Proposed Gathabawn Windfarm 2026

Environmental Impact Assessment Report

Chapter 13: Biodiversity

September 2026

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CHAPTER 13 BIODIVERSITY

EIAR 13.1 INTRODUCTION

Biodiversity is the variability among living organisms from all sources, including terrestrial, marine, and other aquatic ecosystems and the ecological complexes of which they are part. This includes diversity within and between species and ecosystems.

EIAR 13.1.1 Competent Experts

The Biodiversity chapter was prepared by Inis Environmental Consultancy team members who are scientific experts in various fields of ecology and biodiversity. The team members were;

Dr Alex Copland BSc PhD MIEnvSc MCIEEM (Technical Director, INIS): Alex is Technical Director with INIS and reviewed and approved reports for the Gathabawn Windfarm. Alex has over 30 years of professional experience working in both statutory and private companies, in third-level research institutions and with environmental NGOs. They are a full member of the Institute of Environmental Sciences (IES) and the Chartered Institute of Ecology and Environmental Management (CIEEM). They are proficient in experimental design and data analysis and have managed several large-scale, multi-disciplinary ecological projects, managing staff and resources to meet budgetary constraints and the successful delivery of projects on time. These have included research and targeted management work for species of conservation concern, ecological assessments (including fieldwork, as well as EcIA, EIAR and AA/NIS reporting) for large-scale infrastructure projects (including Strategic Infrastructure Developments) and delivering successful planning outcomes, the design and delivery of practical conservation actions with a range of stakeholders and end-users, education and interpretation on the interface between people and the environment and the development of coordinated, strategic plans for birds and biodiversity. They have written numerous scientific papers, developed and contributed to evidence-based position papers, visions and strategies on birds, biodiversity and habitats in Ireland. They also sit on the Editorial Panel of the scientific journal, *Irish Birds*, which publishes original ornithological research relevant to Ireland's avifauna, and CIEEM'S *Irish Policy Group*.

Andrew Whitfield MA BA CEnv CEcol (Associate Consultant to INIS): Andrew authored the impact assessment sections for the Gathabawn Windfarm. Andrew has over thirty years of undertaking and co-ordinating ecological and environmental impact assessments across a wide variety of infrastructure projects, varying in scale from new nuclear power generation facilities, major road and rail construction schemes to housing developments. Andrew has extensive experience of undertaking Phase 1 Habitat Surveys, Breeding and Wintering Bird Surveys, Otter and Badger Surveys, Red Squirrel Surveys, Amphibian Surveys and Butterfly and dragonfly Surveys. He has also undertaken research on the threatened pear-bordered and high brown fritillary butterflies in the UK and has extensive knowledge of butterfly and other invertebrate ecology.

Howard Williams BSc CEnv MCIEEM CBiol MRSB MIFM (Principal Ecologist and CEO of INIS): Howard is a Chartered Environmentalist and a Chartered Biologist and has written and managed many Construction Environmental Management Plans, Article 6 Appropriate Assessments and Ecological Impact Assessments for over 50 wind farm projects. Howard is an expert in the field of avian ecology in addition to having considerable knowledge and experience producing management strategies/prescriptions for a range of protected species, both terrestrial and aquatic.

Conor Daly MSc BSc ACIEEM: is an Ecologist with INIS who co-authored impact assessments and reviewed and edited the baseline sections of this report. He was awarded an MSc in Biodiversity and Conservation and

an Honours BSc in Zoology. Conor has been conducting ecological surveys for projects since 2021 for a variety of projects, including industrial estates and Windfarms (Small-Large). Conor has experience in Raptor conservation with ample experience with bird of prey pressures and threats to protected species and has provided reports for EIAR and NIS reports while working with Inis Environmental Ltd. Conor has experience writing PEA, AA, NIS and EIA reports since 2021 for small urban developments across Ireland involving sensitive receptors such as Lesser Horseshoe Bat, active Badger setts and riverine habitats. They have also contributed to the drafting, finalising and issuing of EcIA, EIA and NIS reports since 2021 on renewable energy and smaller development projects, including wind farms in Counties Kilkenny, Tipperary, Waterford, Clare, Donegal and Roscommon.

Cillian Burke BSc ACIEEM: Cillian is an Ecologist with Inis Environmental Consultants Ltd. with a BSc (Hons) in Environmental Science from Galway University; they co-authored the baseline sections of this report. Cillian has experience in undertaking multi-disciplinary surveys including habitat classification, ornithology vantage point surveys, breeding wader surveys, Ecological Clerk of Works and bat surveys. Cillian has experience writing AA Screening, EIA, IAS and baseline ecology reports, as well as ISMP, BEMP, SHMP since 2021. They have also contributed to the drafting, reviewing and amending of AA, EIA, IAS and NIS reports over three years for renewable energy projects, including wind farms in Counties Waterford, Clare, Donegal and Roscommon.

Katie Connolly MSc BSc: Katie is an Ecologist with Inis Environmental Consultants Ltd. and co-authored the baseline sections of this report who was awarded an MSc in Applied Environmental Science from UCD and a BSc (Hons) in Zoology from University College Dublin (UCD), they co-authored the baseline sections of this report. Katie has conducted habitat, mammal, invasive species, entomological, marine and bat surveys for conservation monitoring projects, species reintroduction projects and private developments. Throughout her years as an ecologist. Katie has experience writing AA, EIA, IAS and baseline ecology reports, as well as ISMPs, Environmental Management Plans and Site-Specific Environmental Control Plans for civil development projects since 2024. They have also contributed to the drafting, reviewing and amending of AA, EIA, IAS and NIS reports over 6 months for renewable energy projects, including wind farms in Counties Waterford, Clare, Donegal and Roscommon.

Katie Sullivan BA MSc ACIEEM: Katie is the quality control manager/field ecologist with Inis Environmental Consultants Ltd. and co-authored the baseline sections of this report. Katie was awarded a BA in Natural Sciences (Zoology) from Trinity College Dublin and an MSc in Wildlife Conservation and Management from UCD, where their research focused on modelling the impacts of result-based agri-environmental schemes on pollinator communities in semi-natural grasslands. Katie has experience writing and reviewing baseline ecology reports since 2023 for renewable energy projects.

EIAR 13.1.2 Sources of Information

Consultation, desktop studies and fieldwork were carried out in order to gather information on the baseline environment.

Table 13-1: Sources of Baseline Information for Biodiversity

Consultation
Feedback was received from: National Parks and Wildlife Service (NPWS): on 24/11/2021 and 31/05/2022, INIS sent a sensitive data request to NPWS and received a response on 29/11/2021 and 23/06/2022. The NPWS was contacted again on 17/11/2025, and a response was received on 18/11/2025. The responses can be found in Appendix 3.2 to Chapter 3: Consultation.

Inland Fisheries Ireland (IFI) was contacted on 24/11/2021 and 15/06/2022 with a request for recommendations or observations. A response was received on 20/12/2021 and 15/06/2022. The IFI was contacted again on 17/11/2025, and a response was received on 22/12/2025. The response can be found in Appendix 3.2 to Chapter 3: Consultation.

The NPWS Development Applications Unit (DAU) was contacted on 24/11/2021 and 02/06/2022 with a request for recommendations or observations. A response was received on 17/08/2022. The DAU was not in a position to make a specific comment at the time.

See Chapter 3: Consultation for further details.

Desktop

- National Parks and Wildlife Service (NPWS) website (www.npws.ie)
- National Biodiversity Data Centre (NBDC) website (www.biodiversityireland.ie)
- Kilkenny City & County Development Plan 2021-2027
- Kilkenny Biodiversity Action Plan 2025-2030
- Transport Infrastructure Ireland (formerly NRA) (www.tii.ie)
- European Union (www.europa.eu)
- Water Framework Directive (www.wfireland.ie)
- Scottish National Heritage (www.nature.scot)
- The Heritage Council (www.heritagecouncil.ie)
- Construction Industry Research and Information Association (www.ciria.org)
- Irish Wildlife Trust (www.iwt.ie)
- Environmental Protection Agency website (www.epa.ie)
- Inland Fisheries Ireland (www.fisheriesireland.ie)
- Birdwatch Ireland (www.birdwatchireland.ie)
- Bat Conservation Ireland (www.batconservationireland.org)
- Butterfly Ireland (www.butterflyconservation.ie)
- Map of Irish Wetlands (www.wetlandsurveys.ie)
- Satellite imagery was reviewed to identify areas of potentially suitable breeding/foraging/roosting habitat.
- National Biodiversity Action Plan (2023-2030)
- The All-Ireland Pollinator Plan (2021-2025)
- EU Birds Directive (2009) Directive 2009/147/EC
- EU Habitats Directive (1992) Council Directive 92/43/EEC
- EC (Birds and Natural Habitats) Regulations 2011 (as amended)
- Water Framework Directive (2000) Directive 2000/60/EC
- Irish Wildlife Acts 1976 to 2023
- The International Convention on Wetlands of International Importance especially as Waterfowl Habitat 1971
- Irish Statute Book (various) European Communities (Natural Habitats) Regulations 1997 (S.I. 94/97) as amended

Review of the other EIA Report Chapters:

- Chapter 5: Description of the Development
- Chapter 6: Land
- Chapter 7: Soils
- Chapter 8: Water
- Chapter 9: Air Quality
- Chapter 10: Noise & Vibration

Fieldwork

Terrestrial Habitats

- General site walkover (Fossitt, 2000; Smith *et al.,* 2011; NPWS, 2019)
- Habitat classification surveys within a 50m buffer of construction works areas (including Facilitating Works locations) (including identification of invasive species)

Terrestrial Invertebrates

- Marsh Fritillary suitability/larval web surveys (combined), butterfly transect surveys (NBDC, 2015)

Amphibians and Reptiles

- General site walkover and nocturnal surveys (NRA, 2006; NRA, 2008; ARC, 2021a)
- Basking mat deployments and daytime visits (ARC, 2021b)

Terrestrial Mammals

- Mammal surveys (general mammal walkover surveys) (NRA, 2005; NRA, 2009a)
- Badger surveys (NRA, 2005)
- Otter surveys (NRA, 2006; Highways Agency, 1999; Reid *et al.,* 2025)
- Camera trap deployment

Bats

- Transect surveys, static detector deployments, bat VP, Preliminary Roost Assessments (PRA), Ground-Level Tree Assessments (GLTA), Emergence (roost) surveys (Collins, 2023; SNH (now NatureScot), 2021; BCI, 2026)

Birds

- Raptor Hinterland surveys (Hen Harrier Roost surveys) (O' Donoghue, 2019; SNH, 2017; Gilbert *et al.,* 2011)
- Standardised transect surveys and Vantage Point (VP) (breeding and wintering seasons) (Birdwatch Ireland, 2012; Bibby *et al.,* 2000; SNH, 2017)
- Breeding Woodcock surveys (Gilbert *et al.,* 2011; Heward *et al.,* 2015; Hoodless *et al.,* 2009)
- Wintering waterbird surveys (I-WeBS) (BirdWatch Ireland, 2012; SNH, 2017)
- Raptor surveys: Breeding Raptor surveys (Barn Owl, Hen Harrier, Peregrine and Kestrel) (Hardey *et al.*, 2013; Gilbert *et al.,* 2021; Lusby & O'Clery, 2014; Ruddock & Whitfield, 2007; Shawyer, 2011; SNH, 2017; TII, 2026; Whitfield *et al.,* 2008)
- Watercourse crossing surveys (Crowe *et al.,* 2008; Cummins *et al.,* 2010; NRA, 2008)

Aquatic Ecology Surveys

- Catchment-wide electro-fishing surveys (CEN, 2003; Central Fisheries Board (CFB), 2008)
- Aquatic site survey (Environmental Agency (EA), 2003; Fossitt, 2000)
- White-clawed crayfish (sweep netting & hand searching) surveys (Reynolds *et al.,* 2010)
- Environmental DNA (eDNA) sampling
- Lacustrine macro-invertebrate community sampling (Cheal *et al.,* 1993)
- Macro-invertebrates (Biological water quality (Q-sampling) surveys (Feeley *et al.,* 2020; Toner *et al.,* 2005; Foster *et al.,* 2009; Kelly-Quinn & Regan, 2012; Byrne *et al.,* 2009; Nelson *et al.,* 2011)
- Macrophytes and aquatic bryophyte surveys (Wyse-Jackson *et al.,* 2016; Lockhart *et al.,* 2012)

EIAR 13.1.3 Methodology Used

A range of field surveys within the relevant Study Areas of each ecological receptor were undertaken for the proposed Gathabawn Windfarm between 2022 and 2026. The scope of these surveys was informed by the desk study and through the outcome of the scoping and consultation process. A detailed description of the field methodologies used is detailed in Appendix 13.1.

The evaluation for Biodiversity herein has been carried out in accordance with '*Environmental Impact Assessment of Projects: Guidance of the preparation of Environmental Impact Assessment Report'*, (EU, 2017); the National Roads Authority (NRA) (2009) '*Guidelines for Assessment of Ecological Impacts of National Road Schemes'*; Percival (2007) '*Predicting the effects of wind farms on birds in the UK: the development of an objective assessment method'*; CIEEM (2018) '*Guidelines for Ecological Impact Assessment in the UK and Ireland'*; EPA (2022) '*Guidelines on the information to be contained in Environmental Impact Assessment Reports'.*

This methodology has been used to determine the importance and sensitivity of receptors, and the magnitude and significance of potential impacts.

The methodology can be found in full in Appendix 13.1: Methodology for the evaluation of Biodiversity.

A list of guidelines and legislation which were taken into account during the evaluation of this chapter is also included in Appendix 13.1.

EIAR 13.1.4 Statement on Certainty and Sufficiency of Information Provided

A clear documentary trail is provided throughout this chapter and chapter appendices to the competency of data and methods used and the rationale for selection of same. The information used to compile this chapter is collated from site-specific investigations, and from data and documents generated by public bodies and statutory agencies. The online baseline data was verified in the field.

The criteria used for Biodiversity appraisals are derived from the NRA (2009b), CIEEM (2017), and CIEEM (2018) guidance in line with EIA guidelines as provided in EPA guidance (2022). All documentation used is referenced at the end of the chapter.

There are a number of limitations inherent to field-based surveying. These relate to the availability of suitable weather conditions for completing surveys, with good visibility and little wind or rain. As such, when undertaking and completing fieldwork, careful consideration and planning were made to ensure optimal weather conditions during survey periods.

Certain survey results obtained in the report are older than three years as of the writing of this report, and as such are considered to be nearing the end of their validity according to CIEEM guidance on the lifespan of ecological reports and surveys (CIEEM, 2019). This was considered in the analysis of species populations and weighted accordingly with the most recent surveys in 2025 and 2026 for all assessments provided in this Chapter. A full suite of winter season ecological surveys is continuing until a planning decision is reached. Due to scheduling constraints, certain VPs were surveyed on the same day. However, all seasons were surveyed for the minimum number of hours as set by NatureScot for VPs (SNH, 2017). Therefore, no significant constraint is related to the VP survey data. However, such scheduling variations are within the accepted reality for conducting field surveys.

Weather stations were deployed for spring, summer and autumn 2025 static detector deployments; however, no weather data was recorded. Weather data from the local Durrow weather station was used to inform the weather conditions within the site for the 2025 efforts. Static detector deployments are currently ongoing for the 2026 season. The spring static detector deployment at T6 partially failed from 22/05/2025 to

24/05/2025, 01/06/2026 to 06/06/2026 and 08/06/2026. The static detector deployed at T4 during summer 2025 was noted missing during collection. The static detector deployed at T6 during summer 2025 malfunctioned, and no data was collected. The static detector deployed at T5 during autumn 2025 malfunctioned from 17/08/2025 to 26/08/2025. The static detector deployed at T9 during autumn 2025 malfunctioned from 19/08/2025 to 26/08/2025. However, these detectors were not deployed at a later date as the detectors at the other turbine locations covered the area adequately.

The zero-crossing method was used for recording bat static detector activity in 2025. It is acknowledged that zero-crossing is less effective in detecting bat activity than full spectrum and, as a result, may lead to slightly lower levels of activity being recorded. However, full spectrum requires significant data storage and battery power to operate; as such, the zero-crossing method was the only available method at the time of these surveys. Furthermore, no qualitative data (mating, social and communicating calls) was required for determining the overall bat activity (passes per night) within the proposed Gathabawn Windfarm. The SD bat activity surveys in 2025 were carried out before the recently published BCI (2026) guidance. Nevertheless, it is considered that the data provided presents an adequate baseline against which impacts within this document can be evaluated and, as such, no limitation to the assessment exists.

The elusive and inconspicuous nature of the target reptile species limits the ability to conclude that an absence of these species during survey efforts means they are not present. As such, where suitable habitat is present for these species, this report acknowledges the potential for the associated species to be present within those suitable habitat areas.

In summary, it is considered that no significant constraints exist, and the survey data provides accurate detail on the baseline biodiversity in relation to the occurrence of species and habitats within the baseline of the proposed development.

EIAR 13.2 SENSITIVE ASPECTS

EIAR 13.2.1 Overview of Biodiversity in the Local Environment

The proposed Gathabawn Windfarm lies within a predominantly agricultural landscape, with improved agricultural grassland, the dominant habitat within the area. Other habitats present include scrub and hedgerows (See Section EIAR 13.3.1). The Cullahill Mountain SAC is located adjacent to the Gathabawn Windfarm boundary at Ballylehaun. The Natura 2000 sites River Barrow and River Nore SAC and River Nore SPA are located downstream of the Gathabawn Windfarm.

In relation to Natura 2000 sites, the site access road between turbines T2 and T3 at the Ballylehaun Section is located adjacent to the boundary of the Cullahill Mountain SAC. This SAC is designated for semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*). The River Barrow and River Nore SAC is located c.7.4km downstream of the proposed Gathabawn Windfarm site, designated for the protection of Otter (*Lutra lutra*) and Freshwater Pearl Mussel (*Margaritifera margaritifera*) along with 20 other Qualifying Interest (QI) habitats and species. The River Nore SPA is also located c.11.30km downstream of the Gathabawn Windfarm site, designated for Kingfisher.

EIAR 13.2.2 Zone of Influence/Study Areas

The area or zone of influence around the proposed Gathabawn Windfarm within which sensitive aspects of the environment could be affected by the windfarm is called the Study Area herein. The Study Areas for the Sensitive Aspects of the Biodiversity environment are set out in the table below and illustrated on Figures 13.1 to 13.8.

Table 13-2: Study Area of the Gathabawn Windfarm in relation to sensitive aspects of the Biodiversity environment

Sensitive Aspect	Zone of Influence/Study Area	Justification for the Study Area Extent
Terrestrial Habitats	Construction works areas plus 50m in all directions	Professional judgement and as per Best Practice (CIEEM, 2018)
Invertebrates	Construction works areas plus 50m in all directions	Professional judgement and as per Best Practice (CIEEM, 2018)
Amphibians & Reptiles	Construction works areas plus 50m in all directions	Professional judgement and as per Best Practice (CIEEM, 2018)
Terrestrial Mammals	Otter: All watercourses within 300m of the works where suitable habitat occurred were surveyed 300m in both directions. Watercourses that intersect the project site boundary up to 13.2km ± 5.3km from crossing points Badger and Other Mammals: Construction works areas plus 100m in all directions.	Professional judgement and as pertinent: Otters: Highways Agency (1999) and NRA (2006) Badgers: NRA (2005) Other Mammal Species: CIEEM (2018) and NRA (2009a)
Bats	Buildings within 500m of the construction works areas; Mature trees within 200m plus blade length of the proposed turbines;	Professional judgement as per best practice: Collins, 2023; BCI, 2026; SNH, 2021; Billington & Norman, 1997; Kelleher & Marnell, 2006

Sensitive Aspect	Zone of Influence/Study Area	Justification for the Study Area Extent
	Linear vegetation features (e.g. hedgerows) of high suitability for foraging bats within the construction works areas; Structures within the construction works areas and along material haulage routes where works are proposed.	
Birds	Species/taxa dependent; up to 5km from construction works areas	Professional judgement and as per Best Practice: (BirdWatch Ireland, 2012; CIEEM, 2018; NRA, 2008; Lusby *et al.*, 2011; SNH, 2017; TII, 2026; EPA, 2006; Gilbert *et al.*, 2011; Bibby *et al.*, 2000; Cummins *et al.,* 2010; Crowe *et al.,* 2008)
Aquatic Habitats & Species	Sub-catchments associated with the works areas- i.e. Goul_SC_010 and Nore_SC_070	Professional judgement and as per Best Practice: (NRA, 2008; CIEEM, 2018; EPA, 2017; DHPLG, 2018; SEPA, 2008; Mumane *et al.* (2006)
Local Water Dependent Habitats	Sub-catchments associated with the works areas- i.e. Goul_SC_010 and Nore_SC_070	Water-dependent habitats potentially affected by the works have the potential to be impacted where any change to the water table or water quality can change the overall health of these types of habitats. Conservative distance for groundwater-related impacts, which in excess of the GSI estimated short groundwater flow path distances for the area. See Figure 13.6.
Designated Sites	All downstream Annex I and Annex II aquatic/riparian/ water dependent habitats and species and habitats of protected species in the: Goul_SC_010, Nore_SC_070 and Nore_SC_060 sub-catchments. The zone of impact extends to any designated sites downstream of the works as far as the transitional waterbody section of the River Nore [(Nore Estuary (IE_SE_100_0400)] or downstream of the Gathabawn Windfarm via physical or hydrological pathways – e.g. Nore_SC_080, Nore_SC_090. In addition, the ZoI for Otter also includes areas 300m from any watercourse stream or river suitable to support couching or holt sites connected to the above-mentioned sub-catchments and 50m from works areas for foraging/commuting habitat. In relation to Kingfisher (ex-situ effects), the zone of impact extends downstream of the works in suitable habitat for Kingfisher as far as the designated sites downstream of the	The Zone of Impact for designated sites is based on the connectivity of impact sources via hydrological, hydrogeological or other pathways to a receptor listed as a QI or SCI (S-P-R) (Office of the Planning Regulator (OPR), 2021).

Sensitive Aspect	Zone of Influence/Study Area	Justification for the Study Area Extent
	Gathabawn Windfarm in the Goul_SC_010, Nore_SC_070, Nore_SC_60 sub-catchments of the River Nore Catchment in which the works are located. In addition, any sites within the Goul_SC_010, Nore_SC_070 and Nore_SC_060 sub-catchments were also considered based on the Gathabawn Windfarm and Candidate Gathabawn Grid Connection overlapping with these sub-catchments. This area was based on reasonable consideration for potential pathways that could facilitate contaminants or pollutants to transfer via hydrogeological pathways to impact sensitive habitats or species.	

EIAR 13.3 BASELINE ENVIRONMENT

The context, characteristics, importance and sensitivity of the baseline environment, and the trends and evolution thereof, in relation to *Terrestrial Habitats, Invertebrates, Amphibians & Reptiles, Terrestrial Mammals, Bats, Birds, Aquatic Habitats & Species, and Designated Sites* are described in the subsections below.

The results of fieldwork and desktop surveys are summarised in the sections below, illustrated on the mapping listed below, with the detailed data included in the Appendices listed:

EIAR Figures: (included at the end of this Chapter)

Figure 13.1: Terrestrial Habitats
Figure 13.2: Invertebrates, Amphibians and Reptiles
Figure 13.3: Terrestrial Mammals
Figure 13.4: Bats
Figure 13.5: Birds
- Figure 13.5.1 – Raptor Surveys
- Figure 13.5.2 – Breeding Wader Survey
- Figure 13.5.3 – I-WEBS Survey Locations
- Figure 13.5.4 – Birds: Vantage Point Locations and Transect Surveys

Figure 13.6: Aquatic Habitats & Species
Figure 13.7: European Sites (SPA & SAC)
Figure 13.8: Designated Sites (pNHA)

EIAR Appendices: (included at the end of this Chapter)

Appendix 13.1 Methodology for the evaluation of Biodiversity
- Section A13.1.2 Methodology – Desktop Review
- Section A13.1.3 Methodology – Fieldwork
- Section A13.1.4 Methodology for Analysing the Evolution of the baseline environment

Appendix 13.2 Statement of Authority
Appendix 13.3: Species Records held by NBDC
Appendix 13.4: Invertebrates, Amphibians, Reptiles and Terrestrial Mammals Survey Data
Appendix 13.5: Bat Survey Results
Appendix 13.6: Bird Fieldwork & Survey Results
Appendix 13.7: Collision Risk Modelling
Appendix 13.8: Aquatic Ecology Survey Results

Older survey efforts: Although not relied upon in the evaluations herein, surveys have been carried out for the Gathabawn Windfarm development between 2019 and 2022, and some references to older survey results are included below where it lends to a deeper understanding of the use of the area over time by a particular species.

EIAR 13.3.1 Context and Characteristics of TERRESTRIAL HABITATS

EIAR 13.3.1.1 Habitats within the Study area

Survey effort: Ground truthing habitat and ecological field surveys were conducted in August 2026 by INIS Environmental ecologists to establish the ecological features and ecological resources of the lands, particularly any rare or protected species and habitats present within the study area or in the greater surroundings and categorise the habitats using the Fossitt (2000) Irish Habitat Classification System and following the Best Practice Guidance for such habitat surveys (Smith *et al.*, 2011).

Survey results: There are a total of 190.33ha within the 50m study area around the Gathabawn Windfarm (this includes the Ballylehaun Section, the Ballyring Section and Facilitating Works FW8 and FW9). The majority of this habitat is Improved Agricultural Grassland (74%), increasing to 85% when Improved Agricultural Grassland mosaics are included. The remaining coverage of the site comprises various small areas of other types of habitats, as outlined in the tables below. The occurrence of the various habitats within the study area is illustrated in Figure 13.1: Terrestrial Habitats.

There are a total of 180.96ha within the 50m study area around the Candidate Gathabawn Grid Connection (this includes the Ballylehaun-Ballyring Underground Cabling, Ballyring-Parksgrove Underground Cabling, Parksgrove Substation and Parksgrove-Moatpark Underground Cabling). The predominant habitat within this study area is Improved Agricultural Grassland (82%), with the remining coverage made up of various small areas of other types of habitats.

There is an overlap of 14.24ha between the windfarm study area and candidate grid connection study area at the Ballyring Area.

Overview of Survey Findings: The habitats recorded within the study area are dominated by Improved agricultural Grassland (GA1), Hedgerow (WL1), Buildings and Artificial Surfaces (BL3) and Treelines (WL2) (Figure 13.1: Terrestrial Habitats). There are also other habitats that, although being less representative of the site, assume higher ecological importance in the local context, habitats such as Dry Calcareous and Neutral Grassland (GS1), Eroding/Upland Rivers (FW1), Oak-Ash-Hazel Woodland (WN2) and Scrub (WS1).

Table 13-3: Total habitats within the Ballylehaun Area

Ballylehaun Area Baseline			
Fossitt Habitat Code	**Habitat Description**	**Area ha (construction works area)**	**Area ha (50m buffer)**
GA1	Improved Agricultural Grassland	31.83	90.48
GA1/HD1	Improved Agricultural Grassland/Dense Bracken	4.17	8.94
WS1	Scrub	0.92	8.32
GA1/ER2/WD5	Improved Agricultural Grassland/Exposed Calcareous Rock/Scattered Trees and Parkland/	1.89	6.85
GA1/ER2	Improved Agricultural Grassland/Exposed Calcareous Rock	2.03	5.59
GS1	Dry Calcareous and Neutral Grassland	0	2.44
BL3	Buildings and Artificial Surfaces	0.77	2.37
WN2	Oak-Ash-Hazel Woodland	0.01	1.92
GS2	Dry Meadows and Grassy Verges	0.97	0.99
WD1	Mixed Broadleaved Woodland	0	0.37
ED3	Recolonising Bare Ground	0.1	0.27

Ballylehaun Area Baseline			
Fossitt Habitat Code	**Habitat Description**	**Area ha (construction works area)**	**Area ha (50m buffer)**
GA2	Amenity Grassland	<0.01	0.25
ER2	Exposed Calcareous Rock	0	0.16
BL3/GA2	Buildings and Artificial Surfaces/Amenity Grassland	0	0.10

Ballylehaun Area Baseline – Linear habitats			
Fossitt Habitat Code	**Habitat Description**	**Length (m) (construction works area)**	**Length (m) (50m buffer)**
WL1	Hedgerow	3,290	6,733
WL2	Treelines	1,073	3,055
BL1	Stone Walls and Other Stonework	942	1,672
BL3	Buildings and Artificial Surfaces	718	1,118
WL2/BL1	Treelines/Stone Walls and Other Stonework	84	210
WL1/WL2	Hedgerow/Treelines	51	51

Table 13-4: Total habitats within the Ballyring Area

Ballyring Area Baseline			
Fossitt Habitat Code	**Habitat Description**	**Area ha (construction works area)**	**Area ha (50m buffer)**
GA1	Improved Agricultural Grassland	12.19	41.46
BC1	Arable Crops	3.19	7.04
ED2	Spoil and Bare Ground	0.93	1.13
ED3/GS2	Recolonising Bare Ground/Dry Meadows and Grassy Verges	0.07	1.07
BL3	Buildings and Artificial Surfaces	0.08	0.44
WS1	Scrub	0.29	0.33
ED5	Refuse and Other Waste	0.13	0.13
WS3	Ornamental/Non-native Shrub	0.01	0.10
ED3	Recolonising Bare Ground	0.08	0.08
GS2	Dry Meadows and Grassy Verges	0.03	0.05
GA1/WS1	Improved Agricultural Grassland/Scrub	0	0.04
FL8	Other Artificial Lakes and Ponds	0	0.01

Ballyring Area Baseline – Linear habitats			
Fossitt Habitat Code	**Habitat Description**	**Length (m) (construction works area)**	**Length (m) (50m buffer)**
WL1	Hedgerow	3,250	6,412
FW4	Drainage Ditches	415	860
WL2	Treelines	16	129

Table 13-5: Total habitats within the Facilitating Works FW8 and FW9

Facilitating Works FW8 and FW9 Baseline			
Fossitt Habitat Code	**Habitat Description**	**Area (ha) (construction works area)**	**Area (ha) (50m buffer)**
BL3	Buildings and Artificial Surfaces	0.06	0.99
GA1	Improved Agricultural Grassland	1.19	8.37
WD1	Mixed Broadleaved Woodland	0	0.04

Facilitating Works FW8 and FW9 Baseline – Linear habitats			
Fossitt Habitat Code	**Habitat Description**	**Length (m) (construction works area)**	**Length (m) (50m buffer)**
WL1	Hedgerow	320	1,163
WL2	Treelines	205	491
BL1	Stone Walls and Other Stonework	0	249
FW1	Eroding/Upland Rivers	0	186

Table 13-6: Total habitats within the Candidate Gathabawn Grid Connection

Candidate Gathabawn Grid Connection Baseline			
Fossitt Habitat Code	**Habitat Description**	**Area (ha) (construction works area)**	**Area (ha) (50m buffer)**
GA1	Improved Agricultural Grassland	13.45	148.23
BL3	Buildings and Artificial Surfaces	1.32	8.57
WD1	Mixed Broadleaved Woodland	0.69	5.14
ED2	Spoil and Bare Ground	3.42	3.68
ED3	Recolonising Bare Ground	1.2	2.42
WS1	Scrub	0.09	2.05
GS2	Dry Meadows and Grassy Verges	0.62	1.86
BC1	Arable Crops	0.29	1.67
FW2	Depositing/Lowland Rivers	0.09	1.52
GA2	Amenity Grassland	0.01	1.47
GS4/WS1	Wet Grassland/Scrub	0.02	1.31
GS1	Dry Calcareous and Neutral Grassland		0.97
BL3/GA2	Buildings and Artificial Surfaces/Amenity Grassland	<0.01	0.92
WD4	Conifer Plantation	0.02	0.73
FW1	Eroding/Upland Rivers	0.03	0.3
ED5	Refuse and Other Waste	0.07	0.13

Candidate Gathabawn Grid Connection Baseline – Linear habitats			
Fossitt Habitat Code	**Habitat Description**	**Length (m) (construction works area)**	**Length (m) (50m buffer)**
WL1	Hedgerow	3,495	17,431
WL2	Treelines	811	6,952
FW4	Drainage Ditches	23	968
FW1	Eroding/Upland Rivers	7	694
BL1	Stone Walls and Other Stonework	187	571

Candidate Gathabawn Grid Connection Baseline – Linear habitats			
Fossitt Habitat Code	**Habitat Description**	**Length (m) (construction works area)**	**Length (m) (50m buffer)**
BL3	Buildings and Artificial Surfaces	0	275
BL1/WL1	Stone Walls and Other Stonework/Hedgerow	0	93
GS2	Dry Meadows and Grassy Verges	4	70

EIAR 13.3.1.2 Most Prevalent Habitat Types

78.4% of the windfarm study area is comprised of two habitat area types - The dominant habitat present is Improved Agricultural Grassland (GA1; 74%), followed by Improved Agricultural Grassland/Dense Bracken (GA1/HD1; 4.69%). Hedgerow (WL1; 64.1%) and Treelines (WL2; 16.5%) make up the majority of the linear habitats present within the windfarm study area.

These habitats are described below.

EIAR 13.3.1.2.1 Improved Agricultural Grassland (GA1)

This habitat is intensively managed, or highly modified agricultural grassland that has been reseeded and/or regularly fertilised and is now heavily grazed and/or used for silage making (Fossitt, 2000). This habitat was recorded throughout the Ballylehaun Area (90.48ha), Ballyring Area (41.46ha) and the Facilitating Works FW8 and FW9 (8.37ha).

This habitat was also recorded within the candidate grid connection 50m study area (148.23ha).

Due to the low ecological value of this habitat and widespread nature across the locale, **Improved Agricultural Grassland (GA1) is <u>not</u> considered a key ecological receptor.**

EIAR 13.3.1.2.2 Improved Agricultural Grassland/Dense Bracken (GA1/HD1)

Dense Bracken is used for areas of open vegetation that are dominated by Bracken (*Pteridium aquilinum*). Cover of the fern may be either patchy or continuous but should exceed 50% overall (Fossitt, 2000). This mosaic habitat was recorded within the Ballylehaun Area, within the footprint of the T7 hardstand and site roads between T5 and T7. The total area of this habitat is 8.94ha within the 50m study area.

Due to its low ecological value and the widespread nature across the locale, **Improved Agricultural Grassland/Dense Bracken (GA1/HD1) is <u>not</u> considered a key ecological receptor.**

EIAR 13.3.1.2.3 Hedgerow (WL1)

Hedgerows are linear strips of shrubs, often with occasional trees, that typically form field or property boundaries. Most hedgerows originate from planting, and many occur on raised banks of earth that are derived from the excavation of associated drainage ditches. Linear strips of low scrub are included in this category if they occur as field boundaries (Fossitt, 2000). Hedgerow habitat was recorded predominantly at the Ballyring Section. Hedgerow was recorded within the footprint of the T9 and T10 hardstands within the Ballyring Area. Common species recorded include Bramble (*Rubus fruticosus agg*.), Blackthorn (*Prunus spinosa*), Hawthorn, Gorse (*Ulex europaeus*), Perennial Ryegrass, Ivy (*Hedera helix*), Herb Robert (*Geranium robertianum*) and Nettle (*Urtica dioica*).. The total length of this habitat is 14,308m within the 50m windfarm study area, while 17,431m was recorded within the candidate grid connection 50m study area.

Due to the high ecological value of the habitat and potential loss during construction works, **Hedgerow (WL1) is considered a key ecological receptor.**

EIAR 13.3.1.2.4 Treelines (WL2)

A treeline is a narrow row or single line of trees that is greater than 5 m in height and typically occurs along field or property boundaries. This category includes tree-lined roads or avenues, narrow shelter belts with no more than a single line of trees, and overgrown hedgerows that are dominated by trees. Most treelines are planted, and trees are often regularly spaced (Fossitt, 2000). This habitat was recorded adjacent to hardcore areas within the Ballylehaun Area and partially within the construction works area south of T8 in the Ballyring Area. Species recorded include Ash, Holly (*Ilex aquifolium*), Beech (*Fagus sylvatica*), Sycamore, Willow and Rowan (*Sorbus aucuparia*). The total length of this habitat is 3,675m within the 50m windfarm study area, and 6,952m within the candidate grid connection 50m study area.

Due to the high ecological value of the habitat and potential loss during construction works, **Treelines (WL2) is considered a key ecological receptor.**

EIAR 13.3.1.3 Other noteworthy habitats

EIAR 13.3.1.3.1 Improved Agricultural Grassland/Scattered Trees and Parkland (GA1/WD5)

Scattered Trees and Parklands can be used in situations where scattered trees, standing alone or in small clusters, cover less than 30% of the total area under consideration but are a prominent structural or visual feature of the habitat. This usually occurs in areas of cultivated grassland, particularly amenity areas (Fossitt, 2000). This habitat was recorded within the Ballylehaun Area, within the footprint of site roads and partially within the T4 hardstand. The total area of this habitat is 6ha within the 50m study area.

Despite the low ecological value of the Improved Agricultural Grassland, the tree features present have importance to local biodiversity for birds, bats and pollinators. As such, given the nature of scattered tree features within the study area, **Improved Agricultural Grassland/Scattered Trees and Parkland (GA1/WD5) is considered a key ecological receptor.**

EIAR 13.3.1.3.2 Buildings and Artificial Surfaces (BL3)

Buildings and Artificial Surfaces habitat includes areas of built land such as buildings and areas of land covered by artificial surfaces such as concrete, tarmac, bricks and blocks, including general public roads and private roads that serve part of the existing farm and forestry access routes (Fossitt, 2000). This habitat occurs throughout the Gathabawn Windfarm. The total area of this habitat is 3.81ha within the 50m windfarm study area, and 8.57ha within the candidate grid connection 50m study area. The total length of this habitat is 1,118m within the 50m windfarm study area, and 275m within the candidate grid connection study area.

Due to its low ecological value of this habitat, **Buildings and Artificial Surfaces (BL3) is <u>not</u> considered a key ecological receptor.**

EIAR 13.3.1.3.3 Scrub

Scrub includes areas that are dominated by at least 50% cover of shrubs, stunted trees or brambles. The canopy height is generally less than 5m, or 4m in the case of wetland areas. Scrub frequently develops as a precursor to woodland and is often found in inaccessible locations, or on abandoned or marginal farmland (Fossitt, 2000). This habitat occurs within the footprint of the bat connectivity areas, adjacent to site roads associated with T6 at the Ballylehaun Area, and within the construction compound footprint in Ballyring. The total area of this habitat is 8.65ha within the 50m windfarm study area, and 2.05ha within the candidate grid connection 50m study area.

Due to the high ecological value of this habitat for mammal and bird species, **Scrub (WS1) is considered a key ecological receptor.**

EIAR 13.3.1.3.4 Dry Calcareous and Neutral Grassland (GS1)

This habitat is used for unimproved or semi-improved dry grassland that may be either calcareous or neutral, but not acid. It is associated with low intensity agriculture and typically occurs on free-draining mineral soils of various depths. Calcareous grassland is restricted in its distribution and is now largely confined to the steep slopes of esker ridges and moraines in the midlands, and to other areas with shallow and rocky limestone soils (Fossitt, 2000). Species recorded include Medow Foxtail (*Alopecurus pratensis*), Cock's Foot (*Dactylis glomerata*), Yorkshire Fog (*Holcus lanatus*), Yarrow (*Achillea millefolium*), Knapweed (*Centaurea nigra*), Broadleaf Plantain (*Plantago major*), Ribwort Plantain (*Plantago lanceolata*), Sheep's Fescue (*Festuca ovina*), Lady's Bedstraw (*Gallium verum*) and Meadow Vetchling (*Lathyrus pratensis*). The total area of this habitat is 2.44ha within the 50m windfarm study area, and 0.97ha within the candidate grid connection study area.

Due to the high ecological value of this habitat and restricted distribution, **Dry Calcareous and Neutral Grassland (GS1) is considered a key ecological receptor.**

EIAR 13.3.1.3.5 Arable Crops (BC1)

This habitat consists of agricultural land that is cultivated and managed for the production of arable crops, including cereals (wheat, barley, oats, maize), and root, leaf, energy or fibre crops such as sugar beet, turnips, rape and flax. Fields of potatoes can be included here, but most other vegetable crops are excluded, as are market gardens (Fossitt, 2000). This habitat was recorded within the area of T12 at the Ballyring Area. The total area of this habitat is 7.04ha within the 50m windfarm study area, and 1.67ha within the candidate grid connection study area.

Due to its low ecological value and fragmented nature of this habitat, **Arable Crops (BC1) is <u>not</u> considered a key ecological receptor.**

EIAR 13.3.1.3.6 Dry Meadows and Grassy Verges (GS2)

Dry meadows that are rarely fertilised or grazed and are mown only once or twice a year for hay are now rare in Ireland. Most have been improved for agriculture, and this type of grassland is now best represented on grassy roadside verges, on the margins of tilled fields, on railway embankments, in churchyards and cemeteries, and in some neglected fields or gardens (Fossitt, 2000). This habitat was recorded opposite of T4 in the Ballylehaun Area, adjacent to existing roads south of T9 and north of T10 within the Ballyring Area. The total area of this habitat is 1.04ha within the 50m windfarm study area, and 1.86ha within the candidate grid connection 50m study area. The total length of this habitat is 70m within the 50m candidate grid connection study area.

Due to its low ecological value and the widespread nature across the locale, **Dry Meadows and Grassy Verges (GS2) is <u>not</u> considered a key ecological receptor.**

EIAR 13.3.1.3.7 Recolonizing Bare Ground (ED3)

This category is used for any areas where bare or disturbed ground, derelict sites or artificial surfaces of tarmac, concrete or hard core have been invaded by herbaceous plants. Vegetation cover should be greater than 50% for inclusion in this category. Most of the typical colonisers are ruderals, or weed plants (Fossitt, 2000). This habitat occurs is scattered throughout the Gathabawn Windfarm, including at the site roads between T11 and T12 within the Ballyring Area. Species recorded included common and widespread species, such as Perennial Ryegrass (*Lolium perenne*), Thistle (*Cirsium spp.),* Ribwort Plantain, Yorkshire Fog, Cock's Foot, Red Clover (*Trifolium pratense*), and Dandelion (*Taraxacum spp*). The total area of this habitat is 0.35ha within the 50m windfarm study area, and 2.42ha within the candidate grid connection study area.

Due to its low ecological value, and the widespread nature across the locale **Recolonising Bare Ground (ED3) is <u>not</u> considered a key ecological receptor.**

EIAR 13.3.1.3.8 Wet Grassland/Scrub (GS4/WS1)

One area of this habitat was recorded opposite the Upper Ballyring Upper Stream, adjacent to the Ballylehaun-Ballyring Underground Cabling element of the Candidate Gathabawn Grid Connection. The total area of this habitat is 1.31ha within the 50m candidate grid connection study area.

Due to its high ecological value and proximity to the 1st Order Ballyring Upper Stream, **Wet Grassland/Scrub (GS4/WS1) is considered a key ecological receptor.**

EIAR 13.3.1.3.9 Amenity Grassland (GA2)

This habitat is typically species-poor and consists of improved grasslands maintained for recreation, aesthetics, or other non-agricultural purposes, like lawns, sports fields, or gardens; plant cover does not exceed 50% (Fossitt, 2000). This habitat was recorded in isolated areas at the Ballylehaun Area and along the Ballylehaun-Ballyring Underground Cabling. The total area of this habitat is 0.25ha within the 50m windfarm study area, and 1.47ha within the candidate grid connection study area.

Due to its low ecological value, **Amenity Grassland (GA2) is <u>not</u> considered a key ecological receptor.**

EIAR 13.3.1.3.10 Eroding/Upland Rivers (FW1)

This category includes natural watercourses, or sections of these, that are actively eroding, unstable and where there is little or no deposition of fine sediment. Eroding conditions are typically associated with the upland parts of river systems where gradients are often steep, and water flow is fast and turbulent (Fossitt, 2000). The Gorteennamuck River intersects the Ballylehaun-Ballyring Underground Cabling, while the Lisdowney Stream and Ballyconra Stream intersect the Ballyring-Parksgrove Underground Cabling. The total area of this habitat is 0.3ha within the 50m candidate grid connection study area. The total length of this habitat is 694m within the 50m candidate grid connection study area.

Due to the high ecological value of this habitat, **Eroding/Upland Rivers (FW1) is considered a key ecological receptor.**

EIAR 13.3.1.3.11 Oak-Ash-Hazel Woodland (WN2)

This habitat is a native, semi-natural woodland that occurs on base-rich or calcareous soils that are generally dry or well-drained, or on rocky limestone terrain (Fossitt, 2000). This habitat was recorded adjacent to the site road between T2 and T3 within the Ballylehaun Area. Species recorded included Ash (*Fraxinus excelsior*) and Hazel (*Corylus avellana*). The total area of this habitat is 1.92ha within the 50m windfarm study area.

Due to the presence of native species and the high ecological value of this habitat, **Oak-Ash-Hazel Woodland (WN2) is considered a key ecological receptor.**

EIAR 13.3.1.3.12 Mixed Broadleaved Woodland (WD1)

This general category includes woodland areas with 75-100% cover of broadleaved trees, and 0-25% cover of conifers. It should be used in situations where woodland stands cannot be classified as semi-natural on the basis of the criteria outlined above. Trees may include native and non-native species (Fossitt, 2000). This habitat was recorded within the Ballylehaun biodiversity enhancement area and south of the Ballylehaun-Ballyring Underground Cabling. Common species recorded include Willow (*Salix spp.*), Sycamore (*Acer pseudoplatanus*), Hawthorn (*Crataegus monogyna*) and Ash. The total area of this habitat is 0.4ha within the 50m windfarm study area, and 5.14ha within the candidate grid connection study area.

Due to the high ecological value of this habitat, **Mixed Broadleaved Woodland (WD1) is considered a key ecological receptor.**

EIAR 13.3.1.3.13 Conifer Plantation (WD4)

This category is used for areas that support dense stands of planted conifers where the broadleaved component is less than 25%, and the overriding interest is commercial timber production. Conifer plantations are characterised by even-aged stands of trees that are usually planted in regular rows, frequently within angular blocks. Species diversity is low, and single-species stands are common (Fossitt, 2000).

This habitat was recorded in isolated areas, east of T7 and adjacent to the Ballylehaun-Ballyring Underground Cabling. Species recorded include European Larch (*Larix decidua*). The total area of this habitat is 0.73ha within the 50m candidate grid connection study area.

Due to its low ecological value and fragmented nature, **Conifer Plantation (WD4) is not considered a key ecological receptor.**

EIAR 13.3.1.3.14 Buildings and Artificial Surfaces/Amenity Grassland (BL3/GA2)

Small areas of this habitat were scattered throughout the Gathabawn Windfarm; these included south of the Ballylehaun construction works area and adjacent to the Ballylehaun-Ballyring Underground Cabling. The total area of this habitat is 0.1ha within the 50m windfarm study area, and 0.92ha within the candidate grid connection study area.

Due to its low ecological value and fragmented nature, **Buildings and Artificial Surfaces/Amenity Grassland (BL3/GA2) is not considered a key ecological receptor.**

EIAR 13.3.1.3.15 Exposed Calcareous Rock (ER2)

This category is used for all natural and artificial exposures of calcareous bedrock and loose rock, and any other exposures of basic rock, with the exception of unstable scree and areas of rocky coastline. It occurs in upland and lowland areas and can include inland cliffs and crags, limestone pavement, and rock surfaces that are exposed by excavation (Fossitt, 2000). This habitat was recorded in one area adjacent to site roads between T4 and T5 within the Ballylehaun Area. The surrounding vegetation was consistent with the surrounding improved agricultural grassland with the addition of Hawthorn. The total area of this habitat is 0.16ha within the 50m windfarm study area.

Due to the high ecological value of this habitat for species such as Common Lizard, **Exposed Calcareous Rock (ER2) is considered a key ecological receptor.**

EIAR 13.3.1.3.16 Ornamental/Non-native Shrub (WS3)

This category should be used for areas that are dominated by ornamental and non-native shrubs. Most of these originate from planting and can be found in formal beds and borders in gardens, parks and other landscaped areas. It also includes areas where non-native shrubs have escaped and become naturalised in urban and rural situations (Fossitt, 2000). This habitat was recorded adjacent to existing roads south of T8 within the Ballyring Area. The total area of this habitat is 0.10ha within the 50m windfarm study area.

Due to its low ecological value, **Ornamental/Non-native Shrub (WS3) is not considered a key ecological receptor.**

EIAR 13.3.1.3.17 Spoil and Bare Ground (ED2)

This habitat includes heaps of spoil and rubble, and other areas of bare ground that are either very transient in nature or persist for longer periods of time because of ongoing disturbance or maintenance. Spoil is generally associated with the excavation or construction of roads and buildings, or with drainage and dredging activities. Once the disturbance ends, spoil is readily colonised by plants (Fossitt, 2000). This habitat was predominantly recorded within existing road and farm tracks within the Ballyring Area. The total area of

this habitat is 1.13ha within the 50m windfarm study area, and 3.68ha within the candidate grid connection study area.

Due to the low ecological value of this habitat, **Spoil and Bare Ground (ED2) is not considered a key ecological receptor.**

EIAR 13.3.1.3.18 Refuse and Other Waste (ED5)

This category is used for any areas where domestic, industrial, agricultural and other waste is stored, treated or disposed. It includes rubbish dumps, tip heads, landfill sites, sewage plants, slurry pits and heaps of manure or spent mushroom compost (Fossitt, 2000). This habitat was recorded within the construction compound within the Ballyring Area. The total area of this habitat is 0.13ha within the 50m study areas for the windfarm and candidate grid connection at the Ballyring Area.

Due to the low ecological value of this habitat, **Refuse and Other Waste (ED5) is not considered a key ecological receptor.**

EIAR 13.3.1.3.19 Stone Walls and Other Stonework (BL1)

This category incorporates stone walls and most other built stone structures in rural and urban situations, apart from intact buildings and coastal constructions made of stone. It includes dry stone and old mortar walls that occur as field or property boundaries (Fossitt, 2000). This habitat was recorded within the construction works area north of T4 within the Ballylehaun Area and adjacent to existing roads along the Ballylehaun-Ballyring Underground Cabling. The total length of this habitat is 1,921m within the 50m windfarm study area, and 571 within the candidate grid connection study area.

Due to the high ecological value of the habitat and potential loss during construction works, **Stone Walls and Other Stonework (BL1) is considered a key ecological receptor.**

EIAR 13.3.1.3.20 Hedgerow/Treelines (WL1/WL2)

This habitat was recorded within the construction works area north of T6 within the Ballylehaun Area. The total length of this habitat is 51m within the 50m windfarm study area.

Due to the high ecological value of the habitat and potential loss during construction works, **Hedgerow/Treelines (WL1/WL2) is considered a key ecological receptor.**

EIAR 13.3.1.3.21 Treelines/Stone Walls and Other Stonework (WL2/BL1)

This habitat was recorded within the Ballylehaun Area, partially located within the construction works area associated with T7. The total length of this habitat is 210m within the 50m windfarm study area.

Due to the high ecological value of the habitat and potential loss during construction works, **Treelines/Stone Walls and Other Stonework (WL2/BL1) is considered a key ecological receptor.**

EIAR 13.3.1.3.22 Stone Walls and Other Stonework/Hedgerow (BL1/WL1)

This habitat was recorded adjacent to existing roads along the Ballylehaun-Ballyring Underground Cabling. The total length of this habitat is 93m within the 50m windfarm study area.

Due to the high ecological value of the habitat and potential loss during construction works, **Stone Walls and Other Stonework/Hedgerows (BL1/WL1) is considered a key ecological receptor.**

EIAR 13.3.1.3.23 Drainage Ditches (FW4)

This category includes linear water bodies or wet channels that are entirely artificial in origin, and some sections of natural watercourses that have been excavated or modified to enhance drainage and control the flow of water (Fossitt, 2000). This habitat was recorded adjacent to the Ballylehaun-Ballyring Cable Link. This

habitat was also recorded intercepting the hardcore areas associated with T11 and adjacent to existing roads within the Ballyring Area. The total length of this habitat is 860m within the 50m windfarm study area, and 968m within the candidate grid connection study area.

Due to the high ecological value of the habitat and potential loss during construction works, **Drainage Ditches (FW4) are considered a key ecological receptor.**

EIAR 13.3.1.4 Occurrence of Flora Protection Order Species

Plant species included on the Flora (Protection) Order (FPO) include vascular plants, mosses, liverworts, stone worts and lichens.

Fieldwork Results: No FPO 2022 (FPO) species are present within, or in proximity to, construction works areas.

No orchid-rich habitats are present within the area of the construction works, operational works or the decommissioning works areas associated with the Proposed Gathabawn Windfarm.

The Proposed Gathbawn Windfarm is directly adjacent to the Cullahill Mountain SAC, which is mapped as orchid-rich Annex I habitat with indicator target species such as Mountain Everlasting, Spring Sedge, Fairy Flax, Carline Thistle and Quaking-grass and a variety of orchids, including Early Purple Orchid, Frog Orchid, Common Spotted-orchid, Common Twayblade and Greater Butterfly Orchid (NPWS, 2021).

Desktop Research Results: The Proposed Gathabawn Windfarm is located in OS grid squares S36 and S37, while the Candidate Gathabawn Grid Connection is located in OS grid squares S36, S37, S46 and S47.. Endangered plant species historically recorded within the Grid Squares include: Opposite-leaved Pondweed (*Groenlandia densa*) in S37, and Betony (*Stachys officinalis*) in S46.

Due to the suitable habitat within the Gathabawn Windfarm site boundary (Dry Calcareous and Neutral Grassland (GS1)) for this species, **FPO Species are considered a key ecological receptor.** FPO Species are assessed in the impact evaluation section herein.

EIAR 13.3.1.5 Other Plant species

EIAR 13.3.1.5.1 Occurrence of Devil's Bit Scabious (Larval food plant for Marsh Fritillary butterfly)

Devil's-bit Scabious (*Succisa pratensis*), the larval food plant of the Marsh Fritillary butterfly and therefore vital for the species. Devil's-bit Scabious was recorded 18 times in the OS grid squares S36 and S37 (most recently in 2025 in S37) and 6 times in S47 (most recently in 2025).

Field Survey results: Host plant was recorded within the site boundary prior to 2023. Site visits in August and September 2026 yielded records of Devil's-Bit Scabious within the study area, but only c.5 individual plants were identified. The occasional individual plant is present within the Cullahill mountain SAC. However, no heavy swards are present.

EIAR 13.3.1.5.2 Occurrence of Invasive Species

Only "High Impact Invasive Species" (Regulation S.I. 374/2024) are discussed in this section as lower impact invasive species are not expected to cause significant negative impacts on local biodiversity; for full list of invasive species records see Appendix 13.3.

Within the 10km squares S36 and S37, four High Impact Invasive Species plants are recorded: Rhododendron (*Rhododendron ponticum*), Giant Hogweed (*Heracleum mantegazzianum*), Japanese Knotweed (*Fallopia japonica*), and Bohemian Knotweed (*Fallopia japonica* x *sachalinensis* = F. x *bohemica*).

Within squares S46 and S47, five High Impact Invasive Species plants are recorded: Canadian Waterweed (*Elodea canadensis*), Cherry Laurel (*Prunus laurocerasus*), Giant Hogweed, Himalayan Balsam (*Impatiens glandulifera*), Japanese Knotweed.

There were two records of Japanese Knotweed gathered during habitat surveys of the Gathabawn Windfarm site in 2022 and 2026 (near an access track to turbine 12). No other invasive species were observed or recorded within the Study Area**,**

EIAR 13.3.1.6 Terrestrial Habitats along the Candidate Gathabawn Grid Connection

The Candidate Gathabawn Grid Connection will traverse across existing agricultural fields and along local roads between the Ballylehaun and Ballyring sites, crossing five minor rivers before joining the public road network at the junction of Parksgrove Road with the N77. The underground cabling will cross the N77 underground via HDD works and will involve installing underground cabling along the N77 before crossing under the River Nore via HDD works. As a result, habitat loss along this route is limited to the terrestrial habitats along the construction works area. None of these areas will experience permanent loss as a result of the Candidate Gathabawn Grid Connection works, with the exception of the area of the Parksgrove Substation, which will involve permanent hardcore works.

Table 13.3-7: Total habitat areas within the Ballylehaun – Ballyring UGC.

Ballylehaun – Ballyring UGC Baseline			
Fossitt Habitat Code	**Habitat Description**	**Area ha (construction works area)**	**Area ha (50m buffer)**
BL3	Buildings and Artificial Surfaces	1.70	4
GA1	Improved Agricultural Grassland	0.46	33.91
GS4/WS1	Wet Grassland/Scrub	0.05	1.34
WD4	Conifer Plantation	0.02	0.45
GS2	Dry Meadows and Grassy Verges	0.01	0.08
GA2	Amenity Grassland (Improved)	0.01	0.65
WL1	Hedgerows	0.01	0.21
BL3/GA2	Buildings and Artificial Surfaces/Amenity Grassland (Improved)	<0.01	0.32
WD1	Mixed Broadleaved Woodland	<0.01	0.21
ED2	Spoil and Bare Ground	<0.01	<0.01
Ballylehaun – Ballyring UGC Linear habitats			
Fossitt Habitat Code	**Habitat Description**	**Length (m) (construction works area)**	**Length (m) (50m buffer)**
WL1	Hedgerows	1,433	9,022
FW4	Drainage Ditches	9	863
GS2	Dry Meadows and Grassy Verges	4	71
FW1	Eroding/Upland Rivers	0	210
BL1/WL1	Stone Walls and other Stonework/Hedgerows	0	5

Table 13.3-8: Total habitat areas within the Ballyring – Parksgrove UGC.

Ballyring – Parksgrove UGC Baseline			
Fossitt Habitat Code	**Habitat Description**	**Area ha (construction works area)**	**Area ha (50m buffer)**
BC1	Arable Crops	0.508	2.793

BL3	Buildings and artificial surfaces	0.182	1.337
BL3/GA2	Buildings and artificial surfaces/Amenity (Improved) Grassland	0	0.182
ED2	Spoil and Bare Ground	0.738	0.842
ED3	Recolonising Bare Ground	0.981	2.054
FW1	Upland/Eroding Rivers	0.039	0.299
FW2	Lowland/Depositing Rivers	0	0.033
GA1	Improved Agricultural Grassland	7.614	76.054
GS2	Dry Meadow and Grassy Verges	0	0.196
WD1	(Mixed) Broadleaf Woodland	0.725	4.091
Ballyring – Parksgrove UGC Linear habitats			
Fossitt Habitat Code	**Habitat Description**	**Length (m) (construction works area)**	**Length (m) (50m buffer)**
BL1	Stone Walls and Other Stonework	30	233
FW1	Upland/Eroding Rivers	59	524
WL1	Hedgerow	1,644	4,739
WL2	Treeline	1,097	4,784

Table 13.3-9: Total habitat areas within the Parksgrove – Moatpark UGC.

Parksgrove – Moatpark UGC Baseline			
Fossitt Habitat Code	**Habitat Description**	**Area ha (construction works area)**	**Area ha (50m buffer)**
BL3	Buildings and artificial surfaces	1.019	3.417
BL3/GA2	Buildings and artificial surfaces/Amenity (Improved) Grassland	0.001	0.364
ED2	Spoil and Bare Ground	0.005	0.006
FW2	Lowland/Depositing Rivers	0.09	1.375
GA1	Improved Agricultural Grassland	2.995	13.398
GS2	Dry Meadow and Grassy Verges	0.537	1.585
WD1	(Mixed) Broadleaf Woodland	0.141	0.386
WD4	Conifer Woodland	0	0.351
Parksgrove – Moatpark UGC Linear habitats			
Fossitt Habitat Code	**Habitat Description**	**Length (m) (construction works area)**	**Length (m) (50m buffer)**
BL1	Stone Walls and Other Stonework	0	39
BL3	Buildings and artificial surfaces	0	275
WL1	Hedgerow	115	485
WL2	Treeline	627	2,394

The habitats have limited value to sensitive ecological receptors. Certain habitats, such as the Hedgerow and Treeline are at risk of significant effect due to the extent of works along the construction work area for the Candidate Gathabawn Grid Connection.

EIAR 13.3.1.6.1 Most Prevalent Habitat Types

The majority of the study area (82.7%) is comprised of two habitat area types: the dominant habitat present is Improved Agricultural Grassland (GA1; 68%), followed by Buildings and Artificial Surfaces (BL3; 7.7%). Hedgerow (WL1; 49.2%) and Treelines (WL2; 48.26%) make up the majority of the linear habitats present within the study area. Upland/Eroding Rivers are present along the Ballylehaun – Ballyring UGC and Ballyring – Parksgrove UGC, and Lowland/Depositing River is present along the Parksgrove – Moatpark UGC.

These habitats are described below.

EIAR 13.3.1.6.1.1 Improved Agricultural Grassland (GA1)

This habitat is intensively managed, or highly modified agricultural grassland that has been reseeded and/or regularly fertilised and is now heavily grazed and/or used for silage making (Fossitt, 2000). This habitat was recorded throughout the Ballyring – Parksgrove UGC (7.614ha) and the Parksgrove – Moatpark UGC (2.995ha).

Due to the low ecological value of this habitat and widespread nature across the locale, **Improved Agricultural Grassland (GA1) is <u>not</u> considered a key ecological receptor.**

EIAR 13.3.1.6.1.2 Buildings and Artificial Surfaces (BL3)

Buildings and Artificial Surfaces habitat includes areas of built land, such as buildings, and areas of land covered by artificial surfaces, such as concrete, tarmac, bricks and blocks. This includes general public roads and private roads that serve part of the existing farm and forestry access routes (Fossitt, 2000). This habitat occurs throughout the Whole Gathabawn Windfarm Project, predominantly occurring as existing roads connecting along the Parksgrove Road and N77. The total area of this habitat is 1.701ha within the 50m study area. Of this area, only 0.183ha sits within the construction works area boundary of the Candidate Gathabawn Grid Connection.

Due to the low ecological value of this habitat, **Buildings and Artificial Surfaces (BL3) are <u>not</u> considered a key ecological receptor.**

EIAR 13.3.1.6.1.3 Hedgerow (WL1)

Hedgerows are linear strips of shrubs, often with occasional trees, that typically form field or property boundaries. Most hedgerows originate from planting, and many occur on raised banks of earth that are derived from the excavation of associated drainage ditches. Linear strips of low scrub are included in this category if they occur as field boundaries (Fossitt, 2000). Hedgerow habitat was recorded predominantly adjacent to existing roads along the Ballyring – Parksgrove UGC. The total length of this habitat is 4,739m within the 50m study area, with 1,644m within the construction works area boundary. The Parksgrove – Moatpark UGC contains only 485m within the 50m Study Area and 115m within the construction works area boundary.

Due to the high ecological value of the habitat and potential loss during construction works, **Hedgerow (WL1) is considered a key ecological receptor.**

EIAR 13.3.1.6.1.4 Treelines (WL2)

A treeline is a narrow row or single line of trees that is greater than 5 m in height and typically occurs along field or property boundaries. This category includes tree-lined roads or avenues, narrow shelter belts with no more than a single line of trees, and overgrown hedgerows that are dominated by trees. Most treelines are planted, and trees are often regularly spaced (Fossitt, 2000). This habitat was recorded adjacent to hardcore areas along the Ballylehaun section of the Ballylehaun – Ballyring UGC and spread across the Ballyring – Parksgrove UGC. Species recorded include Ash, Holly, Beech, Sycamore, Willow and Rowan. The total length

of this habitat is 4,784m within the 50m study area of the Ballyring – Parksgrove UGC, and 1,097m within the construction works area boundary. The Parksgrove – Moatpark UGC has 2,394m within the 50m study area, and 627m within the construction works area boundary.

Due to the high ecological value of the habitat and potential loss during construction works, **Treelines (WL2) is considered a key ecological receptor.**

EIAR 13.3.1.6.2 Other noteworthy habitats

EIAR 13.3.1.6.2.1 Upland/Eroding Rivers

This habitat is found in the headwaters of rivers and in the upper levels of hills and mountains. This habitat is crossed by the Ballylehaun – Ballyring UGC and the Ballyring – Parksgrove UGC at two and three locations, respectively. Two of these watercourses along the Ballyring – Parksgrove UGC are of Local Importance (Higher Value) for fisheries and macroinvertebrates, with historical records supporting the presence of Otter.

Due to their value to aquatic receptors and Otter, and potential loss during construction works, **Upland/Eroding Rivers (FW1) is considered a key ecological receptor**.

EIAR 13.3.1.6.2.2 Lowland/Depositing Rivers

This habitat is found across Ireland in the lower areas of valleys and consists of well-established rivers with varying levels of sediment deposition. This habitat is crossed by the Parksgrove – Moatpark UGC underneath the River Nore. This river is part of the River Barrow and River Nore SAC and the River Nore SPA. As such, this river habitat is relevant to all mobile QI species and mapped QI habitat areas for the SAC and for the sole SCI bird species (Kingfisher).

Due to this habitat's relevance to two European sites, and the potential for habitat degradation as a result of the HDD crossing works, **Lowland/Depositing Rivers (FW2) is considered a key ecological receptor**.

EIAR 13.3.1.6.2.3 (Mixed) Broadleaf Woodland

This habitat is present at two locations. Adjacent to the Parksgrove Substation (0.37ha) and along the Ballyring – Parksgrove UGC route (4.09ha). The area along the Ballyring – Parksgrove UGC is a narrow woodland (30m-85m in width) that will be looped around to avoid impacting any mature trees or fragmenting the habitat.

Due to this habitat's relevance to terrestrial mammals, invertebrates and bird species, and the potential for habitat degradation due to root system damage or dust release as a result of cabling works, **(Mixed) Broadleaf Woodland (WD1) is considered a key ecological receptor**.

EIAR 13.3.1.6.2.3.1 Occurrence of Flora Protection Order Species

Plant species included on the Flora (Protection) Order (FPO) include vascular plants, mosses, liverworts, stoneworts and lichens.

Fieldwork Results: No FPO 2022 (FPO) species are present within, or in proximity to, construction works areas.

No orchid-rich habitats are present within the area of the construction works, operational works or the decommissioning works areas of the Ballyring – Moatpark UGC.

The Ballylehaun – Ballyring UGC is directly adjacent to the Cullahill Mountain SAC, which is mapped as orchid-rich Annex I habitat with indicator target species such as Mountain Everlasting, Spring Sedge, Fairy Flax, Carline Thistle and Quaking-grass and a variety of orchids, including Early Purple Orchid, Frog Orchid, Common Spotted-orchid, Common Twayblade and Greater Butterfly Orchid (NPWS, 2021).

EIAR 13.3.1.7 Existing Sources of Impacts on Terrestrial Habitats

Although no existing pollution or damage to Terrestrial Habitats is taking place at the Gathabawn Windfarm site or along the Grid Connection UGC routes, it is noted that agriculture is the primary land use in the area and is considered to have low ecological value and to have influenced the composition and extent of Terrestrial Habitats within both the study area and the wider surrounding area.

The Parksgrove – Moatpark UGC habitats are experiencing pollution-related impacts from the Ballyragget village, the Tirlán Ballyragget waste treatment and the general agricultural run-off, all entering the River Nore at different points. As such, cumulative contributions of these sources and other grid crossing works are relevant to this habitat at a baseline level.

Within the Study Area, high-impact invasive species were recorded during habitat surveys at Ballyring (Japanese Knotweed). As such, due to the presence of invasive species at Ballyring, the spread of invasive species at the Gathabawn Windfarm site and along the Candidate Gathabawn Grid Connection cannot be ruled out where the same vehicles are being used for construction works from Ballyring to Ballylehaun and from Ballyring to the works along the Ballyring – Moatpark UGC. As such, Invasive species are considered for impacts on habitat along the Candidate Gathabawn Grid Connection.

