Based on the above, the site is evaluated as being of local importance for this species (breeding).	N
	Lesser black-backed gull	BoCCI 4: Amber list (breeding and non-breeding). ROI and county population: 11,842 individuals (EIONET, 2025) and 11.8 individuals (Bird Watch Ireland, 2026), respectively. The county estimate is unlikely to be reliable as gulls are not consistently recorded under the IWeBS scheme. Regular breeding-season incidental activity (10 periods B22, peak 4, all months, within site and buffer; 2 periods B23, peak 4, April). Separately, moderate numbers associated with the off-site lake c. 1.7km north of the site in both seasons (peak 46 B, 50 NB), no regular site usage; non-breeding B24.	Local (breeding and non-breeding)	Peak off-site count of 50 individuals is <1% of ROI population (0.42%). Regular but non-breeding activity, associated mainly with an off-site lake. Based on the above, the site is evaluated as being of local importance for this species (both seasons).	N

Feature Type	Feature	Feature Information	Value	Justification for Evaluation	Important Ecological Feature? Y/N
	Linnet	<p>BoCCI 4: Amber list (breeding).</p> <p>ROI population: 459,892 individuals (Lewis et al., 2019). No reliable county population estimate available.</p> <p>3 individuals recorded incidentally (B24) within the site near a turbine location; suitable breeding habitat present nearby, likely used for foraging and breeding on site. Probable breeding B24.</p>	Local (breeding)	<p>Peak count of 3 individuals is <1% of ROI population (0.0007%).</p> <p>Small numbers, probable on-site breeding, but a common and widespread species nationally.</p> <p>Based on the above, the site is evaluated as being of local importance to this species (breeding).</p>	N
	Little egret	<p>Annex I and BoCCI 4: Green list.</p> <p>ROI and county population: 1,140 (Burke et al., 2025) and 18.85 individuals (Bird Watch Ireland, 2026).</p> <p>Low-level, single-season CRZ flight activity, time spent at PCH and within the CRZ. Separately recorded incidentally B22 (off-site, >500 m) and on B24 breeding wader surveys (>1.7km NW of the site) and NB23/24 feeding distribution surveys (Dovegrove Callovs SPA); no site usage recorded in distribution/abundance surveys; possible breeding B24 (off-site).</p>	Local (breeding and non-breeding)	<p>Peak count of 2 individuals is <1% of ROI population (0.175%) and >1% of county population (10.67%).</p> <p>Low-volume, inconsistent activity with no confirmed on-site breeding.</p> <p>Based on the above, the site is of local importance for the species (both seasons) but taken forward as an IEF as a precaution given Annex I status and potential collision risk pathway.</p>	Y
	Mallard	<p>BoCCI 4: Amber list (breeding and non-breeding).</p> <p>ROI and county population: 17,560 (Burke et al., 2025) and 564 (Bird Watch Ireland, 2026) individuals, respectively.</p>	County (breeding and non-breeding)	<p>Peak off-site count of 22 birds is <1% of ROI population (0.125%) and >1% of county population (3.9%).</p> <p>Regular low-level activity with occasional on-site foraging</p>	Y

Feature Type	Feature	Feature Information	Value	Justification for Evaluation	Important Ecological Feature? Y/N
		Low-level flight activity across two seasons, time spent at PCH and within the CRZ. Regular incidental activity year-round (peak 19 B, 22 NB) associated mainly with an off-site lake c. 1.7km north of the site and Dovegrove Callows SPA; occasional diurnal foraging recorded within the site in the non-breeding season; confirmed breeding off-site at the lake (B24).		but breeding and the bulk of use are off-site. Based on the above, the site is evaluated as being of county importance for the species (both seasons) as a precaution.	
	Merlin	Annex I and BoCCI 4: Amber list (breeding). ROI population: 400 birds (EIONET, 2025). No reliable county population estimate available. Single-season, low-volume non-breeding CRZ/PCH activity only. No confirmed breeding or roosting recorded on distribution/abundance surveys.	County (non-breeding)	Peak count of 1 individual is <1% of ROI population (0.25%). Low count and single-season records. Based on the above, the site is evaluated as being of county importance for this species (non-breeding) as a precaution, given Annex I status.	Y
	Mute swan	BoCCI 4: Amber list (breeding and non-breeding). ROI and county population: 7,940 (Burke et al., 2025) and 220.5 individuals, respectively (Bird Watch Ireland, 2026). 5 individuals recorded at Dovegrove Callows SPA and an off-site lake c. 1.7km north of the site (NB23/24–NB24/25 feeding distribution surveys; incidental nocturnal wader survey NB24/25). No site usage; not recorded B23–B24.	Local (breeding and non-breeding)	Peak count of 5 individuals is <1% of ROI population (0.063%) and >1% of county population (2.27%). No site usage; SPA/off-site lake association only. Based on the above, the site is evaluated as being of local importance for this species (both seasons).	N
	Northern lapwing	BoCCI 4: Red list (breeding and non-breeding). ROI population: 1,040 (EIONET, 2025) and 67,700 (Burke et al., 2025) individuals for the breeding and non-	National (breeding) / county (non-breeding)	Peak on-site count of 11 individuals (breeding season) is >1% of ROI breeding population (1.06%).	Y

Feature Type	Feature	Feature Information	Value	Justification for Evaluation	Important Ecological Feature? Y/N
		<p>breeding ROI populations, respectively. County population (non-breeding estimate available only): 7,044.2 individuals (Bird Watch Ireland, 2026).</p> <p>River Little Brosna Callows NHA population: 4,787.2 individuals (Bird Watch Ireland, 2026).</p> <p>The highest flight activity of any primary target species, recorded in all four survey periods (95/11/17/6 flight lines; cumulative 255 birds), time spent at PCH and within the CRZ. Repeated use of suitable on-site habitat for breeding and foraging. A probable territory and territorial behaviour was recorded in B22–B23; probable breeding in all three breeding seasons (the territory appears to have moved westwards across the years; the latest survey season showed a pair c.500m from the development footprint). Large non-breeding flocks (up to 400) recorded off-site at Dovegrove Callows SPA and nearby.</p>		<p>Peak off-site count of 400 individuals (non-breeding season) is <1% of ROI population (0.59%) and >1% of county population (5.67%).</p> <p>Non-breeding peak count >1% of River Little Brosna Callows NHA population (8.36%).</p> <p>Repeated on-site, probable breeding territory across three seasons and the highest CRZ flight activity and cumulative bird count of any primary target species, and Red List status.</p> <p>Based on the above, the site is evaluated as being of national and county importance for this species (breeding and non-breeding seasons, respectively).</p>	
	Northern raven	<p>BoCCI 4: Green list.</p> <p>ROI population: 55,878 individuals (EIONET, 2025). No reliable county population estimate available.</p> <p>Regular low-level flyover activity recorded in all four seasons; feeding distribution surveys (NB22/23–NB24/25) confirm flyovers only, no site usage. Not recorded breeding.</p>	Local (breeding and non-breeding)	<p>Peak count of 4 individuals is <1% of ROI population (0.007%).</p> <p>Common, Green-listed species with flyover activity only.</p> <p>Based on the above, the site is evaluated as being of local importance (both seasons).</p>	N

Feature Type	Feature	Feature Information	Value	Justification for Evaluation	Important Ecological Feature? Y/N
	Peregrine falcon	<p>Annex I and BoCCI 4: Green list.</p> <p>ROI population: 850 individuals (EIONET, 2025). No reliable county population estimate available.</p> <p>Low-volume flight activity recorded in three of four seasons, time spent at PCH and within the CRZ. Confirmed/probable breeding activity (courtship displays) recorded off-site at Loughnane Quarry, c. 2.2 km from infrastructure (B22 possible, B23 probable); non-breeding-season records are single flyovers with no site usage.</p>	County (breeding and non-breeding)	<p>Peak count of 4 individuals is <1% of ROI population (0.47%).</p> <p>Regular but low-volume CRZ activity; possible / probable breeding is off-site (c.2.2 km away) and no regular on-site foraging is evident.</p> <p>Based on the above, the site is evaluated as being of county importance to the species (both seasons) given that there is collision risk posed to a nearby breeding pair.</p>	Y
	Sandwich tern	<p>Annex I and BoCCI 4: Amber list (breeding).</p> <p>ROI population: 5,038 birds (EIONET, 2025). No reliable county population estimate available.</p> <p>Single incidental record (B22), 1 individual heard off-site (>500 m), interpreted as a passage migrant; no site usage.</p>	Local (breeding)	<p>Peak count of 1 individual is <1% of ROI population (0.02%).</p> <p>Single passage record only, no site usage.</p> <p>Based on the above, the site is evaluated as being of local importance for this species (breeding).</p>	N

Feature Type	Feature	Feature Information	Value	Justification for Evaluation	Important Ecological Feature? Y/N
	Whooper swan	<p>Annex I and BoCCI 4: Amber list (non-breeding).</p> <p>ROI and county population: 14,467 (Burke et al., 2021) and 518.85 (Bird Watch Ireland, 2026) individuals, respectively.</p> <p>River Little Brosna Callows NHA population: 275.6 individuals (Bird Watch Ireland, 2026).</p> <p>Suck River Callows NHA population: 183.4 individuals (Bird Watch Ireland, 2026).</p> <p>Minimal CRZ flight activity, time spent within the CRZ but not at PCH. A single sighting of 3 individuals within the site (c. 465 m from infrastructure, NB23/24–NB24/25), interpreted as an occasional, flood-related presence rather than regular site usage; other records are associated with Dovegrove Callows SPA or elsewhere (seen on only two occasions, low numbers).</p>	County (non-breeding)	<p>Peak count of 5 individuals (off-site) is <1% of ROI and county population (0.035% and 0.963%, respectively).</p> <p>Peak count is >1% of River Little Brosna Callows NHA population (1.81%) and River Suck Callows NHA population (2.73%).</p> <p>Occasional, weather-dependent, single-visit use of the site by small numbers, primarily an offsite-associated wintering population.</p> <p>Based on the above, the site is evaluated as being of county importance to the species (non-breeding) as a precaution given the Annex I status of the species.</p>	Y
	Willow warbler	<p>BoCCI 4: Amber list (breeding).</p> <p>ROI population: 1,721,483 individuals (Lewis et al., 2019). No reliable county population estimates available.</p> <p>4 individuals recorded incidentally (B24) c. 1.7km northwest of site; suitable nesting habitat present, likely used for breeding and foraging. Possible breeding B24; not recorded B22–B23.</p>	Local (breeding)	<p>Peak count of 4 individuals is <1% of ROI population (0.0002%).</p> <p>Small numbers, possible breeding off-site, a common and widespread Amber-list species.</p> <p>Based on the above, the site is evaluated as being of local importance for this species (breeding).</p>	N

Feature Type	Feature	Feature Information	Value	Justification for Evaluation	Important Ecological Feature? Y/N
	Yellowhammer	<p>BoCCI 4: Red list (breeding).</p> <p>ROI population: 217,252 individuals (Lewis et al., 2019). No reliable county population estimate is available.</p> <p>Single incidental record (B23), 1 individual off-site, c. 500 m from infrastructure, associated with off-site hedgerows; no site usage. Probable breeding off-site (B23); not recorded B22/B24.</p>	Local (breeding)	<p>Peak count of 1 individual is <1% of ROI population (0.0005%).</p> <p>No site usage identified despite Red List status; single off-site record only.</p> <p>Based on the above, the site is evaluated as being of local importance for this species (breeding).</p>	N
Terrestrial Mammals (Excluding Bats)	Badger	<p>Wildlife Act (1976 and as amended, 2000); Red list: Least Concern;</p> <p>ROI population: 84,000 individuals (Marnell, Looney, & Lawton, 2019);</p> <p>County Offaly population: 2,391 individuals (estimated);</p> <p>Baseline surveys: No badger setts, nor signs of badger were recorded within 150m of proposed infrastructure during surveys.</p>	Local	No evidence of badger or badger setts were recorded within the survey areas.	N
	Pine marten	<p>Annex V Habitats Directive;</p> <p>Wildlife Act (1976 and as amended, 2000); Red list: Least Concern;</p> <p>ROI population: 3,000 individuals (Marnell, Looney, & Lawton, 2019) but thought to be significantly underestimated;</p> <p>County Offaly population: 224 individuals (but likely underestimated);</p> <p>Baseline surveys: no dens were recorded within 150 m of any proposed infrastructure.</p>	County / Regional	No pine marten dens nor suitable habitat for the species (i.e. secure, elevated, and quiet spaces such as mature deciduous or mixed woodlands) were recorded near any proposed infrastructure.	N
	Red squirrel	<p>Wildlife Act (1976 and as amended, 2000); Red list: Least Concern;</p> <p>ROI population: 40,000 individuals (Marnell, Looney, & Lawton, 2019);</p> <p>County Offaly population: 1,139 individuals;</p>	Local	No red squirrel dreys or signs were recorded near any proposed infrastructure.	N

Feature Type	Feature	Feature Information	Value	Justification for Evaluation	Important Ecological Feature? Y/N
		Baseline surveys: no dreys were recorded within 150 m of proposed infrastructure.			
	Eurasian otter	Annex II and IV Habitats Directive; Wildlife Act (1976 and as amended, 2000); Red list: Least Concern; ROI population: 16,000-22,000 individuals (Marnell, Looney, & Lawton, 2019); County Offaly population: 780–1072 individuals (estimated); River Shannon Callows SAC population: no information available; River Shannon Callows pNHA population: no information available; Baseline surveys: Otter signs (typically spraints) were identified at a total of 4 no. sites on the Rapemills River at sites A1, A4, A7 and near site A3. No breeding (holts) areas were identified in the 150 m vicinity of any of the survey sites.	County / Regional importance (population near project – spraint but no direct observations of downstream populations recorded)	Otters are a QI species for the River Shannon Callows SAC, and River Shannon Callows pNHA, and it is likely that ex-situ populations are present in the Rapemills river. Otter spraints were recorded at site A1, A4, A7 and near site A3 along the Rapemills river, 720m, 1000m, 3293m, and 862m downstream of the project boundary respectively. If the number of aquatic survey sites with otter signs represents a likely estimate of the population at the project (N=4), then this population is not significant in the context of the ROI population (0.02-0.03%) or the County Offaly population (0.37-0.51%).	Y
	Irish hare	Wildlife Act (1976 and as amended, 2000); Red list: Least Concern; ROI population: 223,000 individuals (Marnell, Looney, & Lawton, 2019); County Offaly population: 12,071 individuals (estimated); Baseline surveys: None recorded during surveys, but both desktop records and suitable habitat present along the proposed UGL location.	Local	None recorded during surveys and. Suitable foraging is present within the wider landscape. This species has the best possible conservation status i.e. is common and widespread. Based on the above, the population within the study area is of local importance.	Y
	West European hedgehog	Wildlife Act (1976 and as amended, 2000); Red list: Least Concern;	Local	While no hedgehogs were recorded during surveys, there are desktop records available	Y

Feature Type	Feature	Feature Information	Value	Justification for Evaluation	Important Ecological Feature? Y/N
		ROI population: there is no population estimate available (Marnell, Looney, & Lawton, 2019); County Offaly population: no estimate available; Baseline surveys: none recorded but desktop records and suitable habitat present.		and suitable habitat (e.g. hedgerows and woodland edges) is present within the study area. These habitats are widespread and common in the wider area. This species has the best possible conservation status i.e. is common and widespread. Based on the above, the population within the study area is of local importance.	
	Fallow deer	Wildlife Act (1976 and as amended, 2000); Red list: Least Concern; ROI population: there is no population estimate available (Marnell, Looney, & Lawton, 2019); County Offaly population: no estimate available; Baseline surveys: none recorded.	Local	No deer recorded and more suitable habitat is present within the wider environment (e.g. forestry, woodland, grassland). These habitats are widespread and common in the wider area. This species has the best possible conservation status i.e. is common and widespread.	N
	Pygmy shrew	Wildlife Act (1976 and as amended, 2000); Red list: Least Concern; ROI population: there is no population estimate available (Marnell, Looney, & Lawton, 2019); County Offaly population: no estimate available; Baseline surveys: none recorded.	Local	No pygmy shrew were recorded. However, there is suitable habitat for the species (including grassland, hedgerows) This species has the best possible conservation status i.e. is common and widespread.	Y
	Irish stoat	Wildlife Act (1976 and as amended, 2000); Red list: Least Concern; ROI population: there is no population estimate available (Marnell, Looney, & Lawton, 2019); County Offaly population: no estimate available; Baseline surveys: none recorded.	Local	No Irish stoat were recorded. Suitable habitat for the species was limited to hedgerows as they tend to avoid open habitats (which make up most of the survey areas). This	Y

Feature Type	Feature	Feature Information	Value	Justification for Evaluation	Important Ecological Feature? Y/N
				species has the best possible conservation status i.e. is common and widespread.	
	All other mammal species	Not protected under Wildlife Act (1976 and as amended 2000)	Site	Afforded no legal protection and/or have best possible conservation status – widespread and common, so do not require further assessment	N
Bats	Common pipistrelle	Annex IV Habitats Directive; Wildlife Act (1976 and as amended, 2000); Red list: Least Concern; ROI population: 1 – 2 million individuals (Marnell, Looney, & Lawton, 2019)); County Offaly population: “55965 - 111929 individuals (estimated)”; Baseline surveys: Recorded by ground-level detectors across all seasons and turbine locations. The mean bat passes/night across all turbine locations was 599, 49.54, 24.60 for spring, summer, and autumn, respectively. No roosts were recorded for this species.	Local	Moderate (Ecobat) levels of activity within the study area. No roosts within the works footprint. Based on the above, the population within the study area is of local importance.	Y
	Soprano pipistrelle	Annex IV Habitats Directive; Wildlife Act (1976 and as amended, 2000); Red list: Least Concern; ROI population: 0.54 – 1.2 million individuals (Marnell, Looney, & Lawton, 2019)); County Offaly population: 28500 - 63333 individuals (estimated); Baseline surveys: Recorded by ground-level detectors across all seasons and turbine locations. The mean bat passes/night across all turbine locations was 165, 13, 27 for spring, summer, and autumn, respectively. No roosts were recorded for this species.	Local	Moderate (Ecobat) levels of activity within the study area. Based on the above, the population within the study area is of local importance.	Y

Feature Type	Feature	Feature Information	Value	Justification for Evaluation	Important Ecological Feature? Y/N
	Leisler's bat	Annex IV Habitats Directive; Wildlife Act (1976 and as amended, 2000); Red list: Least Concern; ROI population: 81,000 – 103,000 individuals (Marnell, Looney, & Lawton, 2019)); County Offaly population: 3784 – 7027 individuals (estimated); Baseline surveys: Recorded by ground-level detectors across all seasons and turbine locations. The mean bat passes/night across all turbine locations was 273, 22, and 54 for spring, summer, and autumn, respectively. No roosts were recorded.	Local	Moderate (Ecobat) levels of activity within the study area. Based on the above, the population within the study area is of local importance.	Y
	Nathusius's pipistrelle	Annex IV Habitats Directive; Wildlife Act (1976 and as amended, 2000); Red list: Least Concern; ROI population: 10,000 – 18,000 individuals (Marnell, Looney, & Lawton, 2019) or 100 x 1 km ² cells (NPWS, 2019); County Offaly population: 3784 – 7027 individuals (estimated) Baseline surveys: Recorded by ground-level detectors across all seasons but not all turbine locations. The mean bat passes/night across all turbine locations was 92, 5, and 3 for spring, summer and autumn respectively. No roosts were recorded.	County / Regional	Very low levels of activity within study area. No roosts recorded. Number of grid cells species likely present in is reasonably low. Based on the above, the population within the study area is of county / regional importance.	Y
	Brown-long eared bat	Annex IV Habitats Directive; Wildlife Act (1976 and as amended, 2000); Red list: Least Concern; ROI population: 64,000 – 115,000 individuals (Marnell, Looney, & Lawton, 2019); County Offaly population: 2239 – 4023 individuals (estimated); Baseline surveys:	Local	Very low levels of activity within the study area. Based on the above, the population within the study area is of local importance.	Y

Feature Type	Feature	Feature Information	Value	Justification for Evaluation	Important Ecological Feature? Y/N
		Recorded by ground-level detectors across all turbine locations and seasons. The mean bat passes/night never exceeded 5 across all turbine locations and seasons. No roosts were recorded.			
	Daubenton's bat	Annex IV Habitats Directive; Wildlife Act (1976 and as amended, 2000); Red list: Least Concern; ROI population: 81,000 – 103,000 individuals (Marnell, Looney, & Lawton, 2019); County Offaly population: 4023 – 5116 individuals (estimated); Baseline surveys: The mean bat passes/night was mainly <5 across all turbine locations and seasons except for autumn at T9 where it was 17.3. No roosts were recorded.	Local	Very low levels of activity within the study area. Based on the above, the population within the study area is of local importance.	Y
	Natterer's bat	Annex IV Habitats Directive; Wildlife Act (1976 and as amended, 2000); Red list: Least Concern; ROI population: 5000 (Marnell, Looney, & Lawton, 2019)); County Offaly population: 290 (estimated); Baseline surveys: Recorded by ground-level detectors across all seasons and all turbine locations. The mean bat passes/night never exceeded 2 across all turbine locations and seasons. No roosts were recorded.	Local	Very low levels of activity within the study area. Based on the above, the population within the study area is of local importance.	Y
	Whiskered bat	Annex IV Habitats Directive; Wildlife Act (1976 and as amended, 2000); Red list: Least Concern; ROI population: 5000 (NPWS, 2019); County Offaly population: 160 (estimated); Baseline surveys:	Local	Very low levels of activity within the study area. Based on the above, the population within the study area is of local importance.	Y

Feature Type	Feature	Feature Information	Value	Justification for Evaluation	Important Ecological Feature? Y/N
		Recorded by ground-level detectors across all seasons and all turbine locations. The mean bat passes/night never exceeded 2 across all turbine locations and seasons. No roosts were recorded.			
Other protected fauna	Common lizard	Wildlife Act (1976 and as amended, 2000); Red list: Least Concern; ROI population: None available. County Offaly population: None available. Baseline surveys: not recorded during surveys; however, there was some suitability for lizard at south-facing, damp tussocky grassland, scrub, banks, and bogs.	Local	While no common lizard were recorded during surveys, it is likely damp habitats afford breeding and foraging opportunities for this species throughout the project. This species has the best possible conservation status. Based on the above, the population within the study area is of local importance.	Y
	Common frog	Annex V Habitats Directive; Wildlife Act (1976 and as amended, 2000); Red list: Least Concern; ROI population: 150,000,000 (King, et al., 2011); County Offaly population: 7,843,137; Baseline surveys: not recorded during surveys; however, there was some suitability for frogs at drainage ditches and wet grassland habitats.	Local	While no frogs were recorded during surveys, it is likely damp habitats afford breeding and foraging opportunities for this species throughout the project. This species has the best possible conservation status. Based on the above, the population within the study area is of local importance.	Y
	Smooth newt	Wildlife Act (1976 and as amended, 2000); Red list: Least Concern; ROI population: no estimates available but thought to be stable (King, et al., 2011); County Offaly population: no estimates available; Baseline surveys: not recorded during surveys.	Local	Not recorded during surveys. However, it is likely suitable foraging and breeding habitat is available within the study area in the form of damp grassland, drainage ditches and ephemeral puddles. Much of this habitat is also available within the wider	Y

Feature Type	Feature	Feature Information	Value	Justification for Evaluation	Important Ecological Feature? Y/N
				landscape. This species has the best possible conservation status i.e. it is common and widespread. Based on the above, the population within the study area is of local importance.	
	Marsh fritillary	Annex II Habitats Directive; Annex II Berne Convention; Red list: Vulnerable; ROI population: 248 x 1 km ² grid squares (NPWS, 2019). County Offaly population: 6 x 1 km ² grid squares (estimated). Baseline surveys: No suitable habitat or larvae recorded during targeted survey.	County / Regional	While any population of this species is of high value, there was no suitable habitat within the Project Site, nor evidence of the species.	N
	All other invertebrate species.	Not protected under Wildlife Act (1976 and as amended 2000)	Site	Threatened and near threatened Irish odonate species are associated with habitats not recorded within the study area. The species recorded are afforded no legal protection and/or have best possible conservation status. They are widespread and common, so do not require further assessment.	N
Fisheries and Aquatic Ecology	Atlantic salmon	Annex II and V of Habitats Directive; Red list status: Vulnerable; ROI population: 250,000 individuals (King, et al., 2011). County Offaly population: 7270 individuals (estimated); Baseline surveys: No live sighting, but eDNA detected at sample location A8 was positive for the species. This sample location is ca. 11.37km downstream of the site boundary. None of the sample locations closer to the site tested positive for the species.	Local	Without an estimate, the precautionary principle is taken and it is assumed the downstream salmon population is significant at local importance.	Y

Feature Type	Feature	Feature Information	Value	Justification for Evaluation	Important Ecological Feature? Y/N
	Brown trout	Red list status: Least Concern; ROI population: no estimates available (King, et al., 2011); County Offaly population: no estimate available; Baseline surveys: Recorded at sample sites A1, A4, A7, and A8. The highest density was recorded at A7, and lower densities at the other three sites. These sites are downstream of the project site.	Local	This species has the best possible conservation status. Brown trout also act as host species for pearl mussel species. However, there are no pearl mussels recorded in the catchment. Based on the above, the population within the study area is of local importance.	Y
	Lamprey	Annex II of Habitats Directive; Red list status: Least Concern; ROI population: no estimates available (King, et al., 2011); County Offaly population: no estimate available; Baseline surveys: Lamprey ammocoetes (Lampetra sp.) were recorded in low densities from sites A1 and A4 on the Rapemills River supporting low densities of ammocoetes, respectively (3.5 & 2.3 per m2) These sites are downstream of the Site.	County / Regional (downstream populations)	Lamprey were recorded downstream of the project site. Considering their legal and conservation status, the species is considered to be of county/regional importance.	Y
	European eel	Red list status: Critically Endangered; ROI population: no estimates available (King, et al., 2011); County Offaly population: no estimate available; Baseline surveys: Recorded in eDNA downstream of the Project.	County / Regional (project) and downstream population)	This species has a very poor conservation status. While the Project is located at considerable distance from the coast, it is carried forward for further assessment due to the positive eDNA result downstream of the Project	Y
	White-clawed crayfish	Annex II and V of Habitats Directive; Wildlife Act (1976 and as amended, 2000); ROI population: 860 x 1 km ² grid cells (NPWS, 2019); County Offaly population: 39 x 1 km ² grid cells (estimated); Baseline surveys: No live white-clawed crayfish were recorded during the targeted surveys and environmental DNA sampling of	County/Regional (downstream population only)	Although none were recorded, crayfish remains were recorded in spraint, and burrows were also identified. As such, the species requires further assessment.	Y

Feature Type	Feature	Feature Information	Value	Justification for Evaluation	Important Ecological Feature? Y/N
		the Rapemills River (2 sites) and West Galros Stream failed to detect the species. However, crayfish remains were identified in otter spraint at these sites. Additionally, burrows were identified in the banks at A5 and A6.			
	Three-spined stickleback, stone loach and minnow	Red-list status for three-spined stickleback and minnow are of 'Least Concern' and stone loach is a non-native.	Site	Afforded no legal protection and/or have best possible conservation status – widespread and common, so do not require further assessment.	N

Table 5.12: Evaluation of Ecological Features within Study Area

5.5 POTENTIAL EFFECTS ON BIODIVERSITY

5.5.1 DO-NOTHING SCENARIO (LIKELY EVOLUTION OF THE BASELINE)

The project encompasses commercial conifer forestry plantation, cutover bog, and agricultural lands.

Part of the cutover bog forms part of the wider Bord na Móna Galros bog complex, which is subject to a peatland rehabilitation programme following cessation of industrial peat extraction, as set out in the Bord Na Móna Galros Draft Decommissioning and Rehabilitation Plan (2026). If the project does not proceed, this area would continue to be subject to that separate rehabilitation programme, which includes drain-blocking and hydrological management measures intended to promote the recovery of wetland, fen, heath, grassland or birch woodland habitat across the cutover bog, depending on local peat depth and hydrological conditions.

The underground electricity line comprises the existing road network and improved agricultural grassland. In the absence of the project, it would continue to be used as such.

Taking the above into account, the likely significant effects are described in the following sections.

5.5.2 POTENTIAL CONSTRUCTION PHASE EFFECTS

The construction phase will mainly result in habitat loss/disturbance to facilitate construction of turbines and associated infrastructure, including excavation of cabling trenches during the installation of the underground grid connection. No vegetation clearance is required to implement turbulence buffers and bat mitigation buffers around turbines.

Timing of construction works affects the level and type of impact, especially if undertaken during a critical life stage or season for an ecological feature.

The duration of any construction effects for non-habitat features is likely to be no greater than short-term as the construction phase is anticipated to take 15-18 months.

Likely sources of direct and indirect effects during construction phase are as follows.

Potential sources of direct effects associated with the construction phase of wind energy developments:-

- Clearance of vegetation, soil and rock for access roads, hardstands and turbine bases;
- Clearance of woodland, treelines and hedgerows to facilitate site infrastructure and turbulence/bat mitigation buffers;
- Creation of temporary infrastructure e.g. site compound, blade set-down areas and crane pads;
- Excavation of trenches for cable ducting; and,
- Placement of materials required for infrastructure works.

Potential sources of indirect effects associated with the construction phase of wind energy developments:-

- Stockpiling of materials on-site;

- Dust and changes in air quality;
- Collection/drainage of surface water runoff;
- Pollution and changes in hydrology;
- Spreading non-native/invasive plants; and,
- Construction activity (including noise, light and the presence of construction workers) disturbing birds and mammals.

5.5.2.1 Designated Sites & Ramsar Sites

SACs (both cSAC and full) and SPAs are considered fully in the NIS. The NIS concludes that, with mitigation measures, the project, either alone or in combination with the other projects assessed as part of the NIS process, would not undermine the conservation objectives or have an adverse effect on the integrity of any European site. It follows that there is no significant effect on European sites in EIA terms either.

As outlined in Annex 5.4 and the NIS, there is potential hydrological connection between the Project site and River Shannon Callows SAC, Middle Shannon Callows SPA, Lough Derg North-East Shore SAC, and Lough Derg (Shannon) SPA. There is no direct hydrological connection to River Little Brosna Callows SPA; however, there is a potential ecological connection via collision risk to golden plover, lapwing and black-headed gull, and an indirect pathway via potential ex-situ use by its SCI species of hydrologically connected wetland habitat within Middle Shannon Callows SPA. There is also a potential ecological connection to Slieve Bloom Mountains SPA (hen harrier). As such, these Natura 2000 sites are considered under the NIS. River Suck Callows SPA, Dovegrove Callows SPA, All Saints Bog SPA and All Saints Bog and Esker SAC were screened out at AA screening stage, as no viable impact pathway was identified (Annex 5.4).

None of the NHAs or pNHAs that overlap with SACs or SPAs are partially located outside those site boundaries, and there are no additional qualifying features. Therefore, these nationally designated sites have been indirectly but fully considered within the NIS, with same conclusion as for the European Sites (see **Annex 5.4** and **Section 5.4.1.2**).

The impact assessment in this chapter is therefore restricted to NHAs or pNHAs that do not overlap with SACs or SPAs. Those with connectivity to the project, and which therefore require consideration, are:-

- Woodville Woods pNHA 000927;
- River Little Brosna Callows NHA 000564;
- Lough Nahinch (Tipperary) pNHA 000936; and
- Roscrea Bog pNHA 000583.

Direct Effects

The project is not located within nor adjacent to any nationally designated site (NHA or pNHA). Therefore, construction works will not directly impact on any of these sites designated for nature conservation.

Indirect Effects

Woodville Woods pNHA 000927 has an ecological connection via snipe. However, as there are not predicted to be any significant effects on this species population (see

Section 5.5.2.3 on Birds below), there are no significant effects predicted for Woodville Woods pNHA.

River Little Brosna Callows NHA 000564 has an ecological connection via golden plover, lapwing and snipe. However, as there are no significant effects on these species populations (see **Section 5.5.2.3** on Birds below), there are no significant effects predicted for River Little Brosna Callows NHA.

Lough Nahinch (Tipperary) pNHA 000936 has an ecological connection via snipe. However, as there are not predicted to be any significant effects on this species population (see **Section 5.5.2.3** on Birds below), there are no significant effects predicted for Lough Nahinch (Tipperary) pNHA.

Roscrea Bog pNHA 000583 has an ecological connection via snipe. However, as there are not predicted to be any significant effects on this species (see **Section 5.5.2.3** on Birds below), there are no significant effects predicted for Roscrea Bog pNHA.

5.5.2.2 Habitats & Flora

Direct Effects

Construction of project infrastructure will result in direct habitat loss that is considered long-term (35-year lifespan of project). Some habitats will also be temporarily lost due to the construction of infrastructure e.g., site compounds. For details pertaining to habitats, see **Table 5.13** and Table 5.14.

The overwhelming majority of habitats within the project site occur as large, contiguous areas that are also part of the wider landscape. Therefore, the project is not likely to significantly affect any habitats which could be acting as ecological stepping-stones or corridors for mobile species, given their widespread abundance both inside and outside the project footprint. The exceptions are linear hedgerows, treelines (and hedgerow x treeline mosaics) and watercourses, all of which act as ecological corridors. Without compensation, the loss of these linear hedgerow and treeline ecological corridors, will have a significant negative effect at the local scale, and could be contrary to Article 10 of the Habitats Directive. There will be no loss of riparian habitats and so there will be no effect on riparian habitats acting as ecological corridors.

Wind Farm Site

There will be no loss of Annex I habitats. There are no rare or threatened plant species within the study area and so none are predicted to be lost.

There will be temporary loss of buildings and artificial surfaces BL3, improved agricultural grassland GA1, scrub WS1, and cutover bog PB4.

There will be permanent loss of BC1 stone walls and other stone work, BL3 buildings and artificial surfaces, GA1 improved agricultural grassland, PB4 cutover bog, WD5 scattered trees and parkland, and WS1 scrub.

Most of the terrestrial habitats projected to be lost either temporarily or permanently are of lower value and are common in the wider landscape. These include habitats such as buildings and artificial surfaces BL3, cutover bog PB4, and improved agricultural grassland GA1.

Other habitats have higher biodiversity value, either due to their natural or semi-natural nature, plus ability to provide important habitat for animals. In the absence of mitigation, enhancement or compensation, the loss of scrub WS1 will have a significant negative effect at the local scale.

No riparian (FW2 or FW4) habitats will be lost. Likely effects on ecology relating to water quality within watercourses are detailed below (**Section 5.5.2.7**).

Underground electricity line

There will be no loss of Annex I habitats. There are no rare or threatened plant species within the study area and so none are predicted to be lost.

There will be temporary loss of buildings and artificial surfaces BL3, improved agricultural grassland GA1, scrub WS1, arable crops BC1, treeline WL2, and hedgerow WL1.

There will be no permanent loss of habitats.

Most of the terrestrial habitats projected to be lost either temporarily are of lower value and are common in the wider landscape. These include habitats such as buildings and artificial surfaces BL3, improved agricultural grassland GA1, and arable crops BC1.

Other habitats have higher biodiversity value, either due to their natural or semi-natural nature, plus ability to provide important habitat for animals. In the absence of mitigation, enhancement or compensation, the loss of scrub WS1, hedgerow WL1, and treeline WL2 will have a significant negative effect at the local scale.

No riparian (FW2 or FW4) habitats will be lost. Likely effects on ecology relating to water quality within watercourses are detailed below (**Section 5.5.2.7**).

Turbine Delivery Haul Route

There will be no loss of Annex I habitats. There are no rare or threatened plant species at any of the nodes with proposed works. There will be temporary loss of artificial, highly modified habitats; namely, and BL3 buildings and artificial surfaces, improved agricultural grassland GA1, amenity grassland GA2, conifer plantation WD4, and scattered trees and parkland WD5. These will be immediately reinstated following delivery of the components. There will be a permanent loss of 14m of BL1 Stone walls and other stonework.

There will be temporary loss of recently-planted WD4 conifer plantation to facilitate the widening of the Site entrance. This will also require the temporary loss of WL1 Hedgerow, WS1 Scrub, and GS2 Dry meadows and grassy verges.