EIAR 13.3.2 Context and Characteristics of INVERTEBRATES

The Proposed Gathabawn Windfarm is located in OS grid squares S36 and S37, while the Candidate Gathabawn Grid Connection is located in OS grid squares S36, S37, S46 and S47.

EIAR 13.3.2.1 Marsh Fritillary

Survey effort: Marsh Fritillary suitability and larval web surveys were carried out in August and September 2025 and during September 2026 at the Gathabawn Windfarm site. Butterfly transect surveys were previously also completed in September 2021 at the windfarm site.

Occurrence of Suitable Habitat: Devil's-bit Scabious (*Succisa pratensis*), the larval food plant and therefore vital for the species, is present rarely within the study area. Devil's-bit Scabious was recorded 18 times in the OS grid squares S36 and S37 (most recently in 2025 in S37) and 6 times in S47 (most recently in 2025). The habitats within the proposed windfarm site and along the candidate grid connection include improved agricultural grassland (GA1) habitats and are considered be of Negligible value to Marsh Fritillary, with habitats of Local Importance (Lower value) in the wider area.

Presence of Species - Fieldwork Results: While patches of Devil's Bit Scabious was recorded infrequently during Marsh Fritillary surveys in 2026, no Marsh Fritillary colonies were recorded within the windfarm study area during surveys carried out in 2025 or 2026. Similarly, no Marsh Fritillary were recorded during surveys in 2021. Surveys of the habitat within the adjacent Cullahill Mountain SAC at the Ballylehaun Area does have patches of suitable habitat (i.e. abundant Devils-bit Scabious) and records of larval webs from efforts in 2021 and 2022, with 2023 records of larvae and adults in the north of the SAC recorded on the NBDC. However, follow-up surveys in 2025 and 2026 have yielded no suitable patches of this species' host plant (5 individual plants scattered across large fields) or larval webs. Due to the extent of improved agricultural grassland habitat and public road corridor along the candidate grid connection route, it is considered that there is not suitable habitat to support successful reproduction of Marsh Fritillary within the ecological baseline.

Presence of Species – Desktop Results: 20 sightings of Marsh Fritillary are recorded in the NBDC OS grid square S37, with the most recent sighting from 2023. There are 16 records of Marsh Fritillary in OS grid square S47, most recently recorded in 2023.

Key Biodiversity Receptor Scoping: Despite the absence of suitable habitat, due to records of species' host plant during field surveys in the proposed Gathabawn Windfarm site and the wider area, **Marsh Fritillary is considered a key ecological receptor** under the precautionary principle.

EIAR 13.3.2.2 Existing Sources of Impacts to Marsh Fritillary

No existing pollution or damage to Marsh Fritillary is taking place at the Gathabawn Windfarm site.

EIAR 13.3.3 Context and Characteristics of AMPHIBIANS & REPTILES

The Proposed Gathabawn Windfarm is located in OS grid squares S36 and S37, while the Candidate Gathabawn Grid Connection is located in OS grid squares S36, S37, S46 and S47.

EIAR 13.3.3.1 Smooth Newt, Common Frog, Common Lizard

Smooth Newt (*Lissotriton vulgaris)* is the only native species of tailed amphibian found in Ireland. Records of Palmate Newt (*Lissotriton helveticus*) have been recorded in the Southern Counties and are expanding their territory exponentially since being recorded in Co. Cork 2024. While commonly encountered near water bodies, adult newts are terrestrial, only returning to water bodies to breed. They tend to prefer habitats that offer protection from desiccation, such as long grass, woodland, and scrubland. Newts will over-winter in woodpiles or rotting logs, which offer them some protection from the elements.

Common Lizard *(Zootoca vivipara*) is widespread throughout Ireland. Common Lizard requires good habitat structure with open patches for basking and foraging and areas of cover for protection from predators (Beebee & Griffiths, 2000). They feed on a wide range of invertebrates (King *et al.* 2011).

Common Frog (*Rana temporaria*) is one of only three amphibians found in Ireland. It is a widespread and abundant species occurring in a broad range of habitats throughout the country. Adults congregate to spawn in ponds and ditches in the spring, with young froglets emerging onto land in early summer. These froglets spend 2-3 years on land, feeding on terrestrial invertebrates, before returning to freshwater to breed.

Survey effort: Reptile surveys were conducted in June, July, August and September 2025, with Reptile Mat Deployment surveys undertaken in May 2025 at the windfarm site. Amphibian surveys were conducted in April and May 2025 at the windfarm site and along the candidate grid connection.

Occurrence of Suitable Habitat: The majority of the proposed Gathabawn Windfarm site consists of highly modified habitat of improved agricultural grassland, limiting its potential suitability for Smooth Newt, Common Frog and Common Lizard. As a consequence, while suitable habitat does exist for Smooth Newt (woodland, scrubland, woodpiles, rotting logs), and for Common Frog (scrub and drains), this habitat is not extensive and tends to occur in isolated patches within the much more extensive areas of less suitable habitat (i.e. improved agricultural grassland). However, suitable spawning habitat for amphibian species was recorded in the wider area of the proposed Gathabawn Windfarm (e.g. pond located c.60m west of the proposed Gathabawn Windfarm at the Ballyring Area where Smooth Newt was recorded). High suitability habitat for Common Lizard (exposed rock, stone walls) was also recorded within the proposed Gathabawn Windfarm during reptile surveys.

Presence of Species – Fieldwork Results: A total of 12 adult Smooth Newts were recorded in a quarry c.60m west of the proposed Gathabawn Windfarm at the Ballyring Area; both males and females were recorded during the survey efforts. No Common Frogs were recorded during amphibian surveys. No Common Lizards were recorded during reptile surveys.

Presence of Species – Desktop Research Results: Common Frog was recorded 2 times in OS grid square S37 (most recently in 2019) and 14 times in squares S46 and S47 (most recently in 2014 in S46). Smooth Newt has been recorded 2 times in OS grid squares S46 and S47 (most recently in 2014 in S47). There are no records of Common Lizard in the OS grid squares S36, S37, S46 or S47.

Key Biodiversity Receptor Scoping: Due to the occurrence of desk study records for both Common Frog and Smooth Newt, the confirmed sightings of Smooth Newt within a small quarry adjacent to the Ballyring Area,

and the availability of suitable habitat within the study area, **Smooth Newt and Common Frog are considered to be key ecological receptors**.

Due to the presence of suitable habitat and elusive nature of the species, **Common Lizard is considered to be a key ecological receptor**.

The location of records of Amphibians and Reptiles during fieldwork surveys are illustrated on Figure 13.2: Invertebrates, Amphibians and Reptiles *(included at the end of this chapter)*.

EIAR 13.3.3.2 Existing Sources of Impacts to Amphibians & Reptiles

There are sources present contributing to the existing pollution or damage to suitable habitat for amphibians and reptiles at the Gathabawn Windfarm site. Primarily, the fields are actively under agricultural use for cattle livestock. Run-off from silage and livestock faeces is associated with a reduction in water quality due to the release of excess nutrients.

EIAR 13.3.4 Context and Characteristics of TERRESTRIAL MAMMALS

The principal habitats within the context of Terrestrial Mammals include improved agricultural grassland which provides potential foraging habitat, and forestry, hedgerows and scrub which also provide foraging habitat as well as shelter and locations for breeding and resting.

The Proposed Gathabawn Windfarm is located in OS grid squares S36 and S37, while the Candidate Gathabawn Grid Connection is located in OS grid squares S36, S37, S46 and S47.

The location of records of Terrestrial Mammals during fieldwork surveys are illustrated on Figure 13.3: Terrestrial Mammals *(included at the end of this chapter)*.

EIAR 13.3.4.1 Otter (*Lutra lutra*)

Survey effort: Mammal surveys were undertaken in April, July and September 2025 for the presence of Otter and other mammals, with dedicated Otter surveys undertaken in April, July, September 2025 and September 2026.

Occurrence of Suitable Habitat: There was no occurrence of suitable habitat for Otter within the Gathabawn Windfarm site. The facilitating works at FW8 and FW9 have intermediate suitability for Otter at the bridges adjacent to these works. Within the wider area around the site, suitable habitats of greater value to Otter occurs – i.e. larger streams and rivers, including the River Nore to the east of the Gathabawn Windfarm site – where Good suitability for Otter was also noted at Aquatic Survey site (C6 with high foraging suitability recorded on the Nuenna River (B5 and B6), which provided high cover and abundant food resources.).

Presence of Species - Fieldwork Results: Aquatic surveys in July 2025 recorded an Otter latrine on the Nuenna River at site B6 and Otter spraint sites on the Lisdowney Stream (site C4). An Otter spraint site was also recorded upstream of the Coolnacrutta Stream site (A2) c.800m from the closest windfarm construction works in the Ballylehaun Area. Two Otter spraints (ITM: 644282.43, 673384.19; ITM 644440.86, 672912.35) were recorded on the River Nore as incidental sightings during a Watercourse Survey in May 2025. An Otter Holt/Couch was recorded near these spraint locations. These records were recorded c.1.3km north of the Candidate Gathabawn Grid Connection crossing of the River Nore.
Older surveys at the windfarm site recorded secondary evidence of Otter (spraints, scats and burrows) in 2021 within the Gorteennamuck stream and Gorteenahilla River as well.

Presence of Species - Desktop Research Results: Sightings of Otter are recorded 9 times in the NBDC OS grid squares S36 and S37 (most recently in 2018 in S37), and 10 times in S46 and S47 (most recently in 2015 in S47). Contemporary Annex II Otter records were widespread throughout the respective grid squares, with records available for the Coolnacrutta Stream, River Goul, Gorteenahilla River, Nuenna River, Lisdowney Stream and River Nore (NPWS Protected species Map viewer; 2005-2023 data). The River Barrow and River Nore SAC list Otter as a QI which is crossed by the Candidate Gathabawn Windfarm Grid Connection.

Key Biodiversity Receptor Scoping: Due to the occurrence of suitable habitat downstream of the Gathabawn Windfarm, confirmed secondary evidence recorded in hydrologically connected watercourses, and the wide commuting nature of the species (13.2km ± 5.3km; Reid *et al.*, 2025), **Otter is considered a key ecological receptor**

EIAR 13.3.4.2 Badger (*Meles meles*)

Survey effort: General mammal walkover surveys were undertaken in April, July and September 2025 for the presence of Badgers and other mammals; i.e. well-used pathways, prints/tracks, scat/spraints/droppings, signs of feeding (foraged pine cones, Badger snuffle holes) and places of shelter and features or areas likely

to be of particular value as foraging resources (NRA, 2005), with dedicated Badger surveys undertaken in April and September 2025. Camera Trap surveys were undertaken at the windfarm site in April and September 2025.

Occurrence of Suitable Habitat: The habitats within the study area included improved agricultural grassland (GA1), hedgerow (WL1) and scrub (WS1) habitats and are considered to be of Local Importance (Higher value) to Badger, with habitats of similar Local Importance (Higher value) in the wider area.

Presence of Species - Fieldwork Results: Evidence of the presence of Badger was identified during the Badger survey. Secondary Badger sightings in the form of snuffle holes were recorded east of the Ballylehaun section, the closest sighting of which was recorded c.20m from the construction works area at T2. Multiple Badger paths were recorded leading into dense scrub adjacent to the Cullahill Mountain SAC. An incidental sighting of Badger was also recorded along the site access road to T12 at Ballyring during bat transect surveys in May 2025.

Badger was also recorded at 3 no. camera trap locations in 2025; a total of 9 individuals were recorded. Six of these sightings were recorded within the biodiversity enhancement area footprint, adjacent to T4, with the remaining sightings on the site access road to T2 and near the T7 hardstand. A possible badger sett is present within 100m of the T5 hardstand works but is unlikely to be an active maternity sett based on the limited activity recorded nearby and the soil depth present.

Presence of Species - Desktop Research Results: Badger are recorded 238 times in the NBDC OS grid squares S36 (most recently in 2018 in S37), and 218 times in S46 and S47 (most recently in 2016 in S47).

Key Biodiversity Receptor Scoping: Due to the sightings of Badger during camera trap surveys, secondary evidence (snuffle holes, paths), occurrence of suitable habitat and the 456 records of the species in the wider area, **Badger is considered a key ecological receptor.**

EIAR 13.3.4.3 Irish Hare (*Lepus timidus hibernicus*)

Survey effort: General mammal walkover surveys (NRA, 2005) were undertaken in April, July and September 2025 for the presence of mammals, including Irish Hare. Camera Trap surveys were undertaken at the windfarm site in April and September 2025.

Occurrence of Suitable Habitat: Improved agricultural grasslands (GA1) occur extensively within the Gathabawn Windfarm site. The habitats within the Gathabawn Windfarm and Candidate Gathabawn Grid Connection are considered to be of Local Importance (Lower value) to Irish Hare, with grassland habitats considered to be Local Importance (Lower value), in the wider area.

Presence of Species - Fieldwork Results: A total of 9 sightings of Irish Hare were recorded during camera trap surveys in 2025; all sightings were recorded within the Biodiversity Enhancement Area at Ballylehaun.

Presence of Species - Desktop Research Results: Irish Hare are recorded 14 times in the NBDC OS grid squares S36 and S37 (most recently in 2021 in S36), and 6 times in S46 and S47 (most recently in 2021 in S47).

Key Biodiversity Receptor Scoping: Due to the availability of high suitability habitat within the Gathabawn Windfarm, and the high records of the species in the study area, **Irish Hare is considered a key ecological receptor.**

EIAR 13.3.4.4 Pine Marten (*Martes martes*)

Survey effort: General mammal walkover surveys (NRA, 2005) were undertaken in April, July and September 2025 for the presence of mammals, including Pine Marten. Camera Trap surveys were undertaken at the windfarm site in April and September 2025.

Occurrence of Suitable Habitat: Suitable habitat exists within the study area and wider area for Pine Marten, including areas of scrub (WS1). The habitats at the Gathabawn Windfarm are considered to be of Local Importance (Higher value) to Pine Marten, with habitats of similar Local Importance (Higher value) in the wider area.

Presence of Species - Fieldwork Results: No sightings or evidence of Pine Marten were recorded during survey efforts in 2025.

Presence of Species - Desktop Research Results: Pine Marten are recorded 8 times in the NBDC OS grid squares S36 and S37 (most recently in 2021 in S37), and 15 times in S46 and S47 (most recently in 2021)

Key Biodiversity Receptor Scoping: Due to the suitable habitat in proximity to the Ballylehaun site, despite the absence of sightings during surveys and low records of species in the study area, **Pine Marten is considered a key ecological receptor** under the precautionary principle.

EIAR 13.3.4.5 Irish Stoat (*Mustela erminea hibernica*)

Survey effort: General mammal walkover surveys (NRA, 2005) were undertaken in April, July and September 2025 for the presence of mammals, including Irish Stoat. Camera Trap surveys were undertaken at the windfarm site in April and September 2025.

Occurrence of Suitable Habitat: Suitable habitat within the study area and wider area comprises hedgerows (WL1) and stone walls and other stonework (BL1). The habitats at the Gathabawn Windfarm are considered to be of Local Importance (Higher value) to Irish Stoat, with habitats of similar Local Importance (Higher value) in the wider area.

Presence of Species - Fieldwork Results: No sightings or evidence of Irish Stoat was recorded during survey efforts in 2025.

Presence of Species - Desktop Research Results: Irish Stoat are recorded 5 times in the NBDC OS grid squares S36 and S37 (most recently in 2020 in S37), and 5 times in S46 and S47 (most recently in 2023).

Key Biodiversity Receptor Scoping: Due to the low desk study records and absence of sightings within the Gathabawn Windfarm, **Irish Stoat is not considered a key ecological receptor.**

EIAR 13.3.4.6 Red Squirrel (*Sciurus vulgaris*)

Survey effort: General mammal walkover surveys (NRA, 2005) were undertaken in April, July and September 2025 for the presence of mammals, including Red Squirrel. Camera Trap surveys were undertaken at the windfarm site in April and September 2025.

Occurrence of Suitable Habitat: Limited suitable woodland habitat, such as oak-ash-hazel woodland (WN2) was recorded adjacent to the road-upgraded farm track between T2 and T3. Two large sections of Mixed Broadleaved Woodland (WD1) were recorded in the Ballylehaun section, east of T2, partially within the Cullahill Mountain SAC, and within the footprint of the biodiversity enhancement area. One section of Mixed Broadleaved Woodland (WD1) and Conifer Plantation (WD4) were both recorded adjacent to the Ballylehaun-Ballyring UGC element of the Candidate Gathabawn Grid Connection.

These habitats (WN2 and WD1) at the Gathabawn Windfarm are considered to be of Local Importance (Higher Value) to Red Squirrel. Conifer plantation (WD4) is considered to be of Local Importance (Lower Value).

Presence of Species - Fieldwork Results: No sightings or evidence of Red Squirrel were recorded during survey efforts in 2025.

Presence of Species - Desktop Research Results: Red Squirrel are recorded 19 times in the NBDC OS grid squares S36 and S37 (most recently in 2016 in S36), and 11 times in S46 (most recently in 2023).

Key Biodiversity Receptor Scoping: Despite the low occurrence and fragmented nature of suitable habitat within the Gathabawn Windfarm, and the absence of sightings during surveys, there is suitable habitat to support a Red Squirrel population. As such, **Red Squirrel is considered a key ecological receptor** under the precautionary principle**.**

EIAR 13.3.4.7 Hedgehog (*Erinaceous europaeus*)

Survey effort: General mammal walkover surveys (NRA, 2005) were undertaken in April, July and September 2025 for the presence of mammals, including Hedgehog. Camera Trap surveys were undertaken at the windfarm site in April and September 2025.

Occurrence of Suitable Habitat: Suitable habitat for Hedgehogs exists at the border areas of scrub (WS1), open areas of improved agricultural grasslands (GA1) and hedgerows (WL1). The habitats at the Gathabawn Windfarm are considered to be of Local Importance (Higher value) to Hedgehog with habitats of similar, Local Importance (Higher value), in the wider area.

Presence of Species - Fieldwork Results: No sightings or secondary evidence of Hedgehog was recorded within the study area during mammal surveys.

Presence of Species - Desktop Research Results: Hedgehog are recorded 7 times in the NBDC OS grid squares S36 and S37 (most recently in 2025), and 33 times in S46 and S47 (most recently in 2025).

Key Biodiversity Receptor Scoping: Due to the generally unsuitable habitat, the low extent of desktop records and absence of sightings or secondary evidence being recorded during mammal walkover surveys within the Gathabawn Windfarm, **Hedgehog is not considered a key ecological receptor.**

EIAR 13.3.4.8 Other Mammals

Red Fox *(Vulpes vulpes)***:**

Foxes are highly adaptive mammals that can inhabit any type of land area, from woodland (e.g. WD4) to urban areas (e.g. BL3). Suitable habitat occurs throughout the Gathabawn Windfarm and the surrounding areas. Secondary evidence likely belonging to Red Fox (track) was identified during the field surveys, c. 15m from the construction works area associated with the site access road to T2 at the Ballylehaun Area. Three Red Fox individuals were also recorded at 2 no. camera trap locations in April and September 2025 at the Biodiversity Enhancement Area at the Ballylehaun Area.

A Red Fox carcass was recorded in 2024 north of the EirGrid Ballyragget Substation.

Red Fox are recorded 8 times in the NBDC OS grid squares S36 and S37 (most recently in 2023 in S37), and 9 times in S46 (most recently in 2018 in S46).

Due to its low ecological value, **Red Fox is not considered a key ecological receptor.**

Pygmy Shrew *(Sorex minutus):*

Suitable habitat occurs at the Gathabawn Windfarm and the surrounding areas, i.e. open improved agricultural grasslands (GA1) and hedgerows (WL1). No evidence of Pygmy Shrew was observed on the site.

There are no sightings of Pygmy Shrew within the OS grid squares within which the proposed Gathabawn Windfarm is located. Pygmy Shrew was recorded 3 times in S46 and S47 (most recently in 2012).

Due to the absence of sightings during mammal walkover surveys and low desktop records, **Pygmy Shrew is not considered a key ecological receptor.**

Field Mouse *(Apodemus sylvaticus):*

Suitable habitat occurs at the Gathabawn Windfarm and the surrounding areas, i.e. open improved agricultural grasslands (GA1), hedgerows (WL1). More limited suitable habitat such as oak-ash-hazel woodland (WN2) and mixed broadleaved woodland (WD1) occurs within Gathabawn Windfarm and the surrounding areas. No evidence of Field Mouse was observed on site since 2023.

Field Mouse are recorded 3 times in the NBDC OS grid squares S36 and S37 (most recently in 2012), and 2 times in S46 and S47 (most recently in 2012 in S47).

Due to the absence of sightings during mammal surveys and low numbers of desktop records, **Field Mouse is not considered a key ecological receptor.**

Red Deer *(Cervus elaphus)***:**

Suitable habitat occurs at the Gathabawn Windfarm and the surrounding areas, i.e. improved agricultural grasslands (GA1). No evidence of Red Deer was observed on the site.

Red Deer is recorded 1 time in the NBDC OS grid square S36 in 2011.

Due to the absence of sightings during mammal walkover surveys and low desktop records, **Red Deer is not considered a key ecological receptor.**

EIAR 13.3.4.9 Invasive Mammal Species

Brown Rat (*Rattus norvegicus*) was recorded once during camera trap surveys in September 2025, adjacent to the site access road to T2 at the Ballylehaun Area. No other invasive mammal species were recorded during mammal surveys.

High impact invasive species were recorded on the NBDC database in the vicinity of the proposed Gathabawn Windfarm. Fallow Deer (*Dama dama*) were recorded 3 times in OS grid square S36 (most recently from 1991). Brown Rat were recorded 2 times in S36 (most recently from 2013), and 3 times in S46 (most recently in 2013). American Mink (*Neovison vison*) were recorded 9 times in S36 and S37 (most recently from 2017 in S37), and 3 times in S46 (most recently in 2012 in S46). Grey Squirrel (*Sciurus carolinensis*) were recorded 5 times in S36 and S37 (most recently from 2012 in S36), and 11 times in S46 (most recently in 2017). None of these species are key ecological receptors. However, they are all considered as negative indicators for the key ecological receptors to fully consider impacts on species distributions within the ecological baseline.

EIAR 13.3.4.10 Candidate Gathabawn Grid Connection – Terrestrial Mammals

As stated in **Section 13.3.4.1**, Otter is present along the River Nore and the Lisdowney and Ballyconra rivers. No evidence of badger was recorded along the Candidate Gathabawn Grid Connection.

Due to Otter being a QI of the River Barrow and River Nore SAC, in consideration of the evidence of Otter along the River Nore and desk study data of Otter along the Lisdowney and Ballyconra rivers, Otter is considered a KER for the Candidate Gathabawn Grid Connection for ex-situ impacts arising from Ballyring – Parksgrove UGC and in-situ effects arising from the Parksgrove – Moatpark UGC.

Both of the streams crossed by the Ballylehaun – Ballyring UGC are within the Otter foraging range of the River Barrow and River Barrow Nore SAC (18.7km). The watercourse crossing at W2 has some intermediate suitability for Otter. Otter spraint was recorded on 22/09/2026 at the FW9 crossing downstream of the Ballylehaun – Ballyring UGC crossing. As such, Otter are considered present downstream of the Ballylehaun – Ballyring UGC works.

Despite similar habitats being present along the Candidate Gathabawn Grid Connection to the Gathabawn Windfarm, there are limited areas of woodland and suitable foraging habitats to support local important levels of the same Terrestrial Mammal species as the Gathabawn Windfarm.

However, due to the Ballylehaun – Ballyring UGCs' proximity to records of Badger at Ballylehaun and the extent of woodland habitats scattered across the Ballyring – Moatpark UGC, under the precautionary principle, the same mammal species are considered KERs for this element of the Whole Gathabawn Windfarm Project to fully consider cumulative impacts.

Detailed survey results can be found in Appendix 13.4: Invertebrates, Amphibians, Reptiles, Terrestrial Mammals Survey Data.

In summary, Badger, Irish Hare, Pine Marten, Irish Stoat, Red Squirrel and Hedgehog are all considered KERs.

EIAR 13.3.4.11 Existing Sources of Impacts on Terrestrial Mammals

It is considered that the intensity of agricultural land use is a source of habitat loss/deterioration, disturbance and displacement to Terrestrial Mammals in the area. Badger and Hedgehog are regular victims of roadkill incidents and Department of Agriculture, Food & the Marine culls.

EIAR 13.3.5 Context and Characteristics of BATS

Resident & Vagrant Species in Ireland: There are eleven recorded bat species in Ireland, nine of which are considered resident, and two considered vagrant species. Based on National Biodiversity Data Centre records (OS grid squares S36 and S37) and the results of bat surveys undertaken at the site, not all species occur within the area of the proposed development.

Table 13-10: Resident and Vagrant Bat Species Records within the Gathabawn Windfarm.

Bat Species	Resident/ Vagrant	Species Records in the area of the development	
		NBDC Records within S36 and S37	Site Surveys
Common Pipistrelle (*Pipistrellus pipistrellus*)	Resident	Yes	Yes
Soprano Pipistrelle (*Pipistrellus pygmaeus*)	Resident	Yes	Yes
Nathusius' Pipistrelle (*Pipistrellus nathusii*)	Resident	No	Yes
Whiskered Bat (*Myotis mystacinus*)	Resident	No	N/A*
Natterer's Bat (*Myotis nattereri*)	Resident	Yes	N/A*
Myotis sp.	Resident	N/A	Yes
Leisler's Bat (*Nyctalus leisleri*)	Resident	Yes	Yes
Brown Long-eared Bat (*Plecotus auritus*)	Resident	Yes	Yes
Daubenton's Bat (*Myotis daubentonii*)	Resident	Yes	N/A*
Lesser Horseshoe Bat (*Rhinolophus hipposideros*)	Resident	No	No
Brandt's Bat (*Myotis brandtii*)	Vagrant	No	No
Greater Horseshoe Bat (*Rhinolophus ferrumequinum)*	Vagrant	No	No

*Per methodology appendix, bat calls for Myotis species were determined to genus due to narrow similarities between call frequencies for this group.

Landscape Suitability: The landscape surrounding the proposed Gathabawn Windfarm is predominantly improved agricultural landscapes, with hedgerows / treelines along field boundaries and roadsides, with low-density houses and farm buildings. Bat landscape mapping was reviewed for the Gathabawn Windfarm location which provides an indication of the suitability of the 10km area(s) for bat species. The proposed turbines are located within the OS grid squares S36 and S37. Turbines T1 to T5 are located in OS grid square S37 and turbines T6 to T12 are located in grid square S36.

Table 13-11: Total Habitat Areas within the Gathabawn Windfarm site.

Species	Ballyring T8-T12 (Grid Square S36)	Ballylehaun T6-T7 (Grid Square S36)	Ballylehaun T1 – T5 (Grid Square S37)
	Landscape Suitability Index	Landscape Suitability Index	Landscape Suitability Index
All Bats	27.22/Moderate	20.56/Low	25.44/Low
Common Pipistrelle	45/Very high	37/High	43/Very high
Soprano Pipistrelle	40/Very high	31/High	36/High
Leisler's Bat	40/Very high	30/High	37/Very high
Brown Long-Eared Bat	37/Very high	28/Moderate	34/High
Natterer's Bat	33/High	24/Moderate	33/High

Daubenton's Bat	24/Moderate	14/Low	20/Low
Whiskered Bat	22/Moderate	19/Low	22/Moderate
Lesser Horseshoe Bat	1/Negligible	0/Negligible	1/Negligible
Nathusius' Bat	3/Negligible	2/Negligible	3/Negligible

EIAR 13.3.5.1 Bat Roost Surveys

Crevices and cavities in mature trees, buildings and masonry bridges can provide roosting opportunities for bats. A roosting site may have the potential to accommodate just one or a number of different species and types of roost. Bats may visit these roosting sites occasionally or frequently, and some roosting sites may have continuous use by bats for decades.

The use of features within the site and surrounding area as bat roosts was evaluated through preliminary roost assessment surveys and dusk surveys.

EIAR 13.3.5.1.1 Preliminary Roost Assessment

Survey effort: In order to assess the likelihood of bats being present at various features such as trees, buildings, forestry, woodland, riparian areas and bridges and to evaluate their suitability as roosting sites, Preliminary Roost Assessments (PRAs) were carried out during April 2025 within a 500m buffer zone around the proposed turbine layout. PRAs and a ground level tree assessment (GLTA) were carried out within a 50m buffer zone along the Candidate Gathabawn Grid Connection route during July 2026. Two watercourse crossings related to the Ballylehaun-Ballyring Underground Cabling element of the candidate grid connection were assessed prior to 2025. A site visit in September 2026 verified their suitability in line with CIEEM guidance.

Survey Results: Results presented address the structures within 500m of the turbine locations and trees within 320m of the turbine locations to reflect best practice guidance on determining roosts within the relevant Zone of Influence. As outlined in the table below, three features with Low to Moderate suitability were identified within the proposed windfarm study area (BL8, BL11 and BL14), and eight features were identified with Moderate to High suitability within the candidate grid connection route study area (GC_BL1, GC_BL2, GC_BL3, GC_BL4, GC_BL6, WC1, GC_TR2 and GC_WC2).

Table 13-12: Preliminary Roost Assessment and Ground Level Tree Assessment results of buildings, trees and water crossings 2025 and 2026

Code	Year of Survey	ITM Grid Ref		Description	Suitability Rating
Buildings					
BL1	2025	633421	671482	Cow shed	Negligible
BL2	2025	633414	671507	Small stone shed with metal roof	Negligible
BL3	2025	633405	671508	Small stone building	Negligible
BL4	2025	633394	671509	Small building with metal roof	Negligible
BL5	2025	633379	671504	Concrete storage building	Negligible
BL6	2025	633377	671483	Stone storage building with metal roof	Negligible

Code	Year of Survey	ITM Grid Ref		Description	Suitability Rating
BL7	2025	633376	671514	Residential building, no access points	Negligible
BL8	2025	638938	668956	Abandoned stone farmhouse, roof partially collapsed	Moderate
BL9	2025	635164	668991	Metal storage shed	Negligible
BL10	2025	634642	670309	Farm storage sheds, collapsed roof	Negligible
BL11	2025	633260	671035	Metal farm building with small stone room on north-west side	Low
BL12	2025	633130	670829	Metal farm building	Negligible
BL13	2025	638570	668959	Residential house, no access points	Negligible
BL14	2025	638567	668947	Stone farm building, multiple access points	Moderate
BL15	2025	638565	668920	Concrete shed, collapsed roof	Negligible
BL16	2025	638591	668931	Metal storage shed	Negligible
GC_BL1	2026	640958	670440		High
GC_BL2	2026	640930	670426		High
GC_BL3	2026	640936	670452		Moderate
GC_BL4	2026	640925	670442		Moderate
GC_BL5	2026	640937	670466		Low
GC_BL6	2026	641101	670118		Moderate
GC_BL7	2026	641100	670133		Low
Trees (potential roost – I: Individual, M: Maternity)					
TR1	2025	638660	669373	Large tree with ivy cover	PRF-I
TR2	2025	638287	669146	Large tree with ivy cover	PRF-I
TR3	2025	638538	668958	Large tree with ivy cover	PRF-I
GC_TR1	2026	639465	669065	*Fagus sylvatica*	PRF-M
GC_TR2	2026	639522	669621	*Fagus sylvatica*	PRF-I
Watercourse Crossings					
WC1	2026	635337	670343	Gorteennamuck (15G39)	Moderate
WC2	2026	636082	669684	Gorteenahilla (15G08)	Low
GC_WC1	2026	639479.91	669602.11	Lismaine (15L16)	Negligible

Code	Year of Survey	ITM Grid Ref		Description	Suitability Rating
GC_WC2	2026	639530.12,	669607.4	Lismaine (15L16)	Moderate

EIAR 13.3.5.1.2 Bat Activity Survey (Emergence Surveys)

Suitable sites identified in 2025 were then surveyed at dusk to establish the presence or absence of bat roosts and evaluate their importance (if present). No further surveys were carried out at TR1, TR2 and TR3 as these trees had limited PRF options for only 1-3 individuals (PRF-Individual), and consequently in accordance with guidelines are not required to have a follow-up emergence survey (Collins, 2023). The emergence results of these surveys are summarised below in Table 13-9.

BL8 was observed to be of use as a roost, but only eight Soprano Pipistrelle were recorded emerging from this roost on during one survey in July; it is therefore an unlikely maternity or hibernation roost.

Table 13-13: Emergence Survey Results 2025

Code	Dates/Use of feature/Bat Activity	Importance Evaluation	Nearest Turbine
BL8	**Survey:** 22/07/2025, 21/08/2025 Bat species passes recorded/survey: Common Pipistrelle: 25 commuting, 0 emerging, 70 foraging (total: 95) Soprano Pipistrelle: 20, 37, 50 (total: 107) Leisler's Bat: 8, 0, 6 (total: 14) Myotis sp.: 1, 0, 0 (total: 1) Behaviour recorded: Emerging: 0, 37, 0, 0. Foraging: 70, 50, 6, 0 Commuting: 25, 20, 8, 1	Local (Higher value) -due to Moderate Suitability and the presence of roosting bats	T10 (215m)
BL11	**Survey:** 21/07/2025 Bat species passes recorded/survey: Common Pipistrelle: 9 Soprano Pipistrelle: 40 Leisler's Bat: 5 Behaviour Recorded: Emerging: Nil Foraging: 30 Commuting: 24	Local (Lower Value)	T2 (300m)
BL14	**Survey:** 23/07/2025, 20/08/2025 Bat species passes recorded/survey: Common Pipistrelle: 25, 0, 64 (total: 89) Soprano Pipistrelle: 19, 1, 190 (total: 210) Leisler's Bat: 1, 0, 8 (total: 9) Myotis sp.: 4, 0, 2 (total: 6) Behaviour Recorded: Emerging: 0, 1, 0, 0 Foraging: 64, 190, 8, 2 Commuting: 25, 19, 1, 4	Local (Higher Value) -due to Suitability and the presence of roosting bats	T8 (197m)

EIAR 13.3.5.1.3 Core Sustenance Zones

A Core Sustenance Zone (CSZ) refers to the area surrounding a communal bat roost within which habitat availability and quality will have a significant influence on the resilience and conservation status of the colony using the roost (Collins 2023). This indicates the area within which development work may impact the commuting and foraging habitat of bats using that roost. At BL8 and BL14, emerging Soprano Pipistrelle were recorded. The CSZ for Soprano Pipistrelle is a 2km radius around the roost. BL8 is located approximately 215m from the location of T10.

EIAR 13.3.5.2 Bat Activity Survey (Passive Surveys and Transects)

Survey Results: Bat Activity Surveys at the site of the Gathabawn Windfarm comprised passive surveys, using automated Anabat Express bat detectors, transect surveys . These surveys recorded bat calls, provided a good representation of bat species present, and provided information on their activity during their most active periods, and their use of the site. Surveys were conducted in line with best practice guidance available at the time of surveying (Collins, 2023; SNH, 2021).

EIAR 13.3.5.2.1 Fieldwork – Transect Survey Results

Transect surveys provide a snapshot of the use of an area by bats, and compliment passive surveys. The location of transect surveys was designed to include surrounding habitats and features which would be of particular interest to bat species, such as buildings and linear habitats such as watercourses, hedgerows and treelines.

Survey Effort: Transect surveys were carried out in Spring, Summer and Autumn 2025. The locations of the transect surveys were undertaken in varied agricultural habitats within the Gathabawn Windfarm site.

Survey Results: Transect survey results can be found in the tables below. The locations of the transect surveys are illustrated on Figure 13.4: Bats.

Table 13-14: Bat Transect Survey Results 2025

Species Recorded	Spring (April & May) 3 no. transects 1km of transects total	Summer (June) 3 no. transects 1km of transects total	Autumn (August) 3 no. transects 1km of transects total
Common pipistrelle (*Pipistrellus pipistrellus*)	Frequency: at 3 transects Transect 1: 15 passes (2 commuting, 13 foraging) Transect 2: 27 passes (3 commuting, 24 foraging) Transect 3: 52 passes (5 commuting, 47 foraging)	Frequency: at 2 transects Transect 2: 1 pass (1 commuting) Transect 3: 10 passes (10 foraging)	Frequency: at 2 transects Transect 1: 23 passes (3 commuting, 20 foraging) Transect 3: 11 passes (3 commuting, 8 foraging)
Soprano pipistrelle (*Pipistrellus pygmaeus*)	Frequency: at 3 transects Transect 1: 1 pass (1 commuting) Transect 2: 2 passes (2 foraging) Transect 3: 16 passes (4 commuting, 12 foraging)	Frequency: at 3 transects Transect 1: 17 passes (4 commuting, 13 foraging) Transect 2: 5 passes (1 commuting, 4 foraging) Transect 3: 23 passes (1 commuting, 22 foraging)	Frequency: at 2 transects Transect 1: passes (5 commuting, 35 foraging) Transect 3: 6 passes (3 commuting, 3 foraging)
Leisler's bat (*Nyctalus leisleri*)	Frequency: at 1 transect Transect 1: 1 pass (1 commuting)	None	Frequency: at 2 transects Transect 1: 2 passes (2 commuting) Transect 3: 21 passes (1 commuting, 20 foraging)

Species Recorded	Spring (April & May) 3 no. transects 1km of transects total	Summer (June) 3 no. transects 1km of transects total	Autumn (August) 3 no. transects 1km of transects total
Nathusius' Pipistrelle (*Pipistrellus nathusii*)	None	None	Frequency: at 1 transect Transect 3: 1 pass (1 commuting)

EIAR 13.3.5.2.2 Fieldwork – Passive Static Survey Results

Passive surveys were carried out at twelve locations in 2025 to cover the final Gathabawn Windfarm turbine layout. Seven locations in Ballylehaun and five locations in Ballyring were chosen for the 2025 passive surveys. Locations were based on turbine location and the respective habitat landscape features present. These static detectors were deployed in Spring (April and May), Summer (June), and Autumn (August) for between 12 and 18 nights.

Weather station equipment malfunctioned on all three deployments in 2025 due to data corruption for spring and summer and software for autumn. As such, to the nearest available weather station was sourced for average rainfall and temperature to inform the assessment for activity levels in line with best practice guidance.

Detectors at T4 and T6 for summer deployment were both missing upon collection; as such, no data was available to assess. Detectors at T5 and T9 for autumn deployment also malfunctioned and did not provide the minimum number of nights to assess activity levels for these turbines. These turbines are then inferred to have similar levels to the nearest detector locations relevant.

A map depicting static detector deployment locations can be seen in Figure 13.4: Bats.

It is acknowledged that the classification of *Myotis* spp. from sonograms can be imprecise, so for the purposes of this assessment all *Myotis* records from automated detectors were identified only to genus level. A summary of the results of the Passive Bat Activity surveys are presented in the tables below. For detailed results, see Appendix 13.5.

Table 13-15: Bat Activity Passive Survey Results 2025

Season	Detector ITM location (nearest turbine)	Habitat type surrounding detector	Bat Species	Peak passes per deployment	Average Bat Activity Levels 2025
Spring	634028, 671640 (T1)	Agricultural grassland and hedgerows	Common Pipistrelle	72	Low
			Soprano Pipistrelle	21	Negligible
			Nathusius' Pipistrelle	Nil	Nil
			Leisler's Bat	24	Negligible
			Brown Long-eared Bat	1	Negligible
			Myotis species	Nil	Nil
	633666, 671018 (T2)	Agricultural grassland and treelines	Common Pipistrelle	729	Moderate
			Soprano Pipistrelle	166	Low
			Nathusius' Pipistrelle	Nil	Nil
			Leisler's Bat	23	Negligible
			Brown Long-eared Bat	Nil	Nil
			Myotis species	1	Negligible
		Agricultural grassland, scattered trees and	Common Pipistrelle	130	Low
			Soprano Pipistrelle	7	Negligible

Season	Detector ITM location (nearest turbine)	Habitat type surrounding detector	Bat Species	Peak passes per deployment	Average Bat Activity Levels 2025
	634103, 670736 (T3)	parkland, buildings and artificial surfaces	Nathusius' Pipistrelle	Nil	Nil
			Leisler's Bat	25	Negligible
			Brown Long-eared Bat	1	Negligible
			Myotis species	1	Negligible
	633818, 670304 (T4)	Agricultural grassland	Common Pipistrelle	514	High
			Soprano Pipistrelle	218	Low
			Nathusius' Pipistrelle	Nil	Nil
			Leisler's Bat	120	Low
			Brown Long-eared Bat	2	Negligible
			Myotis species	Nil	Nil
	634229, 670098 (T5)	Agricultural grassland, dry meadows and grassy verges, scattered trees and parkland	Common Pipistrelle	1	Negligible
			Soprano Pipistrelle	Nil	Nil
			Nathusius' Pipistrelle	Nil	Nil
			Leisler's Bat	1	Negligible
			Brown Long-eared Bat	Nil	Nil
			Myotis species	Nil	Nil
	635036, 669483 (T6)	Agricultural grassland and hedgerows	Common Pipistrelle	111	Low
			Soprano Pipistrelle	23	Negligible
			Nathusius' Pipistrelle	Nil	Nil
			Leisler's Bat	92	Low
			Brown Long-eared Bat	Nil	Nil
			Myotis species	1	Negligible
	634868, 669845 (T7)	Agricultural grassland	Common Pipistrelle	20	Negligible
			Soprano Pipistrelle	2	Negligible
			Nathusius' Pipistrelle	Nil	Nil
			Leisler's Bat	Nil	Nil
			Brown Long-eared Bat	1	Negligible
			Myotis species	Nil	Nil
	638417, 669067 (T8)	Agricultural grassland, spoil and bare ground, hedgerows	Common Pipistrelle	231	Moderate
			Soprano Pipistrelle	79	Low
			Nathusius' Pipistrelle	Nil	Nil
			Leisler's Bat	35	Low
			Brown Long-eared Bat	1	Negligible
			Myotis species	1	Negligible
	638896, 669235 (T9)	Agricultural grassland and hedgerows	Common Pipistrelle	490	High
			Soprano Pipistrelle	39	Low
			Nathusius' Pipistrelle	1	Negligible
			Leisler's Bat	32	Low
			Brown Long-eared Bat	2	Negligible
			Myotis species	1	Negligible
	638773, 668875 (T10)	Agricultural grassland	Common Pipistrelle	340	High
			Soprano Pipistrelle	101	Low
			Nathusius' Pipistrelle	Nil	Nil
			Leisler's Bat	425	Moderate

Season	Detector ITM location (nearest turbine)	Habitat type surrounding detector	Bat Species	Peak passes per deployment	Average Bat Activity Levels 2025
			Brown Long-eared Bat	7	Negligible
			Myotis species	4	Negligible
	638405, 668667 (T11)	Agricultural grassland	Common Pipistrelle	21	Negligible
			Soprano Pipistrelle	5	Negligible
			Nathusius' Pipistrelle	Nil	Nil
			Leisler's Bat	7	Negligible
			Brown Long-eared Bat	2	Negligible
			Myotis species	Nil	Nil
	638802, 668330 (T12)	Arable crops, agricultural grassland and hedgerows	Common Pipistrelle	43	Low
			Soprano Pipistrelle	43	Low
			Nathusius' Pipistrelle	1	Negligible
			Leisler's Bat	23	Negligible
			Brown Long-eared Bat	1	Negligible
			Myotis species	3	Negligible
Summer	634028, 671644 (T1)	Agricultural grassland and hedgerows	Common Pipistrelle	28	Negligible
			Soprano Pipistrelle	6	Negligible
			Nathusius' Pipistrelle	Nil	Nil
			Leisler's Bat	50	Low
			Brown Long-eared Bat	3	Negligible
			Myotis species	3	Negligible
	633660, 671024 (T2)	Agricultural grassland and treelines	Common Pipistrelle	141	Low
			Soprano Pipistrelle	51	Low
			Nathusius' Pipistrelle	Nil	Nil
			Leisler's Bat	10	Negligible
			Brown Long-eared Bat	1	Negligible
			Myotis species	1	Negligible
	634110, 670742 (T3)	Agricultural grassland, scattered trees and parkland, buildings and artificial surfaces	Common Pipistrelle	16	Negligible
			Soprano Pipistrelle	3	Negligible
			Nathusius' Pipistrelle	Nil	Nil
			Leisler's Bat	10	Negligible
			Brown Long-eared Bat	1	Negligible
			Myotis species	Nil	Nil
	T4	N/A	Common Pipistrelle	N/A*	N/A*
			Soprano Pipistrelle	N/A*	N/A*
			Nathusius' Pipistrelle	N/A*	N/A*
			Leisler's Bat	N/A*	N/A*
			Brown Long-eared Bat	N/A*	N/A*
			Myotis species	N/A*	N/A*
	634229, 670095 (T5)	Agricultural grassland, dry meadows and grassy verges, scattered trees and parkland	Common Pipistrelle	151	Low
			Soprano Pipistrelle	71	Low
			Nathusius' Pipistrelle	Nil	Nil
			Leisler's Bat	12	Negligible
			Brown Long-eared Bat	1	Negligible
			Myotis species	Nil	Nil

Season	Detector ITM location (nearest turbine)	Habitat type surrounding detector	Bat Species	Peak passes per deployment	Average Bat Activity Levels 2025
	T6	Agricultural grassland and hedgerows	Common Pipistrelle	N/A**	N/A**
			Soprano Pipistrelle	N/A**	N/A**
			Nathusius' Pipistrelle	N/A**	N/A**
			Leisler's Bat	N/A**	N/A**
			Brown Long-eared Bat	N/A**	N/A**
			Myotis species	N/A**	N/A**
	634876, 669838 (T7)	Agricultural grassland	Common Pipistrelle	27	Negligible
			Soprano Pipistrelle	11	Negligible
			Nathusius' Pipistrelle	N/A	Nil
			Leisler's Bat	7	Negligible
			Brown Long-eared Bat	Nil	Nil
			Myotis species	9	Negligible
	638415, 669068 (T8)	Agricultural grassland, spoil and bare ground, hedgerows	Common Pipistrelle	176	Low
			Soprano Pipistrelle	8	Negligible
			Nathusius' Pipistrelle	Nil	Nil
			Leisler's Bat	4	Negligible
			Brown Long-eared Bat	8	Negligible
			Myotis species	8	Negligible
	638896, 669234 (T9)	Agricultural grassland and hedgerows	Common Pipistrelle	388	High
			Soprano Pipistrelle	32	Low
			Nathusius' Pipistrelle	Nil	Nil
			Leisler's Bat	9	Negligible
			Brown Long-eared Bat	Nil	Nil
			Myotis species	2	Negligible
	638775, 668874 (T10)	Agricultural grassland	Common Pipistrelle	424	High
			Soprano Pipistrelle	111	Low
			Nathusius' Pipistrelle	Nil	Nil
			Leisler's Bat	14	Negligible
			Brown Long-eared Bat	1	Negligible
			Myotis species	1	Negligible
	638400, 668669 (T11)	Agricultural grassland	Common Pipistrelle	11	Negligible
			Soprano Pipistrelle	4	Negligible
			Nathusius' Pipistrelle	Nil	Nil
			Leisler's Bat	18	Negligible
			Brown Long-eared Bat	3	Negligible
			Myotis species	1	Negligible
	638799, 668333 (T12)	Arable crops, agricultural grassland and hedgerows	Common Pipistrelle	119	Low
			Soprano Pipistrelle	127	Low
			Nathusius' Pipistrelle	Nil	Nil
			Leisler's Bat	6	Negligible
			Brown Long-eared Bat	1	Negligible
			Myotis species	1	Negligible
Autumn		Agricultural grassland and hedgerows	Common Pipistrelle	116	Low
			Soprano Pipistrelle	28	Low

Season	Detector ITM location (nearest turbine)	Habitat type surrounding detector	Bat Species	Peak passes per deployment	Average Bat Activity Levels 2025
	634032, 671641 (T1)		Nathusius' Pipistrelle	Nil	Nil
			Leisler's Bat	50	Low
			Brown Long-eared Bat	Nil	Nil
			Myotis species	4	Negligible
	633659, 671022 (T2)	Agricultural grassland and treelines	Common Pipistrelle	158	Moderate
			Soprano Pipistrelle	59	Low
			Nathusius' Pipistrelle	Nil	Nil
			Leisler's Bat	97	Low
			Brown Long-eared Bat	Nil	Nil
			Myotis species	1	Negligible
	634112, 670748 (T3)	Agricultural grassland, scattered trees and parkland, buildings and artificial surfaces	Common Pipistrelle	817	High
			Soprano Pipistrelle	266	Low
			Nathusius' Pipistrelle	Nil	Nil
			Leisler's Bat	281	Low
			Brown Long-eared Bat	Nil	Nil
			Myotis species	2	Negligible
	633819, 670296 (T4)	Agricultural grassland	Common Pipistrelle	649	High
			Soprano Pipistrelle	287	Low
			Nathusius' Pipistrelle	27	Negligible
			Leisler's Bat	454	High
			Brown Long-eared Bat	51	Low
			Myotis species	2	Negligible
	634227, 670094 (T5)	Agricultural grassland, dry meadows and grassy verges, scattered trees and parkland	Common Pipistrelle	35***	Negligible***
			Soprano Pipistrelle	15***	Negligible***
			Nathusius' Pipistrelle	1***	Negligible***
			Leisler's Bat	9***	Negligible***
			Brown Long-eared Bat	7***	Negligible***
			Myotis species	1***	Negligible***
	635037, 669458 (T6)	Agricultural grassland and hedgerows	Common Pipistrelle	5	Negligible
			Soprano Pipistrelle	2	Negligible
			Nathusius' Pipistrelle	Nil	Nil
			Leisler's Bat	Nil	Nil
			Brown Long-eared Bat	Nil	Nil
			Myotis species	Nil	Nil
	634873, 669835 (T7)	Agricultural grassland	Common Pipistrelle	4	Negligible
			Soprano Pipistrelle	2	Negligible
			Nathusius' Pipistrelle	Nil	Nil
			Leisler's Bat	Nil	Nil
			Brown Long-eared Bat	Nil	Nil
			Myotis species	Nil	Nil
	638412, 669070 (T8)	Agricultural grassland, spoil and bare ground, hedgerows	Common Pipistrelle	1689	High
			Soprano Pipistrelle	255	Moderate
			Nathusius' Pipistrelle	Nil	Nil
			Leisler's Bat	55	Low

Season	Detector ITM location (nearest turbine)	Habitat type surrounding detector	Bat Species	Peak passes per deployment	Average Bat Activity Levels 2025
			Brown Long-eared Bat	59	Low
			Myotis species	35	Low
	638896, 669234 (T9)	Agricultural grassland and hedgerows	Common Pipistrelle	5***	Negligible***
			Soprano Pipistrelle	1***	Negligible***
			Nathusius' Pipistrelle	Nil***	Nil***
			Leisler's Bat	1***	Negligible***
			Brown Long-eared Bat	Nil***	Nil***
			Myotis species	Nil***	Nil***
	638777, 668870 (T10)	Agricultural grassland	Common Pipistrelle	367	High
			Soprano Pipistrelle	162	Low
			Nathusius' Pipistrelle	Nil	Nil
			Leisler's Bat	11	Negligible
			Brown Long-eared Bat	11	Negligible
			Myotis species	33	Negligible
	638400, 668671 (T11)	Agricultural grassland	Common Pipistrelle	19	Low
			Soprano Pipistrelle	13	Negligible
			Nathusius' Pipistrelle	1	Negligible
			Leisler's Bat	18	Negligible
			Brown Long-eared Bat	6	Negligible
			Myotis species	6	Negligible
	638801, 668333 (T12)	Arable crops, agricultural grassland and hedgerows	Common Pipistrelle	73	Low
			Soprano Pipistrelle	43	Low
			Nathusius' Pipistrelle	Nil	Nil
			Leisler's Bat	40	Low
			Brown Long-eared Bat	13	Negligible
			Myotis species	9	Negligible

**No data, static detector missing from site during collection*

***SD card data corrupted*

**** SD card data corrupted- minimum number of deployment nights not met (T5 2 nights, T9 4 nights)*

EIAR 13.3.5.2.3 Summary of Bat Activity from Passive and Transect Surveys

The level of bat calls recorded during the 2025 passive surveys was spread across a number of species. The majority of these records were related to Common Pipistrelle and Soprano Pipistrelle which were recorded primarily at Negligible to Low levels of activity, with the exception of Moderate and High levels of Common Pipistrelle activity recorded at Ballyring and Ballylehaun and moderate levels of Soprano Pipistrelle at Ballyring in Autumn. Leisler's Bat was recorded at Negligible to Low levels of activity, with one period of High activity (T4 Autumn) and one period of Moderate activity (T10, Spring). Other species including Nathusius' Pipistrelle, Brown Long-eared Bat and *Myotis* spp. were also recorded, although activity levels were generally Negligible.

Common Pipistrelle was the most commonly recorded species (67% of records) from passive surveys at the turbine locations. Soprano Pipistrelle and Leisler's Bat were less frequently detected (16% and 13% respectively), and Brown-long Eared Bat (1.5%), Myotis sp. (1%), and Nathusius' Pipistrelle (0.1%) were rarely detected. Results from transect surveys were in accordance with the results from the passive surveys. Monitoring in summer 2026 has yielded similar activity levels of the same species with deviation relating to Leisler's Bat and Common Pipistrelle have more frequent evening of high activity.

The transect surveys identified commuting Common, Nathusius' and Soprano pipistrelle and Leisler's bat. The majority of activity detected during transect surveys was foraging activity by Common and Soprano Pipstrelle, primarily along the hedgerows and treelines present along Transects 1 and 3. No swarming areas or migration routes were found onsite or in the surrounding area.

EIAR 13.3.5.3 Key Biodiversity Receptors – Bat Species

Although the Landscape Suitability Index for bats indicated that the Gathabawn Windfarm is assessed as lying with a Moderate Suitability Landscape for Bats, the particular habitats and the records of species in the study area **indicated that the bat assemblage be considered to be of Local (higher) importance and are considered a key ecological receptor.**

Two bat roosts were identified within the survey area (BL8, B14). Due to the Moderate suitability for roosting bats, the species present and the numbers associated with these roosts, they are assessed as being of Local Importance (Higher Value). As such, **BL8 and BL14 are considered Key Ecological Features** for the Local Soprano Pipistrelle population.

As a result of the bat activity surveys, Gathabawn Windfarm is identified as being used regularly (High Activity) by Common Pipistrelle and low levels for the other bat species. The Ballyring area recorded moderate levels of Soprano pipistrelle and is also host to two bat roosts for this species. **As such, the following bat species are considered key ecological receptors based on species presence, activity levels and the extent of habitat suitability across the ecological baseline:**

- Soprano Pipistrelle – Roosting (Ballyring), Commuting and Foraging
- Common Pipistrelle - Commuting and Foraging
- Nathusius' Pipistrelle - Commuting and Foraging
- Brown Long-eared Bat - Commuting and Foraging
- Leisler's Bat – Commuting and Foraging
- Daubenton's Bat - Commuting and Foraging
- Whiskered Bat - Commuting and Foraging
- Natterer's Bat - Commuting and Foraging

EIAR 13.3.5.4 Candidate Gathabawn Grid Connection – Bats

Suitable linear features are present across the Candidate Gathabawn Grid Connection. A limited number of trees along this route are set to be felled or removed to facilitate the construction works (2-3 trees). Three trees within 50m of the construction works were identified to be of suitability to support a maternity roost (Section 13.3.5.1).

Two trees are North of the woodland being passed by the Ballyring – Parksgrove UGC. Neither tree is set to be felled to facilitate the works.

One tree is located in woodland connected to the Parksgrove Substation location. No works will require this tree to be felled; however, a section of this woodland will be lost as part of the Parksgrove Substation construction works.

In total, 14 trees with PRF-M potential and two trees with PRF-I potential are within 50m of the Candidate Gathabawn Grid Connection. These trees were mostly mature Ash trees, with two Beech, Willow sp., and Poplar sp. trees, respectively and one Sycamore tree.

As a result, disturbance to roosting individuals at these trees is possible. The watercourse crossing at W3 is upstream of the GC_WC1 crossing with moderate suitability. None of the other watercourse crossings with suitability for roosting bats will involve works across stone works.

As such, all native bat species with the exception of Lesser Horseshoe Bat are **included as a Key Ecological Receptor** for the Candidate Gathabawn Grid Connection.

Detailed survey results can be found in Appendix 13.5: Bat Fieldwork & Survey Results. Figures and Appendices are included at the end of this Chapter

EIAR 13.3.5.5 Existing Sources of Impacts on Bats

There are a number of existing sources of impacts to Bats, which have been considered herein:

- Ash dieback is posing a threat to ash trees across the country. Measures to cure or treat dieback successfully have not been developed yet. According to the Forest Statistics Ireland 2023 report, ash dieback has been reported throughout the island of Ireland, including Co. Kilkenny. Ash dieback may have both positive (increased roosting cavities) or negative impacts (loss of roosting cavities if a tree/branch falls); Bat Conservation Trust assesses the impact of Ash dieback to be positive where trees are left standing or negative if trees are felled but there is no clear indication on overall or longer-term impacts.

EIAR 13.3.6 Context and Characteristics of BIRDS

Proposed Gathabawn Windfarm:

The receiving environment in the proposed Gathabawn Windfarm supports a wide variety of general bird species of open countryside and farmland, in addition to some birds of prey and wader species. Some species are migratory species are only present during the summer or winter months within which they disperse widely over suitable habitat, whilst others are sedentary species and present throughout the year.

Survey effort: In order to determine the composition of the baseline bird population, bird surveys were carried out during winter 2022/2023, breeding 2025, winter 2025/2026, and breeding 2026, comprising:

- vantage point (VP),
- bird transect,
- breeding raptor (Peregrine (*Falco peregrinus*), Kestrel (*Falco tinnunculus*), Barn Owl (*Tyto alba*)),
- raptor hinterland,
- woodcock surveys;
- wetland and waterbirds surveys.

Candidate Gathabawn Grid Connection

The receiving environment in the Candidate Gathabawn Grid Connection supports a wide variety of general bird species of open countryside and farmland, in addition to some birds of prey and wader species. Some species are migratory and are only present during the summer or winter months, within which they disperse widely over suitable habitat, whilst others are sedentary species and present throughout the year.

Survey effort: In order to determine the composition of the baseline bird population, targeted surveys at the River Nore bird surveys were carried out during winter 2022/2023 and winter 2025/2026, comprising:

- Vantage Point (VP); and
- I-WeBS.

Bird surveys for the breeding season were carried out in the breeding seasons 2025 and 2026, comprising:

- Kingfisher Transects.

The bird surveys focused on those species of high nature conservation value for which there is potential for impacts to occur. These target species are derived from the bird species listed on Annex I of the EC Birds Directive and those species that are of high conservation concern (Gilbert *et al.* 2021)

The results of these surveys are summarised below, and the survey locations and results are illustrated on Figure 13.5.1 - Figure 13.5.4. Detailed survey results can be found in Appendix 13.6: Bird Fieldwork & Survey Results. Figures and Appendices are included at the end of this Chapter.

The Proposed Gathabawn Windfarm is located in OS grid squares S36 and S37, while the Candidate Gathabawn Grid Connection is located in OS grid squares S36, S37, S46 and S47.

EIAR 13.3.6.1 Birds of Prey

Two 'red-listed' bird of prey species, **Kestrel** and **Barn Owl,** were recorded during surveys, while 'Green-list' species recorded include Buzzard (*Buteo buteo*), Sparrowhawk (*Accipiter nisus*) and Peregrine. All of these, along with the 'green-listed' Long-eared Owl (*Asio otus*) were recorded on the NBDC database and are expected to occur in the vicinity of the proposed development.

EIAR 13.3.6.1.1 Barn Owl 'Red-listed'

Barn Owl are included on the BoCCI Red List. They are rarely seen during the day, only active late at night. They breed in ruined buildings and to a lesser extent in cavities in trees. They are a scarce resident, mainly occurring in central and southern Ireland (Balmer *et al.,* 2012).

Occurrence of Suitable Habitat: Suitable foraging habitats comprising open grassland, verge habitats, and suitable nesting/roosting features such as mature trees/buildings etc are present within the site and in the wider area.

Presence of Species - Fieldwork: Barn Owl were not observed during Barn Owl surveys carried out in 2025 or 2026, however there was one incidental sighting during bat transect surveys in 2025.

Presence of Species – Desktop Research Results: Barn Owl were recorded 9 times in the OS grid squares S36 and S37 (most recently in 2025 in S37), and 13 times in S46 and S47 (most recently in 2023 in S46).

Due to records of the species within the vicinity of the site, the suitable habitat and its conservation status, **Barn Owl are considered a Key Ecological Receptor.**

EIAR 13.3.6.1.2 Kestrel 'Red-listed'

Kestrel are included on the BoCCI Red List. They are widespread and common throughout Ireland. Kestrel forage over farmland, wetlands, moorland and roadside verges, and nest in trees, buildings and in cracks on cliffs and are known to utilise old crows' nests.

Occurrence of Suitable Habitat: Suitable foraging habitats comprising open grassland, and suitable nesting/roosting features such as mature trees/buildings, etc. are present within the site and in the wider area.

Presence of Species - Fieldwork Results: Breeding raptor surveys in 2025 and 2026 returned no records of Kestrel. Kestrel were recorded four times during transect surveys in winter 2022/2023, and once in winter 2025/2026 at the Gathabawn Windfarm site.

Older surveys at the windfarm site recorded Kestrel during VP surveys in the winter seasons 2019/2020, 2020/2021 and 2021/2022, as well as during the breeding seasons 2020, 2021 and 2022. Kestrel were also recorded during Raptor surveys at the Ballylehaun Area and Ballyring Area in 2021 and 2022.

In addition, Kestrel were recorded 32 times during VP surveys in winter 2022/2023, 31 times in the 2025 breeding season, 24 times in winter 2025/2026, and 21 times in the 2026 breeding season.

Presence of Species - Desktop Research Results: Kestrel were recorded 59 times in the OS grid squares S36 and S37 (most recently in 2025 in S37), and 44 times in S46 and S47 (most recently in 2025 in S47).

Due to their conservation status, and recorded presence within the vicinity of the site, **Kestrel are included as Key Ecological Receptors**.

EIAR 13.3.6.1.3 Hen Harrier 'Amber-listed'

Hen Harrier (*Circus cyaneus*) is included on Annex I of the EC Birds Directive and the BoCCI Amber List, with a decreasing short-term population trend in Ireland. Breeding birds are confined largely to heather moorland and young forestry plantations where they typically nest on the ground, whilst in winter they are found in more coastal and lowland areas throughout Ireland.

Presence of Species – Fieldwork Results: Hen Harriers were not recorded during bird surveys at the Gathabawn Windfarm site.

There is limited suitable habitat to support roosting or nesting individuals. The suitable habitat is limited to the Cullahill Mountain SAC. However, no surveys supported this species' presence.

Presence of Species - Desktop Research Results: Hen Harrier was recorded 2 times in the OS grid square S37 (most recently in 2019).

Despite their conservation status, due to the absence of presence during field surveys and the negligible records of individuals within the grid squares, Hen Harrier is not considered present within the ecological baseline. As such, **Hen Harrier is not included as Key Ecological Receptors.**

EIAR 13.3.6.1.4 Merlin 'Amber-listed'

Merlin (*Falco columbarius*) are included on Annex I of the EC Birds Directive and the BoCCI Amber List. Merlin are a rare breeder in Ireland, nesting on the ground in moorland, mountain and blanket bog habitats, and occasionally in woodland. They are much more widely distributed in the winter and can often be found in lowland and coastal habitats.

Presence of Species – Fieldwork Results: Merlin was not recorded during surveys for the Gathabawn Windfarm.

Presence of Species - Desktop Research Results: Merlin was recorded 5 times in the OS grid square S37 (most recently in 2024).

Despite their conservation status, due to the absence of presence during field surveys and the negligible records of individuals within the grid squares, Merlin is not considered present within the ecological baseline. As such, **Merlin is not included as Key Ecological Receptors.**

EIAR 13.3.6.1.5 Buzzard 'Green-listed'

Buzzard are a common resident raptor species in Ireland with a widespread distribution and an increasing population (Hardey *et al.*, 2013; Gilbert *et al.*, 2021).

Presence of Species - Fieldwork Results: Buzzard were observed 6 times during VP surveys on the river Nore in winter 2025/2026, 56 times onsite in winter 2022/2023, 127 times in the 2025 breeding season, 41 times in winter 2025/2026, and 108 times in the 2026 breeding season. Buzzard were also observed eight times during transect surveys in winter 2022/2023, two times during winter 2025/2026, and three times during the 2026 breeding season. Buzzard were not observed during breeding raptor surveys. Incidental sightings include 1 Buzzard recorded during I-WeBS surveys in 2025, 2 Buzzard recorded during Breeding Kestrel surveys in 2025, 3 Buzzard recorded during Raptor suitability surveys in 2025, and 1 Buzzard recorded during Reptile surveys in 2025.

Presence of Species - Desktop Research Results: Buzzard are recorded 62 times within the OS grid squares S36 and S37 (most recently in 2025), and 58 times in S46 (most recently in 2025).

Due to their recorded presence within the vicinity of the site, **Buzzard are included as a Key Ecological Receptor**.

EIAR 13.3.6.1.6 Long-eared Owl 'Green-listed'

Long-eared Owl are the most common and widespread owl in Ireland. They are a small owl that utilises abandoned corvid nests during the breeding season. They have been recorded roosting in groups of five or more in winter in enclosed forestry.

Presence of Species - Fieldwork Results: Long-eared Owl were not recorded during any bird, bat or other ecology surveys conducted on the Gathabawn Windfarm site.

Suitable foraging habitats comprising open grassland, suitable nesting/ roosting features such as dense woodland are present within the wider area.

Presence of Species - Desktop Research Results: Long-eared Owl was recorded 4 times in the OS grid square S37 (most recently in 2020), and 12 times in S46 and S47 (most recently in 2022 in S47).

Due to the record of the species within the vicinity of the site, **Long-eared Owl are considered a Key Ecological Receptor.**

EIAR 13.3.6.1.7 Peregrine Falcon 'Green-listed'

Peregrine Falcon are included on Annex I of the EC Birds Directive and the BoCCI Green List. They breed on coastal and inland cliffs but can also be found in cities, quarries where suitable high-elevation nesting ledges are available.

Occurrence of Suitable Habitat: Suitable foraging habitats, typically any open landscapes including agricultural grasslands, are present at the Windfarm site. Suitable nesting/roosting habitats, including large buildings (such as derelict castles) and quarries,are similarly available at the site.

Presence of Species – Fieldwork Results: Peregrine were observed once during VP surveys in winter 2022/2023, ten times in the 2025 breeding season, and nine times in the 2026 breeding season. They were observed once during transect surveys in winter 2022/2023. During raptor surveys in 2025 and 2026, 20 Peregrine were recorded.

There is an established nest site recorded West of Ballyring and South of Ballylehaun. Visits in 2025 and 2026 have shown this nest is still active. Juveniles were recorded at the nest site in 2025 and 2026 and in a nearby quarry which is north of Ballyring and east of Ballylehaun in 2025. This nest site is over 1km from the nearest project element.

Presence of Species - Desktop Research Results: There are 14 Peregrine records within the OS grid squares within which the Gathabawn Windfarm is located, the most recent recorded sighting is from 2024.

Due to the record of the species within the vicinity of the site, and due to the presence of foraging habitat within the site and in particular the active nest site within the ZoI for impact to fledging juveniles and foraging breeding individuals, **Peregrine are considered a Key Ecological Receptor**.

EIAR 13.3.6.1.8 Sparrowhawk 'Green-listed'

Sparrowhawk are included on Annex I of the EC Birds Directive. In Ireland, Sparrowhawk are considered to be one of the most common birds of prey. They breed throughout Ireland and nests in trees.

Presence of Species - Fieldwork Results: Sparrowhawk were sighted once during VP surveys on the Nore in winter 2026, 5 times onsite in winter 2022/2023, 7 times in the 2025 breeding season, 9 times in winter 2025/2026, and 10 times in the 2026 breeding season. Sparrowhawk were not recorded during transect surveys. There was also one incidental Sparrowhawk sighting during reptile surveys in 2025.

Presence of Species - Desktop Research Results: Sparrowhawk were recorded 12 times within the OS grid square S37 (most recently in 2025), and 18 times in S46 and S47 (most recently in 2021 in S47).

Due to the presence of this species within the vicinity of the site, the suitable foraging and nesting habitat present its sensitivity to wind farm projects, **Sparrowhawk is included as a Key Ecological Receptor**.

EIAR 13.3.6.1.9 Key Biodiversity Receptor Scoping – Birds of Prey

Due to the record of the species within the vicinity of the site, **Kestrel, Buzzard, Sparrowhawk, Peregrine, Barn Owl** and **Long-eared Owl** are brought forward for further evaluation as key bird receptors herein.

EIAR 13.3.6.2 Kingfisher 'Amber-listed'

Kingfisher (*Alcedo atthis*) are listed as a Special Conservation Interest (SCI) of the River Nore SPA and are known to occur within the River Nore SPA, which is located 5km to the east of the closest Gathabawn Windfarm turbine. Kingfisher favour slow-flowing rivers and streams with abundant prey items and suitable nesting habitat in the form of vertical sandy banks.

Occurrence of Suitable Habitat: Suitable streams are present within the ecological baseline.

Proposed Gathabawn Windfarm: There was 1 no. location surveyed which had intermediate signs of nesting within the study area; this was at the bridge over the Ballyring upper stream where FW9 works will take place adjacent to this a bridge crossing.

Both the River Nore and the Lisdowney stream (W4) both have high suitability for breeding Kingfisher. The Lismaine stream has intermediate suitability downstream of the W3 crossing. The Lisdowney Stream had further areas with intermediate suitability.

Presence of Species – Fieldwork Results: Kingfishers were not recorded during surveys at the Gathabawn Windfarm. Sightings of Kingfisher and suitable possible nesting holes were observed along the River Nore 1km upstream of the Parksgrove – Moatpark UGC in May 2025, Kingfisher was seen flying on three occasions involving 2 different birds.

Presence of Species - Desktop Research Results: Kingfishers were observed 27 times in the OS grid square S37 (most recently in 2023), and 48 times in S46 and S47 (most recently in 2025 in S46).

Due to the Ballylehaun – Ballyring UGC and Ballyring – Parksgrove UGC having direct connectivity to a European site designated for this species, and the presence of suitable habitat for this species upstream of the SPA that is crossed by the Candidate Gathabawn Grid Connection and in proximity to TDR works at FW8, **Kingfisher is included as a Key Ecological Receptor**.

EIAR 13.3.6.3 Passerines

The passerine and thrush species recorded at the windfarm site during breeding and winter bird transect surveys are typical for the habitats at the windfarm site, which mainly comprises agricultural grassland and hedgerows.

EIAR 13.3.6.3.1 Meadow Pipit 'Red-listed'

Meadow Pipit (*Anthus pratensis*) are a widespread breeding species in Ireland found in bogs, uplands and areas of open land and pasture. They are generally sedentary but will move to lowland areas from their breeding sites in winter. They feed on invertebrates such as craneflies, mayflies and spiders and to a lesser extent on seeds.

Presence of Species - Fieldwork Results: Meadow Pipit were recorded during bird transect surveys 4 times during the winter season 2022-2023, 6 times during the 2025 breeding season, 17 times during the winter season 2025/2026 and 14 times during the 2026 breeding season. Meadow Pipit were also recorded during VP surveys at the windfarm site in 2025.

Presence of Species - Desktop Research Results: Meadow Pipit were recorded 50 times in the OS grid squares S36 and S37 (most recently in 2024 in S37), and 43 times in S46 and S47 (most recently in 2023 in S47).

Due to records of the species within the vicinity of the site, **Meadow Pipit are considered a Key Ecological Receptor**.

EIAR 13.3.6.3.2 Redwing 'Red-listed'

Redwing (*Turdus iliacus*) are a widespread winter visitor to Ireland from Iceland and Scandinavia, wintering in open fields and lowland areas, tending to avoid urban areas. Redwing feed on worms and other invertebrates, as well as on Rowan and Hawthorn berries.

Presence of Species - Fieldwork Results: Redwing were recorded 160 times during transect surveys in winter 2022/2023 and 11 times in winter 2025/2026. There were five incidental Redwing sightings during VP surveys at Ballylehaun in January 2026.

Presence of Species – Desktop Research Results: Redwing were observed 38 times in the OS grid squares S36 and S37 (most recently in 2025 in S37), and 29 times in S46 and S47 (most recently in 2022 in S47).

Due to the record of the species within the vicinity of the site, **Redwing are considered a Key Ecological Receptor**.

EIAR 13.3.6.3.3 Yellowhammer 'Red-listed'

Yellowhammer (*Emberiza citrinella*) are a resident in Ireland, mainly along the east and south of the country. They are strongly linked with the cultivation of cereals and populations have declined in areas where these are no longer grown. They feed on grains of grasses and cereals, while young are fed insects.

Presence of Species – Fieldwork Results: Yellowhammer were recorded five times during bird transect surveys in the winter season 2022/2023. There were also two incidental sightings of Yellowhammer during bat static detector surveys in Ballylehaun in May 2025.

Presence of Species - Desktop Research Results: Yellowhammer were observed 66 times in the OS grid squares S36 and S37 (most recently in 2025 in S37), and 41 times in S46 and S47 (most recently in 2025 in S47).

Due to the record of the species within the vicinity of the site, **Yellowhammer are considered a Key Ecological Receptor**.

EIAR 13.3.6.3.4 Goldcrest 'Amber-listed'

Goldcrests (*Regulus regulus*) breed in a wide variety of habitats, including broadleaf forests, hedgerows and suburban gardens. They are also one of the few species that will breed in dense coniferous woodlands. Resident throughout the year, numbers are reinforced by winter immigrants from the north and east. They feed almost exclusively on insects and other invertebrates.

Presence of Species – Fieldwork Results: Four Goldcrest were recorded during the winter season transect surveys 2022/2023, with three during the 2025 breeding season, one recorded in the winter season 2025/2026 and two recorded in the 2026 breeding season.

Presence of Species - Desktop Research Results: Goldcrest were observed 53 times in the OS grid squares S36 and S37 (most recently in 2023 in S37, and 86 times in S46 and S47 (most recently in 2024 in S47).

Due to the record of the species within the vicinity of the site, **Goldcrest are considered a Key Ecological Receptor**.

EIAR 13.3.6.3.5 Greenfinch 'Amber-listed'

Greenfinch (*Chloris chloris*) are resident within Ireland throughout the year, likely joined by wintering Greenfinches from continental Europe. They feed on a variety of seeds, including the berries of hawthorn, blackberry and yew.

Presence of Species – Fieldwork Results: Greenfinch were recorded five times in the transect surveys in winter season 2022-2023 and three times in the 2025 breeding season.

Presence of Species – Desktop Research Results: Greenfinch were observed 73 times in the OS grid squares S36 and S37 (most recently in 2025 in S37), and 50 times in S46 and S47 (most recently in 2023 in S46).

Due to the record of the species within the vicinity of the site, **Greenfinch are considered a Key Ecological Receptor**.

EIAR 13.3.6.3.6 House Martin 'Amber-listed'

House Martin (*Delichon urbicum*) construct nests out of mud, usually underneath the eaves of houses but will also nest on cliffs. They are not present in Ireland as an overwintering species. They feed on invertebrates such as aphids and mayflies.

Presence of Species – Fieldwork Results: House Martin were recorded 20 times in transect surveys in the 2025 breeding season and 13 times in the 2026 breeding season.

Presence of Species – Desktop Research Results: House Martin were observed 46 times in the OS grid squares S36 and S37 (most recently in 2025 in S37), and 44 times in S46 and S47 (most recently in 2025 in S47).

Due to the record of the species within the vicinity of the site, **House Martin are considered a Key Ecological Receptor**.

EIAR 13.3.6.3.7 House Sparrow 'Amber-listed'

House Sparrow (*Passer domesticus*) are one of Irelands most widespread bird species, being resident year-round. They breed mainly around farm buildings and built-up areas, nesting in building cavities.

Presence of Species – Fieldwork Results: House Sparrow were recorded 29 times in the transect surveys in winter 2022/2023, 30 times in the 2025 breeding season, 21 times in winter 2025/2026, and four times in the 2026 breeding season.

Presence of Species – Desktop Research Results: House Sparrow were observed 56 times in the OS grid squares S36 and S37 (most recently in 2025 in S37), and 67 times in S46 and S47 (most recently in 2024).

Due to the record of the species within the vicinity of the site, **House Sparrow are considered a Key Ecological Receptor**.

EIAR 13.3.6.3.8 Linnet 'Amber-listed'

Linnet (*Linaria cannabina*) breed in a variety of habitats, including rough grassland, uplands and in coastal areas with gorse. Rather social and small flocks can be seen even during the breeding season. They are mainly resident within Ireland but will gather in large flocks outside of the breeding season. Linnet feed on seeds, spilt grain, buds and some insects, particularly when feeding young.

Presence of Species – Fieldwork Results: Linnet were recorded once in transect surveys conducted in winter 2022/2023, 4 times in the breeding season 2025, 68 times in winter 2025/2026, and 4 times in the breeding season 2026. There were 3 incidental Linnet sightings during VP surveys in 2025.

Presence of Species – Desktop Research Results: Linnet were observed 42 times in the OS grid squares S36 and S37 (most recently in 2025 in S37), and 34 times in S46 and S47 (most recently in 2023 in S47).

Due to the record of the species within the vicinity of the site, **Linnet are considered a Key Ecological Receptor**.

EIAR 13.3.6.3.9 Skylark 'Amber-listed'

Skylark (*Alauda arvensis*) are a common resident throughout Ireland. They breed in a variety of habitats including cultivated areas, ungrazed grassland and upland heaths. They usually winter in flocks on stubble fields, grasslands and coastal areas and are joined by birds from continental Europe.

Presence of Species – Fieldwork Results: Skylark were recorded three times during transect surveys in the winter season 2022/2023, 28 times in the 2025 breeding season, and 44 times in the 2026 breeding season.

Presence of Species – Desktop Research Results: Skylark were observed 32 times in the OS grid squares S36 and S37 (most recently in 2024 in S37), and 31 times in S46 and S47 (most recently in 2023 in S47).

Due to the record of the species within the vicinity of the site, **Skylark are considered a Key Ecological Receptor**.

EIAR 13.3.6.3.10 Starling 'Amber-listed'

Starling (*Sturnus vulgaris*) are a widespread bird found in the countryside, in woodland and farmland, and in towns and cities. They breed throughout Ireland, but rare or absent on mountain and on moorland in holes or crevices in buildings and in trees, often in loose colonies. Breeding birds are largely resident and are joined by huge numbers of birds from the continent in the winter. They will form huge flocks in the winter and roost in urban situation such as old buildings and piers and in the countryside in reed beds, woodland and on the coast. Starling will forage in a wide variety of situations, usually on grassland in parks, gardens and farmland, but will also feed in trees, on scraps in the streets, on refuse tips and on the strandline. This species is amber-listed based on the low survival rate of juveniles through their first winter. As such, its winter abundance and foraging habitat is the primary conservation objective.

Presence of Species – Fieldwork Results: Starling were recorded 559 times during transect surveys in winter 2022/2023, 74 times in the 2025 breeding season, 268 times in winter 2025/26, and 11 times in the 2026 breeding season. Starling were recorded 40 times during I-WeBS surveys in the winter season 2022/2023. Incidental sightings of Starling were also recorded during VP surveys in 2025.

Presence of Species – Desktop Research Results: Starling were observed 61 times in the OS grid squares S36 and S37 (most recently in 2025 in S37), and 72 times in S46 and S47 (most recently in 2024).

Due to the record of the species within the vicinity of the site and the population extent recorded during transects, **Starling are considered a Key Ecological Receptor**.

EIAR 13.3.6.3.11 Swallow 'Amber-listed'

Swallow (*Hirundo rustica*) construct a bowl-shaped nest out of mud in suitable locations, generally on farm buildings with easy access to insect-rich feeding areas where they feed on insects in flight.

Presence of Species – Fieldwork Results: Swallow were recorded 34 times during transect surveys in the 2025 breeding season and ten times during the 2026 breeding season.

Presence of Species – Desktop Research Results: Swallow were observed 76 times in the OS grid squares S36 and S37 (most recently in 2024 in S37), and 93 times in S46 and S47 (most recently in 2024).

Due to the record of the species within the vicinity of the site, **Swallow are considered a Key Ecological Receptor**.

EIAR 13.3.6.3.12 Tree Sparrow 'Amber-listed'

Tree Sparrow (*Passer montanus*) are a local resident in the east of Ireland. They nest in cavities in building. They are largely sedentary, but young may disperse to new areas.

Presence of Species – Fieldwork Results: Tree Sparrow were recorded 25 times in transect surveys in the winter 2022/2023 season.

Presence of Species – Desktop Research Results: Tree Sparrow were observed 2 times in the OS grid square S37 (most recently in 2021), and 6 times in S46 and S47 (most recently in 2022 in S47).

Due to the record of the species within the vicinity of the site, **Tree Sparrow are considered a Key Ecological Receptor**.

EIAR 13.3.6.3.13 Wheatear 'Amber-listed'

Wheatear (*Oenanthe oenanthe*) are a widespread summer visitor to Ireland. Breeds in a variety of habitats, including areas of exposed rock and short vegetation, while Wheatear winters in southern Africa. Their diet includes insects and invertebrates.

Presence of Species – Fieldwork Results: Wheatear were not recorded during field surveys for the Gathabawn Windfarm.

Presence of Species – Desktop Research Results: Wheatear were observed 4 times in the OS grid square S37 (most recently in 2024).

Due to the limited record of the species within the vicinity of the site, **Wheatear are not considered a Key Ecological Receptor**.

EIAR 13.3.6.3.14 Willow Warbler 'Amber-listed'

Willow Warbler (*Phylloscopus trochilus*) are one of the commonest breeding birds in Ireland, with highest densities in Willow stands along the edges of bogs and marshes, less frequently but still common in hedgerows, woodlands and gardens with well-established shrubs and trees. They are not present in Ireland as an overwintering species. Willow Warbler feed almost exclusively on insects and other invertebrates.

Presence of Species – Fieldwork Results: Willow Warbler were recorded 25 times during transect surveys in the 2025 breeding season and 20 times in the 2026 breeding season.

Presence of Species – Desktop Research Results: Willow Warbler were observed 36 times in the OS grid squares S36 and S37 (most recently in 2023 in S37), and 55 times in S46 and S47 (most recently in 2023 in S47).

Due to the record of the species within the vicinity of the site, **Willow Warbler are considered a Key Ecological Receptor**.

EIAR 13.3.6.3.15 Key Biodiversity Receptors - Passerines

Red-listed species recorded during surveys comprise **Meadow Pipit**, **Redwing** and **Yellowhammer**, while 'Amber-list' species recorded include **Willow Warbler, Starling, Linnet, Swallow, Goldcrest, Greenfinch, House Martin, House Sparrow, Skylark, Tree Sparrow** and **Wheatear.** Red-listed and amber-listed species which were recorded during surveys are brought forward for further evaluation as **key ecological receptors** due the extent of suitable foraging and nesting habitat within the ecological baseline.

All other passerine species recorded were 'green-list' species and are not considered further herein. Details of red, amber and green-listed birds recorded during bird surveys are provided in full in **Appendix 13.6.**

EIAR 13.3.6.4 Waders

Wader species recorded at the windfarm site during bird surveys are typical for the habitats at the windfarm site and surrounding areas, which mainly comprises agricultural grassland and hedgerows.

In the wider area, waders were recorded during the I-WeBS and VP surveys. Site visits prior to 2024 determined no suitable habitat was present within 1km that would warrant breeding wader surveys.

EIAR 13.3.6.4.1 Curlew 'Red-listed'

Curlew (*Numenius arquata*) are the largest wader in Ireland. They nest on the ground in rough pastures, meadows and heather. While they are not a common breeder in Ireland, they are found in most parts of the country. The nearest breeding pairs for this species were recorded in Counties Tipperary and Laois (Colhoun *et al.* 2022). No recent pairs have been reported in Co. Kilkenny. In winter they may be found in a wide range of wetland habitats, both coastal and inland, and in damp fields. They feed on invertebrates, crabs and molluscs.

Presence of Species - Fieldwork Results: The peak count recorded for Curlew during I-WeBS surveys was 22 in 2022/2023. All Curlew sightings were recorded c.5.2km west of T2.

Presence of Species – Desktop Research Results: Curlew were recorded 22 times in the OS grid squares S36 and S37 (most recently in 2024 in S37), and 25 times in S46 and S47 (most recently in 2022 in S46).

Due to the absence of records within the Gathabawn Windfarm Project site boundary and the separation distance from the nearest sightings, **Curlew are not considered a Key Ecological Receptor**.

EIAR 13.3.6.4.2 Dunlin 'Red-listed'

Dunlin (*Calidris alpina*) are a summer visitor to Ireland from northwest Africa and southwest Europe, and winter visitor from Scandinavia to Siberia. Dunlin nest on the ground in sparse, low vegetation during the breeding season, and winters along coastal areas, especially on tidal mudflats and estuaries, with very few inland. Most Dunlin feed predominantly on small invertebrates of estuarine mudflats.

Presence of Species - Fieldwork Results: The peak count recorded for Dunlin during I-WeBS surveys was 50. The Dunlin sightings were west of Ballylehaun, c.5.2km from the closest proposed Gathabawn Windfarm turbine.

Presence of Species – Desktop Research Results: Dunlin were recorded 8 times in the OS grid square S37 (most recently in 2024), and 1 time in S46 (most recently in 2022).

Due to the absence of records within the Gathabawn Windfarm Project site boundary and the separation distance from the nearest sightings, **Dunlin are not considered a Key Ecological Receptor**.

EIAR 13.3.6.4.3 Golden Plover 'Red-listed'

Golden Plover (*Pluvialis apricaria*) are generally found in large, densely-packed flocks, and in a variety of habitats both coastal and inland during winter, when their distribution is widespread in Ireland. They very rarely breed in Ireland (c.10 pairs), with breeding limited to the west/northwest coastal areas of Ireland in heather moors, blanket bogs and acidic grasslands. Golden Plover feed on a variety of soil and surface-living invertebrates, principally soil invertebrates.

Presence of Species – Fieldwork Results (windfarm): Golden Plovers were observed during VP surveys 1,378 times in the winter season 2022/2023 and 28 times in the breeding season 2025.

Presence of Species – Fieldwork Results (grid connection): Golden Plovers were not observed utilising the River Nore or in the suitable foraging habitat along the Candidate Gathabawn Grid Connection during I-WeBS or VP efforts

Presence of Species – Desktop Research Results: Golden Plovers were recorded 20 times in the overlapping OS grid squares S36 and S37 (most recently in 2024 in S37), and 17 times in S46 and S47 (most recently in 2023 in S46).

Due to the records within the Gathabawn Windfarm Project site boundary and extent of activity recorded, and despite the absence of records along the Candidate Gathabawn Grid Connection, **Golden Plover are considered a Key Ecological Receptor**.

EIAR 13.3.6.4.4 Lapwing 'Red-listed'

Lapwing (*Vanellus vanellus*) are a resident and widespread species that has suffered significant population decline in recent years. They breed on open farmland and appear to prefer nesting in fields that are relatively bare (particularly when cultivated in the spring) and adjacent to grass. Their wintering distribution in Ireland is widespread. Large flocks are regularly recorded in a variety of habitats, including most of the major wetlands, and also in pasture and rough land adjacent to bogs. Lapwing feed on a variety of soil and surface-living invertebrates, particularly small insects, spiders and earthworms.

Presence of Species – Fieldwork Results (windfarm): VP surveys recorded 36 Lapwing during the winter 2022/2023 season, with a further eight recorded in winter 2025/2026. Lapwing were not recorded utilising the windfarm site during transect or wader surveys. However, suitable foraging habitat (i.e. grassland) is present in the vicinity of the proposed development. A peak count of 64 Lapwing was recorded in February 2023 during I-WeBS Surveys in winter 2022/2023, the closest record (of six Lapwing) was recorded in November 2022, 3.5km from T1. A peak count of 70 Lapwing was recorded in January 2026 during I-WeBS surveys in winter 2025/2026, the closest record being 4.5km from T1.

Presence of Species – Fieldwork Results (grid connection): Surveys along the River Nore yielded sightings of Lapwing in the fields along the River Nore South of the Ballyring – Parksgrove UGC, with sightings in winter 2022/2023 flying across the River Nore.

Presence of Species – Desktop Research Results: Lapwing sightings were recorded 53 times in overlapping OS grid squares S36 and S37 (most recently in 2025 in S37), and 42 times in S46 and S47 (most recently in 2023 in S46).

Due to the records within the Gathabawn Windfarm Project site boundary and extent of activity recorded, and despite the absence of records along the Candidate Gathabawn Grid Connection, **Lapwing are considered a Key Ecological Receptor**.

EIAR 13.3.6.4.5 Snipe 'Red-listed'

A relatively common wader, Snipe (*Gallinago gallinago*) are a summer visitor from western Europe and west Africa and a winter visitor from Scandinavia and Scotland. They nest on the ground, usually concealed in a grassy tussock, in or near wet or boggy terrain. Young leave the nest soon after hatching. They have a widely dispersed distribution in winter foraging across a variety of wetland and damp habitats. Snipe diet consists largely of vegetable matter and seeds, earthworms, grubs and other soil invertebrates.

Presence of Species – Fieldwork Results (windfarm):: Four Snipe were recorded during VP surveys in the winter season 2022/2023, one Snipe was recorded during VP surveys in the 2025 breeding season, and eight Snipe were recorded during VP surveys in the winter season 2025/2026. Two Snipe were recorded during transect surveys in winter 2022/2023, with a further two recorded in winter 2025/2026. Winter season I-WeBS surveys recorded a peak count of 10 Snipe in 2022/2023 and one Snipe in 2025/2026. Incidental sightings of Snipe include one Snipe during badger surveys in April 2025, one Snipe during bat transect surveys in August 2025 and two Snipe during reptile surveys in August 2025.

Presence of Species – Fieldwork Results (grid connection): Surveys along the River Nore yielded sightings of Snipe in the fields along the River Nore South of the Ballyring – Parksgrove UGC.

Presence of Species – Desktop Research Results: Snipe were recorded 40 times in the overlapping OS grid squares S36 and S37 (most recently in 2025), and 25 times in S46 and S47 (most recently in 2024 in S47).

Due to the records within the Gathabawn Windfarm Project site boundary and the extent of activity recorded along the Candidate Gathabawn Grid Connection, **Snipe are considered a Key Ecological Receptor**.

EIAR 13.3.6.4.6 Woodcock 'Red-listed'

Woodcock (*Scolopax rusticola*) nest on the ground in forests and woodland, usually well camouflaged against dead leaves and low vegetation. Woodcock are red-listed for its breeding population due to loss of suitable habitat.

Presence of Species – Fieldwork Results: No Woodcock were recorded during any surveys at the Gathabawn Windfarm site.

Presence of Species – Desktop Research Results: Woodcock sightings were recorded 7 times in the overlapping OS grid square S37 (most recently in 2021), and 3 times in S47 (most recently in 2018).

Despite the absence of records from field surveys, there is suitable habitat (conifer plantation and hazel wood) present adjacent to both Ballylehaun and Ballyring sites. As such, **Woodcock are considered a Key Ecological Receptor** under the precautionary principle.

EIAR 13.3.6.4.7 Key Biodiversity Receptor Scoping - Waders

Golden Plover, Snipe, Lapwing and Woodcock were recorded during bird surveys for the proposed windfarm, and/or in the vicinity of the Site and consequently are included as **Key Ecological Receptors** herein.

EIAR 13.3.6.5 Waterbirds

The River Barrow and River Nore SAC is separated by a distance of 4.8km from the nearest wind turbine in the proposed Gathabawn Windfarm, and is crossed by the Candidate Gathabawn Grid Connection.

The River Barrow and River Nore SAC is of ornithological importance for a number of EU Birds Directive Annex I waterbird species including Greenland White-fronted Goose, Whooper Swan, Bewick's Swan and Bar-tailed Godwit. Furthermore, nationally important numbers of Bar-tailed Godwit are found during the winter in the SAC. NBDC records show observations of each of these species within the grid squares covering the site.

The River Nore SPA (Site Code: 004233) is located 5km from the nearest Gathabawn Windfarm turbine. The River Nore SPA (Site Code: 004233) is also crossed by the Candidate Gathabawn Grid Connection.

The site is of special conservation interest for Kingfisher. In addition to Kingfisher, other waterbird species which occur within the SPA include Mute Swan, Mallard, Cormorant, Grey Heron and Moorhen (NPWS, 2011). NBDC records show observations of each of these species within the grid squares covering the site.

EIAR 13.3.6.5.1 Shoveler 'Red-listed'

Shoveler (*Anas clypeata*) are a resident and winter migrant in Ireland. Wintering birds originate from across France, northern Europe, the Baltic and western Russia, and winter on a variety of habitats in Ireland including coastal estuaries, lagoons, inland lakes and callows. Breeding populations nest on the ground among waterside vegetation. They feed predominantly on zooplankton, small molluscs, insects, larvae, seeds and plant material.

Presence of Species – Fieldwork Results: A peak count of 25 Shoveler was recorded in January 2026 during I-WeBS surveys in the winter season 2025/2026, with the nearest sighting c.5.2km from the closest proposed Gathabawn Windfarm turbine

Presence of Species – Desktop Research Results: Shoveler were observed 7 times in the OS grid squares S36 and S37 (most recently in 2024 in S37), and 2 times in S46 (most recently in 2022).

Due to the absence of records within the Gathabawn Windfarm Project site boundary and the separation distance from the nearest sightings, **Shoveler are not considered a Key Ecological Receptor**.

EIAR 13.3.6.5.2 Black-headed Gull 'Amber-listed'

Black-headed Gull (*Larus ridibundus*) are a resident along all Irish coasts. They breed on the coast and inland, nesting on the ground in wetland areas such as bogs, marshes and lakes. Irish populations are augmented by wintering birds from northern and eastern Europe and are widespread on both the coast and inland.

Presence of Species – Fieldwork Results (windfarm): Black-headed Gull were observed 328 times during VP surveys on the Nore river in 2026. Black-headed Gull were also recorded 112 times during VP surveys onsite in winter 2022/2023, 8 times in the 2025 breeding season, 89 times in winter 2025/2026, and 18 times in the 2026 breeding season. They were also recorded 5 times during transect surveys in winter 2025/2026. A peak count of 9 Black-headed Gull was recorded in January 2023 during I-WeBS surveys in winter 2022/2023, and 67 Black-headed Gull in December 2025 in winter 2025/2026.

Presence of Species – Fieldwork Results (grid connection): Black-headed Gull were observed utilising the habitat along the Candidate Gathabawn Grid Connection

Presence of Species – Desktop Research Results: Black-headed Gull were observed 24 times in the OS grid squares S36 and S37 (most recently in 2023), and 16 times in S46 and S47 (most recently in 2014 in S47).

Due to the records within the Gathabawn Windfarm Project site boundary, and extent of activity recorded, and along the Candidate Gathabawn Grid Connection, **Black-headed Gull are considered a Key Ecological Receptor**.

EIAR 13.3.6.5.3 Common Gull 'Amber-listed'

Common Gull (*Larus canus*) are a local breeding species in western Ireland. They nest on the ground in a wide variety of habitats, including islands, cliffs and shingle banks. In winter, the numbers of resident birds are joined by wintering birds from Europe. They feed on insects and other invertebrates, fish and fisheries waste.

Presence of Species – Fieldwork Results: Common Gull were not recorded during bird surveys for the Gathabawn Windfarm site.

Presence of Species – Desktop Research Results: Common Gull were observed 3 times in the OS grid squares S36 and S37 (most recently in 2023).

Due to the absence of field records and limited suitability habitat on site, **Common Gull are not considered a Key Ecological Receptor**.

EIAR 13.3.6.5.4 Coot 'Amber-listed'

Coot (*Fulica atra*) are a resident in Ireland at ponds and lakes. They nest in large shallow bodies of water that have abundant bottom vegetation. Wintering Coot are found on lakes, coastal estuaries and river systems. Coot are omnivorous, but feed mainly on plants.

Presence of Species – Fieldwork Results: A peak count of 3 Coot was recorded in January and February 2023 during I-WeBS surveys in winter 2022/2023, and a peak count of 12 Coot was recorded in March 2026 in winter 2025/2026. The closest record c.3.5km north of T1, the closest Gathabawn Windfarm turbine.

Presence of Species – Desktop Research Results: Coot were observed 14 times in the OS grid squares S36 and S37 (most recently in 2024 in S37), and 10 times in S46 and S47 (most recently in 2023 in S46).

Due to the absence of records within the Gathabawn Windfarm Project site boundary and the separation distance from the nearest sightings, **Coot are not considered a Key Ecological Receptor**.

EIAR 13.3.6.5.5 Cormorant 'Amber-listed'

Cormorant (*Phalacrocorax carbo*) are a resident waterbird in Ireland, breeding in colonies mainly around the coast. Birds on the coast breed on cliffs while those inland breed in trees. Cormorant winter at sea and inland.

Presence of Species – Fieldwork Results (windfarm):: Cormorant were recorded seven times during VP surveys on the river Nore in 2026. Cormorant were recorded three times in VP surveys onsite in winter 2022/2023. All of these records are from the lands around the River Nore north of Ballyragget, c.5.5km from the T9, the closest Gathabawn Windfarm turbine.

Presence of Species – Fieldwork Results (grid connection): Cormorant were recorded seven times during VP surveys on the River Nore in 2026. Cormorant were recorded three times in VP surveys on site in winter 2022/2023. All of these records are from the lands around the River Nore north of Ballyragget.

Presence of Species – Desktop Research Results: Cormorant were observed 37 times in the OS grid square S37 (most recently in 2025), and 12 times in S46 and S47 (most recently in 2023 in S47).

Due to the records within the Gathabawn Windfarm Project site boundary, and extent of activity recorded, and along the Candidate Gathabawn Grid Connection, **Cormorant are considered a Key Ecological Receptor**.

EIAR 13.3.6.5.6 Herring Gull 'Amber-listed'

Herring Gull (*Larus argentatus*) are a resident along all Irish coasts, breeding in colonies around the coast with wintering populations widespread on the coast and inland. Their numbers grow considerably during winter with the arrival of birds from Scandinavia.

Presence of Species – Fieldwork Results: Herring Gull were recorded ten times during VP surveys in winter 2022/2023.

Presence of Species – Desktop Research Results: Herring Gull were observed 5 times in the OS grid squares S36 and S37 (most recently in 2024 in S36), and 3 times in S46 and S47 (most recently in 2022 in S47).

Due to the records within the Gathabawn Windfarm Project site boundary and extent of activity recorded, **Herring Gull are considered a Key Ecological Receptor**.

EIAR 13.3.6.5.7 Lesser Black-backed Gull 'Amber-listed'

Lesser Black-backed Gull (*Larus fuscus*) are a summer visitor to lakes and coasts in Ireland, nesting on the ground in a variety of sites, including islands, inland lakes, sand dunes and coastal cliffs. In the winter, Lesser Black-backed Gull are found both inland and along the coast with numbers augmented by migrating birds passing through Ireland.

Presence of Species – Fieldwork Results (windfarm):: Lesser Black-backed Gull were recorded 337 times during VP surveys on the river Nore in 2026. Lesser Black-backed Gull were recorded 707 times during VP surveys in winter 2022/2023, 57 times in the 2025 breeding season, 208 times in winter 2025/2026, and 23 times in the 2026 breeding season. A peak count of 210 Lesser Black-backed Gull was recorded in January 2023 during I-WeBS surveys in winter 2022/2023, and 135 in November 2025 during I-WeBS surveys in winter 2025/2026. They were also recorded 50 times during transect surveys in winter 2025/2026, and once in the 2026 breeding season.

Presence of Species – Fieldwork Results (grid connection): Lesser Black-backed Gull were observed utilising the habitat along the Candidate Gathabawn Grid Connection.

Presence of Species – Desktop Research Results: Lesser Black-backed Gull were observed 22 times in the OS grid squares S36 and S37 (most recently in 2023), and 6 times in S46 and S47 (most recently in 2023 in S47).

Due to the records within the Gathabawn Windfarm Project site boundary, and extent of activity recorded, and along the Candidate Gathabawn Grid Connection, **Lesser Black-backed Gull are considered a Key Ecological Receptor**.

EIAR 13.3.6.5.8 Mallard 'Amber-listed'

Mallard (*Anas platyrhynchos*) are a resident species in Ireland throughout the year. Their nest sites are mostly in ground where hidden in vegetation, while in winter they occur in almost all available wetland habitats. Mallard diet is highly variable, consisting of seeds, molluscs, crustaceans, grain and stubble.

Presence of Species – Fieldwork Results (windfarm): Mallard were recorded once during VP surveys in winter 2022/2023, flying over the River Nore c.6.5km northeast of the closest Gathabawn Windfarm turbine, and 2 times in the 2026 breeding season. A peak count of 16 Mallard was recorded in March 2023 during I-WeBS surveys in winter 2022/2023, and a peak count of 58 Mallard in November 2025 during I-WeBS surveys in winter 2025/2026. The closest record was c.2.4km south of T12, the closest Gathabawn Windfarm turbine.

Presence of Species – Fieldwork Results (grid connection): Mallard were observed utilising the habitat along the Candidate Gathabawn Grid Connection.

Presence of Species – Desktop Research Results: Mallard were observed 23 times in the OS grid squares S36 and S37 (most recently in 2025 in S37), and 59 times in S46 and S47 (most recently in 2023).

Due to the records within the Gathabawn Windfarm Project site boundary and extent of activity recorded, **Mallard are considered a Key Ecological Receptor**.

EIAR 13.3.6.5.9 Little Egret

Little Egret year-round residents of rivers, lakes and coasts in Ireland, nesting on the ground in a variety of sites, including islands, shallow lakes, flood fields and estuaries. In the winter, Little Egret are found both inland and along the coast, along riverbanks and coastal habitats.

Presence of Species – Fieldwork Results (grid connection): Little Egret were observed utilising the habitat along the River Nore upstream and downstream of the Parksgrove – Moatpark UGC.

Due to the limited records within the Gathabawn Windfarm Project site boundary, and extent of activity recorded here, and along the Candidate Gathabawn Grid Connection, **Little Egret are not considered a Key Ecological Receptor**..

EIAR 13.3.6.5.10 Mute Swan 'Amber-listed'

Mute Swan (*Cygnus olor*) are a resident at wetlands throughout Ireland. They breed on lakes, ponds and rivers, and nests are a large mound constructed from reed stem and other aquatic vegetation, with seaweed used in coastal locations. Their diet consists of aquatic plants, occasionally feeding on small amphibians, snails and insects.

Presence of Species – Fieldwork Results: Mute Swan were recorded 3 times during VP surveys on the River Nore in 2026, 10 times during the winter season 2022/2023 and 8 times during the winter season 2025-2026. During these VP surveys, Mute Swan was recorded flying c.0.2km south of the Ballylehaun Section in 2023, with four Mute Swan flying between T8 and T10 at the Ballyring Section. A further eight Mute Swan were recorded flying through the Ballylehaun Section in October 2025, with the closest records c.150m north of T6. A peak count of 12 Mute Swan were recorded in November 2022 during I-WeBS surveys in winter 2022/2023, with a peak count of 9 recorded in November 2025. The closest records were c.3.5km north of the Ballylehaun Section.

Presence of Species – Fieldwork Results (grid connection): Mute Swan were observed utilising the habitat along the Candidate Gathabawn Grid Connection.

Presence of Species – Desktop Research Results: Mute Swan were observed 48 times in the OS grid squares S36 and S37 (most recently in 2025 in S37), and 48 times in S46 and S47 (most recently in 2023 in S46).

Due to the records within the Gathabawn Windfarm Project site boundary, and extent of activity recorded, and along the Candidate Gathabawn Grid Connection, **Mute Swan are considered a Key Ecological Receptor**.

EIAR 13.3.6.5.11 Teal 'Amber-listed'

Teal (*Anas crecca*) breed in small numbers throughout Ireland near small freshwater lakes or pools and small upland streams away from the coast. Their numbers increase after autumn and winter migration takes place, wintering on wetlands with good cover.

Presence of Species – Fieldwork Results (windfarm): A peak count of 60 Teal was recorded in January 2023 during I-WeBS surveys in winter 2022/2023, and a peak count of 43 recorded in November 2025 during winter 2025/2026 surveys. The closest record was c.2.4km south of T12, the closest Gathabawn Windfarm turbine.

Presence of Species – Fieldwork Results (grid connection): Teal were observed utilising the habitat along the Candidate Gathabawn Grid Connection.

Presence of Species – Desktop Research Results: Teal were observed 17 times in the OS grid squares S36 and S37 (most recently in 2024 in S37), and 12 times in S46 and S47 (most recently in 2024 in S47).

Due to the records within the Gathabawn Windfarm Project site boundary, and extent of activity recorded, and along the Candidate Gathabawn Grid Connection, **Teal are not considered a Key Ecological Receptor**.

EIAR 13.3.6.5.12 Tufted Duck 'Amber-listed'

Tufted Duck (*Aythya fuligula*) are a resident and winter visitor to Ireland. Their nests are built in waterside vegetation, with Tufted Duck showing a preference for large open lakes in lowland areas. They winter on lowland freshwater lakes, but often seen on town lakes, canals and slow-moving rivers. Their diet consists predominantly of mussels, crustaceans and insect larvae.

Presence of Species – Fieldwork Results: Tufted Duck were not recorded in the bird surveys conducted for the Gathabawn Windfarm site.

Presence of Species – Desktop Research Results: Tufted Duck were observed 1 time in the OS grid square S37 in 2020.

Due to the absence of records within the Gathabawn Windfarm Project site boundary, **Tufted Duck are not considered a Key Ecological Receptor**.

EIAR 13.3.6.5.13 Wigeon 'Amber-listed'

Wigeon (*Mareca penelope*) are a common winter visitor to Ireland. In winter, Wigeon are widespread, occurring on coastal marshes, freshwater and brackish lagoons, estuaries, bays, inland wetlands, lakes, rivers and turloughs.

Presence of Species – Fieldwork Results: A peak count of 100 Wigeon was recorded in February 2023 during I-WeBS surveys in winter 2022/2023, and a peak count of 208 recorded in March 2026 during winter 2025/2026 surveys. The closest record was of eight no. Wigeon c.2.4km south of T12, the closest Gathabawn Windfarm turbine.

Presence of Species – Desktop Research Results: Wigeon were observed 14 times in the OS grid squares S36 and S37 (most recently in 2024 in S37), and 8 times in S46 and S47 (most recently in 2023 in S46).

Due to the absence of records within the Gathabawn Windfarm Project site boundary and the separation distance from the nearest sightings, **Wigeon are not considered a Key Ecological Receptor**.

EIAR 13.3.6.5.14 Whooper Swan 'Amber-listed'

Whooper Swan (*Cygnus cygnus*) are present in Ireland each winter around inland wetlands, and nest in Iceland during the summer. They occasionally stay in Ireland for the summer and breed on lakes in the midlands and north-west. They forage on grassland and stubble.

Presence of Species – Fieldwork Results (windfarm): Dedicated swan VP surveys were carried out in January 2022 but did not record any Whooper Swan. Whooper Swan were recorded during winter season VP surveys with three records in winter 2022/2023 and six records in winter 2025/2026. A peak count of 28 Whooper Swan was recorded in February 2023 during I-WeBS surveys in winter 2022/2023, and a peak count of 50 recorded in March 2026 during winter 2025/2026 surveys. The closest of these records located c.4.2km north of T1.

Presence of Species – Fieldwork Results (grid connection): Whooper Swan were observed utilising the habitat along the Candidate Gathabawn Grid Connection

Presence of Species – Desktop Research Results: Whooper Swan were observed 36 times in the OS grid square S37 (most recently in 2025), and 11 times in S46 and S47 (most recently in 2023 in S46).

Due to the records within the Gathabawn Windfarm Project site boundary, and extent of activity recorded, and along the Candidate Gathabawn Grid Connection, **Whooper Swan are considered a Key Ecological Receptor**.

EIAR 13.3.6.5.15 Key Biodiversity Receptor Scoping - Waterbirds

Based on the activity recorded within the viewshed study area and the potential for impacts as a result of the Gathabawn Windfarm Project, **Black-headed Gull, Cormorant, Herring Gull, Lesser Black-backed Gull, Mallard, Mute Swan, and Whooper Swan** are considered **Key Ecological receptors**.

EIAR 13.3.6.6 Existing Sources of Impacts on Birds

In relation to the key ecological receptors, the occurrence of existing pollution or environmental damage in the areas on or around the locations of the proposed Gathabawn Windfarm has also been considered and no existing pollution or damage to suitable bird breeding or foraging habitat is taking place at the windfarm site on wader or waterbird species.

However, regular maintenance cutting of hedgerows and the spraying of pesticides within the agricultural fields does pose threats to nesting passerines and birds of prey vulnerable to pesticide-related impacts on food supply and secondary poisoning of affected invertebrates.

EIAR 13.3.7 Context and Characteristics of AQUATIC HABITATS & SPECIES

EIAR 13.3.7.1 Aquatic Habitats

The watercourses in the vicinity of the proposed Gathabawn Windfarm are typically historically modified lowland depositing channels (FW2; Fossitt, 2000) and more natural upland eroding channels (FW1) (*see Terrestrial Habitats Section EIAR 13.3.1.1 for more details*). These small watercourses drain into several sub-basins and sub-catchments (Goul_SC_010 and Nore_SC_070 river sub-catchments), all within the catchment of the Nore Hydrometric Area 15.

Land use practices at the windfarm site and in the wider survey area are dominated by pastures (CORINE 231). Predominantly, the watercourses flow over areas of Visean limestone & calcareous shale and Tournaisian limestone (Geological Survey of Ireland data).

The Candidate Gathabawn Grid Connection crosses 6 watercourses - five of these crossings are smaller rivers and streams (W1, W2, W3, W4, W5). The Parksgrove – Moatpark UGC runs along the verge of the N77 directly parallel to the River Nore before entering agricultural lands and crossing the River Nore via HDD works.

Survey effort: A review was carried out of EPA monitoring stations within the catchment area and the results of EPA monitoring at these locations over the last ten years. In addition, Q-sampling, habitat evaluations and electrofishing were carried out during aquatic surveys in July 2025 at 17 no. sites selected for detailed aquatic assessment in downstream watercourses. The EPA monitoring stations and Aquatic Survey locations are identified on Figure 13.6: Aquatic Habitats & Species.

The results of these surveys are summarised below, and the survey locations and results are illustrated on Figure 13.6: Aquatic Habitats & Species. Detailed survey results can be found in Appendix 13.8: Aquatic Ecology Baseline & Fisheries Report. Figures and Appendices are included at the end of this Chapter.

EIAR 13.3.7.1.1 Watercourses, Sub-basins, Sub-Catchments, and Habitat Quality

The following table identifies the watercourses, sub-basins, sub-catchments associated with the Gathabawn Windfarm site and also provides an overview of the available EPA water quality data from hydrologically connected watercourses within these catchments. Only recent EPA water quality data (i.e., 2019-2024) is included. In addition, the biological water quality at Aquatic Survey locations downstream of the Gathabawn Windfarm is also provided in the table.

Table 13-16: Watercourses, sub-basins, Sub-catchments, EPA Monitoring Results and Aquatic Survey locations

Watercourse Name Stream Order (EPA Code/EU Code)	**Downstream Distance from nearest works**	**Sub-Basin & (*Sub-catchment*)**	**Sub-basin WFD Status & At-Risk Rating (2019-2024)**	**EPA Monitoring Station, location & Result**	**2025 Aquatic Survey – Biological Water Quality Results** (macroinvertebrates)
WINDFARM					
Coolnacrutta Stream 1st Order 15C50 / IE_SE_15G020360	510m from construction works at the Ballylehaun Area	**GOUL_050 *Goul_SC_010***	Moderate 'At risk'	No Q Value data	A1: Q2-3 A2: Q3

Watercourse Name Stream Order (EPA Code/EU Code)	**Downstream Distance from nearest works**	**Sub-Basin & (*Sub-catchment*)**	**Sub-basin WFD Status & At-Risk Rating (2019-2024)**	**EPA Monitoring Station, location & Result**	**2025 Aquatic Survey – Biological Water Quality Results** (macroinvertebrates)
Goul River 4th Order 15G02 / IE_SE_15G020360	4.2km from construction works at the Ballylehaun Area		Moderate 'At risk'	RS15G020360, Q3-4 (Moderate Status, 2025)	A3: Q3
Goul River 4th Order 15G02 / IE_SE_15G020500	2.3km from construction works at the Ballylehaun Area	**GOUL_060 *Goul_SC_010***	Moderate 'At risk'	RS15G020500, Q3 (Poor Status, 2025) – same location used for aquatic survey A4	A4: Q3-4
Lismaine Stream 1st Order 15L16 / IE_SE_15N011700	440m from construction works at the Ballyring Area	**NORE_150 *Nore_SC_070***	Moderate 'Not at risk'	No Q Value data	B1: Q3 B2: Q2-3 B3: Q3
Nuenna River 3rd Order 15N02 / IE_SE_15N020400	4.5km from construction works at the Ballyring Area	**NUENNA_020 *Nore_SC_070***	Poor 'At risk'	RS15N020200, Q3 (Poor Status, 2025) RS15N020400, Q3 (Poor Status, 2025) – same location used for aquatic survey B6	B5: Q3 B6: Q3
Pond, Ballyring Upper	90m from construction works at the Ballyring Area	**GORTEENAHILLA_010 *Nore_SC_070***	Moderate 'At risk'	No Q Value data	P1: N/A
Gorteenahilla Stream 2nd Order 15G08 / IE_SE_15G080300	0m from construction works at the Ballylehaun-Ballyring UGC			RS15G080300, Q3-4 (Moderate Status, 2025) – same location used for aquatic survey B4	B4: Q3-4 C2: Q3
Gorteennamuck Stream 1st Order 15G39 / IE_SE_15G080300	0m from construction works at the Ballylehaun-Ballyring UGC			No Q Value data	C1: N/A
Ballyring_Upper Stream 1st Order 15B73 / IE_SE_15G080300	70m from construction works at the Ballylehaun-Ballyring UGC			No Q Value data	C3: Q3
Lisdowney (Stream) 3rd Order	0m from construction works at the Ballyring-	**NORE_140 *Nore_SC_070***	Moderate 'At risk' (IE_SE_15L020100)	RS15L020100, Q3 (Poor Status, 2025)	C4: Q3

Watercourse Name Stream Order (EPA Code/EU Code)	**Downstream Distance from nearest works**	**Sub-Basin & (*Sub-catchment*)**	**Sub-basin WFD Status & At-Risk Rating (2019-2024)**	**EPA Monitoring Station, location & Result**	**2025 Aquatic Survey – Biological Water Quality Results** (macroinvertebrates)
15L02 / IE_SE_15L020100	Parksgrove UGC				
Ballyconra Stream 1st Order 15B86 / IE_SE_15N011600	0m from construction works at the Ballyring-Parksgrove UGC		Good 'Not at risk'	No Q Value data	C5: N/A
River Nore 6th Order 15N01 / IE_SE_15N011400	0m from construction works at the Parksgrove-Moatpark UGC	**NORE_120 *Nore_SC_070***	Moderate 'At risk'	RS15N011400, Q3-4 (Moderate Status, 2020) RS15N011380, Q3-4 (Moderate Status, 2020)	C6: Q3

Fieldwork Results: The watercourses surveyed in the vicinity of the Gathabawn Windfarm were typically historically modified lowland depositing channels (FW2; Fossitt, 2000) and more natural upland eroding channels (FW1; Fossitt, 2000). Whilst good instream recovery was evident across most modified survey sites, siltation and eutrophication pressures were significant and had impacted aquatic habitats and resulted in a reduction of biological water quality. Low summer flows, very much characteristic of this region, further affected the quality of aquatic habitats. Nearly half of the riverine survey sites were of low fisheries and aquatic value and were evaluated as Local Importance (Lower Value) given an absence of aquatic species or habitats of high conservation value.

Nevertheless, a range of high conservation value species were recorded during the surveys including Annex II Atlantic Salmon (*Salmo Salar*), Lamprey (Lampetra sp.) and Otter, in addition to Red-listed European Eel. Site B6 on the Nuenna River and C6 on the River Nore are located within the River Barrow and River Nore SAC (002162) and the River Nore SPA (004233) sites. Pond site P1 supported a Smooth Newt population, a species protected under the Wildlife Acts 1976-2023. White-clawed Crayfish (*Austropotamobius pallipes*) were detected via eDNA sampling both the River Goul and Nuenna River.

Key Biodiversity Receptor Scoping: There are no watercourses within the boundary of the proposed Gathabawn Windfarm – Ballylehaun Area or Ballyring Area. There are two streams in proximity to the facilitating works in Foyle South, Coolcasshin and Garrydague – the Foyle South stream (~50m) and the Gorteenahilla Stream (5m). The Nuenna River is located downstream of the windfarm site. Due to the hydrological connectivity to these watercourses, the surveyed watercourses in the vicinity of the Gathabawn Windfarm **are considered key ecological receptors.** Impacts to Aquatic Habitats & Species in the vicinity of the Gathabawn Windfarm site are evaluated in Section 13.4 due to their connectivity to downstream Designated Sites.

EIAR 13.3.7.1.2 Watercourses along the Candidate Gathabawn Grid Connection route

The Candidate Gathabawn Grid Connection crosses 6 watercourses - five of these crossings are smaller rivers and streams (W1, W2, W3, W4, W5). The Parksgrove – Moatpark UGC runs along the verge of the N77 directly parallel to the River Nore before entering agricultural lands and crossing the River Nore via HDD works.

Two of the watercourses crossed by the Ballylehaun – Ballyring UGC are within the Gorteenahilla_010 sub-basin (IE_SE_15G080300). Two of the watercourses crossed by the Ballyring – Parksgrove UGC (Lisdowney Stream and Ballyconra) are within the Nore_140 sub-basin (IE_SE_15N011600), and the remaining watercourse (Lismaine Stream) is within the Nore_150 sub-basin (IE_SE_15N011700).

The River Nore crossing is within the Nore_120 sub-basin (IE_SE_15N011400).

The baseline specific to these crossings is provided below.

EIAR 13.3.7.1.2.1 Gorteennamuck Stream (W1)

The Gorteennamuck stream (15G39) (IE_SE_15G080300) is a 1st order stream and was recorded at one location (C1). This stream is in the headwaters of the Gorteenahilla. The Candidate Gathabawn Grid Connection crosses this stream at the C1 sampling point. This area of the stream is of limited suitability for fish and macro-invertebrates due to the semi-dry sections of the stream and rocky outcrops along the riverbanks. Due to the diversion of this stream into a private garden pond, no fish species were present.

EIAR 13.3.7.1.2.2 Gorteenahilla Stream (W2)

The Gorteenahilla stream (15G08) (IE_SE_15G080300) is a 2nd order stream and was recorded at one location (C2). The Candidate Gathabawn Grid Connection crosses this stream at the C2 sampling point. This area of the stream is of good suitability for fish and macro-invertebrates due to the mix of shallow and deeper waters and suitable spawning areas of moderate condition for Brown Trout.

The river depths and water quality improve downstream until reaching the confluence with the River Nore.

Sampling at C2 yielded records of Brown Trout. This stream has value to spawning salmonids and has value to macro-invertebrates as well. There are also records of Otter spraint downstream of this location at the FW9 works downstream of this crossing. This stream also has intermediate suitability at the FW9 works but not at the W2 crossing.

EIAR 13.3.7.1.2.3 Lismaine Stream (W3)

The Lismaine stream (15L16)(IE_SE_15N011700) is a 1st order stream and was recorded at two locations (B1, B2). The mouth of this river joins the River Nore and was also sampled (B3). The Candidate Gathabawn Grid Connection crosses this stream downstream of the B1 sampling point. This area of the stream is of limited suitability for fish and macro-invertebrates due to the semi-dry sections of the stream and rocky outcrops along the riverbanks.

The river depths and water quality improve downstream until reaching the confluence with the River Nore.

Sampling at B3 yielded records of Atlantic Salmon, Brown Trout, Stone Loach, Minnow and Three-spined Stickleback. This site also had suitable riverbed conditions to support use as a lamprey nursery. Some ammocoetes were observed at this point as well. This watercourse has negligible suitability for Kingfisher.

EIAR 13.3.7.1.2.4 Lisdowney Stream (W4)

The Lisdowney Stream (15L02)(IE_SE_15N011600) is a 3rd order stream that was recorded at one location (C4). This location is upstream of the Candidate Gathabawn Grid Connection Crossing.

Over 26 Brown Trout were recorded at this location. Atlantic Salmon was recorded at this location in surveys in 2021 (Appendix 13.8). Otter spraint was recorded at the bridge location 1km upstream of this crossing.

Water quality was recorded as poor. The site visit in September 2026 yielded fresh spraints at this crossing and a mix of intermediate Kingfisher nesting habitat directly downstream of this crossing.

EIAR 13.3.7.1.2.5 Ballyconra stream (W5)

The Ballyconra Stream (15B86)(IE_SE_15N011600) is a 1st order stream that was recorded at one location (C5). This location is upstream of the Candidate Gathabawn Grid Connection Crossing.

This stream was dry at the time of sampling in 2025. No records of Otter were observed. This stream is upstream of a confluence with the Lisdowney stream. This watercourse has negligible suitability for Kingfisher.

EIAR 13.3.7.1.2.6 River Nore (W6)

The River Nore (15N01)(IE_SE_15N011400) is a 6th order river crossed by the Candidate Gathabawn Grid Connection between the Ballyragget bridge and the Tirlán plant. This river was surveyed at the Ballyragget bridge (C6) and downstream at where the Lismaine stream and the Moneenaun stream (15M31)(IE_SE_15N011700)meet with the River Nore (B6).

No electrofishing took place at C6 due to the challenges relating to water depths.

Suitable habitat is present that is of moderate suitability for Atlantic Salmon, Lamprey, and White-clawed Crayfish. Suitable Kingfisher nesting habitat is present upstream and downstream of the Parksgrove – Moatpark UGC.

Sampling at C6 yielded records of Atlantic Salmon, Brown Trout and European Eel. Good habitat suitability is present for Salmonid nursery and for white-clawed Crayfish. An Otter Latrine was recorded at this location.

Freshwater Pearl Mussel is no longer present downstream of the Erkina confluence (Sweeney, 2022). As such, it is not likely to be found downstream of the Candidate Gathabawn Grid Connection crossing. However, due to this Parksgrove – Moatpark UGC being submitted in a separate application, the baseline may change depending on river condition changes. As such, under the precautionary principle, Freshwater Pearl Mussel is considered present within the ecological baseline.

EIAR 13.3.7.1.3 Aquatic Habitats of Conservation Concern

The Gathabawn Windfarm site is located within the Nore catchment; the Gorteennamuck stream, Gorteenahilla stream, Ballyring Upper stream and Lismaine stream flow into the River Barrow and River Nore SAC. Sections of the Nuenna River and Lismaine stream downstream of the windfarm site form part of the River Barrow and River Nore SAC.

QI habitats of the River Barrow and River Nore SAC which could potentially occur within hydrologically connected watercourses or floodplains in the sub-catchments associated with the Gathabawn Windfarm include:

- Watercourses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation
- Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels
- Petrifying springs with tufa formation
- European dry heaths
- Killarney fern
- Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles
- Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior*.

A broad aquatic and riparian habitat assessment was conducted utilising (EA, 2003) and (Fossitt, 2000). This broad characterisation helped define the watercourses' conformity or departure from naturalness.

Surveys of the macrophyte and aquatic bryophyte communities were also conducted to identify any rare macrophyte species listed under the FPO, 2022, Irish Red List for vascular plants (Wyse-Jackson *et al.*, 2016) and/or aquatic bryophytes (Lockhart *et al.*, 2012), or habitats corresponding to Annex I aquatic habitats.

Fieldwork Results: No Annex I habitats or QI habitats of the River Barrow and River Nore SAC were recorded during aquatic surveys.

Key Biodiversity Receptor Scoping: Due to the absence of Annex I habitat recorded within the survey sites during field surveys, and the significant siltation and eutrophication pressures present within these watercourses, **Annex I aquatic habitats are not considered key ecological** receptors for the Gathabawn Windfarm Project**.** Annex I habitats are considered further in relation to the River Barrow and River Nore SAC in **Section 13.3.8 (Designated Sites)**.

EIAR 13.3.7.1.3.1 Local Water Dependent Habitats

Presence of Habitats – Desktop Research Results: There are 16 no. wetland areas identified in the County Kilkenny Preliminary Wetland Survey 2020 and by Wetland Surveys Ireland located within the same sub-basins as the Gathabawn Windfarm. The wetland areas identified within the same sub-basins as Gathabawn Windfarm are outlined in the table below:

Table 13-17: List of wetland habitats within the connected sub-basins

Wetland Name	Wetland Code	Sub-Basin	Distance from Gathabawn Windfarm construction works
Tentore	MIW_KK77	Gorteenahilla_010	60m
Clontubbrid	MIW_KK76	Nore_150	785m
Glashare Attenuation Ponds	MIW_KK235	Goul_050	800m
Rathlogan Pond	MIW_KK236	Goul_050	1.95km
Belville Farm Pond	MIW_KK231	Nuenna_020	2.4km
Parknahowen Attenuation Ponds	MIW_LA270	Goul_060	2.5km
Ballinfrase Graigueagarran	MIW_LA195	Goul_060	2.8km
Parknahown	MIW_LA193	Goul_060	3km
Clone Pond	MIW_KK86	Nore_150	3.2km
Kilrush Wetlands	MIW_KK79	Nuenna_020	3.4km
River Nuenna	MIW_KK241	Nuenna_020	3.8km
Galmoy Fen SAC	MIW_KK4	Goul_050	4km
Newtown Pond	MIW_LA189	Goul_060	5.2km
Crowhill Wet Woodland	MIW_KK83	Nore_150	5.3km
Bawntanameenagh Lake	MIW_KK82	Nuenna_020	5.4km
Newtown Mill Pond	MIW_LA302	Goul_060	6km

Key Biodiversity Receptor Scoping: There is no surface water connectivity to any of these Water Dependent Habitats, and no interactions of groundwater from site areas with these wetlands are expected to occur. Due to the lack of hydrological connectivity between the Gathabawn Windfarm and these habitats, **Local Water Dependent Habitats are not considered a key ecological receptor.**

EIAR 13.3.7.2 Aquatic Species

Survey effort: In order to determine the composition of aquatic species in the baseline environment, a catchment-wide aquatic survey at n=17 sites in the vicinity of the Gathabawn Windfarm was undertaken

during July 2025, which included electro-fishing and eDNA sampling, following notification to Inland Fisheries Ireland.

The aquatic surveys focused on species of high conservation value for which there is potential for impacts to occur. These target species are derived from the conservation objectives and site synopsis for the River Barrow and River Nore SAC. The results of the survey are discussed below in terms of population structure and size and in terms of the habitat value of the surveyed areas, and their suitability as nursery and spawning habitat for salmonids, European Eel and lamprey species. A full description of the survey results on fish stocks and local habitats is presented in Appendix 13.8. The electro-fishing / aquatic survey sites are identified on Figure 13.6: Aquatic Habitats & Species. In addition, the results of targeted eDNA surveys along the River Goul (A4) and Nuenna River (B6) have also been taken into consideration in relation to Freshwater Pearl Mussel, White-clawed Crayfish and Crayfish plague.

EIAR 13.3.7.2.1 Freshwater Pearl Mussel

The Freshwater Pearl Mussel taxon is listed as critically endangered in Ireland (Byrne *et al.* 2009) and across Europe (Moorkens *et al.*, 2017).

Presence of Species – NPWS records: Multiple records for the critically endangered hard-water form of the Freshwater Pearl Mussel were available for the River Nore. This species has declined significantly in recent years and is now confined to areas in the River Nore upstream of it's Erkina confluence at Durrow (NPWS & Triturus data). It has been concluded that pearl mussel is no longer present in the River Nore downstream of the Erkina confluence (Sweeney, 2022).

Presence of Species - Fieldwork Results: Freshwater Pearl Mussel was not recorded during aquatic surveys for the Gathabawn Windfarm. Environmental DNA sampling was undertaken on a precautionary basis in July 2025 on the River Goul (site A4) and Nuenna River (site B6). In keeping with an absence of records for the respective watercourses, Freshwater Pearl Mussel were not detected in the samples from the River Goul or Nuenna River.

Occurrence of Suitable Habitat: The Gathabawn Windfarm is located within two *Margaritifera* sensitive areas, the Nore Upper and Nore Middle catchments, both of which are designated for '*catchments of SAC populations listed in S.I. 296 of 2009'*. Freshwater Pearl Mussel favours fast-flowing and clean rivers, with coarse sand or fine gravel beds. The majority of watercourses surveyed were subject to significant siltation and eutrophication pressures, which resulted in a reduction of biological water quality. Low summer flows, very much characteristic of this region, further affected the quality of aquatic habitats and were evidently an issue for fish populations on several watercourses in the vicinity of the Gathabawn Windfarm, and therefore provided generally unsuitable habitat for Freshwater Pearl Mussel. The Nore population of Freshwater Pearl Mussel within the River Barrow and River Nore SAC is upstream of the Gathabawn Windfarm, within the Nore catchment. As such, the Gathabawn Windfarm does not have direct hydrological connectivity to the Nore population.

Key Biodiversity Receptor Scoping: Due to the limited suitability of habitat downstream of the Gathabawn Windfarm Project and absence of records from surveys in 2025, **Freshwater Pearl Mussel is not considered a key ecological receptor.**

EIAR 13.3.7.2.2 White-clawed Crayfish

Presence of Species – Desktop Research Results: A low number of records for Annex II White-clawed Crayfish were available in the wider survey area, with more contemporary records for the River Goul and River Nore (2025-2023 data). Crayfish remains have previously been identified in Otter spraint on the lower reaches of the Coolnacrutta Stream (current survey site A2) (Triturus 2022 data).

Presence of Species - Fieldwork Results: White-clawed Crayfish surveys were undertaken at the aquatic survey sites in July 2025. No White-clawed Crayfish were recorded via hand-searching or sweep netting of instream refugia at any of the aquatic survey sites in July 2025. Environmental DNA sampling detected White-clawed Crayfish eDNA at the River Goul (site A4) and Nuenna River (site B6) with 5/12 and 3/12 positive qPCR records at these survey sites, respectively. No Crayfish plague (an obligate pathogen of Crayfish) was detected in the samples.

Occurrence of Suitable Habitat: White-clawed Crayfish utilises a broad spectrum of habitats extending from smallest streams and drains to large rivers and medium-sized lakes wherever there is sufficient lime. The White-clawed Crayfish is generally associated with good-quality waters, but this is not necessarily the case in Ireland, where it can occur in water of lower quality (NPWS, 2025a). The majority of watercourses surveyed were subject to significant siltation and eutrophication pressures, which resulted in a reduction of biological water quality. Low summer flows were very much characteristic of this region. These results are in keeping with the low records for the species in the survey area and wider sub-catchments.

Key Biodiversity Receptor Scoping: Despite the absence of suitable habitat and sightings in the vicinity of the Gathabawn Windfarm site, there is hydrological connectivity to suitable habitat within the River Barrow and River Nore SAC, of which White-clawed Crayfish is a QI. **White-clawed Crayfish is considered a key ecological receptor.**

EIAR 13.3.7.2.3 Lamprey Species

Presence of Species – Desktop Research Results: The River Nore in the vicinity of Ballyragget is known to support *Lampetra* sp. Historical Sea Lamprey (*Petromyzon marinus*) records are available for the River Nore at Ballyragget (1968 and 1972). The Nuenna River is known to support low densities of *Lampetra* sp.

Presence of Species - Fieldwork Results: *Lampetra* sp. ammocoetes were recorded from a total of four sites on the Coolnacrutta Stream (A2), River Goul (A4), Lismaine Stream (B3) and Gorteenahilla River (B4), typically in low to medium densities. The River Goul at site A4, located within the River Barrow and River Nore SAC, supported Lamprey (density of 2 per m^2). Sites B3 and B4 supported higher ammocoete densities given the abundance of suitable soft sediment accumulations not typically encountered elsewhere. The Gorteenahilla River supported the highest density of Lamprey (7 per m^2) at site B4, located 1.1km southwest from the Gathabawn Windfarm construction works area.

Occurrence of Suitable Habitat: Lamprey habitat was restricted in the survey area given the higher energy conditions at many sites which discourage the settlement of organic-rich fines required for larval burial (Aronsuu & Virkkala, 2014; Goodwin *et al.*, 2008; Gardiner, 2003), plus siltation, eutrophication and hydromorphological pressures. Given that *Lampetra* spp. require fine, clean gravels for spawning (Dawson *et al.*, 2015; Rooney *et al.*, 2013; Lasne *et al.*, 2010; Kelly & King, 2001), siltation significantly impacted spawning opportunities in the survey area, with bed calcification and eutrophication also additional pressures. Channel gradients and instream barriers (both natural and anthropogenic) further restricted Lamprey populations given their poor ability to navigate even low head obstacles and higher flow velocities.

Key Biodiversity Receptor Scoping: Due to the presence of the species downstream and hydrological connectivity between Lamprey records and the Gathabawn Windfarm site, **Lamprey are considered a key ecological receptor.**

EIAR 13.3.7.2.4 Salmonids – Atlantic Salmon, Brown Trout

Presence of Species – Desktop Research Results: The River Goul, River Nore, Coolnacrutta Stream, Gorteenahilla River and the Lisdowney Stream are known to support Atlantic Salmon and Brown Trout (*Salmo trutta*), while the Nuenna River, a major tributary of the River Nore, is known to support Brown Trout.

Presence of Species - Fieldwork Results: Salmonid populations were widespread in the survey area, although were absent from the upper reaches of several watercourses such as the Coolnacrutta and Lismaine Streams (which supported salmonids further downstream). Atlantic Salmon were recorded from seven sites during aquatic surveys in July 2025 – on the Coolnacrutta Stream (A2), River Goul (A3, A4), Lismaine Stream (B3), Gorteenahilla River (B4) and Nuenna River (B5, B6). None of these points have direct hydrological connectivity with the Gathabawn Windfarm site, however it is noted that turbine delivery route facilitating works at FW9 at located 5m from the Gorteenahilla Stream, while facilitating works at FW8 are ~50m from the Foyle South stream which drains into the Gorteenahilla Stream c.120m downstream of FW9.

Brown Trout had a similar distribution being recorded from these above sites in addition to sites C2 on the Gorteenahilla River and C4 on the Lisdowney Stream. Atlantic Salmon parr were typically present only in low densities, although moderate numbers were recorded from sites on the Nuenna River and its tributary the Gorteenahilla River (superior nurseries). The Nuenna River (sites B5, B6) also supported the highest numbers of Brown Trout recorded during the survey.