Pruning is required of overhanging beech and sycamore trees (WD5 Scattered trees and parkland) at node 7.2.5. However, these are non-native species and would already be subject to routine pruning to maintain road safety.

At node 7.5.1 a single tree will be temporary removed and will be immediately reinstated following delivery of the components. This is an immature Lime species planted as part of urban landscaping.

At node 7.5.3 a tree is to be removed, and a fence will be temporarily removed, and road widening over GA2 amenity grassland. These will be immediately reinstated

following delivery of the components, and the tree replaced with a tree of the same specimen.

At node 7.2.5 there will be permanent loss of a stone wall and an area of trees (WD5 scattered trees and parkland) which will be replaced by a fence.

Fossitt Code	Fossitt Name	Total Baseline	Temporary Loss			Permanent Loss		
			Main Project Site	Underground electricity line	Turbine haul route	Main Project Site	Underground electricity line	Turbine haul route
BC1	Arable crops	0.03ha	0.00ha	0.03ha	0ha	0.00ha	0.00ha	0.00ha
BL1	Stone walls and other stonework	14.00m	0.00m	0.00m	0m	0.00m	0.00m	14m
BL3	Buildings and artificial surfaces	0.56ha	0.01ha	0.04ha	0.16ha	0.02ha	0.00ha	0.00ha
ED3	Recolonising bare ground	0.06ha	0.00ha	0ha	0ha	0.00ha	0.00ha	0.00ha
FW2	Depositing/lowland rivers	66.15m	0.00m	0m	0m	0.00m	0.00m	0.00m
FW4	Drainage ditch	0.05ha	0.00ha	0.00ha	0.00ha	0.00ha	0.00ha	0.00ha
		0.00m	0.00m	0m	0m	0.00m	0.00m	0.00m
GA1	Improved agricultural grassland	12.95ha	0.15ha	0.41ha	0.01ha	2.80ha	0.00ha	0.00ha
GA2	Amenity grassland	0.56ha	0.00ha	0.00ha	0.56ha	0.00ha	0.00ha	0.00ha
GS2	Dry meadows and grassy verges	0.03ha	0.00ha	0.00ha	0.03ha	0.00ha	0.00ha	0.00ha
PB4	Cutover bog	82.44ha	4.89ha	0.00ha	0.00ha	22.44ha	0.00ha	0.00ha
PB4 x WS5	Cutover bog x Recently-felled woodland	4.83ha	0.00ha	0.00ha	0.00ha	0.00ha	0.00ha	0.00ha
WD4	Conifer plantation	1.11ha	0.00ha	0.00ha	0.19ha	0.00ha	0.00ha	0.00ha

Fossitt Code	Fossitt Name	Total Baseline	Temporary Loss			Permanent Loss		
			Main Project Site	Underground electricity line	Turbine haul route	Main Project Site	Underground electricity line	Turbine haul route
WD5	Scattered trees and parkland	0.002ha	0.00ha	0.00ha	0.002ha	0.00ha	0.00ha	0.00ha
		1m	0m	0m	1m	0m	0m	1m
WL1	Hedgerow	0.07ha	0.00ha	0.00ha	0.00ha	0.00ha	0.00ha	0.00ha
		61.49m	0.00m	5.39m	56.1m	0.00m	0.00m	0.00m
WL1 x WL2	Hedgerow x Treeline	280.06m	0.00m	0m	0m	0m	0m	0m
WL2	Treeline	0.05ha	0.00ha	0.02ha	0.00ha	0.00ha	0.00ha	0.00ha
		5.41m	0.00m	5.41m	0m	0.00m	0.00m	0.00m
WS1	Scrub	2.06ha	0.03	0.00ha	0.02ha	0.49ha	0.00ha	0.00ha
		15.57m	0.00m	15.57m	0m	0m	0.00m	0.00m

Table 5.13: Habitat Loss – Breakdown

Fossitt Code	Fossitt Name	Potential EU Annex I or PAW ¹² Affiliation?	Baseline Area (ha) / Length (m)	Total Temporary Loss	Total Permanent Loss	Total Loss	Remaining before Mitigation and Compensation/Enhancement
BC1	Arable crops	No	0.03ha	0.03ha	0.00ha	0.03ha	0.00ha
BL1	Stone walls and other stonework	No	14.00m	0.00m	14.00m	14.00m	0.00m
BL3	Buildings and artificial surfaces	No	0.56ha	0.21ha	0.02ha	0.23ha	0.33ha
ED3	Recolonising bare ground	No	0.06ha	0.00ha	0.00ha	0.00ha	0.06ha
FW2	Depositing/lowland rivers	No	66.15m	0.00m	0.00m	0.00m	66.15m
FW4	Drainage ditch	No	0.05ha	0.00ha	0.00ha	0.00ha	0.05ha
			0.00m	0.00m	0.00m	0.00m	0.00m
GA1	Improved agricultural grassland	No	12.95ha	0.57ha	2.80ha	3.37ha	9.58ha
GA2	Amenity grassland	No	0.56ha	0.56ha	0.00ha	0.56ha	0.00ha
GS2	Dry meadows and grassy verges	No	0.03ha	0.03ha	0.00ha	0.03ha	0.00ha
PB4	Cutover bog	No	82.44ha	4.89ha	22.44ha	27.33ha	55.11ha
PB4 x WS5	Cutover bog x Recently-felled woodland	No	4.83ha	0.00ha	0.00ha	0.00ha	4.83ha
WD4	Conifer plantation	No	1.11ha	0.19ha	0.00ha	0.19ha	0.92ha
WD5	Scattered trees and parkland	No	0.002ha	0.00ha	0.00ha	0.00ha	0.00ha
			1m	1.000m	0m	1.00m	0m

Fossitt Code	Fossitt Name	<u>Potential EU Annex I or PAW¹² Affiliation?</u>	Baseline Area (ha) / Length (m)	Total Temporary Loss	Total Permanent Loss	Total Loss	Remaining before Mitigation and Compensation/Enhancement
WL1	Hedgerow	No	0.07ha	0.00ha	0.00ha	0.00ha	0.07ha
			61.49m	61.49m	0.00m	61.49m	0.00m
WL1 x WL2	Hedgerow x Treeline	No	280.06m	0.00	0.00m	0.00m	280.06m
WL2	Treeline	No	0.05ha	0.02ha	0.00ha	0.02ha	0.03ha
			5.41m	5.41m	0.00m	5.41m	0.00m
WS1	Scrub	No	2.06ha	0.05ha	0.49ha	0.54ha	1.52ha
			15.57m	15.57m	0.00m	15.57m	0.00m

Table 5.14: Habitat Loss – Total Loss

Indirect Effects

Potential indirect effects on habitats include smothering due to sediment wash-out from cleared areas, deposition areas or dewatering of excavations. The effects of this on water quality of aquatic habitats is considered below under 'Fisheries and Aquatic Ecology' at **Section 5.5.2.7**.

Compaction and excavation of soil adjacent to hedgerows WL1/treelines WL2 (including matrices of same) habitats has potential to cause damage and disease of plants. Dust can also smother photosynthetic activity, although it is unlikely dust production will reach levels that will have a discernible effect on plant growth. Without mitigation such as root protection areas, compaction and excavation could have significant negative effects at the local scale on hedgerow WL1 and treeline WL2 habitats.

Although none were recorded at the project site, without biosecurity measures, invasive or non-native plants could spread to the project site via plant machinery and vehicles, which could have a negative effect on sensitive habitats.

5.5.2.3 Birds

Direct Effects

Potential direct construction effects include nest damage or destruction, habitat loss and disturbance/displacement.

Nest Damage or Destruction

Construction and decommissioning activities pose a direct risk to nesting birds through the potential accidental damage or destruction of active nests, eggs or chicks. This is particularly relevant for ground-nesting and low-shrub nesting species that may establish nests within or near the development footprint (Pearce-Higgins et al., 2012), including turbine bases, access tracks, laydown areas, and temporary compounds.

The only IEF bird species recorded breeding within any proximity to the site include common ringed plover, common snipe and northern lapwing.

Vegetation clearance, excavation, and the movement of heavy machinery during the breeding season (typically March to August) can result in the unintentional breach of legal protections under Section 22 – Protection of wild birds (Wildlife Act 1976, as amended) and the EU Birds Directive (2009/147/EC). This risk is addressed through embedded mitigation (**Section 5.6**), including pre-construction nest checks and seasonal restrictions on vegetation clearance; with this mitigation in place, no significant effects of nest damage or destruction are predicted for any IEF species at any geographic scale.

Habitat Loss

The construction phase and decommissioning phases will result in the permanent and temporary loss of habitats that could be used by birds for breeding, foraging, and shelter. This includes the direct footprint of turbines, access roads, and associated infrastructure, with significant excavation of stone involving crushing, as well as temporary working areas. Permanent habitat loss occurs at the construction phase only, where turbine bases, hardstanding and permanent access tracks remain in place for the lifetime of the project; the decommissioning phase, by contrast, involves

only temporary habitat disturbance associated with plant removal and reinstatement works, as set out further below. The scale and ecological value of the affected habitats will influence the magnitude of this impact. Loss of structurally diverse grassland, heath, or wetland habitats may disproportionately affect species with specific habitat requirements, such as waders, raptors, or ground-nesting passerines (Bennun et al., 2021). While some habitat loss may be reversible post-construction, the fragmentation of habitat and reduction in habitat quality during construction can have lasting effects on local bird assemblages, potentially leading to reductions in local abundance and species diversity (Fernández-Bellon et al., 2019).

Construction of the project will lead to a total permanent loss of 25.75ha and c.14m of habitats. Most of the habitats to be lost are cutover bog (22.44 ha). Vegetation cover across the site is not uniform: the core of the cutover bog comprises bare, formerly milled peat with minimal vegetation, while areas towards the periphery retain a greater degree of vegetation cover, including tussocky and rushy vegetation locally suitable for ground-nesting waders.

No permanent habitat loss will occur during decommissioning; all works will be temporary in nature, and habitats will be reinstated.

Direct habitat loss could affect IEF species breeding within the proposed wind farm site, or any sites regularly used for foraging or roosting. IEF species are assessed below.

Black-headed gull

Flight activity data recorded a cumulative 253 birds crossing the CRZ, concentrated in the B22 season, but distribution and abundance surveys confirm that both foraging and probable breeding are centred on the lake c.1.7km north of the site, with no regular site usage recorded in either season (**Table 5.11, Table 5.15**). Black-headed gull is a central-place forager during the breeding season, with studies of rural colonies recording mean maximum foraging distances of 8–12km, up to 27km (Jakubas et al., 2020). The flight activity recorded over the site is consistent with commuting from the off-site colony to foraging grounds elsewhere, rather than dependency on habitats present within the development footprint, and no breeding or roosting resource occurs there. No significant effect of direct habitat loss is predicted at any geographic scale.

Common kestrel

Flight activity data recorded 61 birds cumulatively across the survey programme and consistent presence in every season (**Table 5.15**). Breeding was confirmed in a quarry c.2.2km from the proposed infrastructure, and hunting activity was concentrated in the surrounding landscape rather than within the wind farm site itself. Kestrel typically forages over open habitats supporting healthy field vole populations, including rough grassland, heath and scrub-fringed ground, while avoiding dense woodland (Village, 1990). The recorded flight activity is consistent with birds commuting between the off-site breeding quarry and foraging areas in the wider landscape rather than intensive hunting use of the site itself, and the confirmed breeding location is unaffected by the proposed works. No significant effect of direct habitat loss on kestrel is predicted at any geographic scale.

Common kingfisher

Common kingfisher was recorded on a single occasion, c.1.8km from the site at the Rapemills River, with no repeat observations. A dedicated habitat suitability assessment undertaken in 2023 confirmed limited foraging potential and no suitable breeding habitat at the watercourses nearest to the project site. Kingfisher is entirely dependent on open, fishable water with vertical earth banks suitable for nest excavation (Cummins et al., 2010b), habitat types absent from the site. No significant effect of direct habitat loss is predicted at any geographic scale.

Common ringed plover

A single pair of common ringed plover was recorded mating c.350m from the project footprint in 2023, with no records from the 2022 and 2024 breeding season surveys, or any non-breeding season. Ringed plover nests on open, sparsely vegetated substrates such as shingle, sand or bare stony ground, and inland breeding is typically associated with disturbed ground such as quarries or gravel workings or harvested peat bogs (BTO, 2026b), which aligns with the bare peat habitats present. This notwithstanding, the isolated record, located outside the direct infrastructure footprint and not repeated across three survey years, does not indicate regular breeding use of the site. No significant effect of direct habitat loss is predicted at any geographic scale.

Common snipe

Snipe were confirmed breeding within the site in 2023, with possible breeding in 2024 c.500m southwest of the development footprint, and cumulative flight activity of 54 birds was recorded at generally low levels, with no winter site usage (**Table 5.9**). Breeding snipe require soft, damp soil suitable for probing combined with a tussocky or rushy sward providing cover for nesting and concealment from predators (Hoodless et al., 2007). There are some areas with greater vegetation cover present towards the exterior of the bog, but it is absent from most of the development site. The low numbers recorded across three survey seasons, together with the location of the confirmed 2023 breeding record outside the direct infrastructure footprint, support a conclusion of no significant effect of direct habitat loss at any geographic scale.

Eurasian teal

No breeding or foraging activity was recorded within or adjacent to the site in either season, with all records associated with the lake c.1.7km away in the non-breeding season (**Table 5.9, Table 5.15**). Teal feed in shallow, vegetated open water, and nest in dense ground cover typically, though not exclusively, in proximity to water (Gilbert et al., 1998), a resource not utilised by the species within the site during the survey programme. No significant effect of direct habitat loss is predicted at any geographic scale.

European golden plover

Golden plover activity was recorded only in the non-breeding season, with 178 birds cumulatively recorded in flight but no consistent nocturnal or diurnal foraging use of habitats within 500m; most records were low-level flyovers (**Table 5.9**). Wintering golden plover typically forage and roost in large, open flocks, often in association with lapwing (Gillings & Fuller, 1999), but no repeated ground-based use of the site was recorded across two non-breeding seasons (diurnal and nocturnal). No significant effect of direct habitat loss is predicted at any geographic scale.

Great cormorant

Cormorant was recorded only as occasional flyovers, with no site usage in either season (**Table 5.9, Table 5.15**). As an exclusively piscivorous species dependent on open water for foraging (Hatch et al., 2020), cormorant has no functional requirement for any habitat present within the site. No significant effect of direct habitat loss is predicted at any geographic scale.

Hen harrier

Hen harrier was not recorded using the site in either season, with occasional flyovers only in the non-breeding season (**Table 5.9**). No dedicated winter roost surveys were undertaken due to the absence of suitable roosting habitat, a conclusion reinforced by winter roost surveys carried out for the permitted Phase 1 project¹⁷, which confirmed no roosts were present. National surveys have found heath/bog with a rank heather, purple moor-grass or scrub-dominated sward to be the most frequently used roosting habitat, accounting for 53% of the 203 roosts recorded in Ireland between 2004 and 2020 (O'Donoghue, 2021), and breeding success is positively associated with the extent of such habitat within the territory (Caravaggi et al., 2019). The cutover bog present at the site comprises bare, actively worked peat with minimal vegetation cover, and therefore does not provide the structural cover or prey resource associated with occupied hen harrier habitat elsewhere. This, combined with the complete absence of recorded roosting, breeding or regular hunting activity across the survey programme and the Phase 1 precedent, supports a conclusion of no significant effect of direct habitat loss at any geographic scale.

Little egret

No site usage was recorded in either season, with all observations limited to c.500m from proposed infrastructure (**Table 5.9, Table 5.15**). Little egret forages in shallow lakes, riverbanks, lagoons, estuaries and flooded grassland (BirdWatch Ireland, 2026), which are habitats not present within the site. No significant effect of direct habitat loss is predicted at any geographic scale.

Mallard

Mallard breeds at the lake c.1.7km from the site, with no breeding-season use of the site recorded; in winter, small numbers were occasionally observed foraging by day within the site, though the majority of records remained associated with the lake (**Table 5.9, Table 5.15**). The low frequency and magnitude of on-site use, together with the species' established breeding and foraging use of the nearby lake, supports a conclusion of no significant effect of direct habitat loss at any geographic scale.

Merlin

Merlin was recorded only as occasional flyovers, with a cumulative total of 4 birds recorded in the NB22/23 season and no records in any other season, and no evidence of site usage in either the breeding or non-breeding period (**Table 5.9**). Merlin breeding habitat in Ireland has traditionally been associated with heather-dominated moorland and blanket bog offering suitable ground-nesting cover; however, declining availability of quality heather cover in Ireland has led to merlin increasingly

¹⁷ <https://www.pleanala.ie/en-ie/case/318816> [last accessed 03/09/2026]

nesting in conifer plantations, particularly at forest edges adjacent to open moorland foraging habitat (Lusby et al., 2017), with birds hunting low over open ground for small birds. The bare, actively worked cutover peat present at the site lacks the vegetative cover associated with foraging merlin, and no roosting, breeding or regular hunting activity was recorded across the survey programme. No significant effect of direct habitat loss on merlin is predicted at any geographic scale.

Northern lapwing

Across the survey programme 255 birds were recorded cumulatively, and a single, likely repeat, breeding territory was recorded across all three breeding seasons (**Table 5.9, Table 5.15**). The territory appeared to move westwards throughout the survey years, with a pair located c.500m from the project footprint in the latest B24 season. No site usage was recorded in winter, with large flocks instead recorded c.4km away. Breeding lapwing require open ground with short, sparse vegetation (Galbraith, 1988) and soft, invertebrate-rich substrate offering suitable foraging conditions for chicks (Sheldon et al., 2004), which is present, towards the edges of the cutover bog outside of the project site but not within the site itself. The identified breeding territory lies outside the direct infrastructure footprint. No significant effect of direct habitat loss on lapwing is predicted at any geographic scale.

Peregrine

Peregrine was suspected or probable to breed in Loughnane Quarry, c.2.2km from the site, in two of the three survey seasons, with only occasional flyovers recorded over the site and no evidence of regular hunting activity there (**Table 5.9, Table 5.15**). The confirmed/probable nest site is unaffected by the proposed works and the site does not constitute a regularly used hunting area. No significant effect of direct habitat loss is predicted at any geographic scale.

Whooper swan

Three whooper swans were recorded within 465m of the proposed infrastructure on a single occasion across the entire feeding distribution survey programme, apparently in response to localised flooding, with all other records concentrated at Dovegrove Callows SPA c.4km southwest of the site (**Table 5.9, Table 5.15**). Wintering whooper swan characteristically forage on improved grassland and arable stubble adjacent to core wetland roosts, often near callows (Rees et al., 2019), which are absent from the project site. No significant effect of direct habitat loss is predicted at any geographic scale.

UGL

No important habitats for birds will be permanently lost, with only a minimal amount of treeline and agricultural fields to be temporarily lost and then reinstated (**Section 5.5.2.2**). The duration of UGL works is very short and comparable to normal road works programmes.

THR

There is not predicted to be any permanent loss of important habitats for birds at the THR nodes, with works consisting almost entirely of trimming vegetation, provision of temporary surfaces, widening of field access and temporary removal of signage / street furniture. Any habitats bounding roads due to be lost temporarily will be

reinstated.

Disturbance/Displacement

Construction and decommissioning-related disturbance, including noise, vibration, visual intrusion, and increased human activity, can lead to the temporary displacement of birds from otherwise suitable breeding, roosting or foraging areas.

This is particularly relevant for disturbance-sensitive species such as raptors, ground-nesting birds, and waders (Tolvanen et al., 2023). Displacement may result in reduced territory occupancy, lower breeding success, or increased energetic costs associated with suboptimal habitats. The effects are likely to be most pronounced during the breeding season (predominantly between March and August) but may also affect overwintering or migratory species depending on the timing of works. The spatial extent of disturbance will vary depending on species-specific sensitivity and the intensity of construction activities, and the availability of suitable displacement habitats in the surrounding area.

The likely significant effects associated with construction or decommissioning activities are only likely to occur for as long as the construction or decommissioning phase continues and are thus generally short-term and reversible in nature. The only circumstance in which such effects would not be reversible is if disturbance during construction or decommissioning were severe enough to cause the local breeding population to disappear, and the species does not subsequently return or recruit new individuals to re-establish the population.

Even though significant effects are not likely, the risk of construction disturbance will be further mitigated by avoiding sensitive areas through the implementation of appropriately defined buffer zones and by timing construction activities to avoid periods where sensitive species are present (if and where possible), such as the breeding season. A range of measures have therefore been proposed to mitigate for potential construction disturbance effects (see **Section 5.6.1.5**).

Species-specific assessment is provided below.

Black-headed gull

The surveys did not record black-headed gull breeding or roosting in proximity to the development footprint, and there is no evidence the project represents an important foraging resource for the species. Black-headed gulls were probably breeding and are known to forage and roost outside the breeding season, at a lake c.1.7km from the site. This distance exceeds the maximum disturbance distance of 1,000m reported for any species reviewed by Goodship et al. (2022), the most precautionary benchmark available in the absence of a species-specific figure for black-headed gull. On this basis, disturbance to breeding or wintering black-headed gulls at the site is unlikely to be significant at any geographic scale.

Common kestrel

Kestrel are only considered susceptible to disturbance within 200m of the proposed wind farm site (Goodship et al., 2022). No evidence of breeding or roosting occurs within this distance, so significant disturbance or displacement of breeding or roosting kestrels is not predicted. Some disturbance to foraging birds is possible but this is unlikely to be significant at any geographic scale due to the temporary and localised

nature of any disturbance, and availability of extensive alternative and better foraging habitat in the wider area (most habitats within the proposed wind farm site footprint are cutover bog, which are not suitable for foraging common kestrel).

Common ringed plover

Common ringed plover are only considered susceptible to disturbance within 100-200m of the proposed wind farm site (Goodship et al., 2022). A mating pair were observed during surveys in a single breeding season but were not observed in any other survey season. The mating was observed 350m from any proposed infrastructure. Given this and the lack of observations in any other survey period, any disturbance to breeding or foraging common ringed plover is unlikely to be significant at any geographic scale. Furthermore, a range of mitigation measures are available to prevent disturbance to breeding common ringed plover (see **Section 5.6.1.5**).

Common snipe

Snipe activity across the survey programme was concentrated in the breeding season, with possible breeding recorded c.500m from the development footprint in 2024 and confirmed breeding recorded at a distance greater than 500m from the footprint in 2023; cumulative flight activity was low (54 birds), and no on-site foraging or roosting activity, diurnal or nocturnal, was recorded in the non-breeding season (**Table 5.9, Table 5.15**). No species-specific disturbance buffer for common snipe is published in the most recent NatureScot review of disturbance distances (Goodship et al., 2022), nor could a quantified flush or alert distance be identified elsewhere in the literature. The limited evidence available is nonetheless consistent in characterising the species as tolerant of close approach: common snipe rely on cryptic plumage and remain closely sat when disturbed, flushing only when approached at short range, a trait that complicates standard survey methods and typically requires birds to be walked up before they will flush (Wentworth, 2015). Breeding activity is also spatially concentrated close to the nest, with incubating females generally restricting foraging movements to within 70m before flying to more distant feeding areas (Green, 1988). Taken together, this behavioural evidence, combined with the distance of both the confirmed and possible breeding records from the proposed infrastructure and the absence of any non-breeding season site usage, supports a conclusion that disturbance to breeding or wintering common snipe is unlikely to be significant at any geographic scale. Furthermore, a range of mitigation measures are available to prevent disturbance to breeding common snipe (see **Section 5.6.1.5**).

Eurasian teal

No breeding or foraging activity was recorded within or adjacent to the site in either season, with all records associated with the lake c.1.7km away in the non-breeding season (**Table 5.9, Table 5.15**). This distance exceeds the maximum disturbance distance of 800m reported for any duck species reviewed by Goodship et al. (2022), the most precautionary benchmark available in the absence of a species-specific figure for Eurasian teal. Teal feed in shallow, vegetated open water, and nest in dense ground cover typically, though not exclusively, in proximity to water (Gilbert et al., 1998), a resource not utilised by the species within the site during the survey programme. No significant effect of disturbance or displacement is predicted at any

geographic scale.

European golden plover

No sensitive locations (regular foraging or roosting) within the proposed wind farm site were identified during surveys (diurnal activity was off-site and largely comprised of birds circling overhead, apparently on migration; nocturnal activity was limited to a handful of birds foraging on-site on a few occasions). Non-breeding golden plover requires a buffer of 200-500m to avoid disturbance while foraging or roosting (Goodship et al., 2022). Given that no regular foraging or any roosting was observed, and that birds appeared largely to be passing through the area as part of migratory movements, no significant disturbance / displacement at any geographic scale is likely.

Great cormorant

Great cormorant was recorded occasionally across the survey programme, in each case as birds in transit through the wider area with no evidence of foraging, roosting, or breeding activity at or near the site (**Table 5.9, Table 5.15**). As an exclusively piscivorous species wholly dependent on open water for foraging, and requiring cliffs, trees, or other structures adjacent to water for roosting and breeding (Hatch et al., 2020), cormorant has no functional requirement for any habitat present at the site, and the site does not constitute a resource the species is likely to return to or rely upon. This is consistent with published behavioural evidence indicating that cormorant is among the least sensitive of colonial waterbird species to human disturbance, tolerating close approach before showing a flight response (Velilla et al., 2025). On this basis, and given the complete absence of any foraging, roosting or breeding activity recorded across the survey programme, construction-related disturbance effects on great cormorant are considered unlikely to be significant at any geographic scale.

Hen harrier

Hen harrier was not recorded using the site in either season, with occasional flyovers only in the non-breeding season (**Table 5.9**). No winter roosts were recorded due to the absence of suitable roosting habitat, a conclusion reinforced by winter roost surveys carried out for the permitted Phase 1 project¹⁸, which confirmed no roosts were present within the survey area. The cutover bog present at the site comprises bare, actively worked peat with minimal vegetation cover, and therefore does not provide the structural cover associated with roosting hen harrier habitat. Hen harrier require a buffer of 300-750m to avoid disturbance while roosting or breeding (Goodship et al., 2022). Given the complete absence of recorded roosting, breeding or regular hunting activity across the survey programme and the Phase 1 precedent, supports a conclusion of no significant effect of construction-related disturbance at any geographic scale.

Little egret

No little egret site usage was recorded in either season across the survey programme, with all observations limited to c.500m from the proposed infrastructure (**Table 5.9, Table 5.15**). Little egret forages in shallow lakes, riverbanks, lagoons, estuaries, and

¹⁸ <https://www.pleanala.ie/en-ie/case/318816> [last accessed 03/09/2026]

flooded grassland, none of which are present within the site, and the absence of any recorded site usage across the survey programme indicates the species does not currently use the development footprint or its immediate surroundings for foraging, roosting, or breeding. Given the complete absence of recorded foraging, roosting, or breeding activity at the site, construction-related disturbance to little egret is considered unlikely to be significant at any geographic scale.

Mallard

Mallard were confirmed as breeding c.1.7km from the project site and breeding and non-breeding season activity was focused in this location. There were some observations of birds foraging within the project site, so some disturbance to foraging birds is possible but this is unlikely to be significant due to the temporary and localised nature of any disturbance, and availability of extensive alternative and better foraging habitat in the wider area, particularly within the wetlands 1.7km away. Mallard require a disturbance-free buffer of 50-100m and >100m for the breeding and non-breeding seasons, respectively (Goodship et al., 2022). Given that breeding and non-breeding activity was focused c.1.7km away, construction-related disturbance to mallard is considered unlikely to be significant at any geographic scale.

Merlin

Merlin was recorded only as occasional flyovers, with a cumulative total of 4 birds recorded in the NB22/23 season and no records in any other season, and no evidence of site usage in either the breeding or non-breeding period (**Table 5.9**). Merlin require a disturbance-free buffer of 300-500m and <200m during the breeding and non-breeding seasons (Goodship et al., 2022), respectively. As there was no evidence of birds breeding or roosting in the winter within these distances to the project, no significant disturbance effects are likely at any geographic scale.

Northern lapwing

A single, likely repeat, breeding territory was recorded across all three breeding seasons (**Table 5.9, Table 5.15**). The territory appeared to move westwards throughout the cutover bog over the survey years, with a pair located c.500m from the project footprint in the latest B24 season. Breeding lapwing require a disturbance-free buffer of 108m from wind turbines (Hoetker et al., 2006). All breeding territory locations across the survey years have been located beyond this distance. There is also c.85ha of cutover bog located outside the project area. Thus, while no significant displacement effects are predicted at any geographic scale due to construction-related disturbance, there is ample displacement habitat for any localised displacement that could occur. Furthermore, a range of mitigation measures are available to prevent disturbance to breeding northern lapwing (see **Section 5.6.1.5**).

No site usage was recorded in winter, with large flocks instead recorded c.4km away, precluding any non-breeding season related disturbance impacts to this species at any geographic scale.

Peregrine falcon

No breeding, roosting or foraging occurred within the project site. The nearest nesting location is 2.2km away at Loughnane Quarry. Breeding and non-breeding peregrine are considered susceptible to disturbance within 500-750m and 200m of the proposed

wind farm site (Goodship et al., 2022), respectively. As the separation distance between the known nest is much greater than this distance, no significant disturbance effects are likely at any geographic scale.

Whooper swan

Wintering whooper swan require a disturbance-free buffer of 200-600m (Goodship et al., 2022). There were no regularly recorded aggregations or roosts of whooper swan foraging within this distance to the proposed wind farm site. Three whooper swans were recorded within 465m of the proposed infrastructure on a single occasion across the entire feeding distribution survey programme, apparently in response to localised flooding, with all other records concentrated at Dovegrove Callows SPA c.4km southwest of the site (**Table 5.9, Table 5.15**). On this basis, no significant disturbance effects are likely at any geographic scale.

UGL and THR

There were no sensitive breeding or roosting sites for IEF bird species recorded in proximity to the UGL and THR during desk study or field surveys.

Significant disturbance / displacement effects are unlikely to occur along the UGL or THR nodes, with the UGL proposed to be buried within or adjacent to existing roads or heavily modified cultivated habitats (e.g. agricultural grasslands) and the accommodation works at the THR nodes being minor (e.g. trimming of hedgerows, road widening, trimming of small, individual trees, and removal of road signs and street furniture).

Any disturbance / displacement from construction activities while the cable is being buried within the road is unlikely to be significantly greater than that from typical traffic levels. The UGL and THR nodes do not pass through or within 1km of any sites designated for their ornithological interest that are likely to be affected by the project.

On this basis, no significant disturbance effects for IEF birds along the UGL and THR are predicted at any geographic scale.

Indirect Effects

Indirect effects on birds during construction could arise from pollution of surface water-dependent or groundwater-dependent wetland habitats within nearby nature conservation sites, via two pathways: accidental hydrocarbon spillage from construction plant, fuel storage or refuelling activities, and sediment-laden runoff from excavation, access track construction and other ground-disturbing works. Either pathway, if unmitigated, could result in indirect habitat loss or degradation of prey resources for SCI bird species associated with hydrologically connected sites. The same applies to wetland areas used by bird species from nearby designated sites, even where those wetland areas are not themselves designated, and to non-designated watercourses with confirmed hydrological connectivity to the site.

Except for Middle Shannon Callows SPA (whose wetland habitat may also be used ex-situ by SCI species of River Little Brosna Callows SPA, which is not itself hydrologically connected to the Project) and Lough Derg (Shannon) SPA, there are no nearby surface water-fed or groundwater-dependent habitats within any nature conservation site for birds, and indirect impacts on bird SCIs via this pathway are therefore considered unlikely for all other designated sites.

Potential effects on site drainage arising from construction activities, including new permanent access tracks, are assessed in **Chapter 7**, which concludes that no significant adverse effects on surface water or groundwater regimes are predicted, subject to the pollution prevention and sediment control measures set out in the Construction Environmental Management Plan (CEMP). These measures include bunded fuel storage and refuelling procedures, spill response protocols, and silt/sediment control measures (e.g. silt fencing, settlement ponds) applied during all ground-disturbing works. This finding informs the conclusions below regarding indirect pathways to bird SCI habitat and other IEF bird species via hydrological connectivity. Effects on species are evaluated below.

The following IEF bird species are not dependent on nearby wetland or groundwater-dependent habitats: common kestrel, hen harrier, merlin and peregrine. There is therefore no potential for indirect impacts on these species due to pollution of surface water, sediment loading, or lowering of groundwater.

The following IEF bird species are associated with wetland habitats and are considered further below in relation to indirect pathways: black-headed gull, common kingfisher, common ringed plover, common snipe, Eurasian teal, European golden plover, great cormorant, little egret, mallard, northern lapwing and whooper swan.

Of these, northern lapwing, black-headed gull, whooper swan and European golden plover are SCIs of Middle Shannon Callows SPA, and great cormorant is an SCI of Lough Derg (Shannon) SPA, both of which are hydrologically connected to the site. Given this connectivity, there is potential for indirect effects on these species via degradation of supporting wetland habitat or associated prey resources during construction. However, with the pollution prevention and sediment control measures secured through the CEMP (see **Chapter 7**), the risk of a pollution or sedimentation event of sufficient magnitude to affect water quality at either SPA is considered low. On this basis, indirect effects on northern lapwing, black-headed gull, whooper swan, European golden plover and great cormorant via hydrological pathways are assessed as not significant, subject to implementation of the CEMP measures as a committed mitigation measure.

Common kingfisher was recorded c. 1.8km downstream of the site on the Rapemills River, which is hydrologically connected to the site. Although kingfisher is not a named SCI of any SPA in the vicinity, this represents a confirmed indirect pathway between construction activities and a location where the species is known to occur, principally through potential effects on prey availability (small fish and aquatic invertebrates) arising from sediment loading or pollution. With the CEMP pollution prevention and sediment control measures in place and given the distance and attenuation between the site and the recording location, the risk of an effect of sufficient magnitude to affect kingfisher or its prey base at this location is considered low. Indirect effects on common kingfisher are therefore assessed as not significant.

Common ringed plover was recorded on a single occasion c. 350m from the project footprint, is not a named SCI of any SPA in the vicinity and has no confirmed hydrological connection between its recorded location and the site. No credible indirect pathway is identified, and effects on common ringed plover are assessed as not significant.

Common snipe was recorded either within the site itself or at locations with no hydrological connection to the site; no NHA or pNHA at which snipe is a notable species has a hydrological connection to the site. No credible indirect pathway is identified, and effects on common snipe are assessed as not significant.

Eurasian teal and mallard were each recorded c. 1.7km from the site, at locations with no hydrological connection to the site. No credible indirect pathway is identified, and effects on these species are assessed as not significant.

Little egret was not recorded at any location with a hydrological connection to the site. No credible indirect pathway is identified, and effects on little egret are assessed as not significant.

5.5.2.4 Terrestrial Mammals (Excluding Bats)

Direct Effects

Potential direct effects on mammals during construction include effects on dwellings (resting, hibernating or breeding sites), where the dwelling could be destroyed and/or both adults and juveniles could be killed or injured. Tree/vegetation removal could affect arboreal species (e.g. pine marten and red squirrel) and ground works such as excavation or piling could affect ground-dwelling species (e.g. Irish hare, hedgehog).

Irish hares do not inhabit single dwellings, but rest in 'forms' (VWT, 2023). Young hares hide in long grass in the day and are fed at dusk. As construction will be undertaken during daylight hours, the risk of disturbance is limited to physical disturbance of the young, rather than the mother. As young hares can move freely, it is unlikely they will suffer mortality from construction activities. Direct effects on Irish hare are assessed as not significant.

Hedgehogs hibernate under whatever materials and hiding places they can find, using dead leaves, twigs, feathers and log piles (VWT, 2023). During hibernation, hedgehogs enter a state of torpor from October/November to March/April. This immobility makes them very vulnerable to disturbance. Significant direct effects to hedgehogs could occur at the local scale via destruction of hibernacula and direct mortality, if construction takes place during the winter months (i.e. in the absence of mitigation).

Suitable habitat for stoat was limited to hedgerows. As such, significant direct effects on stoat could occur at the local scale via destruction of hedgerows and direct mortality, if construction takes place in the absence of mitigation.

Pygmy shrew can occupy a variety of habitats. As such, in the absence of mitigation significant direct effects to pygmy shrew at the local scale via direct mortality, if construction takes place in the absence of mitigation.

Indirect Effects

Indirect effects on mammals during construction could result in the loss of potential foraging, commuting and sheltering habitat.

The habitats used by hedgehog, Irish hare, stoat and pygmy shrew that will be removed are widespread and common in both the survey area and the wider landscape. Therefore, no significant indirect effects due to the loss of potential foraging, commuting and sheltering habitat are likely.

Disturbance from noise, vibration, machinery movement and increased human presence could also displace foraging individuals or cause breeding mammals to abandon natal sites.

Hibernating hedgehogs could be disturbed by construction activities, causing them to wake from hibernation prematurely. This could cause mortality, especially if sufficient food is unavailable. For hedgehog, in the absence of mitigation, there could be significant indirect effects due to disturbance at the local scale.

As explained in the previous section under direct effects, breeding Irish hares are unlikely to suffer any significant effects due to disturbance from construction activities.

5.5.2.5 Bats

Direct Effects

Direct effects on bats during construction of the project include vegetation removal or removal/modification of existing structures, which could result in a loss of potential roost sites.

No confirmed bat roosts were recorded within the project within the works footprint. Thus, no direct effects on potential bat roosts are likely.

Along the grid connection, cables will be laid primarily within the existing road network and improved agricultural grassland (both of which are of negligible roosting value). Outside of this, the proposed route intersects with hedgerows, treelines, and matrices of same. No bat roosting potential was noted in these habitats. Where cables will go over bridges or cross watercourses HDD will be used and no roosts were identified. Thus, no direct effects on potential bat roosts are likely. No other potential bat roosts are located within the works footprint along the grid connection.

Along the turbine haul route, the only accommodation works that could potentially affect bat roosts is the trimming of trees. No structures with bat roost potential will be affected. There are no trees requiring trimming/removal along the turbine haul route that were classed as having potential bat roost features. Again, no direct effects on bat roosts are likely.

Indirect Effects

Indirect effects could include the loss of foraging/commuting habitats or features. If lighting is used for night-time working, this could also disturb roosting and foraging bats. Where construction works take place outside daylight hours, directional lighting and cowlings will be used to avoid light spill onto linear habitats and trees, as set out in **Section 5.6.1.7**). Further, of the species utilising the project site, most (common pipistrelle, soprano pipistrelle and Leisler's bat) are less sensitive to light pollution than the less commonly recorded species including brown long-eared bat and *Myotis* species¹⁹.

Within the Project site, linear habitats are limited to the southern section of the site. There will be gaps created in linear habitat to facilitate access tracks (5m wide) and underground electricity line (1m wide). BCI guidance on hedgerow management²⁰

¹⁹ Guidance Note GN08/23 Bats and Artificial Lighting At Night

²⁰ Managing-Hedgerows-for-Bats.pdf

states gaps greater than 5m – 10m may result in bats changing their movements to avoid these gaps. As the proposed gaps will not exceed this width, in the absence of mitigation/ compensation, significant indirect effects on bat species are not considered likely.

5.5.2.6 Other Protected Fauna

Direct Effects

Direct effects on amphibians such as common frog and smooth newt could include destruction of breeding sites and mortality from construction activities.

Spawning common frog could be affected where breeding opportunistically in wet habitats. In the absence of mitigation, significant negative effects for spawning common frog could occur at the local scale as a result of mortality at temporary breeding sites. It is unlikely there will be significant mortality effects for adult smooth newt as the species can quickly colonise new waterbodies.

Indirect Effects

Indirect effects on amphibians could include loss of foraging habitats. For amphibians, habitats that could be used for foraging include drainage ditches (FW4), and wetter parts of improved agricultural grassland (GA1). All these habitats are widely available in the study area and wider landscape. The habitat loss is small relative to the available habitat and not in proximity to a breeding site for these species.

Therefore, it is unlikely that any significant adverse effects will occur for common frog or smooth newt.

5.5.2.7 Fisheries and Aquatic Ecology

Direct Effects

Potential direct effects could include the loss of natural watercourses due to watercourse crossings and the placement of culverts, water quality degradation, the diversion of natural watercourses, increased suspended solids/hydrocarbons/cement leachate within watercourses inside the project site and the loss of freshwater habitats due to removal or blockage of watercourses.

There are no otter holts within 150 m of any aquatic survey site, so no direct effects of disturbance to breeding/resting otters are likely.

While no white-clawed crayfish were recorded during surveys, burrows were observed along the bank at survey site A5 which lies just outside the Project boundary. No European eel were observed, but a positive eDNA was recorded downstream at A6. However, there is no works proposed in this region. As such, direct effects on Atlantic salmon, brown trout, European eel and white-clawed crayfish are unlikely.

The turbine haul route nodes where works are required do not intersect watercourses. As such, no direct effects are likely.

Indirect Effects

Indirect effects include the release of suspended solids (which could be acidic due to presence of conifer plantation), hydrocarbons or cement leachate, which could reach downstream receptors via hydrological connections. This could reduce the

water quality, which could have negative effects on aquatic receptors.

Salmonids require very high levels of water quality to complete their life cycles. High levels of suspended solids can increase turbidity (inhibits respiration) and siltation (affects riverbed substrate composition, reducing spawning and fry survival). Suspended solids typically contain phosphorous or hydrocarbons that can lead to eutrophication and reduced oxygen levels (a cause of death for all salmonid and lamprey life stages). The release of even small amounts of hydrocarbons (e.g. fuel spills) can reduce oxygen levels, affecting salmonid and lamprey populations. Acidification of streams because of conifer plantations and associated forestry operations (Ormerod, Donald and Brown 1989) can also result in the reduction of invertebrate (Ormerod, Rundle, et al. 1993) and fish populations (Harrison, et al. 2014).

Habitat availability and quality are linked with survival rates of salmon fry and parr (Kalleberg, 1958), with small amounts of debris entering a watercourse important for vulnerable life stages of salmon and lamprey potentially leading to negative effects on juvenile survival and habitat use.

Accidental fuel spills, which could occur during construction, can release hydrocarbons, which can bioaccumulate in salmonids (McCain, et al., 1990), leading to loss of condition. As salmonids are known to avoid areas containing hydrocarbons (Maynard & Weber, 1981), fuel spills can lead to effective loss of habitat and/or migration routes. Fuel spills are unlikely to occur at all, and even if one did occur, it is unlikely to be a scale which would have an appreciable effect on salmonid habitats. However, this risk cannot be completely discounted and needs to be considered when designing mitigation for the project.

Acidification of watercourses could also occur if felling of conifer plantation occurs near watercourses. Changes in pH could lead to fish kills and a reduction in recruitment, leading to population declines.

A decrease in fish stocks can also lead to reduced prey availability to otter.

There are no otter holts within 150 m of any proposed infrastructure, so no significant indirect effects on otter are likely as a result of disturbance or as a result of removal of habitat.

While no white-clawed crayfish were recorded during surveys, burrows were observed along the bank at survey site A5 which lies just outside the Project boundary. No European eel were observed, but a positive eDNA was recorded downstream at A6.

Unmitigated secondary effects are therefore likely to be significant at the county/regional scale for Atlantic salmon, brown trout, lamprey sp., white-clawed crayfish, European eel, and otter.

The turbine haul route nodes where works are required do not intersect watercourses. As such, no indirect effects are likely.

5.5.3 POTENTIAL OPERATION PHASE EFFECTS

Direct effects are likely to occur due to the operation of the turbines, hardstands, and access tracks only. Some mitigation measures will also act as sources of operation phase effects. This includes bat mitigation buffers, where the area surrounding certain turbines must be kept free from any forestry/woodland/ hedgerows/treelines

throughout the entire operation phase. For the assessed turbine dimension range, the minimum and maximum horizontal bat-buffer radii are 45m and 80.32m, respectively. The buffer areas comprise cutover bog habitat and are already open, so no initial vegetation clearance is required.

The grid connection will be buried underground following installation. Once installed, there are no likely significant operational effects from the grid connection. Similarly, the turbine haul route is not required during the operation phase of the Project.

The proposed lifespan of the project is 35-years and so operational effects will be long-term.

Potential effects resulting from the operation phase are as follows.

Direct effects:-

- Collision with turbines and barotrauma for bats; and,
- Collision with turbines for birds.

Indirect effects:-

- Collection/drainage of surface water runoff;
- Operational activities and servicing (a few visits per year with a small number of human personnel);
- Displacement effect of operating turbines; and,
- Displacement effects of lighting.

5.5.3.1 Designated Sites

SACs and SPAs are considered fully in the NIS. No adverse effects on the integrity of SACs and SPAs or any other European site were identified and therefore, in an EIA sense, there are no likely significant effects on these designated sites (**Section 5.4.1.1**).

Nationally designated sites (not included within an SAC and SAC) that are within the Zol with connectivity are Woodville Woods pNHA, River Little Brosna Callows NHA, Nahinch (Tipperary) pNHA, and Roscrea Bog pNHA.

Direct Effects

The project is not located within any NHAs or pNHAs, so no significant direct effects are likely.

Woodville Woods pNHA, Lough Nahinch (Tipperary) pNHA and Roscrea Bog pNHA have birds mentioned on their site synopses, so there could be significant effects due to collision with turbines for common snipe. The same is true with River Little Brosna Callows NHA so there could be significant effects due to collision with turbines for European golden plover, northern lapwing and common snipe.

For snipe, the number of predicted collisions per year is 0.16–0.21, depending on turbine configuration. No site-specific population estimate for common snipe is available for Woodville Woods pNHA, Lough Nahinch (Tipperary) pNHA or Roscrea Bog pNHA within the published site synopses, and a robust quantitative assessment of collision risk significance is accordingly not possible for these three sites.

The site synopsis for Woodville Woods pNHA identifies the site's peripheral lake/wetland habitat as capable of harbouring "*considerable numbers*" of snipe, providing

qualitative support for a conclusion of no significant effect. The site synopsis for Lough Nahinch (Tipperary) pNHA identifies the site as important for a range of breeding water birds, including snipe, with bird interest further increased in winter by migratory species; this similarly supports a conclusion of no significant effect.

For Roscrea Bog pNHA, the site synopsis provides no indication of snipe abundance or importance, and no population estimate is available against which to test collision risk quantitatively. The significance of effect has therefore been considered qualitatively, having regard to the following.

First, the magnitude of predicted collision mortality is low in absolute terms: 0.16–0.21 collisions/year, equating to approximately 6–7 birds over the 35-year operational lifetime of the Project. This represents a less than 1% increase on background mortality at both ROI and County Offaly scale (**Table 5.15**), even though the county estimate is considered a substantial underestimate for this cryptic species.

Second, predicted collisions arise from flight activity recorded within the Project site, much of which relates to snipe breeding and foraging on the site itself (confirmed breeding in 2023). Roscrea Bog pNHA lies approximately 18.51 km from the Project, and connectivity is limited to the potential for individual birds to move between the two. Only a proportion of predicted collisions, if any, would therefore involve birds associated with the pNHA.

Third, common snipe is a mobile species, and the Irish wintering population is substantially augmented by migrants from further afield. Given the modest size of the pNHA (c. 27 ha), it is not considered to support a discrete or demographically closed snipe population that is separable from the wider regional population.

On this basis, collision risk is not predicted to result in a significant effect on the snipe population of Roscrea Bog pNHA. The post-construction collision and flight activity monitoring proposed for the Project (**Section 5.7.3**) will verify this conclusion.

For European golden plover, the number of predicted collisions per year is 0.72–0.76. Based on a River Little Brosna Callows NHA winter population of 6,934.8 individuals, this represents a 0.038–0.04% increase relative to background mortality.

For northern lapwing, given the availability of a winter population estimate but not a breeding population estimate for this NHA, collision risk has been assessed against the non-breeding population only. The applicable non-breeding season collision estimate is 0.03 collisions/year (mean of estimates of 0.02 and 0.04 across turbine configurations assessed). Based on a River Little Brosna Callows NHA winter population of 4,787.2 individuals, this represents an increase of less than 0.01% relative to background mortality.

Common snipe is present at River Little Brosna Callows NHA but is not identified in the site synopsis as a species of national or international importance at this site, unlike European golden plover and northern lapwing, both of which are specifically noted as supporting nationally important populations (NPWS, 2002). No basis therefore exists within the site synopsis for establishing the relative importance of this NHA to the wider common snipe population, or for testing collision risk significance against a population specific to this site. The significance of collision risk to common snipe is accordingly assessed at Republic of Ireland and County Offaly population scale, consistent with

the approach applied elsewhere in this assessment (**Section 5.5.3.3**), where this is concluded not to be significant.

As the additional mortality due to collision risk for European golden plover and northern lapwing is <1% of background mortality at this NHA (for best- and worst-case estimates), and collision risk to common snipe is not considered significant at the population scale appropriate to that species, collision is not predicted to have a significant effect on the bird populations of the River Little Brosna Callows NHA.

Indirect Effects

As there are predicted to be no significant indirect effects on birds (see **Section 5.5.3.3** on Birds below), there can be no indirect effects on these designated sites.

As there are no NHAs or pNHAs hydrologically connected to the project, significant indirect effects are not considered likely.

5.5.3.2 Habitats and Flora

Direct Effects

While no vegetation was recorded within the bat-felling mitigation buffer areas during surveys, this could change over the operational lifetime of the project. Bat felling buffers will need to be maintained during the operation phase which may result in habitat loss. However, this is likely to be limited to low-growing pioneer plants such as ruderal vegetation, or immature scrub. Thus, there will be no significant, direct, operational effects on any habitats during the operation phase.

Indirect Effects

There will be no significant, indirect, operational effects on any habitats during the operation phase.

5.5.3.3 Birds

Direct Effects

Potential direct effects include:

- Disturbance / displacement and barrier effects; and,
- Collision with wind turbines.

No operational impacts are likely because of the UGL, which will be buried underground and located almost entirely within or adjacent to the existing road network. The same is also true for the THR nodes because the proposed works will be limited to the construction stage. The remaining project elements are considered in further detail below.

Disturbance/Displacement & Barrier Effects

Operation of the proposed wind farm has the potential to cause disturbance to, and displacement of, birds through the physical presence of turbines and infrequent maintenance-related human activity. Disturbance during operation is generally expected to be lower in magnitude than during construction: maintenance visits are infrequent (typically several times per year), confined to existing tracks and infrastructure, and generate low levels of noise and human presence comparable to, or lower than, existing agricultural activity at the site. Species are also known to

habituate to predictable, low-intensity disturbance sources over time (Drewitt & Langston, 2006; Goodship et al., 2022; Hoetker et al., 2006), and in several published studies no measurable displacement was recorded at all (Devereux et al., 2008; Douglas et al., 2011; Fielding & Haworth, 2013; Whitfield et al., 2010).

Individual turbines, or the wind farm as a whole, may also present a barrier to bird movement. Such effects can only plausibly arise where there is evidence of birds regularly flying through the site or regularly using habitats within it for foraging, breeding or roosting; a barrier effect cannot be inferred in the absence of evidence of regular functional use.

The operational access tracks will not give rise to significant disturbance: operational activity is infrequent, predictable, confined to existing infrastructure, and does not introduce new disturbance sources or affect additional habitat beyond what is already assessed below. Similarly, no significant disturbance or barrier effects are predicted along the UGL or THR nodes, as the grid cable will be buried for the duration of the operation phase and THR works are required for construction only; no sensitive breeding or roosting sites for IEF bird species were recorded within 1 km of either.

Species-specific assessments are provided below for those species for which sufficient site-specific survey evidence is available.

Black-headed gull

No breeding or roosting was recorded within or near the development footprint during surveys. Confirmed foraging and roosting activity was concentrated at a lake c.1.7 km from the site, where the species was also probably breeding. This distance exceeds the maximum disturbance buffer of 1,000 m reported for any species reviewed by (Goodship et al., 2022), which is the most precautionary benchmark available in the absence of a species-specific figure, and the reduced intensity of operational activity relative to construction further reduces the likelihood of an effect at this distance. No regular flight activity across the site was recorded during the survey programme, and in the absence of evidence of functional connectivity through the site, no barrier effect is predicted. Disturbance/displacement and barrier effects on black-headed gull during operation are therefore assessed as not significant at any geographic scale.

Common kestrel

No breeding or roosting locations were identified within the 200 m buffer within which kestrel is considered susceptible to disturbance (Goodship et al., 2022). Foraging habitat within the site footprint is limited (predominantly cutover bog, unsuitable for the species), and the majority of recorded flight activity was located off-site to the west, away from proposed infrastructure. Given the low intensity and predictability of operational activity, disturbance to foraging birds is unlikely to be significant. There was no evidence of regular flight lines through the site, and the dispersed turbine layout is not orientated in a linear fashion that would concentrate any barrier effect. Disturbance/displacement and barrier effects on common kestrel during operation are therefore assessed as not significant at any geographic scale.

Common kingfisher

No common kingfisher were recorded within or near the development footprint during

surveys. A single sighting was made c.1.8km from the site. This distance exceeds the maximum disturbance buffer of 1,000m reported for any species reviewed by (Goodship et al., 2022), which is the most precautionary benchmark available in the absence of a species-specific figure, and the reduced intensity of operational activity relative to construction further reduces the likelihood of an effect at this distance. No flight activity across the site was recorded during the survey programme, and in the absence of evidence of functional connectivity through the site, no barrier effect is predicted. Disturbance/displacement and barrier effects on common kingfisher during operation are therefore assessed as not significant at any geographic scale.

Common ringed plover

A single pair was recorded in one breeding season only, c.350m from any proposed infrastructure, beyond the 100–200m buffer within which the species is considered susceptible to disturbance (Goodship et al., 2022). The absence of records in any other survey season indicates the site does not represent a consistently used breeding location. No repeat records or evidence of regular flight activity across the site were obtained, and a single, non-repeated observation does not support an inference of functional connectivity or regular movement through the site. Disturbance/displacement and barrier effects on common ringed plover during operation are therefore assessed as not significant at any geographic scale.

Common snipe

Confirmed breeding was recorded at a distance greater than 500m from the footprint in 2023, and possible breeding c.500m away in 2024; no on-site foraging or roosting was recorded in the non-breeding season. No published operational disturbance buffer exists for the species, but the available behavioural evidence indicates low sensitivity: snipe rely on cryptic plumage and flush only at short range (Wentworth, 2015), and incubating females typically forage within 70m of the nest before ranging further (Green, 1988). Pearce-Higgins et al. (2009) reported snipe displacement around upland turbines. Given breeding activity is recorded at or beyond 500m, and operational disturbance intensity is lower than during construction, no significant effect is predicted. Cumulative flight activity across the survey programme was low (54 birds), with no evidence of regular, concentrated movement across the site, and no significant barrier effect is therefore predicted. Disturbance/displacement and barrier effects on common snipe during operation are therefore assessed as not significant at any geographic scale.

Eurasian teal

No breeding or foraging activity was recorded within or adjacent to the site in either season, with all records associated with the lake c.1.7km away in the non-breeding season (**Table 5.9, Table 5.15**). This distance exceeds the maximum disturbance distance of 800m reported for any duck species reviewed by Goodship et al. (2022), the most precautionary benchmark available in the absence of a species-specific figure for Eurasian teal, and the reduced intensity of operational activity relative to construction further reduces the likelihood of an effect at this distance. Teal feed in shallow, vegetated open water, and nest in dense ground cover typically, though not exclusively, in proximity to water (Gilbert et al., 1998), a resource not utilised by the species within the site during the survey programme. No evidence of regular flight

activity across the site was recorded, and in the absence of evidence of functional connectivity through the site, no barrier effect is predicted. Disturbance/displacement and barrier effects on Eurasian teal during operation are therefore assessed as not significant at any geographic scale.

European golden plover

Non-breeding golden plover are considered susceptible to disturbance while foraging or roosting within 200–500m buffer of the source of disturbance (Goodship et al., 2022). No regular foraging or roosting locations were identified within the site during surveys; recorded diurnal activity was predominantly off-site birds circling overhead on apparent migration and the transient nature of recorded use reduces the likelihood of a significant operational effect. Overhead activity was characterised as passage/migratory movement rather than regular functional use of the site for foraging, breeding or roosting, and no evidence of a consistent flight corridor through the site was identified. Disturbance/displacement and barrier effects on European golden plover during operation are therefore assessed as not significant at any geographic scale.

Great cormorant

Cormorant was recorded only occasionally, as birds in transit through the wider area, with no foraging, roosting or breeding activity at or near the site. As an exclusively piscivorous species dependent on open water and adjacent cliffs, trees or structures (Hatch et al., 2020), none of which are present at the site, cormorant has no functional requirement for site habitat. Published evidence also indicates cormorant is among the least disturbance-sensitive of colonial waterbird species (Velilla et al., 2025). All records were of birds in transit with no evidence of a regular or concentrated flight path through the site. Disturbance/displacement and barrier effects on great cormorant during operation are therefore assessed as not significant at any geographic scale.

Hen harrier

No breeding, roosting or regular hunting activity was recorded during the survey programme, with only occasional non-breeding-season flyovers. Winter roost surveys, including those carried out for the permitted Phase 1 project, confirmed no roosts within the survey area, consistent with the unsuitability of the site's cutover bog (bare, actively worked peat with minimal vegetation cover) as roosting habitat. Hen harrier are considered susceptible to disturbance within 300–750m of the disturbance source (Goodship et al., 2022). The absence of any confirmed roosting, breeding or regular hunting activity across the survey programme, corroborated by the Phase 1 winter roost survey precedent, indicates no regular functional use of the site consistent with a barrier effect. Disturbance/displacement and barrier effects on hen harrier during operation are therefore assessed as not significant at any geographic scale.

Little egret

No site usage was recorded in either season, with all observations limited to c.500m from proposed infrastructure. Little egret forages in shallow lakes, riverbanks, lagoons, estuaries and flooded grassland, none of which occur within the site. The complete absence of recorded site usage indicates there is no regular flight activity through the site against which to assess a barrier effect. Disturbance/displacement and barrier

effects on little egret during operation are therefore assessed as not significant at any geographic scale.

Mallard

Breeding and most of the foraging/roosting activity were concentrated c.1.7km from the site, exceeding the 50–100m (breeding) and >100m (non-breeding) buffers within which mallard is considered susceptible to disturbance (Goodship et al., 2022). Some on-site foraging activity was recorded but given extensive alternative foraging habitat available in the wider area, including the 1.7km wetland, and reduced operational activity relative to construction, no significant effect is predicted. No evidence of regular flight activity across the site was recorded and foraging and breeding activity were both concentrated well away from proposed infrastructure. Disturbance/displacement and barrier effects on mallard during operation are therefore assessed as not significant at any geographic scale.

Merlin

Merlin was recorded only as occasional flyovers (4 birds, NB22/23 season only), with no evidence of breeding, roosting or regular site usage in any season. Merlin is considered susceptible to disturbance within 300–500m (breeding) and <200m (non-breeding) of the source of disturbance (Goodship et al., 2022). The low frequency and single-season occurrence of flyover records does not support an inference of regular functional use or a consistent flight corridor through the site. Disturbance/displacement and barrier effects on merlin during operation are therefore assessed as not significant at any geographic scale.

Northern lapwing

A single, likely repeat breeding territory was recorded across all three survey seasons, moving progressively westward through the cutover bog, with the most recent (B24) location c.500m from proposed infrastructure, beyond the 108m disturbance buffer for breeding lapwing (Hoetker et al., 2006). No winter site usage was recorded, with wintering flocks instead located c.4km away. Approximately 85ha of cutover bog is available outside the development footprint, providing ample displacement habitat should localised displacement occur. No evidence of barrier effects for either northern lapwing or waders as a group, has been shown in a review of 127 separate studies of wind farms in 10 countries, most of them in Germany (Hoetker et al., 2006). Disturbance/displacement effects on northern lapwing during operation are assessed as not significant at any geographic scale, and barrier effects are considered not significant.

Peregrine falcon

No breeding, roosting or foraging activity was recorded within the site. The nearest known nest site is 2.2km away at Loughnane Quarry, exceeding the 500–750m (breeding) and 200m (non-breeding) buffers within which the species is considered susceptible to disturbance (Goodship et al., 2022). No evidence of regular flight activity through the site was recorded, consistent with the distance to the nearest known nest site. Disturbance/displacement and barrier effects on peregrine falcon during operation are therefore assessed as not significant at any geographic scale.

Whooper swan

No regularly recorded aggregations or roosts occurred within the 200–600m buffer within which wintering whooper swan is considered susceptible to disturbance (Goodship et al., 2022). A single record of three birds within 465m appeared to relate to localised flooding rather than regular site use; the great majority of records were concentrated at Dovegrove Callows SPA, c.4km southwest of the site. Regular activity is therefore associated with the SPA rather than with the site itself, and the single anomalous record does not indicate regular movement through the turbine array. Disturbance/displacement and barrier effects on whooper swan during operation are therefore assessed as not significant at any geographic scale.

Collision with Wind Turbines

Collision of a bird with turbine rotor blades is generally fatal. The consequences of such mortality depend on the size, density, and demography of the affected population. In species with low population densities and low reproductive rates such as raptors, each additional loss can represent a higher proportion of the local population, with greater potential for negative population-level effects than in abundant, fast-reproducing species such as passerines (Beston et al., 2016). Large birds such as raptors and waterfowl also tend to be long-lived and have low annual productivity, which increases their sensitivity to additional mortality from turbine collisions (Carrete et al., 2012; Katzner et al., 2016).

The likelihood of collision is influenced by several interacting factors, including the size, manoeuvrability, and flight behaviour of the species, their use of the Wind Farm Site, environmental conditions, and the design and layout of the wind farm itself. Collision risk is typically greatest for species that spend a high proportion of time flying within the rotor-swept zone, such as foraging or displaying raptors, and for birds that undertake regular low-level flights between feeding and roosting areas (e.g. swans, geese, and other wildfowl). Risk increases in areas where large concentrations of birds occur (e.g. migration bottlenecks) and during poor visibility or negative weather conditions that reduce birds' ability to detect or avoid turbines (Langston & Pullan, 2003; Pearce-Higgins et al., 2009). Raptors may also be more vulnerable where wind farms coincide with areas of high prey density or where suitable perching structures are present near turbines (Percival, 2005).

Although passerines nesting or foraging within a wind farm might appear to be at regular risk of collision, evidence indicates that small birds generally collide with turbines infrequently compared with larger species. Most passerines fly below the height of the turbine blades or migrate at altitudes above rotor level. Moreover, many species migrate nocturnally and traverse wind farm sites rapidly, limiting their exposure time (Bradarić et al., 2024; Mills et al., 2011).

Empirical monitoring studies consistently show that raptors, gulls, and large waterbirds are overrepresented in collision records relative to their abundance, while passerines constitute only a small proportion of fatalities (Erickson et al., 2014; Thaxter et al., 2017). This pattern reflects behavioural and aerodynamic differences but also the influence of detection bias: small carcasses are removed more rapidly by scavengers and are harder to locate during searches (Devault et al., 2017). Even after correction for such biases, however, passerines remain among the least affected groups.

From a population perspective, most passerine species are widespread, abundant, and characterised by high reproductive output ('fast' life-history traits). Consequently, additional mortality from wind turbine collisions is generally unlikely to result in measurable population effects. In contrast, species with small or declining populations, slow reproduction, and high site fidelity, such as target raptor species and large, less manoeuvrable waterbirds (e.g. swans and geese), are of higher sensitivity to collision impacts. Populations with a favourable conservation status (stable or increasing) are also more capable of compensating for small increases in mortality through density-dependent processes, whereas populations already in decline may not be able to do so.

It is important to note that operational disturbance and collision risk effects are spatially mutually exclusive: a bird that avoids the wind farm due to disturbance cannot simultaneously be at risk of collision. However, they are not temporally exclusive as a bird may initially avoid the Wind Farm Site but later habituate, at which point it could be exposed to collision risk. In addition, habitat change associated with construction or ongoing bog rehabilitation may alter collision risk over time, for example by attracting open-ground species to recently felled areas or wetland species to recolonising cutover bog.

IEF species that were scoped in for detailed assessment and considered at risk of collision with the Project, based on flight activity data recorded, were subjected to CRM (see **Annex 5.9**) and included:

- Black-headed gull;
- Common kestrel;
- Common snipe;
- Eurasian teal;
- European golden plover;
- Great cormorant;
- Hen harrier;
- Little egret;
- Mallard;
- Merlin;
- Northern lapwing;
- Peregrine; and
- Whooper swan.

Rationale for Prediction of Effect

Without application of methods such as Population Viability Analysis (PVA) it is not fully known to what extent the populations of target species can sustain additional levels of mortality.

It has been assumed, however, that any impact not increasing adult mortality by more than 1% of the existing background mortality rate can be considered insignificant (Percival, 2003). This approach is inherently precautionary when applied to non-breeding populations because adult birds typically have the highest survival rates. High adult survival means that natural (background) mortality is very low. As a result,

even a small number of turbine-related deaths can represent more than a 1% increase above this low baseline. Using adult survival rates therefore makes it easier for predicted collision mortality to exceed the 1% threshold and thus increases the likelihood of identifying a likely significant effect.

Where excess mortality is >1% of background levels, a more detailed assessment of the predicted mortality over the 35-year lifespan of the Project has been provided. This considers each species' population size, recent population trends and ecology following (NatureScot, 2025b) guidance, as well as providing information on empirically documented cases of collision for further context (Dürr, 2026; O'Donoghue et al., 2020). Significant negative effects are only likely where the number of predicted deaths due to the Project are likely to result in appreciable differences to projected rates of population decline or recovery.

Note that recent background trends may not continue over the lifespan of the Project, even if the Project did not go ahead. This is because population declines or increases may eventually plateau, depending on the drivers for the population trend. However, in absence of detailed population modelling, we have assumed that the recent trends will continue.

Sources of empirically documented collisions in Europe come from the (Dürr, 2026) database. While the Dürr database does not perfectly reflect reality (not all wind farm projects and countries carry out post-construction monitoring in the same way, with the same intensity, with the same level of detail and reporting), it represents the best estimate we have of the empirical effects of collision on European birds. Collisions reported in the Republic of Ireland and Northern Ireland are conflated within the 'GB' column in the Dürr (2026) dataset and have been manually extracted so that only those for the island of Ireland are reported in this Chapter. Other additional datasets have been consulted for evidence of documented collisions in the Republic of Ireland, such as the RAPTOR protocol report (O'Donoghue et al., 2020) and Irish Hen Harrier Threat Response plan (NPWS, 2024).

Summary of CRM Outputs

Table 5.15 summarises the outcome of the CRM, accompanied by relevant supplementary data to support the evaluation of the potential significance of predicted collision mortality for each species. Adult survival rates are taken from BTO BirdFacts (BTO, 2026a). Annual background mortality is calculated as population size multiplied by background mortality rates (i.e. 1-survival rates). For further details regarding the CRM see **Annex 5.9**. Note that all calculations have been undertaken based on unrounded data.

Potential for Increased Future Collision Risk due to Habitat Change (Bord na Móna Rehabilitation)

Baseline survey data used to inform the CRM (**Section 5.3.3; Annex 5.9**) reflect flight activity recorded during the period May 2022 to March 2024, prior to implementation of the peatland rehabilitation measures proposed for the wider Galros bog complex, of which part of the wind farm site's cutover bog forms a part (**Section 5.5.1**). The Bord na Móna Galros Draft Decommissioning and Rehabilitation Plan (2026) includes drain-blocking and hydrological management measures intended to promote the recovery of wetland, fen and associated habitats across areas of cutover bog, including areas

within or adjacent to the wind farm site, over the coming years.

Several of the primary target bird species subject to collision risk modelling above, including common snipe, northern lapwing, Eurasian teal, mallard and black-headed gull, are associated with damp, open or wetland habitats of the kind the rehabilitation programme is intended to create. There is accordingly potential for the extent and quality of habitat suitable for these species within or adjacent to the wind farm site to increase over the course of the Project's operational lifespan, independently of the Project, as BnM's separate rehabilitation programme matures. Should this occur, baseline flight activity levels recorded prior to rehabilitation may not fully represent activity levels once rehabilitation measures have taken effect, with a corresponding possibility that collision risk for these species could increase relative to the levels predicted in this assessment.

This potential is considered adequately addressed by three factors taken together: the CRM outputs above already incorporate highly precautionary assumptions, inclusion of all flight activity within 500m of turbines, adult survival rates and for many species, an avoidance rate that is not based on empirical evidence (**Section 5.5.3.3**). None of the species concerned are predicted to approach significance even under current baseline collision estimates, providing headroom before an increase in site use would translate into a significant effect; and the post-construction collision and breeding wader monitoring programme proposed for the Project (**Section 5.7.3.3**), which runs for a minimum of three years post-construction under a formal review and adaptive management mechanism, would identify and respond to any material increase in collision rates for these species, whatever the underlying cause. On this basis, no significant effect due to potential future habitat change is considered likely, though this is recognised as an area of residual uncertainty which the monitoring programme is, in part, designed to address.

Nocturnal Migration and Avian Lighting

Baseline surveys were mainly conducted during daylight hours. Therefore, it is possible that collision risk to nocturnal birds, especially nocturnal migrants, could be underestimated. However, this is unlikely to be the case for the following reasons.

First, dedicated nocturnal migration surveys were undertaken during peak migration periods in the spring and autumn of 2024, and spring of 2025 using a thermal camera. No migratory movements were detected. Second, following the latest NatureScot CRM guidance (Band, 2024), collision risk estimates have been corrected for all species known to have nocturnal or crepuscular flight activity to account for any nocturnal flight activity that may have been missed by diurnal surveys.

Third, although nocturnal bird migration is extensive, empirical data indicate that nocturnal migrants do not face elevated collision risk at onshore wind farms compared to their diurnally migrating counterparts. In a comprehensive study of four German wind farms located along major migration corridors, Welcker et al. (2017) found that strictly nocturnal migrants accounted for only 8.6% of total fatalities, showing no disproportionately higher collision rate compared to daytime migrants. Similarly, research conducted at three large wind farms in the Netherlands during autumn and winter (Krijgsveld et al., 2009) revealed that nocturnal migrants exhibited an extremely low collision risk, emphasizing that night-flying migrants are not inherently

at elevated danger. Together, these studies demonstrate that even though many passerine and other species migrate at night, nocturnal migration does not translate to higher mortality at onshore turbines, indicating that nocturnal migration does not, in itself, translate into higher collision rates at onshore turbines.

Similarly, there will be aviation obstruction lighting used as part of the Project, which could potentially increase collision risk to nocturnal migrants. Artificial light can impact birds in many ways, however phototaxis – attraction to light, has the potential to have a negative effect in this situation. Although the exact mechanism of the attraction to artificial light is unknown, interference with the magnetic compass of birds (Poot et al., 2008) or navigation by moonlight (Rodríguez et al., 2015), are most likely. A NatureScot (NatureScot, 2020) information note highlighted that the species most at risk from collision with lit wind turbines were burrowing nesting seabirds and nocturnally migrating passerines. The Wind Farm Site is located far from the coast, therefore impacts on burrowing seabirds are ruled out.

Mortality rates from illuminated wind turbines have been studied in North America only, there are very few European and even fewer UK or Irish examples of such research. One study found that nocturnal migrating bird mortality was low, between one and seven individuals per turbine per year (Kerlinger et al., 2010). The results also highlighted that large scale mortality rates at wind farms with lighting are highly unlikely to occur. Mortalities in general were lower at wind farms compared to communications towers. This is likely to be due to communications towers being greater in height than turbines, extending into altitudes where most nocturnal migrants fly and being constructed with guy wires that are less easily observed by flying birds.

The minimal UK/European studies available are based on offshore wind farms; these found that terrestrial birds can be attracted to illuminated offshore structures at night, therefore there is a greater collision risk (Hüppop et al., 2006). The comparison of onshore and offshore turbines has limited merit however, as birds fly lower over the sea than on land (Krüger & Garthe, 2001), increasing collision risk and is included only as it is one of the few UK/European studies. Furthermore, offshore structures offer a place of rest for migrant species in an area of limited opportunity (the open sea), whereas there are plentiful resting places in the vicinity of an onshore wind farm.