Occurrence of Suitable Habitat: The watercourses surveyed in the vicinity of the Gathabawn Windfarm were typically historically modified lowland depositing channels (FW2; Fossitt, 2000) and more natural upland eroding channels. Siltation of spawning habitat was especially noticeable throughout the survey area, with Hydromorphological impacts reducing habitat heterogeneity and the quality of available nursery areas.

Key Biodiversity Receptor Scoping: Due to the presence of the species downstream and hydrological connectivity between salmonid records and suitable habitat, including nursery habitat, and the Gathabawn Windfarm site, **Atlantic Salmon and Brown Trout are considered key ecological receptors.**

EIAR 13.3.7.2.5 Other Fish Species

Other fish species recorded in the catchment (NPWS, NBDC or during aquatic surveys) include:

- Minnow (*Phoxinus phoxinus*)
- Stone Loach (*Barbatual barbatula*)
- Rudd (*Scardinius erythropthalmus)*
- Three-spined Stickleback (*Gasterosteus aculeatus*)

Presence of Species – Desktop Research Results: The River Goul is known to support Stone Loach and Three-spined Stickleback (Triturus 2021-2024 data; IFI data). The River Nore is known to support Stone Loach, Minnow and Rudd (Triturus 2021-2024 data). The Nuenna River, Gorteenahilla River, Lismaine Stream and Lisdowney Stream are known to support Three-spined Stickleback.

Presence of Species – Fieldwork Results: Minnow, Stone Loach and Three-spined Stickleback were recorded at sites A4 on the River Goul and B3 on the Lismaine Stream. Minnow (n=1) and Stone Loach (n=7) were recorded at the River Goul (A3). Three-spined Stickleback was recorded on the Lismaine Stream (B2) (n=6), Gorteenahilla River (B4) (n=2) and Ballyring Upper Stream (C3) (n=10). Rudd was not recorded during the aquatic surveys.

Occurrence of Suitable Habitat: In general, the biological water quality of the survey area was unsatisfactory status and typically of poor (Q2-3) to moderate (Q3-4) status with significant siltation and hydromorphological impacts evidently contributing to a reduction in water quality, in addition to eutrophication pressures. Agriculture, hydromorhology and urban waste are known to be the major water quality pressures within the wider survey area (EPA data), and this was supported by observations made during the aquatic surveys. The River Goul recorded high sedimentation, bed compaction and enrichment pressures. Significant siltation, as well as poor summer flows and shallow depths, were recorded in the Lismaine Stream. The Gorteenahilla River was heavily silted with high floc and filamentous algal cover indicating eutrophication pressures; a significant point source of pollution was identified immediately

upstream of the bridge with sewage fungus on the bed. The Ballyring Upper Stream suffered from low summer flows, and the substrate was heavily silted; filamentous algae cover was high, indicating eutrophication pressures.

Key Biodiversity Receptor Scoping: Due to the presence of these species downstream and hydrological connectivity between records and the Gathabawn Windfarm site, **Minnow, Stone Loach and Three-spined Stickleback are considered key ecological receptors.**

EIAR 13.3.7.2.6 European Eel

On both a global and Irish scale, the European Eel (*Anguilla anguilla*) is listed as 'critically endangered' (Pike *et al.*, 2020; King *et al.*, 2011).

Presence of Species – Desktop Research Results: The River Goul, River Nore, Coolnacrutta Stream, Gorteenahilla River and Lisdowney Stream are known to support European Eel (Triturus 2021-2024 data; IFI data).

Presence of Species – Fieldwork Results: European Eel were only recorded in low numbers at 3 no. sites on the Coolnacrutta Stream (A1), River Goul (A4) and Nuenna River (B6). Sites beyond the scope of electro-fishing on the River Nore (C6) also provided good quality European Eel habitat and likely supported the species.

Occurrence of Suitable Habitat: The low European Eel numbers and absence from many physically suitable sites likely reflects the high number of barriers to fish passage present in the Nore catchments, as well as widespread low summer flow conditions which influence and restrict fish distribution. European Eel penetration into many Nore tributaries is low (Gargan *et al.*, 2011), primarily due to the high number of aforementioned instream barriers within the catchment. As European Eel occurrence decreases significantly with increasing distance from the sea (Degerman *et al.*, 2019), the paucity of European Eel observed in the survey sub-catchments can be further explained by the distance between the survey area and marine habitats (Matondo *et al.*, 2021; Chadwick *et al.*, 2007) (c. 90km nearest instream distance).

Key Biodiversity Receptor Scoping: Due to the presence of these species downstream and hydrological connectivity between records and the Gathabawn Windfarm site, **European Eel is considered a key ecological receptor.**

EIAR 13.3.7.2.7 Aquatic Invertebrates

Presence of Species - Fieldwork Results: No rare or protected macro-invertebrate species (according to national red lists) were recorded in the samples taken from a total of 14 no. wetted riverine sites or 1 no. pond site in July 2025.

Occurrence of Suitable Habitat: The biological water quality of the survey area was unsatisfactory (i.e. ≤Q3-4) and typically of poor status (Q2-3 or Q3) with significant siltation and hydromorphological impacts evidently contributing to a reduction in water quality, in addition to eutrophication pressures. Agriculture is known to be the major water quality pressure within the wider survey area (EPA, 2024 & other EPA data) and this was supported by observations made during the aquatic surveys.

Key Biodiversity Receptor Scoping: Due to absence of sightings of rare or protected macro-invertebrate species and the absence of suitable habitats in the streams that drain the Project site, **aquatic invertebrates are not considered a key ecological receptor.**

EIAR 13.3.7.2.8 Key Biodiversity Receptor Scoping - Aquatics

Due to the records of Annex II QI species and fish of lesser conservation concern, the River Nore is considered a **Key Ecological Receptor**. Due to its designation under the Natura 2000 network within the River Barrow and River Nore SAC.

Atlantic Salmon, White-clawed Crayfish, River Lamprey, Brook Lamprey, Freshwater Pearl Mussel and Otter **are all considered as KERs of International Importance** for in-situ (Salmon, White-clawed Crayfish, River Lamprey, Brook Lamprey, Freshwater Pearl Mussel and Otter) and ex-situ (Salmon, White-clawed Crayfish, River Lamprey, Brook Lamprey, and Otter) populations connected to the River Barrow and River Nore SAC.

The remaining salmonids (Stone Loach, Minnow and Three-spined Stickleback) **are considered KERs of Local Importance (Higher Value)**.

Detailed survey results can be found in Appendix 13.8: Aquatic Fieldwork & Survey Results. Figures and Appendices are included at the end of this Chapter.

EIAR 13.3.7.3 Existing Sources of Impacts to Aquatic Habitats & Species

The following existing pollution/damage is acting as a 'source' of impact to Aquatic Habitats & Species:

- Siltation and hydromorphological impacts contributing to a reduction in water quality, in addition to eutrophication pressures
- Agricultural and forestry pressures (including but not limited to historical drainage, enrichment, siltation)

EIAR 13.3.8 Context and Characteristics of DESIGNATED SITES

Designated Sites include European Sites, such as Natura 2000, Ramsar Site and Sites of National Importance.

EIAR 13.3.8.1 European Sites within the Zone of Influence– Natura 2000 (SACs, SPAs)

European designated sites relate to the Natura 2000 network Special Protection Area (SPA) and Special Area of Conservation (SAC) sites. These Natura 2000 sites are addressed fully in the Appropriate Assessment (AA) Report 2026, which accompanies this application, and the evaluation is summarised herein for ease of reference. Candidate SACs (cSACs), proposed SPAs (pSPAs) and important bird areas (IBAs) were also considered.

EIAR 13.3.8.1.1.1 Locational Context – European Sites within Study Area

There are eight European Sites within the study area – one SPA and five SACs. See Figure 13.7: European Sites (SPA & SAC).

No cSACs, pSPAs or Important Bird Areas (IBAs) have potential connectivity with the Gathabawn Windfarm Project. The distances of the Natura 2000 sites from the nearest works/activities associated with the Gathabawn Windfarm Project are outlined in the table below.

Table 13.3-18: Proximity of Natura 2000 sites to the Gathabawn Windfarm

No.	Natura 2000 site	Approximate Distance of the Natura 2000 site
1	River Barrow and River Nore SAC [002162]	4.6km to Proposed Gathabawn Windfarm 0km to Candidate Gathabawn Grid Connection
2	River Nore SPA [004233]	4.8km to Proposed Gathabawn Windfarm 0km to Candidate Gathabawn Grid Connection
3	Cullahill Mountain SAC [000831]	5m to Proposed Gathabawn Windfarm 8m to Candidate Gathabawn Grid Connection (Ballylehaun – Ballyring UGC only)
4	Spahill and Clomantagh Hill SAC [000849]	850m to Proposed Gathabawn Windfarm 1.8km to Candidate Gathabawn Grid Connection
5	Galmoy Fen SAC [001858]	3.7km to Proposed Gathabawn Windfarm 5.77km to Candidate Gathabawn Grid Connection
6	Lisbigney Bog SAC [000869]	11km to Proposed Gathabawn Windfarm 6.42km to Candidate Gathabawn Grid Connection
7	The Loughans SAC [000407]	5.8km to Proposed Gathabawn Windfarm 6.76km to Candidate Gathabawn Grid Connection

EIAR 13.3.8.1.2 Locational Context – Overlap with European Sites

The Whole Gathabawn Windfarm Project **does overlap the boundary with two European Sites**. The Parksgrove – Moatpark UGC crosses underneath the River Nore designations of River Nore SPA and River Barrow and River Nore SAC. Due to the works taking place along the N77 within the boundary of the River Barrow and River Nore SAC and crossing the River Nore, there is potential for surface run-off and direct release of pollutants and sediments. One site, Cullahill Mountain SAC, is in adjacent to the Proposed Gathabawn Windfarm (5m separation) and to the Ballylehaun – Ballyring UGC (8m separation). No works are anticipated to impact boundary verge habitats or habitats within the boundary of this SAC.

EIAR 13.3.8.1.3 Stage I Screening – Initial Screening for Connectivity

In the AA Report 2026, each of the Natura 2000 sites within the study area was initially screened for connectivity with the Gathabawn Windfarm – both alone and in combination with other elements of the whole project and in combination with other plans and projects. All phases of the development were considered, i.e. construction, operational, and decommissioning phases. The Screening exercise considered the site-specific conservation measures and conservation objectives for each of the sites.

Screening for Connectivity found that 6 No. SAC sites and 7 No. SPA sites (listed below) had no connectivity for impacts with the Gathabawn Windfarm (either alone or in combination), and therefore these sites were screened out from further consideration in the AA Report 2026:

- Galmoy Fen SAC [001858]
- The Loughans SCA [000407]
- Lisbigney Bog SAC [000869]
- Spahill and Clomantagh Hill SAC [000849]
- Ballynafagh Lake SAC [001387]
- East Burren Complex SAC [001926]
- Wicklow Mountains SPA [004040]
- Wexford Harbour and Slobs SPA [004076]
- Tramore Back Strand SPA [004027]
- Mid Waterford Coast SPA [004193]
- Helvick Head to Ballyquin SPA [004192]
- Middle Shannon Callows SPA [004096]
- Little Brosna Callows SPA [004086]
-

The remaining three European Sites – Cullahill Mountain SAC, River Nore SPA an the River Barrow and River Nore SAC have potential connectivity and were subject to further screening exercise in the AA Report 2026.

A brief summary of the characteristics of these Natura 2000 sites is provided below along with the results of the Screening exercise.

EIAR 13.3.8.1.4 Stage I Screening of the Natura 2000 sites with potential connectivity to the Development

EIAR 13.3.8.1.4.1 Cullahill Mountain SAC – Context and Characteristics

Cullahill Mountain SAC lies on a western outlier of the Castlecomer plateau, 6km north-east of Johnstown in Co. Kilkenny. In this area, the underlying limestone has been exposed relatively recently by erosion of the higher shales. The rock is in the form of an escarpment, with a steep side facing the central plain (and the Cork-Dublin road) and more gradual slopes to the south-east where the shale soon appears.

EIAR 13.3.8.1.4.2 The vegetation of most of the site comprises a herb-rich grassland over limestone. The orchid flora of the grassland is notably rich, with Common Twayblade (*Listera ovata*), Frog Orchid (*Coeloglossum viride*), Bee Orchid (*Ophrys apifera*), Early-purple Orchid (*Orchis mascula*) and Green-winged Orchid (*Orchis morio*) occurring. Green-winged Orchid is an uncommon species and the site is particularly notable for the abundance of this species. River Barrow and River Nore SAC – Context & Characteristics

The River Barrow and River Nore SAC (Site Code: 002162) consists of the freshwater stretches of the Barrow and Nore River catchments as far upstream as the Slieve Bloom Mountains, and it also includes the tidal elements and estuary as far downstream as Creadun Head in Waterford. The site passes through eight counties – Offaly, Kildare, Laois, Carlow, Kilkenny, Tipperary, Wexford and Waterford. Major towns along the edge of the site include Mountmellick, Portarlington, Monasterevin, Stradbally, Athy, Carlow, Leighlinbridge,

Graiguenamanagh, New Ross, Inistioge, Thomastown, Callan, Bennettsbridge, Kilkenny and Durrow. The larger of the many tributaries include the Lerr, Fushoge, Mountain, Aughavaud, Owenass, Boherbaun and Stradbally Rivers of the Barrow, and the Delour, Dinin, Erkina, Owveg, Munster, Arrigle and King's Rivers on the Nore.

The site is important for the presence of several E.U. Habitats Directive Annex II animal species, including Desmoulin's Whorl Snail (*Vertigo moulinsiana*), Freshwater Pearl Mussel, White-clawed Crayfish, Sea Lamprey (*Petromyzon marinus*), Brook Lamprey (*Lampetra planeri*), River Lamprey (*Lampetra fluviatilis*), Twaite Shad (*Alosa fallax*), Otter and Atlantic Salmon. The SAC also contains a variety of terrestrial, freshwater and estuarine habitats.

EIAR 13.3.8.1.4.3 River Nore SPA – Context & Characteristics

The River Nore SPA [Site Code: 004233] is a long, linear site that includes the following river sections: the River Nore from the bridge at Townparks, (north-west of Borris in Ossory) to Coolnamuck (approximately 3km south of Inistioge) in Co. Kilkenny; the Delour River from its junction with the River Nore to Derrynaseera bridge (west of Castletown) in Co. Laois; the Erkina River from its junction with the River Nore at Durrow Mills to Boston Bridge in Co. Laois; a 1.5km stretch of the River Goul upstream of its junction with the Erkina River; the Kings River from its junction with the River Nore to a bridge at Mill Island, Co. Kilkenny. The site includes the river channel and marginal vegetation.

Kingfisher is the only SCI associated with this SPA.

EIAR 13.3.8.2 Ramsar Sites

Ramsar sites are classified under the Convention on Wetlands of International Importance.

The Whole Gathabawn Windfarm does not overlap the boundary of any Ramsar site, and there are no Ramsar sites within the study area.

The nearest Ramsar site is the Slieve Bloom Mountains (Site number: 335), which is c.27km northwest of the Whole Gathabawn Windfarm Project.

EIAR 13.3.8.3 National Sites – Natural Heritage Areas, proposed Natural Heritage Areas

Natural Heritage Areas (NHA) are protected under the Wildlife (Amendment) Act 2000, whereas proposed NHAs (pNHA) will not have legal protection until the consultative process with the relevant landowners and authorities has been completed; a lengthy process taking many years and is ongoing for all pNHAs. pNHAs were considered for the scoping of National sites as these sites may be promoted in the future.

The Whole Gathabawn Windfarm Project does not overlap the boundary of any NHA site.

The Gathabawn Windfarm does not overlap the boundary of any pNHA site, however the Candidate Gathabawn Grid Connection does overlap the boundary of one pNHA site – the River Nore/ Abbeyleix Woods Complex pNHA.

There are no NHA sites within the study area (10km). pNHA sites within 10km are identified in the table below, which includes an examination of the separation distance and hydrological connectivity. Scoping of these sites follows after the table. See Figure 13.8: Designated Sites (pNHA).

Table 13-19: Sites of national importance within the study area.

Name	Site code	Main features	Separation Distance	Hydrological Connection
Cullahill Mountain pNHA	000831	Located within the Cullahill Mountain SAC.	5m from windfarm works areas 8m from grid connection works	No
Spahill and Clomantagh Hill pNHA	000849	Located within the Spahill and Clomantagh Hill SAC.	0.9km from windfarm works areas 1.8km from grid connection works	No
River Nore/ Abbeyleix Woods Complex pNHA (*also a wildfowl sanctuary*)	002076	Stretching from Shanahoe in County Laois southwards along the River Nore to Ballyragget, County Kilkenny: Ancient woodlands; Rare and protected plant species, lichens, mosses; Rare invertebrates; Birds: Jay, Long-eared Owl, Raven; Fauna: Otter, Freshwater Pearl Mussel, spawning area for Twaite Shad	5.4km from windfarm works areas 0m from grid connection works	Yes
Galmoy Fen pNHA	001858	Located within the Galmoy Fen SAC.	3.7km from windfarm works areas 5.8km from grid connection works	No
Curragh and Goul River Marsh pNHA	000420	Low-lying wet meadows and river habitats that experience prolonged winter flooding	5.1km from windfarm works areas 6.8km from grid connection works	No
Cuffsborough pNHA	000418	Grassland used by Greenland White-fronted Geese	9.7km from windfarm works areas 10.6km from grid connection works	
The Loughans pNHA	000407	Located within The Loughans SAC.	5.9km from windfarm works areas 6.8km from grid connection works	No
Ardaloo Fen pNHA	000821	Wetland area beside the River Nore Wetland flora Birds: Wildfowl and waders, passerines (warblers)	8.7km from windfarm works areas 7.3km from grid connection works	No
Lisbigney Bog pNHA	000869	The site features rare calcareous fen and raised bog habitats that support protected species, including Desmoulin's whorl snail and the common frog	11km from windfarm works areas 6.4km from grid connection works	No
Inchbeg pNHA	000836	Wetland area along River Nore Birds: Golden Plover, Lapwing, Whooper Swan, Bewick's Swan	5.3km from windfarm works areas 3.0km from grid connection works	Yes
Esker Pits pNHA	000832	Gravel pits	>10km from windfarm works 7.3km from construction works areas	No
Coolacurragh Wood pNHA	000862	Wet woodland on base-rich soils	>10km from windfarm works 8.5km from construction works areas	No
Grantstown Wood And Lough pNHA	000417	Wet woodland on base-rich soils	>10km from windfarm works 8.8km from construction works areas	No
Dunmore Cave pNHA	000401	Rare glacial-meltwater limestone geology, rich dripstone formations	8.87km from construction works areas	No

The Inchbeg pNHA and Ardaloo Fen pNHA overlap with the River Barrow and River Nore SAC and are downstream of the Whole Gathabawn Windfarm Project. While no site conservation objectives are provided for these pNHA sites, it can be reasonably inferred to share QI/SCIs with the corresponding SAC based on the site synopsis and conservation objectives.

EIAR 13.3.8.4 Existing Sources of Impacts to Designated Sites

The occurrence of existing pollution or environmental damage in the areas on or around the location of the Gathabawn Windfarm has also been considered, and the following existing pollution/damage has been considered herein:

Cullahill Mountain SAC and overlapping and adjacent pNHA and Nature Reserve sites; : The main threats to the site include agricultural intensification, principally over-grazing by livestock, although under-grazing is also considered to have a negative impact as this would alter the structure of the grassland sward communities present on the site. Apart form agriculture, the other main threat is from Invasive Alien Plant Species (IAPS) infestation.

River Barrow and River Nore SAC/River Nore SPA and overlapping pNHA sites: The main threats to the site and current damaging activities include high inputs of nutrients into the river system from agricultural run-off and several sewage plants, over-grazing within the woodland areas, and invasion by non-native species, for example Cherry Laurel (*Prunus laurocerasus*) and Rhododendron. The water quality of the site remains vulnerable. Good quality water is necessary to maintain the populations of the Annex II animal species listed above. Good quality is dependent on controlling fertilisation of the grasslands, particularly along the Nore. It also requires that sewage be properly treated before discharge. Drainage activities in the catchment can lead to flash floods which can damage the many Annex II species present. Capital and maintenance dredging within the lower reaches of the system pose a threat to migrating fish species such as lamprey and shad. Land reclamation also poses a threat to the salt meadows and the populations of legally protected species therein. Impacts to high and low water tables are likely to affect tidal vegetation as a result of climate change impacting weather extremes.

EIAR 13.3.9 Importance, Sensitivity and Vulnerability to Change

EIAR 13.3.9.1 Importance of the Biodiversity Resource at the Proposed Development Site

The importance of biodiversity resources within the study area for the proposed Gathabawn Windfarm development has been evaluated using criteria from relevant Best Practice Guidance (e.g. NRA, 2009; SNH, 2017; SNH 2021, etc.). Overall, it is considered that the biodiversity resource is of Local Importance (higher value) due to:

- The presence of locally important populations of priority species or habitats or natural heritage features identified in the Local Biodiversity Action Plan, if this has been prepared; (*Kilkenny Biodiversity Action Plan 2025 - 2030).*
- The presence of 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.
- The development site contains 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;
- The development site includes areas 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.

EIAR 13.3.9.2 Importance and Sensitivity of Key Biodiversity Receptors

The table below identifies the importance and sensitivity of the key biodiversity receptors, which has been evaluated using the combined NRA and Percival criteria as outlined in Appendix 13.1. A total of five mammal, two aquatic, one invertebrate, fourteen habitats and eight bird receptors of Local Importance (Lower Value) are excluded from this list, as rationale is provided in the sections above.

Table 13-20: Importance and Sensitivity of Key Biodiversity Receptors

Key Ecological Receptors	Importance and Sensitivity Rating	Rating Rationale
Terrestrial Habitats		
Hedgerows (WL1)	Local Importance (Higher Value) Low Sensitivity	Based on level of maturity and value to birds/mammals/ amphibians, provides commuting pathways and trees may provide possible day roosts for bats.
Treelines (WL2)	Local Importance (Higher Value) Low Sensitivity	Based on level of maturity and value to birds/mammals/ amphibians, provides commuting pathways and trees may provide possible day roosts for bats.
Scrub (WS1)	Local Importance (Higher Value) Low Sensitivity	Based on level of maturity and value to birds/mammals/ amphibians.
Dry Calcareous and Neutral Grassland (GS1)	Local Importance (Higher Value) Low Sensitivity	Based on level of maturity and ecological value to pollinator species.
Wet Grassland/Scrub (GS4/WS1)	Local Importance (Higher Value) Low Sensitivity	Based on potential value to certain species, particularly birds, mammals and amphibians.
Eroding/Upland Rivers (FW1)	Local Importance (Higher Value) Low Sensitivity	Based on ecological value to birds, mammals (including bats) and amphibians for foraging and commuting purposes.
Oak-Ash-Hazel Woodland (WN2)	Local Importance (Higher Value) Low Sensitivity	Based on level of maturity and value to birds and mammals, and trees may provide possible day roosts for bats.
Mixed Broadleaved Woodland (WD1)	Local Importance (Higher Value)	Based on level of maturity and value to birds and mammals, and trees may provide possible day roosts for bats.
Exposed Calcareous Rock (ER2)	Local Importance (Higher Value) Low Sensitivity	Based on ecological value to Common Lizard as basking habitat.
Stone Walls and Other Stonework (BL1)	Local Importance (Higher Value) Low Sensitivity	This habitat has potential ecological value to support a limited species, such as lichens, mosses and ferns.
Hedgerow/Treelines (WL1/WL2)	Local Importance (Higher Value) Low Sensitivity	Based on level of maturity and value to birds/mammals/ amphibians, provides commuting pathways and trees may provide possible day roosts for bats.
Treelines/Stone Walls and Other Stonework (WL2/BL1)	Local Importance (Higher Value) Low Sensitivity	Based on level of maturity and value to birds/mammals/amphibians, provides commuting pathways and trees may provide possible day roosts for bats. Stone walls can support a limited species, such as lichens, mosses and ferns.

Key Ecological Receptors	Importance and Sensitivity Rating	Rating Rationale
Improved Agricultural Grassland/Scattered Trees and Parkland (GA1/WD5)	Local Importance (Higher Value) Low Sensitivity	Based on level of maturity and value to birds/mammals/amphibians, provides commuting pathways and trees may provide possible day roosts for bats.
Drainage Ditches (FW4)	Local Importance (Higher Value) Low Sensitivity	This habitat has low ecological value to birds, mammals (including bats), and amphibians but provides connectivity to higher value habitats.
Amphibians		
Smooth Newt	Local Importance (Higher Value) Low Sensitivity	IUCN Red List – Least Concern. Irish (King *et al.,* 2011) Red List: Least Concern. Protected under the Wildlife Act (as amended), included in Appendix III of the Bern Convention. Due to the occurrence of both adult male and female Smooth Newts within the study area and high suitability habitat availability for both Smooth Newt and Common Frog near the Gathabawn Windfarm.
Common Frog		
Reptiles		
Common Lizard	Local Importance (Higher Value) Low Sensitivity	IUCN Red List – Least Concern. Irish (King *et al.,* 2011) Red List: Least Concern. Protected under the Wildlife Act (as amended), included in Appendix III of the Bern Convention. Presence of high suitability habitat within the Gathabawn Windfarm and elusive nature of the species.
Invertebrates		
Marsh Fritillary	Local Importance (Higher Value) Low Sensitivity	IUCN Red List – Least Concern. Irish (Regan *et al*., 2010) Red List: Vulnerable. Protected under the Wildlife Act (as amended). EU Habitats Directive Annex II. Some suitable habitat within the site boundary; formerly recorded near the site boundary in Cullahill Mountain SAC.
Terrestrial Mammals		
Otter	International Importance Very High Sensitivity	IUCN Red List – Least Concern. Irish (Marnell *et al.*, 2019) Red List: Least Concern. Protected under the Wildlife Act (as amended), included in Appendix III of the Bern Convention. EU Habitats Directive Annex II & IV. Secondary evidence and high suitability habitat recorded downstream of the Gathabawn Windfarm. Ex-situ QI of the River Barrow and River Nore SAC.
Badger	Local Importance (Higher Value) Low Sensitivity	IUCN Red List – Least Concern. Irish (Marnell *et al.*, 2019) Red List: Least Concern. Protected under the Wildlife Act (as amended), included in Appendix III of the Bern Convention. Secondary evidence and sightings recorded within the site boundary.
Irish Hare	Local Importance (Higher Value)	IUCN Red List – Least Concern. Irish (Marnell *et al.*, 2019) Red List: Least Concern.

Key Ecological Receptors	Importance and Sensitivity Rating	Rating Rationale
	Low Sensitivity	Protected under the Wildlife Act (as amended), included in Appendix III of the Bern Convention. Sightings recorded within the site boundary.
Pine Marten	Local Importance (Higher Value) Low Sensitivity	IUCN Red List – Least Concern. Irish (Marnell *et al.*, 2019) Red List: Least Concern. Protected under the Wildlife Act (as amended), included in Appendix III of the Bern Convention. Suitable habitat within the Gathabawn Windfarm.
Red Squirrel	Local Importance (Higher Value) Low Sensitivity	IUCN Red List – Least Concern. Irish (Marnell *et al.*, 2019) Red List: Least Concern. Protected under the Wildlife Act (as amended), included in Appendix III of the Bern Convention. Suitable habitat to support a Red Squirrel population within the Gathabawn Windfarm. Presence of desk study records.
Bats		
Common Pipistrelle	Local Importance (Higher Value) Low Sensitivity	IUCN Red List – Least Concern. Irish (Marnell *et al.*, 2019) Red List: Least Concern. Habitats Directive Article 17 Reporting: Favourable status (with the exception of Nathusius' Pipistrelle, which has an Unknown status). Protected under the Wildlife Act (as amended), included in Appendix IV of the EU Habitats Directive. Two Soprano Pipistrelle roosts (BL8 and BL14) were recorded within the survey area. Commuting Common Pipistrelle, Soprano Pipistrelle, Leisler's Bat and Myotis sp. were recorded during transect surveys across the ecological baseline. Common Pipistrelle and Soprano Pipistrelle which were recorded primarily at Negligible to Low levels of activity during passive surveys, with occasional High and Moderate levels of activity. Nathusius' Pipistrelle, Leisler's Bat, Brown Long-eared Bat and *Myotis* spp. were also recorded during passive surveys, although activity levels were generally Low and Negligible.
Soprano Pipistrelle		
Leisler's Bat		
Myotis species		
Nathusius' Pipistrelle		
Brown Long-eared Bat		
Birds		
Barn Owl	Local Importance (Higher Value) Low Sensitivity	Although not recorded during surveys, there are suitable roost structures within 1km of the proposed windfarm site boundary. As such, there is potential for this species to be present within the baseline in the future. This is a Red-listed BoCCI species with high sensitivity to construction works.
Buzzard	Local Importance (Higher Value) Low Sensitivity	These species are green-listed but are sensitive receptors to operating turbines. As such, they are both KERs of Local Importance (Higher Value)
Sparrowhawk		
Long-eared Owl	Local Importance (Higher Value) Low Sensitivity	Although not recorded during surveys, there are suitable roosting forestry habitats within 1km of the proposed windfarm site boundary. As such, there is potential for this species to be present within the baseline in the future. Despite its green-listed BoCCI status, it has high sensitivity to construction works.

Key Ecological Receptors	Importance and Sensitivity Rating	Rating Rationale
Kestrel	Local Importance (Higher Value) Low Sensitivity	Breeding raptor surveys in 2025 and 2026 returned no records of Kestrel. As a Red-listed BoCCI species, this species is important to the local biodiversity.
Peregrine	Local Importance (Higher Value) Low Sensitivity	Nesting pair present within 2km. Adults and juveniles recorded during VP surveys. Additional nest site outside 2km also.
Kingfisher	Local Importance (Higher Value) Low Sensitivity	Present within the survey area. Suitable streams are present within the ecological baseline.
Meadow Pipit	Local Importance (Higher Value) Low Sensitivity	All are present in breeding and/or winter seasons. As Red-/amber listed BoCCI species, these species are important to the local biodiversity and warrant consideration for significant effects within the local extent of their populations.
Redwing		
Yellowhammer		
Goldcrest		
Greenfinch		
House Martin		
House Sparrow		
Linnet		
Skylark		
Starling		
Swallow		
Tree Sparrow		
Wheatear		
Willow Warbler		
Woodcock	Local Importance (Higher Value) Low Sensitivity	Suitable habitat within the ecological baseline of the windfarm site. As a Red-listed BoCCI species, this species is important to the local biodiversity and warrants consideration for significant effects within the local extent of their populations.
Golden Plover	Local Importance (Higher Value) Low Sensitivity	Present in large numbers during winter and migratory periods. Given the separation distance and the small numbers relative to the population present and large flocking behaviour, it is considered a KER of Local value only.
Lapwing	Local Importance (Higher Value) Low Sensitivity	Present in large numbers during winter and migratory periods. Given the separation distance and the small numbers relative to the population present and large flocking behaviour, it is considered a KER of Local value only.
Snipe	Local Importance (Higher Value) Low Sensitivity	Present on site to a limited extent. As a Red-listed BoCCI species, this species is important to the local biodiversity and warrants consideration for significant effects within the local extent of their populations.
Black-headed Gull	Local Importance (Higher Value) Low Sensitivity	Present commuting and foraging through the wind farm site area at levels warranting Collision risk modelling.
Cormorant	Local Importance (Higher Value) Low Sensitivity	Present commuting through the wind farm site area at levels warranting Collision risk modelling.

Key Ecological Receptors	Importance and Sensitivity Rating	Rating Rationale
Herring Gull	Local Importance (Higher Value) Low Sensitivity	Present commuting and foraging through the wind farm site area at levels warranting Collision risk modelling.
Lesser Black-backed Gull	Local Importance (Higher Value) Low Sensitivity	Present commuting and foraging through the wind farm site area at levels warranting Collision risk modelling.
Mallard	Local Importance (Higher Value) Low Sensitivity	Present commuting through the wind farm site area at levels warranting Collision risk modelling.
Mute Swan	Local Importance (Higher Value) Low Sensitivity	Present commuting through the wind farm site area at levels warranting Collision risk modelling.
Whooper Swan	Local Importance (Higher Value) Low Sensitivity	Present commuting through the wind farm site area at levels warranting Collision risk modelling.
Aquatics		
White-clawed Crayfish	International Importance Very High Sensitivity	IUCN Red List – Endangered. Protected under the Wildlife Act (as amended), included in Appendix III of the Bern Convention. EU Habitats Directive Annex II & V. Downstream connectivity to mapped areas of the species within the River Barrow and River Nore SAC.
Lamprey species	International Importance Very High Sensitivity	IUCN Red List – Least Concern (Sea Lamprey), Near Threatened (Brook Lamprey and River Lamprey) Irish (King *et al.,* 2011) Red List: Least Concern (Brook Lamprey and River Lamprey), Near Threatened (Sea Lamprey). Protected under the Wildlife Act (as amended), included in Appendix III of the Bern Convention. EU Habitats Directive Annex II (Brook Lamprey, River Lamprey and Sea Lamprey), Annex V (River Lamprey). Species recorded during aquatic surveys downstream of the Gathabawn Windfarm. QIs of the River Barrow and River Nore SAC.
Salmonids (Atlantic Salmon and Brown Trout)	International Importance Very High Sensitivity (Atlantic Salmon) Local Importance (Higher Value) Low Sensitivity (Brown Trout)	IUCN Red List – Near Threatened (Atlantic Salmon), Least Concern (Brown Trout) Irish (King *et al.,* 2011) Red List: Vulnerable (Atlantic Salmon), Least Concern (Brown Trout) Protected under the Wildlife Act (as amended), included in Appendix III of the Bern Convention (Atlantic Salmon). EU Habitats Directive Annex II & Annex V (Atlantic Salmon). Species recorded during aquatic surveys downstream of the Gathabawn Windfarm. Atlantic Salmon is a QI of the River Barrow and River Nore SAC.
Minnow, Stone Loach and Three-spined Stickleback	Local Importance (Higher Value) Low Sensitivity	IUCN Red List – Least Concern (Minnow, Stone Loach, Three-spined Stickleback) Irish (King *et al.,* 2011) Red List: Least Concern (Minnow, Stone Loach, Three-spined Stickleback) Species recorded during aquatic surveys downstream of the Gathabawn Windfarm.

Key Ecological Receptors	**Importance and Sensitivity Rating**	**Rating Rationale**
European Eel	Local Importance (Higher Value) Low Sensitivity	IUCN Red List – Critically Endangered Irish (King *et al.,* 2011) Red List: Critically Endangered Protected under the Wildlife Act (as amended) Species recorded during aquatic surveys downstream of the Gathabawn Windfarm.
Designated Sites		
Cullahill Mountain SAC River Barrow and River Nore SAC River Nore SPA	International Importance Very High Sensitivity	'European Site' including Special Area of Conservation (SAC), Site of Community Importance (SCI), Special Protection Area (SPA) or proposed Special Area of Conservation.
Inchbeg pNHA	National Importance Very High Sensitivity	Sites proposed as a Natural Heritage Area (pNHA).

EIAR 13.3.9.3 Vulnerability to Change

The vulnerability of each of the key biodiversity receptors to changes in the environment is provided in the table below:

Table 13-21: Vulnerability of Key Biodiversity Receptors to Changes in the Environment

Key Ecological Receptors	Susceptible to the following effects:
Terrestrial Habitats	
Hedgerows (WL1)	Direct land take, pollution, and environmental changes resulting from modification such as increased drainage. Encroachment from invasive species which may out-compete local native species. Habitats are also sensitive to human activities such as burning and recreational use.
Treelines (WL2)	
Scrub (WS1)	
Dry Calcareous and Neutral Grassland (GS1)	
Wet Grassland/Scrub (GS4/WS1)	
Eroding/Upland Rivers (FW1)	Direct land take, pollution, and environmental changes resulting from modification such as increased drainage. Encroachment from invasive species which may out-compete local native species. Siltation and hydromorphological impacts contributing to a reduction in water quality, in addition to eutrophication pressures. Agricultural and forestry pressures (including but not limited to historical drainage, enrichment, siltation).
Oak-Ash-Hazel Woodland (WN2)	Direct land take, pollution, and environmental changes resulting from modification such as increased drainage. Encroachment from invasive species which may out-compete local native species. Habitats are also sensitive to human activities such as burning and recreational use.
Mixed Broadleaved Woodland (WD1)	
Exposed Calcareous Rock (ER2)	Direct land take. Encroachment from invasive species which may out-compete local native species.
Stone Walls and Other Stonework (BL1)	Direct land take, pollution, and environmental changes resulting from modification such as increased drainage. Encroachment from invasive species which may out-compete local native species. Habitats are also sensitive to human activities such as burning and recreational use.
Hedgerow/Treelines (WL1/WL2)	
Treelines/Stone Walls and Other Stonework (WL2/BL1)	
Improved Agricultural Grassland/Scattered Trees and Parkland (GA1/WD5)	
Drainage Ditches (FW4)	Direct land take, pollution, and environmental changes resulting from modification such as increased drainage. Encroachment from invasive species which may out-compete local native species. Siltation and hydromorphological impacts contributing to a reduction in water quality, in addition to eutrophication pressures. Agricultural and forestry pressures (including but not limited to historical drainage, enrichment, siltation).
Amphibians	
Smooth Newt	Habitat loss, availability of suitable refuges such as logs/tree stumps, increased cover of submerged vegetation (O'Neil *et al.*, 2004). Direct mortality through predation and increases in local populations of carnivorous birds, fish and mammals, Disturbance through visual intrusion, noise and vibration Reduction in food sources – small invertebrates and tadpoles.

Key Ecological Receptors	**Susceptible to the following effects:**
Common Frog	Habitat loss and fragmentation, and predation from many predators including Kestrels, stoats, foxes and cats (King *et al.,* 2011).
Reptiles	
Common Lizard	Habitat loss and fragmentation, and predation from many predators including Kestrels, stoats, foxes and cats (King *et al.,* 2011).
Invertebrates	
Marsh Fritillary	The main threat to Marsh Fritillary is habitat loss, particularly the improvement of agricultural land (including drainage or wet grassland, over-grazing, agricultural abandonment (including under-grazing) and land-use change (such as afforestation); habitat fragmentation also impacts the metapopulation structure of this species.
Terrestrial Mammals	
Otter	The main threats to Otter include pollution – particularly organic pollution resulting in fish kills; and accidental deaths (e.g. collision with road traffic). Disturbance to riverbank habitat also negatively impacts Otters (NPWS, 2025a).
Badger	Anthropogenic threats, such as illegal persecution (snaring, hunting with dogs, disturbance of setts) and road casualties (Marnell, *et al.,* 2019). Bovine tuberculosis is present in the Irish Badger population and related badger removal programmes carried out by the Department of Agriculture. Disturbance/displacement due to land take or machinery operations within 30-50m of a sett, with distances increasing to 150m of a sett if activities such as piling or blasting are proposed. Habitat loss greater than 25% of any social group's territory size is deemed as significant. Disturbance to foraging individuals may occur from construction noise and visual intrusion, especially during periods of night-time working. Habitat loss or the construction of significant barriers may also dissect territories.
Irish Hare	Modern agricultural methods (e.g. silage cutting) may increase mortality, particularly of juveniles. Habitat loss and fragmentation lead to isolation and inbreeding. Confirmation in mid-2019 of Rabbit Haemorrhagic Disease 2 (RHD2) in Irish Hares presents a new concern (Marnell *et al.,* 2019).
Pine Marten	Habitat loss, fragmentation and woodland management practices (Marnell *et al.,* 2019).
Red Squirrel	Deforestation; their abundance is directly related to woodland available. Competition with Grey Squirrel populations in broadleaf and mixed wood habitat. Impacts of the squirrel pox virus, which is carried by the Grey Squirrel (Marnell *et al.,* 2019).
Bats	
BL8 and BL14	The key sensitivities of bats are the destruction or disturbance of their roosting places, and the modification of their commuting routes and foraging habitats (NPWS 2013, Collins *et al.,* 2023). During the day, bats roost in man-made structures (typically houses, farm buildings and bridges), mature trees, and caves. They can suffer direct effects due to the destruction or modification of their roosts (e.g. the demolition of a house or felling of a tree), or indirect effects due to disturbance of the area surrounding a roost (e.g. illumination of exit/entry points, or removal of surrounding vegetation). They are most sensitive to effects during their maternity and hibernation periods, which are from May to August and November to March, respectively.
Common Pipistrelle	
Soprano Pipistrelle	
Nathusius' Pipistrelle	
Brown Long-eared Bat	
Daubenton's Bat	
Whiskered Bat	
Natterer's Bat	
Birds	

Key Ecological Receptors	Susceptible to the following effects:
Kestrel	Causes for the recent decline of Kestrel in Ireland are likely centred around prey availability, agricultural changes and reduced feeding opportunities (Wilson-Parr & O'Brien, 2019), as well as secondary rodenticide poisoning.
Buzzard	Loss of foraging and nesting habitat through agricultural changes and reduced feeding opportunities.
Sparrowhawk	Loss of foraging and nesting habitat and anticoagulant rodenticides (rat poisons). Direct human impacts such as shooting and trapping (NPWS, 2019)
Peregrine	Loss of foraging and nesting habitat, poisoning and illegal persecution.
Barn Owl	Toxic farm chemicals (Second Generation Anticoagulant Rodenticides), with 85% of Irish Barn Owls having detectable residues in their system, loss of hunting habitat, increased disturbance, hard winters and the increase in traffic collisions have all been suggested as possible reasons for decline (Shawyer, 1985; Shawyer & Dixon, 1999).
Long-eared Owl	Due to the difficulties in detecting the species, the trend is uncertain, and hence the drivers of change are also unclear (BTO, 2011).
Kingfisher	Habitat destruction, degradation via pollution (e.g. agricultural run-off; pesticides; increased turbidity) and/or poor management of watercourses and barriers to migration.
Meadow Pipit	Changes in grazing regimes can influence the breeding abundance; climate change may cause the species to be increasingly restricted to suitable areas for breeding, as Meadow Pipit abundance is negatively correlated with temperature (BTO, 2011).
Willow Warbler	Climate change, changes in habitat over a large area, winter and migratory issues and decreased breeding success.
Starling	Changes in the management of agricultural farmland and habitat loss causing a reduction in first-year overwinter survival rates.
Linnet	Decreased breeding success as a result of agricultural intensification.
Redwing	Climate change, changes in habitat over a large area, winter and migratory issues and decreased breeding success.
Skylark	Agricultural intensification, specifically the change from spring to autumn sowing of cereals, which reduces the number of breeding attempts possible and may also reduce overwinter survival due to loss of winter stubbles.
Swallow	Loss of livestock farming and grazed grassland, together with arable intensification, has caused the Swallow population to decline. Climatic warming is leading to an earlier start to the breeding season, and nestling mass is negatively correlated with temperature (Facey *et al.,* 2020).
Goldcrest	Vulnerable to hard winters. Loss of woodland habitat and predation from natural predators such as Sparrowhawk.
Greenfinch	The rapid decline since 2005 has been caused by a severe outbreak of trichomoniasis (Lawson *et al.,* 2018). Productivity data show minor decreases in clutch and brood sizes, but no change in the number of fledglings per breeding attempt. The trend towards earlier laying may be explained by recent climate change (Crick & Sparks, 1999).
Yellowhammer	Declines in annual survival have been proposed as the demographic mechanism for decline, due to winter resource limitation, although ring-recovery data are sparse and so most evidence for this is indirect.
House Martin	Warmer, drier conditions as a result of climate change have been suggested as a possible cause of the decline, but the efficacy of this has not been tested.
House Sparrow	Changes in survival rates due to lack of food resources, because of agricultural intensification, are the main driver of House Sparrow declines in farmland.
Tree Sparrow	Components of agricultural intensification, such as reductions in winter stubble, have been implicated in declines, although direct evidence supporting such ideas is largely incidental.

Key Ecological Receptors	Susceptible to the following effects:
Wheatear	Changes could be linked to reductions in Rabbit abundance and grazing, which may have led to changes in the availability and quality of grassland habitat for foraging.
Golden Plover	Habitat loss or fragmentation through afforestation, habitat loss from peat extraction, ground-based predation, destruction from agricultural machinery and flooding.
Lapwing	Habitat loss and degradation due to the intensification of farming (extensive drainage, increased use of pesticides and fertilisers, re-seeding, earlier and more frequent mowing) have reduced breeding productivity.
Snipe	Habitat loss or fragmentation through afforestation, habitat loss from peat extraction, ground-based predation, destruction from agricultural machinery and flooding.
Woodcock	Disturbance, reduction of the field layer by deer, increasing dryness of woodland and changes in surrounding land management are threatening Woodcock populations.
Black-headed Gull	Black-headed Gull productivity has fluctuated and may have been affected by predation from American Mink, although it is unclear whether this may have driven population trends.
Cormorant	The drivers of change for this species are unclear. Ongoing conflicts with angling and aquaculture have been considered.
Herring Gull	Reduced feeding opportunities due to a reduction in fisheries discards.
Lesser Black-backed Gull	Reduced feeding opportunities due to a reduction in fisheries discards.
Mallard	Declines in wintering numbers have been attributed to a decrease in immigration from the continent, with birds tending to winter further north and east as a result of climate change (Mitchell *et al.* 2002; Sauter *et al.,* 2010).
Mute Swan	Increasing overwinter survival and having knock-on effects on breeding success, although a recent study found no evidence in support of any long-term effect of winter temperatures on the population.
Whooper Swan	No known effects are documented. The cause of the increase in breeding records is unclear. Some breeding records result from injured birds being unable to migrate back to Iceland, but others may reflect an expansion of the breeding range resulting from the growth of the Icelandic population (Balmer *et al.,* 2013, Stanbury *et al.,* 2021).
Aquatics	
White-clawed Crayfish	White-clawed Crayfish faces threats from non-indigenous crayfish species and Crayfish Plague (*Aphanomyces astaci*). Non-indigenous crayfish species impact the White-clawed Crayfish through direct predation and competition but also act as carriers of crayfish plague (NPWS, 2025a).
Lamprey species	Barriers to upstream migration (e.g. weirs), which limit access to spawning beds and juvenile habitat; changes in precipitation due to climate change; and impacts from fishing on prey species availability. Habitat quality is considered deteriorating for River Lamprey due to a range of prevailing pressures and future threats including barriers to migration, increases in river discharge due to several factors including climate change, nutrient pollution due to anthropogenic activities, and impacts at sea such as commercial fishing that may impact on prey or host species (NPWS, 2025a).
Salmonids (Atlantic Salmon and Brown Trout)	A substantial number of habitat threats and pressures impact Atlantic Salmon, including aquaculture, declining quality of water and habitat, and physical barriers to migration, including from hydroelectric schemes (NPWS, 2025a).
Minnow, Stone Loach and Three-spined Stickleback	Minnow is more tolerant than most species but still susceptible to severe water pollution (King *et al.,* 2011). Stone Loach is susceptible to water pollution but appears to tolerate moderate organic pollution and is also very sensitive to pollution by heavy metals (King *et al.,* 2011). Three-spined Stickleback is a relatively pollution-tolerant species; fluctuations in water level would severely impact spawning success in such habitats.

Key Ecological Receptors	**Susceptible to the following effects:**
European Eel	Suggested threats include climate change and shifts in ocean currents, overfishing, habitat loss in the freshwater range, mortality in hydropower plants, disease and parasites, and chemical contamination affecting reproductive ability (King *et al.,* 2011).
Designated Sites	
Cullahill Mountain SAC	SAC, SPA, and pNHA sites are sensitive to hydrological changes to groundwater and surface water quality which may affect water-dependent ecosystems, and habitat disturbance or loss. Land-use change, primarily through agricultural intensification and changes to grazing and cropping regimes, also has the potential to affect these sites. Within individual Designated Sites, specific species may be sensitive to disturbance, displacement, habitat loss or a reduction in prey item species or accidental mortality, which could reduce their favourable conservation status. Designated sites are also sensitive to encroachment by invasive species.
River Barrow and River Nore SAC	
River Nore SPA	
Inchbeg pNHA	

EIAR 13.3.10 Evolution of the Baseline Environment *(the 'Do-Nothing' scenario)*

The trends within the baseline environment, including the main drivers of change and the likely evolution of the environment in the absence of the development, are identified in the tables below.

Table 13-22: Evolution of the Baseline Environment – Terrestrial habitats, amphibians, reptiles, terrestrial mammals, bats, aquatics and designated sites

Key Ecological Receptors	Current Trends	Main Drivers of Change	Evolution
Terrestrial Habitats			
Hedgerows (WL1)	Occurrence of habitats in the baseline environment is stable within the windfarm site boundary.	The main drivers of change for habitats result from agricultural improvements and habitat loss/change, resulting in the loss of habitat both locally and within a wider landscape.	It is assumed that the baseline environment in relation to the habitats, as described herein, will be the receiving environment at the time of construction, with ongoing trends as identified expected to be reflected during the operational and decommissioning phase.
Treelines (WL2)			
Scrub (WS1)			
Dry Calcareous and Neutral Grassland (GS1)			
Wet Grassland/Scrub (GS4/WS1)			
Eroding/Upland Rivers (FW1)			
Oak-Ash-Hazel Woodland (WN2)			
Mixed Broadleaved Woodland (WD1)			
Exposed Calcareous Rock (ER2)			
Stone Walls and Other Stonework (BL1)			
Hedgerow/Treelines (WL1/WL2)			
Treelines/Stone Walls and Other Stonework (WL2/BL1)			
Drainage Ditches (FW4)			

Key Ecological Receptors	Current Trends	Main Drivers of Change	Evolution
Amphibians			
Smooth Newt	Widespread in Ireland, but locally distributed and under-recorded. May be more common in midlands, but found in coastal counties (King *et al.,* 2011). There is no population estimate available for Ireland and therefore, there is no evidence to illustrate the current population status.	The appearance of the Alpine Newt (*Ichthyosaura alpestris*) in the South of Ireland may impact its overall range in the future. As such, the overall population trend in a Do-Nothing scenario will be uncertain dependant on the ways in which the suitable stream's and wetland habitats will respond to the weather changes brought on by climate change and the expanding range of a non-native species occupying the same niche.	It is assumed that the baseline environment in relation to the amphibian species, as described herein, will be the receiving environment at the time of construction, with ongoing trends as identified expected to be reflected during the operational and decommissioning phase.
Common Frog	Widespread and common throughout Ireland. Found in every county and from sea level to upland (King *et al.,* 2011).	Factors such as climate change are contributing to inconsistent weather causing early spawning in January/February and suitable areas becoming unsuitable before tadpoles reach adulthood. As such, the overall population trend in a Do-Nothing scenario will be uncertain dependant on the ways in which the suitable streams and wetland habitats will respond to the weather changes brought on by climate change.	
Reptiles			
Common Lizard	Common Lizards are widely distributed in throughout Ireland (Marnell, 2002). They have been recorded in a range of habitats, which include woodland, marshes, heathland, bogs, sand dunes, hedgerows and even gardens.	The status of the Common Lizard in Ireland is unknown at present. However, recent studies of amphibian and reptile populations in Britain and mainland Europe are suggesting a decline in population density in recent years due to both natural and man-made threats.	It is assumed that the baseline environment in relation to the amphibian species, as described herein, will be the receiving environment at the time of construction, with ongoing trends as identified expected to be reflected during the operational and decommissioning phase.
Invertebrates			
Marsh Fritillary	The Marsh Fritillary has a wide but patchy distribution across Ireland (Phelan *et al.*, 2021). It has experienced a population decline due to a decrease in the amount of suitable habitat. It is more common in the midlands and the western half the country.	Habitat loss and habitat fragmentation, including agricultural intensification (drainage and over-grazing) agricultural abandonment (and under-grazing), afforestation	is assumed that the baseline environment in relation to the amphibian species, as described herein, will be the receiving environment at the time of

Key Ecological Receptors	Current Trends	Main Drivers of Change	Evolution
			construction, with ongoing trends as identified expected to be reflected during the operational and decommissioning phase.
Terrestrial Mammals			
Otter	Otter is considered to be of Favourable conservation status (NPWS, 2025a) and is listed as 'least concern' on the all-Ireland red list of mammals (Marnell *et al.,* 2019). The most recent national survey undertaken in 2023-2024 indicates that the population has stabilised overall and that the species remains widespread (Reid *et al.,* 2025).	The key drivers of change to Otter occurrence include canalization or resectioning of freshwater rivers, siltation, pollution, water abstraction and conifer plantations (Reid *et al.,* 2025). Many Otters are killed on the roads each year; a smaller number are killed in fishing nets and lobster pots. Severe water pollution incidents leading to fish kills and removal of riparian habitats reduce habitat suitability for Otters (Marnell *et al.,* 2019).	It is assumed that the baseline environment in relation to the mammal species, as described herein, will be the receiving environment at the time of construction, with ongoing trends as identified expected to be reflected during the operational and decommissioning phase.
Badger	Badgers were previously assessed as 'least concern' in Ireland and have remained at this classification (Marnell *et al.* 2019). Despite localised removals for Tuberculosis management, badgers remain widespread, in a broad range of habitats. Irish badgers have a stable population, estimated in the Republic of Ireland as 84,000 and in Northern Ireland as 33,500 (Marnell *et al.* 2019)	The primary threat to Badger is the persecution regarding the spread of Tuberculosis and poaching/culls being conducted to manage their numbers.	
Irish Hare	Irish Hare is considered to be of Favourable conservation status (NPWS, 2025a) and is listed as 'least concern' on the all-Ireland red list of mammals (Marnell *et al.,* 2019). Stable, but with population fluctuations. Most recent estimates of 27,400 for Northern Ireland (Reid *et al.,* 2009) and 223,000 for the Republic (McGowan, 2019).	Modern agricultural methods (e.g. silage cutting), may increase mortality, particularly of juveniles. Habitat loss and fragmentation lead to isolation and inbreeding. Confirmation in mid2019 of RHD2 in Irish hares presents a new concern.	
Pine Marten	The population is thought to be increasing. Most recently estimated at 3,000 (O'Mahony *et al.,* 2017); however, this may be a significant underestimate.	Suffered extensive persecution before legal protection. Recent expansion may bring renewed threat of persecution from gun clubs and poultry keepers. Tendency to den in houses has led to conflict as the species spreads. Habitat loss and fragmentation a	

Key Ecological Receptors	Current Trends	Main Drivers of Change	Evolution
		concern. Woodland management practices also important.	
Red Squirrel	Previously estimated at 40,000 individuals (Waters & Lawton, 2011); current figure may be higher in correlation with the recent range expansion.	Due to their close association with forest habitat, Red Squirrel is very severely impacted by deforestation; its abundance is directly related to woodland available. Invariably lose out to grey squirrel populations in broadleaf and mixed wood habitat, due to competition and the impact of squirrel pox virus, which is carried by the Grey Squirrel.	
Bats			
BL8 and BL14 Common Pipistrelle Soprano Pipistrelle Leisler's Bat Nathusius' Pipistrelle Brown Long-eared Bat Daubenton's Bat Whiskered Bat Natterer's Bat	All Irish bat species are considered to be of Favourable conservation status with the exception of Nathusius' Pipistrelle which has an Unknown status. Most bat species are listed as 'least concern' on the all-Ireland red list of mammals (Marnell *et al.,* 2019), including the Nathusius' Pipistrelle. Leisler's Bat is listed as 'near threatened' because Ireland supports an internationally important population, but the overall population status of this species is known to be stable or increasing.	The key drivers of change to bats are the destruction or disturbance of their roosting places, and the modification of their commuting routes and foraging habitats (NPWS 2013, Collins, 2023). They can suffer direct effects due to the destruction or modification of their roosts or indirect effects due to disturbance of the area surrounding a roost. Common Pipistrelle, Soprano Pipistrelle, Nathusius' Pipistrelle and Leisler's Bat are particularly sensitive to wind turbine collisions (SNH, 2021).	It is assumed that the baseline environment in relation to bat species, as described herein, will be the receiving environment at the time of construction, with ongoing trends as identified expected to be reflected during the operational and decommissioning phase.
Aquatics			
White-clawed Crayfish	White-clawed Crayfish is considered to be of Bad conservation status (NPWS, 2025a).	The key driver of change to White-clawed Crayfish population decline and poor future prospects for the species due to the presence of the Crayfish Plague organism across seventeen catchments.	It is assumed that the baseline environment in relation to aquatic species, as described herein, will be the receiving environment at the time of construction, with ongoing trends as identified expected to be reflected during the operational and decommissioning phase.
Lamprey species	Sea Lamprey is considered to be of Bad conservation status, Brook Lamprey is considered to be of Favourable conservation status, and River Lamprey is considered to be of Inadequate conservation status (NPWS, 2025a).	Key drivers of change to Sea Lamprey include barriers to upstream migration (e.g. weirs), which limit access to spawning beds and juvenile habitat; changes in precipitation due to climate change; and impacts from fishing on prey species availability. The overall status of this species is assessed as Bad, as in the last two	

Key Ecological Receptors	Current Trends	Main Drivers of Change	Evolution
		assessments, but there is a change in trend from stable to deteriorating (NPWS, 2025a). While several pressures have been identified for Brook Lamprey, these pressures are often indirect, usually acting in combination, and deemed as having low influence. Their effects are typically restricted to specific catchments and hence act on a minority of the population; the overall status remains Favourable (NPWS, 2025a). For River Lamprey, habitat quality was considered as deteriorating due to a range of prevailing pressures and future threats including barriers to migration, increases in river discharge due to several factors including climate change, nutrient pollution due to anthropogenic activities, and impacts at sea such as commercial fishing that may impact on prey or host species. The overall status assessment for River Lamprey has changed from Unknown to Inadequate (NPWS, 2025a).	
Salmonids (Atlantic Salmon and Brown Trout)	The overall status remains Bad for Atlantic Salmon. The overall trend for Atlantic Salmon has declined from Inadequate and stable in the last assessment (NPWS, 2025a). Localised extinctions of Brown Trout have occurred (e.g. in some small lakes in south Donegal, but no evidence of substantial decline in population size over the national territory (King *et al.,* 2011).	Key drivers of change to Atlantic Salmon include aquaculture, declining quality of water and habitat, and physical barriers to migration, including from hydroelectric schemes. Although the protection for this species is in freshwater, there are also marine pressures that are influencing the population viability. The overall status is assessed as Bad and deteriorating, a decline from Inadequate and stable in the last assessment (NPWS, 2025a). Key drivers of change to Brown Trout populations include gross pollution, introduction of other fish species such as Pike (*Esox lucius*), Roach (*Rutilus rutilus*) and Dace (*Leuciscus leuciscus*), the invasive weed *Lagarosiphon,* arterial drainage, overgrazing and	

Key Ecological Receptors	Current Trends	Main Drivers of Change	Evolution
		afforestation. Sea Louse infestations linked to salmon aquaculture in the west of Ireland have devastated the marine survival of the local sea trout stocks.	
Minnow, Stone Loach and Three-spined Stickleback	No population estimates or trends have been compiled for Minnow and Stone Loach in Ireland, but they can occur in large numbers where competition and predation are limited. No population estimates or trends have been undertaken for Three-spined Stickleback, but there is no evidence of major national or local decline. All three species are of 'least concern' on the all-Ireland red list of freshwater fish (King *et al.,* 2011).	Minnow is more tolerant than most species but still susceptible to severe water pollution (King *et al.,* 2011). Stone Loach is susceptible to water pollution but appears to tolerate moderate organic pollution. Also, they are very sensitive to pollution by heavy metals (King *et al.,* 2011). Water pollution with associated fish kill is a constant possibility in the aquatic environment although this is a relatively pollution-tolerant species.	
European Eel	European Eels are widespread in fisheries surveys of rivers and lakes of all sizes in Ireland. The recruitment of juveniles into Irish catchments has declined dramatically, in line with experience along the Atlantic seaboard (King *et al.,* 2011). A dramatic pan-European decline in glass European Eels returning from the sea occurred in the early 1980s, and glass European Eel numbers are now at <7% of pre 1908s averages (ICES, 2010).	Suggested causes of freshwater recruitment decline include climate change and shifts in ocean currents, overfishing, habitat loss in the freshwater range, mortality in hydropower plants, disease and parasites, and chemical contamination affecting reproductive ability. Due to the shared nature of the European Eel stock, continental threats also impact on recruitment of European Eel to Ireland (King *et al.,* 2011).	
Designated Sites			
Cullahill Mountain SAC River Barrow and River Nore SAC,	Habitats Directive (SACs) are reported to the EU under Article 17 of said directive (1992/43/EC). The overall status of Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites) is Bad (NPWS, 2025a), the same as the last two assessments. The overall status of Water courses of plain to montane levels with the *Ranunculion fluitantis* and	The main drivers of change for Designated Sites result from agricultural improvements and habitat loss/change resulting in the loss of habitat both locally and within a wider landscape. There are no current policies or initiatives that are likely to result in significant land-use change and therefore habitats prior to and during construction, operation and decommissioning of the windfarm development.	It is assumed that the baseline environment in relation to these designated sites, as described herein, will be the receiving environment at the time of construction with ongoing trends as identified expected to be reflected during the operational and decommissioning phase.

Key Ecological Receptors	Current Trends	Main Drivers of Change	Evolution
	Callitricho-Batrachion vegetation is Inadequate and deteriorating, the same as the last two assessments (NPWS, 2025a). The overall status of Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae** is Bad with a deteriorating trend, unchanged since 2019 (NPWS, 2025a). The overall status of Petrifying springs with tufa formation (*Cratoneurion*) is Inadequate, but the overall trend is now reported as stable rather than deteriorating due to more accurate data (NPWS, 2025a). The overall status of Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles is Bad, with a deteriorating trend, unchanged since 2019 (NPWS, 2025a). The overall status of White-clawed Crayfish is Bad with a deteriorating trend, unchanged from the 2019 assessment (NPWS, 2025a). The overall status of Sea Lamprey is assessed as Bad; there is a change in trend from stable to deteriorating (NPWS, 2025a). The overall status of Brook Lamprey remains Favourable, as it has been for the last three reporting periods due to the widespread distribution of Brook Lamprey; identified pressures are often indirect, usually acting in combination, and deemed as having low influence (NPWS, 2025a). The overall status assessment for River Lamprey has changed from Unknown to Inadequate with more		

Key Ecological Receptors	Current Trends	Main Drivers of Change	Evolution
	accurate data recorded in this reporting period (NPWS, 2025a). The overall status remains Bad for Twaite Shad and Atlantic Salmon. The overall trend for Twaite Shad is now deteriorating, a change from the stable trend reported in 2019. The overall trend for Atlantic Salmon has declined from Inadequate and stable in the last assessment (NPWS, 2025a). Otter is considered to be of Favourable conservation status (NPWS, 2025a) and is listed as 'least concern' on the all-Ireland red list of mammals (Marnell *et al.,* 2019). The most recent national survey undertaken in 2023-2024 indicates that the population has stabilised overall and that the species remains widespread (Reid *et al.,* 2025).		
River Nore SPA	Population trends in respect of taxa designated under the EU Birds Directive (SPAs) are reported by the latest Irish Wildlife Manual 162 on the status and distribution of wintering waterbirds in Ireland 2023 (Burke *et al.,* 2025) and the River Nore SPA Conservation Objectives Document (NPWS, 2024). Kingfisher: The all-Ireland population is estimated at 1,300 - 2,100 pairs (NPWS, 2013). A survey of six SAC river catchments in 2010 identified this SPA as supporting 16-22 breeding territories/pairs, or up to 1.7% of the all-Ireland population (NPWS, 2024). The breeding population has undergone a moderate short-term and long-term decline (Gilbert *et al.,* 2021).	The main drivers of change for this SPA result from agricultural improvements and habitat loss/change, resulting in the loss of habitat both locally and within a wider landscape. Threats and pressures specific to this SPA include landfill, land reclamation and drainage. Drivers of change to Kingfisher populations within the SPA include habitat destruction, degradation via pollution (e.g. agricultural run-off; pesticides; increased turbidity) and/or poor management of watercourses and barriers to migration. There are no current policies or initiatives that are likely to result in significant land-use change and therefore habitats prior to and during construction, operation and decommissioning of the windfarm development.	It is assumed that the baseline environment in relation to this designated site, as described herein, will be the receiving environment at the time of construction, with ongoing trends as identified expected to be reflected during the operational and decommissioning phase.

Table 13-23: Key Ecological Receptors Current Trends Main Drivers of Change Evolution of the Environment / Receiving Environment - Birds

Key Ecological Receptors	Current Trends	Main Drivers of Change	Evolution
Birds			
Barn Owl	Short-term population trend for Barn Owl is unknown (Balmer *et al.,* 2013). The long-term change in breeding range indicates a significant decline in breeding range and so it is likely that the population has also declined in the long-term. The national breeding Barn Owl population is estimated to be approximately 562-702 pairs (Lusby *et al.*, 2019).	Long-term climatic predictions suggest that warmer, wetter, winters and drier summers will become more frequent, with more extreme weather events likely. Combined with changes in land management, increased urbanisation and increased biotic pressures, climate change may lead to an increase in the national, regional and local populations and distributions of some bird species (e.g., certain migratory species) but a decrease in other species. However, such changes are unlikely to be material during the intervening period between the time when the field surveys were undertaken to inform this assessment and	It is assumed that the baseline environment in relation to bird species, as described herein, will be the receiving environment at the time of construction, with ongoing trends as identified expected to be reflected during the operational and decommissioning phase.
Buzzard	Buzzard has been experiencing a positive trend in recent years thanks to the reduction in human persecution and the ample habitat being available across Ireland. The national breeding Buzzard population is estimated to be approximately 1,500 pairs (Rooney, 2013).		
Long-eared Owl	Comprehensive population data is lacking for this species. The available data to hand are principally the 1968-72 and 1988-91 breeding bird atlases (Sharrock 1976; Gibbons *et al.* 1993). Such data is primarily focused on the species' distribution, and so no short- or long-term population trends could be estimated.		
Kestrel	Kestrel has experienced a short- and long-term trend of decline across its breeding population (Lewis *et al.* 2020). This has resulted in it being Red-listed for its breeding and wintering populations. The current national Kestrel breeding population is estimated to be between 9,918 and 17,393 (Lewis *et al.* 2019).		
Peregrine	The short-term and long-term population trends for Peregrine is increasing. The 1981 National Survey was based on approximately 50% coverage of the breeding range in 15 representative areas (Madden *et al.,* 2009). The national breeding Peregrine population is estimated to be approximately 425 pairs (Wilson O'Brien, 2018).		
Sparrowhawk	The short-term population trend for Sparrowhawk is stable, the long-term population trend is unknown. The national breeding Sparrowhawk population in Ireland is estimated to be approximately 11,859 individuals (Lewis *et al.*, 2019).		
Kingfisher	The short-term (2011-2016) and long-term (2006-2016) breeding population trends for Kingfisher have been decreasing (Gilbert *et al.,* 2021). Estimated number of pairs within the River Nore SPA to be between 16-22.		
Meadow Pipit	The short-term (2011-2016) and long-term (2006-2016) breeding population trends for Meadow Pipit have been decreasing (Gilbert *et al.,* 2021).		
Redwing	The short-term and long-term wintering population is not known. However, the European population is considered to be in long-term decline.		
Yellowhammer	The short-term (2011-2016) and long-term (2006-2016) breeding population trends for Yellowhammer have been decreasing (Gilbert *et al.,* 2021).		
Goldcrest	Goldcrest populations are stable in Ireland but are experiencing short-term declines in Europe (Gilbert *et al.*, 2021).		

Key Ecological Receptors	Current Trends	Main Drivers of Change	Evolution
Greenfinch	The short-term (2011-2016) and long-term (2006-2016) breeding population trends have been decreasing (Gilbert *et al.,* 2021).	the opening year of operation of the windfarm development.	
House Martin	The short-term (2011-2016) and long-term (2006-2016) breeding population trends is increasing with fluctuating periods of decreased numbers. (Gilbert *et al.,* 2021).		
House Sparrow	The short-term (2011-2016) breeding population trend is decreasing, with long-term (2006-2016) breeding population trends with a slight increase (Gilbert *et al.,* 2021).		
Linnet	The short-term (2011-2016) and long-term (2006-2016) breeding population trends for Linnet have been increasing and stable, respectively (Gilbert *et al.,* 2021).		
Skylark	The short-term (2011-2016) and long-term (2006-2016) breeding population trends have been decreasing (Gilbert *et al.,* 2021).		
Starling	The short-term (2006-2016) breeding population trend for starling has been stable the long-term (1980-2016) breeding population trend is unknown due to insufficient or no data available (Gilbert *et al.,* 2021).		
Swallow	The short-term (2006-2016) breeding population trend for Swallow has been stable, the long-term (1980-2016) breeding population trend is unknown due to insufficient or no data available (Gilbert *et al.,* 2021).		
Tree Sparrow	Populations are stable in Ireland but are experiencing short-term declines in Europe (Gilbert *et al.*, 2021).		
Wheatear	Populations are stable in Ireland but are experiencing short-term declines in Europe (Gilbert *et al.*, 2021).		
Willow Warbler	Willow Warbler populations are all stable in Ireland but are experiencing short-term declines in Europe (Gilbert *et al.*, 2021).		
Woodcock	The short-term (2000-2011) breeding population trend for Woodcock is stable, the long-term (1972-2011) population trend is unknown (Balmer *et al.,* 2013). Due to a lack of survey data, the magnitude of this decrease is not estimated here. Therefore, the long-term population trend has to be reported as 'unknown'.		
Golden Plover	It is estimated that there are 84-98 breeding pairs in Ireland (NPWS, 2019b). The winter population is estimated at 90,770 individuals. The national winter population has undergone a long-term decline in a 26-year period (1995-2022) (Burke *et al.,* 2025). The breeding population has undergone a short-term and long-term decline (NPWS, 2019b).		
Lapwing	The national winter population is estimated to be 81,580 individuals (Burke *et al.,* 2025). The national breeding population is estimated to be 476-620 breeding pairs (NPWS*,* 2019b). The national wintering population has undergone a long-term decline in a 26-year period (1995-2022) (Burke *et al.,* 2025). The breeding population has undergone a short-term and long-term decline (Lauder & Donaghy, 2008; Gibbon *et al.*, 1993).		

Key Ecological Receptors	Current Trends	Main Drivers of Change	Evolution
Snipe	The short-term and long-term winter population trend for Snipe is unknown due to absent or insufficient data. The short-term and long-term breeding population trends for Snipe have been decreasing over 25 years (Gilbert *et al.*, 2021). The national breeding Snipe population is estimated to be approximately 4,275 pairs (Lauder & Donaghy, 2008). Peak I-WeBS counts in the Republic of Ireland between 2018-2023 are estimated to be 835 (Burke *et al.,* 2025).		
Black-headed Gull	The short-term and long-term winter population trend is not available. The long-term breeding population trends for Black-headed Gull have been decreasing with some short-term increases (Gilbert *et al.*, 2021; NPWS, 2020). The national breeding population is estimated to be approximately 7,810 pairs (NPWS, 2020). Peak I-WeBS counts in the Republic of Ireland between 2018-2023 are estimated to be 22,716 (Burke *et al.*, 2025).		
Cormorant	The short-term and long-term winter population trend is increasing (Burke *et al.*, 2025). The long-term breeding population trends for Cormorant have been decreasing with some short-term increases (Gilbert *et al.*, 2021; NPWS, 2020). The national breeding population is estimated to be approximately 4,688 pairs (NPWS, 2020). Peak I-WeBS counts in the Republic of Ireland between 2018-2023 are estimated to be 12,310 (Burke *et al.*, 2025).		
Herring Gull	The short-term and long-term winter population trend is not known. The short-term and long-term breeding population trends for Herring Gull have been decreasing (Gilbert *et al.*, 2021). The national breeding population is estimated to be approximately 10,333 pairs (NPWS, 2020). Peak I-WeBS counts in the Republic of Ireland between 2018-2023 are estimated to be 7,146 (Burke *et al.*, 2025).		
Lesser Black-backed Gull	The short-term and long-term winter population trend is not known. The short-term and long-term breeding population trends for Lesser Black-backed Gull have been decreasing (Gilbert *et al.*, 2021). The national breeding population is estimated to be approximately 7,112 pairs (NPWS, 2020). Peak I-WeBS counts in the Republic of Ireland between 2018-2023 are estimated to be 5,464 (Burke *et al.*, 2025).		
Mallard	The short-term and long-term winter population trend is decreasing (Gilbert *et al.*, 2021; Burke *et al.*, 2025). The short-term and long-term breeding population trends for Mallard is stable (NPWS, 2020). The national breeding population is estimated to be approximately 15,400 pairs (NPWS, 2020). Peak I-WeBS counts in the Republic of Ireland between 2018-2023 are estimated to be 25,160 (Burke *et al.*, 2025).		
Mute Swan	The short-term and long-term winter population trend is stable but does represent an internationally important population relating to the European population (Gilbert *et al.*, 2021; Burke *et al.*, 2025). The short-term and long-term breeding population trends for Mute Swan are decreasing (NPWS, 2020). The national breeding population is estimated to be approximately 3,516 pairs (NPWS, 2020). Peak I-WeBS counts in the Republic of Ireland between 2018-2023 are estimated to be 10,520 (Burke *et al.*, 2025).		
Whooper Swan	The short-term and long-term winter population trend is increasing (Gilbert *et al.*, 2021; Burke *et al.*, 2025). Peak I-WeBS counts in the Republic of Ireland between 2018-2023 are estimated to be 19,111 (Burke *et al.*, 2025).		

Key Ecological Receptors	Current Trends	Main Drivers of Change	Evolution

EIAR 13.4 IMPACT OF THE PROPOSED DEVELOPMENT

This Section comprises an evaluation of the impacts of the proposed development on the receiving Biodiversity environment.

EIAR 13.4.1 Criteria and Methodology

The criteria used for impact evaluation in this report is based on *Environmental Impact Assessment of Projects: Guidance on the preparation of Environmental Impact Assessment Report* (EU, 2017) and Guidelines on the information to be contained in Environmental Impact Assessment Reports (EIAR) (EPA, 2022) and the *Guidelines for Ecological Impact Assessment in the UK and Ireland* (CIEEM, 2018).

The criteria used to evaluate the sensitivity of ecological receptors, the magnitude of impacts and the resultant significance of likely or potential effects is based on a combination of NRA guidance (NRA, 2009) and methodology developed by Percival (2007). Reason and Wray (2025), SNH (2021) and Collins (2023) were also used to evaluate bat roosts and commuting routes/foraging areas. The methodology for determining the significance of impacts to Biodiversity receptors is based on the sensitivity of the attribute (sensitive receptor) and the magnitude of the impact, as outlined in Appendix 13.1.

EIAR 13.4.2 Source-Pathway-Receptor

The following sources of impacts and pathways for these impacts to the identified receptors (sensitive aspects) of Biodiversity, are listed below:

EIAR 13.4.2.1 Sources of Impact

Construction Stage	Operational Stage	Decommissioning Stage
Land take;	Land cover change;	Movement of soils and machinery;
Excavation works;	Reinstatement of vegetation;	Noise and human activity;
Movement and storage of soils and overburden material;	New above ground structures;	Artificial lighting
Oils, fuels and chemicals;	Operating turbines	Reinstatement works
Cement-based compounds;	Operation of electrical and electronical equipment;	
Works in drainage channels, including the installation of new crossing structures	Artificial lighting;	
Works within or close to watercourses	Noise and human activity;	
Horizontal directional drilling	Delivery of materials	
Tree felling;		
Vegetation clearance;		
New hardstanding areas and access roads;		
Noise and visual intrusion;		
Presence of construction personnel;		
Operating machinery;		
Storage of materials;		
Delivery of materials		
Artificial lighting		

EIAR 13.4.2.2 Pathways

- Land cover
- Direct contact
- Ground
- Soil
- Water
- Air
- Visibility

EIAR 13.4.2.3 Receptors

- Terrestrial Habitats
- Amphibians & Reptiles
- Terrestrial Mammals
- Bats
- Birds
- Aquatic Habitats & Species
- Designated Sites

EIAR 13.4.3 Overview of the Evaluation of effects on Biodiversity

A summary of the findings of the evaluation of the effects of the proposed Gathabawn Windfarm on Biodiversity are listed in the table below. The relevant phases of the development are the construction, operational and decommissioning phases which are denoted by C, O and D respectively.

The evaluations follow this summary table.

The following effects are evaluated in detail to determine whether or not they are likely to be Significant.

Table 13-24: List of effects to Biodiversity evaluated in detail

BATS IMPACTS	
Mortality of bats due to collision or barotrauma (O)	*13.4.4.1*
BIRDS IMPACTS	
Birds of Prey, Waders and Waterbirds: Mortality of birds due to collision (O)	*13.4.4.2*
TERRESTRIAL HABITATS, AQUATIC HABITATS & DESIGNATED SITES	
Introduction or spread of invasive species (terrestrial, riparian, aquatic) (C, O, D)	*13.4.4.3*
DESIGNATED SITES IMPACTS - Culllahill Mountain SPA, River Barrow and River Nore SAC, River Nore SPA, Cullahill Mountain pNHA, Abbeyleix Wood & River Nore pNHA	
Indirect loss, degradation, fragmentation of QI habitats or suitable habitats for QI/SCI species due to spread of invasive species (C, O, D)	*13.4.4.4*
Indirect loss, degradation, fragmentation of QI habitats or suitable habitats for QI/SCI species due to reductions in water quality in downstream watercourses (C, O, D)	
TERRESTRIAL HABITATS	
Habitat enhancement and protection	*13.4.4.5*

All of the remaining effects of the proposed Gathabawn Windfarm on Biodiversity have no likelihood of causing significant adverse effects to Biodiversity receptors. A short evaluation of these effects is provided in Section 13.4.4.5, with a list of these impacts provided in the table below. The relevant phases of the

development are the construction, operational and decommissioning phases which are denoted by C, O and D respectively.

Table 13-25: List of effects to Biodiversity which will not be significant

Effects of the Proposed Development which will not be significant	Phase	Impact Significance
Effects to Terrestrial Habitats	**see Section 13.4.4.3**	
Direct loss of Flora Protection Order Species	C	Not Significant
Direct loss of Terrestrial Habitats (excluding hedgerows and treelines)	C, O	Not Significant
Hedgerow loss, severance and loss of trees	C, O	Neutral Impact
Landscape level habitat fragmentation	C, O	Not Significant
Surface or groundwater dependent habitat degradation	C	Neutral Impact
Change in composition of Terrestrial Habitats due to Bat Buffer Zones	C, O	Not Significant
Impacts to Invertebrates	**see Section 13.4.5.1.1**	
Marsh Fritillary - Habitat loss/degradation	C, O, D	No Likely Impact
Mortality of in-situ larvae, pupae or airborne individuals (due to groundworks, movement of vehicles and machinery)	C, O, D	Imperceptible Impact
Disturbance/displacement due to vibrations from construction plant, and operating/moving machinery	C, O, D	Imperceptible Impact
Mortality of airborne individuals (due to operational turbines)	O	Neutral Impact
Impacts to Amphibians & Reptiles	**see Section 13.4.5.1.2**	
Loss, reduction or degradation of foraging and breeding habitat	C, O, D	No Likely Impact
Physical injury/direct mortality	C	Imperceptible Impact
Disturbance/displacement	C	Imperceptible Impact
Physical injury/direct mortality, disturbance/displacement	O, D	Neutral Impact
Impacts to Terrestrial Mammals - Otter	**see Section 13.4.6**	
Physical loss or degradation of suitable terrestrial habitat for Otter and availability of non-aquatic prey item species	C, O, D	Slight Impact
Reduction in aquatic habitat quality and availability of aquatic prey item species for Otter	C	Slight Impact
Reduction in aquatic habitat quality and availability of aquatic prey item species for Otter	O, D	Neutral Impact
Mortality, disturbance or displacement of Otter	C,O, D	Slight Impact
Impacts to Other Terrestrial Mammals – Badger, Pine Marten, Irish Stoat, Red Squirrel	**see Section 13.4.7**	
Habitat loss or reduction – Badger, Pine Marten, Irish Stoat, Red Squirrel	C, O, D	Not Significant
Habitat protection, creation and enhancement – Badger, Pine Marten, Irish Stoat, Red Squirrel	C, O, D	Not Significant
Mortality, disturbance or displacement at breeding or resting sites of Badger, Pine Marten, Irish Stoat, Red Squirrel	C	Not Significant
Mortality, disturbance or displacement of foraging Badger, Pine Marten, Irish Stoat, Red Squirrel	C	Not Significant
Mortality, disturbance or displacement of Badger, Pine Marten, Irish Stoat, Red Squirrel	O,D	Imperceptible Impact
Impacts to Bats	**see Section 13.4.8**	
Loss, reduction of feeding areas and/or severance of commuting routes	C, O, D	Not Significant
Destruction of bat roosts	C	Imperceptible
Disturbance or displacement of roosting bats due to construction works	C	Not Significant
Disturbance or displacement of roosting or foraging bats as a result of operational turbines	O	Not Significant

Disturbance of roosting bats during operational phase maintenance and decommissioning works	O, D	Not Significant
Disturbance of foraging bats during operational phase maintenance and decommissioning works	O, D	Imperceptible
Avoidance of roosting/foraging areas due to increased EMF	O	Imperceptible
Impacts to Birds – Birds of Prey	**see Section 13.4.9.2.1**	
Birds of Prey: Reduction or loss or fragmentation of suitable habitat (foraging, nesting, roosting)	C, O, D	Not Significant
Birds of Prey: Reduction in prey item species	C, O, D	Not Significant
Birds of Prey: Habitat enhancement	C, O, D	Not Significant Positive impact
Birds of Prey: Physical injury/destruction of nests or chicks	C	No Likely Impact
Birds of Prey: Physical injury/destruction of nests or chicks	O, D	No Likely Impact
Birds of Prey: Disturbance and/or displacement from construction works areas	C	No Likely Impact
Birds of Prey: Disturbance/displacement from operational turbines (visual presence/movement and noise)	O	Not Significant
Birds of Prey: Disturbance/displacement from Operating turbines (visual presence and movement, noise)	O	Slight – Not Significant
Birds of Prey: Disturbance and/or displacement from operational maintenance works/activities and decommissioning works	O, D	Slight - Not Significant
Birds – General: Exposure to EMF	O	No Likely Impact
Impacts to Birds – Passerines	**see Section 13.4.9.2.2**	
Passerines: Permanent or temporary reduction or loss or fragmentation of suitable habitat (foraging, nesting, roosting)	C, O, D	Slight Impact
Passerines: Habitat enhancement	C, O, D	Not Significant
Passerines: Physical injury/destruction of nests or chicks	C	Not Significant
Passerines: Disturbance/displacement from construction works areas	C	Not Significant
Passerines: Collision risk	O	Not Significant
Passerines: Disturbance/displacement from operational turbines	O	Not Significant
Passerines: Disturbance/displacement from operational maintenance works/activities and decommissioning works	O,D	Not Significant
Impacts to Birds – Waders	**see Section 13.4.9.2.3**	
Waders: Permanent or temporary reduction or loss or fragmentation of suitable habitat (foraging, roosting)	C, O, D	Not Significant
Waders: Physical injury/destruction of nests or chicks	C, O, D	Not Significant
Waders: Disturbance/displacement from construction works areas	C	Not Significant
Waders: Disturbance/displacement from operational turbines	O	Not Significant
Waders: Collision risk	O	Not Significant
Waders: Disturbance and/or displacement from operational maintenance works/activities and decommissioning works	O, D	Slight - Not Significant
Impacts to Birds – Waterbirds	**see Section 13.4.9.2.4**	
Waterbirds: Permanent or temporary reduction or loss or fragmentation of suitable habitat (foraging, roosting)	C, O, D	Not Likely Not Significant
Waterbirds: Physical injury, destruction of nests	C, O, D	Not Likely Not Significant
Waterbirds: Disturbance/displacement from construction works areas	C	Not Likely Not Significant
Waterbirds: Collision risk	O	Not Significant
Waterbirds: Disturbance/displacement from operational turbines, and from maintenance works/activities	O	Not Significant
Waterbirds: Disturbance/displacement from decommissioning works	D	No Likely Impact

Impacts to Birds – Kingfisher	**see Section 13.4.9.2.5**	
Kingfisher: Permanent or temporary reduction or loss or fragmentation of suitable habitat (foraging, nesting, roosting)	C, O, D	Not Likely Not Significant
Kingfisher: Physical injury/destruction of nests or chicks	C	Not Significant
Kingfisher: Disturbance/displacement from construction works areas	C	Not Significant
Kingfisher: Collision risk	O	Not Significant
Kingfisher: Disturbance/displacement from operational turbines	O	Not Significant
Kingfisher: Disturbance/displacement from operational maintenance works/activities and decommissioning works	O,D	Not Significant
Impacts to Aquatic Habitats & Species	**see Section 13.4.10**	
Hydromorphological impacts due to instream or works adjacent to wet drainage channels and watercourses	C	Neutral
Hydromorphological impacts to downstream waterbodies due to changes to drainage regimes and surface water runoff	C, O, D	Slight - Not Significant
Habitat degradation on aquatic habitats and species due to reductions in water quality during construction	C	Not Significant
Habitat degradation on aquatic habitats and species due to reductions in water quality during operation and decommissioning	O, D	Not Significant
Disturbance/displacement/mortality of species of conservation importance	C, O, D	Not Significant
Impacts to Designated Sites	**see Section 13.4.11**	
Direct Habitat Degradation Effects to Annex I habitats within Designated Sites (SAC, SPA and pNHA) and suitable habitats for Annex I and II species within or ex-situ Designated Sites due to land cover change, vegetation removal or excavation works	C, O, D	Not Significant
Reductions in WFD Status of downstream Designated Sites (SAC, SPA and pNHA)	O, D	Imperceptible Impact
Indirect Habitat Degradation Effects to Annex I habitats and suitable habitats for Annex I and II species of downstream Designated Sites (SAC, SPA and pNHA) due to sedimentation and reductions in water quality.	O, D	Imperceptible Impact
Indirect Habitat Degradation Effects to Annex I habitats and suitable habitats for Annex I and II species of downstream Designated Sites (SAC, SPA and pNHA) due to changes in flow/water quantities or drainage regimes	O, D	Not Significant
Indirect Habitat Degradation Effects to Annex I habitats and suitable habitats for Annex II species of Cullahill Mountain SAC and Cullahill Mountain pNHA due to changes in flow/water quantities or drainage regimes	C, O, D	Not Significant
Indirect Habitat Degradation Effects to Annex I habitats and suitable habitats for Annex I and II species of downstream Designated Sites (SAC, SPA and pNHA) due to the spread of invasive species)	C, O, D	No Impact
Direct loss (mortality) of Annex I or Annex II species of Designated Sites	C, O, D	Not Significant
Disturbance or displacement of Annex I or Annex II species of Designated Sites	C, O, D	No Impact
Displacement of Annex I or Annex II species of Designated Sites from the windfarm area	C, O, D	No Impact

EIAR 13.4.4 Evaluation of effects to Terrestrial Habitats

A summary of the findings of the evaluation of the effects of the proposed Gathabawn Windfarm on Terrestrial Habitats are listed in the table below. The relevant phases of the development are the construction, operational and decommissioning phases which are denoted by C, O and D respectively.

The evaluations follow this summary table.

The following effects are evaluated in detail to determine whether or not they are likely to be Significant.

Table 13-26: List of effects to Terrestrial Habitats evaluated in detail

TERRESTRIAL HABITATS, AQUATIC HABITATS & DESIGNATED SITES	
Introduction or spread of invasive species (terrestrial, riparian, aquatic) (C, O, D)	*13.4.4.1*
TERRESTRIAL HABITATS	
Habitat enhancement and protection	*13.4.4.2*

All of the remaining effects of the proposed Gathabawn Windfarm have no likelihood of causing significant adverse effects to Terrestrial Habitat receptors. A short evaluation of these effects is provided in Section 13.4.4.3, with a list of these impacts provided in the table below. The relevant phases of the development are the construction, operational and decommissioning phases which are denoted by C, O and D respectively.

Table 13-27: List of effects to Terrestrial Habitats which will not be significant

Effects which will not be significant	**Phase**	**Impact Significance**
Effects to Terrestrial Habitats	**see Section 13.4.4.3**	
Direct loss of Flora Protection Order Species	C	Not Significant
Direct loss of Terrestrial Habitats (excluding hedgerows and treelines)	C	Not Significant
Hedgerow loss, severance and loss of trees	C	Neutral Impact
Landscape level habitat fragmentation	C	Not Significant
Surface or groundwater dependent habitat degradation	C	Neutral Impact
Change in composition of Terrestrial Habitats due to Bat Buffer Zones	C, O	Not Significant

EIAR 13.4.4.1	**Introduction or spread of terrestrial invasive species**
Sensitive Aspect:	Terrestrial Habitats, Terrestrial Annex I habitats of Designated Sites
Importance:	**Local (higher) – Terrestrial Habitats and Very High – Designated Sites**
Impact Source(s)	Excavation and relocation of soils, movement of machinery
Impact Pathway(s)	Soils
Project Stage	Construction, Operation & Decommissioning Phases

Overview of Impact (general):

Invasive Alien Plant Species (IAPS) include non-native, terrestrial invasive species such as Japanese Knotweed or Cherry Laurel.

IAPS could be introduced to a site through the movement of plant/machinery and delivery vehicles, and natural materials such as soil, fencing posts, hedging and trees onto the development site. IAPS infestations could be spread through the disturbance of vegetation, groundworks and the movement of soils and machinery.

Invasive alien plants are a threat to Ireland's biodiversity and ecosystems. Terrestrial invasive alien plants can degrade natural ecosystems by outcompeting native flora, reducing overall biodiversity, and altering physical habitat structures.

Examination of the Impact of the Proposed Gathabawn Windfarm:

There were two records of Japanese Knotweed gathered during habitat surveys of the Gathabawn Windfarm site in 2022 and 2026 (near an access track to turbine 12). No other invasive species were observed or recorded within 50m of the project works in the Ballyring Area. No invasive species were recorded at the Ballylehaun Area.

In relation to the Candidate Gathabawn Grid Connection, the Underground Cabling is routed along public roads and across agricultural lands, while the Parksgrove Substation is located on scrub/vacant land. No invasive species were recorded during 2026 habitat surveys.

Activities relating to the movement of machinery and groundworks/earthworks have the potential to introduce new infestations of Invasive Alien Plant Species (IAPS) to the site and/or spread existing IAPS infestation, due to the movement of machinery and vehicles onto the site from other locations. Therefore the risk of movement/introduction of invasive species cannot be excluded.

Additionally, although the presence of vehicles on the windfarm during the Construction and Operational Phase and during Decommissioning Works will be negligible, and groundworks/movement of soils will be at discrete locations at the windfarm site, with no requirement for works in the vicinity of watercourses or any instream works, the risk of movement/introduction of invasive species cannot be excluded.

In relation to terrestrial habitats, should an infestation be established on the windfarm site or along the grid connection, the effects could result in aggressive spreading of the species into locally important habitats and local Annex I habitats and pose dangers to the mammal and bird baselines, with a moderate to high magnitude.

The risk for the introduction/spread of IAPS is greatest during the construction phase due to the extent of the construction works areas and the volumes of traffic and movement of machinery coming onto the project site. The risk of the introduction/spread of IAPS is considered to be lower during the operational and decommissioning phases of the Gathabawn Windfarm due to the reduced extent of works and the much-reduced level of groundworks, and movement of machinery/vehicles onto the windfarm site and Parksgrove Substation.

The introduction or spread of invasive species within the Gathabawn Windfarm site could result in impacts of High magnitude, albeit on features of Low sensitivity within the site resulting in impacts that are **Not significance**.

In relation to higher value habitats in the Cullahill Mountain SAC, there is potential for the dispersal of invasive species which could in turn affect the Qualifying Interests of the Cullahill Mountain SAC, which is designated for Annex I Semi-natural grassland habitats. Without mitigation in place, given the absence of invasive species at the Ballylehaun Area, but taking into account the risk or introduction of invasive species

with site vehicles/machinery entering the site, the magnitude of unmitigated impacts could potentially be High magnitude, on features of Very High sensitivity (in relation to the Annex I habitats).

In relation to the River Barrow and River Nore SAC, given the separation distances to the QI Annex I terrestrial habitats from the Gathabawn Windfarm works and from the Candidate Gathabawn Grid Connection works, it is considered that the spread of terrestrial invasive species into Annex I terrestrial habits is unlikely to occur.

Impact Magnitude	Potentially Moderate	**Impact Significance: *(pre-mitigation)***	**Potentially Significant**

Mitigation and Monitoring Measures: Even though Significant impacts are not predicted; the following mitigation and monitoring measures will be implemented as best practice environmental management.

WM21	Treatment of the existing stand of Japanese Knotweed at the Ballyring Area has commenced pre-application and will continue during the planning and pre-construction phase. Treatment of the existing Japanese Knotweed will be carried out an invasive species specialist consultant in accordance with best practice.
WM03 GM03	Pre-construction surveys for invasive species will be carried out to determine if any new infestations of invasive species have been established in the interim period between the submission of the planning application and the commencement of construction works. These pre-construction confirmatory surveys for invasive species will be carried out at the construction works areas plus 7m, by the Project Ecologist, to accurately determine the extent of new invasive species infestations. Mapping, showing the most up to date distribution and extent of each infestation, will be distributed to the Environmental Clerk of Works and to the Project Engineer.
WM12 GM12	The Environmental Management Team will monitor construction works for compliance with the Environmental Management Plan. The project Environmental Management Team which includes an Environmental Clerk of Works, the Project Ecologist and specialists as required such as archaeologists, invasive species specialists and hydrologists, who are independent of the site contractors. The Environmental Management Team will report to the owner's Project Manager.
WM20 GM20	Liaison with Contractor: The Project Ecologist will liaise with the Contractors on a weekly basis regarding the upcoming schedule of works and will advise the Contractors of any particular ecological protection requirements at specific locations on site.
WM22 GM21	Any excavation works in close proximity (7m) to an invasive species infestation location will be carried out under the direct supervision of an invasive species specialist ecologist.
WM23 GM22	Invasive Species Control: Visual inspections will be carried out by the Contractor on all machinery and equipment (particularly for machinery and equipment which has come into contact with water or soils) for evidence of attached plant or animal material, or adherent mud or debris. Any attached or adherent material will be removed before entering or leaving the site, securely stored away from traffic for removal to a contaminated waste Community Liaison Officer bin at the temporary constructions.
WM27	Ecological Monitoring of initial groundworks and road construction works within 50m of the boundary of the Cullahill Mountain SAC. This monitoring will be conducted by the Ecological Clerk of Works, who will have a have a 'stop-works' authority to temporarily stop construction works and the Contractor will implement the necessary actions and measures to the satisfaction of the Ecological Clerk of Works, before construction works can once again commence.
WM51 GM50	Treatment/management of invasive species infestations: Any infestations of Japanese knotweed or other high-impact invasive species within 7m of works will be covered with high density polyethylene grass carpet terram prior to any works commencing at the location. The covering of any new infestations will only be carried out under the direct supervision of a specialist invasive species ecologist, and works within 7m of the infestation will be under the direct supervision of this specialist invasive species ecologist.
WM52	Monitoring of invasive species: Works within 7m of an invasive species infestation will only be carried out under the direct supervision of a specialist invasive species ecologist with prior experience of this type of work.
WM100	Annual Invasive Species Survey: An invasive species survey will be conducted of the Biodiversity Areas, and the operational windfarm site. Should a new infestation be identified, remedial measures will be implemented. Any remedial works will be carried out by the Asset Manager or Environmental

	Manager for low to medium impact species, and by an invasive species specialist ecologist for high-impact invasive species.
WM101	Invasive Species Survey during major maintenance: Prior to facilitating works for turbine component transportation, the works locations will be surveyed for invasive plant species. Should a new infestation be identified, then the works within 7m of the infestation will be carried out under the direct supervision of an ecologist with prior experience of invasive species.
WM127GM96	Invasive Species Survey: Before any decommissioning works commence, the works locations will be surveyed for invasive plant species infestations and should any be present within 7m of the works, then the works within 7m of the infestation will be under the direct supervision of an ecologist with prior experience of invasive species.
Effectiveness of Mitigation: The inspection of lands for the presence of invasive species prior to the carrying out of groundworks or vegetation removal (during any phase of the Gathabawn Windfarm) will avoid accidental spreading of invasive species and will enable the appropriate removal of any infestations which are likely to be affected. The visual inspection and cleaning of all site machinery and equipment prior to its arrival on site will prevent the introduction of invasive species.	
Residual Impact Significance *(post-mitigation)*:	**Neutral**

EIAR 13.4.4.2	**Habitat enhancement and protection**
Sensitive Aspect:	Terrestrial Habitats
Importance:	**Local (High)** (as per Section EIAR 13.3.1.1)
Impact Source(s)	Preservation of parkland habitat and hazel woodland, creativity of connectivity corridor, planting/establishment of new hedgerows, and enhancement of existing hedgerows, creation of biodiversity pockets, restoration of dry-stone walls.
Impact Pathway(s)	Land cover
Project Stage	Construction & Operation Phases

Overview of Impact (general):

The Gathabawn Windfarm Project includes actions which will see the protection of existing veteran hawthorn trees, protection of existing semi-natural hazel woodland, creation of a biodiversity connectivity corridor connecting existing hazel woodland with the adjacent Gales Hill Nature Reserve, creation of high-value biodiversity areas at Ballyring and the provision and enhancement of existing hedgerows as well as new linear hedgerow habitat. The protection and enhancement of seminatural habitats and the provision of new linear habitat will contribute to the long-term protection of existing habitat and the provision of additional habitat over the long-term for birds, bats, other mammals and reptiles and amphibians as well as reduce the fragmentation of the wider landscape for species that require linear corridors for commuting and access to/between foraging and breeding/roosting features.

Examination of the Impact of the Proposed Gathabawn Windfarm Project:

Impact characteristics: Indirect, Likely, long-term

Extent: Protection and conservation management of 5.3ha Hazel Wood, and planting/establishment of 3.7km of new hedgerows which will include 100 trees (to offset the removal of 3.7km of hedgerow including the felling of 10 trees), and the enhancement of 1.3km of existing hedgerow.

Biodiversity Areas totalling 7ha form part of the proposed Gathabawn Windfarm development and will be protected and managed for the duration of the development. This comprises:

- Planting 3,700m of new hedgerow which include 100 no. native trees, (as per EIAR 5.3.15 above)
- Improving 1,300m of existing poor cover hedgerows by interplanting into gaps (as above)
- 1.7ha of agricultural lands and 5.3ha of hazel woodland have been secured for the operational lifetime of the Gathabawn Windfarm under a long-term lease agreement with the landowners. These areas will be managed as follows in order to increase the biodiversity resource at the windfarm site:
- At the Ballyring Area, two areas of agricultural land, 1ha in total, will also be planted with high biodiversity value native tree and plant species in order to create pockets of higher value habitat at the Ballyring site.
- At the Ballylehaun site, a Biodiversity Connectivity Corridor will be created on 0.7ha of lands and will comprise a 15m wide and 500m long corridor linking two areas of hazel woodland – (i) the 5.3ha of hazel wood which will be leased for the lifetime of the windfarm, and (ii) the hazel woodland which is owned by the NPWS and forms part of the Gales Hill Nature Reserve.
- The 5.3ha hazel wood will be protected for the lifetime of the windfarm to prevent any felling or removal of trees;
- The Biodiversity Areas will be fenced to ensure that they allow wildlife free passage while preventing access by livestock;
- The Biodiversity Areas will be maintained through regularly removing invasive species and managing tree densities and ground cover within the wood and within the connectivity corridor.

In addition, the stone-wall features at the site will be restored by an experienced dry stone wall builder. Dry-stone walls provide shelter and nesting sites for animals, including invertebrates, amphibians, reptiles, birds and small mammals. Their surface can host a diversity of mosses, liverworts, lichens and ferns, the

species present being influenced by the type of stone. South facing walls are particularly important for warmth loving insects.

Overall Rationale (Proposed Gathabawn Windfarm): The creation and enhancement of the Biodiversity areas aims to preserve existing habitat and create new habitats and the control of these areas over the operational phase will have a long term, positive effect on the biodiversity interest of the area. These measures have the potential to have positive indirect impacts on mammals, birds and invertebrates which use the Gathabawn Windfarm area for foraging and refuge. The overall benefit to biodiversity will be Slight Positive.

The enhancement of 1.3km of existing Hedgerow habitat and the establishment of 3.7km of replacement Hedgerow habitat will have a Slight Positive effect within the local area. In addition, the indirect impact species will be Slight Positive.

Impact Magnitude	Low	**Impact Significance:**	**Slight Positive**

EIAR 13.4.4.3 Gathabawn Windfarm Impacts to Terrestrial Habitats which will not be Significant

All of the remaining effects of the Proposed Gathbawn Windfarm on Terrestrial Habitats will not be significant. A short evaluation of these effects is provided below.

Direct loss of Flora Protection Order Species (C): No Likely Impact - Not Significant. One Flora Protection Order (FPO) species (Opposite-leaved Pondweed) has been recorded in the NBDC database in OS grid square 10km squares S36 and S37. Betony (Stachys officinalis) was also recorded in square S46. No FPO species were recorded during habitat surveys within, or in close proximity to, construction works areas. Although this does not rule out the presence of FPO species entirely, it is unlikely that they are present on site. As a result, it is unlikely there will be a direct loss of FPO species.

Direct disturbance/reduction in Terrestrial Habitats (excluding hedgerows and treelines) (C): Not Significant. The permanent habitat loss as a result of the development of the Gathabawn Windfarm relates to habitats of low intrinsic biodiversity value, mainly comprising Improved Agricultural Grassland. The loss of other habitats accounts for approximately <1% of other habitats, none of which are considered as anything more than locally important habitat, which accounts for a not-significant effect in a worst-case scenario. Due to the limited extent of semi-natural habitats lost in the context of abundance of these habitats in the wider landscape, the impact is evaluated as not significant. Local artificial buildings or structures were identified as of Local Importance (Higher Value) to a limited extent based only on potential to provide suitable roost structures for bats, and there will be no loss of these buildings or structures as a result of the development and therefore no effects on this habitat type.

Hedgerow loss, severance and loss of trees (C): Neutral Impact. To provide bat buffer zones around the turbines, or to facilitate the delivery of the large turbine components, 3,700m of hedgerow and 10 trees will be removed during the construction works, this equates to c. 50% of the Hedgerows within the construction area. However, the hedgerow network in the local area is extensive. New hedgerows and trees will be planted at the Gathabawn Windfarm Site, and their locations have been proposed to replace, enhance and restore the hedgerow network in the local area which will result in impacts being Neutral.

Landscape level habitat fragmentation (C): Not Significant. The site roads, 8.3km in total, will mainly comprise the construction of 6.5km of new roads and the upgrading and widening of 1.8km of existing private farm tracks. Due to the nature of windfarm layout with turbines and associated infrastructure located predominately within Improved Agricultural Grassland of limited ecological value and the fact that permanent loss of semi-natural habitats of Local Importance (Higher Value) represents <1% of the total study area, no landscape level fragmentation is likely to occur.

Surface or groundwater dependent habitat degradation (C): Neutral impact. The Gathabawn Windfarm site does not support areas of habitat which are dependent on surface or groundwater, therefore the development will not affect drainage regimes or groundwater levels within this type of habitat. Furthermore, with the maintenance of drainage regimes through the use of cross drains and regular release of water from the windfarm drainage system, no impact on the availability of surface water or groundwater in surrounding habitats, including the Tentore wetland area, is expected to occur.

Change in composition of Terrestrial Habitats due to Bat Buffer Zones (C, O): Not Significant. The removal of the improved agricultural grassland and hedgerow habitat is Not Significant due to the low ecological value of these habitats. The maintenance of a short grass sward within the buffer areas will minimise the use of the area by prey items for birds and bats and will facilitate a more accurate account of fatalities detected during the post-construction monitoring periods. Given the current low ecological value of the baseline habitat affected by the bat buffer mitigation measure, changes to baseline terrestrial habitats will not be significant.

EIAR 13.4.4.4 Impacts to Terrestrial Habitats – CANDIDATE GATHABAWN GRID CONNECTION

Direct loss of Flora Protection Order Species (C): No Likely Impact - Not Significant. One Flora Protection Order (FPO) species (Opposite-leaved Pondweed) has been recorded in the NBDC database in OS grid square S36 downstream of the Candidate Gathabawn Grid Connection crossing. No FPO species were recorded during habitat surveys within, or in close proximity to, construction works areas. Although this does not rule out the presence of FPO species entirely, it is unlikely that they are present on site or downstream given the records are from 1866. As a result, it is unlikely there will be a direct loss of FPO species.

Direct disturbance/reduction in Terrestrial Habitats (excluding hedgerows and Treelines) (C): Moderate Effect. The permanent habitat loss as a result of the development of the Whole Gathabawn Windfarm Project relates to habitats of low intrinsic biodiversity value, mainly comprising of improved agricultural grassland fields. The loss of other habitats accounts for less than 1% of locally important habitat, which accounts for a moderate effect in a worst-case scenario. Due to the limited extent of semi-natural habitats lost in the context of abundance of these habitats in the wider landscape, the impact is evaluated as not significant. Local artificial buildings or structures were identified as of Local Importance (Higher Value) to a limited extent based only on their potential to provide suitable roost structures for bats and Barn Owls, and there will be no loss of these buildings or structures as a result of the development and therefore no effects on this habitat type.

Hedgerow loss, severance and loss of trees (C): Moderate Effect. Construction stage works will not result in the permanent loss of trees or hedgerow. Temporary loss to sections of hedgerows and treelines along the Candidate Gathabawn Grid Connection will not pose any significant loss and be replanted as part of the construction phase works.

Landscape level habitat fragmentation (C): Not Significant. Due to the nature of Candidate Gathabawn Grid Connection located predominately adjacent to or near hedgerow and treelines, and with relatively small areas of trenching works through locally important habitats across the entire route.

EIAR 13.4.4.5 Environmental Protection Measures for the protection of Terrestrial Habitats

In addition to the mitigation measures identified in Sections EIAR 13.4.4.1 and EIAR 13.4.4.2 above, additional best practice measures which form part of standard windfarm construction/operation will be implemented during the construction/operation/decommissioning of the Gathabawn Windfarm Project to protect Terrestrial Habitats and avoid/reduce these not significant effects. These best practice measures are identified in Section EIAR 13.4.12 and are included in the Construction Environmental Management Plan for the Gathabawn Windfarm project which accompanies the subject planning application. Operational and decommissioning measures will be included in the Environmental Management Plans for those phases of the project.

EIAR 13.4.4.6 Evaluation of the Whole Project Impact to Terrestrial Habitats

When the residual impacts of the Proposed Gathabawn Windfarm and the Candidate Gathbawn Grid Connection to Terrestrial Habitats are considered cumulatively, it is considered that the whole project impact will be Not Significant.

EIAR 13.4.5 Evaluation of effects to Invertebrates, Amphibians and Reptiles

A summary of the findings of the evaluation of the effects of the proposed Gathabawn Windfarm on Invertebrates, Amphibians and Reptiles are listed in the table below. The relevant phases of the development are the construction, operational and decommissioning phases which are denoted by C, O and D respectively.

The evaluations follow this summary table.

The proposed Gathabawn Windfarm has no likelihood to cause significant adverse effects to Invertebrate, Amphibian or Reptile receptors. A short evaluation of these effects is provided in Section 13.4.5.1 and 13.4.5.2, with a list of these impacts provided in the table below. The relevant phases of the development are the construction, operational and decommissioning phases which are denoted by C, O and D respectively.

Table 13-28: List of effects to Invertebrates, Amphibians or Reptiles which will not be significant

Effects which will not be significant	Phase	Impact Significance
Impacts to Invertebrates	**see Section 13.4.5.1.1**	
Marsh Fritillary - Habitat loss/degradation	C, O, D	No Likely Impact
Mortality of in-situ larvae, pupae or airborne individuals (due to groundworks, movement of vehicles and machinery)	C, O, D	No Likely Impact
Disturbance/displacement due to vibrations from construction plant, and operating/moving machinery	C, O, D	Unlikely Impact
Mortality of airborne individuals (due to operational turbines)	O	No Likely Impact
Impacts to Amphibians & Reptiles	**see Section 13.4.5.1.2**	
Loss, reduction or degradation of foraging and breeding habitat	C	Imperceptible Impact
Physical injury/direct mortality	C	Imperceptible Impact
Disturbance/displacement	C	Imperceptible Impact
Physical injury/direct mortality, disturbance/displacement	O, D	Neutral Impact

EIAR 13.4.5.1 Gathabawn Windfarm Impacts to Invertebrates, Amphibians and Reptiles which will not be Significant

All of the effects of the Proposed Gathbawn Windfarm on Invertebrates, Amphibians and Reptiles will be Not Significant. A short evaluation of these effects is provided below:

EIAR 13.4.5.1.1 Impacts to Invertebrates – Marsh Fritillary

Marsh Fritillary – Habitat loss/degradation (C,O,D): No Likely Impact: Marsh Fritillary colonies can occur in a wide variety of habitats including sand dunes, calcareous grassland, fens, bogs and upland heaths and grasslands. The presence of its foodplant Devil's-bit Scabious, *Succisa pratensis* is an essential habitat component (Phelan *et al*., 2021). Although Devil's-bit Scabious was recorded adjacent to the project site, no stands are present within the proposed works boundary. The Cullahill Mountain SAC does have patches of suitable habitat and even record of larval webs from surveys undertaken in 2021 and 2022. However, follow-up surveys in 2025 and 2026 have yielded no suitable patches of this species' host plant or larval webs (5 individual plants scattered across large fields). It is therefore considered unlikely that habitat containing Devils Bit Scabious will be affected by groundworks during the construction period.

Notwithstanding the absence of Marsh Fritillary colonies, the rarity of its foodplant Devil's Bit Scabious, and the lack of suitable habitats for hMarsh Fritillary to colonise the Project site, the unlikely possibility, given the recorded habitats, remains that patches of DBS could become established at the site during the post-application/pre-construction period.

Marsh Fritillary could also become established during the operational lifetime of the windfarm. However, due to the small size of the areas which will be subject to groundworks during the operational phase, with additional relatively small areas (berms and overburden storage areas) subject to works during decommissioning, it is considered that the potential for significant habitat loss or degradation can be excluded due to the small size of the areas subject to groundworks (where DBS could potentially be removed), and the isolated and discrete nature of the locations of these works.

Marsh Fritillary - Mortality of in-situ larvae, pupae or airborne individuals (due to groundworks, movement of vehicles and machinery) (C,O,D): No Likely Impact: Suitable habitat does not exist within the Construction Works Area boundary, and no suitable habitats containing Devils Bit Scabious (DBS) or Marsh Fritillary larval webs/individuals were recorded during surveys at the Project site. The nearest Marsh Fritillary colony to construction works areas was last recorded on 14th September 2021 within the Cullahill Mountain SAC, adjacent to the Project site. Therefore, due to the lack of DBS and lack of webs within the construction works area boundary, it is considered unlikely that mortality of any in-situ larvae or airborne individuals will occur as a result of groundworks or movement of machinery during the construction period.

Notwithstanding the absence of Marsh Fritillary colonies and the absence of its foodplant Devil's Bit Scabious at the Project site, the unlikely possibility, given the recorded habitats, remains that patches of DBS and possibly Marsh Fritillary colony(s) could become established at the site before the commencement of construction works. Therefore, mitigation measures are included in the Construction Environmental Management Plan which address any future colonisation of the project site by Devil's-bit Scabious and Marsh Fritillary butterfly. These measures include pre-construction survey of construction works plus 100m in all directions to determine the distribution of DBS during last available Aug/Sept prior to commencement of construction works will be undertaken (WM28). Any areas of DBS that are located within construction works boundary, will be strimmed/cut to ground level in the last available April/early May period prior to commencement of construction to prevent new colonies becoming established within the works areas. In the highly unlikely event that Marsh Fritillary larval webs are detected within the footprint of the proposed Gathabawn Windfarm, NPWS will be consulted about measures to protect any Marsh Fritillary individuals

(including larvae and/or pupae) at the site. Appropriate mitigation measures (WM61) for such protection will include turves containing Devil's-bit Scabious to be translocated to a nearby location that would be suitable for the establishment of Devil's-bit Scabious. Before translocation, the soil of the mitigation site will be scarified to allow the roots of the plants take hold. These actions will help increase the success of the translocation of Devil's-bit Scabious from the donor site to the mitigation site. Weather conditions will be monitored, and where possible turves will be translocated when the soil is damp but not waterlogged, with a forecast for rain in the following days to aid establishment to ensure that the donor turves succeed. Long periods of drought will be avoided. All translocation works must be supervised by an ecologist with experience of habitat management and establishment of Devil's-bit Scabious.

In relation to operational and decommissioning works, however, due to the small size of the areas which will be subject to groundworks during the operational phase, with additional relatively small areas (berms and overburden storage areas) subject to works during decommissioning, it is considered that the potential for significant mortality of in-situ larvae, pupae or airborne individuals can be excluded due to the small size of the areas subject to groundworks (where DBS could potentially be removed), and the isolated and discrete nature of the locations of these works.

Marsh Fritillary - Disturbance/displacement due to vibrations from construction plant, and operating/moving machinery (C,O,D): Unlikely Impact: Marsh Fritillary (individuals or larval webs) were not recorded at the Gathabawn Windfarm Project site during surveys. Furthermore, its foodplant, Devils Bit Scabious (DBS), is also not present within the construction works area boundary. The nearest Marsh Fritillary colony was last recorded in 2021 within the Culahill Mountain SAC, adjacent to the Project site. Therefore it is unlikely that construction excavation works and the movement of machinery will result in disturbance or displacement of Marsh Fritillary.

In relation to the operational and decommissioning phases of the development - due to the very low levels of maintenance vehicles and use of machinery on site and the small size of the areas which will be subject to groundworks (re-widening entrances and junctions) during the operational phase, and due to the very low number of vehicles and machines required, and small size of the areas subject to groundworks (re-widening entrances and junctions, reinstating hardstands) during decommissioning combined with the short duration (4 months) of the decommissioning works, it is considered that the potential for significant disturbance/displacement or mortality due to moving machinery/vehicles can be excluded.

Marsh Fritillary - Mortality of airborne individuals (due to operational turbines) (O): No Likely Impact: Marsh Fritillary are not expected to fly within the rotor zone of the turbines, and therefore mortality is unlikely to occur as a result of operating turbines.

EIAR 13.4.5.1.2 Impacts to Amphibians & Reptiles – which will not be Significant

Loss, reduction or degradation of foraging and breeding habitat (C): Imperceptible impact, Not Significant. The habitats at the Gathabawn Windfarm site are predominately of low suitability to amphibians and reptiles, with no habitat of a semi-permanent-to-permanent nature with potential to support frog populations found on site. Loss or reduction of suitable habitats which mainly comprise scrub, relates to approximately 1.1ha or c 2.5% of the footprint of the development. Amphibians and reptiles are known to be adaptable to different habitats, and suitable habitat is present to a limited degree within the Gathabawn Windfarm Site and wider area. Overall, the impact to amphibians and reptiles as a result of the development will be imperceptible.

Physical injury/direct mortality (C): Imperceptible impact. The habitats at the Gathabawn Windfarm site are predominantly of low value to amphibians and reptiles, and this is reflected in the low number of records available through the NBDC historically. Twelve adult Smooth Newts were recorded in a quarry c.61m west

of the proposed Gathabawn Windfarm. Therefore, the potential for direct mortality or injury as a result of ground clearance and groundworks during construction are low, mortality or injury impacts will be Not Significant.

Disturbance/displacement (C): Imperceptible impact. Amphibian and reptile species discussed are known to utilise a range of different habitats. As there is a predicted low occurrence of species throughout the site of the Gathabawn Windfarm, with most habitats at the windfarm site of low value to amphibians and reptiles, the potential for disturbance/displacement at construction works areas is low. Furthermore, the magnitude of disturbance or displacement effects is ameliorated by the availability of suitable habitat in the surrounding areas. Disturbance or displacement of amphibians will be Not Significant.

Physical injury/direct mortality, disturbance or displacement (O, D): Neutral impact. Given the predicted low occurrence of amphibian and reptile species throughout the site of the Gathabawn Windfarm, the potential for mortality, injury, disturbance or displacement is low. The management (mowing, scrub removal) of bat buffer areas will prevent suitable habitat for amphibians or reptiles becoming established in these areas. Therefore, it is unlikely that amphibians or reptiles will be significantly affected by any operational phase or decommissioning works. Displacement effects are ameliorated by the existence of suitable habitat in the surrounding areas.

EIAR 13.4.5.2 Impacts to Terrestrial Invertebrates or Amphibians – CANDIDATE GATHABAWN GRID CONNECTION

Marsh Fritillary (C): No Likely Impact: The Candidate Gathabawn Grid Connection does not overlap with any habitat that has potential to support Marsh Fritillary. As it is not a KER from project sources not already considered within the proposed Gathabawn Windfarm Project. No additional impacts are identified for the Whole Gathabawn Windfarm Project beyond what is stated in section 13.4.

Loss, reduction or degradation of foraging and breeding habitat (C): Low impact. The habitats along the Candidate Gathabawn Grid Connection are predominantly of low suitability to amphibians and reptiles, with no habitat of a semi-permanent-to-permanent nature with potential to support frog populations found on site. Loss or reduction of suitable habitats, which mainly include grassland, farm trails and roads. Amphibians and reptiles are known to be adaptable to different habitats, and suitable habitat is present along the three watercourse crossings and the River Nore. Although suitable habitat is present at these crossings, any impacts via the works will be short-term and low magnitude impacts to habitat connectivity and water quality. Given the worst-case impacts could pose high magnitude impacts to water quality, it would still only constitute a moderate effect on Amphibian KERs. Overall, the impact to amphibians and reptiles as a result of the development will be of moderate effect in the worst instance.

Physical injury/direct mortality (C): Imperceptible impact. The habitats at the Candidate Gathabawn Grid Connection site are predominantly of low value to amphibians and reptiles, and this is reflected in the low number of records available through the NBDC historically. Therefore, the potential for direct mortality or injury as a result of Grid Connection excavation works or vehicles during construction are low, mortality or injury impacts will be Not Significant.

Disturbance/displacement (C) : Imperceptible impact. Amphibian and reptile species discussed are known to utilise a range of different habitats. As there is a predicted low occurrence of species throughout the site of the Candidate Gathabawn Grid Connection, with most habitats of low value to amphibians and reptiles, the potential for disturbance/displacement at construction works areas is low. Furthermore, the magnitude of disturbance or displacement effects is ameliorated by the availability of suitable habitat in the surrounding areas. Disturbance or displacement of amphibians will be Not Significant.

Physical injury/direct mortality, disturbance or displacement (O, D): Low impact. Given the predicted low occurrence of amphibian and reptile species throughout the site of the Candidate Gathabawn Grid Connection, the potential for mortality, injury, disturbance or displacement is low. The duration for such impacts is limited to temporary maintenance sources across the entire Grid Connection. Therefore, it is unlikely that amphibians or reptiles will be significantly affected by any operational phase or decommissioning works. Displacement effects are ameliorated by the existence of suitable habitat in the surrounding areas.

EIAR 13.4.5.3 Environmental Protection Measures for the protection of Invertebrates, Amphibians, and Reptiles

Best practice measures which form part of standard windfarm construction/operation will be implemented during the construction/operation/decommissioning of the Gathabawn Windfarm Project to protect Invertebrates, Amphibians and Reptiles and avoid/reduce these not significant effects. These best practice measures are identified in Section EIAR 13.4.12 and are included in the Construction Environmental Management Plan for the Gathabawn Windfarm project which accompanies the subject planning application. Operational and decommissioning measures will be included in the Environmental Management Plans for those phases of the project.

EIAR 13.4.5.4 Evaluation of the Whole Project Impact to Invertebrates, Amphibians and Reptiles

When the impacts of the Proposed Gathabawn Windfarm and the Candidate Gathbawn Grid Connection to Invertebrates, Amphibians and Reptiles are considered cumulatively, it is considered that the whole project impact will be Not Significant.

EIAR 13.4.6 Evaluation of effects to Otter

A summary of the findings of the evaluation of the effects of the proposed Gathabawn Windfarm on Otter are listed in the table below. The relevant phases of the development are the construction, operational and decommissioning phases which are denoted by C, O and D respectively.

The evaluations follow this summary table.

The proposed Gathabawn Windfarm has no likelihood of causing significant adverse effects to Otter. A short evaluation of the effects on Otter is provided in Section 13.4.6.1, with a list of these impacts provided in the table below. The relevant phases of the development are the construction, operational and decommissioning phases which are denoted by C, O and D respectively.

Table 13-29: List of effects to Otter which will not be significant

Effects which will not be significant	**Phase**	**Impact Significance**
Impacts to Terrestrial Mammals - Otter	**see Section 13.4.6.1**	
Physical loss or degradation of suitable terrestrial habitat for Otter and availability of non-aquatic prey item species	C, O, D	Slight Impact
Reduction in aquatic habitat quality and availability of aquatic prey item species for Otter	C	Slight Impact
Reduction in aquatic habitat quality and availability of aquatic prey item species for Otter	O, D	Neutral Impact
Mortality, disturbance or displacement of Otter	C,O, D	Slight Impact

EIAR 13.4.6.1 Gathabawn Windfarm Impacts to Otter which will not be Significant – WHOLE PROJECT

All of the effects of the Proposed Gathbawn Windfarm on Otter will be Not Significant. A short evaluation of these effects is provided below:

Physical loss or degradation of suitable terrestrial habitat for Otter and availability of non-aquatic prey item species (C, O, D): Slight Impact. As there is no suitable habitat for Otter within the Gathabawn Windfarm site, no evidence of Otter was recorded during mammal surveys, camera trap surveys or during other ecological surveys at the Gathbawn Windfarm site. There are no watercourses within the windfarm site boundary. Therefore, no likely impacts are anticipated.

Operational phase groundworks and vegetation removal are limited to (1) site drainage network, (2) the bat buffer zones around the turbines. During the decommissioning phase, the hardstands will be reinstated using soils from the overburden storage areas and adjacent drains will be filled in, the decommissioning works at the turbine locations will be located within the operational-phase bat buffer zones. These operational management practices will prevent the establishment of suitable habitat for otter and consequently no habitat effects are expected to this species during the operational or decommissioning phases.

Reduction in aquatic habitat quality and availability of aquatic prey item species for Otter (C): Slight impact.

Only relatively small volumes of fuels/oils will be on-site at any one time and kept within a bunded containment area at the temporary construction compound, therefore any impacts that do arise (worst case) will be very localised to the source/works activity area, limited to small, isolated, low volume spills of oils/fuels. Most concrete pouring will be used for turbine base construction with concrete material poured at the turbine base area which will be contained by an underlying binding layer and temporary shuttering. Concrete pours for foundations at the substation and at the met mast will similarly be contained within the excavation with a binding layer and shuttering further containing the concrete. Overall, habitat degradation is considered unlikely to occur due to no instream works in natural watercourses, the absence of suitable aquatic habitat within the Windfarm and absence of hydrological connectivity to available aquatic habitat in the surrounding area, therefore, it is considered that any water quality impacts due to contamination by hydrocarbons or cementitious materials associated with construction of the windfarm elements of the project will be of Negligible magnitude equating to Neutral impacts to water quality.

The aquatic habitats that supported fish and other aquatic species do not occur within the Windfarm site and therefore there is no potential for mortality, disturbance or displacement of prey item species in local watercourses. Records of frogs was low and the effect on Amphibians has been evaluated as Negligible in Section 13.4.5.1.2 above.

Reduction in aquatic habitat quality and availability of aquatic prey item species for Otter as a result of contamination by hydrocarbons or cementitious materials (O,D): Neutral Impact.

During the operational and decommissioning phases, the potential for silt-laden runoff is much reduced compared to the construction phase. Furthermore, no instream works will take place, no felling will be required, and the number of vehicles on-site will be very small. Some minor maintenance works will be required periodically during operation, such as maintenance of the internal roads and hardstand areas. These works would be of a very minor scale, brief duration and would be very infrequent. Potential sources of sediment laden water would only arise from surface water runoff from small areas where new material is added during maintenance works. It is considered that given no watercourses exist within the Windfarm site boundary, any levels of suspended sediment in surface water runoff would not reach any waterbody and will be neutral during the operational phase.

Also, during decommissioning, the reinstatement of the turbine hardstands and foundation areas will involve using topsoil stored in the permanent overburden storage berms alongside the hardstands and site access roads. The new and widened site roads would be left in place as forestry roads.

In relation to contamination by hydrocarbons, due to the very small number of vehicles associated with operational and decommissioning phase works, there is a very low risk associated with release of hydrocarbons from site vehicles, and it is not envisaged that any refuelling works will be undertaken on site during the operational phase. Therefore, the potential for contamination effects is Neutral.

In relation to the potential for reductions in prey item species due to water quality in downstream waterbodies, the potential for silt-laden or contaminated runoff during the operational and decommissioning stages is lower than during the construction phase and Neutral/Negligible impacts are expected. Overall, the magnitude will be Negligible equating to Neutral impacts.

Overall, the magnitude of potential decreases in water quality, and secondary impacts on Otter habitat quality and prey item availability, during the operational and decommissioning phases is evaluated as Negligible.

Mortality, disturbance or displacement of Otter (C, O, D): Slight Impact. Considered unlikely to occur due to lack of suitable terrestrial and aquatic habitat on-site, no instream works in natural watercourses. Overall, the magnitude will be Negligible equating to Neutral impacts.

Overall, due to the Lack of identified impacts associated with all phases of the development and despite the High sensitivity of Otter, the potential overall impact of the Proposed Gathabawn Windfarm to Otter is evaluated as Not Significant

EIAR 13.4.6.2 Candidate Gathabawn Grid Connection impact evaluation - Otter

See Section EIAR 13.4.11.2

EIAR 13.4.6.3 Environmental Protection Measures for the protection of Otter

In addition to the mitigation measures listed in Section 13.4.11.2, best practice measures which form part of standard windfarm construction/operation will be implemented during the construction/operation/decommissioning of the Gathabawn Windfarm Project to protect Invertebrates, Amphibians and Reptiles and avoid/reduce these not significant effects. These best practice measures are identified in Section EIAR 13.4.12 and are included in the Construction Environmental Management Plan for the Gathabawn Windfarm project which accompanies the subject planning application. Operational and decommissioning measures will be included in the Environmental Management Plans for those phases of the project.

EIAR 13.4.6.4 Evaluation of the Whole Project Impact to Otter

When the residual impacts of the Proposed Gathabawn Windfarm and the Candidate Gathbawn Grid Connection to Otter are considered cumulatively, it is considered that the whole project impact will be Not Significant..

EIAR 13.4.7 Evaluation of effects to Other Terrestrial Mammals

A summary of the findings of the evaluation of the effects of the proposed Gathabawn Windfarm on Other Terrestrial Mammals are listed in the table below. The relevant phases of the development are the construction, operational and decommissioning phases which are denoted by C, O and D respectively.

The evaluations follow this summary table.

The proposed Gathabawn Windfarm has no likelihood of causing significant adverse effects to Other Terrestrial Mammal receptors. A short evaluation of these effects is provided in Section 13.4.7.1, with a list of these impacts provided in the table below. The relevant phases of the development are the construction, operational and decommissioning phases which are denoted by C, O and D respectively.

Table 13-30: List of effects to Other Terrestrial Mammals which will not be significant

Effects which will not be significant	Phase	Impact Significance
Impacts to Other Terrestrial Mammals – Badger, Pine Marten, Irish Stoat, Red Squirrel	**see Section 13.4.7.1**	
Habitat loss or reduction – Badger, Pine Marten, Irish Stoat, Red Squirrel	C, O, D	Not Significant (C) Neutral (O&D)
Habitat protection, creation and enhancement – Badger, Pine Marten, Irish Stoat, Red Squirrel	C, O, D	Not Significant
Mortality, disturbance or displacement at breeding or resting sites of Badger, Pine Marten, Irish Stoat, Red Squirrel	C	Not Significant
Mortality, disturbance or displacement of foraging Badger, Pine Marten, Irish Stoat, Red Squirrel	C	Neutral
Mortality, disturbance or displacement of Badger, Pine Marten, Irish Stoat, Red Squirrel	O,D	Imperceptible Impact

EIAR 13.4.7.1 Gathabawn Windfarm Impacts to Other Terrestrial Mammals which will not be Significant

All of the effects of the Proposed Gathbawn Windfarm on Other Terrestrial Mammals will be Not Significant. A short evaluation of these effects is provided below:

Habitat loss or reduction – Badger, Pine Marten, Irish Stoat, Red Squirrel, Irish Hare (C, O, D):

Not Significant – Construction Phase. Construction works will cause losses of some suitable foraging, resting and/or breeding habitat for European Badger, Irish Hare, Pine Marten, Irish Stoat and Red Squirrel in the form of grassland GA1 (c44ha), scrub WS1 (c1.2ha), and/or hedgerows WL1 (3700m), within the boundary of the construction works area, reducing down to c.4.4ha of GA1 and GA1 mosaic and c.0.05ha of WS1 under the footprint of the permanent structures such as access roads, turbine hardstanding areas and control buildings during the operational phase.

Although suitable habitats will be lost as a result of the development, the magnitude of suitable grassland and the other habitats, habitat loss will be low (1-5%) in the context of the availability of suitable habitat surrounding the works areas. While the changes to suitable habitats in the area of the windfarm will be discernible, the underlying character of suitable habitats at the site and in the immediate surrounding area will be similar to pre-development conditions.

Due to the Low magnitude of habitat loss/reduction and the Low sensitivity of these mammal species, the impact is evaluated as Not Significant.

Neutral impact – Operational and Decommissioning Phases. Operational phase groundworks and vegetation removal are limited to (1) site drainage network, (2) hardstanding areas, and (3) the bat buffer zones around the turbines. During the decommissioning phase, the hardstands will be reinstated using soils from the overburden storage areas and adjacent drains will be filled in, the decommissioning works at the turbine locations will be located within the operational-phase bat buffer zones.

These areas will be regularly maintained through the removal of any build-up of silt or clumps of grass or other materials such as scrub from site drains; and through the regular removal of scrub and the maintenance of a low grass sward through agricultural grazing or mowing, as appropriate to the location within the bat buffer zones and the junction and entrance locations.

These operational management practices will prevent the establishment of suitable habitat for Pine Marten, Irish Stoat, Red Squirrel and Hedgehog and consequently no habitat effects are expected to these species during the operational or decommissioning phases.

In relation to Badger, Irish Hare and Hedgehog, who utilize grassland as foraging habitat, the management of the bat buffer zones will continue to provide foraging habitat and any habitat impacts (either positive or negative) will be negligible in the context of the small size and dispersed nature of the habitats at these locations and the widespread availability of grassland habitats in the local and wider surrounding areas.

Habitat protection, creation and enhancement (C,O,D): Not Significant (positive): The planted areas at Ballyring and the connectivity corridor at Ballylehaun will provide suitable foraging and/or resting habitat for Badger, Irish Hare, Pine Marten, Irish Stoat and Hedgehog. While these habitats may be of value to Badger, Irish Hare, Pine Marten, Irish Stoat and Hedgehog, given their Low sensitivity and the abundance of suitable habitats on site and in the surrounding areas, this positive impact is evaluated as Not Significant. In relation to Red Squirrel, the habitat enhancements will be Neutral, given the absence of afforestation as part of the biodiversity creation actions.

Mortality, disturbance or displacement of Badger, Irish Hare, Pine Marten, Irish Stoat, Red Squirrel at breeding or resting sites (C): Not Significant. Limited sighting and records of Badger and Irish Hare are an indication of low utilisation of the site by the aforementioned species and suggests an overall low level of usage by the species of concern within the Gathabawn Windfarm site.

Mortality, disturbance or displacement of foraging Badger, Irish Hare, Pine Marten, Irish Stoat, Red Squirrel, (C): Neutral impact. Limited sighting and records of Badger and Irish Hare are an indication of low utilisation of the site by the aforementioned species and suggests an overall low level of usage by the species of concern within the Gathabawn Windfarm site. Secondary Badger sightings in the form of snuffle holes were recorded east of the Ballylehaun section, the closest sighting of which was recorded c.15m from the construction works area. Multiple Badger paths were recorded leading into dense scrub adjacent to the Cullahill Mountain SAC.

Badger was also recorded at 3 no. camera trap locations in 2025; a total of 9 individuals were recorded. Six of these sightings were recorded within the biodiversity enhancement area footprint, adjacent to T4 and near the T7 hardstand.

No Badger setts, Squirrel drays or Pine Marten or Irish Stoat dens were recorded during the mammal walkover surveys in 2025.

Overall, this site is of low value to native Irish terrestrial mammals but may be of local importance to some. It is more likely that species such as Irish Hare, Pine Marten, Irish Stoat and Red Squirrel utilise more native, less modified habitats surrounding the Gathabawn Windfarm site (such as mature patches of native woodland and freshwater streams) as breeding and hunting grounds and utilise the Gathabawn Windfarm site periodically for foraging and navigating between territories or hunting grounds.

Mortality, disturbance or displacement – Badger, Irish Hare, Pine Marten, Irish Stoat, Red Squirrel, (O, D): Imperceptible impact. Given that Badger, Irish Hare, Pine Marten, Irish Stoat, and Red Squirrel are expected to occur in low numbers at the Gathabawn Windfarm site, the fact that these species are mainly active and foraging between dusk and dawn, whereas operational and decommissioning phase works and activities will be mainly concentrated to daylight hours, with negligible levels of vehicles/personnel or machinery onsite, and taking place mainly at turbine hardstand locations, and also taking into consideration the brief duration of works at any particular location, the availability of suitable habitat in the surrounding area, combined with the Low sensitivity of these species, the magnitude of impact is expected to be Negligible. Therefore, it is considered that any mortality, disturbance or displacement effects will be Neutral.

EIAR 13.4.7.2 Candidate Gathabawn Grid Connection impact evaluation – Other Terrestrial Mammals

Habitat loss or reduction – Badger, Pine Marten, Irish Stoat, Red Squirrel (C): Not Significant – Construction Phase.

Although suitable habitats will be lost (on a temporary or short-term basis) as a result of the development, the magnitude of suitable grassland and other habitats will be low (1-5%) in the context of the availability of suitable habitat surrounding the works areas. While the changes to suitable habitats in the area of the Candidate Gathabawn Grid Connection will be discernible, the underlying character of suitable habitats at the site and in the immediate surrounding area will be similar to pre-development conditions.

Due to the Low magnitude of habitat loss/reduction and the Low sensitivity of these mammal species, the impact is evaluated as Not Significant.

Not Significant – Operational and Decommissioning Phases. The operational phase is not anticipated to result in any loss of habitat. During the decommissioning phase, the Grid Connection will be left in-situ. As such, no habitat loss will result from either of these phases from the Whole Gathabawn Windfarm Project.

Habitat protection, creation and enhancement (C,O,D): Not Significant (positive): Any hedgerow or treeline impacted by the Candidate Gathabawn Grid Connection will be replaced with native hedgerow species and trees to improve the biodiversity of the affected habitats. This will provide a net improvement for these receptors.