Effects on migrating passerines remain, although the mortality suggested by North American research is relatively low, considering most passerines are short lived and prolific breeders. Diurnal bird data does not show a significant number of migrating passerines at the Wind Farm Site. Therefore, no significant negative effects are likely in association with aviation lighting.

Species	Estimated No. of Collisions / Year	Population Type ²¹	Population Size	Adult Survival Rates	Background Mortality (Deaths / Year)	% Increase on Background Mortality Due to Collision	Total No. Of Collisions Over 35 Y Lifespan	Population Trend	Empirically Documented Collisions – Europe (Dürr, 2026)	Empirically Documented Collisions - Ireland
Black headed gull	0.17 – 0.19	ROI (b and nb)	48,821 individuals (nb), 7,810 pairs (b)	0.90	4,882.1	0.003-0.004%	5.78 – 6.48	-58% 1998 – 2018 (20 years)	838	0
		County (nb)	278.35 individuals (nb)		27.835	0.59-0.66%				
Common kestrel	0.26 – 0.31	ROI (b and nb)	13,500 individuals (b)	0.69	4,185	0.006-0.007%	9.1-10.85	-53% 1998 – 2018 (20 years)	905	2 (O'Donoghue et al., 2020)
Common snipe	0.16 – 0.21	ROI (b and nb)	8,550 individuals (b)	0.48	4,446	0.003-0.005%	5.43-7.18	-50% 1998 – 2018 (20 years)	20	0
		County (b and nb)	40.75 individuals (nb; likely underestimate)		21.19	0.73-0.97%				
Eurasian teal	0.02 – 0.03	ROI (b and nb)	37,480 individuals (nb)	0.53	17,615.60	0.0001-0.0002%	0.70-0.88	-6% 2011/12 to 2015/16 (5 years)	15	0
		County (b and nb)	1,962.75 individuals (nb)		922.49	0.002-0.003%				
European golden plover	0.72 – 0.76	ROI (nb)	81,190 individuals (nb)	0.73	21,921.3	0.0033-0.0035%	25.2-26.4	-9.7% 2011/12 to 2015/16 (5 years)	47	0
		County (nb)	8,490.3 individuals (nb)		2,292.38	0.03%				

²¹ Population estimates for common kestrel, merlin and peregrine falcon are breeding-population figures; no separate non-breeding (winter) population estimate is available for these resident raptor species in Ireland. The breeding population figure has been applied as the denominator against the full annual (breeding and non-breeding season) collision estimate, which is considered a precautionary approach, since it tests total annual mortality against the smaller of the two population figures that would otherwise apply across the year.

Species	Estimated No. of Collisions / Year	Population Type ²¹	Population Size	Adult Survival Rates	Background Mortality (Deaths / Year)	% Increase on Background Mortality Due to Collision	Total No. Of Collisions Over 35 Y Lifespan	Population Trend	Empirically Documented Collisions – Europe (Dürr, 2026)	Empirically Documented Collisions - Ireland
Great cormorant	0.005	ROI (b and nb)	8,670 individuals (nb)	0.88	1,040.4	0.0005%	0.175	-9.7% 2011/12 to 2015/16 (5 years)	36	0
		County (nb)	14.75 individuals (nb) individuals		1.77	0.28%				
Hen harrier	0.005	ROI (b and nb)	373 individuals (nb)	0.81	70.87	0.007%	0.175	-33% 2015-2022 (7 years)	30	1 in Antrim (Dürr, 2026); one possible and four probable / confirmed incidences of turbines strike (NPWS, 2024; O'Donoghue et al., 2020)
Little egret	0.04 – 0.045	ROI (b and nb)	1,140 individuals (nb)	0.712	328.32	0.012-0.014%	1.4-1.575	+8% 2011/12 to 2015/16 (5 years)	7	0
		County (b and nb)	18.85 individuals (nb)		5.43	0.74-0.83%				
Mallard	0.10 – 0.11	ROI (b and nb)	17,560 individuals (nb)	0.627	6,549.88	0.0015-0.0016%	3.32-3.68	-11.8% 2011/12 to 2015/16 (5 years)	414	0
		County (b and nb)	564 individuals (nb)		210.37	0.048-0.052%				
Merlin	0.01 – 0.0151	ROI (b and nb)	400 individuals (b)	0.62	152	0.007-0.01%	0.35-0.53	-40% (40 years)	5	0
Northern lapwing	0.15 – 0.18 (annual)	ROI (nb)	67,700 individuals (nb)	0.705	19,971.5	0.00075 - 0.0009%	5.25-6.12	-14.0% 2011/12 to 2015/16 (5 years)	33	0
	0.12 – 0.15	ROI (b)	1,040 individuals (b)		306.8	0.039-0.047%	4.20-5.08			
	0.15 – 0.18 (annual)	County (nb)	7,044.2 individuals (nb)		2,078.039	0.0072-0.0084%	5.25-6.125			

Species	Estimated No. of Collisions / Year	Population Type ²¹	Population Size	Adult Survival Rates	Background Mortality (Deaths / Year)	% Increase on Background Mortality Due to Collision	Total No. Of Collisions Over 35 Y Lifespan	Population Trend	Empirically Documented Collisions – Europe (Dürr, 2026)	Empirically Documented Collisions - Ireland
Peregrine falcon	0.015	ROI (b and nb)	850 (b)	0.81	161.5	0.009%	0.525	Stable	57	0
Whooper swan	<0.01	ROI (nb)	14,467 (nb)	0.801	2,878.93	<0.001%	<0.35	+22.1% 2015-2020 (5 years)	10	0
		County (nb)	518.85 (nb)		103.25	<0.01%	<0.35	+208% 2015-2020 (5 years)		

Table 5.15: CRM Outputs and Population Data

Common kingfisher were not recorded by any flight activity surveys and so collision is not predicted to have a significant effect on this species at any geographical scale.

Common ringed plover was treated as a secondary target species and not subject to collision risk modelling, on the basis of its low and inconsistent site use. The species was recorded in only two of six survey seasons (breeding 2022 and 2023): 12 of 432 five-minute periods in 2022 (peak count 3, June–July) and 5 of 432 in 2023 (peak count 3, May–June), under 2% of watch time in the seasons it occurred, and absent entirely from the non-breeding, migration and 2024 breeding surveys. One probable breeding record was made (mating pair, 23 May 2023), with no equivalent record in 2022 or 2024, indicating intermittent rather than consistently held site occupation.

Common ringed plover is characterised by low-level, low-speed, highly manoeuvrable flight typically well below rotor-swept height, and no activity indicative of turbine-height transit or regular commuting flight was recorded in any survey season.

Given this low, inconsistent level of use and the absence of any elevated or transiting flight activity, common ringed plover is not considered to be exposed to a meaningful collision risk pathway. A significant effect as a result of collision is not considered likely at any geographical scale.

As shown in **Table 5.15** above, additional mortality due to collision risk is <1% of background mortality (for best- and worst-case estimates) and therefore collision is not predicted to have a significant effect on the ROI or County Offaly populations of the following species:

- Black-headed gull,
- Common snipe,
- Eurasian teal,
- European golden plover,
- Great cormorant,
- Great white-egret,
- Little egret,
- Mallard,
- Northern lapwing (wintering population), and
- Whooper swan.

The same is true for ROI populations for the following species i.e. collision (best- and worst-case estimates) is not predicted to have a significant effect on the ROI populations:

- Common kestrel,
- Hen harrier,
- Merlin,
- Northern lapwing (breeding population), and
- Peregrine falcon.

Common kestrel, merlin and peregrine falcon– county-scale assessment

Common kestrel, merlin and peregrine falcon are wide-ranging species that do not exhibit the site fidelity characteristic of the waterbird species assessed against I-WeBS site-based population data above. Individuals of these species hold large home ranges or territories, and there is continuous interchange across administrative boundaries through dispersal and ranging behaviour; County Offaly does not, therefore, represent a discrete or demographically closed population unit for any of the three species. On this basis, assessment at national (ROI) population scale is considered the primary and most biologically appropriate basis for concluding on the significance of collision risk for these species.

Northern lapwing – breeding population county-scale assessment

Unlike the wintering population, for which a reliable County Offaly estimate is available (see above), a comparable data gap exists for northern lapwing during the breeding season. No reliable county-level breeding population estimate could be sourced. On this basis, assessment at national (ROI) population scale is considered the primary and most biologically appropriate basis for concluding on the significance of collision risk for the breeding population of this species.

It is noted that the predicted collision estimate is disproportionately influenced by flight activity recorded during a single survey period: breeding 2022 bird density (CRM Report; **Annex 5.9**) was up to two orders of magnitude higher than the equivalent months in breeding 2023, despite consistent survey effort across all four periods. On the basis of two years of VP data alone (the NatureScot (2025c) minimum recommended duration), it would not be possible to determine whether this reflects a genuine higher-use year or an anomalous outlier.

However, this is informed by the independent breeding wader transect surveys, which recorded a consistently low number of lapwing (1–3 birds) with probable-to-confirmed breeding evidence in the site across all three breeding seasons surveyed (2022, 2023 and 2024), including in 2024 when survey effort was approximately double that of the preceding two years. This suggests the resident lapwing presence at the site has remained broadly stable and supports the interpretation that the elevated 2022 VP flight activity reflects an atypically active flight period for a consistent population, rather than a substantially larger number of birds using the site that year. Given this remains based on indirect evidence rather than a second season of comparable VP data, this uncertainty is nonetheless addressed through the monitoring-linked approach set out in **Section 5.7.3.3**.

Given the residual uncertainty associated with the county-level population data gap and the influence of the breeding 2022 survey period on the mean collision estimate, a monitoring programme is proposed (**Section 5.7.3.3**) to verify post-construction lapwing activity and collision risk at the site. Should monitoring indicate effects greater than predicted, additional mitigation measures would be implemented in response, as set out in the adaptive management framework in **Section 5.7.3.3**.

Indirect Effects

If hydrocarbon spills during the operation of the project led to pollution of wetland habitats and/or dewatering of groundwater-dependent habitats within nearby

designated sites for birds, it could result in indirect habitat loss for qualifying bird species. The same is true for wetland sites that could be used by bird species from nearby designated sites, even if those wetland sites are not designated themselves, and for non-designated watercourses with confirmed hydrological connectivity to the site.

The SCI species and hydrologically connected sites relevant to this pathway are as identified for the construction phase in **Section 5.5.2.3** (Middle Shannon Callows SPA and Lough Derg (Shannon) SPA), comprising northern lapwing, black-headed gull, whooper swan and European golden plover (Middle Shannon Callows SPA) and great cormorant (Lough Derg (Shannon) SPA).

Common kingfisher, while not a named SCI of any SPA in the vicinity, was recorded c.1.8km downstream of the site on the Rapemills River, which is hydrologically connected to the site, representing a confirmed indirect pathway as identified for the construction phase.

Common ringed plover, common snipe, Eurasian teal, mallard and little egret were recorded either within the site itself or at locations with no hydrological connection to the site; no credible indirect pathway was identified for these species during construction.

Fuel storage, refuelling and general ground disturbance during operation are substantially reduced compared to construction, being limited to routine maintenance activities and bunded storage at O&M facilities and are managed under the CEMP. The risk of a pollution or sedimentation event of sufficient magnitude to affect these designated sites is therefore lower than during construction, for which no significant effect was concluded.

As concluded by **Chapter 7 Water**, with embedded mitigation measures in place there will be no significant effects on any wetland site. On this basis, no significant indirect effects are predicted during the operation phase on northern lapwing, black-headed gull, whooper swan, European golden plover, great cormorant or common kingfisher via this pathway.

For common ringed plover, common snipe, Eurasian teal, mallard and little egret, no credible indirect pathway was identified during construction, and the reduced scale of ground disturbance and fuel storage during operation further reduces the already very low likelihood of an effect. No significant indirect effects on these species are predicted during the operation phase.

5.5.3.4 Terrestrial Mammals (excluding bats)

Direct Effects

Inappropriately timed vegetation removal to maintain bat mitigation buffers could result in direct effects on breeding or resting sites for ground-dwelling mammals, namely hedgehog, Irish hare, stoat, and pygmy shrew. As shown in **Section 5.4.4**, there were no mammal breeding or resting sites recorded during the surveys within or in any proximity to the bat mitigation buffers. There was no vegetation present in these areas at the time of survey. If this changes during the operation phase and vegetation within the buffer areas develops and requires removal, then inappropriately timed vegetation removal could cause significant effects on hedgehog at the local scale if

it destroys occupied hibernacula in the absence of mitigation.

Indirect Effects

Generally, mammals are thought to be tolerant of operational wind farms, with little disturbance/displacement from the turbines themselves or personnel.

Creation of bat mitigation buffers are unlikely to result in short-term displacement of foraging, commuting, or sheltering mammals in any adjacent areas considering the absence of suitable habitat in the buffer areas, and given the abundance of suitable displacement habitats in the wider area.

Hibernating hedgehogs could be disturbed by vegetation removal activities, causing them to wake from hibernation prematurely. This could cause mortality, especially if sufficient food is unavailable. For hedgehog, there could be significant indirect effects due to disturbance at the local scale. This could result in short-term indirect effects.

5.5.3.5 Bats

Direct Effects

Potential direct effects include:

- Collision with wind turbines; and,
- Barotrauma (injuries to internal air cavities and blood vessels caused by sudden changes in air pressure behind a moving blade).

Bat species likely to be at risk from these two effects relates to the likelihood that the species will fly at PCHs in an open landscape. The probability of direct effects is higher when a turbine is located near a habitat feature such as a hedgerow, treeline or forest edge. The turbine buffer areas are already open, and no initial vegetation clearance is required. Their management will maintain separation between turbine blades and surrounding bat commuting and foraging habitat features and prevent the establishment of trees or scrub closer to the turbines. No reduction in recorded bat activity arising from initial vegetation clearance has therefore been assumed.

An assessment of direct effects is provided for each bat species recorded during surveys below.

Common & Soprano Pipistrelle

Common pipistrelle and soprano pipistrelle populations are thought to be at high risk of direct effects from operational turbines (NatureScot, 2021). Both species typically use woodland/plantation edge, scrub, treelines and hedgerows for foraging and commuting. Some of the proposed infrastructure is close to these features. In Europe, 3,401 and 494 no. fatalities were recorded for common pipistrelle and soprano pipistrelle, respectively (Dürr, 2026)²². Mathews et al. (2016) found that both pipistrelle species were most recorded as fatalities at operational wind farms in the UK.

The overall risk was calculated based on species' population vulnerability to wind farms and the site risk level (based on habitat features present and the size of the project).

Common pipistrelle reached a high overall risk score at T10 in spring, summer and

²² <https://lfu.brandenburg.de/sixcms/media.php/9/fledermaus-uebersicht-eu.xlsx>

autumn (overall risk score = 15 using max activity), and T11 in summer and autumn (overall risk score = 15 using max activity), and T10 in autumn (overall risk score = 15 using median activity).

Soprano pipistrelle reached a high overall risk score at T10 in spring, and T9 and T10 in autumn (each an overall risk score = 15 using max activity).

Common pipistrelle was the most frequently recorded species, with a peak activity (largest number of calls per night) of 620 calls recorded at location T10 in the spring season, and the greatest mean was 98 calls per night at T10 across all seasons.

Soprano pipistrelle was the next most frequently recorded species, with a peak activity (largest number of mean calls per night) recorded at location T10 in the spring season and a mean of 165 calls per night.

Without mitigation, operation phase effects are likely to have significant effects on common and soprano pipistrelle populations at the local level.

Nathusius' Pipistrelle

Nathusius' pipistrelle populations are thought to be at high risk of direct effects from operational turbines (NatureScot, 2021). This species regularly flies in the open at height, especially during migration. In Europe, 1,792 no. fatalities were recorded (Dürr, 2023). Rydell et al. (2010) found that the species made up 13% of fatalities at operational wind farms in the UK.

The overall risk was calculated based on species' population vulnerability to wind farms and the site risk level (based on habitat features present and the size of the project).

Nathusius' pipistrelle reached a high overall risk score at T9 during spring (overall risk score = 15 using max activity).

Nathusius' pipistrelle was the most infrequently recorded 'high collision risk' species, with a peak activity (largest number of mean calls per night) recorded at location T9 in the spring season, although the number of calls was relatively low (mean of 17 calls per night). Only 3 calls were recorded in the autumn season.

Without mitigation, operation phase effects are likely to have significant effects on Nathusius' pipistrelle populations, given the overall risk score at T9 in spring, and the location of the Project site in relation to the species edge range.

Leisler's Bat

Leisler's bat populations are thought to be at high risk of direct effects from operational turbines (NatureScot, 2021). This species regularly flies over open habitats at height. In Europe, 813 no. fatalities were recorded (Dürr, 2023). Mathews et al. (2016) found common noctule bats were among the most recorded bat fatalities at operational wind farms in the UK. While this is a different species to Leisler's bat, they exhibit similar patterns of flight behaviour to Leisler's bat and so collision risk is also likely to be similar.

The overall risk was calculated based on species' population vulnerability to wind farms and the site risk level (based on habitat features present and the size of the project).

Leisler's bat reached a high overall risk score at T9 during spring and autumn (overall risk score = 15 using max activity), and T10 in spring and summer (overall risk score = 15 using max activity), and T11 in summer (overall risk score = 15 using max activity).

Leisler's bat was the third most frequently recorded species, with a peak activity (largest number of mean calls per night) recorded at location T9 in the spring season and a mean of 273 calls per night.

Without mitigation, operation phase effects are likely to have significant effects on Leisler's bat populations at the local level.

Daubenton's Bat, Natterer's Bat, Brown long-eared bat & Whiskered Bat

While brown long-eared bat, Daubenton's bat, Natterer's bat and whiskered bat were also recorded, these species are at low risk of collision with turbines due to their flight and foraging behaviour.

Populations of bats within the *Myotis* genus are thought to be at low risk of direct effects from operational turbines (NatureScot, 2021). In Europe, 12, 6 and 8 no. fatalities were recorded for Daubenton's bat, Natterer's bat and whiskered bat, respectively (Dürr, 2023). Mathews et al. (2016) found *Myotis* species were among the least recorded bat fatalities at operational wind farms in the UK. Most *Myotis* bat species fly at heights of 20-30 m (i.e. typically below rotor swept height), prefer cluttered habitats and have high levels of manoeuvrability (Mathews et al., 2016; Rydell, et al., 2010).

Populations of brown long-eared bat are also thought to be at low risk of direct effects from operational turbines (NatureScot, 2021). This species typically flies at low heights and close to vegetation. In Europe, 9 no. fatalities were recorded (Dürr, 2023). Mathews et al. (2016) found brown long-eared bats were among the least recorded bat fatalities at operational wind farms in the UK.

These species were all recorded at much lower frequencies than soprano pipistrelle, Leisler's bat or common pipistrelle by static detectors. There is therefore unlikely to be negative direct effects on these species during the operation phase.

Indirect Effects

Indirect effects due to operational lighting could disturb or displace roosting or foraging bats. However, the installation of additional lighting on the turbines themselves is to be minimal.

Leisler's bat, and common and soprano pipistrelle, are less sensitive to light disturbance than the other species of bat recorded at the project site (Nathusius' pipistrelle, Natterer's bat, Daubenton's bat, whiskered bat and brown long-eared bat). These three species were the most frequently recorded bats.

Overall, indirect effects on bats are unlikely to be significant.

5.5.3.6 Other Protected Fauna

Direct Effects

No direct effects on common frog or smooth newt are predicted during the operation phase.

Indirect Effects

No indirect effects on common frog or smooth newt are predicted during the operation phase.

5.5.3.7 Fisheries and Aquatic Ecology

Direct Effects

While no white-clawed crayfish were recorded during surveys, burrows were observed along the bank at survey site A5 which lies just outside the Project boundary. No European eel were observed, but a positive eDNA was recorded downstream at A6. However, there is no works proposed in this region during the operation phase. As such, direct effects on Atlantic salmon, brown trout, European eel and white-clawed crayfish are unlikely during the operation phase.

Indirect Effects

Potential indirect effects include release of suspended solids or hydrocarbons (from vehicles) into watercourses as described in **Section 5.5.2.7**, which could travel downstream to IEFs including brown trout, brook lamprey, European eel, white-clawed crayfish and otter. The same secondary effects therefore apply as described for the construction phase.

In the absence of mitigation, there could be significant effects on brown trout, white-clawed crayfish, European eel, and otter at the county/regional scale.

5.5.4 POTENTIAL DECOMMISSIONING PHASE EFFECTS

Some effects are predicted to be similar to the effects described for the construction e.g. disturbance/displacement to IEF birds, bats and mammals via increased noise levels/light levels/presence of construction workers, ground clearance works and reinstatement. This is due to similar activities taking place as for the construction phase. Surface water quality could also be affected via ground disturbance, refuelling and accidental release of hazardous materials stored onsite, which could affect IEF designated sites and fish/aquatic ecology.

Other effects are predicted to be similar to those arising during construction but of a lower magnitude. Turbine foundations will be left in situ and covered with soil, while the access tracks will remain. Consequently, the extent of excavation, ground disturbance and habitat loss during decommissioning will be lower than during construction.

For brevity, a full list of effects is given in **Section 5.5.2** for the construction phase and it can be assumed that the same effects will occur for the decommissioning phase.

5.5.5 CUMULATIVE IMPACT ASSESSMENT

Wind farms and other projects within 20 km of the project are shown below in **Table 5.16**. This 20 km search distance is recommended by IWEA (2012) guidelines.

Cush Wind Farm – Phase II

Development Type	Development	Planning Register Reference	Development Description	Status	Status of Connectivity to Project
Wind farm	Cush Wind Farm (Phase I), Co. Offaly	ABP-318816-24	8 no. wind turbines and all associated infrastructure.	Permitted	Downstream hydrological and hydrogeological connectivity
Wind farm	Cush Wind Farm Phase I Section 146B Alteration Request, Co. Offaly	ACP-324405-26	Request to alter the permitted Cush Wind Farm Phase I development to provide for design flexibility in respect of the permitted turbine dimensions.	Proposed	Downstream hydrological and hydrogeological connectivity
Wind farm	Cloghan Wind Farm, Co. Offaly	14/188 (PL19.244053), and 19/404	9 no. wind turbines and all associated infrastructure.	Existing	None
Grid Connection	Cloghan Wind Farm Grid Connection, Co. Offaly	19/555	Approximately 8km of underground electricity cables.	Existing	None
Wind farm	Meenwaun Wind Farm, Co. Offaly	15/44 (PL19.244903)	4 no. wind turbines and all associated infrastructure.	Existing	None
Wind farm	Leabeg Wind Farm, Co. Offaly	10/130 and 14/95	2 no. wind turbines and all associated infrastructure.	Existing	None
Wind farm	Carrig and Skehanagh Wind Farms, Co. Tipperary	5123495 and 5123496	5 & 3 (8 total) no. wind turbines and all associated infrastructure.	Existing	None
Wind farm	Carrig Renewables Wind Farm, Co. Tipperary	23/60763 (PL92.318689)	7 no. wind turbines and all associated infrastructure.	Permitted	None
Grid Connection	Carrig Renewables Wind Farm Grid Connection, Co. Tipperary & Co. Offaly	23/60140	Provision of underground electrical cabling (38kV) from Townparks to the existing Dallow 110kV substation in Clondallow to facilitate connection of the proposed Carrig Renewables Wind Farm.	Permitted	None
Wind farm	Derrinlough Wind Farm, Co. Offaly	ABP-306706-20	21 no. wind turbines and all associated infrastructure.	Existing	None

Development Type	Development	Planning Register Reference	Development Description	Status	Status of Connectivity to Project
BESS	Derrinlough Wind Farm, Co. Offaly	FMR 26/01 (Design Flexibility Request)	Proposed Battery Energy Storage System consisting of battery container units, transformers, inverters, underground cabling, associated control rooms, access routes, lighting, CCTV, lightning masts, fencing and grid connection to the existing Derrinlough 110kV substation.	Proposed	None
Wind farm	Ballincor Wind Farm, Co. Tipperary	PAX92.324279	10 year planning permission for the project of Ballincor Wind Farm and all associated infrastructure	Proposed	None
Wind farm	Lea Mor Renewable Energy Community Wind Turbine	24/60326 (ABP-321244-24)	Single wind turbine, substation and associated development.	Permitted	None
Solar farm	Summit Solar Ltd Solar Farm, Clonbeale Beg Glebe, Rathnure North, Parkmore, Cultree, Rathmount, Mullanafawnia, and Russellspeenn, Co. Offaly	20/476, 21/622, and 22/368	Solar Farm Development.	Permitted	This solar farm is located upstream of the Project. There is a potential hydrological link via Rapemills river which borders the solar farm boundary. The solar farm boundary also overlaps the underground electricity line location.
Substation	JCO Ltd Summit Solar Ltd 110kV Substation, Mullanafawnia, Co. Offaly	ACP-324608-26. Pre-application Consultation (PAC)	110kV electricity substation.	Proposed	None
Solar farm	Solar Farm, Ballindown, Bogderries, Ballywilliam, and Ballynaguilsha, Co. Offaly	21/227	Solar Farm Development.	Permitted	None

Development Type	Development	Planning Register Reference	Development Description	Status	Status of Connectivity to Project
Solar farm	Solar Farm, Dovehill, Gortnamuck, Curraghmore (Eglisk By), and Feagh, Co. Offaly	23/74	Solar Farm Development.	Permitted	None
Solar farm	Derrycarney Solar Farm, Lumcloon, Bun, Derrycarney, Falsk, Derries Rin, Lea Beg, and Lea More, Co. Offaly	23/20 (ABP-316303-23)	Solar Farm Development.	Permitted	None
Solar farm	Solar Farm, Stonestown, Kilcamin, Crancreegh, and Derinlough, Co. Offaly	26/60237	Solar Farm Development.	Proposed	None
Other	Loughnane Concrete (Loughnane Concrete Ltd), Co. Offaly	82/662, 94/13, 95/519, 96/251 and 97/384	Quarry, concrete batching plant and all associated plant and machinery.	Existing	None.
Other	Smyths Sand & Gravel, Co. Offaly	06/13 (PL19.221091)	Quarry, concrete batching plant and all associated plant and machinery.	Existing	None.
Other	Derrinlough Briquette Factory, Co. Offaly	88/274, 09/399, and 14/251	Briquette factory with all associated infrastructure.	Existing	None.
Other	Telecommunications Mast, Boolinarig Big, Co. Offaly	13/247	1 no. 24m telecoms mast, access track and all ancillary works.	Existing	None
Other	Telecommunications Mast, Clooneen, Co. Offaly	13/69 (PL19.242181)	1 no. 30m telecoms mast, access track and all ancillary works.	Existing	None
Other	Abattoir Facility (Banagher Chilling Ltd), Co. Offaly	19/325 and ABP-308004-20	Upgrade and extension of an existing abattoir facility.	Permitted	None
Other	Agricultural Developments	Various	Various	Existing, Permitted and Proposed	None
Other	Residential Dwellings	Various	Various	Existing, Permitted and Proposed	None

Development Type	Development	Planning Register Reference	Development Description	Status	Status of Connectivity to Project
Other	Commercial Forestry Plantations	-	-	Existing	None
Other	Bord Na Móna Operations	Various	Various	Existing	None
Battery Storage	Battery Energy Storage System (BESS) & Synchronous Condenser, Shannonbridge, Co. Offaly	22/223	Demolition of existing ESB WOP Station and development/operation of a BESS & Synchronous Condenser.	Permitted	None

Table 5.16: Other Developments within 20 km of the Project

5.5.5.1 Potential Construction Phase Cumulative Effects

Likely cumulative effects resulting from the construction phase are limited to water quality changes to watercourses draining the project. Thus, other existing or permitted projects could have an additive or incremental effect on water quality over the short term. In the absence of mitigation, these effects have the potential to be significant for both downstream nature conservation sites and aquatic receptors (e.g. brown trout, lamprey, European eel, white clawed-crayfish and otter).

Significant negative cumulative effects to water quality could occur if any consented or proposed projects are constructed at the same time as the project and without mitigation.

There is one permitted project with downstream hydrological connectivity to the project (see Cush Wind Farm Phase 1 and alteration for same in **Table 5.16**). Summit Solar Farm Ltd (20/476) is located upstream of the Project, there is a potential hydrological connection via Rapemills which borders the permitted solar farm, and the boundary overlaps that of the proposed underground electricity line. As the solar farm was permitted in 2020 and that planning is valid for five years, it is considered unlikely to be constructed at the same time as the project. Additionally, as it is permitted, the environmental report and NIS both outline mitigation measures that must be undertaken as per the conditions of the grant of planning.

Similarly, the Offaly County Development Plan provides a framework for land use developments and activities with potential for construction and operation source effects throughout the county.

In terms of water quality, none of the sites sampled achieved target good status ($\geq Q4$) biological water quality. Rapemills river was Q3 (poor status), while all other sampling sites ranged from Q2-3 to Q3 (poor status).

There is one Section 4 discharges to water linked to the watercourses that drain from the project Site within a 40km instream distance. Banagher concrete (2023_915) discharges to the Rapemills river downstream of the Project site. There are no Industrial Emissions (IE) licences downstream.

Overall, considering the existing effects of diffuse water pollution and in the absence of mitigation, secondary cumulative effects on freshwater ecology are likely to be significant for brown trout, lamprey, European eel, white-clawed crayfish, and otter at the county / regional scale.

European sites are considered fully in the NIS accompanying this planning application. The conclusion of the NIS was that, with mitigation, there would not be an adverse effect on the integrity of any European Sites because of the project, in combination with all other projects and plans (**Section 5.4.1.1**). In EIA terms, this means there are no likely significant cumulative effects on European sites.

Birds

Likely cumulative effects on birds during construction are limited to those occurring due to concurrent construction of the Project and other developments in the wider area. Construction-phase disturbance is generally of shorter duration but higher intensity than operational-phase disturbance, given the greater volume of plant,

vehicle movements and workforce presence involved.

Of the developments listed in **Table 5.16**, only Cush Wind Farm Phase I, the Summit Solar Ltd solar farm/substation, and the Bord na Móna Galros Rehabilitation Plan are considered to have realistic potential for spatial and temporal overlap with the Project's construction-phase zone of influence. The remaining wind energy developments listed in **Table 5.16** are located at separation distances of 2km or greater and are not considered further here.

Cush Wind Farm Phase I

Given the applicant's intention that both phases will be constructed concurrently, there is potential for cumulative construction-phase disturbance to birds using the wider Cush landscape. Both phases' individual construction-phase assessments (**Section 5.5.2.3**) applied the same published species-specific disturbance buffer distances (Goodship et al., 2022; Hoetker et al., 2006) and independently concluded no significant disturbance effect for any IEF species, on the same evidential basis (confirmed breeding/roosting locations lying beyond the relevant buffer in each case) as the operational-phase conclusion above. No significant cumulative construction-phase disturbance or displacement effect is considered likely on this basis.

The northern lapwing territory shared between the Project and Phase I (**Section 5.5.3.3**) warrants the same precautionary treatment during construction as during operation, given its demonstrated inter-annual mobility. Both the 2021/2022 (Phase I) and 2024 (Project) recorded locations lie beyond the 108m disturbance buffer for breeding lapwing; however, given the potential for concurrent construction activity from both phases to overlap spatially with this mobile territory in a manner not captured by either phase's individual baseline data, this pathway is addressed through the same pre-construction survey and species-specific disturbance-free buffer commitments set out in **Section 5.6.1.5**, applied with regard to both phases' combined infrastructure.

Summit Solar Ltd solar farm

The Biodiversity Management Plan and Natura Impact Statement prepared for the Summit Solar Ltd development confirm that no protected or notable bird species were recorded during habitat surveys of the site, with birds concluded to utilise the site's hedgerow, treeline and scrub habitats only for nesting and foraging by common, widespread species. The associated Natura Impact Statement screened out all qualifying bird species of the relevant Natura 2000 sites within range, with no evidence of any sensitive bird activity, breeding, roosting or foraging of note recorded at or near the site, including the area of the proposed 110kV substation and UGL connection point. On this basis, and given the temporary, short-duration nature of construction disturbance associated with both developments, a significant cumulative construction-phase disturbance effect on IEF bird species is not considered likely at this location. Should construction of the Project's grid connection/substation works and the Summit Solar Ltd solar farm occur concurrently, standard good practice construction management measures common to both developments (pre-construction checks for breeding birds, seasonal restrictions on vegetation clearance) would further reduce the potential for any residual effect.

Bord na Móna Galros Rehabilitation Plan

BnM's rehabilitation works, principally drain-blocking and targeted hydrological management, could occur concurrently with the Project's construction phase. As set out in **Section 5.5.3.3**, BnM's Rehabilitation Plan itself commits to an ecological appraisal of the impacts of planned rehabilitation works on ground-nesting breeding bird species, with scheduling to be adapted accordingly, comparable to the Project's own construction-phase mitigation (**Section 5.6.1.5**). Given the short-duration, low-intensity, non-rotating nature of rehabilitation activity relative to wind farm construction, and the presence of comparable bird-sensitive scheduling controls in both programmes, a significant cumulative construction-phase disturbance effect is not considered likely. As with the operational-phase conclusion, given the demonstrated mobility of the shared northern lapwing territory and the potential for BnM's rehabilitation footprint to overlap with areas it could occupy, this pathway is addressed on a precautionary basis through the pre-construction survey and disturbance-free buffer commitments in **Section 5.6.1.5**, alongside the post-construction monitoring already committed to for the operation phase.

5.5.5.2 Potential Operation phase Cumulative Effects

Operational effects will occur as a result of the turbines, hardstands, and access track. As the grid connection will be located underground, there will be no operational effects due to underground cabling/ducting.

The proposed lifespan of the project is 35-years, therefore for ornithology and bat receptors, the duration of effects is likely to be long-term. As the footprint of the project is within a landscape largely modified by former industrial peat extraction and agriculture, any effects due to habitat loss are largely fully reversible.

In the absence of mitigation, possible cumulative effects include:

- deterioration of water quality within the catchment with potential for downstream effects on QI species and habitats within the River Shannon Callows SAC 000216, Lough Derg, North-east Shore SAC 002241, Lough Derg (Shannon) SPA, and Middle Shannon Callows SPA 004096;
- collision risk and barrier effects on sensitive bird populations;
- local habitat loss/indirect disturbance effects on birds and bats; and,
- collision risk effects on bat populations.

Birds

Likely significant cumulative effects on birds are limited to those occurring due to the Project and other wind farms. These effects are:

- displacement;
- collision; and,
- barrier effect.

There are 9 no. wind farm developments and one single turbine located within 20km proximity to the Project (see **Table 5.16**); however, only some have details of collision risk assessments undertaken, as summarised below.

Cush Wind Farm Phase 1 and Section 146B Alteration Request

According to the EIAR written in 2023 by SLR, bird survey carried out to inform the planning application recorded the following target species: black-headed gull, common kestrel, common snipe, Eurasian teal, European golden plover, great cormorant, hen harrier, mallard, northern lapwing, peregrine falcon and whooper swan.

Given that phase 1 is located adjacent to phase 2, there is potential for cumulative barrier effects and disturbance / displacement throughout all phases, particularly as it is the intention that both phases are constructed and become operational at the same time.

As part of a Section 146B Alteration Request, the collision risk modelling was updated by SLR in 2026 to reflect a proposed minimum and maximum set of turbine dimensions. The predicted number of collisions (minimum vs. maximum number of collisions) for bird species recorded at both Cush phase 1 and Cush phase 2 were given as:-

- Black-headed gull 0.8951 to 0.9607 collisions/year;
- Common kestrel 0.5347 to 0.5758 collisions/year;
- Common snipe 0.3625 to 0.393 collisions/year;
- Eurasian teal 1.2517 to 1.3538 collisions/year;
- European golden plover 6.38586 to 6.94355 collisions/year;
- Great cormorant 0.0712 to 0.0757 collisions/year;
- Hen harrier 0.007 to 0.0077 collisions/year;
- Mallard 0.0759 to 0.0816 collisions/year;
- Northern lapwing 3.964 to 4.2711 collisions/year (annual only; no seasonal breakdown reported);
- Peregrine falcon 0.0315 to 0.0338 collisions/year; and
- Whooper swan 0.0695 to 0.0734 collisions/year.

Therefore, there is potential for significant cumulative effects to occur in combination with the Project.