Mortality, disturbance or displacement of Badger, Pine Marten, Irish Stoat, Red Squirrel at breeding or resting sites (C): Not Significant. Limited sighting and records of Badger and Irish Hare are an indication of low utilisation of the site by the aforementioned species and suggests an overall low level of usage by the species of concern within the Gathabawn Windfarm site.

Mortality, disturbance or displacement of breeding or foraging Badger, Pine Marten, Irish Stoat, Red Squirrel, (C): Neutral impact. Limited sightings and records of Badger and Irish Hare are an indication of low utilisation of the site by the aforementioned species and suggest an overall low level of usage by the species of concern along the Candidate Gathabawn Grid Connection. No secondary evidence supports any Badger setts or warrens along the Candidate Gathabawn Grid Connection. No Badger setts, Squirrel drays or Pine Marten or Irish Stoat dens were recorded during the mammal walkover surveys in 2025.

Overall, this site is of low value to native Irish terrestrial mammals but may be of local importance to some. It is more likely that species such as Irish Hare and Badger utilise more native, less modified habitats surrounding the Candidate Gathabawn Grid Connection (such as mature patches of native woodland) as breeding and hunting grounds and utilise the Candidate Gathabawn Grid Connection periodically for foraging and navigating between territories or hunting grounds.

Mortality, disturbance or displacement – Badger, Pine Marten, Irish Stoat, Red Squirrel, (O, D): Imperceptible impact. Given that Badger, Pine Marten, Irish Stoat, and Red Squirrel are expected to occur in low numbers along the Candidate Gathabawn Grid Connection, the fact that these species are mainly active

and foraging between dusk and dawn, whereas operational and decommissioning phase works and activities will be mainly concentrated to daylight hours, with negligible levels of vehicles/personnel or machinery onsite, and taking place mainly at turbine hardstand locations, and also taking into consideration the brief duration of works at any particular location, the availability of suitable habitat in the surrounding area, combined with the Low sensitivity of these species, the magnitude of impact is expected to be Negligible. Therefore, it is considered that any mortality, disturbance or displacement effects will be Neutral.

EIAR 13.4.7.3 Environmental Protection Measures for the protection of Other Terrestrial Mammals

Best practice measures which form part of standard windfarm construction/operation will be implemented during the construction/operation/decommissioning of the Gathabawn Windfarm Project to protect Other Terrestrial Mammals and avoid/reduce these not significant effects. These best practice measures are identified in Section EIAR 13.4.12 and are included in the Construction Environmental Management Plan for the Gathabawn Windfarm project which accompanies the subject planning application. Operational and decommissioning measures will be included in the Environmental Management Plans for those phases of the project.

EIAR 13.4.7.4 Evaluation of the Whole Project Impact to Other Terrestrial Mammals

When the impacts of the Proposed Gathabawn Windfarm and the Candidate Gathbawn Grid Connection to Other Terrestrial Mammals are considered cumulatively, it is considered that the whole project impact will be Not Significant..

EIAR 13.4.8 Evaluation of effects to Bats

A summary of the findings of the evaluation of the effects of the proposed Gathabawn Windfarm on Bats are listed in the table below. The relevant phases of the development are the construction, operational and decommissioning phases which are denoted by C, O and D respectively.

The evaluations follow this summary table.

The following effects are evaluated in detail to determine whether or not they are likely to be Significant.

Table 13-31: List of effects to Bats evaluated in detail

BATS IMPACTS	
Mortality of bats due to collision or barotrauma (O)	*13.4.8.1*

All of the remaining effects of the proposed Gathabawn Windfarm have no likelihood of causing significant adverse effects to Bats receptors. A short evaluation of these effects is provided in Section 13.4.8.2, with a list of these impacts provided in the table below. The relevant phases of the development are the construction, operational and decommissioning phases which are denoted by C, O and D respectively.

Table 13-32: List of effects to Bats which will not be significant

Effects which will not be significant	**Phase**	**Impact Significance**
Impacts to Bats	**see Section 13.4.8.2**	
Loss, reduction of feeding areas and/or severance of commuting routes	C, O, D	Not Significant
Destruction of bat roosts	C	Imperceptible
Disturbance or displacement of roosting bats due to construction works	C	Not Significant
Disturbance or displacement of roosting or foraging bats as a result of operational turbines	O	Not Significant
Disturbance of roosting bats during operational phase maintenance and decommissioning works	O, D	Not Significant
Disturbance of foraging bats during operational phase maintenance and decommissioning works	O, D	Imperceptible
Avoidance of roosting/foraging areas due to increased EMF	O	Imperceptible

EIAR 13.4.8.1 Mortality of bats due to collision or barotrauma

Sensitive Aspect:	Bats
Importance:	**Local (high)** (as per Section EIAR 13.3.9)
Impact Source(s)	Operating turbines
Impact Pathway(s)	Direct contact, air
Project Stage	Operation Phase

Overview of Impact (general):

The rotation of wind turbine blades has the potential to result in direct contact with bat species resulting in physical injury and/or mortality of individual bats. Due to the stationary nature of the met mast and of the structures associated with the Parksgrove Substation, collision related effects are not likely to occur.

When wind speeds are insufficient for power generation, the blades of wind turbines continue to rotate slowly, which is referred to as 'idling'. It is understood that a significant number of bat fatalities can occur when turbines are idling, because these low-wind scenarios often correspond to optimum foraging periods and because the tips of blades can maintain relatively high speeds even when the turbine blade itself, is rotating slowly.

An indication of potential vulnerability of bat species as a function of turbine collision risk is provided below with respect to the species recorded at Gathabawn Windfarm:

- Low vulnerability – Brown Long-eared Bat, Natterer's, Whiskered, Daubenton's Bat.
- High vulnerability - Common Pipistrelle, Soprano Pipistrelle, Leisler's Bat, Nathusius' Pipistrelle.

Examination of the Impact of the Proposed Gathabawn Windfarm 2026:

The levels of recorded activity of common and widespread species, aligned with the habitat suitability, is assessed as overall High (although habitats within the Site generally have low intrinsic value they may be useful in providing connectivity for commuting within the landscape), which results in the area of the Gathabawn Windfarm being assessed as of Local Importance (Higher Value).

Common Pipistrelle was the most commonly recorded species (67% of records) from passive surveys at the turbine locations. Soprano Pipistrelle and Leisler's Bat were less frequently detected (16% and 13% respectively), and Brown-long Eared Bat (1.5%), Myotis sp. (1%), and Nathusius' Pipistrelle (0.1%) were rarely detected. The transect surveys identified commuting Common, Nathusius' and Soprano Pipistrelle and Leisler's Bat. The majority of activity detected during transect surveys was foraging activity by Common and Soprano Pipistrelle, primarily along the hedgerows and treelines present along Transects 1 and 3. No swarming areas or migration routes were found onsite or in the surrounding area.

Common Pipistrelle, Soprano Pipistrelle and Leisler's Bat were the commonest species identified and as all three are considered as High Risk from collision, equating to High Magnitude impacts on local populations in a worst-case scenario, albeit of Low sensitivity due to their wide distribution, the risk of collision for these species was evaluated, and Peak Risk is assessed as High without mitigation.

The other species are assessed as Low Risk from collision or are present at low numbers and potential impacts are assessed as Low and are considered unlikely to occur above negligible levels.

Impact Magnitude	Low to High	**Impact Significance:** ***(pre-mitigation)***	**Slight** (*Low Risk species*) to **Moderate** (*High Risk species*)

Mitigation and Monitoring Measures: The following mitigation and monitoring measures will be implemented as best practice environmental management.

WM07 GM07	Pre-construction surveys for Bat roosts will be carried out at all trees and buildings identified as having bat roost potential during initial pre-planning surveys. Surveys will be carried out by the Project Ecologist at a time of year that is appropriate to the type of roost e.g. June to August for maternity roosts, or November to February for hibernation roosts. If the location or status of roosts has changed, then the use of lighting at nearby construction works locations will be adapted accordingly by the Project Ecologist.
WM64	A 50m bat buffer area from the tips of Turbine blades will be created through the removal of hedgerows during the construction phase.

WM117	The bat buffer zone will be maintained during operation by trimming existing trees and hedgerows, removing any scrub and additionally no new trees or hedgerows will be planted within the buffer zones. Grazing intensity and sward heights will be monitored, and where grazing has ceased in agricultural lands around a turbine that the grass will be mowed to maintain a low sward if required.
WM98	Bat Activity Surveys: Post-construction bat activity and roost surveys will be carried out during the Operational Years 1, 2, 3, 5 and 10 to record any change to baseline roosting and activity trends. Operational Phase bat surveys will include carcass searches at the turbine locations. Carcass search methodology will involve searching a 100m^2 grid square for each turbine. Surveyors will walk a transect path every 5-10m within the square searching visually for carcasses. Due to the difficulty in locating smaller remains such as bats and taking into account the rotor diameter of the turbine blades, where available, specially trained detection dog teams will be used to conduct searches within a 60m radius of each turbine tower instead of visual searches. Detection dog teams have been shown to detect 70-100% of carcasses present where dogs and handlers are proficiently trained and experienced compared to visual searches being only 10-70% efficient depending on searcher expertise and terrain factors (McKeague et al., 2024; Paule et al., 2011). Both carcass search methods will be conducted with efficiency trials and carcass removal rate surveys on site to inform the collision rate estimates based on the number of carcasses found. The results of the operational phase bat surveys will inform further mitigation where the collision rate proves to be higher than predicted based on the field study data presented in this EIAR 2026. These measures are in line with the best practice guidance for post-construction monitoring of onshore windfarms for Bat species (NatureScot, 2021).
WM118	Feathering the blades: The rotational speed of the turbine blades when idling during low wind speeds will be reduced by 'feathering' the turbine blades, which means turning the turbine blades parallel to the wind. With feathering in place, the turbines can continue to rotate slowly, but at speeds that pose much less of a risk to bats (Bats and Onshore Wind Turbines: Survey, Assessment and Mitigation - SNH 2019). The feathering will reduce the rotational speed of the turbine blades when idling so they do not exceed 2RPM.
WM119	Curtailment Strategy - Bats: Operational monitoring will be undertaken at each turbine, using automated detectors at ground level, for periods of at least ten nights, during spring (April, May), mid-summer (June, July) and autumn (August, September). Prevailing on-site weather data (temperature, wind speeds and rainfall) will be recorded concurrently with the bat activity monitoring, in order to identify conditions associated with high levels of Leisler's Bat activity. This monitoring will be carried out in order to collect sufficient data to inform the development of an effective curtailment strategy for the protection of Leisler's Bat, while avoiding curtailment of operating turbines unnecessarily. The monitoring will identify the periods in which there is risk to Leisler's Bat and will also identify periods where there is little or no risk to Leisler's Bat. For example, a curtailment strategy could comprise the following parameters: If the bats are only active in significant numbers between sunset and sunrise, then curtailment would be targeted only on these periods. Or where bat activity is strongly influenced by weather conditions such as temperature, wind speeds and rainfall, curtailment would reflect the suitable or unsuitable conditions. Where high Leisler's Bat activity is recorded during monitoring, curtailment would be deployed on turbines where the activity occurs when ALL of the following parameters are met: - when wind speeds are below 6 m/s, and - when air temperatures are above 9°C and - between 1st April and 30th September throughout the night (starting 15 minutes prior to sunset and ending 30 minutes after sunrise). If the monitoring indicates that curtailment is required, then the relevant turbines will be curtailed similar to the parameters listed above and will be informed by the data gathered during monitoring. Annual reports on the curtailment strategy will be provided to relevant statutory bodies (where required). The report will also consider the latest bat monitoring and deterrent systems.
Effectiveness of Mitigation:	

50m buffer from blade tip to trees and hedgerows (NatureScot, 2021), and the maintenance of low grass sward within these zones, will significantly reduce bat activity within the zone of influence of the turbine rotor. During low wind conditions, the feathering of the blades when turbines are idling so they do not exceed 2RPM has been shown to significantly reduce collision risk to bats (Arnett *et al*., 2011, 2013; NatureScot, 2021). The development and implementation of a smart curtailment strategy based on activity monitoring results along with weather conditions and time of year/day, and the refining of this strategy based on operational phase bat surveys, will decrease the likelihood of high levels of bat activity at turbine locations when the blades are in operation. Post-construction monitoring surveys, including carcass searches, will be carried out to track the effectiveness of implemented mitigation measures and will provide a means to respond to changes and effects to the ecological baseline as a result of the project as soon as they arise, should they occur.	
Residual Impact Significance *(post-mitigation)*:	**Imperceptible** (*Low Risk*) to **Slight** (*High Risk*)

EIAR 13.4.8.2 Gathabawn Windfarm Impacts to Bats which will not be Significant

All of the remaining effects of the Proposed Gathbawn Windfarm on Bats will be Not Significant. A short evaluation of these effects is provided below:

Loss, reduction of feeding areas and/or severance of commuting routes (C, O, D): Not Significant. Suitable foraging habitat, albeit of limited value, occurs throughout the Gathabawn Windfarm site with semi-natural habitat recorded in the study area (Improved Grassland, Dense Bracken, Scrub, Dry Meadow, Wet Grassland) 54.35a, and Hedgerows (7000m). As suitable foraging habitat occurs in the study area, any loss or degradation of habitat has the potential to affect the use of the area by bats.

Approximately 3,700m of hedgerow loss is anticipated at the Gathabawn site during the construction phase. Of the habitats lost to the construction of the windfarm c. 44.08ha comprises Improved Grassland, which is a habitat of limited value to foraging bats. There is therefore potential for changes to bat commuting or feeding areas in positive and negative ways. However, given the limited value that these habitats provide. Any scale of impact would be low to negligible in Magnitude.

As such, this impact poses less than **Slight effects** on Bats.

Destruction of bat roosts (C): Imperceptible impact. No demolition of buildings required, no felling of trees with Moderate/High suitability for roosting bats along hedgerows or hedgerows to be removed at the windfarm site, and no works within the root protection zone of mature trees. Therefore, it is considered that destruction of bat roosts and potential mortality of roosting bats is not likely to occur.

Disturbance or displacement of roosting bats due to construction works (C): Not Significant. Surveys for suitable roosting features within, and 500m surrounding, construction works areas identified three features as being of Low to Moderate suitability as roosts within the proposed windfarm study area. Emergence surveys undertaken in 2025 confirmed one of these (BL8) as a roost but due to low numbers recorded emerging, an unlikely maternity roost. BL8 is located c. 200m north-east of T10 and thus deemed to be sufficiently distant that impacts will be imperceptible (SNH, 2019). The other roost (BL14) only recorded one emerging soprano pipistrelle and is therefore likely a transitory roost and being located c. 188m from T8, again impacts are considered as imperceptible due to the limited importance of the roost despite lying within the 200m potential zone of effect (SNH, 2019).

Artificial lighting will be mainly used at the temporary construction compounds and occasionally at turbine sites if required to complete a construction work task. As the main source of light during the construction phase (i.e. at the compounds) will be >500m from the nearest identified bat roosts or features within Ballylehaun and c. 400m from BL8 at Ballyring, it is considered that bats roosting at these features or commuting from them to foraging areas are unlikely to be affected by lighting at the construction compound. In relation to foraging/commuting bats, while there is potential for displacement along short lengths of nearby hedgerow and treelines, the availability of suitable alternative foraging and commuting habitat reduces the magnitude of impact. Furthermore, the construction phase is temporary in duration, and it is therefore considered that any disturbance or displacement of bats will be Low magnitude.

Overall, due to the low number of potential roosts, the limited importance and/or the separation distance of potential impacts to recorded roosts, the Local Importance (higher Value) of the area for bats, the negligible change to baseline conditions and the temporary duration of construction works, the magnitude of disturbance impacts will be generally Low to Negligible during the construction phase.

Disturbance or displacement of roosting or foraging bats as a result of operational turbines (O): Not Significant. Surveys for suitable roosting features within, and 500m surrounding, construction works areas

identified three features as being of Low to Moderate suitability as roosts within the proposed windfarm study area. Emergence surveys undertaken in 2025 confirmed one of these (BL8) as a roost but due to low numbers recorded emerging, an unlikely maternity roost. BL8 is located c. 200m north-east of T10 and thus deemed to be sufficiently distant that impacts will be imperceptible (SNH, 2019). The other roost (BL14) only recorded one emerging soprano pipistrelle and is therefore likely a transitory roost and being located c. 188m again impacts are considered as imperceptible due to the limited importance of the roost despite lying within the 200m potential zone of effect (SNH, 2019).

In relation to lighting on the operational turbines, due to the distance of operational turbines from potential roosts and the establishment of bat buffer zones and the design of other mitigation measures to encourage bats away from the operational turbines, impact magnitude is Low.

In relation to foraging/commuting bats, while there is potential for disturbance in close proximity to the operating turbines, the availability of alternative foraging and commuting habitat reduces the magnitude of impact to Low magnitude.

Overall, due to the moderate suitability for roosting bats, the species present and the numbers associated with the confirmed roosts, the Local importance of the area for bats, the negligible change to baseline conditions, and the distance of the operational turbines from potential roosts, the magnitude of disturbance or displacement impacts will be Low in general throughout the windfarm site.

Disturbance of roosting bats during operational phase maintenance and decommissioning works (O, D): Not Significant/No Likely Impact. During the operational and decommissioning phases due to low level of impact sources (noise, vibration, lighting, presence of people) arising from very low, infrequent use of heavy machinery, the small number of personnel and vehicles on site, with works of short duration and at discrete works locations (c. once per week at a turbine location during operation, typically 4-5 days for turbine component replacement works, and for a period of c.2 weeks per turbine during the decommissioning phase), it is evaluated that any disturbance effects at bat roosts will be Neutral. Therefore, the potential for significant impacts as a result of maintenance or decommissioning works can be excluded.

Disturbance of foraging bats during operational phase maintenance and decommissioning works (O, D): Imperceptible. The magnitude of any disturbance of foraging bats will be Low to Negligible during the operational and decommissioning phases due to low level of impact sources (noise, vibration, lighting, presence of people) arising from the very low and infrequent use of heavy machinery, the small number of personnel and vehicles on site, with works generally taking place during daylight hours and infrequently. It is evaluated that any disturbance effects will be Imperceptible.

Avoidance of roosting/foraging areas due to increased EMF (O): Imperceptible impact. There will be no increase in electric fields as a result of EMF from underground cables due to the screening of these fields by the metallic sheath surrounding the cables and the backfill materials above the cables, the screening by the steel turbine towers and the steelwork/metalwork at the substation. While there will be some increase in ambient magnetic field levels, these levels will be substantially below EU EMF Limits. Due to the implementation of bat buffer zones, with any exposure momentary and reversible as a bat passes over/close by the location of electrical equipment, it is considered that any impacts will be Imperceptible.

EIAR 13.4.8.3 Candidate Gathabawn Grid Connection impact evaluation - Bats

Loss, reduction of feeding areas and/or severance of commuting routes (C, O, D): Not Significant. Suitable foraging habitat, albeit of limited value, occurs throughout the Candidate Gathabawn Grid Connection site with semi-natural habitat recorded in the study area (Improved Grassland, Dense Bracken, Scrub, Dry Meadow, , and Hedgerows. As suitable foraging habitat occurs in the study area, any loss or degradation of habitat has the potential to affect the use of the area by bats. An area of woodland/scrub north of the TR47 potential

tree roost will be removed as part of the Parksgrove Substation construction works. The habitat will be replaced within the same field as the Parksgrove Substation to draw activity away from the substation and provide alternative habitat long term for bat and bird species. This loss will be short-term in nature and poses low-magnitude impacts given the extent of habitat that will be unaffected by the Parksgrove Substation and, as such, will be of slight effect on commuting and foraging behaviour.

Approximately 2,741m of hedgerow and treeline overlaps with the Candidate Gathabawn Grid Connection Route construction works area boundary. However, less than 100m will be lost across the entire route to facilitate the works and is isolated to 4m sections across several linear features. No significant fragmentation is anticipated. There is therefore potential for changes to bat commuting or feeding areas in positive and negative ways. However, given the low magnitude scope loss/fragmentation that these habitats will experience. Any scale of impact would be low to negligible in Magnitude.

As such, this impact poses less than **Slight effects** on Bats.

Destruction of bat roosts (C): Imperceptible impact. No demolition of buildings required, no felling of trees with Moderate/High suitability for roosting bats along hedgerows or hedgerows to be removed along the Candidate Gathabawn Grid Connection, and no works within the root protection zone of mature trees will take place. Therefore, it is considered that destruction of bat roosts and potential mortality of roosting bats is not likely to occur.

Disturbance or displacement of roosting bats due to construction works (C): Not Significant. Surveys for suitable roosting features within 250m and surrounding construction work areas identified one bridge crossing of Moderate suitability as roosts along the Candidate Gathabawn Grid Connection (WC4). This bridge is not being crossed by the works. The crossing runs north of this bridge. As such, impacts to this species are limited to temporary works, as the works at this crossing will last 3 days to 1 week in a worst-case scenario. One tree of PRF-M suitability is located 50m from the Parksgrove substation and is 30m from the cabling works. Due to the habitat removal at this location, including an extent of tree removal, disturbance to roosting and foraging bats is likely. However, due to the timing of any vegetation clearance outside the core season for bats, any disturbance to roosting bats is limited to hibernation roosts. This tree will not be felled or damaged. There is potential to disturb roosting bats. However, any impacts will be limited to short-term effects related to cable trenching works. As such, any extent of disturbance is unlikely to exceed imperceptible effects due to the limited importance of the roost despite lying within the 200m potential zone of effect (SNH, 2019). There is also regular day and night time disturbance sources from the traffic on the N77. As such, the construction works pose a negligible increase in noise and human presence sources.

Fourteen trees (TR2, TR32, TR32, TR31, TR30, TR29, TR19, TR18, TR17, TR47, TR51, TR52, TR57, TR58) along the Ballyring – Parksgrove UGC were identified to be of moderate suitability for bats. These trees will be passed by the trenching works. Due to the timing of works during the day and the temporary duration of works within 50m of these trees. Any impact will be negligible even in a worst-case scenario.

Artificial lighting will be mainly used at the temporary construction compounds internally at the Parksgrove substation. As the main source of light during the construction phase (i.e. at the compounds) will be 50m from the nearest potential roost, it is considered that bats roosting at these features or commuting from them to foraging areas are unlikely to be affected by lighting at the construction compound. No work at night will take place at the Parksgrove substation during construction. In relation to foraging/commuting bats, while there is potential for displacement along short lengths of nearby hedgerow and treelines, the availability of suitable alternative foraging and commuting habitat reduces the magnitude of impact. Furthermore, the construction phase is short-term in duration, and it is therefore considered that any disturbance or displacement of bats will be Low magnitude.

Overall, due to the low number of potential and limited importance and/or distance from potential impacts of potential roost features, the Local Importance (higher Value) of the area for bats, the negligible change to baseline conditions and the temporary duration of construction works, the magnitude of disturbance impacts will be generally Low to Negligible during the construction phase.

Disturbance or displacement of roosting or foraging bats as a result of operational substation, grid maintenance and decommissioning (O, D): Not Significant. Surveys for suitable roosting features within 250m and surrounding construction work areas identified one tree of PRF-M suitability located 50m from the Parksgrove substation and is 30m from the cabling works. This tree will not be felled or damaged. There is potential to disturb roosting bats during operational night-time lighting, noise and human presence. However, given the lighting designs will be motion-sensor activated and directed inward, no lighting spill is anticipated to reach this roost or the foraging habitat within the woodland. As such, in respect to the stated design measures and the tree location adjacent to a busy national road (N77) any extent of disturbance is unlikely to exceed low to moderate effects in a worst-case scenario due to the extent of existing disturbance and the design measures already in place to offset light pollution in line with local development and biodiversity action plans.

Overall, due to the low number of potential and distance from potential impacts of potential roost features, the Local Importance (higher Value) of the area for bats, the low change to baseline conditions and the design measures in place, the magnitude of disturbance impacts will be generally Low to negligible during the operation phase.

The decommissioning phase for the substation will involve maintaining the substation and leaving it in the care of EirGrid. As such, decommissioning impacts will be unchanged from the operational phase impacts.

Avoidance of roosting/foraging areas due to increased EMF (O): Imperceptible impact. There will be no increase in electric fields as a result of EMF from underground cables due to the screening of these fields by the metallic sheath surrounding the cables and the backfill materials above the cables, the screening by the steel turbine towers and the steelwork/metalwork at the substation. While there will be some increase in ambient magnetic field levels, these levels will be substantially below EU EMF Limits. The nearest roost feature to the Parksgrove substation is 50m south of the boundary. As such, any extent of EMF impacts will be negligible at this distance. Due to the separation distance from worst-case scenario EMF levels, with any exposure momentary and reversible as a bat passes over/close by the location of electrical equipment, it is considered that any impacts will be low to neutral.

EIAR 13.4.8.4 Environmental Protection Measures for the protection of Bats

In addition to the mitigation measures identified in Section EIAR 13.4.8.1 above, additional best practice measures which form part of standard windfarm construction/operation will be implemented during the construction/operation/decommissioning of the Gathabawn Windfarm Project to protect Bats and avoid/reduce these not significant effects. These best practice measures are identified in Section EIAR 13.4.12 and are included in the Construction Environmental Management Plan for the Gathabawn Windfarm project which accompanies the subject planning application. Operational and decommissioning measures will be included in the Environmental Management Plans for those phases of the project.

EIAR 13.4.8.5 Evaluation of the Whole Project Impact to Bats

When the residual impacts of the Proposed Gathabawn Windfarm and the Candidate Gathbawn Grid Connection to Bats are considered cumulatively, it is considered that the whole project impact will be Not Significant..

EIAR 13.4.9 Evaluation of effects to Birds

A summary of the findings of the evaluation of the effects of the proposed Gathabawn Windfarm on Birds are listed in the table below. The relevant phases of the development are the construction, operational and decommissioning phases which are denoted by C, O and D respectively.

The evaluations follow this summary table.

The following effects are evaluated in detail to determine whether or not they are likely to be Significant.

Table 13-33: List of effects to Birds evaluated in detail

BIRDS IMPACTS	
Birds of Prey, Waders and Gulls: Mortality of birds due to collision (O)	*13.4.9.1*

All of the remaining effects of the proposed Gathabawn Windfarm have no likelihood of causing significant adverse effects to Bird receptors. A short evaluation of these effects is provided in Section 13.4.9.2, with a list of these impacts provided in the table below. The relevant phases of the development are the construction, operational and decommissioning phases which are denoted by C, O and D respectively.

Table 13-34: List of effects to Birds which will not be significant

Effects which will not be significant	**Phase**	**Impact Significance**
Impacts to Birds – Birds of Prey	**see Section 13.4.9.2**	
Birds of Prey: Reduction or loss or fragmentation of suitable habitat (foraging, nesting, roosting)	C, O, D	Not Significant
Birds of Prey: Reduction in prey item species	C, O, D	Not Significant
Birds of Prey: Habitat enhancement	C, O, D	Not Significant
Birds of Prey: Physical injury/destruction of nests or chicks	C	No Likely Impact
Birds of Prey: Physical injury/destruction of nests or chicks	O, D	No Likely Impact
Birds of Prey: Disturbance and/or displacement from construction works areas	C	Not Significant
Birds of Prey: Disturbance/displacement from operational turbines (visual presence/movement and noise)	O	Slight - Not Significant
Birds of Prey: Disturbance and/or displacement from operational maintenance works/activities and decommissioning works	O, D	Not Significant
Birds – General: Exposure to EMF	O	No Likely Impact
Impacts to Birds – Passerines	**see Section 13.4.4.5.8**	
Passerines: Permanent or temporary reduction or loss or fragmentation of suitable habitat (foraging, nesting, roosting)	C, O, D	Slight Impact
Passerines: Habitat enhancement	C, O, D	Not Significant
Passerines: Physical injury/destruction of nests or chicks	C, O, D	Slight – Not Significant
Passerines: Disturbance/displacement from construction works areas	C	Not Significant
Passerines: Collision risk	O	Not Significant
Passerines: Disturbance/displacement from operational turbines	O	Not Significant
Passerines: Disturbance/displacement from operational maintenance works/activities and decommissioning works	D	Not Significant
Impacts to Birds – Waders	**see Section 13.4.4.5.9**	
Waders: Permanent or temporary reduction or loss or fragmentation of suitable habitat (foraging, , roosting)	C	Slight impact
Waders: Physical injury/destruction of nests or chicks	C, O, D	Not Significant
Waders: Disturbance/displacement from construction works areas	C	Not Significant

Waders: Disturbance/displacement from operational turbines	O	Not Significant
Waders: Collision risk	O	Imperceptible impact
Waders: Disturbance and/or displacement from operational maintenance works/activities and decommissioning works	O, D	Slight - Not Significant
Impacts to Birds – Waterbirds	**see Section 13.4.4.5.10**	
Waterbirds: Permanent or temporary reduction or loss or fragmentation of suitable habitat (foraging, roosting)	C, O, D	Not Significant
Waterbirds: Physical injury, destruction of nests	C, O, D	Not Significant
Waterbirds: Disturbance/displacement from construction works areas	C	Not Significant
Waterbirds: Collision risk	O	Imperceptible
Waterbirds: Disturbance/displacement from operational turbines, and from maintenance works/activities	O	Not Significant
Waterbirds: Disturbance/displacement from decommissioning works	O,D	No Likely Impact
Impacts to Birds – Kingfisher	**see Section 13.4.4.5**	
Permanent or temporary reduction or loss or fragmentation of suitable habitat	C,O,D	Not Significant
Physical injury, destruction of nests	C,O,D	Not Significant
Disturbance/displacement from construction works areas	C	Not Significant
Collision risk	O	Imperceptible
Disturbance/displacement from operational turbine locations	O	Not Significant
Disturbance/displacement from operational maintenance works/activities and decommissioning works	O,D	No Likely Impact

EIAR 13.4.9.1 Birds of Prey, Waders and Waterbirds: Collision risk

Sensitive Aspect:	Birds
Importance:	**Local (high)** (as per Section EIAR 13.3.9)
Impact Source(s)	Collision with turbine structures or turbine blades
Impact Pathway(s)	Direct contact
Project Stage	Operation Phase

Overview of Impact (general):

Birds that are not displaced could potentially be vulnerable to collision with the proposed Gathabawn Windfarm turbines. The level of collision with wind turbines is presumed to be dependent on the level of flight activity over the wind farm and the ability of various bird species to detect and manoeuvre around rotating turbine blades. Birds that collide with a turbine are likely to be killed or fatally injured, this may in turn potentially affect the maintenance of bird populations (ScottishPower Renewables, 2019).

Collision Risk Modelling has been carried out for the Gathabawn Windfarm, using a mathematical model to predict the numbers of individual birds, of a particular species, that may be killed by collision with moving wind turbine rotor blades. The modelling method used in this collision risk calculation follows NatureScot (2024) guidance which is derived from the Band Model (Band, 2024).

The results of the Collision Risk Modelling are summarised below and can be found in full in Appendix 13.7.

Due to the stationary nature of the met mast and substation buildings, structures and apparatus, collision related effects are not likely to occur.

Examination of the Impact of the Proposed Gathabawn Windfarm 2026:

Birds of Prey

Four Bird of Prey species, Buzzard, Kestrel, Peregrine and Sparrowhwk, were selected for assessment based on their presence at Gathabawn Windfarm and their status. No other Birds of Prey were selected for assessment due to low numbers or absence from the site.

For **Buzzard**, magnitude of impact is evaluated as **Low** with a **Negligible** sensitivity of these species, giving a **Not Significant** Impact. Pearce-Higgins (2009) found that Buzzard showed strong avoidance behaviour to wind turbines - and that this behavioural response is likely to reduce the risk of any collision posed by the Gathabawn Windfarm turbines. The collision risk for Buzzard was estimated to be 4.2 collisions per annum when accounting for avoidance behaviour.

Based on the absence of any evidence of breeding within the Gathabawn Windfarm site during the surveys undertaken, and the low risk of collision to Buzzards based on previous studies of its high avoidance rate, the potential impact associated with collision is predicted to represent a low magnitude impact. Furthermore, the population of Buzzards occurring in the surrounding area is presumed to be limited to one breeding pair (see Section 13.3.6.1.5 above). Given that the most recently available national breeding Buzzard population in Ireland is estimated to be approximately c.2,000 pairs (NPWS Article 12 Report, 2013-2018), mortality as a result of collision to the population using the wind farm site and surrounding area will result in a worst-case scenario loss of one breeding pair. This worst-case scenario loss is representative of an impact of Low magnitude. A Low magnitude impact to this bird receptor of low sensitivity will result in an impact of Slight significance of effect.

For **Kestrel**, magnitude of impact is evaluated as **Low** which, with a **Medium** sensitivity of these species, gives a **Not Significant** Impact. The collision risk for Kestrel was estimated to be 1.6 collisions per annum when accounting for avoidance behaviour, with an uncertainty factor of 0.57, giving a range of collision risk between 0.7 and 2.5 individuals per annum. Given that the most recently available national breeding Kestrel population in Ireland is estimated to be approximately c.13,500 pairs (NPWS Article 12 Report, 2013-2018), mortality as a result of collision to the population using the wind farm site and surrounding area will result in a worst-case scenario loss of one breeding pair. This loss is representative of an impact of Low magnitude. A Low magnitude impact to this bird receptor of Medium sensitivity will result in an impact of Slight significance of effect.

For **Peregrine**, magnitude of impact is evaluated as **Low** which, with a **Medium** sensitivity of these species, gives a **Not Significant** Impact. The collision risk for Peregrine was estimated to be 0.2 collisions per annum when accounting for avoidance behaviour, with very limited foraging activity recorded within the proposed project during the breeding and winter seasons. Due to the low number of sightings during field surveys, the magnitude of any collision impact is assessed as Low given this species has accepted high tolerance for operating turbines, resulting in an overall impact significance of **Low**. The most recently available national breeding Peregrine population in Ireland is estimated to be approximately c.425 pairs (NPWS Article 12 Report, 2013-2018), mortality as a result of collision to the population using the wind farm site and surrounding area will result in a worst-case scenario loss of one breeding pair. This loss is representative of an impact of Low magnitude. A Low magnitude impact to this bird receptor of Medium sensitivity will result in an impact of Slight significance of effect.

For **Sparrowhawk**, the magnitude of impact is evaluated as **Low** with a **Negligible** sensitivity of these species, giving a **Not Significant** Impact. The collision risk for Sparrowhawk was estimated to be 0.1 collisions per annum when accounting for avoidance behaviour. Given the low level of activity recorded by this species, the collision rate is not likely to exceed 7 individuals over the 35-year operational phase. As such, collision mortality impacts are unlikely to occur beyond low to negligible levels over the 35-year operational phase, given the intervening period between collisions (one every five years) will allow for population recovery. With a national population estimated at c.12,000 pairs (NPWS Article 12 Report, 2013-2018), this worst-case scenario loss is representative of an impact of Low magnitude. A Low magnitude impact to this bird receptor of low sensitivity will result in an impact of Slight significance of effect.

Waders: Three species of wader, Golden Plover, Lapwing and Snipe, were selected for assessment based on their presence at Gathabawn Windfarm Project and their status. Due to low/no numbers recorded at the site, Woodcock and Curlew did not meet the threshold for collision risk assessment. Although Snipe was assessed within the collision risk model (see Appendix 13.7) on a precautionary basis, the determined collision risk for Snipe was <0.05birds/annum, so any impact would be considered negligible and is not considered further.

Lapwing had an estimated collision risk of 0.1 birds/annum. Although over the 35-year lifespan of the proposed Gathabawn Windfarm Project there would be four fatalities estimated for Lapwing, this is equivalent to 0.006% of the wintering population of 67,700 individuals (Burke *et al.*, 2025); Lapwing were recorded in October and December (one flock of six in December 2022 and one flock of eight in October 2025), with no breeding season records. As such, the impact is considered Negligible for national and international population present in Ireland as substantially less than 1% of the population is likely to be affected. The numbers recorded during

VP surveys were determined to be migratory flocks, based on their presence only in October and December. Given this consideration, the significance of impact is only relevant to the national population and is considered **Not Significant**, as this species was not identified as a resident of the receiving environment.

Golden Plover has an estimated collision risk of 12.3 individuals per annum. Although an assessment of collision risk for Golden Plover in the breeding season was undertaken, the reality is that they do not occur as a breeding species in this area. The "breeding season" population was recorded in September which represents migrating flocks returning to wintering sites. As the extent of this collision risk is isolated to migrating flocks, the magnitude of this impact is therefore more representative with consideration of the wintering population.

Although an apparently high collision risk, the national wintering population of Golden Plover is c. 82,190 (Burke *et al.*, 2025) which, suggesting that the total number of collisions over the 35-year operational life of the windfarm would result in a total loss of 430 birds which would be equivalent to 0.5% of the wintering population. However, an unpublished review (Gittings, 2022) recommended that Golden Plover collision risk is assessed using avoidance rates of both 99.6% (as applied here) and 99.8%, rather than the 98% indicated by SNH (2018), which does not specifically assess Golden Plover (the 98% indicated by SNH is the default avoidance rate). If the higher avoidance rate indicated by Gittings 2022 was adopted the collision risk would decrease by a factor of 2 (i.e. 6.1 collisions per annum, or 213 collisions over the lifetime of the windfarm).

Furthermore, the flocking behaviour of Golden Plover does not lend itself to assessment using the Collision Risk Model. The high collision risk is based on the presence of a single flock in the survey area on one day (24th March 2023), consisting of c.220 individuals that flew around the survey area for about one hour. Due to the mathematical approach to determine flight time for collision risk modelling (where the number of flight seconds are multiplied by the number of birds present to determine flight risk), this single flock accounted for 540,550 seconds of the total flight time recorded for Golden Plover of 546,205 seconds (i.e. 99% of the total flight time). Without this single flock, the collision risk estimate for Golden Plover would be 0.1 collision/annum (based on the 99.6% avoidance rate).

Nevertheless, the presence of this flock is part of the baseline and indicative of movements of Golden Plover with the proposed Gathabawn Windfarm Project area. As such, the assessment is based on the inclusion of this flock. Even with the inclusion of this single flock, the impact is considered **Not Significant** for the national and international population present in Ireland as less than 1% of the population is likely to be affected. The numbers recorded during VP surveys were determined to be migratory flocks, based on their presence only in January, March, October and December. Given this consideration, the significance of impact is only relevant to the national population, as this species was not identified as a resident of the receiving environment. Despite this low magnitude, there is still a risk of slight significant effect.

Waterbirds and Gulls

Four **Waterbird** species **Black-headed Gull**, **Lesser Black-backed Gull**, **Mute Swan** and **Whooper Swan** were selected for assessment based on their presence at Gathabawn Windfarm and their status.

Black-headed Gull and Lesser Black-backed Gull are species at risk from mortality related effects, with the worst-case scenario for fatalities equating to 0.9 collisions per annum for Lesser Black-backed Gull and 0.3 collisions per annum for Black-headed Gull; collision mortality impacts are therefore estimated at 32 Lesser Black-backed Gulls and 11 Black-headed Gull fatalities over the 35 year operational phase. The national population of wintering Black-headed Gull in Ireland is c.20,000, with the wintering population for Lesser Black-backed Gull estimated at c.5,500 individuals. As such, the level of impact equates to substantially less that 1%of the all-Ireland population. As such, this impact constitutes a **Low** magnitude effect on local populations in a worst-case scenario which, with a **Medium** sensitivity of these species, gives a **Not Significant** Impact.

The two species of swan, Mute Swan and Whooper Swan, were selected for assessment based on their presence at Gathabawn Windfarm Project and their status. For Mute Swan, just three flightlines were recorded during the 24 months of VP surveys, giving an estimated collision risk of 0.1/annum. Similarly, for Whooper Swan, only two flightlines were recorded during VP surveys, also giving an estimated collision risk of 0.1/annum. For both species, magnitude of impact is evaluated as **Low** which, with a **Medium** sensitivity of these species, gives a **Not Significant** Impact.

In light of the above, it is considered that collision risk for bird species as a result of the Gathabawn Windfarm 2026 ranges from Slight to Moderate effects for Key receptors.			
Impact Magnitude	Low	**Impact Significance: *(pre-mitigation)***	**Not Significant**
Mitigation and Monitoring Measures: The following mitigation and monitoring measures will be implemented as best practice environmental management.			
WM64	A 50m bat buffer area from the tips of Turbine blades will be created through the removal of hedgerows during the construction phase.		
WM117	The bat buffer zone will be maintained during operation by trimming existing trees and hedgerows, removing any scrub and additionally no new trees or hedgerows will be planted within the buffer zones. Grazing intensity and sward heights will be monitored, and where grazing has ceased in agricultural lands around a turbine that the grass will be mowed to maintain a low sward if required.		
WM99	Bird Surveys; Confirmatory bird activity surveys, including fatality monitoring (carcass searches, carcass removal rates and detection efficiency) during Years 1, 2, 3, 5, and every 5 years thereafter of the operational phase. (SNH, 2009).		
Effectiveness of Mitigation: 50m buffer from blade tip to trees and hedgerows, and the maintenance of a low grass sward around the turbines will significantly reduce bird of prey activity within the zone of influence of the turbine rotor. Post-construction monitoring surveys will be carried out to track the effectiveness of implemented mitigation measures during the Operational Years 1, 2, 3, 5 and 10, and fatality monitoring will be used to identify any mortality rates that exceed the collision rates projected for this impact by the Collision Risk Model Assessment. This monitoring will provide the evidence of effectiveness of the mitigation measures and provide a means to respond to changes and effects to the ecological baseline as a result of the project, should they occur. It is expected that with the implementation and maintenance of buffer zones around turbines, along with operational phase surveys and fatality monitoring and the implementation of other mitigation if required, that residual impacts will be Not Significant for Kestrel and Neutral for Buzzard, Peregrine and Sparrowhawk.			
Residual Impact Significance *(post-mitigation)*:			**Not Significant** (High Risk) – **Neutral** (Low Risk)

EIAR 13.4.9.2 Gathabawn Windfarm Impacts to Birds which will not be Significant

All of the remaining effects of the Proposed Gathbawn Windfarm on Birds will be Not Significant. A short evaluation of these effects is provided below:

EIAR 13.4.9.2.1 Impacts to Birds (BIRDS OF PREY) – which will not be Significant (WINDFARM)

Birds of Prey: Reduction or loss or fragmentation of suitable habitat (foraging, nesting, roosting) (C,O,D): Not Significant. Due to the limited nature and value of the loss of semi-natural habitats due to the development, and the adaptability of bird of prey species which were recorded at the proposed development site, which are known to utilise a range of different habitats, with abundant similar habitat available/occurring throughout the windfarm site and in the wider surrounding area, that permanent reduction in suitable habitats will be Low magnitude on site, and Negligible at a wider landscape scale, and taking account the Moderate Sensitivity of Kestrel, Peregrine, and Barn Owl, and the Low sensitivity of Buzzard and Sparrowhawk, that magnitude of permanent impacts to these species will be Low/Negligible and Not Significant. Any temporary losses are considered Negligible and Not Significant with reinstatement of the temporary areas and availability to birds of prey, following completion of construction works.

During the operational and decommissioning phases due to low level of impact sources (noise, vibration, lighting, presence of people) arising from very low, infrequent use of heavy machinery, the small number of personnel and vehicles on site, with works of short duration and at discrete works locations (c. once per week at a turbine location during operation, typically 4-5 days for turbine component replacement works, and for

a period of c.2 weeks per turbine during the decommissioning phase), it is evaluated that any disturbance effects will be Neutral. It is not anticipated that there will be any additional habitat losses associated with the operational and decommissioning phases of the development. Therefore, the potential for significant impacts as a result of maintenance or decommissioning works can be excluded.

Birds of Prey: Reduction in prey item species (C,O,D): Not Significant. Due to the low numbers of small mammals, passerines, reptiles or amphibians recorded on site, with the construction works likely to displace rather than remove any prey items from construction works areas, with prey items therefore likely to be available to birds of prey outside of works areas, it is considered that any impacts will be of Negligible magnitude and Not Significant.

During the operational and decommissioning phases, due to low level of impact sources (noise, vibration, lighting, presence of people) arising from very low, infrequent use of heavy machinery, the small number of personnel and vehicles on site, with works of short duration and at discrete works locations (c. once per week at a turbine location during operation, typically 4-5 days for turbine component replacement works, and for a period of c.2 weeks per turbine during the decommissioning phase), it is evaluated that any disturbance effects will be Neutral. It is not anticipated that there will be anu additional habitat losses associated with the operational and decommissioning phases of the development. Therefore, the potential for significant impacts as a result of maintenance or decommissioning works can be excluded.

Birds of Prey: Habitat enhancement (C,O,D): Not Significant (positive): Overall, the increase and enhancement of the hedgerow network, and the creation, protection and management of the proposed Biodiversity Areas will not result in the windfarm site becoming an important or valuable resource to Birds of Prey. While it is expected that Birds of Prey will benefit positively from habitat creation and protection, and hedgerow creation and enhancement, this will be a minor (albeit positive) shift away from the baseline habitats and therefore of Low magnitude and Not Significant.

Birds of Prey: Destruction of nests, mortality of chicks (C): No Likely Impact. Due to the limited extent and value of semi-natural habitats at the Gathabawn Windfarm site, and no nesting birds of prey recorded within the site boundary during surveys between 2023 and 2026, it is considered unlikely that this impact will occur.

Birds of Prey: Destruction of nests, mortality of chicks (O, D): No Likely Impact. Groundworks during operation and decommissioning are limited to the annual maintenance of the hardstanding areas and site drainage system. Due to the very small scale and infrequency of works, which will be brief in duration, with birds of prey unlikely to nest in areas within the windfarm site or adjacent to turbines, it is considered that destruction of nests and/or mortality of chicks is unlikely to occur.

Birds of Prey: Disturbance and/or displacement (C): Not Significant. Construction works and activities may result in some disturbance and/or displacement as a result of visual stimuli, noise, presence of people and operating machines. However, the species recorded are known to utilise a range of different habitats and tend to have large ranges both during the breeding and wintering periods. As suitable habitat is widespread in the area and wider countryside and taking into account the low occurrence of species throughout the proposed development site, it is evaluated that the potential for disturbance/displacement as a result of construction works and activities is low to negligible. Furthermore, this potential effect relates to the construction phase and is therefore temporary/short-term in duration. As a result, disturbance and displacement is unlikely to significantly impact birds of prey species using the site, and overall it is considered that any effects will be Not Significant.

Barn Owl is a nocturnal bird of prey and unlikely to be affected by construction works which will mainly be carried out during daylight hours.

Birds of Prey: Disturbance/displacement from Operating turbines (visual presence and movement, noise) (O): Slight - Not Significant. Raptor species recorded during the breeding season and/or non-breeding season

comprised Kestrel, Buzzard, Sparrowhawk, Peregrine, Barn Owl and Long-eared Owl. Kestrel, Peregrine, Buzzard and Sparrowhawk were the dominant raptor species recorded with one record of Barn Owl.

There is an established Peregrine nest site recorded West of Ballyring and South of Ballylehaun. No other Birds of Prey were recorded as breeding species in the area and only recorded in low numbers. As these species use a variety of habitats which are widespread in the wider area and their low levels of turbine avoidance, it is exevaluated that the magnitude of disturbance/displacement will be Negligible. When the Moderate sensitivity of Kestrel and Peregrine (Annex I species) and Barn Owl (Red Listed) and the Low sensitivity of Sparrowhawk and Buzzard (Green listed) are taken into consideration, it is evaluated that the significance of impact will be Not Significant.

Birds of Prey: Disturbance and/or displacement from maintenance activities and decommissioning works (O, D): Slight - Not Significant. Levels of works and activities during both the operational and the decommissioning phases will be substantially less than during the construction phase. Taking the lower levels of works/activities, the low levels of birds of prey recorded on site during surveys, and the characteristics of the species recorded which are known to utilise a range of different habitats and tend to have large ranges during the breeding and wintering seasons, with suitable habitat widespread in the area and wider countryside. Therefore, it is evaluated that any disturbance or displacement effects as a result of works or activities during the operational or decommissioning phases will be Negligible and Not Significant.

Birds - General: Exposure to EMF (O): No Likely Impact. EMF comprises electric and magnetic fields. Increases in electric fields will be Negligible/Low due to the screening by the steel turbine towers, the steelwork/metalwork at the substations, the metallic sheaths surrounding the cables and the backfill materials above underground cables, with any increases in levels of magnetic fields substantially below EU EMF Limits. No likely effect to birds of prey using the site as literature supports no precedent for EMF as a viable impact.

EIAR 13.4.9.2.2 Impacts to Birds (PASSERINES) – which will not be Significant – WHOLE PROJECT

Passerines: Permanent or temporary reduction or loss or fragmentation of suitable habitat (foraging, nesting, roosting) (C,O,D): Slight impact. Passerine species identified utilise a wide range of habitats that are widespread throughout the Gathabawn Windfarm and Candidate Gathabawn Grid Connection sites and throughout the local area. While there will be some loss of semi-natural habitat, it is considered that in the context of the availability of these habitats in the wider surrounding area, with no loss or alteration of key habitats, and the limited value to foraging, nesting or roosting passerines of the majority of habitats subject to permanent and temporary land-use change (improved agricultural grassland) , that the impact magnitude will be Low, representing a minor shift away from baseline conditions, and taking into account the Low sensitivity of passerine species recorded, that any impact will be Slight.

Passerines: Habitat Enhancement (C,O,D): Not Significant: While it is expected that Passerines will benefit positively from habitat creation, protection, and hedgerow creation and enhancement, this will be a minor (albeit positive) shift away from the baseline habitats and therefore of Low magnitude and Not Significant

Passerines: Physical injury/destruction of nests or chicks (C,O,D): Slight – Not Significant. Removal of groundcover has potential to destroy nests and result in the mortality of ground nesting birds such as Meadow Pipit and Skylark. Tree-felling, scrub and groundcover removal associated with hedgerow removal could affect the nests of Goldcrest. While scrub removal has potential to affect nests of Willow Warbler and Linnet.

Starling typically use cavities in buildings and other structures (including holes in trees), and Swallows also use buildings to construct their nests. These species are unlikely to be affected by construction works, as no works to buildings are proposed.

Due to the low number of passerines recorded at the site and works only likely to affect nests established before groundworks, vegetation removal or hedgerow removal commence in an area (as birds are likely to avoid nesting close to active construction works), it is evaluated that the magnitude of impact is Low with less than 5% of suitable habitat likely to be affected and therefore it is considered that effects to nests or chicks will be Slight for Meadow Pipit and Not Significant for the remaining passerine species.

The loss of a nest/mortality of chicks is unlikely to affect local populations to any significant degree, due to the extensive nature of suitable habitat and the widespread nature of the potentially affected species, and therefore effects to local Passerine populations will be Not Significant.

Levels of works and activities during both the operational and the decommissioning phases will be substantially less than during the construction phase. Groundworks during decommissioning are limited to small discrete locations at turbine hardstands. Due to the small scale of individual works, and the likely continued low use of the windfarm site by passerines, it is considered unlikely that a significant/important number of nesting birds will be affected, and the potential for significant impacts can be excluded.

Passerines: Disturbance/displacement from construction works areas (C): Not Significant. It is considered that due to the recorded and predicted low occurrence of passerine species throughout the Gathabawn Windfarm and Candidate Gathabawn Grid Connection sites, and due to the availability and abundance of suitable alternative habitat away from construction works areas and due to the temporary nature of works, that any disturbance or displacement of passerines will be Low, and therefore Not Significant. In addition, studies on the impacts of wind farms during construction (Pearce-Higgins *et al.* 2012) have found little evidence of significant disturbance effects on passerine species.

Passerines: Collision risk (O): Unlikely, Not Significant. Most passerine species and common resident passerines such as Meadow Pipit, and other passerines are not considered to be at risk of collision with the operating wind farm as their flight heights are generally well below the lowest point of a rotating turbine blade. Therefore, collision risk with the turbines is considered unlikely and Not Significant.

Passerines: Disturbance/displacement from operational turbines, and from maintenance works/activities (O): Not Significant. Most passerine (perching) species and general lowland farmland birds are not considered to be particularly susceptible to impacts from wind farms (SNH, 2017). Studies on the impacts of wind farms during operation (Pearce-Higgins *et al.* 2009) have found little evidence of significant disturbance effects on passerine species. In addition, habitats on site are generally of limited value to passerines (predominantly improved agricultural grassland), and low numbers of passerines were recorded. It is considered that any impacts will be of Low magnitude, and Not Significant.

Passerines: Disturbance/displacement from decommissioning works (D): Not Significant. Due to the location of decommissioning works predominantly at turbine locations, with low numbers of passerines expected at the windfarm site due to the removal of hedgerows, scrub and trees from surrounding bat buffer zones during operation, and with low numbers of passerines expected along the Candidate Gathabawn Grid Connection, and the separation distance between works (e.g. between the turbines), with works of brief duration, and reversible with completion of works, and the assumed continued availability of suitable alternative habitats in the surrounding landscape, it is considered that any disturbance or displacement of passerines during decommissioning works will be Negligible, and any impacts will be Not Significant.

EIAR 13.4.9.2.3 Impacts to Birds (WADERS) – which will not be Significant

Waders: Permanent or temporary reduction or loss or fragmentation of suitable habitat (foraging, roosting) (C): Slight impact. Suitable habitat at the Gathabawn Windfarm site is limited to Improved Grassland. Suitable habitat along the Candidate Gathabawn Grid Connection is limited to habitat along the

edges of the River Nore and flooded fields across the wider baseline. The mix of habitats at the proposed development site are abundant and widespread throughout the surrounding area. It is considered that the loss of agricultural grasslands at the windfarm site will be Low/Negligible magnitude being a minor change to the makeup of habitats in the local and wider area, and consequently it is evaluated that loss of suitable habitat in relation to Golden Plover, Lapwing or Snipe will be Not Significant.

In relation to Woodcock, which utilises woodland and forestry habitats, this species was not recorded from the windfarm site itself and no direct loss of suitable habitat will result from construction, operation or decommissioning of the windfarm. No woodland or wetland will be lost as a result of the Candidate Gathabawn Grid connection. Overall, is evaluated that loss of suitable habitat in relation to Woodcock will be Not Significant.

Waders: Physical injury/destruction of nests or chicks (C,O,D): Not Significant -construction phase. No species of wader were recorded as potentially breeding within the Gathabawn Windfarm site or within its immediate environs. Along the Candidate Gathabawn Grid Connection, no species of wader, other than Woodcock, were recorded as potentially breeding within its immediate environs. As such, given the Low sensitivity of Woodcock the absence of impacted habitat, it is evaluated that this impact to Woodcock will be Not Significant.

While suitable habitat, albeit of limited value, is available within the works areas subject to groundworks during the construction, operational and decommissioning phases, it is considered highly unlikely that these wader species will nest within these areas. During decommissioning, the hardstands and foundations will be covered over using soils in permanent berms at each turbine location, it is considered highly unlikely that waders would nest on these berms. During the operational phase, any emerging scrub and tree saplings within the bat buffer zones will be regularly removed, this work will take place by hand and is unlikely to result in mortality of ground nesting birds or destruction of nests/chicks.

Overall, it is considered unlikely that mortality or injury will occur to any nesting waders, or their eggs/chicks during the operation or decommissioning phases.

Waders: Disturbance/displacement from construction works areas (C): Not Significant. The habitats occurring within and surrounding the windfarm site are sub-optimal for breeding waders and are not suitable for sensitive waders such as Curlew and Golden Plover. In relation to the Candidate Gathabawn Grid Connection, although it is deemed that there is potential suitable habitat for these species along the River Nore SPA site, there has been evidence of limited use of any area of the for breeding by these species.

When the availability of suitable habitat in the wider surrounding area, and the temporary nature of construction works are also taken into account, it is evaluated that any disturbance or displacement of potential breeding waders will be Negligible to Low, and Not Significant.

Waders: Disturbance/displacement from operational turbines (O): Not Significant**.** The habitats occurring within and surrounding the windfarm or grid connection sites are sub-optimal for breeding and wintering waders, and are not suitable for sensitive waders such as Curlew and Golden Plover. With the exception of waders overflying the site, the majority of records for this group are in excess of the 2.5km considered as a zone of influence for operational turbines. It is therefore evaluated that any disturbance or displacement of potential breeding and wintering waders will be Negligible to Low, and Not Significant.

Waders: Collision risk (O): Imperceptible impact. Due to low/no numbers recorded at the site, Woodcock and Curlew did not meet the threshold for collision risk assessment. Three species of wader, Golden Plover, Lapwing and Snipe, were selected for assessment based on their presence at Gathabawn Windfarm site and their status – see detailed evaluation of collision risk for these species in Section 13.4.4.2. Impact on the remaining wader species (Curlew, Dunlin and Woodcock) is assessed to pose negligible to no magnitude of

effect on these receptors equating to imperceptible effect in the worst-case scenario. As such any impact would be Not Significant.

Waders: Disturbance/displacement from operational maintenance works/activities and decommissioning works (O, D): Slight - Not Significant. While suitable habitat is available to a limited extent within the works areas, with suitable habitat also occurring on adjacent lands for Golden Plover, Lapwing, Curlew, Dunlin, Snipe and Woodcock, important numbers of these species are not expected to occur at the Gathabawn Windfarm site. When the availability of suitable habitat both throughout the windfarm site and along the grid connection and in the wider surrounding area, and the brief nature of operational or decommissioning works are also taken into account, it is evaluated that any disturbance or displacement will be Negligible, and Not Significant.

EIAR 13.4.9.2.4 Impacts to Birds (WATERBIRDS) – which will not be Significant

Waterbirds: Permanent or temporary reduction or loss or fragmentation of suitable habitat (foraging, roosting) (C,O,D): Not Likely, Not Significant.

Windfarm: Due to the absence of suitable habitat for waterbird species recorded during surveys, no loss of suitable habitat will occur. Given the absence of watercourses, and just one wet drain on site (D02), the absence of records of waterbirds from within and adjacent to the Windfarm, and the availability of more suitable habitat in the wider area, impacts to waterbirds are considered Negligible and Not Significant.

Grid Connection; No loss of suitable foraging or roosting habitat is likely to occur as a result of the Candidate Gathabawn Grid Connection. Given that five watercourse crossings associated with the Ballylehaun – Ballyring UGC and Ballyring – Moatpark UGC support limited potential habitat for such species, and wet drains on site, the absence of records of waterbirds from within and adjacent to the Whole Gathabawn Windfarm Project, and the availability of more suitable habitat in the wider area, impacts to waterbirds are considered Negligible and Not Significant.

Waterbirds: Physical injury, destruction of nests (C,O,D): Not Likely, Not Significant.

Windfarm: Given the absence of watercourses, and just one wet drain (D02) on site, the absence of records from within and adjacent to the Windfarm, and the availability of more suitable habitat in the wider area, impacts to waterbirds are considered Negligible and Not Significant. During the operational and decommissioning phases, due to the discrete locations of works, mainly at turbines hardstands, the absence of records from within and adjacent to the Windfarm, waterbirds unlikely to occur in lands at or adjacent to works locations associated with the operational or decommissioning phases, and no suitable breeding habitat at the Gathabawn Windfarm site, it is evaluated that disturbance or displacement effects are unlikely to occur during operational or decommissioning works or activities.

Grid Connection; Given the absence of watercourses, with the exception of the five watercourse crossings associated with the Ballylehaun – Ballyring UGC and Ballyring – Moatpark UGC supports limited potential habitat for such species, and wet drains on site, the absence of records from within and adjacent to the Windfarm, and the availability of more suitable habitat in the wider area, impacts to waterbirds are considered Negligible and Not Significant. During the operational and decommissioning phases, due to the discrete locations of works, mainly at joint bays and the substation, and the absence of records from within and adjacent to the Candidate Gathabawn Grid Connection, waterbirds are unlikely to occur on lands at or adjacent to works locations associated with the operational or decommissioning phases, and there is no suitable breeding habitat at the Whole Gathabawn Windfarm site; it is evaluated that no loss of nests or breeding individuals is likely to occur during operational or decommissioning works or activities.

Waterbirds: Disturbance/displacement from construction works areas (C): No Likely Impact, Not Significant. Windfarm: Given the absence of watercourses, and just one wet drain (D02) on site, the absence of records from within and adjacent to the Windfarm, and the availability of more suitable habitat in the wider area, impacts to waterbirds are considered Negligible and Not Significant. Due to the distance of the other waterbirds recorded during surveys from the Gathabawn Windfarm construction works areas, and taking into account the temporary duration of construction works, and absence of suitable habitat at the windfarm site, it is considered that disturbance or displacement is unlikely to occur.

Grid Connection; The main source for this impact are the HDD entry and exit pits on either side of the River Nore. These works will take over a 10–30-day period and will produce substantial noise and human presence during this period. However, once complete, no further disturbance or displacement effects will remain. As such, any impact to birds utilising the River Nore will be short-term in nature and will not impact bird species distribution beyond 500m from the entry and exit pits. As such, the Candidate Gathabawn Grid Connection will result in only low magnitude impacts on Waterbird KERs.

Due to the distance of the other waterbirds recorded during surveys from the Whole Gathabawn Windfarm construction works areas, and taking into account the short-term duration of construction works, and absence of suitable habitat at the windfarm site, it is considered that disturbance or displacement will be slight in a worst-case scenario.

Waterbirds: Collision risk (O):): Imperceptible impact. Due to low/no numbers recorded at the site, Cormorant, Herring Gull and Mallard did not meet the threshold for collision risk assessment. Four species of waterbird, Black-headed Gull, Lesser Black-backed Gull, Mute Swan and Whooper Swan, were selected for assessment based on their presence at Gathabawn Windfarm site and their status – see detailed evaluation of collision risk for these species in Section 13.4.4.2. Impact on the remaining waterbird species (Cormorant, Herring Gull and Mallard) is assessed to pose negligible to no magnitude of effect on these receptors equating No Likely Impact, Not Significant. Given the absence of watercourses and very low occurrence of wet drains on site, the absence of records from within and adjacent to the Windfarm, and the availability of more suitable habitat in the wider area, collision risk to waterbirds are considered Negligible and Not Significant.

Due to the distance of other waterbirds recorded during surveys from the Turbines, and the absence of suitable habitat for these species at the windfarm site, it is considered that interaction with turbines is unlikely to occur, and the potential for significant effects via this impact can be excluded.

Waterbirds: Disturbance/displacement from operational turbine locations (O): Not Significant**.** The habitats occurring within and surrounding the windfarm site are sub-optimal for breeding and wintering Waterbirds. With the exception of Waterbirds overflying the site, the majority of records for this group are in excess of the 0.2km considered as a zone of influence for operational turbines. It is therefore evaluated that any disturbance or displacement of potential breeding and wintering waders will be Negligible to Low, and Not Significant.

Waterbirds: Disturbance/displacement from operational maintenance works/activities and decommissioning works (O, D): No Likely Impact.

Windfarm: Due to the discrete locations of works, mainly at turbines hardstands, the absence of records from within and adjacent to the Windfarm, waterbirds unlikely to occur in lands at or adjacent to works locations associated with the operational or decommissioning phases, and no suitable breeding habitat at the Gathabawn Windfarm site, it is evaluated that disturbance or displacement effects are unlikely to occur during operational or decommissioning works or activities.

Grid Connection; Due to the discrete locations of works, mainly at joint bays and the Parksgrove Substation, the absence of records from within and adjacent to the Candidate Gathabawn Grid Connection, waterbirds are unlikely to occur on lands at or adjacent to works locations associated with the operational or

decommissioning phases, and no suitable breeding habitat at the Candidate Gathabawn Grid Connection, it is evaluated that disturbance or displacement effects are unlikely to occur during operational or decommissioning works or activities.

EIAR 13.4.9.2.5 Impacts to Birds (KINGFISHER) – which will not be Significant

Kingfisher: Permanent or temporary reduction or loss or fragmentation of suitable habitat (foraging, roosting) (C,O,D): Not Likely, Not Significant.

Windfarm: Due to the absence of suitable habitat for Kingfisher recorded during surveys, no loss of suitable habitat will occur. Given the absence of watercourses, and just one wet drain on site (D02), the absence of records of Kingfisher from within and adjacent to the Windfarm, and the availability of more suitable habitat in the wider area, impacts to Kingfisher are considered Negligible and Not Significant.

Grid Connection; No loss of suitable foraging or roosting habitat is likely to occur as a result of the Candidate Gathabawn Grid Connection. Given that five watercourse crossings associated with the Ballylehaun – Ballyring UGC and Ballyring – Moatpark UGC contain limited suitability for Kingfisher, and with the availability of these habitats in the wider surrounding area, with no loss or alteration of key habitats, the impact magnitude will be Negligible and are considered Not Significant.

Kingfisher: Physical injury, destruction of nests (C,O,D): Not Likely, Not Significant.

Windfarm: Given the absence of watercourses, and just one wet drain (D02) on site, the absence of records from within and adjacent to the Windfarm, and the availability of more suitable habitat in the wider area, impacts to Kingfisher are considered Negligible and Not Significant. During the operational and decommissioning phases, due to the discrete locations of works, mainly at turbines hardstands, the absence of records from within and adjacent to the Windfarm, Kingfisher is unlikely to occur in lands at or adjacent to works locations associated with the operational or decommissioning phases, and no suitable breeding habitat at the Gathabawn Windfarm site, it is evaluated that disturbance or displacement effects are unlikely to occur during operational or decommissioning works or activities.

Grid Connection; Given the absence of watercourses, with the exception of the five watercourse crossings associated with the Ballylehaun – Ballyring UGC and Ballyring – Moatpark UGC supports limited potential habitat for Kingfisher, impacts to Kingfisher are considered Negligible and Not Significant. During the operational and decommissioning phases, due to the discrete locations of works, mainly at joint bays and the substation, and the absence of records from within and adjacent to the Candidate Gathabawn Grid Connection, Kingfisher is unlikely to occur on lands at or adjacent to works locations associated with the operational or decommissioning phases, and there is no suitable breeding habitat at the Whole Gathabawn Windfarm site; it is evaluated that no loss of nests or breeding individuals is likely to occur during operational or decommissioning works or activities.

Kingfisher: Disturbance/displacement from construction works areas (C): No Likely Impact, Not Significant.
Windfarm: Given the absence of watercourses, and just one wet drain (D02) on site, the absence of records from within and adjacent to the Windfarm, and the availability of more suitable habitat in the wider area, impacts to Kingfisher is considered Negligible and Not Significant. Due to absence of suitable habitat at the windfarm site, it is considered that disturbance or displacement is unlikely to occur.

Grid Connection; The main source for this impact are the HDD entry and exit pits on either side of the River Nore. These works will take over a 10–30-day period and will produce substantial noise and human presence during this period. However, once complete, no further disturbance or displacement effects will remain. As such, any impact to Kingfisher utilising the River Nore will be short-term in nature and will not impact this

species distribution beyond 500m from the entry and exit pits. As such, the Candidate Gathabawn Grid Connection will result in only low magnitude impacts on Kingfisher.

Taking into account the short-term duration of construction works, and absence of suitable habitat at the windfarm site, it is considered that disturbance or displacement will be slight in a worst-case scenario.

Kingfisher: Collision risk (O): Imperceptible impact. Due to low/no numbers recorded at the site, Kingfisher is assessed to pose negligible to no magnitude of effect on these receptors equating No Likely Impact, Not Significant. Given the absence of watercourses and suitable habitats on site, the absence of records from within and adjacent to the Windfarm, and the availability of more suitable habitat in the wider area, collision risk to Kingfisher is considered Negligible and Not Significant.

Due to the distance to suitable habitats, it is considered that interaction with turbines is unlikely to occur, and the potential for significant effects via this impact can be excluded.

Kingfisher: Disturbance/displacement from operational turbine locations (O): Not Significant**.** There are no habitat for Kingfisher on the windfarm site. It is therefore evaluated that any disturbance or displacement of Kingfisher will be Negligible, and Not Significant.