Meenwaun Wind Farm

According to the EIAR written in 2015 by Fehily Timoney and Company, bird surveys carried out to inform the planning application recorded the following target species: whooper swan, Greenland white-fronted goose, European golden plover, common snipe, common kestrel, Eurasian woodcock and common buzzard.

Given the separation distance, there is no realistic potential for significant cumulative barrier effects or operational displacement upon IEF bird species. In terms of collision risk, no quantitative assessment was undertaken, so only a qualitative cumulative collision risk assessment is possible. The significance of effects for bird species recorded at both Cush and Meenwaun were given as:-

- Common kestrel – low significance;
- Common snipe – low significance;
- Eurasian woodcock – low significance;
- European golden plover – very low significance; and,

- Whooper swan – low significance;

Therefore, there is only low potential for significant cumulative effects to occur in combination with the Project.

Derrinlough Wind Farm and Design Flexibility Request

According to the EclA written in 2020 by MKO, bird surveys carried out to inform the planning application recorded the following target species: whooper swan, European golden plover, hen harrier, little egret, peregrine falcon, northern lapwing, black-headed gull, Eurasian curlew, common buzzard, Eurasian teal, Eurasian wigeon, black-tailed godwit, northern shoveler, Eurasian sparrowhawk, ringed plover, merlin, redshank, red-necked phalarope, common kestrel and common snipe.

Given the separation distance, there is no realistic potential for significant cumulative barrier effects or operational displacement upon IEF bird species. In terms of collision risk, quantitative assessment was undertaken, so quantitative cumulative collision risk assessment is possible. The predicted number of collisions for bird species recorded at both Cush and Derrinlough were given as:-

- Black-headed gull 1.832/year;
- Common kestrel 1.62/year;
- Common snipe 0.06/year;
- Eurasian teal 0/year;
- Eurasian wigeon 0/year;
- Eurasian woodcock 0/year;
- European golden plover 14.191/year;
- Hen harrier 0.004/year;
- Little egret 0.015/year;
- Northern lapwing 0.187/year (breeding), 3.307/year (non-breeding) and 3.494/year (annual);
- Peregrine falcon 0.07/year; and,
- Whooper swan 0.21/year;

Therefore, there is potential for significant cumulative effects to occur in combination with the project in the absence of mitigation.

Cloghan Wind Farm

According to the EIAR written in 2014 by EcoFact Environmental Consultants, bird surveys carried out to inform the planning application recorded the following target species: Greenland white-fronted goose. A later EclA report was submitted as part of an application for modified consent by SLR consultants using data from 2018-19 and recorded the following target species: common snipe, greylag goose, hen harrier and northern lapwing.

Given the separation distance, there is no realistic potential for significant cumulative barrier effects or operational displacement upon IEF bird species. In terms of collision risk, quantitative assessment was undertaken, so quantitative cumulative collision risk assessment is also possible. The predicted numbers of collisions/year for bird species recorded at both Cush and Cloghan were given as:-

- Common snipe 0.004/year;
- Hen harrier 0.0058/year; and
- Northern lapwing 0.77293/year (breeding), 0.08537/year (non-breeding) and 0.69272/year (annual, as a mean across survey years).

Therefore, there is potential for significant cumulative effects to occur in combination with the project in the absence of mitigation.

Leabeg Wind Farm

According to the EIAR written in 2010 by Gaelectric Developments Ltd, bird surveys carried out to inform the planning application recorded the following target species: whooper swan and hen harrier.

Given the separation distance, there is no realistic potential for significant cumulative barrier effects or operational displacement upon IEF bird species. In terms of collision risk, quantitative assessment was undertaken, so quantitative cumulative collision risk assessment is also possible. The predicted numbers of collisions/year as recorded by surveys for bird species recorded at both Cush and Leabeg were given as:-

- Hen harrier 0/year; and,
- Whooper swan 0/year.

Therefore, there is no potential for significant cumulative effects to occur in combination with the project.

Carrig and Skehanagh Wind Farm

No documents relevant to ornithology for Carrig and Skehanagh Wind Farm were available in an online search suggesting it was not assessed given the small size of the schemes and therefore no quantitative assessment of cumulative effects for these projects is possible. Given the separation distances and given that both turbine clusters contain only low numbers of turbines each, significant cumulative effects are very unlikely. This is because the further away two wind farms are from each other, the lower the likelihood that bird populations will be affected by both wind farms. Similarly, the fewer turbines that are present in each wind farm, the lower the additive cumulative collision risk.

Carrig Renewables Wind Farm and Grid Connection

According to the EIAR written in 2023 by MKO, bird surveys carried out to inform the planning application recorded the following target species: European golden plover, hen harrier, merlin, peregrine, whooper swan, northern lapwing, black-headed gull, great cormorant, Eurasian teal, barn owl, Eurasian curlew, common kestrel, common snipe, Eurasian woodcock, common buzzard and Eurasian sparrowhawk.

Given the separation distance, there is no realistic potential for significant cumulative barrier effects or operational displacement upon IEF bird species. In terms of collision risk, quantitative assessment was undertaken, so quantitative cumulative collision risk assessment is also possible. The predicted numbers of collisions/year for bird species recorded at both Cush and Carrig Renewables Wind Farm were given as:-

- European golden plover (wintering) 2.345/year – slight significance;
- Hen harrier (wintering) 0.005/year;

- Peregrine (all seasons) 0.152/year;
- Whooper swan (wintering) 0.326/year;
- Northern lapwing (wintering) 1.058–2.941/year, depending on turbine type;
- Black-headed gull (wintering and breeding) 1.296/year and 0.194, respectively; only the wintering totals are included in the cumulative totals, consistent with the non-breeding populations against which significance is assessed;
- Great cormorant (wintering and breeding) 0.015/year and 0.078/year, respectively, respectively; only the wintering totals are included in the cumulative totals, consistent with the non-breeding populations against which significance is assessed;
- Eurasian teal (wintering) 0/year;
- Common kestrel (all seasons) 1.848/year; and
- Common snipe (all seasons) 0.166/year.

Therefore, there is potential for significant cumulative effects to occur in combination with the project in the absence of mitigation

Lea Mor Renewable Energy Community Wind Turbine

According to the EIAR written in 2024 by EirEco, bird surveys carried out to inform the planning application recorded the following target species: kestrel, whooper swan, buzzard, sparrowhawk, lapwing, hen harrier, greylag goose, snipe, mute swan, grey heron, black-headed gull, golden plover, lesser black-backed gull, crane and mallard.

Given the separation distance, there is no realistic potential for significant cumulative barrier effects or operational displacement upon IEF bird species. In terms of collision risk, quantitative assessment was undertaken, so quantitative cumulative collision risk assessment is also possible. The predicted numbers of collisions/year and the significance of effects for bird species recorded at both Cush and Lea Mor Renewable Energy Community Wind Turbine were given as:-

- Kestrel 0.883/year;
- Whooper swan 0.009/year;
- Lapwing (non-breeding) 7.641/year;
- Hen harrier 0.0003/year;
- Common snipe 0.008/year
- Black-headed gull 0.965/year
- European golden plover 0.377/year; and
- Mallard 0.012/year.

Therefore, there is potential for significant cumulative effects to occur in combination with the project in the absence of mitigation

Ballincor Wind Farm

According to the EIAR written in 2026 by Tobin, bird surveys carried out to inform the planning application recorded the following target species: barn owl, black-headed gull, black-tailed godwit, common buzzard, common gull, coot, cormorant, curlew,

golden plover, great black-backed gull, green sandpiper, grey heron, hen harrier, herring gull, jack snipe, kestrel, kingfisher, northern lapwing, lesser black-backed gull, little egret, little grebe, mallard, merlin, mute swan, peregrine falcon, pintail, shoveler, snipe, sparrowhawk, redshank, teal, tufted duck, greenland white-fronted goose, whooper swan, white-tailed eagle, wigeon, and woodcock.

Given the separation distance, there is no realistic potential for significant cumulative barrier effects or operational displacement upon IEF bird species. In terms of collision risk, quantitative assessment was undertaken, so quantitative cumulative collision risk assessment is also possible. The predicted numbers of collisions/year and the significance of effects for bird species recorded at both Cush and Ballincor Wind Farm were given as:-

- Black-headed gull (non-breeding) 0.31-0.43/year;
- Great cormorant (breeding) 0.10-0.12 and (non-breeding) 0.32-0.44/year;
- European golden plover (non-breeding) 7.9-9.4/year;
- Hen harrier (annual) 0.01-0.02/year;
- Common kestrel (annual) 1.4-2.9/year;
- Northern lapwing (non-breeding) 1.4-1.6/year;
- Little egret (breeding) 0-0.01/year and (non-breeding) 0.01-0.05/year);
- Mallard (annual) 0.56-0.68/year;
- Merlin (annual) 0-0.01/year;
- Peregrine falcon (annual) 0.02-0.03/year;
- Eurasian teal (non-breeding) 0-0.01/year; and
- Whooper swan (non-breeding) 0.02-0.05/year.

Therefore, there is potential for significant cumulative effects to occur in combination with the project in the absence of mitigation.

Cush Wind Farm Temporary Met Mast

The temporary met mast will be removed prior to the construction of the project. As such, there will be no cumulative effect.

Bord na Móna Galros Rehabilitation Plan

The Bord Na Móna Galros Draft Decommissioning and Rehabilitation Plan (2026) is not itself a source of bird collision, disturbance or displacement risk, as it involves no turbine or other tall rotating infrastructure, and accordingly has no additive collision estimate to contribute to the cumulative total in **Table 5.17**. However, given the potential for BnM's proposed drain-blocking and hydrological management measures to increase wetland habitat extent and quality within or adjacent to the wind farm site over the Project's operational lifetime, with a corresponding potential to increase future use of the site by wetland-associated collision-risk species, this interaction is addressed separately in **section 5.5.3.3** rather than as a quantitative contribution to **Table 5.17**. As set out there, the potential effect is considered adequately addressed through the inherent conservatism of the CRM, the margin before predicted collision mortality for

the relevant species would approach significance, and the post-construction monitoring and adaptive management framework proposed for the Project (**Section 5.6.1.5**).

Cumulative disturbance / displacement and barrier effect

Of the developments listed in **Table 5.16**, the majority are not considered capable of contributing to cumulative disturbance, displacement or barrier effects on bird species in combination with the Project, for the following reasons:

Non-wind energy developments (quarries, solar farms, telecommunications masts, the BESS and synchronous condenser, the abattoir facility, agricultural and residential development, forestry, and Bord na Móna operations) do not involve rotating turbine blades and therefore do not have the potential to contribute to barrier effects. While construction-phase noise and visual disturbance from these developments could theoretically overlap temporally with the Project, none are located sufficiently close to the Project site to result in spatial overlap of their zones of influence with the Project's, with the exception of the Summit Solar Ltd solar farm and associated 110kV substation, addressed separately below. Disturbance and displacement effects associated with solar farm and quarry development are also generally of a different character and substantially lower magnitude than those associated with wind turbines, given the absence of rotating infrastructure and, in the case of solar farms, the typically lower level of ongoing operational human activity once construction is complete.

Of the wind energy developments listed, only Cush Wind Farm Phase I is considered to have realistic potential to contribute to cumulative disturbance, displacement or barrier effects in combination with the Project, for the reasons set out below. The remaining wind energy developments (Meenwaun, Leabeg, Cloghan, Carrig and Skehanagh, Carrig Renewables, Derrinlough, Ballincor and Lea Mor) are all located at separation distances of 2km or greater from the Project site. Given typical foraging and commuting ranges of the target bird species and the localised nature of turbine-related displacement and barrier effects (generally most pronounced within several hundred metres of turbine infrastructure, tapering with distance), the separation distances involved make significant cumulative displacement or barrier effects between the Project and these developments unlikely.

Cush Wind Farm Phase I is located immediately adjacent to the Project (Phase II) site, is a permitted development, and it is the applicant's intention that both phases will be constructed and become operational concurrently. Given this direct adjacency and shared construction/operational timeline, Cush Wind Farm Phase I is considered to represent the only development with realistic potential to act cumulatively with the Project in respect of disturbance, displacement and barrier effects on bird species using the wider Cush landscape.

Both phases have been assessed independently using a consistent methodological approach, applying the same published species-specific disturbance buffer distances (Goodship et al., 2022; Hoetker et al., 2006). For the great majority of IEF bird species, both assessments independently concluded no significant disturbance, displacement or barrier effect. This includes, for example, black-headed gull (probable breeding colony c.1.7km from the Project, exceeding the 1,000m disturbance-free buffer),

common kestrel (breeding c.2.2km from the Project at a quarry, exceeding the 200m disturbance-free buffer), peregrine falcon (breeding/probable breeding c.2.2km from the Project and c.1.3km from Phase I, both exceeding the 500–750m disturbance-free buffer), and hen harrier (no confirmed roosting, breeding or regular hunting activity recorded at either phase). Given that neither phase's own assessment identified a significant effect for these species individually, and that the relevant sensitive locations lie at a substantial distance from both phases' combined infrastructure, no significant cumulative disturbance, displacement or barrier effect is considered likely for these species.

Northern lapwing warrants closer consideration. Phase I recorded a breeding pair c.410m northwest of Turbine T8 in 2021 and 2022 (outside the Phase I site), and the Project (Phase II) subsequently recorded a breeding territory that moved progressively westward across the 2022–2024 survey seasons, situated c.500m from Phase II infrastructure by 2024. Given the spatial and temporal continuity between these records, this is considered likely to represent the same breeding pair/territory, exhibiting inter-annual movement across the wider landscape spanning both development footprints, rather than two discrete pairs.

Both phases' individual assessments concluded no significant disturbance or displacement effect on this territory, as both the 2021/2022 (Phase I) and 2024 (Phase II) locations lie beyond the 108m disturbance buffer identified for breeding lapwing (Hoetker et al., 2006). However, because this territory has been shown to move within the landscape between phases and survey years, its future location cannot be predicted with confidence, and it cannot be assumed that it will continue to occupy a position beyond 108m of infrastructure from both phases in every future breeding season. The cumulative presence of turbine infrastructure from both phases increases the overall extent of the landscape within which this mobile territory could, in a future season, come into closer proximity to infrastructure than has been recorded to date.

Notwithstanding this, approximately 85ha of cutover bog habitat is available outside the Phase II development footprint alone, together with further suitable cutover bog habitat present more widely across the landscape spanning both phases, considered sufficient to accommodate continued territory shift without resulting in significant disturbance or displacement, whichever direction that shift takes. On this basis, a significant cumulative disturbance or displacement effect on this lapwing territory is not considered likely; however, given the demonstrated mobility of this specific pair across both development footprints, this conclusion is addressed through the post-construction monitoring programme proposed for this species (**Section 5.6.1.5**), which will track this territory's continued location relative to both phases' infrastructure and allow any unforeseen effect to be identified and responded to via the adaptive management framework.

On this basis, cumulative disturbance, displacement and barrier effects on bird species arising from the concurrent construction and operation of Cush Wind Farm Phase I and the Project are not considered significant, with the exception of the precautionary monitoring commitment retained for northern lapwing as set out above.

The Summit Solar Ltd solar farm is located immediately adjacent to the Project's

underground electricity line (UGL), with the closest parcel of the consented solar farm situated approximately 10m from the UGL at its closest point; the UGL terminates directly into the associated proposed Summit Solar Ltd 110kV substation at Mullanafawnia. Given this direct spatial adjacency, potential cumulative effects at this specific location are considered separately below.

As solar farm development does not involve rotating infrastructure, it has no potential to contribute to barrier effects, whether alone or in combination with the Project's turbines, which are located a substantial distance from the solar farm/substation area. As established in the project-alone assessment above, the UGL will be buried underground for its entire length, and no significant operational-phase disturbance or barrier effect is predicted for birds along this route; solar farm operation is similarly associated with a low level of ongoing human activity once construction is complete. The relevant potential cumulative effect is therefore limited to the construction phase, where installation of the UGL and construction of the solar farm could occur within a similar timeframe and in immediate proximity to one another.

Bord na Móna's wider peatland operations are addressed together with other non-wind energy developments above. However, the Galros Bog complex, part of which forms part of the wind farm site, is additionally subject to a dedicated rehabilitation programme described in the Bord Na Móna Galros Draft Decommissioning and Rehabilitation Plan (2026), which directly overlaps areas of the Project's cutover bog infrastructure (**Section 5.1**) and is accordingly considered separately here, alongside the Summit Solar Ltd development above, as an exception to the general dismissal of non-wind developments on grounds of separation distance.

BnM's rehabilitation works, principally drain-blocking and targeted hydrological management, involve short-duration, non-rotating plant activity, and have no potential to contribute to barrier effects given the absence of rotating infrastructure. Should drain-blocking or associated ground works occur concurrently with operation of the Project, there is potential for temporary disturbance to birds using areas of shared habitat, in particular ground-nesting waders such as common snipe and northern lapwing.

This potential is not considered likely to result in a significant cumulative effect. BnM's Rehabilitation Plan itself commits to an ecological appraisal of the impacts of planned rehabilitation works on ground-nesting breeding bird species, with the scheduling of operations to be adapted accordingly, a control directly comparable to the seasonal restrictions and pre-construction nest checks embedded in the Project's own mitigation (**Section 5.6.1.5**). Given the short-duration, low-intensity and non-rotating nature of rehabilitation activity relative to wind farm operation, and the presence of comparable bird-sensitive scheduling controls in both programmes, a significant cumulative disturbance or displacement effect arising from the concurrent implementation of BnM's rehabilitation measures and the Project is not considered likely.

Given the demonstrated inter-annual mobility of the shared northern lapwing territory between the Project and Cush Wind Farm Phase I (see above), and the potential for BnM's rehabilitation footprint to overlap with areas the territory could occupy in future seasons, this cumulative disturbance pathway is addressed, on a precautionary basis,

through the same post-construction breeding wader monitoring programme proposed for this species (**Section 5.7.3.3**). Should monitoring identify disturbance-related effects coincident with BnM rehabilitation activity, this would be considered under the same adaptive management framework.

In summary, cumulative disturbance, displacement and barrier effects on bird species arising from other developments in the wider area, whether alone or in combination with the Project, are not considered significant. The only residual matter carried forward is the precautionary monitoring commitment for the shared northern lapwing territory between the Project, BnM rehabilitation plan and Cush Wind Farm Phase I, set out above and addressed further in **section 5.7.3.3**.

Cumulative collision risk

Where collision risk has been analysed quantitatively, the number of collisions per year can be summed together to obtain an estimate of cumulative collision risk. This is the most usable approach for assessing cumulative collision risk and is recommended by NatureScot (2025a) guidance. This has been undertaken below in **Table 5.17** for IEF birds present at the project where collision risk modelling has been undertaken. It must be acknowledged that these cumulative estimates are likely to over-represent collision risk, as all flights within 500m of the turbines were included for collision risk modelling. Similarly, assessment is based on adult rather than juvenile survival (lower survival rates mean that any deaths due to collision with turbines is likely to have less of an effect on a population) and so the realised risk to avian populations is likely to be less. Avoidance rates used are highly precautionary and the default 98% avoidance rate used for most species (see **Annex 5.9**) is not based on empirical evidence. Again, this is likely to produce an overestimate of true collision risk.

For European golden plover, northern lapwing and black-headed gull, cumulative collision estimates are presented both as published and adjusted to reflect current avoidance rate evidence. The collision estimates for the other wind farms considered cumulatively were derived using the generic NatureScot default avoidance rate of 98%. For black-headed gull, the NatureScot species-specific avoidance rate for small gulls is 99.2%. For European golden plover and northern lapwing, as set out in **Annex 5.9**, post-construction monitoring evidence (Gittings, 2022) supports avoidance rates of 99.5–99.8%, and an avoidance rate of 99.5% for both species was accepted by An Coimisiún Pleanála in its determination of Brittas Wind Farm (ABP-321454-24). The collision estimates for Cush Wind Farm Phase I, updated as part of the Section 146B Alteration Request, were also derived at 98%, consistent with the basis on which that development was originally assessed and permitted.

Under the Band collision risk model, predicted collisions are directly proportional to $(1 - \text{avoidance rate})$. Collision estimates derived at 98% have therefore been adjusted by multiplying by $(1 - A)/(1 - 0.98)$: a factor of 0.40 for black-headed gull (99.2%) and 0.25 for European golden plover and northern lapwing (99.5%). The lower, more precautionary end of the evidence range (99.5%) has been used for these adjustments, rather than 99.8%. No adjustment has been applied to any other species.

The adjustment assumes that the other developments' collision estimates were otherwise derived using the standard Band model, so that only the avoidance rate differs. Both the published and adjusted totals are presented in **Table 5.17**, and the

significance of cumulative effects has been considered against both.

Quantitative cumulative collision risk assessment has been undertaken only for those species and projects for which numerical collision risk modelling outputs are available. Where a neighbouring project's assessment was qualitative only (Meenwaun Wind Farm) or where no ornithological assessment could be sourced (Carrig and Skehanagh Wind Farm), it is not possible to combine these qualitative judgements with the quantitative collision estimates of other projects, as no common numerical basis for summation exists. This is standard practice and consistent with NatureScot (2025a) guidance, which recommends summation of quantitative collision estimates where available; it does not represent a data gap in this assessment. The qualitative conclusions reached for these projects (very low to low significance for all species assessed at Meenwaun; very unlikely for Carrig and Skehanagh, given separation distance and scheme size) remain valid and are considered alongside the quantitative cumulative totals presented below.

Common kingfisher was not recorded during flight activity surveys at the Project and was therefore not included in project-level collision risk modelling (section **Collision with Wind Turbines**). None of the other consented or operational developments reviewed for cumulative assessment (**Table 5.16**) recorded common kingfisher as a target species or reported a species-specific collision estimate. In the absence of any quantitative collision output for this species from any constituent project, no common numerical basis for summation exists, and cumulative collision risk to common kingfisher has accordingly not been quantitatively assessed, consistent with the approach applied elsewhere in this section where comparable data are unavailable.

Common ringed plover was recorded only as a secondary target species at the Project, reflecting its low and inconsistent level of site use, and was not subject to quantitative collision risk modelling for this reason (section **Collision with Wind Turbines**). Of the other developments reviewed for cumulative assessment, none reported a species-specific collision estimate for common ringed plover. As no quantitative collision output is available for this species from either the Project or any constituent project, cumulative collision risk to common ringed plover has not been quantitatively assessed.

On this basis, cumulative collision risk for common kingfisher and common ringed plover is not significant at any geographical scale.

Species	Project Collision Risk	Cumulative Collisions / Year	Cumulative Significance
Hen harrier	0.005	0.037-0.048	<p>The number of cumulative collisions is predicted to result in a 0.053–0.067% increase relative to background mortality for the ROI population. As predicted cumulative collision mortality does not exceed 1% of background mortality for the ROI population, no significant cumulative collision effects are likely at this geographical scale.</p> <p>No county-specific population estimate is available for hen harrier. The Slieve Bloom Mountains SPA, which extends across the Laois/Offaly border, supported in the region of eight to nine breeding pairs (c. 16–18 individuals, exclusive of non-breeding floaters) at the time of the most recent national survey (Ruddock et al., 2024); however, the distribution of this population relative to the county boundary has not been established, and this total cannot be disaggregated to a county-specific figure.</p> <p>Site-specific baseline survey data provide additional relevant context. Hen harrier was recorded on only seven occasions across two full years of vantage point survey effort (May 2022–March 2024), with all records occurring during the non-breeding season and none during either breeding season monitored; peak count in any single flight line was one bird throughout. This pattern of low-frequency, single-bird, non-breeding-season-only records is consistent with occasional use of the site by wintering or dispersing individuals from the wider regional population, rather than by breeding or territory-holding birds associated with a resident local population and supports the conclusion that the site does not form part of the core range of a discrete, site-faithful county population.</p> <p>Hen harrier is, in any case, a wide-ranging species that disperses from natal territories and ranges widely outside the breeding season; County Offaly, bisected by a single cross-boundary SPA, is not considered to represent a discrete or demographically closed population unit for this species.</p> <p>Assessment at national (ROI) population scale is therefore considered the appropriate and precautionary basis for conclusion, and is further supported by the low-level, non-breeding-season pattern of site use recorded during baseline surveys.</p> <p>On this basis, a significant cumulative effect on hen harrier because of collision is not considered likely.</p>
Whooper Swan	<0.01	0.63 – 0.68	<p>The Project's predicted contribution is negligible but not zero (<0.01 collisions/year; Table 5.15). Including the other developments for which whooper swan collision estimates are available (Cush Wind Farm Phase I, Derrinlough, Leabeg, Carrig Renewables, Lea Mor and Ballincor), the cumulative total is 0.63–0.68 collisions/year. This represents a 0.022–0.024% and 0.61–0.66% increase relative to background mortality for the ROI and County Offaly populations, respectively. As predicted cumulative collision mortality does not exceed 1% of</p>

Species	Project Collision Risk	Cumulative Collisions / Year	Cumulative Significance
			background mortality at either geographical scale, and the Project contributes less than 2% of the cumulative total, no significant cumulative collision effect on whooper swan is likely.
Golden plover	0.72 - 0.76	31.92 – 34.01 (corrected to 14.44 – 16.12)	<p>The uncorrected number of cumulative collisions is predicted to result in 0.146–0.155% and 1.39–1.48% increase relative to background mortality for the ROI and County Offaly populations, respectively.</p> <p>As predicted cumulative collision mortality does not exceed 1% of background mortality for the ROI population, no significant cumulative collision effects are likely at this geographical scale.</p> <p>While the predicted cumulative collision mortality exceeds 1% of background mortality at the County Offaly scale (1.39-1.48%), this is considered to reflect two compounding sources of conservatism rather than a genuine effect on the population.</p> <p>Firstly, European golden plover is a species that, while roosting on wetlands and estuaries covered by the I-WeBS site network, feeds extensively on inland farmland, pasture and arable land not covered by that network; established research on the species' winter ecology confirms that standard wetland-based waterbird monitoring schemes substantially undercount inland farmland-feeding golden plover, and I-WeBS is specifically identified as being subject to this limitation (Gillings & Fuller, 1999). A back-calculation indicates that the uncorrected cumulative collision mortality would fall below the 1% significance threshold at a County Offaly population of approximately 11,820–12,600 individuals, requiring the true county population to be in the order of 39–48% higher than the I-WeBS-derived estimate of 8,490.3 individuals used in this assessment. Given the recognised tendency of I-WeBS to undercount farmland-feeding birds of this species, a shortfall of this order is plausible, although it is not relied upon in isolation; the second source of conservatism set out below is sufficient on its own to bring cumulative mortality below the 1% threshold.</p> <p>Secondly, the cumulative collision estimate itself incorporates an inherent conservatism arising from inconsistent avoidance rate assumptions across the constituent projects. The collision estimate for the Project has been calculated using the evidence-based 99.5% avoidance rate; however, the collision estimates for most other consented and operational wind energy developments included within the cumulative total were derived using the NatureScot default 98% avoidance rate, reflecting best practice at the time those assessments were undertaken. As predicted collisions under the Band (2024) collision risk model are directly proportional to (1 – avoidance rate), an assessment using a 98% avoidance rate will, for equivalent flight activity data, predict four times as many collisions as the same data assessed at 99.5% (calculated as $(1 - 0.98) \div (1 - 0.995) = 4.0$). On this basis, were the other constituent projects' collision estimates to be recalculated using the current evidence-based avoidance rate, their contribution to the cumulative total would be expected to reduce to approximately 25% of the value currently used, representing a reduction of the order of 75%. The cumulative collision total and resulting percentage</p>

Species	Project Collision Risk	Cumulative Collisions / Year	Cumulative Significance
			<p>increase relative to background mortality presented above is accordingly considered a substantial overestimate of the likely true cumulative effect, over and above the population-based considerations discussed above. This correction has not been applied to the collision estimates for Ballincor Wind Farm, as its golden plover estimates were already derived using an evidence-based avoidance rate of 99.6% (Gittings, 2022); they are included in the corrected total as submitted. When the corrected cumulative collision risk figure is analysed, this represents a 0.63–0.70% increase on background mortality for the County Offaly population</p> <p>Accordingly, cumulative collision risk to European golden plover is not considered significant at any relevant population scale, including County Offaly.</p>
Black-headed gull	0.17 – 0.19	5.45 – 5.67 (corrected to 2.47 – 2.64)	<p>The uncorrected number of cumulative collisions is predicted to result in a 0.11-0.12% and 19.6–20.3% increase relative to background mortality for the ROI and County Offaly populations, respectively.</p> <p>As predicted cumulative collision mortality does not exceed 1% of background mortality for the ROI population, no significant cumulative collision effects are likely at this geographical scale.</p> <p>The predicted cumulative collision mortality substantially exceeds 1% of background mortality at the County Offaly scale using the I-WeBS-derived county population figure of 278.35 individuals. Several lines of evidence indicate that this figure materially understates the true county population, and that County Offaly does not, in any case, represent an appropriate scale at which to assess significance for this highly mobile, non-site-faithful species. NatureScot guidance on assessing significance of effects on bird populations from onshore wind farms (NatureScot, 2025a) recommends that cumulative impacts be assessed at the relevant biogeographical scale rather than an administrative boundary, so that the population unit used reflects the species' actual range and movement ecology; a county boundary has no ecological basis for a species such as black-headed gull, which shows no evidence of site fidelity to County Offaly specifically.</p> <p>Counts of gulls are optional under I-WeBS/WeBS core count methodology, and it is a recognised feature of this monitoring approach that gull species are consequently subject to under-recording relative to mandatory core count species. An area-proportional share of the ROI population (48,821 individuals), based on County Offaly's approximate 2.8% share of the state's land area, indicates a county population in the order of 1,367 individuals - approximately 4.9 times higher than the I-WeBS-derived county estimate of 278.35 individuals used in this assessment, and independently corroborating that the I-WeBS total substantially understates the county's true black-headed gull population. This area-proportional approach itself likely remains conservative for County Offaly specifically, given the county's disproportionate share of nationally important wetland and callows habitat (including the Shannon and Little Brosna Callows complex) relative to an average county; density of a wetland-associated species such as black-headed</p>

Species	Project Collision Risk	Cumulative Collisions / Year	Cumulative Significance
			<p>gull would reasonably be expected to exceed the national average in a county with this concentration of suitable habitat, rather than conform to it.</p> <p>Winter distribution mapping (BirdWatch Ireland, 2026a) shows black-headed gull to be present across virtually every 10km grid square nationally during the non-breeding season. This confirms the species is not confined to I-WeBS-monitored sites and supports the case that county-level presence extends well beyond what site-based I-WeBS totals capture, though it does not itself confirm uniform density across that range, this is addressed instead by the area-proportional and habitat-based reasoning above.</p> <p>Survey data for the Project recorded a probable breeding colony of black-headed gull, with counts of up to approximately 80 birds recorded across multiple survey visits during the 2024 breeding season; this colony lies in an area with no I-WeBS count site within 2km and is not reflected in the I-WeBS-derived county total, providing direct, site-specific confirmation of the wider coverage gap.</p> <p>The collision estimate for the Project has additionally been calculated using the current evidence-based avoidance rate of 99.2% for small gull species; collision estimates for other consented and operational developments included within the cumulative total were derived using the earlier NatureScot default rate of 98%, reflecting best practice at the time those assessments were undertaken. As predicted collisions under the Band (2024) collision risk model are directly proportional to (1 – avoidance rate), an assessment using a 98% avoidance rate will, for equivalent flight activity data, predict 2.5 times as many collisions as the same data assessed at 99.2% (calculated as $(1 - 0.98) \div (1 - 0.992) = 2.5$). On this basis, were the other constituent projects' collision estimates to be recalculated using the current evidence-based avoidance rate, their contribution to the cumulative total would be expected to reduce to approximately 40% of the value currently used, representing a reduction of the order of 60%. This correction has not been applied to the collision estimates for Ballincor Wind Farm, as its black-headed gull estimates were already derived using the 99.2% avoidance rate for small gulls; they are included in the corrected total as submitted. The cumulative collision total and resulting percentage increase in background mortality presented above is accordingly considered a substantial overestimate of the likely true cumulative effect.</p> <p>Applying both the avoidance rate correction and the area-proportional county population (1,367 individuals), predicted cumulative collision mortality represents approximately 1.8-1.9% of background mortality for the County Offaly population. The Project's own contribution represents 0.12-0.14% of the area-based county background mortality, so the project does not materially contribute to a cumulative effect, which is driven by other schemes.</p> <p>Even with both corrections applied, cumulative collision mortality therefore remains above 1% of background mortality at the County Offaly scale, and the conclusion for this species rests principally on</p>

Species	Project Collision Risk	Cumulative Collisions / Year	Cumulative Significance
			<p>the scale at which significance is assessed. For context, the corrected cumulative total would fall below 1% of background mortality at a county population of approximately 2,470–2,640 individuals, around 1.8–1.9 times the area-proportional estimate; given the county's above-average extent of wetland and callovs habitat described above, a county population of this order is considered plausible. At the ROI scale, which is considered the appropriate population unit for this species, the uncorrected cumulative effect is 0.11–0.12% of background mortality.</p> <p>Considered alongside the evidence that County Offaly is not, in any case, an appropriate scale at which to assess significance for this species, and that the corrected 1.8-1.9% figure itself likely retains an element of conservatism given the reasoning set out above, a significant cumulative effect on black-headed gull as a result of collision is not considered likely.</p>
Lapwing	0.12 – 0.15 (breeding) and 0.03 (non-breeding); 0.15–0.18 (annual)	5.04 – 5.38 (1.35 – 1.45 corrected) (breeding); 17.49 – 19.88 (5.44 – 6.19 corrected) (non-breeding); 18.40 – 20.81 (5.76 – 6.53 corrected) (annual)	<p>Northern lapwing has separate breeding and wintering populations in the Republic of Ireland (1,040 and 67,700 individuals, respectively), and only the wintering population has an available county-level (I-WeBS-derived) estimate (7,044.2 individuals for County Offaly); no county-level breeding population estimate is available. Cumulative collision risk has accordingly been assessed separately against each population. Seasonal collision estimates have been used where reported: Cloghan Wind Farm and Derrinlough Wind Farm report breeding, non-breeding and annual estimates; Carrig Renewables Wind Farm, Lea Mor Renewable Energy Community Wind Turbine and Ballincor Wind Farm report non-breeding estimates only. Cush Wind Farm Phase I reports an annual estimate only (3.964–4.2711 collisions/year), and, as a precaution, this has been included in full in both the breeding and the non-breeding totals. The seasonal totals therefore do not sum to the annual total, both because Phase I is counted in each season and because the annual estimate reported for Cloghan Wind Farm (0.69272 collisions/year) is a mean across survey years and is lower than the sum of its seasonal estimates (0.85830 collisions/year).</p> <p>Breeding population: the uncorrected cumulative breeding-season total (5.04–5.38 collisions/year) is predicted to result in a 1.64–1.75% increase relative to background mortality for the ROI breeding population. This figure substantially overstates the likely effect. It includes the full annual estimate for Cush Wind Farm Phase I, a large part of which is likely to relate to the non-breeding season and which is also counted in full in the non-breeding total below, and it is based on the NatureScot default 98% avoidance rate for all developments other than the Project. Applying the avoidance rate correction described below, while retaining the Phase I estimate in full, reduces the cumulative breeding-season total to 1.35–1.45 collisions/year, a 0.44–0.47% increase relative to background mortality, which is below the 1% threshold. The conclusion for the breeding population therefore depends on this correction, the basis for which is set out in Section 5.5.3.3 and Annex 5.9. The Project's own breeding-season contribution (0.12–0.15 collisions/year) represents 0.04–0.05% of background mortality for the ROI breeding population; the cumulative total is driven principally by Cush Wind Farm Phase I and Cloghan Wind Farm, and the Project</p>

Species	Project Collision Risk	Cumulative Collisions / Year	Cumulative Significance
			<p>does not materially contribute to it. On this basis, no significant cumulative collision effect on the breeding population is likely.</p> <p>Given the absence of a robust county-level breeding population estimate, the ROI breeding population is considered the more reliable basis for concluding on cumulative significance, consistent with the precautionary approach adopted elsewhere in this assessment; residual uncertainty regarding the breeding population at county scale continues to be addressed through the post-construction monitoring programme set out in Section 5.7.3.3.</p> <p>Wintering population: the uncorrected cumulative non-breeding total (17.49–19.88 collisions/year) is predicted to result in a 0.088–0.100% and 0.84–0.96% increase relative to background mortality for the ROI and County Offaly wintering populations, respectively. As neither exceeds 1% of background mortality, no significant cumulative collision effect on the wintering population is likely at either geographical scale. As a further precautionary check, if the full annual cumulative total (18.40–20.81 collisions/year) were attributed to the wintering population, this would represent a 0.092–0.104% and 0.89–1.00% increase relative to background mortality for the ROI and County Offaly wintering populations, respectively. This places the upper bound at, but not materially above, the 1% threshold. This scenario is itself highly precautionary, as it attributes breeding-season collisions, which are assessed against the breeding population above, to a wintering population made up largely of migrants that are absent during the breeding season.</p> <p>It is also noted that the collision estimate for the Project has been calculated using the evidence-based 99.5% avoidance rate, while collision estimates for the other consented and operational developments included within the cumulative total were derived using the NatureScot default 98% avoidance rate, reflecting best practice at the time those assessments were undertaken. As predicted collisions under the Band (2024) collision risk model are directly proportional to (1 – avoidance rate), an assessment using a 98% avoidance rate will, for equivalent flight activity data, predict four times as many collisions as the same data assessed at 99.5%. Applying this correction to the earlier schemes (but not to Ballincor Wind Farm, whose lapwing estimates, although derived at 98%, are included uncorrected as a precaution), the corrected cumulative non-breeding total of 5.44–6.19 collisions/year represents a 0.26–0.30% increase (0.28–0.31% if the corrected annual total of 5.76 – 6.53 collisions/year is applied) relative to background mortality for the County Offaly wintering population. For the wintering population, the uncorrected cumulative totals are accordingly considered a conservative overestimate of the likely true cumulative effect, providing additional confidence in the conclusion of no significant effect; for the breeding population, the conclusion relies on this correction, as set out above.</p>

Species	Project Collision Risk	Cumulative Collisions / Year	Cumulative Significance
			Accordingly, cumulative collision risk to northern lapwing is not considered significant for either the breeding or wintering population, at national or (where applicable) county scale.
Little egret	0.04 – 0.05	0.065-0.12	<p>The number of cumulative collisions is predicted to result in a 0.020–0.037% and 1.19–2.21% increase relative to background mortality for the ROI and County Offaly populations, respectively.</p> <p>As predicted cumulative collision mortality does not exceed 1% of background mortality for the ROI population, no significant cumulative collision effects are likely at this geographical scale.</p> <p>The predicted cumulative collision mortality exceeds 1% of background mortality at the County Offaly scale. A back-calculation indicates that the predicted cumulative collision mortality would fall below the 1% significance threshold at a County Offaly population of approximately 22.5–41.7 individuals, compared with the county population figure of 18.85 individuals derived from summed mean peak I-WeBS counts - a difference of the order of 4–23 birds. County-level totals derived from summed mean peak I-WeBS counts substantially underrepresent the true county population for waterbird species using habitat outside the I-WeBS site network (see cormorant assessment below), and little egret is known to use small and ephemeral wetland habitat such as flooded fields and field drains not covered by the I-WeBS site network. Together with the species' continuing range expansion and ongoing colonisation of new sites within Ireland since its first breeding record in 1997 (BirdWatch Ireland, 2026), it is considered plausible that the true County Offaly population exceeds the I-WeBS-derived estimate by a margin sufficient to bring predicted cumulative collision mortality below the 1% significance threshold. County Offaly does not, in any case, represent a closed population unit for a species that is still actively expanding its range and dispersing between sites, and assessment at the national (ROI) scale, at which cumulative mortality is less than 0.04% of background mortality, is considered the more robust basis for conclusion.</p> <p>Accordingly, cumulative collision risk to little egret is not considered significant at any relevant population scale, including County Offaly.</p>
Teal	0.02 – 0.03	1.27 – 1.39	The number of cumulative collisions is predicted to result in a 0.0072 – 0.0079% and 0.138 – 0.150% increase relative to background mortality for the ROI and County Offaly populations, respectively. As these collision estimates do not exceed a 1% increase in background mortality, no significant cumulative collision effects are likely at these two geographical scales.
Snipe	0.16 – 0.21	0.75 – 0.83	<p>The number of cumulative collisions is predicted to result in a 0.0169–0.0187% and 3.536–3.916% increase relative to background mortality for the ROI and County Offaly populations, respectively.</p> <p>As predicted cumulative collision mortality does not exceed 1% of background mortality for the ROI population, no significant cumulative collision effects are likely at this geographical scale.</p>

Species	Project Collision Risk	Cumulative Collisions / Year	Cumulative Significance
			<p>While the predicted cumulative collision mortality exceeds 1% of background mortality at the County Offaly scale, this apparent exceedance is considered an artefact of the methodology used to derive the county population estimate rather than a genuine effect on the population. County-level totals derived by summing mean peak I-WeBS counts across designated sites substantially underrepresent the true resident/wintering common snipe population. Common snipe is a highly cryptic species that is readily overlooked by standard waterbird count methodology, which is optimised for detecting open-water and exposed-shore species rather than birds concealed in dense marginal or emergent vegetation; established guidance on snipe monitoring recognises that counts derived from methods of this kind represent considerable underestimates of the true wintering population (Jackson, 2004). Common snipe also occurs extensively in habitat outside the I-WeBS site network, including small and ephemeral wet grassland, drains, callows and field-margin wet flushes, which are not systematically covered by the I-WeBS site-based methodology, and I-WeBS survey methods are recognised as unsuitable for some waterbird species that utilise such habitats (Burke et al., 2025).</p> <p>Common snipe is not a species reliant on discrete, readily-censused open-water sites in the manner of many other I-WeBS-monitored waterbirds, and County Offaly does not represent a closed or biologically meaningful population unit given the extent of suitable but unsurveyed wet grassland and marginal habitat present across the county, including extensive cutaway and cutover bog margins and callows habitat.</p> <p>A back-calculation indicates that the predicted cumulative collision mortality would fall below the 1% significance threshold at a County Offaly population of approximately 144–160 individuals, a figure considered well within the plausible range for the species in the county given the extent of suitable unsurveyed habitat and the recognised tendency of standard count methodology to substantially underestimate true snipe abundance.</p> <p>Accordingly, the estimated percentage increase relative to the County Offaly population is considered a gross overstatement of actual effect, and cumulative collision risk to common snipe is not considered significant at any relevant population scale, including County Offaly.</p>
Common kestrel	0.26 – 0.31	6.55 – 8.14	<p>The number of cumulative collisions is predicted to result in a 0.156–0.194% increase relative to background mortality for the ROI population. As predicted cumulative collision mortality does not exceed 1% of background mortality for the ROI population, no significant cumulative collision effects are likely at this geographical scale.</p> <p>No regional or county population estimate is available for common kestrel.</p>

Species	Project Collision Risk	Cumulative Collisions / Year	Cumulative Significance
			<p>Common kestrel, while widespread and abundant nationally, is not a site-faithful species and does not maintain a discrete or demographically closed population at county scale; individuals range over large home ranges and there is continuous interchange across administrative boundaries, consistent with the species' occurrence in 88% of 10km squares nationally (Balmer et al., 2013).</p> <p>County Offaly is not therefore considered to represent a biologically meaningful population unit against which to assess cumulative collision risk for this species, and assessment at national (ROI) population scale is considered the appropriate and precautionary basis for conclusion.</p> <p>On this basis, and consistent with the project-alone assessment (Section 5.5.3.3), a significant cumulative effect on common kestrel as a result of collision is not considered likely.</p>
Peregrine falcon	0.015	0.28 – 0.30	<p>The number of cumulative collisions is predicted to result in a 0.176–0.183% increase relative to background mortality for the ROI population. As predicted cumulative collision mortality does not exceed 1% of background mortality for the ROI population, no significant cumulative collision effects are likely at this geographical scale.</p> <p>No county population estimate is available for peregrine falcon.</p> <p>Peregrine falcon is a wide-ranging, territorial breeding species that, unlike the site-faithful waterbird species assessed against I-WeBS site-based population data above, does not have a discrete or demographically closed population at county scale; juvenile dispersal distances are substantial and there is continuous interchange of individuals across administrative boundaries. County Offaly is not therefore considered to represent a biologically meaningful population unit against which to assess cumulative collision risk for this species, and assessment at national (ROI) population scale, as set out above, is considered the appropriate and precautionary basis for conclusion.</p> <p>On this basis, and consistent with the project-alone assessment (Section 5.5.3.3), a significant cumulative effect on peregrine falcon as a result of collision is not considered likely.</p>
Great cormorant	0.005	0.51 – 0.66	<p>The number of cumulative collisions is predicted to result in a 0.050 – 0.061% and 29.2 – 35.7% increase relative to background mortality for the ROI and County Offaly populations, respectively.</p> <p>As predicted cumulative collision mortality does not exceed 1% of background mortality for the ROI population, no significant cumulative collision effects are likely at this geographical scale.</p> <p>While the predicted cumulative collision mortality exceeds 1% of background mortality at the County Offaly scale, this exceedance is considered to arise largely from the methodology used to derive the</p>

Species	Project Collision Risk	Cumulative Collisions / Year	Cumulative Significance
			<p>county population estimate rather than a genuine effect on the population. County-level totals derived by summing mean peak I-WeBS counts across designated sites substantially underrepresent the true resident/wintering population, as I-WeBS site coverage does not extend to the full range of habitat used by cormorant in the county (e.g. small and ephemeral waterbodies, minor watercourses and other habitats outside the I-WeBS site network), and the species' high mobility between foraging and roosting locations (Klimaszyk & Rzymiski, 2015) means site-based counts cannot be reliably summed to derive a discrete county population as I-WeBS survey methods are unsuitable for some waterbird species that utilise other habitats, such as non-wetland habitat, small and ephemeral wetlands, and other areas difficult to monitor from land-based surveys (Burke et al., 2025).</p> <p>Cormorant at the national/flyway scale is a highly mobile, generalist species not reliant on discrete site fidelity (Hatch et al., 2020) in the manner of many other I-WeBS-monitored waterbirds, and County Offaly does not represent a closed or biologically meaningful population unit. Assessment at the national (ROI) scale, at which cumulative mortality represents less than 0.07% of background mortality, is therefore considered the appropriate basis for conclusion.</p> <p>A back-calculation indicates that the predicted cumulative collision mortality would fall below the 1% significance threshold at a County Offaly population of approximately 425–550 individuals. This is substantially above the I-WeBS-derived county figure and reflects the fact that the county-scale exceedance is driven almost entirely by other schemes: the Project's own contribution (0.005 collisions per year) represents 0.27–0.29% of background mortality for the I-WeBS-derived County Offaly population, below the 1% threshold even against that highly conservative population figure. The Project therefore does not materially contribute to any cumulative effect at county scale.</p> <p>Accordingly, the estimated percentage increase relative to the County Offaly population is considered a substantial overstatement of actual effect, and cumulative collision risk to cormorant is not considered significant at any relevant population scale, including County Offaly.</p>
Mallard	0.10 – 0.11	0.74 – 0.88	<p>The number of cumulative collisions is predicted to result in a 0.0115 – 0.0132% and 0.358 – 0.414% increase relative to background mortality for the ROI and County Offaly populations, respectively. As these collision estimates do not exceed a 1% increase in background mortality, no significant cumulative collision effects are likely at these two geographical scales.</p>
Merlin	0.01 – 0.02	0.01 – 0.03	<p>The number of cumulative collisions is predicted to result in a 0.0066–0.0148% increase relative to background mortality for the ROI population. As predicted cumulative collision mortality does not exceed 1% of background mortality for the ROI population, no significant cumulative collision effects are likely at this geographical scale. Consistent with the project-alone assessment (see Section 5.5.3.3) merlin is a wide-ranging species that does not maintain a discrete population at county scale, and no significant cumulative collision effects are likely at any geographical scale.</p>

Table 5.17: Cumulative Collision Risk

Designated Sites and Birds

Nationally designated sites within the Zone of Influence with connectivity to the Project, and not already addressed within the NIS as SPAs, are Woodville Woods pNHA, River Little Brosna Callows NHA, Lough Nahinch (Tipperary) pNHA and Roscrea Bog pNHA (**Section 5.5.3.1**). Collision risk was identified for common snipe at Woodville Woods, Lough Nahinch and Roscrea Bog pNHAs, and for European golden plover, northern lapwing and common snipe at River Little Brosna Callows NHA.

As set out in **Section 5.5.3.1**, no site-specific population estimate for common snipe is available for Woodville Woods, Lough Nahinch or Roscrea Bog pNHAs, and a robust quantitative cumulative assessment is accordingly not possible for these three sites. This is considered together with the non-statutory status of pNHAs and supports a qualitative approach to cumulative assessment at these sites, consistent with that applied at the project-alone stage.

The cumulative collision estimate for common snipe (**Table 5.17**) is 0.75–0.83 collisions/year. In the absence of a population estimate against which to test this figure at Woodville Woods, Lough Nahinch or Roscrea Bog pNHAs, the qualitative conclusions reached at the project-alone stage (**Section 5.5.3.1**) are relied upon and considered to remain valid in a cumulative context, given the relatively small scale of the cumulative addition involved, for Woodville Woods and Lough Nahinch.

The same conclusion applies to Roscrea Bog pNHA. The Project contributes 0.16–0.21 of the 0.75–0.83 cumulative collisions/year, and many of the other schemes contributing to the cumulative total are at a greater distance from the pNHA. The considerations set out at the project-alone stage (low absolute magnitude, the attribution of collisions largely to birds using the Project site itself, and the absence of a discrete pNHA population) therefore apply equally in a cumulative context. No significant cumulative effect on the Roscrea Bog pNHA snipe population is predicted.

For River Little Brosna Callows NHA, a site-specific population estimate is available for European golden plover and northern lapwing (non-breeding population), and a quantitative cumulative assessment has accordingly been undertaken.

For European golden plover, the cumulative collision estimate is 31.92–34.01 collisions/year. Based on the River Little Brosna Callows NHA winter population of 6,934.8 individuals (BirdWatch Ireland, 2026), being the most recent I-WeBS-derived estimate and taken to apply equally to the overlapping River Little Brosna Callows SPA, this represents a 1.70–1.82% increase relative to background mortality on an uncorrected basis. As set out for this species elsewhere in this assessment (**Table 5.17**), this cumulative total is considered to substantially overestimate the likely true effect, owing to inconsistent avoidance rate assumptions across the constituent projects contributing to the cumulative total. The correction has not been applied to Ballincor Wind Farm, whose golden plover estimates were already derived using an evidence-based avoidance rate of 99.6% (Gittings, 2022). Applying the corrected cumulative total of 14.44–16.12 collisions/year reduces this to a 0.77–0.86% increase. The uncorrected figure therefore exceeds 1% of background mortality, and the conclusion for this population relies on the avoidance rate correction, the basis for which is set out in Section 5.5.3.3 and Annex 5.9; this is consistent with the approach taken for the breeding population of northern lapwing (**Table 5.17**). For context, against the reference population given in the conservation objectives for the overlapping SPA (12,818 individuals; NPWS), the equivalent figures are 0.92–0.98%

(uncorrected) and 0.42–0.47% (corrected). As predicted cumulative collision mortality does not exceed 1% of background mortality on a corrected basis, no significant cumulative collision effect on the River Little Brosna Callows NHA population of European golden plover is likely.

For northern lapwing, given the availability of an NHA winter population estimate but not a breeding population estimate, cumulative collision risk has been assessed against the non-breeding population only. The applicable cumulative non-breeding collision estimate is 17.49–19.88 collisions/year (uncorrected), reducing to 5.44–6.19 collisions/year when corrected for the avoidance rate inconsistency described above. Based on the River Little Brosna Callows NHA winter population of 4,787.2 individuals (BirdWatch Ireland, 2026), being the most recent I-WeBS-derived estimate and taken to apply equally to the overlapping SPA, this represents a 1.24–1.41% increase relative to background mortality on an uncorrected basis, and 0.39–0.44% on a corrected basis. If the full annual cumulative total (18.40–20.81 collisions/year; 5.76–6.53 collisions/year corrected) were attributed to this population, the increase would be 1.30–1.47% (uncorrected) and 0.41–0.46% (corrected). The uncorrected figures therefore exceed 1% of background mortality and, as for European golden plover above, the conclusion for this population relies on the avoidance rate correction. For context, against the reference population given in the conservation objectives for the overlapping SPA (7,841 individuals; NPWS), the equivalent figures are 0.76–0.86% (uncorrected) and 0.24–0.27% (corrected). As predicted cumulative collision mortality does not exceed 1% of background mortality on a corrected basis, no significant cumulative collision effect on the River Little Brosna Callows NHA non-breeding population of northern lapwing is likely.

For common snipe, consistent with the project-alone assessment (**Section 5.5.3.1**), the species is not identified in the site synopsis as a population of national or international importance at this NHA. Cumulative collision risk to common snipe is accordingly assessed at Republic of Ireland and County Offaly population scale (**Table 5.17**), where this is concluded not to be significant, rather than against a population specific to this site.

Bats

Likely significant cumulative effects on bats are limited to those occurring due to the Project and other wind farms. These effects are:-

- collision; and
- barotrauma.

Potential cumulative operational effects need to be considered in light of bat mitigation buffers, which will be created during the construction phase. This will ensure there is a minimum separation distance of 50m from blade tip to any likely commuting or foraging habitat feature. Bat mitigation buffers will be maintained over the lifespan of the project.

There are 9 no. wind farm developments located within 20km proximity to the project (see **Table 5.16**) with details of collision risk assessments undertaken for each wind farm summarised below.

Ballincor Wind Farm

According to the 2026 EIAR written by Tobin, in the absence of mitigation, the proposed Ballincor wind farm would likely have a 'permanent, slight, negative' effect

on bats at a local level.

Cush Wind Farm Phase I

According to the EIAR written in 2023 by SLR, in the absence of mitigation the proposed wind farm would be likely to have significant effects on bat populations at the local level.

Cloghan Wind Farm

According to the EIAR written in 2019 by IWCM Ltd stated that, in the absence of mitigation, the bat species most commonly recorded (common and soprano pipistrelle) would not be affected by the installation of wind turbines within the site. The effects on Pipistrelle bat species would be imperceptible, and not significant negative effects on Leisler's bats.

Meenwaun Wind Farm

According to the EIAR written in 2015 by Fehily Timoney and Company common pipistrelle, soprano pipistrelle, and Leisler's bat were all recorded during surveys. They concluded that, in the absence of mitigation, collision risk to bats had to be considered.

Leabeg Wind Farm

According to the EIAR prepared in 2010 by Galeelectric, no assessment was carried out to determine bat activity levels at the wind farm site.

Carrig and Skehanagh Wind Farm

Assessments for Carrig and Skehanagh Wind Farm were unavailable on the planning portal.

Carrig Renewables Wind Farm

According to the EIAR written in 2023 by MKO, Leisler's bat, common pipistrelle, soprano pipistrelle, Nathusius' pipistrelle, *Myotis* spp. and brown long-eared bat were recorded during surveys. It was concluded that, in the absence of mitigation, collision mortality, barotrauma and other injuries caused by bats coming into contact or close proximity to operational turbines were a potential effect of the project. Any increase in artificial lighting at night associated with the project would also have the potential to result in displacement effects on bats. The magnitude of this effect in the absence of mitigation was classified as moderate at the local scale.

Derrinlough Wind Farm

According to the EIAR written in 2020 by MKO, it was concluded that, in the absence of mitigation, operational effects would be a long-term effect on Pipistrelle species and Leisler's bat species as a result of mortality due to collision. The magnitude of this effect in the absence of mitigation was classified as moderate on the basis that no significant roosts were identified in the immediate vicinity of the turbines and the median level of activity was considered moderate (on a precautionary basis).

Cumulative collision risk

Without mitigation, the additive effects of the project in-combination with the other wind farms, are likely to have a cumulative effect on some local bat populations (most likely high-collision risk species such as Leisler's bat and common, soprano and

Nathusius' pipistrelle). However, blade feathering below cut-in wind speed at all Project turbines from commissioning, together with the maintenance of the bat mitigation buffers, will reduce the Project's contribution to cumulative collision risk. It can be difficult to predict bat behaviour post-construction (Richardson, Lintott, Hosken, Economou, & Mathews, 2021), and so as a precaution, it is predicted that there still may be a residual effect that is not significant on local populations of high collision-risk species (Leisler's bat and common, soprano and Nathusius' pipistrelle).

Potential Decommissioning Phase Cumulative Effects

These will be similar to construction phase and/or of lower magnitude.

5.6 MITIGATION MEASURES

The Developer will be responsible for implementing proposed mitigation and compensation during construction and the operator will be responsible for the same during operation and decommissioning.

5.6.1 MITIGATION MEASURES DURING CONSTRUCTION PHASE

5.6.1.1 *Designated Nature Conservation Sites, Fisheries and Aquatic Ecology*

Mitigation measures to prevent adverse effects on downstream European Sites during construction are provided in full in the NIS. These will ensure no deterioration in the quality of water entering the River Shannon Callows SAC, Lough Derg (Shannon) SPA, Lough Derg North East Shore SAC, and Middle Shannon Callows SPA (including wetland habitat potentially used ex-situ by SCI species of River Little Brosna Callows SPA) and will ensure there will be no effects on any QF habitats and species. The same is true for IEF non-QI aquatic habitats and species.

These measures are taken from **Chapter 7** and the CEMP (**Annex 3.4**).

In order to mitigate potential effects during the construction phase, best practice construction methods will be implemented in order to prevent water (surface water and groundwater) pollution. Good practice measures will be applied in relation to pollution risk, sediment management and management of surface runoff rates and volumes.

A CEMP (**Annex 3.4**) has been prepared for the project to ensure adequate protection of the water environment. All personnel working on the project will be responsible for the environmental control of their work and will perform their duties in accordance with the requirements and procedures of the CEMP.

During the construction phase, all works associated with the construction of the project will be undertaken in accordance with the guidance contained within CIRIA Document C741 'Environmental Good Practice on Site' (CIRIA, 2015). Any groundwater encountered will be managed and treated in accordance with CIRIA C750, 'Groundwater control: design and practice' (CIRIA, 2016).

Clear Felling and Surface Water Quality Effects

Best practice methods related to water incorporated into the forestry management and mitigation measures have been derived from:-

- Department of Agricultural, Food and the Marine (2019) *Standards for Felling and Reforestation*;
- Forestry Commission (2004) *Forests and Water Guidelines, Fourth Edition*. Publ. Forestry Commission, Edinburgh;
- Coillte (2009) *Forest Operations and Water Protection Guidelines*;
- Coillte (2009) *Methodology for Clear Felling Harvesting Operations*; and,
- Forest Service (2000: *Forestry and Water Quality Guidelines*. Forest Service, DAF, Johnstown Castle Estate, Co. Wexford.

Mitigation by Avoidance

There is a requirement in the *Forest Service Code of Practice* and in the *FSC Certification Standard* for the installation of buffer zones adjacent to aquatic zones at

planting stage.

During the construction phase, a self-imposed conservative buffer zone of 50m will be maintained for all Rapemills River and West Galros Stream where possible.

The large distance between the majority of the felling areas and sensitive aquatic zones means that any poor quality runoff arising from felling areas can be adequately managed and attenuated prior to even reaching the aquatic buffer zone and primary drainage routes. Where tree felling is required in the vicinity of streams, the additional mitigation measures outlined below will be employed.

Mitigation by Design

Mitigation measures which will reduce the risk of entrainment of suspended solids and nutrient release in surface watercourses comprise best practice methods, as follows:-

- Machine combinations (i.e. handheld or mechanical) will be chosen which are most suitable for ground conditions and which will minimise soils disturbance;
- Checking and maintenance of tracks and culverts will be ongoing through any felling operation. No tracking of vehicles through watercourses will occur. Where possible, existing drains will not be disturbed during felling works;
- Ditches which drain from the areas to be felled towards existing surface watercourses will be blocked, and temporary silt traps will be constructed. No direct discharge of such ditches to watercourses will occur. Drains and sediment traps will be installed during ground preparation. Collector drains will be excavated at an acute angle to the contour (~0.3%-3% gradient), to minimise flow velocities. Main drains to take the discharge from collector drains will include water drops and rock armour, as required, where there are steep gradients, and avoid being placed at right angles to the contour;
- Sediment traps will be sited in drains downstream of felling areas. Machine access will be maintained to enable the accumulated sediment to be excavated. Sediment will be carefully disposed of in the spoil disposal areas. All new silt traps will be constructed on even ground and not on sloping ground;
- In areas particularly sensitive to erosion or where felling inside the 50m buffer is required, it will be necessary to install double or triple sediment traps;
- All drainage channels will taper out before entering the 50m buffer zone. This ensures that discharged water gently fans out over the buffer zone before entering the aquatic zone, with sediment filtered out from the flow by ground vegetation within the zone. On erodible soils, silt traps will be installed at the end of the drainage channels, to the outside of the buffer zone;
- Drains and silt traps will be maintained throughout all felling works, ensuring that they are clear of sediment build-up and are not severely eroded. Correct drain alignment, spacing and depth will ensure that erosion and sediment build-up are minimized and controlled;
- Brash or bog mats will be used to support vehicles on soft ground, reducing topsoil and mineral soils erosion and avoiding the formation of rutted areas, in which surface water ponding can occur. Brash mat renewal will take place before they become heavily used and worn. Provision will be made for brash mats along all off-road routes, to protect the soil from compaction and rutting. Where there is risk of severe erosion occurring, extraction will be suspended

during periods of high rainfall;

- Timber will be stacked in dry areas, and outside the 50m watercourse buffer. Straw bales and check dams will be emplaced on the down gradient side of timber storage/processing sites;
- Works will be carried out during periods of no, or low, rainfall in order to minimise entrainment of exposed sediment in surface water run-off;
- Checking and maintenance of roads/tracks and culverts will be ongoing through the felling operation;
- Refuelling or maintenance of machinery will not occur within 50m of a watercourse. Mobile bowser, drip kits, qualified personnel will be used where refuelling is required;
- A permit to refuel system will be adopted;
- Branches, logs or debris will not be allowed to build up in aquatic zones. All such material will be removed when harvesting operations have been completed, but care will be taken to avoid removing natural debris deflectors;
- Trees will be cut manually from along streams and using machinery to extract whole trees; and
- Travel will only be permitted perpendicular to and away from surface water features.

Silt Traps

Silt traps will be strategically placed down-gradient within forestry drains near streams. The main purpose of the silt traps and drain blocking is to slow water flow, increase residence time and allow settling of silt in a controlled manner.

Drain Inspection and Maintenance

The following items will be carried out during pre-felling inspections and regularly thereafter:-

- Communication with tree felling operatives in advance to determine whether any areas have been reported where there is unusual waterlogging or bogging of machines;
- Inspection of all areas reported as having unusual ground conditions;
- Inspection of main drainage ditches and outfalls. During pre-felling inspections, the main drainage ditches will be identified. Where possible, the pre-felling inspection will be carried out during rainfall;
- Following tree felling, all main drains will be inspected to ensure that they are functioning;
- Extraction tracks within 10m of drains will be broken up and diversion channels created to ensure that water in the tracks spreads out over the adjoining ground;
- Culverts on drains exiting the site, if impeded by silt or debris, will be unblocked; and
- All accumulated silt will be removed from drains and culverts, and silt traps, and this removed material will be deposited away from watercourses to ensure that it will not be carried back into the trap or stream during subsequent rainfall.

Surface Water Quality Monitoring

Sampling will be completed before, during (if the operation is conducted over a protracted time) and after the felling activity. The 'before' sampling will be conducted within 4-weeks of the felling activity commencing, preferably in medium-to-high water flow conditions. The 'during' sampling will be undertaken once a week or after rainfall events. The 'after' sampling will comprise as many samplings as necessary to demonstrate that water quality has returned to pre-activity status (i.e. where an impact has been shown).

Details of the proposed surface water quality monitoring programme are outlined in the Water Quality Monitoring Plan (**Annex 3.4**).

The surface water sampling locations used in this EIAR for the project site and grid connection (i.e. SW1 – SW4) will also be used as sampling locations during felling activities.

Also, daily surface water monitoring forms (for visual inspections and field chemistry measurements) will also be utilised at every works site near any watercourse. These will be taken daily and kept on site for record and inspection.

Earthworks (Removal of Vegetation Cover, Excavations and Stock Piling) Resulting in Suspended Solids Entrainment in Surface Water

Mitigation by Avoidance

The key mitigation measure during the construction phase is the avoidance of sensitive aquatic areas by using a 50m buffer. From the constraints map (**Annex 7.4**) it is evident that only the underground electricity line is within a 50m buffer zone.

As described above and at **Chapter 3**, specific mitigation measures, incorporated into the design of the project and through implementation of best practice methodologies (discussed below) will be employed where work inside buffer zones is proposed.

The generally large setback distance from sensitive hydrological features at the project site ensures that sufficient space is provided for the installation of drainage mitigation measures (discussed below) and to ensure their effective operation. The proposed buffer zone will ensure:

- Avoidance of physical damage to watercourses, and associated release of sediment;
- Avoidance of excavations within close proximity to surface water courses;
- Avoidance of the entry of suspended sediment from earthworks into watercourses; and,
- Avoidance of the entry of suspended sediment from the construction phase drainage system into watercourses, achieved in part by ending drain discharge outside the buffer zone and allowing percolation across the vegetation of the buffer zone.

Mitigation by Prevention

The following section details the measures which will be put in place during the construction phase to ensure that surface water features are protected from the release of silt or sediment and to ensure that all surface water runoff is fully treated

and attenuated to avoid the discharge of dirty water.

- Source controls to limit the likelihood for 'dirty water' to occur:
- Interceptor drains, vee-drains, diversion drains, flume pipes, erosion and velocity control measures such as use of sand bags, oyster bags filled with clean washed gravel, filter fabrics, and other similar/equivalent or appropriate systems;
- Small working areas, covering stockpiles, weathering off stockpiles, cessation of works in certain areas or other similar/equivalent or appropriate measures.
- In-Line controls to ensure appropriate management of silt laden water:
- Interceptor drains, vee-drains, oversized swales, erosion and velocity control measures such as check dams, sand bags, oyster bags, straw bales, flow limiters, weirs, baffles, silt bags, silt fences, sedimats, filter fabrics, and collection sumps, temporary sumps/attenuation lagoons, sediment traps, pumping systems, settlement ponds, temporary pumping chambers, or other similar/equivalent or appropriate systems.
- Treatment systems to fully attenuate silt laden waters prior to discharge:
- Temporary sumps and attenuation ponds, temporary storage lagoons, sediment traps, and settlement ponds, and proprietary settlement systems such as Siltbuster, and/or other similar/equivalent or appropriate systems; and
- The existing settlement ponds/lagoons on the BnM lands.

It should be noted for this site that an extensive network of bog drains already exists, and these will be integrated and enhanced as required and used within the wind farm drainage system. The integration of the existing land drainage network and the proposed wind farm network is common practice in wind energy developments and will also result in benefits to surrounding lands.

The main elements of interaction with existing drains will be as follows:

- Apart from interceptor drains, which will convey clean runoff water to the downstream drainage system, there will be no direct discharge (without treatment for sediment reduction and attenuation for flow management) of runoff from the wind farm drainage into the existing site drainage network. This will reduce the likelihood of any increased risk of downstream flooding or sediment transport/erosion;
- Silt traps will be placed in the existing drains upstream of any streams where construction works is taking place, and these will be diverted into proposed interceptor drains, or culverted under/across the works area; and
- Buffered outfalls, which will be numerous over the site, will promote percolation of drainage waters across vegetation and close to the point at which the additional runoff is generated, rather than direct discharge to the existing drains of the site.

Water Treatment Train

While the silt/sediment ponds and lagoons are assessed as providing a sufficient level of protection to avoid any deterioration in downstream water quality; a final line of defence can be provided by a water treatment train such as a 'Siltbuster', if required. If the discharge water from construction areas fails to be of a high quality, then a filtration treatment system (such as a 'Siltbuster' or similar equivalent treatment train [sequence of water treatment processes]) will be used to filter and treat all surface

discharge water collected in the dirty water drainage system. This water treatment train will apply for the entirety of the construction phase.

Silt Fences

Silt fences will be emplaced within drains down-gradient of all construction areas. Silt fences are effective at removing heavy settleable solids. This will act to prevent entry to watercourses of sand and gravel sized sediment, released from excavation of mineral sub-soils of glacial and glacio-fluvial origin, and entrained in surface water runoff. Inspection and maintenance of these structures during construction phase is critical to their functioning to stated purpose. They will remain in place throughout the entire construction phase. Double silt fences will be emplaced within drains down-gradient of all construction areas inside the hydrological buffer zones to provide an additional layer of protection in these areas.

Silt Bags

Silt bags will be used where small to medium volumes of water need to be pumped from excavations. As water is pumped through the bag, most of the sediment is retained by the geotextile fabric allowing filtered water to pass through. Silt bags will be used with natural vegetation filters or sedimats (sediment entrapment mats, consisting of coir or jute matting) placed at the silt bag location to provide further treatment of the water outfall from the silt bag. Sedimats will be secured to the ground surface using stakes/pegs. The sedimat will extend to the full width of the outfall to ensure all water passes through this additional treatment measure.

Existing BnM/Galros Bog Settlement Ponds/lagoons

The project infrastructure on the BnM lands (i.e. turbines T9 – T11 and spoil deposition areas) have the added benefit of the existing settlement ponds/lagoon providing additional attenuation.

Management of Runoff from Soil Deposition Areas

It is proposed that excavated overburden/spoil will be utilised for reinstatement of excavated areas etc. and for landscaping purposes. Excess material, or material which is unsuitable for this purpose, will be stored, permanently, at 1 no. dedicated spoil deposition area located southeast of proposed turbine T11 as well as smaller deposition areas at each of the 3 no. turbine locations.

All proposed spoil deposition areas are located outside the 50m stream buffer zone (refer to **Annex 7.4**).

During the initial placement of spoil in the deposition areas, silt fences, straw bales and biodegradable matting will be used to control surface water runoff. Double silt fencing will be placed along the edge of each bog drain that intercepts the deposition areas.

Drainage from overburden deposition areas will ultimately be into the existing bog drain network where it is proposed that check dams will be installed every 20m or so to create a series of settlement ponds, before being discharged.

The spoil deposition area drainage on the BnM lands have the added benefit of the existing settlement ponds/lagoons.

Spoil deposition areas will be sealed with a digger bucket and vegetated as soon as

possible to reduce sediment entrainment in runoff. Once re-vegetated and stabilised, spoil deposition areas will no longer be a likely source of silt laden runoff. Surface water protection infrastructure will be left in place until the areas have stabilised.

Underground Electricity Line Installation Works

Mitigation measures which are outlined below will be implemented to ensure that silt laden or contaminated surface water runoff from the trenching work does not discharge directly to the Rapemills River:

- All existing dry drains that intercept the works area will be temporarily blocked down-gradient of the works using temporary check dams/silt traps (e.g. straw bales);
- Clean water diversion drains will be installed upgradient of the works areas, as required;
- Check dams/silt fence arrangements (silt traps or straw bales) will be placed in all existing drains that have surface water flows and also along existing roadside drains;
- A double silt fence perimeter will be placed down-slope of works areas that are located inside the watercourse 50m buffer zones;
- At drain crossing locations, where open trenching is required, damming and over pumping method will be used to manage flows in the drain.

Specific mitigation measures relating to the directional drilling at the crossing location are detailed below.