Kingfisher: Disturbance/displacement from operational maintenance works/activities and decommissioning works (O, D): No Likely Impact.

Windfarm: Due to the discrete locations of works, mainly at turbines hardstands, the absence of records from within and adjacent to the Windfarm, Kingfisher is unlikely to occur in lands at or adjacent to works locations associated with the operational or decommissioning phases, and no suitable breeding habitat at the Gathabawn Windfarm site, it is evaluated that disturbance or displacement effects are unlikely to occur during operational or decommissioning works or activities.

Grid Connection; Due to the discrete locations of works, mainly at joint bays and the Parksgrove Substation, the limited number of records from within and adjacent to the Candidate Gathabawn Grid Connection, Kingfisher is unlikely to occur on lands at or adjacent to works locations associated with the operational or decommissioning phases, it is evaluated that disturbance or displacement effects are unlikely to occur during operational or decommissioning works or activities. It is therefore evaluated that any disturbance or displacement of Kingfisher will be Negligible, and Not Significant.

EIAR 13.4.9.3 Environmental Protection Measures for the protection of Birds

In addition to the mitigation measures identified in Section EIAR 13.4.9.1 above, additional best practice measures which form part of standard windfarm construction/operation will be implemented during the construction/operation/decommissioning of the Gathabawn Windfarm Project to protect Birds and avoid/reduce these not significant effects. These best practice measures are identified in Section EIAR 13.4.12 and are included in the Construction Environmental Management Plan for the Gathabawn Windfarm project which accompanies the subject planning application. Operational and decommissioning measures will be included in the Environmental Management Plans for those phases of the project.

EIAR 13.4.9.4 Evaluation of the Whole Project Impact to Birds

When the residual impacts of the Proposed Gathabawn Windfarm and the Candidate Gathbawn Grid Connection to Birds are considered cumulatively, it is considered that the whole project impact will be Not Significant.

EIAR 13.4.10 Evaluation of effects to Aquatic Habitats & Species

A summary of the findings of the evaluation of the effects of the proposed Gathabawn Windfarm on Aquatic Habitats & Species are listed in the table below. The relevant phases of the development are the construction, operational and decommissioning phases which are denoted by C, O and D respectively.

The evaluations follow this summary table.

The following effects are evaluated in detail to determine whether or not they are likely to be Significant.

Table 13-35: List of effects to Aquatic Habitats & Species evaluated in detail

AQUATIC HABITATS	
Introduction or spread of invasive species (riparian, aquatic) (C, O, D)	*13.4.10.1*

All of the remaining effects of the proposed Gathabawn Windfarm have no likelihood of causing significant adverse effects to Aquatic Habitats and Aquatic Species receptors. A short evaluation of these effects is provided in Section 13.4.10.2, with a list of these impacts provided in the table below. The relevant phases of the development are the construction, operational and decommissioning phases which are denoted by C, O and D respectively.

Table 13-36: List of effects to Aquatic Habitats & Species which will not be significant

Effects which will not be significant	**Phase**	**Impact Significance**
Impacts to Aquatic Habitats & Species	**see Section 13.4.10.2**	
Hydromorphological impacts due to instream or works adjacent to wet drainage channels and watercourses	C	Neutral
Hydromorphological impacts to downstream waterbodies due to changes to drainage regimes and surface water runoff	C, O, D	Not Significant
Habitat degradation on aquatic habitats and species due to reductions in water quality during construction	C	Not Significant
Habitat degradation on aquatic habitats and species due to reductions in water quality during operation and decommissioning	O, D	Not Significant
Disturbance/displacement/mortality of species of conservation importance	C	Not Significant

EIAR 13.4.10.1	**Introduction or spread of invasive species (terrestrial, riparian, aquatic)**
Sensitive Aspect:	Aquatic Habitats & Species, Designated Sites
Importance:	**Local (higher) – Aquatic Habitats and Very High – Designated Sites**
Impact Source(s)	Excavation and relocation of soils, movement of machinery
Impact Pathway(s)	Soils
Project Stage	Construction, Operation & Decommissioning Phases

Overview of Impact (general):

NTS 1 Invasive Alien Plant Species (IAPS) include non-native, terrestrial invasive species such as Japanese Knotweed or Cherry Laurel, invasive riparian vegetation (such as Himalayan Balsam), and invasive aquatic species which include non-native invasive species such as fish and mobile invertebrate fauna (such as Asian Clam, Signal Crayfish, or non-native shrimp species).
NTS 2 IAPS could be introduced to a site through the movement of plant/machinery and delivery vehicles, and natural materials such as soil, fencing posts, hedging and trees onto the development site. IAPS infestations could be spread through the disturbance of vegetation, groundworks and the movement of soils and machinery.
NTS 3 Aquatic and riparian invasive species have the potential for significant ecosystem disturbance, disrupting the predator/prey balance or causing habitat disruption within aquatic systems. The spread of invasive species is not restricted in extent to the footprint of construction/instream works but can be transported both upstream (mobile species and 3rd party transport) and downstream (hydrological transport) within a watercourse, potentially extending throughout the catchment.
The introduction or spread of invasive species within the Gathabawn Windfarm site or within the Candidate Gathabawn Grid Connection site could result in impacts of High magnitude, albeit on features of Low sensitivity within the site resulting in impacts of Low significance. The potential spread of invasive species outside of the Gathabawn Windfarm site (as a result of windfarm activities) could result in impacts of High magnitude, on features of Very High sensitivity, given the pathways to Natura 2000 sites, resulting in impacts of Moderate significance.

Examination of the Impact of the Proposed Gathabawn Windfarm:

Activities relating to the movement of machinery and groundworks/earthworks have the potential to introduce new infestations of Invasive Alien Plant Species (IAPS) to the site and/or spread existing IAPS infestation. In relation to aquatic/riparian areas, invasive species may be introduced to unaffected catchments via excavated material by site machinery.

There were two records of Japanese Knotweed gathered during habitat surveys of the Gathabawn Windfarm site in 2022 and 2026 (near an access track to turbine 12). No other invasive species were observed or recorded within 50m of the project works and there is an absence of watercourses within the development boundary. However, due to the movement of machinery and vehicles onto the site from other locations, the risk of movement/introduction of invasive species cannot be excluded. Additionally, although the presence of vehicles on the windfarm during the Construction and Operational Phase and during Decommissioning Works will be negligible, and groundworks/movement of soils will be at discrete locations at the windfarm site, with no requirement for works in the vicinity of watercourses or any instream works, the risk of movement/introduction of invasive species cannot be excluded.

Along the Candidate Gathabawn Grid Connection: The construction of Underground Cabling for the Candidate Gathabawn Grid Connection will, however, require six water course crossings at the Gorteenamuck Stream (W1), Gorteenahilla Stream (W2), Lismaine Stream (W3), Lisdowney Stream (W4), Ballyconra Stream (W5) and the River Nore. These watercourses maintain downstream connectivity, to the River Barrow and River Nore SAC and are therefore a potential pathway for IAPS.

In relation to terrestrial/riparian habitats, should an infestation be established on the windfarm site, the effects could result in aggressive spreading of the species into locally important habitats and pose dangers to the mammal, aquatic and bird baselines, with a moderate to high magnitude.

The risk for the introduction/spread of IAPS is greatest during the construction phase due to the extent of the construction works areas and the volumes of traffic and movement of machinery onsite. The risk of the introduction/spread of IAPS is considered to be lower during the operational and decommissioning phases of

the Gathabawn Windfarm due to the reduced extent of works and the much-reduced level of groundworks, and movement of machinery/vehicles onto the site.

There is potential for the dispersal of invasive species which could in turn affect the Qualifying Interests of the River Barrow and River Nore SAC. Without mitigation in place, given the absence of invasive species onsite, but taking into account the risk or introduction of invasive species with site vehicles/machinery entering the site, and the potential for effects both upstream and downstream in a catchment, the magnitude of unmitigated impacts could potentially be High in smaller watercourses and Medium/Low in the larger rivers, due to the potential for loss of larger sections of habitat / species within the smaller watercourses.

Impact Magnitude	Potentially Moderate	**Impact Significance: *(pre-mitigation)***	**Potentially Significant**

Mitigation and Monitoring Measures: Even though Significant impacts are not predicted; the following mitigation and monitoring measures will be implemented as best practice environmental management.	
WM21	Treatment of the existing stand of Japanese Knotweed at the Ballyring Area has commenced pre-application and will continue during the planning and pre-construction phase. Treatment of the existing Japanese Knotweed will be carried out an invasive species specialist consultant in accordance with best practice.
WM03 GM03	Pre-construction surveys for invasive species will be carried out to determine if any new infestations of invasive species have been established in the interim period between the submission of the planning application and the commencement of construction works. These pre-construction confirmatory surveys for invasive species will be carried out at the construction works areas plus 7m, by the Project Ecologist, to accurately determine the extent of new invasive species infestations. Mapping, showing the most up to date distribution and extent of each infestation, will be distributed to the Environmental Clerk of Works and to the Project Engineer.
WM12 GM12	The Environmental Management Team will monitor construction works for compliance with the Environmental Management Plan. The project Environmental Management Team which includes an Environmental Clerk of Works, the Project Ecologist and specialists as required such as archaeologists, invasive species specialists and hydrologists, who are independent of the site contractors. The Environmental Management Team will report to the owner's Project Manager.
WM20 GM20	Liaison with Contractor: The Project Ecologist will liaise with the Contractors on a weekly basis regarding the upcoming schedule of works and will advise the Contractors of any particular ecological protection requirements at specific locations on site.
WM22 GM21	Any excavation works in close proximity (7m) to an invasive species infestation location will be carried out under the direct supervision of an invasive species specialist ecologist.
WM23 GM22	Invasive Species Control: Visual inspections will be carried out by the Contractor on all machinery and equipment (particularly for machinery and equipment which has come into contact with water or soils) for evidence of attached plant or animal material, or adherent mud or debris. Any attached or adherent material will be removed before entering or leaving the site, securely stored away from traffic for removal to a contaminated waste Community Liaison Officer bin at the temporary constructions.
WM27	Ecological Monitoring of initial groundworks and road construction works within 50m of the boundary of the Cullahill Mountain SAC. This monitoring will be conducted by the Ecological Clerk of Works, who will have a have a 'stop-works' authority to temporarily stop construction works and the Contractor will implement the necessary actions and measures to the satisfaction of the Ecological Clerk of Works, before construction works can once again commence.
WM51 GM50	Treatment/management of invasive species infestations: Any infestations of Japanese knotweed or other high-impact invasive species within 7m of works will be covered with high density polyethylene grass carpet terram prior to any works commencing at the location. The covering of any new infestations will only be carried out under the direct supervision of a specialist invasive species ecologist, and works within 7m of the infestation will be under the direct supervision of this specialist invasive species ecologist.
WM52	Monitoring of invasive species: Works within 7m of an invasive species infestation will only be carried out under the direct supervision of a specialist invasive species ecologist with prior experience of this type of work.

WM100	Annual Invasive Species Survey: An invasive species survey will be conducted of the Biodiversity Areas, and the operational windfarm site. Should a new infestation be identified, remedial measures will be implemented. Any remedial works will be carried out by the Asset Manager or Environmental Manager for low to medium impact species, and by an invasive species specialist ecologist for high-impact invasive species.
WM101	Invasive Species Survey during major maintenance: Prior to facilitating works for turbine component transportation, the works locations will be surveyed for invasive plant species. Should a new infestation be identified, then the works within 7m of the infestation will be carried out under the direct supervision of an ecologist with prior experience of invasive species.
WM127 GM96	Invasive Species Survey: Before any decommissioning works commence, the works locations will be surveyed for invasive plant species infestations and should any be present within 7m of the works, then the works within 7m of the infestation will be under the direct supervision of an ecologist with prior experience of invasive species.
Effectiveness of Mitigation: The inspection of lands for the presence of invasive species prior to the carrying out of groundworks or vegetation removal (during any phase of the Gathabawn Windfarm) will avoid accidental spreading of invasive species and will enable the appropriate removal of any infestations which are likely to be affected. The visual inspection and cleaning of all site machinery and equipment prior to its arrival on site will prevent the introduction of invasive species.	
Residual Impact Significance *(post-mitigation)*:	**Neutral**

EIAR 13.4.10.2 Gathabawn Windfarm Impacts to Aquatic Habitats and Species which will not be Significant

All of the remaining effects of the Proposed Gathbawn Windfarm on Aquatic Habitats and Species will be Not Significant. A short evaluation of these effects is provided below:

Hydromorphological impacts due to instream works or works adjacent to wet drainage channels and watercourses (C): Neutral: There are no instream works in natural watercourses associated with the Proposed Gathabawn Windfarm. Works in wet drainage channels are limited to one small farm drain D02, which is not connected to downstream watercourses and is typically dry in the summer months. Therefore, it is considered that any impacts will be of Negligible magnitude equating to effects to aquatic habitats that are Not Significant.

Hydromorphological impacts to downstream waterbodies due to changes to drainage regimes and surface water runoff (C, O, D): Slight – Not Significant Access track construction, construction of the turbine foundations and other new, hard surfaces have the potential to result in a small increase in surface water run-off in the catchments associated with the Proposed Gathabawn Windfarm.

Risk of an increase in downstream flooding is considered to be low due to the small increase in run-off from surfaced and hard stand areas for the Proposed Development Site relative to overall catchment areas. Potential to increase flooding in the local streams is considered temporary, short-term, unlikely, slight – not significant, negative.

Habitat degradation on aquatic habitats and species due to reductions in water quality during construction (C): Not Significant. The impact on Water Quality or Quantity, as evaluated in Chapter 8 Water are presented: no likely significant effects are expected due to the spread-out nature of the eight turbines and two borrow pits within the site and no significant groundwater flow interactions are expected. No changes to the drainage regimes within the site as a result of construction works because the surface water drainage system includes measures (clean water cross drains, check dams, settlement ponds, buffered outfalls and natural vegetation filters) ensures there will be no change to the existing drainage regimes.

In relation to contamination by hydrocarbons or cementitious material, only relatively small volumes of fuels/oils will be on-site at any one time and kept within a bunded containment area at the temporary construction compound, therefore any impacts that do arise (worst case) will be very localised to the source/works activity area, limited to small, isolated, low volume spills of oils/fuels. Most concrete pouring will be used for turbine base construction with concrete material poured at the turbine base area which will be contained by an underlying binding layer and temporary shuttering while the foundations for the substation and the Met Mast base will similarly be contained within a foundation.

Overall, habitat degradation is considered unlikely to occur due to no instream works in natural watercourses, the absence of suitable aquatic habitat within the Windfarm and absence of direct hydrological connectivity to available aquatic habitat in the surrounding area, and the natural vegetation buffers between the works and the nearest watercourses, therefore, it is considered that any habitat degradation impacts to downstream watercourses due to sedimentation, contamination or changes in drainage or flow regimes will be of Negligible magnitude equating to effects to aquatic habitats that are Not Significant.

Habitat degradation on aquatic habitats and species due to reductions in water quality during operation and decommissioning (O, D): Not Significant. During the operational and decommissioning phases, the potential for silt-laden runoff is much reduced compared to the construction phase. Furthermore, no instream works will take place, no felling will be required, and the number of vehicles on-site will be very small.

Some minor maintenance works will be required periodically during operation, such as maintenance of the internal roads and hardstand areas. These works would be of a very minor scale, brief duration and would be very infrequent. Potential sources of sediment laden water would only arise from surface water runoff from small areas where new material is added during maintenance works. It is considered that given no watercourses exist within the Windfarm site boundary, any levels of suspended sediment in surface water runoff would not reach any waterbody and will be neutral during the operational phase.

Also, during decommissioning, the reinstatement of the turbine hardstands and foundation areas will involve using soil stored in the permanent overburden storage berms alongside the hardstands. The new and widened site roads would be left in place for agricultural use.

In relation to contamination by hydrocarbons, due to the very small number of vehicles associated with operational and decommissioning phase works, there is a very low risk associated with release of hydrocarbons from site vehicles, and it is not envisaged that any refuelling works will be undertaken on site during the operational phase. Therefore, the potential for contamination effects is Not Significant.

Overall, the magnitude of potential decreases in habitat quality as a result of reductions in water quality during the operational and decommissioning phases is evaluated as Negligible and Not Significant.

Disturbance/displacement/mortality of species of conservation importance (C): Not Significant. Considered unlikely to occur due to no instream works in natural watercourses and that the Windfarm has no direct hydrological connectivity to available aquatic habitat in the surrounding area. The aquatic habitats that supported fish and other aquatic species in the vicinity of the Windfarm have limited connectivity to the Windfarm site. Overall, the magnitude will be Negligible equating to effects to aquatic species that are Not Significant.

EIAR 13.4.10.3 Candidate Gathabawn Grid Connection impact evaluation - Aquatic Habitats & Species

Hydromorphological impacts due to instream works or works adjacent to wet drainage channels and watercourses on non-QI and SCI receptors (C): Moderate effect, Not Significant. Instream works are planned across 4 of the 5 watercourse crossings of the Candidate Gathabawn Grid Connection. No instream works are planned for the HDD crossing of the River Nore. However, frac-out may result in the release of drilling fluid and sediment. The impact to the River Nore is addressed in section 13.5.2.

Crossings of the Gorteennamuck, Lismaine, Lisdowney and Ballyconra streams will be crossed in a worst-case scenario of using 'dam and over pump' method to install the underground cabling. No watercourse crossing works will exceed 10 days at any specific crossing. As such, this will impact immediate water flow regimes but only to a low magnitude. Any downstream impacts on water levels will not exceed negligible levels. Therefore, any hydromorphological impacts are short-term and pose low-magnitude changes to overall watercourse flow regimes.

Both W1 and W2 along the Ballylehaun – Ballyring UGC will be crossed via HDD or via the existing bridge structures. As such, no change to hydromorphological regimes is anticipated at these crossings. As such, no significant effect is anticipated.

Hydromorphological impacts to downstream waterbodies due to changes to drainage regimes and surface water runoff (C, O, D): Not Significant. At the Whole Gathabawn Windfarm site, excavated soil across watercourses will be used for backfilling of the Underground Cabling. Any run-off or change to drainage regimes will be short-term and of negligible magnitude to the overall flow regimes for the impacted rivers.

According to Chapter 8: Water , the risk of an increase in downstream flooding is considered to be low, given the permanent hardstanding footprint of 6.6ha relative to the overall catchment areas, and the design of the

site drainage network to manage and attenuate surface water run-off. It is considered that any impacts due to an increase in surface water run-off would be temporary, short-term, unlikely, slight – not significant, negative.

Given the location of the Whole Gathabawn Windfarm crossing involving instream works of minor watercourse, changes to drainage regimes into the individual sub-basins will be Not Significant.

Habitat degradation on non-QI aquatic habitats and species due to reductions in water quality during construction (C): Not Significant. The impact on Water Quality or Quantity, as evaluated in Chapter 8 Water are presented: no likely significant effects are expected due to the short-term nature of the 5 watercourses along the Candidate Gathabawn Grid Connection and no significant groundwater flow interactions are expected. No changes to the drainage regimes within the site as a result of construction works because the surface water drainage system includes measures (clean water cross drains, check dams, settlement ponds, buffered outfalls and natural vegetation filters) ensures there will be no change to the existing drainage regimes.

In relation to contamination by hydrocarbons or cementitious material, only relatively small volumes of fuels/oils will be on-site at any one time and kept within a bunded containment area at the temporary construction compound; therefore, any impacts that do arise (worst case) will be very localised to the source/works activity area, limited to small, isolated, low volume spills of oils/fuels. Most concrete pouring will be used for turbine base construction, with concrete material poured at the turbine base area which will be contained by an underlying binding layer and temporary shuttering, while the foundations for the substation and the Met Mast base will similarly be contained within a foundation.

Overall, habitat degradation is considered unlikely to occur due to the limited and short-term instream works in natural watercourses; therefore, it is considered that any habitat degradation impacts to downstream watercourses due to sedimentation, contamination or changes in drainage or flow regimes will be of moderate magnitude, equating to effects to aquatic habitats that are Not Significant.

Habitat degradation on non-QI aquatic habitats and species due to reductions in water quality during operation and decommissioning (O, D): Not Significant. During the operational and decommissioning phases, the potential for silt-laden runoff is much reduced compared to the construction phase. Furthermore, no instream works will take place, no felling will be required, and the number of vehicles on-site will be very small.

Some minor maintenance works will be required periodically during operation, such as maintenance of the underground cables via joint bays and substation maintenance. These works would be of a very minor scale, brief duration and would be very infrequent. Potential sources of sediment-laden water would only arise from surface water runoff from small areas where new material is added during maintenance works. Any levels of suspended sediment in surface water runoff would not reach any waterbody and will be neutral during the operational phase.

Also, during decommissioning, no substantive works of excavation will take place along the Ballyring – Moatpark UGC.

In relation to contamination by hydrocarbons, due to the very small number of vehicles associated with operational and decommissioning phase works, there is a very low risk associated with release of hydrocarbons from site vehicles, and it is not envisaged that any refuelling works will be undertaken on site during the operational phase. Therefore, the potential for contamination effects is Not Significant.

Overall, the magnitude of potential decreases in habitat quality as a result of reductions in water quality during the operational and decommissioning phases is evaluated as Negligible and Not Significant.

EIAR 13.4.10.4 Environmental Protection Measures for the protection of Aquatic Habitats & Species

In addition to the mitigation measures identified in Section EIAR 13.4.10.1 above, additional best practice measures which form part of standard windfarm construction/operation will be implemented during the construction/operation/decommissioning of the Gathabawn Windfarm Project to protect Aquatic Habitats and Species and avoid/reduce these not significant effects. These best practice measures are identified in Section EIAR 13.4.12 and are included in the Construction Environmental Management Plan for the Gathabawn Windfarm project which accompanies the subject planning application. Operational and decommissioning measures will be included in the Environmental Management Plans for those phases of the project.

EIAR 13.4.10.5 Evaluation of the Whole Project Impact to Aquatic Habitats & Species

When the residual impacts of the Proposed Gathabawn Windfarm and the Candidate Gathbawn Grid Connection to Aquatic Habitats and Species are considered cumulatively, it is considered that the whole project impact will be Not Significant.

EIAR 13.4.11 Evaluation of effects to Designated Sites

A summary of the findings of the evaluation of the effects of the proposed Gathabawn Windfarm on Designated Sites are listed in the table below. The relevant phases of the development are the construction, operational and decommissioning phases which are denoted by C, O and D respectively.

The evaluations follow this summary table.

The following effects are evaluated in detail to determine whether or not they are likely to be Significant.

Table 13-37: List of effects to Designated Sites evaluated in detail

DESIGNATED SITES – CULLAHILL MOUNTAIN SAC	
Dust soiling	*13.4.11.1*
Introduction or spread of invasive species (C, O, D)	*13.4.4.1*
DESIGNATED SITES - River Nore designations:	
Introduction or spread of invasive species (terrestrial, riparian, aquatic) (C, O, D)	*13.4.10.1*
Reduction in Water Quality	*13.4.11.2*

All of the remaining effects of the proposed Gathabawn Windfarm have no likelihood of causing significant adverse effects to Designated Site receptors. A short evaluation of these effects is provided in Section 13.4.11.1 and 13.4.11.2, with a list of these impacts provided in the table below. The relevant phases of the development are the construction, operational and decommissioning phases which are denoted by C, O and D respectively.

Table 13-38: List of effects to Designated Sites which will not be significant

Effects which will not be significant	**Phase**	**Impact Significance**
Effects to Cullahill Mountain SAC, Cullahill Mountain pNHA and Gales Hill Nature Reserve	**see Section 13.4.11.1**	
Direct habitat degradation due to Land Cover change, vegetation removal	C,O,D	Not Significant
Indirect habitat degradation – compaction, contamination, landslip	C	No Likely Impact
Indirect habitat degradation – change in flow regimes	C, O, D	No Impact
Indirect Habitat Degradation - changes in flow/water quantities	C, O, D	No Impact
Effects to River Nore SPA, River Barrow & River Nore SAC, River Nore & Abbeyleix Woods Complex pNHA	**see Section 13.4.11.2**	
Reduction in Water Quality	O,D	Imperceptible
Land cover change	C,O,D	Not Significant
WFD Status	O,D	Imperceptible
Change in flow / water quantities	O,D	Slight – Not Significant
Mortality, disturbance or displacement of Kingfisher	C,O,D	No Likely Impact Not Significant.
Mortality, disturbance or displacement of Otter	C,O,D	No Likely Impact Not Significant
Mortality, disturbance or displacement of Fisheries	C,O,D	No Likely Impact Not Significant
Mortality, disturbance or displacement of other than Otter or Kingfisher	C,O,D	Not Significant

EIAR 13.4.11.1 Evaluation of Effects to Cullahill Mountain SAC

EIAR 13.4.11.1.1 Designated Sites: Cullahill Mountain SAC - Indirect impacts to Annex I habitats and typical species due to Dust Soiling

Sensitive Aspect:	Designated Sites – Cullahill Mountain SAC, Cullahill Mountain pNHA, Gales Nature Reserve
Importance:	**Very High – Designated Sites**
Impact Source(s)	Excavation and relocation of soils, groundworks, overburden storage, presence/use of machinery, oils and fuels, concrete pours
Impact Pathway(s)	Aerial deposition, surface water runoff, soil, groundwater flow paths
Project Stage	Construction Phase

Overview of Impact (general):

Air quality effects and air pollution during construction has the potential to affect sensitive habitats, leading to long-term habitat degradation. Excess nitrogen from ammonia and nitrogen oxides arising from vehicle emissions may lead to nutrient enrichment, altering plant communities in nitrogen-sensitive habitats. Pollutants such as sulphur dioxide and nitrogen oxides may also contribute to acid deposition, which can degrade soil and water quality, impacting species adapted to low-nutrient conditions. Persistent exposure to air pollutants can weaken habitat resilience, making these habitats more vulnerable to other environmental stressors. Dust accumulation on plant surfaces from construction activities can reduce photosynthesis, impair respiration, and hinder growth, particularly in sensitive habitats and can enter water bodies, affecting aquatic habitats. Persistent dust pollution can lead to gradual habitat degradation and increase vulnerability to wider pressures.

Examination of the Impact of the Proposed Gathabawn Windfarm:

The QI for Cullahill Mountains SAC comprises a semi-natural, herb-rich grassland and scrub on limestone. Such habitats are dependent upon nutrient-poor conditions and are therefore susceptible to air pollution and are dependent on ongoing management to preserve their floristic diversity. Prolonged nutrient enrichment can result in the dominance of more aggressive plant species and the loss of those more sensitive species indicative of the QI habitats. Despite the close proximity of elements of the Ballylehaun array to Cullahill SAC, due to the short-term nature of construction activities it is not anticipated that nutrient enrichment from vehicular emissions would be significant.

Likewise the proximity of elements of the Ballylehaun array, primarily the access roads from the Construction Compound to T2 and T3 locations, as well the Windfarm Cabling route and establishment of the Ballylehaun Control Building along the southern perimeter of the SAC has the potential to generate dust which could affect the vegetation communities within the SAC. The extent of worst-case dust contamination, the impact would be negative, temporary to short term and of **moderate significance**.

Examination of the Impact of the Candidate Gathabawn Grid Connection:

Works along the Candidate Gathabawn Grid Connection are only relevant to the Cullahill Mountain SAC, and pNHA, and only relate to the Ballylehaun – Ballyring UGC route as it leaves the construction compound East of T3 at Ballylehaun. Works are limited to trenching within the existing rural road. This route is downslope of the Cullahill SAC and pNHA boundary. Hedgerows composed of scrub and healthy, mature trees are present across this boundary. As such, there is appropriate barriers to prevent any release of dust to impact the grassland habitats within the SAC. The nearest mapped area of the QI habitat within the SAC is 30m est. from the Ballylehaun – Ballyring UGC works. Therefore, in consideration of the duration of these works, the intervening habitats between the works and the QI habitats reducing any dust from impact it and the downslope position of the road where works are taking place, no significant effects are anticipated on these designated sites.

Impact Magnitude	Low	**Impact Significance: *(pre-mitigation)***	**Moderate**

Mitigation and Monitoring Measures: Even though Significant impacts are not predicted; the following mitigation and monitoring measures will be implemented as best practice environmental management.

WM24 GM23	Monitoring – Dust: During working hours, the construction contractor will monitor dust control methods and weather forecasts for dry and windy conditions and will carry out weekly on-site and off-site inspections to monitor dust caused by the construction works. Public roads will be regularly inspected for cleanliness and regular dust soiling checks of surfaces along public roads and within 100m of site access points will also be carried out. The frequency of monitoring will be increased when construction activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.
WM27	Ecological Monitoring of initial groundworks and road construction works within 50m of the boundary of the Cullahill Mountain SAC. This monitoring will be conducted by the Ecological Clerk of Works, who will have a have a 'stop-works' authority to temporarily stop construction works and the Contractor will implement the necessary actions and measures to the satisfaction of the Ecological Clerk of Works, before construction works can once again commence.
WM54	Traffic speed limits of 50km/h along the Local Roads L1807, L1806, L1804 and L5818; 30km/hr along the local roads L58141, and L18062 and 15km/hr along windfarm site roads.
WM55	A barrier fence to control the extent of construction works will be erected 5m from the boundary of the Cullahill Mountain SAC where works are within 75m of the SAC boundary. The placement of this barrier will be carried out before construction works commence in the area and under the supervision of the Ecological Clerk of Works. No works will take place beyond this barrier.
WM57	Dry Stone Walls: following the completion of construction works, historic dry-stone walls within the Ballylehaun Area of the Gathbawn Windfarm will undergo restorations by an experienced dry stone wall builder. The methodology will be provided to and agreed with the Conservation Officer of Kilkenny County Council before restoration works commence. Sections of walls affected by the construction works will undergo restorations where possible, any sections of wall at the Ballylehaun Area which show existing damage or collapse will be included in the restoration programme.
WM58	Veteran Hawthorns: Whilst the LiDAR has successfully been used as a method to record the remnant historical field boundaries within the Ballylehaun Area of the wind farm development, to preserve the historic landscape and prevent further impacts following the construction of the wind farm, the developers of the Project have agreed with the owners of the lands in the vicinity of Turbine T4 in Ballylehaun that the landowner will not remove the remnant field boundaries or fell the veteran hawthorn trees on the upland section of their farm unless considered necessary for the continued use of the land for agricultural purposes
WM59	Parking Exclusion Zone: Overnight parking of plant and machinery will only be permitted at locations which are greater than 50m from the Cullahill Mountain SAC.
WM60	Road Paving: In order to reduce the potential for dust emissions, the uphill section of the windfarm site road between T2 and T3 will be paved with tarmacadam. A dry wheel wash will be installed on level ground before and after this road to reduce dirt on the wheels of vehicles travelled near to the boundary of the Cullahill Mountain SAC.
WM18 GM18	Fit for Purpose: All plant and machinery which will be used during construction will be fit for purpose and in good working order prior to mobilisation to works areas. The plant and machinery will be regularly inspected by the Contractor for leaks and maintained in good working order for the duration of the works.
WM19 GM19	Fuel, oil and chemical stores including tanks and drums will be regularly inspected for leaks and signs of damage.
WM43	Drainage network: Windfarm site roads and hardstanding areas are designed to have a permanent surface water drainage network in place. Temporary works areas, such as turning heads, borrow pits and compounds will have a temporary surface water drainage network in place during works. The drainage infrastructure will not be installed during heavy or prolonged rainfall events or when the soil is waterlogged. The site drainage network will ensure that all surface water runoff from upgraded roads and new road surfaces (including hardstand areas) will be captured and treated prior to discharge/release. Transverse drains ('grips') will be constructed, where appropriate, in the surface layer of access tracks to divert any runoff into swales/track side drains; The site drainage network will include check dams and settlement ponds which will settle suspended solids in water runoff while also slowing down the rate of water run-off from these areas. Water will be released to surrounding

	vegetation at regular intervals via buffered outfall weirs, which also form part of the drainage network.
WM42 GM35	Weather forecasts will be consulted in advance of works. If there is heavy prolonged rainfall or if an exceptional rainfall event occurs, then construction works will cease until peak flows have subsided.
WM47	Concrete control procedures will be implemented and will include the following: - No concrete batching will take place on site, all concrete will be ready-mixed and delivered just-in-time. - The pouring of concrete will be scheduled for dry days. If a sudden rainfall event should occur, then suitable covers will be ready and available at the pour site to cover the concrete. - The pour site will be kept free of standing water. - All operators involved in pouring concrete will be trained and experienced in working with concrete. - Run-off from wind turbine foundation concrete pours will not be permitted to flow over adjacent lands or enter drainage channels. The run-off will be contained within the foundation area and pumped into a skip to settle out; settled solids will be appropriately disposed of off-site. - The Contractor will not permit the discharge of cement contaminated waters to the construction phase drainage system, onto adjacent lands or directly to any artificial drain or watercourse. Concrete trucks will be washed out at the supplier's facilities and not on site. The only concrete washing that will occur on site is the hand washing of the chutes at the rear of the trucks. Washing of chutes will only take place at the designated area and into a Roadside Concrete Washout unit.
Effectiveness of Mitigation: The above mitigation measures are proven and effective best practice measures which will avoid and minimise the risk of sediment or contaminant release by: timing of construction activities around Cullahill Mountan SAC to be undertaken Autumn/Winter; reducing the potential for dust/sediment/contaminant release (limestone and tarmac capping, weather related restrictions, management of overburden, concrete controls, refuelling controls, removal of brash) use of dust fences and dust suppression water bowsers, capturing and treating any sediment/fuel spills that are released (silt fencing, Siltbuster, drainage system, wheel washes) Thereby breaking the pathway between the potential sources and the receptor. Following the implementation of mitigation measures, minimal dust contamination to Cullahill Mountain SAC sensitive habitats will occur, therefore any potential negative impacts on adjacent terrestrial habitats, will be negligible	
Residual Impact Significance *(post-mitigation)*:	**Neutral**

EIAR 13.4.11.1.2 Gathabawn Windfarm Impacts to Cullahill Mountain SAC which will not be Significant

All of the remaining effects of the Proposed Gathbawn Windfarm on the Cullahill Mountain SAC will be Not Significant. A short evaluation of these effects is provided below:

Habitat Degradation Effects to Annex I habitats within Designated Sites (Cullahill Mountain SAC and pNHA, (and Gales Hill Nature Reserve) and suitable habitats for Annex I and II species within or ex-situ Designated Sites due to land cover change, vegetation removal or excavation works (C,O,D): Not Significant**.**

There are no records of Annex I habitat at the Gathabawn Windfarm site, and none of the habitat at the windfarm site have the potential to support QI or SCI species. The magnitude of impacts will therefore be Negligible equating to Not Significant effects on Annex I habitats and Annex I and II within or ex-situ of Designated Sites.

Indirect habitat degradation – compaction (C): No Likely Impact: the windfarm works and Candidate Gathabawn Grid Connection works are separated from the boundary of the SAC by at least 5m. Therefore, no compaction is expected to occur to nearby Annex I habitats.

Indirect habitat degradation due to landslip (C): No Likely Impact. The potential for landslip or geotechnical instability was evaluated by Fehily Timoney consulting engineers, who concluded that landslip or instability at the Ballylehaun Area was not likely to occur due to the competent strong limestones occurring at the Ballylehaun Area. Their evaluation included the windfarm access road between T2 and T3.

Indirect Habitat Degradation Effects to Annex I habitats and suitable habitats for Annex II species of Cullahill Mountain SAC, Cullahill Mountain pNHA and the Gales Hill Nature Reserve due to reductions in water quality: (C, O, D) **No Impact**. The Cullahill Mountain SAC comprises semi-natural dry grasslands and scrubland facies on calcareous substrates and is an important orchid site. The pNHA and Nature Reserve overlap the SAC boundary, with the Nature Reserve also including an area of hazel wood and some agricultural grassland. While these sites are immediately adjacent to windfarm and grid connection works water runoff from the Ballylehaun Area will be captured in the site drainage system which will prevent dirty wate runoff into the designated sites. Furthermore these sites are generally upslope of the windfarm works and separated by stone walls and banks. As such, there are appropriate barriers to prevent any release of sediment laden runoff to impact the grassland habitats within the SAC. No surface water quality effects are anticipated on these designated sites.

Indirect Habitat Degradation Effects to Annex I habitats and suitable habitats for Annex II species of Cullahill Mountain SAC, Cullahill Mountain pNHA and the Gales Hill Nature Reserve due to changes in flow/water quantities or drainage regimes: (C, O, D) **No Impact**. The windfarm works will not cause a drawdown of the water table because the site is underlain by competent strong limestones and any drawdown in groundwater would be very localised. In addition the drainage system is designed to release water regularly, thereby preventing any changes to local drainage regimes.

Overall, impact to water regimes on the Cullahill Mountains SAC are considered as imperceptible.

EIAR 13.4.11.2 Evaluation of Effects to River Nore SPA, River Barrow & River Nore SAC

EIAR 13.4.11.2.1 Designated Sites: Indirect impacts to Annex I habitats and to Annex I and Annex II ex-situ mobile species as a result of reductions in water quality

Sensitive Aspect: Importance:	Designated Sites – River Nore SPA, River Barrow & River Nore SAC and River Nore and Abbeyleix Wood Complex pNHA **Very High – Designated Sites**
Impact Source(s)	Excavation and relocation of soils, groundworks, overburden storage, presence/use of machinery, oils and fuels, concrete pours
Impact Pathway(s)	Aerial deposition, surface water runoff, soil, groundwater flow paths
Project Stage	Construction Phase

Overview of Impact (general):

Watercourses are highly sensitive to changes in water quality, containing sensitive aquatic ecological receptors including salmonids, lamprey species and a diverse macroinvertebrate community. Reduction in water quality could potentially result from pollutants entering watercourses in water runoff from construction works areas.

The sources of effects to water quality from the development are: suspended solids (sediment-laden runoff) from excavations and soil movement and storage at the construction works areas; concrete spills or concrete washout waste water; spills or leaks of oils or fuels from site plant, machinery and vehicles or during refuelling; and the potential for nutrient runoff from brash in felling areas.

The Whole Gathabawn Windfarm Project site is proposed for a location upstream of the River Nore SPA and River Barrow and River Nore SAC and is spread over a number of river body catchments.

Examination of the Impact of the **Proposed Gathabawn Windfarm**:

In relation to the Special Conservation Interest species, lamprey species, Atlantic Salmon and secondary evidence of Otter were recorded during 2025 aquatic surveys in downstream watercourses. Twaite Shad - while it wasn't recorded during aquatic surveys - could also occur downstream of the development. The known populations of Freshwater Pearl Mussel and Desmoulin's Whorl Snail in the River Barrow and River Nore SAC are located upstream of the development. In relation to White-clawed Crayfish, the Gathabawn Windfarm is hydrologically connected to the mapped locations of the QI species, c.13km downstream.

Due to separation distances of the main wind farm works from local streams and rivers, and in the absence of instream works at the windfarm site, limited to facilitating works close (5m) to the Ballyring Upper stream, it is considered that the magnitude of any contamination impacts would be low – negligible to watercourses hosting QIs. Therefore, given the hydrological separation distance, the extent of a worst-case scenario pollution or sediment release event, the impact would be negative, temporary to short term and of **moderate significance**.

Examination of the Impact of the **Candidate Gathabawn Grid Connection**

The Candidate Gathabawn Grid Connection site crosses four sub-basins of the Nore (Nore_120, Nore_130, Nore_140, Nore_150). The watercourses crossings of the Candidate Gathabawn Grid Connection cross watercourses with downstream connectivity to the River Barrow and River Nore SAC. The nearest confluence with the River Nore is 2.4 km downstream of the W4 crossing. W3 and W4 have some suitability for Kingfisher and have records of Otter upstream of the W3 crossing. As such, impacts to stream flow and water quality due to watercourse crossing works pose potential to impact ex-situ QI species and in-situ water quality. These crossings will pose likely sources for these impacts for less than 10 days in a worst-case scenario.

In relation to the Special Conservation Interest bird species (Kingfisher) of the River Nore SPA, and the Qualifying Interests of the River Barrow and River Nore SAC (Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation, Petrifying springs with tufa formation (*Cratoneurion*), Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*), Freshwater Pearl Mussel, White-clawed Crayfish, Sea Lamprey, Brook Lamprey, River

Lamprey, Twaite Shad, Atlantic Salmon and Otter), the AA Report 2026 concluded that due to the scale of drilling excavations and storage/movement of overburden at the Candidate Gathabawn Grid Connection, the use of machinery run on hydrocarbons, and the use of concrete for foundation construction, that there is potential for construction works to release sediment or contaminants to downslope watercourses, and in the absence of mitigation measures these effects could be significant.

Any such pollution event would pose low to moderate to Very High impacts to watercourses hosting these QIs ex-situ of the SAC. Given the hydrological separation distance and the extent of a worst-case scenario pollution or sediment release event, the impact would be Very High in nature to downstream water quality for QIs and SCIs

In relation to the Qualifying Interests Estuaries [1130], Mudflats and sandflats not covered by seawater at low tide [1140], Reefs [1170], Salicornia and other annuals colonising mud and sand, Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*), Mediterranean salt meadows (*Juncetalia maritimi*) [1410], European dry heaths [4030], Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels, Old sessile oak woods with Ilex and Blechnum in the British Isles, Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*) [91E0], Desmoulin's Whorl Snail, these QI habitats and species are not vulnerable to changes in water quality based on mapped distribution and separation distance from the nearest possible habitat area, and therefore the potential for significant impacts to the these habitat and species via reductions in water quality can be excluded. (see Section 13.5.3.11).

Impact Magnitude	Low (wind farm) Low to potentially High (grid connection)	**Impact Significance:** ***(pre-mitigation)***	**Moderate (windfarm)** **Potentially Significant (grid connection)**

Mitigation and Monitoring Measures: Even though Significant impacts are not predicted; the following mitigation and monitoring measures will be implemented as best practice environmental management.	
WM33 GM30	Excavation of Materials: The excavation of earth materials during the construction stage will be kept to a minimum. The excavation of materials will be completed in accordance with best practices for the management and treatment of such materials. (i.e. British Standards BS6031:2009 Code of Practice for Earthworks, and MAFF (2000) Good Practice for Handling Soils).
WM35	Protection of Soils in Berms; All storage berms will be graded and sealed following emplacement. Topsoil and subsoil will be stockpiled separately. Where possible, the upper vegetative layer (where still present) of excavated soil will be stored with the vegetation part of the sod facing the right way up to encourage growth of plants and vegetation at the surface of the stored spoil within the storage areas. Re-seeding will also be carried out in these areas. Measures such as interceptor ditches around the bases of these areas, and silt curtains will also be incorporated where required to prevent runoff of suspended solids, dust and soil erosion.
GM32	Protection of Soils in Berms; All storage berms will be graded and sealed following emplacement. Topsoil and subsoil will be stockpiled separately. Re-seeding of permanent berms will be carried out as soon as practical in these areas. Construction works areas along cable routes in agricultural lands will be reseeded as son as practical after reinstatement. Measures such as silt curtains around the bases of these areas and sediment traps will also be incorporated to prevent runoff of suspended solids, dust and soil erosion, if required.
GM45	Fuel/Oil control procedures will be implemented and will include the following: On site re-fuelling 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 refuelled off-site, and will be towed around the site by a 4x4 jeep to where machinery is located. The 4x4 jeep will carry fuel absorbent material and pads in the event of any accidental spillage. Mobile measures such as drip trays and fuel absorbent mats will be used during all refuelling operations. In addition, spill response apparatus including spill-kits and fuel absorbent mats will be stored in the cabin of each vehicle and operators will be fully trained in the use of this equipment and in the

	implementation of the Emergency Response Plan, as contained in the Environmental Management Plan. The fuel bowser will be parked on a level area, away from main traffic activity, in a designated part of the construction compound when not in use. Taps, nozzles or valves associated with mobile fuel bowser will be fitted with a lock system. Only designated trained and competent operatives will be authorised to refuel plant on site. A Permit to Fuel system will be put in place.
GM44	Concrete control procedures will be implemented and will include the following: - All concrete will be ready-mixed and delivered to site just-in-time; - Dry granular cement will be used in UGC cable trenches; - The pouring of concrete will be scheduled for dry days. If a sudden rainfall event should occur, then plastic covers will be ready and available at the pour site to cover the concrete. - The pour site will be kept free of standing water; - Designated trained operator experienced in working with concrete will be employed during concrete pouring; - Concrete trucks will be washed out at the supplier's facilities and not on site. The only concrete washing that will occur on site is the hand washing of the chutes at the rear of the trucks. Washing of chutes will only take place at the designated area and into a Roadside Concrete Washout unit. No discharge of cement contaminated waters to any artificial drain or watercourse will be allowed.
WM45 GM37	Where dewatering of trenches or excavations is required, there will be no direct discharge of treated water into any watercourse or drain or directly onto adjacent habitats. Rather, all pumped water will be discharged via a silt bag or infiltration trench or settlement pond, as appropriate, to surrounding vegetation.
WM43	Drainage network: Windfarm site roads and hardstanding areas are designed to have a permanent surface water drainage network in place. Temporary works areas, such as turning heads, borrow pits and compounds will have a temporary surface water drainage network in place during works. The drainage infrastructure will not be installed during heavy or prolonged rainfall events or when the soil is waterlogged. The site drainage network will ensure that all surface water runoff from upgraded roads and new road surfaces (including hardstand areas) will be captured and treated prior to discharge/release. Transverse drains ('grips') will be constructed, where appropriate, in the surface layer of access tracks to divert any runoff into swales/track side drains; The site drainage network will include check dams and settlement ponds which will settle suspended solids in water runoff while also slowing down the rate of water run-off from these areas. Water will be released to surrounding vegetation at regular intervals via buffered outfall weirs, which also form part of the drainage network.
WM42 GM35	Weather forecasts will be consulted in advance of works. If there is heavy prolonged rainfall or if an exceptional rainfall event occurs, then construction works will cease until peak flows have subsided.
WM41 GM34	Protection of watercourses and existing drains: Additional mitigation measures will be deployed within 50m of watercourses or wet drainage features, including the placement of silt trapping arrangements along preferential surface water flowpaths, and temporary drain blocking in existing drains. Works will not take place within this 50m zone during prolonged heavy or exceptional rainfall events.
GM108	The Parksgrove-Moatpark UGC works will not be carried out during the period 1st April to 31st July inclusive
GM109	The Promoter of the of the Gathabawn Windfarm Project will liaise with other renewable energy developers where there is potential for the timing of groundworks associated with grid connection works to overlap within a sub-catchment. The Promoter will liaise with the other developer(s) with the aim of jointly agreeing the timing of works to provide a buffer of time between works. The Project Ecologist will consult with NPWS and advise on the timing of the works to avoid or reduce cumulative impacts to habitats and species in downstream waterbodies and in the Parksgrove/Moatpark area.
Effectiveness of Mitigation:	

The above mitigation measures are proven and effective best practice measures which will avoid and minimise the risk of sediment or contaminant release by:

- reducing the potential for sediment/contaminant release (limestone capping, weather related restrictions, management of overburden, concrete controls, refuelling controls, timing of works when rivers are the shallowest); and
- capturing and treating any sediment/fuel spills that are released (silt fencing, Silt buster, drainage system, wheel washes)

Following the implementation of mitigation measures, minimal sediment or contaminants will enter downslope watercourses, therefore, any potential negative impacts on downstream waterbodies, aquatic habitats or species will be negligible.

Residual Impact Significance *(post-mitigation)*:	**Neutral**

EIAR 13.4.11.2.2 Designated Sites: Introduction or spread of invasive species (terrestrial, riparian, aquatic)

Sensitive Aspect:	Terrestrial Habitats, Terrestrial Mammals, Aquatic Habitats & Species, Designated Sites
Importance:	**International – Designated Sites, Local (Higher Value) – Non-QI Habitats and Species**
Impact Source(s)	Excavation and relocation of soils, movement of machinery, drilling entry/exit pits, underground drilling.
Impact Pathway(s)	Soils
Project Stage	Construction, Operation & Decommissioning Phases

Overview of Impact (general):

Invasive Alien Plant Species (IAPS) include non-native, terrestrial invasive species such as Japanese Knotweed or Cherry Laurel, invasive riparian vegetation (such as Himalayan Balsam), and invasive aquatic species which include non-native invasive species such as fish and mobile invertebrate fauna (such as Asian Clam, Signal Crayfish, or non-native shrimp species).

IAPS could be introduced to a site through the movement of plant/machinery and delivery vehicles, and natural materials such as soil, fencing posts, hedging and trees onto the development site. IAPS infestations could be spread through the disturbance of vegetation, groundworks and the movement of soils and machinery.

Aquatic and riparian invasive species have the potential for significant ecosystem disturbance, disrupting the predator/prey balance or causing habitat disruption within aquatic systems. The spread of invasive species is not restricted in extent to the footprint of construction/instream works but can be transported both upstream (mobile species and 3rd party transport) and downstream (hydrological transport) within a watercourse, potentially extending throughout the catchment.

The introduction or spread of invasive species across the Whole Gathabawn Windfarm Project could result in impacts of High magnitude on features of Very High sensitivity within the site, resulting in impacts of significance, given the pathways to Natura 2000 sites, resulting in impacts of significance on in-situ QI habitats and species of the River Barrow and River Nore SAC and SCIs of the River Nore SPA.

Examination of the Impact of the Proposed Gathabawn Windfarm:

No invasive species were observed or recorded within 50m of the windfarm works with the exception of the two areas of Japanese Knotweed located at Ballyring (**EIAR 13.3.1.5.2**). These locations were recorded in 2022 and as of 22/09/2026, have not expanded or increased in area. While there is an absence of watercourses within the wind farm development boundary, due to the movement of machinery and vehicles onto the site from other locations, the risk of introduction of invasive species cannot be excluded. Additionally, although the presence of vehicles on the windfarm during the Construction and Operational Phase and during Decommissioning Works will be negligible, and groundworks/movement of soils will be at discrete locations at the windfarm site, with no requirement for works in the vicinity of watercourses or any instream works, the risk of movement/introduction of invasive species cannot be excluded.

The risk for the introduction/spread of IAPS is greatest during the construction phase due to the extent of the construction works areas and the volumes of traffic and movement of machinery onsite. The risk of the introduction/spread of IAPS is considered to be lower during the operational and decommissioning phases of the Gathabawn Windfarm due to the reduced extent of works and the much-reduced level of groundworks, and movement of machinery/vehicles onto the site.

There is potential for the dispersal of invasive species which could in turn affect the Qualifying Interests of the River Barrow and River Nore SAC. Without mitigation in place, given the absence of invasive species onsite, but taking into account the risk or introduction of invasive species with site vehicles/machinery entering the site, there is potential for effects both upstream and downstream in a catchment,

Examination of the Impact of the Candidate Gathabawn Grid Connection:

Activities relating to the movement of machinery and groundworks/earthworks have the potential to introduce new infestations of Invasive Alien Plant Species (IAPS) to the site and/or spread existing IAPS infestation. In relation to aquatic/riparian areas, invasive species may be introduced to unaffected catchments via excavated material by site machinery.

There were no records of invasive species gathered during habitat surveys of the Candidate Gathabawn Grid Connection Windfarm site in 2026. No other invasive species were observed or recorded within 50m of the project works with the exception of the two areas of Japanese Knotweed located at Ballyring (**EIAR 13.3.1.5.2**). These locations were recorded in 2022 and as of 22/09/2026, have not expanded or increased in spread.

Works along the Candidate Gathabawn Grid Connection will be isolated to 100m sections of trenching and cabling. Despite to the limitations of excavation along the grid connection, isolated nature of the watercourse crossings at W3, W4 and W5 and the HDD crossings at W1, N77 and under the River Nore, the risk of introduction of invasive species cannot be excluded. Additionally, although the presence of vehicles on the project during the Construction and Operational Phase and during Decommissioning Works will be negligible, and groundworks/movement of soils will be at discrete locations at the windfarm site, with some requirement for works in the vicinity of watercourses or any instream works, the risk of movement/introduction of invasive species cannot be excluded.

In relation to terrestrial habitats, should an infestation be established across the Candidate Gathabawn Grid Connection, the effects could be result in aggressive spreading of the species into locally important habitats and pose dangers to the mammal and bird baselines, with a moderate to high magnitude.

The risk for the introduction/spread of IAPS is greatest during the construction phase due to the extent of the construction works areas in proximity to the River Nore and the volumes of traffic and movement of machinery onsite. The risk of the introduction/spread of IAPS is considered to be lower during the operational and decommissioning phases of the Whole Gathabawn Windfarm 2026 due to the reduced extent of works and the much-reduced level of groundworks, and movement of machinery/vehicles onto the site.

There is potential for the dispersal of invasive species which could in turn affect the Qualifying Interests of the River Barrow and River Nore SAC and the Special Conservation Interests of the River Nore SPA. Without mitigation in place, given the absence of invasive species on site, but taking into account the risk of introduction of invasive species with site vehicles/machinery entering the site, and the potential for effects both upstream and downstream in a catchment, the magnitude of unmitigated impacts could potentially be High in smaller watercourses and Medium/Low in the larger rivers, due to the potential for loss of larger sections of habitat/species within the smaller watercourses.

Impact Magnitude	Potentially Moderate	**Impact Significance: *(pre-mitigation)***	**Potentially Significant**

Mitigation and Monitoring Measures: Even though Significant impacts are not predicted; the following mitigation and monitoring measures will be implemented as best practice environmental management.	
WM03 GM03	Pre-construction surveys for invasive species will be carried out to determine if any new infestations of invasive species have been established in the interim period between the submission of the planning application and the commencement of construction works. These pre-construction confirmatory surveys for invasive species will be carried out at the construction works areas plus 7m, by the Project Ecologist, to accurately determine the extent of new invasive species infestations. Mapping, showing the most up to date distribution and extent of each infestation, will be distributed to the Environmental Clerk of Works and to the Project Engineer.
WM12 GM12	The Environmental Management Team will monitor construction works for compliance with the Environmental Management Plan. The project Environmental Management Team which includes an Environmental Clerk of Works, the Project Ecologist and specialists as required such as archaeologists, invasive species specialists and hydrologists, who are independent of the site contractors. The Environmental Management Team will report to the owner's Project Manager.
WM22 GM21	Any excavation works in close proximity (7m) to an invasive species infestation location will be carried out under the direct supervision of an invasive species specialist ecologist.
WM23 GM22	Invasive Species Control: Visual inspections will be carried out by the Contractor on all machinery and equipment (particularly for machinery and equipment which has come into contact with water or soils) for evidence of attached plant or animal material, or adherent mud or debris. Any attached or adherent material will be removed before entering or leaving the site, securely stored away from traffic for removal to a contaminated waste Community Liaison Officer bin at the temporary constructions.
WM51 GM50	Treatment/management of invasive species infestations: Any infestations of Japanese knotweed or other high-impact invasive species within 7m of works will be covered with high density polyethylene grass carpet terram prior to any works commencing at the location. The covering of

	any new infestations will only be carried out under the direct supervision of a specialist invasive species ecologist, and works within 7m of the infestation will be under the direct supervision of this specialist invasive species ecologist.
WM52	Monitoring of invasive species: Works within 7m of an invasive species infestation will only be carried out under the direct supervision of a specialist invasive species ecologist with prior experience of this type of work.
Effectiveness of Mitigation: The inspection of lands for the presence of invasive species prior to the carrying out of groundworks or vegetation removal (any phase of the Whole Gathabawn Windfarm Project) will avoid accidental spreading of invasive species and will enable the appropriate removal of any infestations which are likely to be affected. The visual inspection and cleaning of all site machinery and equipment prior to its arrival on site will prevent the introduction of invasive species.	
Residual Impact Significance *(post-mitigation)*:	**Neutral**

EIAR 13.4.11.2.3 Designated Sites: Mortality, Disturbance/Displacement impacts to SCIs and QIs in-situ and ex-situ as a result of watercourse crossings.

Sensitive Aspect:	Terrestrial and aquatic Species, Designated Sites
Importance:	**International – Very High – Designated Sites**
Impact Source(s)	Movement of machinery, artificial lighting, human presence, drilling works.
Impact Pathway(s)	Noise, Visual, Underground vibration
Project Stage	Construction, Operation & Decommissioning Phases

Overview of Impact (general):

The Candidate Gathabawn Grid Connection will involve construction equipment and drilling within 100m of the River Nore. As such, there is disturbance and displacement likely to impact individuals of QI and SCI populations along the riverbanks within 100m of the entry and exit pits.

The Parksgrove Substation is located within 50m of the River Barrow and River Nore SAC. There is potential for construction and operational phase disturbance and displacement effects due to increased lighting at this location.

There is suitable habitat to support Otter and Kingfisher in the area.

Vibrations underground via the HDD are unlikely to impact the aquatic species to any significant extent but are considered below to fully address the likelihood.

Heavy machinery and construction vehicles will be passing and operating in proximity to watercourses with confirmed records of Otter and suitable habitat for Kingfisher. Although unlikely, collisions with individuals may occur at watercourse crossings along the Whole Gathabawn Windfarm Project.

Examination of the Impact of the Whole Gathabawn Windfarm Project:

Proposed Gathabawn Windfarm: Potential for impacts only relates to facilitating works in close proximity to the Ballyring Upper and Foyle South streams, with works 5m and 50m from these streams respectively. Habitat at both crossing locations is suitable for Otter, and there are suitable habitats for Kingfisher along these watercourses. However, as there are no in-stream works proposed, mortality or either Otter or Kingfisher at crossing locations is considered very unlikely to occur. Any impact would therefore be negative but given the temporary and short-term nature of the works, any impact would by **Not Significant**.

The proposed watercourse crossing works may give rise to disturbance or displacement impacts on Otter or Kingfisher. However, due to separation distances of the main wind farm works from local streams and rivers, and in the absence of instream works at the windfarm site, limited to facilitating works close (5m) to the Ballyring Upper stream, it is considered that the magnitude of any, disturbance or displacement impacts would be low – negligible to watercourses hosting SCIs or QIs. Therefore, the extent of a worst-case scenario disturbance or displacement event, the impact would be negative, temporary to short term and of **moderate significance**.

Candidate Gathabawn Grid Connection:

Otter and Kingfisher are both present along the River Nore. However, no evidence of otter holt or couching site is recorded within 500m of the HDD crossing works. No evidence of kingfisher nesting within 300m of the HDD works was recorded. However, due to the HDD works taking place within the River Barrow and River Nore SAC and within 50m of the River Nore SPA, future baseline changes may yield changes to this existing baseline. As such, disturbance to nesting or roosting Kingfisher or breeding or resting Otter cannot be ruled out.

Should this occur, impacts pose potentially moderate to very high magnitude impacts on Kingfisher and moderate to High impacts on Otter. This is due to the sensitivity levels and the tolerance of this QI and SCI species to noise-based disturbance.

Crossings along the Ballyring – Parksgrove UGC works will involve in-stream works. As such, there is potential for impacts to ex-situ Otter and potentially ex-situ Kingfisher. These impacts will be short-term to facilitate the underground trenching under the river. As such, any impact poses a moderate impact on these QI and SCI species ex-situ of these designated sites, and in the absence of mitigation measures, these effects could be significant.

Machinery and equipment may result in vehicle collision with Otter or commuting Kingfisher, which are low flyers, due to the works taking place within the River Barrow and River Nore SAC and within 50m of the River

Nore SPA. As such, although unlikely to occur, absent mitigation to limit vehicle speed and time works outside peak activity times for these KERs, moderate to Very High significant effects cannot be ruled out given the importance of these receptors to the ecological baseline.

Artificial lighting during the construction phase poses potential to impact Otter and Kingfisher due to increased lighting during substation hardstand and construction works. These impacts would pose a low to moderate magnitude impact given the regular vehicle traffic passing on the N77. As such, construction-related lighting poses moderate to Significant effects to Otter where lighting is exceeds the existing baseline or is present during twilight hours where these species are most likely to be disturbed by such sources.

Operational Lighting poses a long-term impact to Otter and Kingfisher due to the need for lighting to be bright enough for Health and Safety reasons. All lighting not essential to health and safety will be amber and red to reduce light pollution levels. Even with these designs, specific design measures for lighting are required to ensure no significant disturbance or displacement effects on Otter or Kingfisher occur over the 40 operational phase of the substation.

Impact Magnitude	Potentially Moderate to Very High	**Impact Significance: *(pre-mitigation)***	**Potentially Significant**

Mitigation and Monitoring Measures: Even though Significant impacts are not predicted; the following mitigation and monitoring measures will be implemented as best practice environmental management.

GM04	Pre-construction surveys for Otter holts will be carried out out by an experienced Ecologist to determine if any new Otter holts have been established in the interim period between the submission of the planning application and the commencement of construction works. These pre-construction confirmatory surveys for Otter holts and activity (particularly holts at which breeding females or cubs are present) will be carried out 150m upstream and downstream of watercourse crossing locations.
GM05	Pre-construction surveys for Kingfisher nests will be carried out to determine if any new Kingfisher nests have been established in the interim period between the submission of the planning application and the commencement of construction works. These pre-construction confirmatory surveys will be carried out by a suitably qualified Ornithologist within the construction works area boundary and within 300m upstream and downstream of watercourse crossing locations and will be undertaken between March and April (early visit) and again between May and June (late visit).
WM53 GM51	Should an Otter holt be identified during pre-construction surveys, then all construction works within 150m of the active otter holt, will be carried out during daylight hours and outside of 2 hours after sunrise or before sunset during summer/outside of 1 hours after sunrise or before sunset during winter. If an active holt (particularly holts at which breeding females or cubs are present) is located within 150 meters of the watercourse crossing points, no works will be undertaken while cubs are present in the holt and NPWS will be notified immediately. No wheeled or tracked vehicles (of any kind) will be used within 20m of active but non-breeding otter Holts – except under license, and light work, such as digging by hand or scrub clearance will not take place within 15m of such holts, except under license. The prohibited working area associated with otter holts will, where appropriate, be fenced with temporary fencing prior to any invasive works and declared as 'out of bounds'. Appropriate awareness of the purpose of the enclosure will be conveyed through toolbox talks with site personnel and sufficient signage will be placed on each exclusion fence. All contractors or operators on site will be made fully aware of the procedures pertaining to each affected holt and subject to conformance audits.
GM52	Road traffic speed limits of 50km/h along the Local Roads L1807, L1806, L1804, and L5818; 30km/hr along the local roads L5821, L5820 and L18062; and 15km/hr along windfarm site roads.
WM63 GM54	Security lighting will be used at compounds. All lighting will be cowled in order to prevent light spill, and no lighting will be left turned on overnight. Lighting will be controlled by motion and time sensors to minimise the amount of time the lights are operational.
GM55	Noise and emissions from plant/machinery: Plant and machinery will not be permitted to idle. Machinery used intermittently will be shut down when not in use. Any plant operating within 50m of the River Nore or within 200m of a bat roost (if any) will be fitted with noise dampeners and an acoustic enclosure or portable screen placed between the source of noise and the sensitive receptor.

WM68 GM57	Bird breeding season: Hedgerow removal, tree felling or pruning, and scrub clearance will take place outside of the bird breeding season (1st March to the 31st of August).
WM69 GM58	Ground-nesting birds: Where groundworks in grassland are scheduled to take place during the Meadow Pipit, Curlew, Snipe or Lapwing breeding season, surveys will be carried out by the Site Ecologist of suitable habitat, prior to ground/vegetation clearance works. Where active nests are present and the number of nests represents >1% of the local population, the works within close proximity to an active nest will not be carried out until fledging is completed.
GM59	Should a Kingfisher nest be identified within 300m of watercourse crossing points during pre-construction surveys (*see GM05*), then no construction activities will be permitted within 300m of Kingfisher nest locations during the bird breeding season (March – August inclusive) or until nesting is confirmed as complete following supervision by a suitably qualified Ornithologist.
WM70	Should a Kingfisher nest be identified within the Ballyring Upper Stream within 300m of the road bridge in Coolcashin/Garrydague during pre-construction surveys (*see* SM05), then no construction activities will be permitted within 300m of Kingfisher nest locations during the bird breeding season (March – August inclusive) or until nesting is confirmed as complete following supervision by a suitably qualified Ornithologist.
GM61	Dust Control: Any loads of material which have the potential for dust emissions (such as aggregate) will be covered during transportation.
WM72	Dust control: Dust minimisation measures will be implemented during the construction works as follows: • The site roads will be regularly inspected and swept to remove build up of mud and aggregate materials from their surface, • Any road that has the potential to give rise to fugitive dust will be regularly watered, as appropriate, during dry and windy conditions. • Vehicles delivering material with dust potential will be enclosed or covered with tarpaulin to restrict the escape of dust. Public roads in the vicinity of the site will be regularly inspected for cleanliness, and cleaned as necessary
WM73 GM62	Work hours: Construction operations shall generally be restricted to between 0700-1900hrs Monday to Friday, and 0800-1300hrs on Saturdays. Site activities which are likely to create high levels of noise or vibration will be limited to these hours of operation, with no noisy operations on Sundays or Public Holidays. However, to ensure that optimal use is made of good weather period or at critical periods within the programme, it could be necessary on occasion to work outside of these hours.
WM76 GM64	Noise and emissions from plant/machinery: Plant and machinery will not be permitted to idle. Machinery used intermittently will be shut down when not in use. The best means practicable, including proper maintenance of plant, will be employed to minimise the GHG emissions and noise produced by on-site operations. All vehicles and plant will be fitted with effective exhaust silencers. Noise dampeners will be fitted where required. To protect residential amenity, if any plant/machine is required to operate before 07:00hrs or after 19:00hrs Monday to Friday, or before 08:00hrs or after 13:00hrs on a Saturday, then it will be surrounded by an acoustic enclosure or portable screen.
WM120 GM91	Security lighting will be cowled in order to prevent light spill and no lighting will be left turned on overnight. Lighting will be controlled by motion and time sensors to minimise the amount of time the lights are operational.
WM102 GM93	Environmental Management Plan for the Operational Phase: Following the completion of the construction and commissioning of the Project, the Environmental Management Plan will be updated, and the operation of the Gathabawn Windfarm Project will be carried out in accordance with the updated Plan. A suitably qualified Environmental Manager will be appointed by the Project Promoter, and it will be their responsibility to ensure that the EMP is implemented through liaising with the Asset Manager and by carrying out regular audits on EMP compliance.

	The EMP will be an important contract document for the Asset Management contractor who will be contractually obliged to comply with the EMP and the requirements of the Environmental Manager.
GM105	There will be no refuelling of plant or machinery within 100m of a watercourse, wet drainage channel or private well/spring. Any re-fuelling of machinery on site will be carried out using a mobile double skinned fuel bowser. Spill response apparatus including spill-kits and hydrocarbon absorbent packs will be stored in the cabin of each vehicle and operators will be fully trained in the use of this equipment.
WM133	Fuel Controls: Overnight parking of plant and machinery will only be permitted at the turbine locations. There will be no refuelling of vehicles or plant permitted within 100m of a watercourse or drainage feature or within 100m of the Cullahill Mountain SAC or the Gales Hill Nature Reserve. Any re-fuelling of machinery on site will be carried out using a mobile double skinned fuel bowser which will carry fuel absorbent material and pads in the event of any accidental spillages. In addition, spill response apparatus including spill-kits and hydrocarbon absorbent packs will be stored in the cabin of each vehicle and operators will be fully trained in the use of this equipment.
GM103	Reinstatement Works: Following cable pulling works, the covers will be replaced on the chambers, and ground above the chamber reinstated as appropriate to the location. If in agricultural lands, the area will be reseeded as appropriate and fenced from livestock until revegetation has occurred. Land reinstatement works will not take place during periods of prolonged heavy rain or exceptional rainfall events or when the soil is waterlogged.