Horizontal Directional Drilling (HDD)

The following mitigation will be carried out during directional drilling works:

- Firstly, the crossing works area will be clearly marked out with fencing or flagging tape to avoid unnecessary disturbance of vegetation;
- A minimum 10m vegetated buffer will be maintained between the HDD working areas, including launch and receiving pits, and the riverbank. Plant entry into this buffer will be avoided. Where limited access within the buffer is demonstrably unavoidable, ground-protection mats will be used and the duration and extent of access will be minimised. There will be no storage of material/equipment, excavated material or overnight parking of machinery inside the 10m buffer zone;
- Double silt fencing will be placed upslope of the buffer zone on each side of the watercourse.
- Mats will be used underneath the excavator, inside the 10 metre vegetative buffer zone, to prevent soil erosion/rutting and potential surface water quality impacts from localised surface water runoff;
- Temporary storage of excavated material will be undertaken outside of the 10m buffer on flat ground or within a local hollow area. A containment berm will be placed downslope of the excavated material which in turn will be surrounded by secondary silt fence protection to prevent saturated soil from flowing back into the watercourse;
- Operation of machinery and use of equipment within the 10m buffer will be kept to a minimum to avoid any unnecessary disturbance;
- There will be no refuelling allowed within 50m of the watercourse crossing;

- All plant will be checked for purpose of use prior to mobilisation at the watercourse crossing; and,
- Works shall not take place during periods of heavy rainfall and will be scaled back or suspended if heavy rain is forecasted.

Mitigation Measures relating to the use of a mixture of a natural, inert and fully biodegradable drilling fluid such as Clear Bore™ and water for directional drilling include:

- The area around the Clear Bore™ batching, pumping and recycling plants will be bunded using terram and sandbags in order to contain any spillages;
- One or more lines of silt fences will be placed between the works area and adjacent rivers and streams on both banks;
- Accidental spillage of fluids will be cleaned up immediately and transported off site for disposal at a licensed facility; and,
- Adequately sized skips will be used for temporary storage of drilling arisings during directional drilling works. This will ensure containment of drilling arisings and drilling flush.

A Fracture Blow-out (Frac-out) Prevention and Contingency Plan will be prepared by the drilling contractor prior to construction and will include the following measures:

- The drilling fluid/bentonite will be non-toxic and naturally biodegradable (i.e., Clear Bore Drilling Fluid or similar will be used);
- The area around the drilling fluid batching, pumping and recycling plants will be bunded using terram and/or sandbags to contain any potential spillage;
- A double row of silt fencing will be placed between the works area and the adjacent river;
- Spills of drilling fluid will be cleaned up immediately and transported off-site for disposal at a licensed facility;
- Adequately sized skips will be used where temporary storage of arisings are required;
- The drilling process/pressure will be constantly monitored to detect any possible leaks or breakouts into the surrounding geology or local watercourse;
- This will be gauged by observation and by monitoring the pumping rates and pressures. If any signs of breakout occur then drilling will be immediately stopped;
- Any frac-out material will be contained and removed off-site;
- The drilling location will be reviewed, before re-commencing with a higher viscosity drilling fluid mix; and,
- If the risk of a further inadvertent return remains high, the drilling methodology and alignment will be reviewed within the assessed works corridor before drilling recommences.

Pre-emptive Site Drainage Management

The works programme for the initial construction stage of the development will also take account of weather forecasts, and predicted rainfall in particular. Large excavations and movements of soil/subsoil or vegetation stripping will be suspended or scaled back if prolonged or intense rain is forecast. The extent to which works will be scaled back or suspended will relate directly to the amount of rainfall forecast.

The following forecasting systems are available and will be used on a daily basis at the site to direct proposed construction activities:

- General Forecasts: Available on a national, regional and county level from the Met Éireann website (www.met.ie/forecasts). These provide general information on weather patterns including rainfall, wind speed and direction but do not provide any quantitative rainfall estimates;
- Meteo Alarm: Alerts to the possible occurrence of severe weather for the next 2 days. Less useful than general forecasts as only available on a provincial scale;
- 3 hour Rainfall Maps: Forecast quantitative rainfall amounts for the next 3 hours but does not account for possible heavy localised events;
- Rainfall Radar Images: Images covering the entire country are freely available from the Met Éireann website (www.met.ie/latest/rainfall_radar.asp). The images are a composite of radar data from Shannon and Dublin airports and give a picture of current rainfall extent and intensity. Images show a quantitative measure of recent rainfall. A 3 hour record is given and is updated every 15 minutes. Radar images are not predictive; and,
- Consultancy Service: Met Éireann provide a 24 hour telephone consultancy service. The forecaster will provide interpretation of weather data and give the best available forecast for the area of interest.

Using the safe threshold rainfall values will allow work to be safely controlled (from a water quality perspective) in the event of an impending high rainfall intensity event.

Works will be suspended if forecasting suggests either of the following is likely to occur:

- >10 mm/hr (i.e. high intensity local rainfall events);
- >25 mm in a 24-hour period (heavy frontal rainfall lasting most of the day); or,
- >half monthly average rainfall in any 7 days.

Prior to works being suspended the following control measures will be completed:

- Secure all open excavations;
- Provide temporary or emergency drainage to prevent back-up of surface runoff; and,
- Avoid working during heavy rainfall and for up to 24-hours after heavy events to ensure drainage systems are not overloaded.

Timing of Site Construction Works

The construction of the site drainage system will be carried out, at the respective locations, prior to other activities being commenced. The construction of the drainage system will only be carried out during periods of, where possible, no rainfall, therefore avoiding runoff. This will avoid the risk of entrainment of suspended sediment in surface water runoff, and transport via this pathway to surface watercourses. Construction of the drainage system during this period will also ensure that attenuation features associated with the drainage system will be in place and functional for all subsequent construction works.

Monitoring

Prior to the commencement of development, a detailed Site Drainage Plan and SWMP will be prepared to detail the siting and composition of the surface water

management measures. The respective plans, which will form part of a detailed Construction Environmental Management Plan (CEMP), will be prepared prior to the commencement of development.

The CEMP will also include a detailed Water Quality Monitoring Plan for the monitoring of surface waters in the vicinity of the construction site by a designated Environmental Manager. The monitoring programme will comprise field testing and laboratory analysis of a range of agreed parameters. The civil works contractor, who will be responsible for the construction of the site drainage system, and Environmental Manager will undertake regular inspections of the drainage system to ensure that all measures are functioning effectively. The surface water sampling locations used in this EIAR (i.e. SW1 – SW4) will be used during construction activities. Regular inspections of all installed drainage systems will be undertaken, especially after heavy rainfall, to check for blockages, and ensure there is no build-up of standing water in parts of the systems where it is not intended.

Any excess build-up of silt levels that may decrease the effectiveness of the drainage feature, will be removed and disposed of in an appropriate manner.

Excavation Dewatering and Effects on Surface Water Quality

The management of excavation dewatering (pumping), particularly in relation to any accumulation of water in foundations or electricity line trenches, and subsequent treatment prior to discharge into the drainage network will be undertaken as follows:-

- Appropriate interceptor drainage, to prevent upslope surface runoff from entering excavations, will be put in place;
- The interceptor drainage will be discharged to the site constructed drainage system or onto natural vegetated surfaces and not directly to surface waters to ensure that Greenfield runoff rates are mimicked;
- If required, pumping of excavation inflows will prevent build-up of water in the excavation;
- The pumped water volumes will be discharged via volume and silt/sediment ponds and settlement lagoons adjacent to excavation areas, or via specialist treatment systems such as a Siltbuster unit;
- There will be no direct discharge to surface watercourses, and therefore no risk of hydraulic loading or contamination will occur;
- Daily monitoring of wind farm excavations by the Environmental Manager will occur during the construction phase. If high levels of seepage inflow occur, excavation work at this location will cease immediately and a geotechnical assessment undertaken; and,
- A mobile 'Siltbuster' or similar equivalent specialist treatment system will be available on-site for emergencies. Siltbusters are mobile silt traps that can remove fine particles from water using a proven technology and hydraulic design in a rugged unit. The mobile units are specifically designed for use on construction-sites. They will be used as final line of defence if needed.

Release of Hydrocarbons during Construction and Storage

Mitigation measures proposed to avoid release of hydrocarbons at the site are as follows:-

- The volume of fuels or oils stored on site will be minimised. All fuel and oil will

be stored in an appropriately bunded area within the temporary construction compound. Only an appropriate volume of fuel will be stored at any given time. The bunded area will be roofed to avoid the ingress of rainfall and will be fitted with a storm drainage system and an appropriate oil interceptor;

- All bunded areas will have 110% capacity of the volume to be stored;
- On site refuelling of machinery will be carried out using a mobile double skinned fuel bowser. The fuel bowser, a double-axel custom-built refuelling trailer will be re-filled at the temporary compound and will be towed around the site by a 4x4 jeep to where plant and machinery is located. No refuelling will be permitted at works locations within the 50m hydrological buffer. The 4x4 jeep will also be fully stocked with fuel absorbent material and pads in the event of any accidental spillages. The fuel bowser will be parked on a level area in the construction compound when not in use and only designated trained and competent operatives will be authorised to refuel plant on site. Mobile measures such as drip trays and fuel absorbent mats will be used during all refuelling operations to avoid any accidental leakages;
- All plant and machinery used during construction will be regularly inspected for leaks and fitness for purpose;
- Spill kits will be readily available to deal with and accidental spillages;
- All waste tar material arising from road cuttings (from trenching or other works in public roads) will be removed off-site and taken to a licensed waste facility. Due to the potential for contamination of soils and subsoils, it is not proposed to utilise this material for any reinstatement works; and
- An outline emergency plan for the construction phase to deal with accidental spillages is contained within the Planning-Stage CEMP (**Annex 3.4**). This emergency plan will be further developed prior to the commencement of project, and will be agreed with the Planning Authority as part of the detailed CEMP.

Release of Cement-Based Products

The following mitigation measures are proposed to ensure that the release of cement-based products is avoided:-

- No batching of wet-cement products will occur on site. Ready-mixed concrete will be brought to site as required and, where possible, emplacement of pre-cast products will be utilised;
- All watercourse crossings will utilise pre-cast products and the use of wet-cement products within the hydrological buffer will be avoided;
- Where concrete is delivered on site, only the chute will be cleaned, using the smallest volume of water practicable. Chute cleaning will be undertaken at lined cement washout ponds with waters being stored in the temporary construction compound, removed off site and disposed of at an approved licensed facility. No discharge of cement contaminated waters to the construction phase drainage system or directly to any artificial drain or watercourse will be allowed;
- Weather forecasting will be used to ensure that prolonged or intense rainfall is not predicted during concrete pouring activities; and,
- The concrete pour site will be kept free of standing water and plastic covers will be ready in case of sudden rainfall event.

Hydrological Impacts on Designated Sites

The proposed mitigation measures for protection of surface water quality, which will include buffer zones and robust drainage control measures (i.e. interceptor drains, swales, silt/settlement ponds, settlement lagoons), will ensure that the quality of runoff from development areas will be very high. Accordingly, no further mitigation measures are assessed as being required.

As stated in Section 7.6.1.1, an “imperceptible, temporary effect” on local streams and rivers would, if it occurs, be extremely localised and of a very short duration (i.e. hours). Therefore, considering the imperceptible effects on local surface water quality along increased dilution capacity of downstream river waterbodies, significant indirect hydrological or water quality effects on the downstream designated sites will not occur.

Effects on the WFD Status

No additional targeted measures are required or proposed in respect of the WFD assessment. The strict implementation of the measures set out in the preceding sections will ensure that the status of both surface water and groundwater bodies in the vicinity of the site will be maintained.

With regard to treatment standards, the drainage system has been designed to achieve compliance with surface water Environmental Quality Standards (EQS) in the downstream receiving waters. Details of monitoring proposals, to ensure this compliance, is described in the Planning-Stage SWMP (**Annex 3.4**).

The application of the drainage management as outlined will ensure compliance with EU Surface Water Regulations and WFD requirements while also maintaining the baseline hydrology of the site.

As such, the project is compliant with the requirements of the Water Framework Directive (2000/60/EC) and the Groundwater Directive (2006/118/EC).

Effects on Rath GWS Source

The below mitigation only applies to the underground electricity line.

No refuelling or handling of fuels/oil/lubricants/chemicals will be permitted within 100m of the mapped source protection area boundary.

In addition, to prevent potential leaching of cement from the electricity cable trenching, a geotextile liner will be placed around the founding layer (lean mix concrete) where concrete is to be poured.

Also, there will be clear signage in place inside the source protection area to remind construction workers that the area is inside a drinking water protection area and that there are restrictions around the use of fuels/oil/lubricants/chemicals.

Risk of Flooding During UGL Construction

The first point of mitigation is ongoing monitoring of weather forecasts and weather warnings. The project Environmental Manager (EM) or the site Ecological Clerk of Works (ECoW) will be responsible for monitoring weather forecasts during the construction phase.

When the forecast indicates rainfall exceeding any of the works-suspension thresholds set out above, or where a Met Éireann Status Yellow or higher rainfall warning is issued, the planned responses detailed below will be implemented.

A potential high intensity rainfall event would likely be identified 3-5 days in advance, with more accurate forecasts of severity within 24-48 hours of occurrence. Preparations for a flood event would begin from the initial indications that there may be a high rainfall event. This would allow time for the preparation and the implementation of additional emergency mitigation measures.

A managed retreat from the fluvial flood zone will be implemented in the event of a forecasted high intensity rainfall event and/or weather warning related to rainfall. This will include the following:

- Any areas where soil/subsoil is exposed at the surface will be compacted firmly with a digger bucket or a suitably sized excavator.
- Open trenches will be backfilled and compacted.
- Existing sediment control measures will be removed, as these may be washed away and deposited elsewhere by the floodwaters.
- All plant, machinery and equipment will be removed from the flood zones.
- Works will be postponed in the event of flood or high flows in the river.

Exposed soils/peat (exposed temporary stockpiles) will be covered with plastic sheeting during all relatively heavy rainfall events and during periods where works have temporarily ceased before completion at a particular area (e.g., overnight and weekends).

Cessation of all construction works until the storm event, including the storm runoff has passed. All construction works will cease during storm events such as yellow warning rainfall events. Following heavy rainfall events, and before construction works recommence, the project site will be inspected and corrective measures implemented to ensure safe working conditions e.g. dewatering of standing water in open excavations, etc.

5.6.1.2 Habitats

The majority of the project layout does not overlap with high-value terrestrial habitats and is located almost entirely within cutover bog habitat, and improved grassland. The grid connection is located almost entirely private lands and through improved grassland, hedgerow, and treeline.

The turbine buffer areas are already open, and no initial vegetation clearance is required.

Any treelines or hedgerows removed will be replaced in-situ or elsewhere in the Project at appropriate locations (i.e. designed to maximise ecological connectivity and outside of bat mitigation buffers). All new treelines or hedgerows will be planted using native species and in a similar composition to treelines or hedgerows lost.

To avoid widespread disturbance to habitats, access within the project will be restricted to the footprint of the proposed works corridor and no access between different parts of the project will be permitted, except via the proposed works corridor.

An Ecological Clerk of Works (ECoW) will be employed throughout the construction phase to ensure that construction activities do not encroach, unnecessarily, into any important habitats outside of the footprint of the Project.

A balance sheet is presented in **Table 5.18** below.

Fossitt Code	Fossitt Name	Total Baseline	Temporary Loss			Total Temporary Loss	Reinstatement In-Situ
			Main Project Site	Underground electricity line	Turbine haul route		
BC1	Arable crops	0.03ha	0.00ha	0.03ha	0ha	0.03ha	0.03ha
BL1	Stone walls and other stonework	14.00m	0.00m	0.00m	0m	0.00m	0.00m
BL3	Buildings and artificial surfaces	0.56ha	0.01ha	0.04ha	0.16ha	0.21ha	0.21ha
ED3	Recolonising bare ground	0.06ha	0.00ha	0ha	0ha	0.00ha	0.00ha
FW2	Depositing/lowland rivers	66.15m	0.00m	0m	0m	0.00m	0.00m
FW4	Drainage ditch	0.05ha	0.00ha	0ha	0ha	0.00ha	0.00ha
		0.00m	0.00m	0m	0m	0.00m	0.00m
GA1	Improved agricultural grassland	12.95ha	0.15ha	0.41ha	0.01ha	0.57ha	0.57ha
GA2	Amenity grassland	0.56ha	0.00ha	0ha	0.56ha	0.56ha	0.56ha
GS2	Dry meadows and grassy verges	0.03ha	0.00ha	0ha	0.03ha	0.03ha	0.03ha
PB4	Cutover bog	82.44ha	4.89ha	0ha	0ha	4.89ha	4.89ha
PB4 x WS5	Cutover bog x Recently-felled woodland	4.83ha	0.00ha	0ha	0ha	0.00ha	0.00ha
WD4	Conifer plantation	1.11ha	0.00ha	0ha	0.19ha	0ha	0ha

Fossitt Code	Fossitt Name	Temporary Loss				Total Temporary Loss	Reinstatement In-Situ
		Total Baseline	Main Project Site	Underground electricity line	Turbine haul route		
WD5	Scattered trees and parkland	0.002ha	0.00ha	0ha	0.001ha	0ha	0ha
		1m	0.00m	0m	1m	1.000m	1.000m
WL1	Hedgerow	0.07ha	0.00ha	0ha	0ha	0.00ha	0.00ha
		61.49m	0.00m	5.39m	56.1m	61.49m	61.49m
WL1 x WL2	Hedgerow x Treeline	280.06m	0.00m	0m	0m	0.00	0.00
WL2	Treeline	0.05ha	0.00ha	0.02ha	0ha	0.02ha	0.02ha
		5.41m	0.00m	5.41m	0m	5.41m	5.41m
WS1	Scrub	2.06ha	0.03ha	0ha	0.02ha	0.05ha	0.05ha
		15.57m	0.00m	15.57m	0m	15.57m	15.57m

Table 5.18: Mitigation for Temporary Habitat Loss

5.6.1.3 Rare Flora

No rare flora were recorded during surveys and so no mitigation measures are required.

5.6.1.4 Invasive Plants

While no invasive species were recorded within 150m of the red line boundary, or 50m of the UGL, in order to prevent the spread of invasive alien species into the working areas of the project site, the following biosecurity protocol shall be adopted at all times throughout the construction process.

Awareness

- Prior to working on the Site, all contractors will be briefed on invasive species and will be provided with information on identification, and of the need to prevent further spread of invasive species, as well as details of the biosecurity protocol.
- Any additional positive or suspected identification of invasive non-native species during Site works shall be reported to an ecologist for verification, so that appropriate advice can be given.

Machinery

- Cleaning operations will take place in a designated area to prevent further spread.
- Mud and organic debris will not be allowed to accumulate on tracks, tyres or under wheel arches.

Personnel

- Personnel shall check and clean their footwear and tools each day before leaving the area to work on other Sites, or other parts of the Site.

5.6.1.5 Birds

To avoid widespread disturbance to birds, access will be restricted to the footprint of the proposed works corridor. Measures proposed in this section will prevent deterioration of water quality and adverse effects on birds relying on downstream habitats, such as kingfisher.

The following will be implemented to reduce the possibility of damage and destruction (and disturbance to sensitive species) to occupied bird nests:-

- clearance of woodlands and uncultivated vegetation i.e. trees and hedgerows (including vegetation removal for creation/maintenance of bat mitigation buffers), will be undertaken outside the main breeding season from March to August inclusive;
- if other site clearance and construction activities are required to take place during the main breeding bird season, pre-commencement survey work will be undertaken to ensure that nest destruction and disturbance is avoided;
- once vegetation has been removed from the works corridor, these areas will be retained in a condition that limits suitability for nesting birds for the remainder of the construction phase e.g. vegetation cover for ground nesting species will be kept short by cutting or tracking over with an excavator; and

- a suitably experienced Ecologist will be employed for the duration of the construction period to make contractors aware of the ornithological sensitivities of the Project and to undertake surveys for nesting birds throughout the construction period, enforcing exclusion areas as required.

In addition to the general measures set out above, species-specific disturbance-free buffers will be applied around any active nests of northern lapwing, common snipe and common ringed plover identified through pre-construction survey, reflecting the confirmed or probable breeding presence of these species within or adjacent to the site during baseline surveys. While baseline breeding locations for all three species were recorded beyond the relevant published disturbance distances, breeding waders are known to shift territory location between seasons, as demonstrated by the lapwing territory itself, which moved progressively westward across the three baseline breeding seasons, and it cannot be assumed that this pattern will not continue during the construction period.

Accordingly, where pre-commencement or construction-phase survey identifies an active nest or breeding territory of these species within 500m of proposed works, a buffer will be established around the confirmed nest location, informed by the published disturbance distances applicable to each species (108m for northern lapwing (Hoetker et al., 2006) and 100–200m for common ringed plover (Goodship et al., 2022)). No published disturbance buffer exists for common snipe; in the absence of a quantified figure, a precautionary buffer of 100m will be applied, informed by the species' documented tolerance of close approach and the concentration of recorded foraging movements by incubating birds within 70m of the nest (Green, 1988). No construction activity will take place within the relevant buffer until breeding has concluded or the nest is confirmed to have failed, as determined by the site ECoW.

The Bord Na Móna Galros Draft Decommissioning and Rehabilitation Plan (2026) references Red- and Amber-listed bird species recorded within the wider Galros bog rehabilitation footprint, informed substantially by the dedicated bird survey data collected for the Project (see **section 5.4.3**), and notes that these records may inform the timing, access arrangements and drain-blocking locations. The ornithological considerations relevant to the Project itself are addressed through the mitigation measures set out in this section, including pre-construction nest checks, seasonal restrictions on vegetation clearance, species-specific disturbance-free buffers and ECoW oversight throughout construction.

5.6.1.6 Terrestrial Mammals (excluding bats)

Measures proposed in **Section 5.6.1.1** will prevent deterioration of water quality and adverse effects on mammals relying on downstream habitats, such as otter. Habitat features important for mammals will be retained as much as possible (e.g. hedgerows, treelines and scrub).

A pre-construction walkover survey of the project will be undertaken. This will search for mammal resting/breeding places, which could change over time. If any are identified, then appropriate exclusion zone(s) will be implemented and construction activities timed to avoid sensitive periods, such as the breeding season or hibernation, as relevant.

The following will be implemented to reduce the possibility of direct and indirect effects on mammals:-

- limiting constructions works to daylight hours. Proposed construction hours are 07:00 and 19:00 Monday to Friday, excluding public holidays, and between 07:00 and 13:00 on Saturdays. Should these fall outside daylight hours, cowl and directional lighting will be used to avoid light spillage beyond the footprint of works;
- providing exit points for any excavations (e.g. escape planks or spoil runs) so mammals do not become trapped; and
- a suitably qualified Ecologist will be employed for the duration of the construction period to make contractors aware of the mammalian sensitivities of the Project and to undertake surveys for breeding or resting mammals throughout the construction period, enforcing exclusion areas as required. Though currently not required based on the baseline data, if this changes during pre-construction surveys, these are 50m for red squirrel, 100m for pine marten, 150m for otter and 50m for badger.
- Vegetation/brush clearance will be undertaken outside November-March to avoid the hibernation period.

5.6.1.7 Bats

All hedgerows and treelines that will be lost due to construction will be replaced within the Project. This will ensure that there is no net loss of commuting and foraging routes for bats.

Along the grid connection, immediately in advance of construction works, an ecologist will undertake a comprehensive survey of bridges / structures / trees with bat roosting potential (see **Annex 5.6**) and emergence surveys will be carried out to determine if bats are present following Collins (2023) guidelines.

No destruction or disturbance of active bat roosts is predicted to be required. While one PRF-I tree was recorded within the UGL study area, this was located c. 11m from the proposed UGL and will be retained. No roosting bat, nor evidence of use by bats was observed. Regardless, 'soft felling' measures will still be implemented (BCT,2018). This will be carried out in suitable weather conditions and at appropriate times of year. Briefly, this involves the following:-

- removal of the tree in sections, starting with the top branches and working down the trunk avoiding cutting through cavities;
- lowering of any sections with potential roost features with care, positioning them on the ground with potential entrances to roosts facing upwards to allow bats to exit the roost; and
- leaving these sections in place for at least 24 hours in suitable weather.

The following will also be implemented to reduce the possibility of direct and indirect effects on bat species: lighting will be limited to daylight hours. However, where this cannot be avoided, directional lighting and cowl will be used, avoiding light spill onto linear habitats and trees..

5.6.1.8 Other Protected Fauna

Pre-construction checks will be undertaken for spawning frogs if construction works

are undertaken in February.-April Adults and spawn will be translocated under NPWS licence (currently available without application as licence no. 04/2026 and this would be revised in 2027, as available) to suitable alternative locations if present. Pitfall traps and drift fences will be used to capture adult frogs.

Amphibian-proof fencing close to any waterbodies will be used to prevent frogs or smooth newts from accessing any parts of the Project most hazardous to amphibians during the construction phase.

5.6.2 MITIGATION MEASURES DURING OPERATION PHASE

5.6.2.1 Designated Nature Conservation Sites, Fisheries and Aquatic Ecology

Mitigation measures to protect water quality are shown in **Chapter 7** and in **Annex 3.4** of this EIAR. Maintenance of the wind farm drainage system will ensure the system is operating effectively and will be undertaken following the CIRIA C753 SuDS and Maintenance Manual. A review of the ecological mitigation measures will be required during the operation phase and project specific mitigation will be provided as appropriate where further measures are required to ensure no significant environmental effects on aquatic receptors and designated sites. The following mitigation measures will be implemented and can be added to:

- site access will be restricted by gates to prevent illegal dumping, use by off road vehicles etc; and,
- as during construction, any stockpiled material will be within the proposed site compound or a minimum of 50m from any surface water drainage.

This will prevent any negative effects on downstream aquatic receptors and designated sites.

5.6.2.2 Birds

Turbine Curtailment

Based on the bird survey data collated, curtailment is not considered necessary.

However, curtailment for birds may be implemented depending on the results of the proposed monitoring programme (see **Section 5.7.3.3**). If required, curtailment will be implemented via a system of adaptive management. Thus, if bird carcasses are recorded during post-construction monitoring, curtailment will be implemented where appropriate during 'at-risk' time periods and as discussed and agreed with NPWS.

No significant collision effects on IEF birds are predicted (Section 5.5.3.3), so no bird-specific operational mitigation is required from commissioning, and the residual effect conclusions for birds do not rely on curtailment. Curtailment is a precautionary, adaptive measure that would be implemented only where post-commissioning monitoring demonstrates a notable adverse effect on IEF birds.

5.6.2.3 Bats

Bat mitigation buffers

The turbine buffer areas are already open, and no initial vegetation clearance is required. Their management will maintain separation between turbine blades and surrounding bat commuting and foraging habitat features and prevent the establishment of trees or scrub closer to the turbines. NatureScot (2021) guidelines

state that a 50m distance from the blade tips of the turbine to the nearest habitat feature must be maintained free of trees and shrubs for the duration of wind farm operation. The following formula is used:

Where b = buffer radius, bl = blade length, hh = hub height, fh = feature height (all in metres).

Thus, the buffer radius is given as the horizontal distance from the turbine tower and relates to both the habitat feature height, the turbine hub height and the blade length. Taller habitat features require a larger horizontal buffer radius. Note that feature heights were assumed as the maximum height that could be obtained over the lifespan of the project. Based on the features present (cutover bog), this height was 0m.

Details of the buffers required for each turbine are shown below in **Table 5.19** and **Figure 1 of Annex 5.7**.

Turbine Number	Habitat Feature	Buffer (m)		Area (ha) or length (m) to be removed
		Minimum	Maximum	
T9	Cutover bog	45	80.32	0
T10	Cutover bog	45	80.32	0
T11	Cutover bog	45	80.32	0

Table 5.19 Details of Bat Mitigation Buffers Required for Each Turbine

Turbine Curtailment

It is predicted that bat mitigation buffers will limit bat activity near turbines, reducing potential collision risk.

The following operational mitigation measures for bats are proposed (see also Section 5.7.3):-

- **Feathering of Blades:** there is evidence that bat casualties at wind farms is reduced by pitching the blades out of the wind ("feathering") to reduce rotation speeds below 2 rpm. while idling. As such, the feathering of blades to prevent 'idling' below the turbine cut-in wind speed will be implemented at all turbines from commissioning, from sunset to sunrise during the bat activity season (April–October), in line with NatureScot (2021). Feathering may be limited further to weather conditions suitable for bat activity (for example, above a minimum air temperature and in low rainfall), with parameters agreed with the planning authority. Where post-construction activity and fatality monitoring in years 1 and 2 (Section 5.7.3) demonstrates low collision risk at a turbine, feathering may be relaxed at that turbine with the agreement of the planning authority; and
- **Curtailment:** this involves raising the cut-in speed with associated loss of power generation. This also involves reducing the blade rotation below the cut-in speed, as above. The curtailment is achieved by feathering/pitching the blade out of the wind (not the actual braking of the turbine) so that the blades continue to rotate slowly (at ~2 r.p.m. or less). Curtailment will be implemented via a system of adaptive management. Thus, where post-

construction activity or fatality monitoring (Section 5.7.3) indicates elevated collision risk or bat fatalities at any turbine, cut-in speeds will be increased at the relevant turbine(s) during the bat activity season (April–October) and where temperatures are suitable for bat activity, with parameters agreed with the planning authority and NPWS.

The turbine buffer areas are already open, and no initial vegetation clearance is required. Their management will maintain separation between turbine blades and surrounding bat commuting and foraging habitat features and prevent the establishment of trees or scrub closer to the turbines. No reduction in recorded bat activity arising from initial vegetation clearance has therefore been assumed.

Taking account of blade feathering below cut-in wind speed at all turbines from commissioning, which prevents rotor movement at low wind speeds when bat activity at rotor height is typically greatest, and of the recorded species, spatial and seasonal activity patterns, including periods of higher activity, together with the turbine layout, dimensions and habitat separation distances, no significant residual collision effects on bats are predicted. The proposed monitoring programme will test the assessment predictions and inform any necessary additional mitigation. Curtailment will be implemented at the relevant turbine(s) where monitoring demonstrates that it is required.

5.6.3 MITIGATION MEASURES DURING DECOMMISSIONING PHASE

Mitigation measures for decommissioning will be similar to those for the construction phase; however, the magnitude required will be less, as track and turbine installation will not be required.

5.7 COMPENSATION MEASURES

A habitat and species management plan has been prepared and included in **Annex 5.7**. This outlines in detail the proposed compensation and enhancement measures for the project.

5.7.1 REPLACEMENT PLANTING

To compensate for the loss of permanent habitat loss, compensation planting will be carried out within the Project site. The placement of these will be designed to ensure connectivity between habitat features at the project is maintained and enhanced. The replacement of treelines and hedgerows will also ensure that there is no net loss as a result. The placement of these replacement hedgerows will also be used to help enhance biodiversity (see **Section 5.7.2** below). A balance sheet is presented below in **Table 5.20**.

Fossitt Code	Fossitt Name	Total Baseline	Total Permanent Loss	Compensation	Balance after Compensation	Net Change after Compensation	Justification
BC1	Arable crops	0.03ha	0.00ha	0.00ha	0.03ha	0.00ha	No loss, no compensation required.
BL1	Stone walls and other stonework	14.00m	14.00m	0m	0.00m	-14.00m	No compensation required as this is a highly modified habitat
BL3	Buildings and artificial surfaces	0.56ha	0.02ha	0.02ha	0.54ha	-0.02ha	No compensation required as this is a highly modified habitat
ED3	Recolonising bare ground	0.06ha	0.00ha	0.00ha	0.06ha	0.00ha	No loss, no compensation required.
FW2	Depositing/lowland rivers	66.15m	0.00m	0.00m	66.15m	0.00m	No loss, no compensation required.
FW4	Drainage ditch	0.05ha	0.00ha	0.00ha	0.05ha	0.00ha	No loss, no compensation required.
		0.00m	0.00m	0.00m	0.00m	0.00m	No loss, no compensation required.
GA1	Improved agricultural grassland	12.95ha	2.80ha	0.00ha	10.15ha	-2.80ha	No compensation required as this is a highly modified habitat
GA2	Amenity grassland	0.56ha	0.00ha	0.00ha	0.56ha	0.00ha	No loss, no compensation required.
GS2	Dry meadows and grassy verges	0.03ha	0.00ha	0.00ha	0.03ha	0.00ha	No loss, no compensation required.

Fossitt Code	Fossitt Name	Total Baseline	Total Permanent Loss	Compensation	Balance after Compensation	Net Change after Compensation	Justification
PB4	Cutover bog	82.44ha	22.44ha	0ha	60.00ha	-22.44ha	No compensation required as this is a highly modified habitat. The peatland is completely degraded with no peat-forming vegetation present.
PB4 x WS5	Cutover bog x Recently-felled woodland	4.83ha	0.00ha	0.00ha	4.83ha	0.00ha	No loss, no compensation required.
WD4	Conifer plantation	1.11ha	0.00ha	0.00ha	1.11ha	0.00ha	No loss, no compensation required.
WD5	Scattered trees and parkland	0.002ha	0.00ha	0.00ha	0.00ha	0.00ha	No loss, no compensation required.
		1m	0m	0m	1.00m	0m	1.00m
WL1	Hedgerow	0.07ha	0.00ha	0.00ha	0.07ha	0.00ha	No loss, no compensation required.
		61.49m	0.00m	0.00m	61.49m	0.00m	No loss, no compensation required.
WL1 x WL2	Hedgerow x Treeline	280.06m	0.00m	0.00m	280.06m	0.00m	No loss, no compensation required.
WL2	Treeline	0.05ha	0.00ha	0.00ha	0.05ha	0.00ha	No loss, no compensation required.

Fossitt Code	Fossitt Name	Total Baseline	Total Permanent Loss	Compensation	Balance after Compensation	Net Change after Compensation	Justification
		5.41m	0.00m	0.00m	5.41m	0.00m	No loss, no compensation required.
WS1	Scrub	2.06ha	0.49ha	0.49ha	2.06ha	0ha	No loss, no compensation required.
		15.57m	0.00m	0.00m	15.57m	0.00m	

Table 5.20: Compensation for Habitat Loss

5.7.2 Enhancement Measures

Enhancement measures are detailed in the Habitat and Species Management Plan, **Annex 5.7** with a balance sheet presented below in **Table 5.21**.

Fossitt Code	Fossitt Name	Area (ha) / Length (m)					Justification
		Total Baseline	Balance after Mitigation and Compensation	Enhancement	Total after Enhancement	Change from Baseline after Enhancement (+ Gain / - Loss)	
BC1	Arable crops	0.03ha	0.03ha	0.00ha	0.03ha	0.00ha	No net loss, no enhancement required.
BL1	Stone walls and other stonework	14.00m	0.00m	0.00m	0.00m	-14.00m	No enhancement required as this is a highly modified habitat
BL3	Buildings and artificial surfaces	0.56ha	0.54ha	0.00ha	0.54ha	-0.02ha	No enhancement required as this is a highly modified habitat
ED3	Recolonising bare ground	0.06ha	0.06ha	0.00ha	0.06ha	0.00ha	No net loss, no enhancement required.
FW2	Depositing/lowland rivers	66.15m	66.15m	0.00m	66.15m	0.00m	No net loss, no enhancement required.
FW4	Drainage ditch	0.05ha	0.05ha	0.00ha	0.05ha	0.00ha	No net loss, no enhancement required.
		0.00m	0.00m	0.00m	0.00m	0.00m	No net loss, no enhancement required.

Fossitt Code	Fossitt Name	Area (ha) / Length (m)					Justification
		Total Baseline	Balance after Mitigation and Compensation	Enhancement	Total after Enhancement	Change from Baseline after Enhancement (+ Gain / - Loss)	
GA1	Improved agricultural grassland	12.95ha	10.15ha	0.00ha	10.15ha	-2.80ha	No enhancement required as this is a highly modified habitat
GA2	Amenity grassland	0.56ha	0.56ha	0.00ha	0.56ha	0.00ha	No net loss, no enhancement required.
GS2	Dry meadows and grassy verges	0.03ha	0.03ha	0.34ha	0.37ha	0.34ha	Enhancement will be created within the Project site along access track and switchroom.
PB4	Cutover bog	82.44ha	60.00ha	0.00ha	60.00ha	-22.44ha	No enhancement required as this is a highly degraded habitat.
PB4 x WS5	Cutover bog x Recently-felled woodland	4.83ha	4.83ha	0.00ha	4.83ha	0.00ha	No net loss, no enhancement required.
WD4	Conifer plantation	1.11ha	1.11ha	0.00ha	1.11ha	0.00ha	No net loss, no enhancement required.
WD5	Scattered trees and parkland	0.002ha	0.00ha	0.00ha	0.00ha	0.00ha	No net loss, no enhancement required.
		1m	1m	0.00m	0.00m	0.00m	
WL1	Hedgerow	0.07ha	0.07ha	0.03ha	0.10ha	0.03ha	Enhancement will be created within the Project site to

Fossitt Code	Fossitt Name	Area (ha) / Length (m)					Justification
		Total Baseline	Balance after Mitigation and Compensation	Enhancement	Total after Enhancement	Change from Baseline after Enhancement (+ Gain / - Loss)	
		61.49m	61.49m	138.37m	199.86m	138.37m	improve connectivity to the wider habitat while avoiding the required bat mitigation buffers.
WL1 x WL2	Hedgerow x Treeline	280.06m	280.06m	221.38m	501.44m	221.38m	Enhancement will be created within the Project site to improve connectivity to the wider habitat while avoiding the required bat mitigation buffers.
WL2	Treeline	0.05ha	0.05ha	0.03ha	0.08ha	0.03ha	Enhancement will be created within the Project site to improve connectivity to the wider habitat while avoiding the required bat mitigation buffers.
		5.41m	5.41m	209.92m	215.33m	209.92m	
WS1	Scrub	2.06ha	2.06ha	0.00ha	2.06ha	0.00ha	No net loss, no enhancement required.
		15.57m	15.57m	0.00m	15.57m	0.00m	

Table 5.21: Enhancement Measures - Habitats

5.7.3 MONITORING

Note, the conclusion for the impact assessment is based on the data yielded, and there is no dependence on the post-construction monitoring to reach this conclusion. Rather, monitoring ensures that proposed mitigation measures are operating as intended and allows for adjustments of operations to be made where necessary to ensure compliance with consent conditions such as emission limit values, conditions of operation, performance criteria indicators and detection of unexpected mitigation failures (EPA, 2022).

5.7.3.1 *General Pre-Construction Confirmation Surveys*

To prevent accidental disturbance to resting places of protected mammals (badgers, red squirrel, pine marten, otter and hedgehog), an ecological walkover survey will be undertaken prior to any construction activities within the project footprint.

Similarly, trees within the works corridor will be re-assessed for bat roosting potential, with any emergence surveys carried out as required.

Checks for nesting birds will be required for construction undertaken during the bird breeding season. If nests are recorded, ongoing monitoring and appropriate exclusion zones will be implemented to determine when and where works can proceed.

5.7.3.2 *Water Quality (During and Post-Construction)*

Water quality monitoring will be undertaken as outlined in **Chapter 7**. This will check the efficacy of mitigation measures.

5.7.3.3 *Birds (Post-Construction)*

Bird monitoring has been informed by (NatureScot, 2009) best practice guidance and will comprise the two elements described below. The purpose of monitoring is to verify the predictions of this assessment against actual post-construction bird activity and collision rates, and to add to the wider evidence base regarding bird and wind farm interactions.

Collision monitoring

A targeted range of flight activity (VP) surveys and collision monitoring (carcass searching) will be undertaken during the breeding and non-breeding seasons in years 1, 2 and 3 post-construction, to monitor the rate of avian turbine collisions and identify any significant unforeseen adverse effects.

VP surveys will be undertaken using the methodology outlined in NatureScot (2025c) guidance, involving six hours of survey per vantage point per month, annually for each survey year, with vantage point viewsheds covering the Project site.

Carcass searches will be undertaken at least once per month around each turbine location, annually for each survey year. Searches will be carried out by qualified ecologists and may be human- or dog-led. Methods to correct for bias in searcher efficiency and scavenger removal of carcasses will be incorporated.

Data from VP surveys and carcass searches will be reviewed annually by a suitably qualified ornithologist, with findings reported to Offaly County Council at the end of

each survey year. If the rate of turbine strikes recorded is as low as predicted by the CRM (which is highly precautionary), monitoring should no longer be required beyond year 3. Should annual review identify results that depart materially from the predictions of this assessment (e.g. evidence of collision mortality, or flight activity data indicating materially elevated collision risk during particular periods), the following adaptive response will apply:-

- The circumstances and magnitude of the departure from predicted effects will be assessed by a suitably qualified ornithologist;
- Where warranted, the monitoring programme itself may be revised (e.g. adjustment of vantage point coverage, survey frequency, or seasonal focus) to better characterise the issue identified;
- Where monitoring indicates a credible risk to a species or population, mitigation measures will be developed and implemented (including the possibility of turbine curtailment, targeted at the specific turbine(s), time period(s) and/or weather conditions associated with the elevated risk); and,
- The effectiveness of any curtailment or other mitigation response will itself be monitored and reported on.

As no significant collision effects on bird species are predicted by this assessment, this monitoring and review mechanism is intended as a precautionary safeguard rather than as a response to an anticipated effect. Monitoring is proposed for a period of 3 years post-construction in the first instance, with the review mechanism described above providing the means to identify at an early stage whether extended monitoring or additional mitigation is warranted. Should monitoring results indicate a need for continued monitoring beyond this period, this would be identified through the annual review process and agreed with Offaly County Council accordingly. Proposed mitigation and monitoring measures will be agreed with the planning authority prior to implementation.

Northern Lapwing – Breeding Territory Monitoring

In addition to the collision monitoring set out above, targeted breeding wader survey monitoring will be undertaken for northern lapwing, reflecting the residual uncertainty identified in this assessment regarding the location and population context of the breeding territory recorded within and adjacent to the Project site across the 2022–2024 survey seasons, and its relationship to a further breeding record at the adjacent Cush Wind Farm Phase I site.

Breeding wader surveys, following the same methodology applied during the baseline survey programme (following the methodology set out in O'Brien & Smith (1992)), will be undertaken during the breeding season (April–July) in years 1, 2 and 3 post-construction, to confirm the continued location of this territory relative to Project, Cush Wind Farm Phase I infrastructure, and Bord Na Móna's Galros rehabilitation infrastructure and activity, and to verify breeding activity levels against those recorded during baseline surveys.

Data will be reviewed annually by a suitably qualified ornithologist, with findings reported to Offaly County Council at the end of each survey year alongside the collision monitoring results above. Should annual review identify that the territory has relocated to a position within the relevant disturbance buffer distance of Project or

Phase I infrastructure (108m; Hoetker et al. (2006)), or that breeding activity levels or success have declined materially relative to the baseline, the same adaptive response process set out above will apply, which may result in additional mitigation such as further habitat management, revised site access/maintenance scheduling during the breeding season, or other measures agreed with the planning authority.

As no significant effect on this species is predicted by this assessment, this monitoring is proposed as a precautionary safeguard, consistent with the approach applied to collision monitoring above, rather than in response to an anticipated effect. Monitoring is proposed for a period of 3 years post-construction in the first instance, on the same basis and subject to the same review mechanism as set out above.

5.7.3.4 Bats (Post-Construction)

Post-construction monitoring is required in line with commitments made in respect of the project being permitted and should be seen as an opportunity to obtain data on bat/turbine interactions and to allow adaptive management of the proposed mitigation measures.

The post-construction monitoring programme will consist of:-

- **Static detector surveys:** these surveys will allow for a valid comparison of bat activity and project site usage with pre-construction levels. Following NatureScot (2021) guidance, the surveys are to be conducted during years 1, 2 and 3 post construction to allow for annual variation and cumulative effects. Reports will be submitted to the competent authority and NPWS following each year of surveys. Surveys will follow baseline survey methods, as outlined in NatureScot (2021) guidance. After three years of post-construction surveys, the monitoring programme may be extended or halted based on the results and following agreement with the competent authority and NPWS; and
- **Fatality monitoring: this will be conducted during years 1, 2 and 3** post construction to allow for annual variation and cumulative effects. The comprehensive fatality monitoring programme for birds as described above will be extended and duplicated to bats for the first three years per the post-construction monitoring requirements recommended by NatureScot (2021). After three years of post-construction surveys, the monitoring programme may be extended or halted following agreement with the competent authority and NPWS. Search intervals for bats will reflect the faster removal of small carcasses by scavengers, and searcher efficiency and carcass persistence trials will be undertaken.

The results of the post-construction monitoring surveys will be used to determine whether further mitigation measures, such as turbine curtailment, are required. Curtailment will be triggered where either activity monitoring (for example, a material increase in activity relative to baseline) or fatality monitoring indicates elevated collision risk, and the results will also inform any relaxation of feathering. The programme will be aligned with, and may be delivered jointly with, the post-construction bat monitoring programme required for Cush Wind Farm Phase I under Condition 11 of ABP-318816-24, so that a consistent approach applies across both phases.

Bat mitigation buffers will need to be monitored in years 1, 2 and 3 following construction to ensure vegetation clearance is maintained and management

measures have resulted in maintaining the desired habitat conditions. Habitats will be maintained in this manner for the duration of the project lifespan. The monitoring programme will help ensure there are no significant adverse effects on bats.

5.7.4 RESIDUAL EFFECTS

A summary of the effects, mitigation and residual effects, taking into account cumulative effects, is set out in **Table 5.23**.

Note that a 'balance-sheet' of habitat losses and gains is also presented in **Table 5.22**.

Fossitt Code	Fossitt Name	Total Baseline	Balance from Baseline after Mitigation, Compensation, and Enhancement	Net Change from Baseline after Mitigation, Compensation, and Enhancement (+ Gain / - Loss)	Justification
BC1	Arable crops	0.03ha	0.03ha	0.00ha	No net loss, no enhancement required.
BL1	Stone walls and other stonework	14.00m	0.00m	-14.00m	No enhancement required as this is a highly modified habitat
BL3	Buildings and artificial surfaces	0.56ha	0.54ha	-0.02ha	No enhancement required as this is a highly modified habitat
ED3	Recolonising bare ground	0.06ha	0.06ha	0.00ha	No net loss, no enhancement required.
FW2	Depositing/lowland rivers	66.15m	66.15m	0.00m	No net loss, no enhancement required.
FW4	Drainage ditch	0.05ha	0.05ha	0.00ha	No net loss, no enhancement required.
		0.00m	0.00m	0.00m	No net loss, no enhancement required.
GA1	Improved agricultural grassland	12.95ha	10.15ha	-2.80ha	No enhancement required as this is a highly modified habitat
GA2	Amenity grassland	0.56ha	0.56ha	0.00ha	No net loss, no enhancement required.
GS2	Dry meadows and grassy verges	0.03ha	0.37ha	0.34ha	Enhancement will be created within the Project site along access track and switchroom.
PB4	Cutover bog	82.44ha	60.00ha	-22.44ha	No compensation required as this is a highly degraded habitat.
PB4 x WS5	Cutover bog x Recently-felled woodland	4.83ha	4.83ha	0.00ha	No net loss, no enhancement required.
WD4	Conifer plantation	1.11ha	1.11ha	0.00ha	No net loss, no enhancement required.

Fossitt Code	Fossitt Name	Total Baseline	Balance from Baseline after Mitigation, Compensation, and Enhancement	Net Change from Baseline after Mitigation, Compensation, and Enhancement (+ Gain / - Loss)	Justification
WD5	Scattered trees and parkland	0.002ha	0.00ha	0.00ha	No net loss, no enhancement required.
		1m	0.00m	0m	
WL1	Hedgerow	0.07ha	0.10ha	0.03ha	Enhancement will be created within the Project site to improve connectivity to the wider habitat while avoiding .
		61.49m	199.86m	138.37m	
WL1 x WL2	Hedgerow x Treeline	280.06m	501.44m	221.38m	Enhancement will be created within the Project site to improve connectivity to the wider habitat while avoiding .
WL2	Treeline	0.05ha	0.08ha	0.03ha	Enhancement will be created within the Project site to improve connectivity to the wider habitat while avoiding .
		5.41m	215.33m	209.92m	
WS1	Scrub	2.06ha	2.06ha	0.00ha	No net loss, no enhancement required.
		15.57m	15.57m	0.00m	

Table 5.22: Habitat Balance Sheet

Ecological Feature	Phase	Potential Effect	Potential Cumulative Effect	Significance Pre-Mitigation	Proposed Mitigation	Significance of Residual Effect
Habitats						
BC1	Construction	Direct: No effects	No elevated risk	Not significant	None required	Not significant
	Operation	Indirect: No effects	No elevated risk	Not significant	None required	Not significant
	Decommissioning	Direct: No effects	No elevated risk	Not significant	None required	Not significant
BL1	Construction	Direct: There will be a direct loss of habitat. Indirect: No indirect effects	No elevated risk	Not significant	None required	Not significant
	Operation	Direct: No effects Indirect: No effects	No elevated risk	Not significant	None required	Not significant
	Decommissioning	Direct: There will be a direct loss of habitat. Indirect: No indirect effects	No elevated risk	Not significant	None required	Not significant
BL3	Construction	Direct: There will be a direct loss of habitat. Indirect: No indirect effects	No elevated risk	Not significant	None required	Not significant
	Operation	Direct: No effects Indirect: No effects	No elevated risk	Not significant	None required	Not significant
	Decommissioning	Direct: There will be a direct loss of habitat. Indirect: No indirect effects	No elevated risk	Not significant	None required	Not significant
ED3	Construction	Direct: No effects Indirect: No effects	No elevated risk	Not significant	None required	Not significant
	Operation	Direct: No effects Indirect: No effects	No elevated risk	Not significant	None required	Not significant
	Decommissioning	Direct: No effects Indirect: No effects	No elevated risk	Not significant	None required	Not significant
FW2	Construction	Direct: No effects Indirect: Negative impacts on water quality	No elevated risk	Significant	Mitigation relating to watercourses are outlined in section 5.6.1.1, Chapter 7, and Annex 3.4	Not significant
	Operation	Direct: No effects Indirect: No effects	No elevated	Not significant	None required	Not significant

Ecological Feature	Phase	Potential Effect	Potential Cumulative Effect	Significance Pre-Mitigation	Proposed Mitigation	Significance of Residual Effect
			risk			
	Decommissioning	Direct: No effects Indirect: Negative impacts on water quality	No elevated risk	Not significant	Mitigation relating to watercourses are outlined in section 5.6.1.1, Chapter 7, and Annex 3.4	Not significant
FW4	Construction	Direct: No effects Indirect: Negative impacts on water quality	No elevated risk	Not significant	Mitigation relating to watercourses are outlined in section 5.6.1.1, Chapter 7, and Annex 3.4	Not significant
	Operation	Direct: Indirect:	No elevated risk	Not significant	None required	Not significant
	Decommissioning	Direct: No effects Indirect: Negative impacts on water quality	No elevated risk	Not significant	Mitigation relating to watercourses are outlined in section 5.6.1.1, Chapter 7, and Annex 3.4	Not significant
GA1	Construction	Direct: Habitat loss Indirect: No effect	No elevated risk	Not significant	None required	Not significant
	Operation	Direct: No effects Indirect: No effects	No elevated risk	Not significant	None required	Not significant
	Decommissioning	Direct: Habitat loss Indirect: No effect	No elevated risk	Not significant	None required	Not significant
GA2	Construction	Direct: Habitat loss Indirect: No effect	No elevated risk	Not significant	Habitat will be reinstated.	Not significant
	Operation	Direct: No effects Indirect: No effects	No elevated risk	Not significant	None required	Not significant

Ecological Feature	Phase	Potential Effect	Potential Cumulative Effect	Significance Pre-Mitigation	Proposed Mitigation	Significance of Residual Effect
	Decommissioning	Direct: Habitat loss Indirect: No effect	No elevated risk	Not significant	Habitat will be reinstated.	Not significant
GS2	Construction	Direct: Habitat loss Indirect: No effect	No elevated risk	Not significant	None required	Not significant
	Operation	Direct: No effects Indirect: No effects	No elevated risk	Not significant	None required	Not significant
	Decommissioning	Direct: Habitat loss Indirect: No effect	No elevated risk	Not significant	None required	Not significant
PB4	Construction	Direct: Habitat loss Indirect: No effect	No elevated risk	Significant at the local scale	Habitat loss cannot be directly mitigated as the habitat cannot be replaced. However, the project has considered the wider rehabilitation plans for Galros bog in line with the Rehabilitation Plan. The Project will implement the measures in this plan in order to enhance the cutover bog.	Not significant
	Operation	Direct: No effects Indirect: No effects	No elevated risk	Not significant	None required	Not significant
	Decommissioning	Direct: Habitat loss Indirect: No effect	No elevated risk	Significant at the local scale	Habitat loss cannot be directly mitigated as the habitat cannot be	Not significant

Ecological Feature	Phase	Potential Effect	Potential Cumulative Effect	Significance Pre-Mitigation	Proposed Mitigation	Significance of Residual Effect
					replaced. However, the project has considered the wider rehabilitation plans for Galros bog in line with the Rehabilitation Plan. The Project will implement the measures in this plan in order to enhance the cutover bog.	
PB4 x WS5	Construction	Direct: No effects Indirect: No effects	No elevated risk	Not significant	None required	Not significant
	Operation	Direct: No effects Indirect: No effects	No elevated risk	Not significant	None required	Not significant
	Decommissioning	Direct: No effects Indirect: No effects	No elevated risk	Not significant	None required	Not significant
WD4	Construction	Direct: Habitat loss Indirect: No effect	No elevated risk	Not significant	Habitat will be reinstated.	Not significant
	Operation	Direct: No effects Indirect: No effects	No elevated risk	Not significant	None required	Not significant
	Decommissioning	Direct: Habitat loss Indirect: No effect	No elevated risk	Not significant	Habitat will be reinstated.	Not significant
WD5	Construction	Direct: Habitat loss Indirect: No effect	No elevated risk	Not significant	Habitat will be replanted in-situ	Not significant

Ecological Feature	Phase	Potential Effect	Potential Cumulative Effect	Significance Pre-Mitigation	Proposed Mitigation	Significance of Residual Effect
	Operation	Direct: No effects Indirect: No effects	No elevated risk	Not significant	None required	Not significant
	Decommissioning	Direct: Habitat loss Indirect: No effect	No elevated risk	Not significant	Habitat will be replanted in-situ	Not significant
WL1	Construction	Direct: Habitat loss Indirect: No effect	No elevated risk	Significant at the local scale	Habitat will be replanted in-situ	Not significant
	Operation	Direct: No effects Indirect: No effects	No elevated risk	Not significant	None required	Not significant
	Decommissioning	Direct: Habitat loss Indirect: No effect	No elevated risk	Significant at the local scale	Habitat will be replanted in-situ	Not significant
WL1 x WL2	Construction	Direct: Habitat loss Indirect: No effect	No elevated risk	Significant at the local scale	Habitat will be replanted in-situ	Not significant
	Operation	Direct: No effects Indirect: No effects	No elevated risk	Not significant	None required	Not significant
	Decommissioning	Direct: Habitat loss Indirect: No effect	No elevated risk	Significant at the local scale	Habitat will be replanted in-situ	Not significant
WL2	Construction	Direct: Habitat loss Indirect: No effect	No elevated risk	Significant at the local scale	Habitat will be replanted in-situ	Not significant
	Operation	Direct: No effects Indirect: No effects	No elevated risk	Not significant	None required	Not significant
	Decommissioning	Direct: Habitat loss Indirect: No effect	No elevated risk	Significant at the local scale	Habitat will be replanted in-situ	Not significant

Ecological Feature	Phase	Potential Effect	Potential Cumulative Effect	Significance Pre-Mitigation	Proposed Mitigation	Significance of Residual Effect
WS1	Construction	Direct: Habitat loss Indirect: No effect	No elevated risk	Not significant	None required	Not significant
	Operation	Direct: No effects Indirect: No effects	No elevated risk	Not significant	None required	Not significant
	Decommissioning	Direct: Habitat loss Indirect: No effect	No elevated risk	Not significant	None required	Not significant
Fisheries and Aquatic Ecology						
Brown trout, lamprey, white clawed crayfish, European eel, Atlantic salmon, and otter	Construction	Direct: none Indirect: short-term deterioration in water quality due to pollution or suspended solids	Risk slightly increased due to other projects and plans	Significant at the county / regional scale for brown trout, lamprey, white clawed crayfish, European eel, Atlantic salmon, and otter	See section 5.6.1 based on Chapter 7 and CEMP in Annex 3.4 found in Volume III of this EIA	Not significant
	Operation	Direct: none Indirect: short-term deterioration in water quality due to lag in re-vegetation of bat mitigation buffers / poorly designed engineered, and constructed wind farm, leading to increased run-off and sedimentation	Risk slightly increased due to other projects and plans	significant effects on brown trout, Atlantic salmon, and otter at the county/regional scale.	See section 5.6.2 based on Chapter 7 and CEMP in Annex 3.4 found in Volume III of this EIA	Not significant
	Decommissioning	Direct and indirect: as for construction phase but less excavation and no cement/concrete needed, so potential effects are reduced in magnitude.	Risk slightly increased due to other projects and plans	Significant at the county / regional scale for brown trout, lamprey, white clawed crayfish, European eel, Atlantic salmon, and otter	See section 5.6.3 based on Chapter 7 and CEMP in Annex 3.4 found in Volume III of this EIA	Not significant
Designated Sites						
European Sites	Considered in NIS and assessed above in Sections 5.5.2.1, and 5.5.3.1. The NIS confirmed that, with mitigation measures, the project, either alone or in combination with any other plan or project, would not undermine the conservation objectives or have an adverse effect on the integrity of any European site					

Ecological Feature	Phase	Potential Effect	Potential Cumulative Effect	Significance Pre-Mitigation	Proposed Mitigation	Significance of Residual Effect
Woodville Woods pNHA	Construction / decommissioning	No direct or indirect effects.	No elevated risk	Not significant	None	Not significant
	Operation	Direct mortality due to collision for snipe.	Additional mortality could occur to populations due to other wind farms in area	Not significant	Carcass search/VP monitoring, years 1–3 (section 5.6.2)	Not significant
	Decommissioning	No direct or indirect effect.	No elevated risk	Not significant	None	Not significant
Lough Nahinch (Tipperary) pNHA	Construction / decommissioning	No direct or indirect effects.	No elevated risk	Not significant	None	Not significant
	Operation	Direct mortality due to collision for snipe.	Additional mortality could occur to populations due to other wind farms in area	Not significant	Carcass search/VP monitoring, years 1–3 (section 5.6.2)	Not significant
Roscrea Bog pNHA	Construction / decommissioning	No direct or indirect effects.	No elevated risk	Not significant	None	Not significant
	Operation	Direct mortality due to collision for common snipe	Additional mortality could occur to populations due to other wind farms in area	Not significant	Carcass search/VP monitoring, years 1–3 (section 5.6.2)	Not significant
River Little Brosna Callows NHA	Construction / decommissioning	No direct or indirect effects.	No elevated risk	Not significant	None	Not significant
	Operation	Direct mortality due to collision for golden plover, lapwing and snipe	Additional mortality could occur to populations due to other wind farms in	Not significant	Carcass search/VP monitoring, years 1–3 (section 5.6.2)	Not significant

Ecological Feature	Phase	Potential Effect	Potential Cumulative Effect	Significance Pre-Mitigation	Proposed Mitigation	Significance of Residual Effect
			area. Cumulative mortality exceeds 1% of background for golden plover and lapwing on an uncorrected basis, but is below 1% when corrected to the 99.5% avoidance rate			
IEF Birds Primary Target Species						
Avian assemblage (primary target species as a collective)	Construction and Decommissioning	Direct nest damage or destruction	Risk unchanged by other developments (site-specific, pre-mitigation risk not additive)	Not significant, subject to embedded mitigation	Seasonal clearance restrictions, pre-clearance nest checks, ECoW oversight (section 5.6.1)	Not significant
		Habitat loss (species-specific conclusions, section Habitat Loss).	Risk unchanged by other developments.	Not significant at any geographic scale for all IEF species assessed	None required beyond avoidance / design (habitat loss largely outside confirmed breeding / foraging locations)	Not significant
		Disturbance / displacement (species-specific conclusions, section Disturbance/Displacement).	Risk unchanged by other developments.	Not significant at any geographic scale for all IEF species assessed	Species-specific disturbance-free buffers applied to any active nest of northern lapwing, common snipe or common ringed	Not significant

Ecological Feature	Phase	Potential Effect	Potential Cumulative Effect	Significance Pre-Mitigation	Proposed Mitigation	Significance of Residual Effect
					plover identified by pre-construction survey (section 5.7.3).	
Northern lapwing, black-headed gull, whooper swan, European golden plover (Middle Shannon Callows SPA SCIs); great cormorant (Lough Derg (Shannon) SPA SCI)		Indirect habitat/prey degradation via hydrological pathway to SPA wetlands	Risk unchanged by other developments	Not significant subject to CEMP pollution prevention/sediment control	CEMP measures: bunded fuel storage, spill response, silt fencing/settlement ponds (section 5.8.1.1 and Chapter 7)	Not significant
Common kingfisher		Indirect effects via prey (fish/invertebrate) availability, Rapemills River (c.1.8km downstream)	Risk unchanged by other developments	Not significant given distance/attenuation, subject to CEMP	As above	Not significant
Common ringed plover, common snipe, Eurasian teal, mallard, little egret		Indirect effects	Risk unchanged by other developments	No credible pathway identified	None required	Not significant
Black-headed gull, common kestrel, common kingfisher, common ringed plover, common snipe, Eurasian teal,	Operation	Disturbance/displacement/barrier	Not significant	Not significant	See section 5.6.2	Not significant

Ecological Feature	Phase	Potential Effect	Potential Cumulative Effect	Significance Pre-Mitigation	Proposed Mitigation	Significance of Residual Effect
European golden plover, great cormorant, hen harrier, little egret, mallard, merlin, peregrine falcon, whooper swan						
Northern lapwing			Cumulative presence of infrastructure from both Cush Phase I and the Project increases the extent of landscape within which the shared, mobile lapwing territory could occur; recorded locations to date (Phase I 2021/2022; Project 2022–2024) remain beyond the 108m disturbance buffer for both phases individually	Not significant	Post-construction breeding wader monitoring, years 1–3, tracking territory position relative to both phases' infrastructure (section 5.6.2)	Not significant

Ecological Feature	Phase	Potential Effect	Potential Cumulative Effect	Significance Pre-Mitigation	Proposed Mitigation	Significance of Residual Effect
Eurasian teal, mallard	Operation	Direct mortality, collision	Not significant at ROI or county scale	Not significant	Carcass search and VP monitoring, years 1–3 (section 5.7.3); curtailment via adaptive management if warranted	Not significant
Common kestrel, hen harrier, peregrine falcon			Not significant	Not significant	As above	Not significant
Black-headed gull			Not significant at ROI scale (0.11–0.12% uncorrected). Exceeds 1% at County Offaly scale against the I-WeBS-derived population (19.6–20.3% uncorrected; c. 1.8–1.9% with avoidance rate and area-based population corrections); County Offaly is not considered an appropriate population unit for this species (Table 5.17)	Not significant	As above	Not significant

Ecological Feature	Phase	Potential Effect	Potential Cumulative Effect	Significance Pre-Mitigation	Proposed Mitigation	Significance of Residual Effect
Common snipe			Not significant at ROI scale (0.017–0.019%). Exceeds 1% at County Offaly scale against the I-WeBS-derived population (3.5–3.9%), considered an artefact of that estimate for this cryptic species (Table 5.17)	Not significant	As above	Not significant
European golden plover			Not significant at ROI scale (0.146–0.155%). Exceeds 1% at County Offaly scale uncorrected (1.39–1.48%); 0.63–0.70% when corrected to the 99.5% avoidance rate (Table 5.17)	Not significant	As above	Not significant
Great cormorant			Not significant at ROI scale (0.050–0.061%). Exceeds 1% at County Offaly scale against the I-WeBS-derived	Not significant	As above	Not significant

Ecological Feature	Phase	Potential Effect	Potential Cumulative Effect	Significance Pre-Mitigation	Proposed Mitigation	Significance of Residual Effect
			population (29.2–35.7%), considered an artefact of that estimate; Project contribution 0.27–0.29% (Table 5.17)			
Little egret			Not significant at ROI scale (0.020–0.037%). Exceeds 1% at County Offaly scale against the I-WeBS-derived population (1.19–2.21%), considered an artefact of that estimate (Table 5.17)	Not significant	As above	Not significant
Merlin			Same as Project-alone (no other project data) - not significant	Not significant	As above	Not significant
Northern lapwing (breeding)			Not significant at ROI scale: cumulative breeding-season total is 1.64–1.75%	Not significant at ROI scale	Carcass search and VP monitoring, years 1–3 (section 5.7.3); curtailment via adaptive management if warranted	Not significant

Ecological Feature	Phase	Potential Effect	Potential Cumulative Effect	Significance Pre-Mitigation	Proposed Mitigation	Significance of Residual Effect
			of background mortality uncorrected, but 0.44–0.47% when corrected to the 99.5% avoidance rate			
Northern lapwing (wintering)			Not significant at ROI and County Offaly scale (0.84–0.96% uncorrected, County Offaly). Against the River Little Brosna Callows NHA population: 1.24–1.41% uncorrected, 0.39–0.44% corrected to the 99.5% avoidance rate (Table 5.17)	Not significant	Carcass search / VP monitoring as above	Not significant
Whooper swan			Negligible predicted collisions for the Project	Not significant	None required	Not significant

Ecological Feature	Phase	Potential Effect	Potential Cumulative Effect	Significance Pre-Mitigation	Proposed Mitigation	Significance of Residual Effect
			(<0.01/year); cumulative total 0.63–0.68/year, <1% of background mortality at ROI and county scale			
Common kingfisher		No collision pathway identified (species not recorded in flight activity surveys)	Not assessed quantitatively - no CRM data for Project or neighbouring developments	Not significant (N/A)	None required	Not significant
Common ringed plover		Direct mortality, collision - not subject to quantitative CRM as recorded as secondary target	Not assessed quantitatively - no CRM data for Project or neighbouring developments	Not significant	None required	Not significant
Northern lapwing, black-headed gull, whooper swan, European golden plover (Middle Shannon Callows SPA SCIs)	Operation	Indirect habitat/prey degradation via hydrological pathway (hydrocarbon spill/dewatering) to SPA wetlands	Risk unchanged by other developments	Not significant. Operational fuel storage/refuelling/ground disturbance substantially reduced relative to construction, for which no significant effect was concluded	Reduced O&M fuel storage/refuelling procedures; CEMP	Not significant
Great cormorant (Lough Derg)		Indirect habitat/prey degradation via hydrological pathway	Risk unchanged by other developments	Not significant, on the same basis as above	As above	Not significant

Ecological Feature	Phase	Potential Effect	Potential Cumulative Effect	Significance Pre-Mitigation	Proposed Mitigation	Significance of Residual Effect
(Shannon) SPA SCI)						
Common kingfisher		Indirect effects via prey availability, Rapemills River (c.1.8km downstream)	Risk unchanged by other developments	Not significant given distance/attenuation and reduced operational risk relative to construction	As above	Not significant
Common ringed plover, common snipe, Eurasian teal, mallard, little egret		Indirect effects	No hydrological connection identified between recorded locations and the site (as construction phase)	No credible pathway identified; reduced operational scale further lowers already negligible risk	None required	Not significant
IEF Mammals (Non-Bat)						
Irish hare	Construction / decommissioning	Direct destruction of forms / mortality	No risk	Not significant as construction will be undertaken in daylight hours	See Section 5.6.1.6.	Not significant
	Operation	Direct loss of breeding/resting sites during vegetation clearance to maintain bat mitigation buffers	No risk	Not significant as vegetation clearance will be undertaken in daylight hours	See Section 5.6.2.	Not significant
		Indirect disturbance/displacement	No risk	Not significant	None	Not significant
Hedgehog	Construction / decommissioning	Direct destruction of hibernacula / mortality if construction takes place in winter months	No risk	Significant at local scale	See Section 5.5.2.4.	Not significant
		Indirect disturbance could cause premature emergence from hibernation and starvation	No risk	Significant at local scale	See Section 5.5.2.4.	Not significant
	Operation	Direct loss of breeding/resting sites during vegetation	No risk	Significant at local scale	See Section 5.6.2.	Not significant

Ecological Feature	Phase	Potential Effect	Potential Cumulative Effect	Significance Pre-Mitigation	Proposed Mitigation	Significance of Residual Effect
		clearance to maintain bat mitigation buffers				
		Indirect disturbance/displacement could cause premature emergence from hibernation and starvation	No risk	Significant at local scale	See Section 5.6.2.	Not significant
Irish stoat	Construction / decommissioning	Direct mortality if construction takes place in the absence of mitigation.	No risk	Significant at local scale	See Section 5.5.2.4.	Not significant
		Indirect loss of potential foraging, commuting and sheltering habitat	No risk	Significant at local scale	See Section 5.5.2.4.	Not significant
	Operation	Direct loss of breeding/resting sites during vegetation clearance to maintain bat mitigation buffers	No risk	Significant at local scale	See Section 5.6.2.	Not significant
		Indirect disturbance/displacement	No risk	Not significant	None	Not significant
Pygmy shrew	Construction / decommissioning	Direct mortality if construction takes place in the absence of mitigation.	No risk	Significant at local scale	See Section 5.5.2.4.	Not significant
		Indirect loss of potential foraging, commuting and sheltering habitat	No risk	Significant at local scale	See Section 5.5.2.4.	Not significant
	Operation	Direct loss of breeding/resting sites during vegetation clearance to maintain bat mitigation buffers	No risk	Significant at local scale	See Section 5.6.2.	Not significant
		Indirect disturbance/displacement	No risk	Not significant	None	Not significant
IEF Bats						
Bat assemblage	Construction / decommissioning	Direct destruction / disturbance of roost sites	No risk	Not significant at no roosts were recorded in works footprint of Project	See Section 5.5.2.5.	Not significant
	Operation	Indirect disturbance / displacement due to lighting	No risk	Not significant as most recorded bat species	Embedded mitigation and	Not significant

Ecological Feature	Phase	Potential Effect	Potential Cumulative Effect	Significance Pre-Mitigation	Proposed Mitigation	Significance of Residual Effect
				(common and soprano pipistrelle and Leisler's bat) are less sensitive to light disturbance; other species only recorded very infrequently	good practice will avoid effects on bats (Section 5.5.3.5)	
		Indirect loss of foraging / commuting features and disturbance by night-time working	No risk	Not significant as there are limited linear habitats and the Project site is poorly connected to the wider landscape.	No night working is proposed as part of embedded mitigation (Section 5.5.3.5). Design of Project designed to avoid disrupting connectivity to landscape. Compensatory measures (Section 5.7.1) to offset loss of hedgerows and treelines will ensure like-for-like replanting of linear feature lost.	Not significant
Common, Nathusius' and soprano pipistrelle, and Leisler's bat	Operation	Direct collision with turbines or barotrauma	Additional mortality could occur to populations due to other wind farms in area	Significant at local scale	Blade feathering below cut-in wind speed at all turbines from commissioning (April–October, sunset to sunrise; weather parameters and any relaxation agreed with the planning authority); maintenance of	Not significant

Ecological Feature	Phase	Potential Effect	Potential Cumulative Effect	Significance Pre-Mitigation	Proposed Mitigation	Significance of Residual Effect
					bat mitigation buffers. Post-construction bat activity and fatality monitoring, years 1–3 (Section 5.7.3), aligned with Cush Wind Farm Phase I (Condition 11). Curtailment (increased cut-in speed) at relevant turbine(s) where activity or fatality monitoring indicates it is required.	
<i>Myotis</i> species and brown long-eared bat	Operation	Direct collision with turbines or barotrauma	Additional mortality could occur to populations due to other wind farms in area	Not significant due to low activity and collision risk	Bat buffers will be implemented to reduce collision risk.	Not significant
IEF Other Fauna						
Amphibians (common frog and smooth newt), common lizard	Construction / decommissioning	Direct effects via accidental destruction of spawn.	No risk	Significant at local scale	See Section 5.5.2.6.	Not significant
		Indirect loss of foraging habitats	No risk	Not significant as replant lands will provide compensatory foraging, commuting and sheltering habitat	None required	Not significant

Table 5.23: Summary of Effects

5.7.5 CONCLUSION

This chapter comprehensively assesses the project which is described throughout.

A proposed mitigation scheme for the construction, operational and decommissioning phases is described in this chapter and these mitigation measures will be implemented in full for the project.

Assuming that the mitigation measures in this Chapter are adopted in full, there are not likely to be any residual significant effects on important ecological features.

5.8 REFERENCES

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