Effectiveness of Mitigation:

The pre-construction surveys and timing of works will ensure any impact on Otter or Kingfisher will be avoided by not having works take place with the relevant ZoI to these receptors during the construction phase.

Lighting design to ensure no light spill occurs and that any lighting will only be on where work Is taking place outside day-time hours removes any potential or significant disturbance effects.

Vehicle speed restriction and timing of works will ensure no likelihood for collision with Otter or commuting Kingfisher will occur during construction or operational phases.

Residual Impact Significance *(post-mitigation)*:	**Neutral**

EIAR 13.4.11.2.4 Designated Sites: Reduced availability of prey items due physical loss or degradation of suitable aquatic habitat for Kingfisher and Otter.

Sensitive Aspect:	Designated Sites
Importance:	**Very High – Designated Sites**
Impact Source(s)	Excavation and relocation of soils, groundworks, overburden storage, presence/use of machinery, oils and fuels, underground drilling, accidental release of sediment and drilling fluid.
Impact Pathway(s)	Surface water runoff, soil, groundwater, in-stream release (frac-out)
Project Stage	Construction Phase

Overview of Impact (general):

Watercourses are highly sensitive to changes in water quality, containing sensitive aquatic ecological receptors including salmonids, lamprey species and a diverse macroinvertebrate community. Reduction in water quality could potentially result from pollutants entering watercourses in water runoff from construction works areas.

Although unlikely, the HDD path will extend 100munderground from entry to exit pits. Due to the gravels present river bed of the River Nore and the nature of HDD works, a worst-case scenario frac-out cannot be ruled out. As such, release of drilling fluid and fine sediment directly into the River Nore is an unlikely but potentially Very Significant impact on water quality. Both entry and exit pits are within the boundary of the River Barrow and River Nore SAC and within 50m of the River Nore.

The sources of effects on water quality from the development are: suspended solids (sediment-laden runoff) from excavations and soil movement and storage at the construction works areas; concrete spills or concrete washout wastewater; spills or leaks of oils or fuels from site plant, machinery and vehicles or during refuelling; the potential for nutrient runoff from excavated soil, and the release of drilling fluid and sediment due to frac-out.

Examination of the Impact of the Whole Gathabawn Windfarm Project:

Proposed Gathabawn Windfarm: Potential for impacts only relates to facilitating works in close proximity to the Ballyring Upper and Foyle South streams, with works 5m and 50m from these streams respectively. Habitat at both crossing locations is suitable for Otter, and there are suitable habitats for Kingfisher along these watercourses. However, as there are no in-stream works proposed, habitat degradation impacting prey sepceis fo Kingfisher or Otter is considered very unlikely to occur. Any impact would therefore be negative but given the temporary and short-term nature of the works, any impact would by **Not Significant**.

Candidate Gathabawn Grid Connection

The Whole Gathabawn Windfarm Project site is proposed for a location upstream of the River Nore SPA and River Barrow and River Nore SAC and is spread over a number of river body catchments. The Candidate Gathabawn Grid Connection site crosses four sub-basins of the Nore (Nore_120, Nore_130, Nore_140, Nore_150)

In relation to the Special Conservation Interest bird species (Kingfisher [A229]) of the River Nore SPA, and the Qualifying Interests of the River Barrow and River Nore SAC (Estuaries [1130], Mudflats and sandflats not covered by seawater at low tide [1140], Reefs [1170], Salicornia and other annuals colonising mud and sand, Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*), Mediterranean salt meadows (*Juncetalia maritimi*) [1410], Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation, European dry heaths [4030], Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels, Petrifying springs with tufa formation (*Cratoneurion*), Old sessile oak woods with Ilex and Blechnum in the British Isles, Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*) [91E0], Desmoulin's Whorl Snail, Freshwater Pearl Mussel, White-clawed Crayfish, Sea Lamprey, Brook Lamprey, River Lamprey, Twaite Shad, Atlantic Salmon, Otter, Killarney Fern), the AA Report 2026 concluded that due to the scale of drilling excavations and storage/movement of overburden at the Candidate Gathabawn Grid Connection, the use of machinery run on hydrocarbons, and the use of concrete for foundation construction, that there is potential for construction works to release sediment or contaminants to downslope watercourses, and in the absence of mitigation measures these effects could be significant.

Any such pollution event would pose low to moderate to Very High impacts to watercourses hosting these QIs. Given the hydrological separation distance and the extent of a worst-case scenario pollution or sediment release event, the impact would be Very High in nature to downstream water quality for QIs and SCIs In relation to the Qualifying Interests Estuaries [1130], Mudflats and sandflats not covered by seawater at low tide [1140], Reefs [1170], Salicornia and other annuals colonising mud and sand, Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*), Mediterranean salt meadows (*Juncetalia maritimi*) [1410], European dry heaths [4030], Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels, Old sessile oak woods with Ilex and Blechnum in the British Isles, Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*) [91E0], Desmoulin's Whorl Snail, these QI habitats and species are not vulnerable to changes in water quality based on mapped distribution and separation distance from the nearest possible habitat area, and therefore the potential for significant impacts to the these habitat and species via reductions in water quality can be excluded. (see Section 13.5.3.11).			
Impact Magnitude	Moderate to Very High	**Impact Significance: *(pre-mitigation)***	**Very Significant**
Mitigation and Monitoring Measures: Even though Significant impacts are not predicted; the following mitigation and monitoring measures will be implemented as best practice environmental management.			
WM01 GM01	Engineering Review: A suitably qualified engineer will review and approve the civil contractor's method statements and final detailed design prior to the commencement of construction works.		
WM02 GM02	Water Quality Monitoring: Confirmatory surface water quality monitoring will be carried out prior to the commencement of construction works at the water quality monitoring locations to determine the pre-construction status of surface water quality in downstream watercourses. This monitoring will include laboratory analysis of water samples which will be carried out by an independent and appropriately certified laboratory. The monitoring of water quality parameters and collection of samples will be undertaken by the Environmental Clerk of Works, who will be appropriately trained on the required monitoring methods and the use, calibration and maintenance of all monitoring equipment used. Records will be kept of biological and chemical monitoring undertaken carried out prior to the commencement of construction works.		
WM16 GM16	Surface water quality monitoring of watercourses downstream of the works will be carried out at regular intervals by the Environmental Management team during the construction phase. Laboratory analysis of water samples will also be undertaken as part of the monitoring programme by an independent and appropriately certified laboratory. The surface water monitoring locations and sampling programme are defined in the Surface Water Management Plan which forms part of the Gathabawn Windfarm Project Environmental Management Plan. Surface water quality monitoring will include Total Suspended Solids [TSS] monitoring, with readings above 25mg per litre (as specified in the Salmonid Waters Regulations, SI 293 of 1988) triggering a non-compliance issue, and resultant remedial action by the construction Contractor, in line with the EMP. Records will be kept of biological and chemical monitoring undertaken before, during and after the works, and will be made available upon request to any authorised person as defined under the Local Government (Water Pollution) Acts.		
WM17	Additional WQ Monitoring at D2: At Drain D2, monitoring of Q values and sediment build up will be carried out immediately downstream of the diversion works on this farm drainage channel. This monitoring will also be conducted as part of surface water monitoring before and after the crossing works in order to confirm that the Q values and sediment levels return to baseline levels. Prior to dam being removed at D2, where sediment build up poses significant downstream effects on the watercourse, this sediment will be removed.		
GM17	At W3, W4 and W5, monitoring of Q values and sediment build up will be carried out immediately downstream of the dam locations during crossing works. This monitoring will be conducted throughout the construction works and also conducted as part of surface water monitoring in order		

	to confirm that the Q values and sediment levels return to baseline levels. Prior to dam being removed at W3, W4 or W5, where sediment build up poses significant downstream effects on the watercourse, this sediment will be removed.
GM28	Control of Movement of Machinery/Vehicles: Construction traffic, personnel and materials will be restricted to within the construction works area fence and will avoid moving onto areas not delineated on the site drawings.
WM32 GM29	Land reinstatement will not be carried out during very wet weather or when the soil is waterlogged. If any compaction has occurred along the construction works area, these areas will be ploughed with a sub-soiler to loosen the subsoil layer.
WM33 GM30	Excavation of Materials: The excavation of earth materials during the construction stage will be kept to a minimum. The excavation of materials will be completed in accordance with best practices for the management and treatment of such materials. (i.e. British Standards BS6031:2009 Code of Practice for Earthworks, and MAFF (2000) Good Practice for Handling Soils).
WM34 GM31	Storage of Overburden: During construction works, excavated material will be removed for temporary or permanent storage at designated berms. All storage berms will be placed more than 50m away from any watercourse or wet drainage channel. Temporary silt control methods such as silt fencing or curtains will be placed around all overburden storage areas and/or installed between the berms and local watercourses or wet drainage channel, depending on the location, and the existing vegetative between the berms and watercourse / drainage features will be left in place.
GM32	Protection of Soils in Berms; All storage berms will be graded and sealed following emplacement. Topsoil and subsoil will be stockpiled separately. Re-seeding of permanent berms will be carried out as soon as practical in these areas. Construction works areas along cable routes in agricultural lands will be reseeded as son as practical after reinstatement. Measures such as silt curtains around the bases of these areas and sediment traps will also be incorporated to prevent runoff of suspended solids, dust and soil erosion, if required.
GM33	No storage of excavated material on the public road along the UGC routes, all excavations from public roads will be removed to licensed waste facilities in accordance with the Waste Management Plan.
WM41 GM34	Protection of watercourses and existing drains: Additional mitigation measures will be deployed within 50m of watercourses or wet drainage features, including the placement of silt trapping arrangements along preferential surface water flowpaths, and temporary drain blocking in existing drains. Works will not take place within this 50m zone during prolonged heavy or exceptional rainfall events.
WM42 GM35	Weather forecasts will be consulted in advance of works. If there is heavy prolonged rainfall or if an exceptional rainfall event occurs, then construction works will cease until peak flows have subsided.
GM36	At Parksgrove Substation, a permanent surface water drainage network will be installed at the substation compound and along the associated access road, and will ensure that all surface water runoff from the access road and new the hardstand areas will be captured and treated prior to discharge/release. The drainage infrastructure will not be installed during heavy or prolonged rainfall events or when the soil is waterlogged. The site drainage network will include check dams and settlement ponds which will settle suspended solids in water runoff while also slowing down the rate of water run-off from these areas. Water will be released to surrounding vegetation via buffered outfall weirs.
WM45 GM37	Where dewatering of trenches or excavations is required, there will be no direct discharge of treated water into any watercourse or drain or directly onto adjacent habitats. Rather, all pumped water will be discharged via a silt bag or infiltration trench or settlement pond, as appropriate, to surrounding vegetation.
GM38	Any replacement culverts under the public road (if required), will be sized to cope with a minimum 100-year flood event. In all cases, culverts will be oversized to allow mammals to pass through the culvert. The replacement of drain crossing structures will be carried out in accordance with the Office of Public Works (OPW) Guidelines Construction, Replacement or Alteration of Bridges and Culverts

	(2013), and also with the Department of Transport, Tourism & Sport Guidelines for Managing Openings in Public Roads (April 2017). Crossings will be designed to meet IFI's *Guidelines on Protection of Fisheries during Construction Works in and adjacent to Waters 2016* and *OPW's Design Guidance For Fish Passage On Small Barriers (2021).*
WM46	Isolation of flow: Works in wet drainage channels will not be undertaken without isolation of flow within the drain. The water will be isolated from the works by over pumping, flume (pipe) or channel diversion methods.
GM39	In-stream works – isolation of flow and electrofishing: In-stream works at W3, W4 and W5 will not be undertaken without isolation of flow within the watercourse by over-pumping through a flume (pipe). The Project Ecologist will supervise all watercourse crossing works at W1 to W6 inclusive. A pre-works survey will be carried out by the Project Ecologist to identify any electrofishing requirements at the watercourses, and if required electrofishing of the isolated section will be carried out under licence prior to the commencement of excavation works.
GM40	Instream works at W3, W4 and W5 will be followed by site-specific reinstatement measures to ensure the restoration of flow character and morphology within the affected reach. Measures will include: bank stabilisation using boulder armour or willow/brush bank protection; reinstatement of bank slope and character, creation of compound channels where necessary; reinstatement of instream flow features such as boulder substrates, pool / riffle sequences, or spawning cobbles; and planting along the riparian margin to stabilise banks, add flood protection and provide riparian buffer.
GM41	HDD Control of Works: The horizontal directional drilling works will be carried out by an experienced Drilling Contractor and supervised and managed by a competent and experienced Mud Engineer who understands the technicalities and challenges of drilling works. The Mud Engineer will advise the Construction Manager on the selection of competent drillers for the HDD works; monitor the watercourse bed during drilling works and will supervise the drilling works including the drilling pressures and the implementation of any contingency measures. From a surface water quality protection perspective, the area around the launch/reception pit, bentonite batching, pumping and recycling plant will be bunded using appropriate terram geotextile and/or sandbags in order to contain any spillages. Drilling fluid returns will be contained within a sealed tank / sump to prevent migration from the works area. Spills of drilling fluid will be cleaned up immediately and stored in an adequately sized watertight skip before being taken off-site to a suitably licensed waste facility. The HDD works from preparatory stage through to reinstatement will be supervised by the Project Ecologist. In the event of a break-out occurring, the Environmental Emergency Response Procedure for Frac-Out will be implemented which includes the following contingency measures; - In the event of break-out occurring in the stream/river bed, the rig will immediately shut off the pumps and the drilling assembly will be pulled off to reduce annular pressures; - In the event of break-out on the road an excavator will be available to dig a pit to contain fluid with vacuum trucks/pumps available to transfer drill fluid from the containment point back to the recycling point; and in either scenario, drilling fluid additives designed to plug the formation will be introduced to the circulation system and let set. Environmental Emergency Response Procedures are included in the Whole Gathabawn Windfarm Project Environmental Management Plan.
GM42	Protective Barrier: Prior to works commencing along the Parksgrove-Moatpark UGC, a silt curtain will be installed immediately inside the road boundary fence for the entire length of the UGC within the verge, and where the UGC enters agricultural land, a double silt curtain will be installed on the outside of the construction works area upto and around the drilling pit on the western side of the river. On the eastern side of the River Nore, prior to works commencing, a silt curtain will be installed along the entire length of the access road from the R432, with a double silt fence installed beyond the construction works area boundary upto and around the drilling pit on the eastern side of the river.

GM43	Only precast concrete or double skinned HDPE pipes will be used for new drain crossing structures, if required, along the Ballylehaun-Ballyring UGC. Only precast concrete chambers will be used at Joint Bays.
GM44	Concrete control procedures will be implemented and will include the following: - All concrete will be ready-mixed and delivered to site just-in-time; - Dry granular cement will be used in UGC cable trenches; - The pouring of concrete will be scheduled for dry days. If a sudden rainfall event should occur, then plastic covers will be ready and available at the pour site to cover the concrete. - The pour site will be kept free of standing water; - Designated trained operator experienced in working with concrete will be employed during concrete pouring; - Concrete trucks will be washed out at the supplier's facilities and not on site. The only concrete washing that will occur on site is the hand washing of the chutes at the rear of the trucks. Washing of chutes will only take place at the designated area and into a Roadside Concrete Washout unit. No discharge of cement contaminated waters to any artificial drain or watercourse will be allowed.
GM45	Fuel/Oil control procedures will be implemented and will include the following: On site re-fuelling 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 refuelled off-site, and will be towed around the site by a 4x4 jeep to where machinery is located. The 4x4 jeep will carry fuel absorbent material and pads in the event of any accidental spillage. Mobile measures such as drip trays and fuel absorbent mats will be used during all refuelling operations. In addition, spill response apparatus including spill-kits and fuel absorbent mats will be stored in the cabin of each vehicle and operators will be fully trained in the use of this equipment and in the implementation of the Emergency Response Plan, as contained in the Environmental Management Plan. The fuel bowser will be parked on a level area, away from main traffic activity, in a designated part of the construction compound when not in use. Taps, nozzles or valves associated with mobile fuel bowser will be fitted with a lock system. Only designated trained and competent operatives will be authorised to refuel plant on site. A Permit to Fuel system will be put in place.
GM46	Along the cable routes, there will be no refuelling of plant or machinery within 100m of a watercourse or wet drainage channel or local spring/well.
WM49 GM47	Storage of Fuels, Oils and Chemicals: All fuels or oils or chemicals, required during construction, will be stored in a designated, bunded, locked storage area within the temporary compounds. All fuel, oil and chemical storage areas will be bunded appropriately to 110% of the volume of oils/fuels each area contains for the duration of the construction phase. All bunded areas will be fitted with a storm drainage system and an appropriate oil interceptor. Ancillary equipment such as hoses, pipes will be contained within the bunded area. Fuel, oil and chemical stores including tanks and drums will be regularly inspected for leaks and signs of damage. Safety data sheets for all chemicals used will be kept on-site. An emergency response plan to deal with accidental spillages will be contained within the Environmental Management Plan.
WM50 GM48	Overnight parking of plant and machinery will only be permitted at an existing hard-core surface at locations which are greater than 50m from watercourse/drainage features/Cullahill Mountain SAC. Drip trays and fuel traps will be used under and around parked plant and machinery to contain any potential leaks.
GM49	In-stream works (W3, W4 and W5) will only be undertaken during the IFI specified period (July, August and September) and will be carried out in accordance with the *Guidelines on Protection of Fisheries during Construction Works in and adjacent to Waters* (IFI, 2016). As requested by IFI during

	preplanning consultations for the windfarm, a site-specific method statement for each crossing will be provided to IFI and OPW at least one month ahead of works at each crossing.
GM55	Noise and emissions from plant/machinery: Plant and machinery will not be permitted to idle. Machinery used intermittently will be shut down when not in use. Any plant operating within 50m of the River Nore or within 200m of a bat roost (if any) will be fitted with noise dampeners and an acoustic enclosure or portable screen placed between the source of noise and the sensitive receptor.
GM56	Hedgerow planting: Any gaps created in hedgerows along the Ballyring-Parksgrove UGC will be reinstated with native hedgerow species in the next suitable planting period following the completion of the works. Hedging plants will be sourced from Department of Agriculture approved nurseries.
WM60	Road Paving: In order to reduce the potential for dust emissions, the uphill section of the windfarm site road between T2 and T3 will be paved with tarmacadam. A dry wheel wash will be installed on level ground before and after this road to reduce dirt on the wheels of vehicles travelled near to the boundary of the Cullahill Mountain SAC.
GM61	Dust Control: Any loads of material which have the potential for dust emissions (such as aggregate) will be covered during transportation.
WM73 GM62	Work hours: Construction operations shall generally be restricted to between 0700-1900hrs Monday to Friday, and 0800-1300hrs on Saturdays. Site activities which are likely to create high levels of noise or vibration will be limited to these hours of operation, with no noisy operations on Sundays or Public Holidays. However, to ensure that optimal use is made of good weather period or at critical periods within the programme, it could be necessary on occasion to work outside of these hours.
GM80	Controlling Extent of Works; Cable trenching along the Candidate Gathabawn Grid Connection route will be carried out in short, progressive sections, no longer than 100m in length, with each section reinstated before the next is opened.
WM96 GM86	Surface water quality monitoring of watercourses downstream of the works will be carried out monthly for the first six months post construction, and thereafter annually during the Operational Years 1, 2, 3, 4 and 5, and then every 5 years thereafter, to record any change to baseline trends. Samples will be analysed by an appropriately certified laboratory and the resulting report submitted to Kilkenny County Council.
GM88	The Asset Manager will have responsibility for the implementation of the operational phase mitigation measures and will appoint environmental specialists as required.
WM114 GM89	Vegetation Monitoring: The rate of re-vegetation of exposed soils and growth of newly planted hedgerows and trees will be checked by the Asset Manager during quarterly site inspections. Where revegetation is slower than expected, that area will be prepared and re-seeded or replanted in an appropriate manner, as advised by a suitably qualified ecologist.
GM90	Fuel/Oil control procedures will be implemented and will include the following: All fuels or oils, required during operation, will be stored in a designated, bunded, locked storage area within the substation compound. All fuel storage areas and the transformer at Parksgrove Substation will be bunded appropriately to 110% of the volume of oils/fuels relevant for each area/or for the transformer. All bunded areas will be fitted with a storm drainage system and an appropriate oil interceptor. Ancillary equipment such as hoses, pipes will be contained within the bunded area. Fuel, oil and chemical stores including tanks and drums will be regularly inspected for leaks and signs of damage. Safety data sheets for all chemicals used will be kept on-site.

Effectiveness of Mitigation:

The above mitigation measures are proven and effective best practice measures which will avoid and minimise the risk of sediment or contaminant release by:

- reducing the potential for sediment/contaminant release (limestone capping, weather related restrictions, management of overburden, concrete controls, refuelling controls, timing of works when rivers are the shallowest)

- capturing and treating any sediment/fuel spills that are released (silt fencing, Siltbuster, drainage system, wheel washes)

Thereby breaking the pathway between the potential sources and the receptor.

Timing of works and pre-construction surveys will also confirm any contamination extent will not impact on nesting kingfisher, breeding otter or spawning aquatic species.

Following the implementation of mitigation measures, minimal sediment or contaminants will enter downslope watercourses, therefore, any potential negative impacts on downstream waterbodies, aquatic habitats or species will be negligible.

The inspection of lands for the presence of invasive species prior to the carrying out of groundworks or vegetation removal (any phase of the Whole Gathabawn Windfarm Project) will avoid accidental spreading of invasive species and will enable the appropriate removal of any infestations which are likely to be affected. The visual inspection and cleaning of all site machinery and equipment prior to its arrival on site will prevent the introduction of invasive species.

Residual Impact Significance *(post-mitigation)*:	**Slight**

EIAR 13.4.11.3 Gathabawn Windfarm Impacts to the River Nore designations which will not be Significant

All of the remaining effects of the Proposed Gathbawn Windfarm on Designated Sites along the River Nore will be Not Significant. A short evaluation of these effects is provided below:

A number of QIs of the River Barrow and River Nore SAC are only found significantly downstream of the proposed Gathabawn Windfarm and the Candidate Gathabawn Grid Connection (more than 10 sub-catchments downstream) (Estuaries [1130], Mudflats and sandflats not covered by seawater at low tide [1140], Reefs [1170], Salicornia and other annuals colonising mud and sand [1310], Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330], Mediterranean salt meadows (*Juncetalia maritimi*) [1410]. These intertidal habitats are not considered to be part of the relevant ZoI given the separation distance between the nearest project source and the extent of dissolution across multiple sub-catchments. As such no significant effects are anticipated for these QIs.

Habitat Degradation Effects to Annex I habitats within Designated Sites (River Barrow and River Nore SAC, River Nore SPA and Abbeyleix Woodland Complex pNHA) and suitable habitats for Annex I and II species within or ex-situ Designated Sites due to land cover change, vegetation removal or excavation works (C,O,D): Not Significant**.** There are no records of Annex I habitat at the Gathabawn Windfarm site, and none of the habitat at the windfarm site have the potential to support QI or SCI species . The magnitude of impacts will therefore be Negligible equating to effects on Annex I habitats and Annex I and II within or ex-situ of Designated Sites as Not Significant.

Reductions in WFD Status of downstream Designated Sites (River Barrow and River Nore SAC, River Nore SPA and Abbeyleix Woodland Complex pNHA (O, D): Imperceptible Impact. The River Barrow and River Nore SAC is c. 7.4km downstream from the closest element of the proposed Gathabawn Windfarm Project element. Groundworks during the operational or decommissioning phases of the proposed Gathabawn Windfarm Project will be limited to minor upkeep of the site roads, hardstands and drainage system during the operational phase, and the removal of turbines during decommissioning, with the turbine hardstands reinstated using soils stored in long-term storage berms. Due to the brief duration of works during the operational and decommissioning phases, the small extent of groundworks, the very small number of vehicles/machinery present on site, the negligible use of oils, the discreet locations of works spread over two sub-catchments with all works taking place within the site drainage system, and the separation distances from the windfarm site (and subsequent dilution factors) to the SAC, potential impacts to water quality will be imperceptible.

Indirect Habitat Degradation Effects to Annex I habitats and suitable habitats for Annex I and II species of downstream Designated Sites due to sedimentation and reductions in water quality (River Barrow and River Nore SAC, River Nore SPA and Abbeyleix Woodland Complex pNHA (O, D): Imperceptible Impact. The River Barrow and River Nore SAC is c. 7.4km downstream from the closest element of the proposed Gathabawn Windfarm Project element. There are no records of Annex I habitat at the Gathabawn Windfarm site, and none of the habitat at the windfarm site have the potential to support QI or SCI species.

Groundworks during the operational or decommissioning phases of the proposed Gathabawn Windfarm Project will be limited to minor upkeep of the site roads, hardstands and drainage system during the operational phase, and the removal of turbines during decommissioning, with the turbine hardstands reinstated using soils stored in long-term storage berms. Due to the brief duration of works during the operational and decommissioning phases, the small extent of groundworks, the very small number of vehicles/machinery present on site, the negligible use of oils, the discreet locations of works spread over two sub-catchments with all works taking place within the site drainage system, and the absence of Annex I habitats or suitable habitats for Annex I or II species, and the separation distances from the windfarm site (and subsequent dilution factors) to the SAC, potential impacts to water quality will be imperceptible.

Indirect Habitat Degradation Effects to Annex I habitats and suitable habitats for Annex I and II species of downstream Designated Sites (River Barrow and River Nore SAC, River Nore SPA and Abbeyleix Woodland Complex pNHA (O, D) due to changes in flow/water quantities or drainage regimes: Slight – Not Significant
Access track construction, construction of the turbine foundations and other new, hard surfaces have the potential to result in a small increase in surface water run-off in the catchments associated with the Proposed Gathabawn Windfarm. Risk of an increase in downstream flooding is considered to be low due to the small increase in run-off from surfaced and hard stand areas, the use of aggregates at the turbine hardstand areas, and the installation of the site drainage network which will attenuate water runoff, before regularly releasing it over outfall weirs to the surrounding vegetation. for the Proposed Gathabawn Windfarm Site relative to overall catchment areas. Potential to increase flooding in the local streams is considered temporary, short-term, unlikely, not significant, negative.

Annex I or Annex II species (other than Otter or Kingfisher)

Direct loss (mortality) of Annex I or Annex II species of Designated Sites (C, O, D) No Likely Impact: Due to the absence of any QI species within the proposed Gathabawn Project Area and the unsuitability of habitats to support such species, the potential impacts associated with direct mortality are considered as Not Significant.

Disturbance or displacement of Annex I or Annex II species of Designated Sites (C, O,D): No Likely Impact: Due to the absence of any QI species within, or within the proximity of, the proposed Gathabawn Project Area and the unsuitability of habitats to support such species the potential impacts associated with disturbance and displacement through all phases of the development are considered as Not Significant.

Displacement of Annex I or Annex II species of Designated Sites from the windfarm area (C, O, D): No Likely Impact: Due to the absence of any QI species within, or within the proximity of, the proposed Gathabawn Project Area and the unsuitability of habitats to support such species the potential impacts associated with displacement through all phases of the development are considered as Not Significant.

EIAR 13.4.11.4 Environmental Protection Measures for the protection of Designated Sites

In addition to the mitigation measures identified in Sections EIAR 13.4.11.1.1 and EIAR 13.4.11.2.1 to EIAR 13.4.11.2.4 above, additional best practice measures which form part of standard windfarm construction/operation will be implemented during the construction/operation/decommissioning of the Gathabawn Windfarm Project to protect Designated Sites and avoid/reduce these not significant effects. These best practice measures are identified in Section EIAR 13.4.12 and are included in the Construction Environmental Management Plan for the Gathabawn Windfarm project which accompanies the subject planning application. Operational and decommissioning measures will be included in the Environmental Management Plans for those phases of the project.

EIAR 13.4.11.5 Evaluation of the Whole Project Impact to Designated Sites

When the residual impacts of the Proposed Gathabawn Windfarm and the Candidate Gathbawn Grid Connection to Designated Sites are considered cumulatively, it is considered that the whole project impact will be Not SIgnificant.

EIAR 13.4.12 Best Practice Measures

In addition to mitigation and monitoring measures outlined in Sections 13.4.4 to 13.4.11 above, best practice measures which form part of standard windfarm construction/operation will be implemented during the construction/operation/decommissioning of the development to protect the Biodiversity environment and avoid/reduce these not significant effects. These environmental protection measures are identified below and are in the Environmental Management Plan 2026 for the Whole Gathabawn Windfarm Project.

WM = Windfarm Measures, GM = Grid Connection Measure

Construction Stage	
WM06 GM06	Pre-construction surveys for Badger setts will be carried out to determine if any new Badger setts have been established in the interim period between the submission of the planning application and the commencement of construction works. These pre-construction confirmatory surveys will be carried out by the Project Ecologist within the construction works area boundary and within 50m of the construction works areas and carried out no more than 10-12 months in advance of proposed construction activities.
WM07 GM07	Pre-construction surveys for Bat roosts will be carried out at all trees and buildings identified as having bat roost potential during initial pre-planning surveys. Surveys will be carried out by the Project Ecologist at a time of year that is appropriate to the type of roost e.g. June to August for maternity roosts, or November to February for hibernation roosts. If the location or status of roosts has changed, then the use of lighting at nearby construction works locations will be adapted accordingly by the Project Ecologist.
WM28	Marsh Fritillary: A pre-construction survey of construction works plus 100m in all directions to determine the distribution of the Marsh Fritillary's food plant Devil's Bit Scabious (DBS) will be carried out by an ecologist during the last available August/September prior to commencement of construction works. Any areas of DBS that are located within construction works boundary during the Aug/September survey will be strimmed/cut to ground level in the last available April/early May period prior to commencement of construction.
WM29 GM26	Environmental Management Plan: The construction of the Gathabawn Windfarm Project will be carried out in accordance with the Environmental Management Plan (EMP). The EMP will include all of the mitigation measures and monitoring arrangements for the Project. An Environmental Clerk of Works will be appointed, independent of the main construction Contractor, and will carry out weekly audits on EMP compliance. If non-compliance is detected, then, prompt corrective action will be agreed and committed to by the Contractor, with a view to the swift and effective resolution of any deviations from the EMP requirements. The EMP will be an important contract document for the main construction contractor (Contractor) who will be contractually obliged to comply with the EMP and the requirements of the Environmental Clerk of Works. Furthermore, if a significant unforeseen environmental effect takes place, then, the Environmental Clerk of Works will have a 'stop-works' authority to temporarily stop works until the issue is resolved.
WM30 GM27	Fencing of works areas: The boundaries of construction works areas in agricultural lands will be fenced to prevent the encroachment of construction phase personnel, machinery or materials beyond this boundary. Livestock proof fencing will be used, with landowner access maintained through the provision of openings along the boundary fences.
WM31	Control of Movement of Machinery/Vehicles: Construction traffic, personnel and materials will be restricted to the hardcore surfaces, particularly with respect to the newly constructed access roads. This means that machinery will be kept on the windfarm site roads and hardstanding areas, and, aside from advancing excavations, will avoid moving onto areas not delineated on the site drawings.
GM28	Control of Movement of Machinery/Vehicles: Construction traffic, personnel and materials will be restricted to within the construction works area fence and will avoid moving onto areas not delineated on the site drawings.
WM62 GM53	Should a Badger sett be identified within 50m of construction works areas during pre-construction surveys, then NWPS will be notified immediately and derogation licenses will be secured in consultation with NPWS to ensure the proposed works cause as limited an effect as possible.
WM68 GM57	Bird breeding season: Hedgerow removal, tree felling or pruning, and scrub clearance will take place outside of the bird breeding season (1st March to the 31st of August).

WM65	Plant and machinery will not be permitted to idle and any plant operating within 200m of a bat roost (if any) will be fitted with noise dampeners and surrounded by an acoustic enclosure or portable screen.
Operational Stage	
WM66	Bat Boxes will be installed under the supervision of the Project Ecologist. These bat boxes will be placed in a suitable location to compensate for any loss through disturbance of potential roosts during the construction works and to provide alternative roosting locations for local roosting bats.
WM111	WQ and Soil Protection at Turbine Delivery Facilitating Works locations: During any reopening/re-widening of site entrances or facilitating works locations, any topsoil removed to reveal the hardcore underneath will be stored in an adjacent temporary deposition area, sealed to prevent erosion, and a silt curtain will be erected downslope of this deposition area. Following the completion of the transportation, the hardcore area will be covered over once again using the soil in the deposition area. The area will be reseeded/replanted as appropriate to the location. The area will we fenced from livestock until revegetation I has occurred.
WM112	Control of vehicle/machinery movement: Operational phase traffic, personnel and materials will be restricted to the windfarm site roads and hardstanding areas.
WM116	Bat Boxes: The new bat boxes will be checked annually for integrity and will be replaced if necessary.
Decommissioning Stage	
WM131 GM97	Fit for Purpose: All plant and machinery which will be used during decommissioning works will be fit for purpose and in good working order prior to mobilisation to works areas.
WM123GM94	Up-to-date Best Practice: Prior to the commencement of decommissioning works, a review of these protective measures listed herein will be carried out to ensure that the most up-to-date measures are implemented during decommissioning works to comply with best practice at the time.
WM122 GM95	Environmental Management Plan: Any decommissioning works will be carried out in accordance with the updated EMP. A suitably qualified Environmental Manager will be appointed by the Project Promoter, and it will be their responsibility to ensure that the EMP is implemented through liaising with the Asset Manager and the decommissioning Contractor(s) and by carrying out regular audits on EMP compliance. The EMP will be an important contract document for the decommissioning contractor(s) who will be contractually obliged to comply with the EMP and the requirements of the Environmental Manager
WM134 GM103	Protection of WQ and Soils: During decommissioning works, topsoil removed will be stored in an adjacent temporary deposition area, sealed to protect it from weathering, and a silt curtain will be erected around this deposition area.
WM126	Fauna surveys: It is recommended that a programme of pre-decommission monitoring of terrestrial habitats, marsh fritillary, bats, terrestrial mammals and birds be conducted in the period preceding the commencement of substantial decommissioning works to ensure adequate protection of these species is ensured during the process of decommissioning. The resulting survey data can inform the design of any mitigation that may be required and ensure that any such mitigation is fully and effectively implemented.
WM128 GM104	Weather forecasting warnings will be consulted in advance of works, and decommissioning works will not take place during periods of prolonged heavy rain or exceptional rainfall events.
WM130	Control of Machinery/Vehicular Movements; Decommissioning traffic, personnel and materials will be restricted to the decommissioning works areas. Machinery will be kept on the windfarm site roads and hardstanding areas, and, aside from reinstatement works, will avoid moving off the hardstanding areas where possible.
GM105	There will be no refuelling of plant or machinery within 100m of a watercourse, wet drainage channel or private well/spring. Any re-fuelling of machinery on site will be carried out using a mobile double skinned fuel bowser. Spill response apparatus including spill-kits and hydrocarbon absorbent packs will be stored in the cabin of each vehicle and operators will be fully trained in the use of this equipment.
WM136 GM107	Revegetation: The Asset Manager and Project Ecologist will check the rate of re-vegetation of exposed soils and reinstated areas quarterly following decommissioning works (until revegetation is attained). Where revegetation is slower than expected, that area will be prepared and re-seeded in an appropriate manner.

EIAR 13.5 CUMULATIVE EFFECTS WITH OTHER PROJECTS

Other existing and permitted projects, and projects advanced in the planning system were examined for their potential to cumulatively affect Biodiversity with the Proposed Gathabawn Windfarm and the Candidate Gathabawn Grid Connection. These projects are referred to as 'Other Projects' herein. The potential for off-site and secondary consequential development was also considered.

Cumulative Study Areas are set out below and Other Projects located within these Study Areas were identified and examined for potential for cumulative effects.

Terrestrial Habitats; Invertebrates, Amphibians & Reptiles: The Cumulative Study Area comprises the construction works areas associated with the proposed Gathabawn Windfarm and the Candidate Gathabawn Grid Connection, plus an area of 100m extending around the construction works area. It is considered that this area is sufficient to identify those Other Projects which may cause cumulative effects to Terrestrial Habitats and Amphibians & Reptiles with the Gathabawn Windfarm Project. Consideration of Other Projects connected to the same hydrological pathways as the Whole Gathabawn Windfarm Project were also considered to address aquatic habitat impacts on amphibians.

Terrestrial Mammals: The Cumulative Study Area comprises 600m upstream and downstream of watercourse crossing locations (in relation to Otter only, 6 No. of which occur for this development), and the construction works areas associated with the Whole Gathabawn Windfarm Project plus an area of 200m extending around the construction works areas. It is considered that this area is sufficient to identify those Other Projects which may cause cumulative effects to Terrestrial Mammals (Otter, Badger, Pine Marten, Irish Stoat, and Red Squirrel) with the Whole Gathabawn Windfarm. Consideration of Other Projects connected to the same hydrological pathways relevant to the Whole Gathabawn Windfarm Project were also considered to address aquatic habitat impacts on Otter.

Bats: The Cumulative Study Area comprises the construction works areas associated with the Whole Gathabawn Windfarm Project plus an area of 250m extending around the construction works areas; and an area of 5km around the Gathabawn wind turbines. Projects within 100m of the Candidate Gathabawn grid Connection is considered relevant to inform impacts on roosting or foraging bats. It is considered that this area is sufficient to identify those Other Projects which may cause cumulative effects to bats with the Whole Gathabawn Windfarm Project.

Birds: The Cumulative Study Area comprises 4km around the construction works areas and 4km around the operating turbines (to identify Other Projects which involve large above-ground structures, such as wind farms). It is considered that this area is sufficient to identify those Other Projects which may cause cumulative effects to Birds with the Whole Gathabawn Windfarm Project. Significant effects relating to disturbance/displacement or barrier effects were considered based on the farthest disturbance distance (1km Greenland White-fronted Goose). Greenland White-fronted Goose is not a KER for the Whole Gathabawn Windfarm Project but has a disturbance distance far greater than other bird species and is used as the worst-case scenario disturbance range to inform barrier effect impacts. Windfarms located beyond this distance were considered for cumulative mortality impacts only.

Aquatic Habitats & Species: Sub-catchments associated with the works areas – i.e. Goul_SC_010, Nore_SC_070 and Nore_SC_060. The Nore_SC_080 is also included, due to its proximity to the whole project works. It is considered that this area is sufficient to identify those Other Projects which may cause cumulative effects to Aquatic Habitats and Species with the Whole Gathabawn Windfarm Project.

Designated Sites: Two study areas are considered:

(a) 20km from the Proposed Gathabawn Windfarm turbines to identify large structures, such as wind

turbines, which could contribute to cumulative effects on SCIs of Designated Sites; and

(b) The upper Nore catchment (i.e. the Goul, Erkina Nore (SC_010 to Nore_SC_100) and Dinin sub-catchments): this area comprises all sub-catchments of the River Nore as far south of Kilkenny City (Nore SC_100). The large upstream catchment of the River Nore at Kilkenny City (1,745km^2) and high flows (50%ile – 19m^3/sec) mean potential cumulative effects on water quality downstream of the Nore SC_100 will not be perceptible.

It is considered that this area is sufficient to identify those Other Projects which may cause cumulative effects to Designated Sites with the Whole Gathabawn Windfarm Project.

Other Projects Scoped-IN: 100m, 200m, 500m or 600m study areas: Other Projects in the Parksgrove/Moatpark area: BESS 1 and BESS 2, grid connections associated with Seskin WF, Ballynalacken WF, and Briskalagh WF; Parksgrove Solar Farm, Tirlán Dairy Processing Facility, Tirlán Water Treatment Plant & Anaerobic Digestor. (*Only relates to the Candidate Gathabawn Grid Connection - No Other Projects scoped in for consideration within 600m of the Proposed Gathabawn Windfarm)*.

Other Projects Scoped-IN: 4km and 10km study areas for birds and bats: BESS 1 and 2, Lisdowney Wind Farm (existing), Lisheen Wind Farm (existing), Farranrory Wind Farm (under construction), Ballynalacken Windfarm (consented), Seskin Wind Farm (under appeal, ACP), Briskalagh Wind Farm (consented), Bruckana Wind Farm (existing), Littleton Windfarm (in-planning), and potential Killoshulan Wind Farm (pre-planning).

Other Projects Scoped-IN: 20km study area: In addition to the wind farm projects listed above, Foylatalure WF (existing), Ballybay WF (existing), Kyleballyoughter WF (consented), Cnoc WF (consented), Pinewood WF (under construction), potential Fassa WF (pre-planning), and Crutt single turbine (consented) were considered to address biogeographical landscape-scale impacts on Natura 2000 Network sites for Birds.

Other Projects Scoped-IN: Local Sub-catchments Goul SC 010, Nore SC 070, Nore SC 060 and Nore SC 080: Seskin Wind Farm (under appeal, ACP), Ballynalacken Windfarm Project (consented), potential Killoshulan WF (pre-planning), Moatpark BESS 1, Moatpark BESS 2 and grid connections (associated with Seskin WF, Briskalagh WF, Littleton WF and Killoshulan WF),

Other Projects Scoped-IN: Upper Nore Catchment: in addition to the wind farm projects listed in the Local Sub-Catchments above, Coolglass WF (consented), potential Fassa WF and grid connection (pre-planning.

The Other Projects which occur within the Cumulative Study Areas were subject to a cumulative scoping exercise (see Appendix 5.4). As a result of this scoping exercise, some of these Other Projects were scoped IN for evaluation of cumulative effects, and these projects are included in EIAR 13.5.1 below.

The Other Projects which have been Scoped-IN to the cumulative evaluations herein are identified in Figure 13.9.1 to Figure 13.9.3 (*included at the end of this chapter*).

EIAR 13.5.1 Evaluation of Cumulative Impacts with Other Projects

EIAR 13.5.1.1 Construction Phase Cumulative Impacts

EIAR 13.5.1.1.1 Parksgrove/Moatpark/River Nore Area

Although it is unlikely to occur, there is potential that up to four grid connections (associated with the Briskalagh WF (consented), Littleton WF (in-planning), Seskin WF (in-planning) and Killoshulan WF(pre-planning)) could be constructed during the same time period as the proposed Gathabawn Windfarm Project. These UGCs will be built to Eirgrid specifications which include minimum separation distances between the cable sets. All four projects involve HDD crossing works under the River Barrow and River Nore SAC and River Nore SPA with short sections of cable routes located within the agricultural fields on both sides of the River

Nore. These projects will also involve temporary habitat loss within the River Barrow and River Nore SAC and along the verge of the N77 national road in the Parksgrove and Ballyconra areas.

One the western side of the River Nore the Wastewater treatment plant associated with the Tirlán Dairy Processing plant is located c.500m upstream of the River Nore HDD crossing point. This is a licensed facility regulated by the EPA (License N, this Other Project is subject to an EPA licence (P0359-04).

On the eastern side of the River Nore, Both BESS projects at Moatpark will involve construction works in proximity to the River Norein agricultural grasslands of local importance. The Ballynalacken WF grid connection also involves a HDD under the Rathduff Stream which drains into the River Nore c.200m from the crossing point on the R432 regional road.

A number of protection measures are included with these Other Projects: The Seskin and Littleton HDD projects will be timed to not occur during the core breeding period 1st April- 8th July. Ballynalacken WF has committed to controlling the timing of HDD works to avoid cumulative impacts with other projects, and to carry out these works when the Rathduff Stream is in its dry state. The BESS projects will be undertaken completely outside the bird breeding season.

However, in a worst-case scenario, where these works take place within the same time period, there would be an increase in noise and human-related disturbance, although the context of the immediately adjacent N77 national road is noted. In a worst-case scenario there is potential for individual temporary low-magnitude habitat loss or degradation, disturbance or displacement impacts to pose a cumulatively higher magniude impact to terrestrial habitats, birds, amphibians, and Otter, with potential for cumulative effects to be moderate to high magnitude and potentially of short-term duration. There is also potential for net increases in the release of sediment into the River Nore and risk of fraq-out, with potential significant cumulative impacts on water quality. As such, additional mitigation in relation to coordination between these projects is required.

The following additional measures for cumulative impacts in the Parksgrove/Moatpark/River Nore area are outlined below:

GM108: The Parksgrove-Moatpark UGC works will not be carried out during the period 1st April to 31st July inclusive

GM109: The Promoter of the of the Gathabawn Windfarm Project will liaise with other renewable energy developers where there is potential for the timing of groundworks associated with grid connection works to overlap within a sub-catchment. The Promoter will liaise with the other developer(s) with the aim of jointly agreeing the timing of works to provide a buffer of time between works. The Project Ecologist will consult with NPWS and advise on the timing of the works to avoid or reduce cumulative impacts to habitats and species in downstream waterbodies and in the Parksgrove/Moatpark area.

It is also noted that the cables which will be installed for the Parksgrove-Moatpark UGC will have the capacity to carry 100MW, more than the 54MW needed for the Gathabawn project. Furthermore, the location and design of the Gathabawn Parksgrove Substation would allow future generators in the area to use the Eirgrid side of the Parksgrove Substation to connect to the National Grid at Moatpark. This would result in the underground cable connecting the Gathabawn project to the Moatpark substation also being available for any future project which would avoid further connections crossing beneath the River Nore. Providing an alternative means of connecting to the national grid without requiring additional crossings of the River Nore.

In consideration of the mitigation measures which form part of the other consented projects, the mitigation measures already assigned for the Candidate Gathabawn Grid Connection, including confirmatory surveys for otter and kingfisher, restriction of works within close proximity to Otter holts or Kingfisher nests, and surface water protection and water quality monitoring, and taking into account the additional mitigation

measures GMXX and GMXX outlined above, it is evaluated that **residual cumulative impacts on habitats and species in the area of the River Nore crossing will be Not Significant**.

EIAR 13.5.1.1.2 Goul_SC_010 and Nore_SC_070 sub-catchments

In the local sub-catchments, the Briskalagh WF and Littleton WF grid routes cross the Lismaine and Lisdowney streams downstream of the Ballyring-Parksgrove UGC crossing works of these two streams. The potential Killoshulan WF grid connection crosses the Lisdowney Stream upstream of the Gathabawn works. This potential grid connection also crosses the Foyle South stream which joins the Gorteenahilla River at a confluence point downstream of the works related to the Gathabawn Windfarm Project which includes facilitating works close to the Gorteenahilla Stream, and cabling works for the Ballylehaun-Ballyring UGC further upstream. The Killoshulan Wind Farm is located in the same catchments as the Gathabawn Windfarm, while the Seskin Wind Farm is located in the Nore_SC_070. Although some in-combination interactions related to decline in water quality are possible. The impact sources from the Whole Gathabawn Windfarm Project do not pose beyond low magnitude impacts. **As such, even with in-combination interactions, in consideration of mitigation measures in place for the Whole Gathabawn Windfarm Project, cumulative impacts pose moderate effects in a worst-case scenario and is not significant.**

EIAR 13.5.1.1.3 Cumulative adverse effects to Local Roosting or Foraging Bats

The potential for cumulative impacts only relates to the Whole Gathabawn Windfarm Project. The Parksgrove, Tirlán and Ballyragget solar farms are all located 1 km from the Parksgrove Substation. Given that there is some habitat being removed as part of the Substation hardstand works, there is potential for wider-scale impacts on foraging or commuting bats due to human presence and artificial lighting for bats in the Parksgrove area.

However, per the Parksgrove solar farm EcIA from 2024, the habitat impacted by this project is of limited value to bats. In consideration of the habitat compensation at the Parksgrove Substation to compensate for any loss of woodland, any cumulative impacts will be negligibly different from the impact identified for the Whole Gathabawn Windfarm Project. No Other Projects with potential to impact roosting bats in proximity to identified bat roost features, and the Whole Gathhabawn Windfarm Project are present.

As such, cumulative adverse effects on local roosting or foraging bats will be of low magnitude and therefore not significant.

EIAR 13.5.1.2 Operational Phase Cumulative Impacts

EIAR 13.5.1.2.1 Cumulative Collision Risk or Displacement effects to Bats

Collision Risk:

Only one windfarm development (Lisdowney) is within 2km of the proposed Gathabawn Windfarm site. The potential Killoshulan Wind Farm is 2.4km distance. The remainder are more than 4km away. As such, the Lisdowney windfarm is the only project with any potential for collision or disturbance-related impacts from operating turbines on local bat populations. The proposed Gathabawn Windfarm site poses a worst-case scenario impact of medium magnitude in the absence of mitigation measures. In consideration of the habitat management on site and the bat buffer implemented for the proposed Gathabawn Windfarm site, cumulative impacts on bats are unlikely to be above low magnitude impacts. As such, no significant cumulative adverse effects are anticipated.

When the effects of the proposed Gathabawn Windfarm are considered collectively with all of the Other Projects and existing sources of impacts within the Cumulative Study Area, it is evaluated that, due to the separation distance between the proposed Gathabawn Windfarm and the Other Projects, the existing status of the Lisdowney windfarm, which does not appear to present a collision risk to bats, and the extensive availability of alternative suitable foraging, commuting and roosting habitat in the surrounding area, **the collective cumulative impact on bats will not be significant**.

Disturbance/Displacement:

Windfarms within 5km pose limited cumulative impacts on bats based on the separation distance between other project turbines, the habitat creation on site at Ballylehaun and the extent of suitable habitat that will remain unaffected as a result of these projects.

Potential displacement effects are possible as a result of the Parksgrove solar farm and the Parksgrove Substation. Background operational noise and lighting from both sites are not anticipated to exceed levels impacting humans but may impact bat activity. The woodland creation measures at the Parksgrove Substation have been designed to draw bat activity away from both the substation and the solar farm to reduce any adverse impact on foraging and roosting behaviour of the local bat populations. As such, any impact would be of low magnitude in the local context given the remaining available habitat and separating distance of the woodland habitat from these noise and light sources. **As such, significant cumulative adverse effects on bats are not anticipated with other projects within 5km.**

EIAR 13.5.1.2.2 Cumulative Collision Risk or Displacement effects to Birds

Eleven species (Buzzard, Kestrel, Peregrine, Sparrowhawk, Golden Plover, Lapwing, Snipe, Black-headed Gull, Lesser Black-backed Gull, Mute Swan and Whooper Swan) were active enough during the baseline surveys to trigger collision risk assessment at the Gathabawn Windfarm site. Golden Plover was the only bird to be considered where a potential slight significant effect was identified which resulted from the presence of a single migratory flock. Wind farms within 20km were assessed for wider landscape impacts; however, local impacts were limited to projects with disturbance areas (1km) that were in proximity to the proposed Gathabawn Windfarm disturbance area.

Disturbance/Displacement:

Only one windfarm (Lisdowney) is within 2km of the Gathabawn Windfarm and, as such, poses potential for disturbance/displacement related effects on shared Bird KERs. This is already operational and poses no in-combination interactions with its construction with the Whole Gathabawn Windfarm Project construction phase. A total of 9 no. KERS (Peregrine, Buzzard, Kestrel, Sparrowhawk, Goldcrest, Meadow Pipit, Skylark, Snipe) have been identified by this windfarm for operational-related disturbance/displacement impacts but

were not likely to be significant effects. This impact assessment was made based on available data at the time of submission. However, given the wind farm's operational period and the retained success of the nesting Peregrine in the wider landscape, the evidence supports that the Lisdowney windfarm poses no operational significant effects to these receptors on nesting territories or foraging ranges. In consideration of this project's proximity to the proposed Gathabawn Windfarm site. It may result in an increased overall barrier effect on migrating Golden Plover and foraging Peregrine and Kestrel individuals breeding in the wider landscape.

Even accounting for a worst-case scenario, any such displacement will not significantly impact either species, as flight activity from VP surveys supports that these individuals are not making regular use of the proposed Gathhabawn Windfarm site as regular foraging or commuting route.

One additional project does pose potential for significant cumulative barrier effect. Killoshulan Windfarm is a medium-sized windfarm (11 no. turbines) being considered for planning directly south-west of the proposed Gathabawn Windfarm. The worst-case scenario 1km displacement buffers do create narrow commuter spaces between the proposed Gathabawn Windfarm turbines and the potential Killoshulan turbine locations. This windfarm would, in combination with the Whole Gathabawn Windfarm Project, surround the Peregrine nest at Balleen Lower. Both projects are more than 1km from this nest site. This would, in effect, create a narrow area between this species' 750m disturbance buffer zone and the disturbance sources from operating turbines. This other project is in pre-planning and has not been finalised. As such, worst-case scenario design supports a potential for mortality of breeding Peregrine, where the Killoshulan Windfarm site is potentially the habitat providing the foraging habitat for the nesting pair in the area.

There is also potential for significant disturbance/displacement of migrating Golden Plover flocks. Given their avoidance levels and the extent of displacement spanning over a 6.5km area from the southernmost turbine at the Killoshulan Windfarm and the northernmost turbine at the Lisdowney Windfarm, there is likely cumulative adverse mortality and disturbance/displacement effects on such flocks during migratory periods.

As such, under the precautionary principle, conditional mitigation measures for this project site are required to avoid cumulative adverse effects on breeding Peregrine and migratory wader flocks.

Displacement Barrier Effect across Counties Kilkenny/Laois/Tipperary (20km):

The remaining wind farms (no. 12) are more than 4km from the proposed Gathabawn Windfarm site. One other wind farm is currently in pre-planning (Fassa). A worst-case 1km disturbance buffer was applied to all 13 projects based on available information on layouts and a 500m buffer for collision risk to identify any significant barrier effects across Co.'s Kilkenny, Laois and Tipperary. In applying this worst-case scenario impact zone, there are multiple barriers formed by the other wind farms across the wider landscape. None of the 13 projects poses any likely impact on bird receptors as a result of operational in-combination effects with the proposed Gathabawn Windfarm site.

As such, significant cumulative adverse effects on birds as a result of landscape scale displacement are not anticipated with Other Projects.

Collision Risk:

The majority of the wind farm and solar farm projects are greater than 10km from the proposed Gathabawn Windfarm.

Three wind farms (Lisdowney, Seskin and Killoshulan) are within 5km of the proposed Gathabawn Windfarm. The Lisdowney wind farm did not identify any likely significant effect as a result of collision on bird species.

The Killoshulan windfarm is still in pre-planning. As such, no CRM data is available to inform collision rates for this wind farm.

The Seskin windfarm has CRM data available. Similar species were identified for collision and are assessed in the table below.

Table 13.5-1: Estimated Cumulative Collision for wind farms within 5km of the proposed Gathabawn Windfarm.

Species	Proposed Gathabawn Windfarm Estimated Collision Rate per annum	Seskin Windfarm Estimated Collision Rate per annum	Cumulative No. of years per collision
Black-headed Gull	0.3	NA	3.33
Buzzard	4.2	1.17	0.19
Golden Plover	12.3	0.29	0.08
Kestrel	1.6	0.49	0.48
Lapwing	0.1	NA	10
Lesser Black-backed Gull	0.9	NA	1.11
Mute Swan	0.1	NA	10
Peregrine	0.2	0.003	4.93
Snipe	0.0	0.01	N/A
Sparrowhawk	0.1	0.05	6.66
Whooper Swan	0.1	0.02	8.33

The cumulative collision contributes to an increased collision rate for Buzzard, Kestrel, Peregrine, Sparrowhawk and Whooper Swan. Only three species have collision rates that pose potential significant effect, preventing any recovery of population levels. Buzzard, Golden Plover and Kestrel are predicted to experience more than one collision per annum. However, both Buzzard and Kestrel collision rates are offset due to the bat buffer management measures at all turbines to reduce suitable foraging habitat under the blade swept area. Golden Plover has the highest collision rate due to a large migratory flock being recorded in winter 2022/2023. The realistic collision rate for Golden Plover is likely much lower and limited to the migratory periods in March/April and September. As such, in consideration of these factors, cumulative collision is unlikely to exceed low magnitude levels over the shared operational lifespan of these projects.

As such, significant cumulative adverse effects on birds as a result of collision are not anticipated with Other Projects.

EIAR 13.5.1.2.3 Cumulative adverse effects to Bird Species of Designated Sites

Only one SPA is within 20km of the Whole Gathabawn Windfarm Project (River Nore SPA). The operational elements of the proposed Gathabawn Windfarm are limited to the operating turbines, which are more than 1km from the nearest watercourse with suitability for its sole SCI (Kingfisher). As such, cumulative effects as a result of the proposed Gathabawn Windfarm are unlikely to occur.

The operational elements of the Whole Gathabawn Windfarm Project include the Parksgrove Substation and grid maintenance works. Other Projects pose negligible interaction with these elements to increase the magnitude or likelihood of effects on Kingfisher in-situ or ex-situ of the River Nore SPA during the operational phase. As such, cumulative effects as a result of the proposed Gathabawn Windfarm are unlikely to occur.

EIAR 13.5.1.2.4 Cumulative adverse effects to QIs of Designated Sites

Two SACs are within 2km of the Whole Gathabawn Windfarm Project (Cullahill Mountain SAC, River Barrow and River Nore SAC). No Other Projects are connected to or relevant to the Cullahill Mountain SAC. As such, no potential for cumulative interactions is likely.

The operational elements of the proposed Gathabawn Windfarm are limited to the operating turbines, which are more than 1km from the nearest watercourse, with suitability for its mobile QIs of the River Barrow and

River Nore SAC. Reopening of the facilitating works during major maintenance of turbine components, will occur infrequently, and will of minor scale and brief duration. As such, cumulative effects as a result of the proposed Gathabawn Windfarm are unlikely to occur.

The operational elements of the Whole Gathabawn Windfarm Project include the Parksgrove Substation and grid route inspection activities, Other Projects pose negligible interaction with these elements to increase the magnitude or likelihood of effects on Otter and other mobile QIs in-situ or ex-situ of the River Barrow and River Nore SAC during the operational phase. As such, cumulative effects as a result of the Whole Gathabawn Windfarm Project are unlikely to occur.

EIAR 13.5.1.2.5 Mitigation measures for Operational Phase Cumulative Adverse effects

Annual Collision rates at the Lisdowney and the as-yet-to-be-submitted Killoshulan Windfarms will be requested from NPWS to inform cumulative collision of KERs to ensure any fatalities of Peregrine, Kestrel or Buzzard in the breeding season or Golden Plover during the migratory periods are reported and responded to accordingly. The Promoter of the Gathbawn Windfarm commits to sharing bird survey monitoring results with NPWS.

EIAR 13.5.1.3 Cumulative Evaluation – Summary

A number of in-combination interactions have the potential to occur during both the construction phase and operational phase. The majority of the interactions can be avoided by timing works to avoid relevant activities occurring at the same time. Such co-ordination will prevent impacts on habitat and water quality occurring within the same season and reduce any temporary decline from any one project contributing to cumulative adverse effects on any sensitive receptors. Operational monitoring measures are required to determine bird activity, and these are to be shared with NPWS and the planning authority to effectively offset any likelihood for significant cumulative adverse effects. Therefore, it is evaluated that the **collective cumulative impact of the Whole Gathabawn Windfarm Project and the Other Projects on Biodiversity in consideration of the mitigation measures stated, will not be significant.**

EIAR 13.6 Summary Conclusion

TERRESTRIAL HABITATS:

Gathabawn Windfarm Project (Ballylehaun, Ballyring).

No habitats of county importance or higher are present within the construction or operational/decommissioning phase works areas for the proposed Gathabawn Windfarm Project (Ballylehaun, Ballyring). (Section EIAR 13.3.1.1). The permanent habitat loss as a result of the development of the Gathabawn Windfarm relates to habitats of low intrinsic biodiversity value, mainly comprising Improved Agricultural Grassland. The loss of other habitats accounts for approximately <1% of other habitats, none of which are considered as anything more than locally important. As such the proposed Gathabawn Windfarm Project (Ballylehaun, Ballyring) poses Not Significant impacts to these habitats.

To provide bat buffer zones around the turbines, or to facilitate the delivery of the large turbine components, 3,700m of hedgerow and 10 trees will be removed during the construction works, this equates to c. 50% of the Hedgerows within the construction area. However, the hedgerow network in the local area is extensive and with the adoption of mitigation measures to replace, enhance and restore the hedgerow network in the local area impacts are Not Significant.

No watercourse of ecological importance is located within 50m of the Gathabawn Windfarm Project (Ballylehaun, Ballyring).

Gathabawn Windfarm Project (Ballylehaun, Ballyring, Candidate Gathabawn Grid Connection)

Loss of, and impacts to terrestrial habitats associated with the whole Gathabawn Windfarm Project (Ballylehaun, Ballyring, Candidate Gathabawn Grid Connection) will affect similar habitats to those identified above and with the adoption of prescribed mitigation measures result in the Not Significant impacts.

INVERTEBRATES:

Gathabawn Windfarm Project (Ballylehaun, Ballyring).

No invertebrate species of conversation concern were recorded within the area of construction works of the proposed Gathabawn Windfarm Project (Ballylehaun, Ballyring) (EIAR 13.3.2.1). Although Devil's-bit Scabious was recorded adjacent to the project site, no stands are present within the proposed works boundary. The Cullahill Mountain SAC does have patches of suitable habitat and records of larval webs from surveys undertaken in 2021 and 2022. However, follow-up surveys in 2025 and 2026 have yielded no suitable patches of this species' host plant or larval webs (5 individual plants scattered across large fields) within the Project boundary. Due to the absence of suitable habitat and despite historical records of the species in the wider area, Marsh Fritillary is unlikely to be affected by the proposed Gathabawn Windfarm Project (Ballylehaun, Ballyring) .

The low diversity and numbers of invertebrates recorded opportunistically during ecological surveys reflect the low ecological value and biodiversity that was noted on the site during surveys. Therefore, it is considered that the proposed Gathabawn Windfarm Project (Ballylehaun, Ballyring) will not result in Impacts on terrestrial invertebrate receptors.

Gathabawn Windfarm Project (Ballylehaun, Ballyring, Candidate Gathabawn Grid Connection)

No additional features of potential value for Invertebrate species, and in particular Marsh Fritillary, were identified within areas potentially affected by the wider Gathabawn Windfarm Project (Ballylehaun, Ballyring, Candidate Gathabawn Grid Connection) and impacts are therefore, likewise, assessed as Not Significant.

AMPHIBIANS & REPTILES:

Gathabawn Windfarm Project (Ballylehaun, Ballyring).

The habitats at the Gathabawn Windfarm Project (Ballylehaun, Ballyring) site are predominately of low suitability for amphibians and reptiles, with no habitat of a semi-permanent-to-permanent nature with potential to support populations found on site, although a population of Smooth Newts were recorded from a quarry c.60m from the boundary of the windfarm. No impacts were identified that are greater than Imperceptible on these receptors.

Gathabawn Windfarm Project (Ballylehaun, Ballyring, Candidate Gathabawn Grid Connection)

No additional features of potential value for amphibian and reptile species were identified within areas potentially affected by the wider Gathabawn Windfarm Project (Ballylehaun, Ballyring, Candidate Gathabawn Grid Connection) and impacts are therefore, likewise, assessed as Not Significant.

TERRESTRIAL MAMMALS:

Gathabawn Windfarm Project (Ballylehaun, Ballyring).

There was no suitable habitat to support Otter within the Gathabawn Windfarm Project (Ballylehaun, Ballyring) site. Two other mammal species were recorded within the receiving environment – Badger and Irish Hare and other species potentially present based on historic records and/or the presence of suitable habitat include Pine Marten, Irish Stoat and Red Squirrel. Effects on all of these species were identified to be Not Significant as a result of the Project.

Otter was not observed on site, nor was any secondary evidence of Otter recorded at the wind farm site. The nearest stream more than 50m from the works boundaries. Otter is present in watercourses downstream of the red line boundary of the Gathabawn Windfarm Project (Ballylehaun, Ballyring) site, and it is considered that this species is unlikely to commute through the area of the windfarm site. No instream works or watercourse crossing works are required for the construction of the windfarm. When this is considered, along with the absence of evidence at the windfarm site, no impacts greater than Slight are expected to Otter.

Gathabawn Windfarm Project (Ballylehaun, Ballyring, Candidate Gathabawn Grid Connection)

With the exception of water course crossings discussed below, no additional features of potential value for terrestrial mammal species (other than Otter) were identified within areas potentially affected by the wider Gathabawn Windfarm Project (Ballylehaun, Ballyring, Candidate Gathabawn Grid Connection) and impacts are therefore, likewise, assessed as Not Significant.

The Candidate Gathabawn Grid Connection will involve construction equipment and drilling within 100m of the River Nore. Therefore, these crossing may result in the potential for disturbance and displacement to impact to Otters that may be present and also potential impacts to prey though impacts to water quality. In addition, the Parksgrove Substation is located within 50m of the River Barrow and River Nore SAC which has the potential for construction and operational phase disturbance and displacement effects due to increased lighting at this location.

With the adoption of appropriate mitigation measures (pre-construction surveys, timing of works, appropriate lighting design and vehicle speed restrictions in proximity to watercourses) impacts are assessed as Slight and Not Significant.

BATS:

Gathabawn Windfarm Project (Ballylehaun, Ballyring).

Seven bat species were recorded during field surveys (Soprano Pipistrelle , Common Pipistrelle, Nathusius' Pipistrelle, Brown Long-eared Bat, Daubenton's Bat, Whiskered Bat, Natterers Bat)

Two bat roosts were confirmed within the windfarm site. One of these was confirmed as a roost but due to low numbers recorded emerging, an unlikely maternity roost. This roost is located c. 200m north-east of T10 and thus deemed to be sufficiently distant that impacts will be imperceptible. The other roost only recorded one emerging Soprano Pipistrelle and is therefore likely a transitory roost and being located c. 188m from T8, again impacts are considered as imperceptible due to the limited importance of the roost despite lying within the 200m potential zone of effect.

The majority of bats recorded during transect and static surveys were Common Pipistrelle and Soprano Pipistrelle (86%) with variable levels of activity (low to high), Leisler's Bat (12% of records) and other species had negligible levels of activity recorded. No swarming areas or migration routes were found onsite or in the surrounding area

Common Pipistrelle were the commonest species identified and are considered as High Risk from collision with turbines. As such, mitigation measures to implement a bat buffer zone around the turbines and to control the timing of forestry felling are proposed, along with operational monitoring to identify at-risk times/conditions in order to deploy smart curtailment/feathering of turbines. Fatality monitoring (including carcass retention trials, carcass searches (with trained detection dogs where available) and efficiency trials) will be deployed to monitor the success and efficacy of the smart curtailment methods implemented. The residual impact (mortality) to bats is predicted to be Imperceptible-Slight adverse significance.

Disturbance or displacement of roosting or foraging bats was evaluated as Imperceptible and Not Significant mainly due to the separation distance to the identified roosts, and the absence of hedgerow removal or requirement to fell mature deciduous trees for the project, the limited use of lights at the project and the temporary duration of the construction phase.

Gathabawn Windfarm Project (Ballylehaun, Ballyring, Candidate Gathabawn Grid Connection)

Potential impacts associated with the Gathabawn Windfarm Project (Ballylehaun, Ballyring, Candidate Gathabawn Grid Connection) are broadly similar to those identified above but additional potential additional impacts include the loss of an area of woodland north of a potential tree roost to be removed as part of the Parksgrove Substation construction works. However, with the adoption of mitigation proposals including habitat replacement the loss will be short-term in nature and poses low-magnitude impacts. Impacts to bats utilising the area are therefore considered as Low to Negligible during the construction phase and therefore Not Significant.

BIRDS:

Gathabawn Windfarm Project (Ballylehaun, Ballyring).

Bird receptors within the ecological baseline comprise four main groups.

Birds of Prey: Five species were recorded utilising the receiving environment of the windfarm site during bird surveys – Buzzard, Kestrel, Sparrowhawk, Peregrine and Barn Owl. No Long-eared Owls were recorded.though these are expected to occur as there is suitable habitat and records on the National Biodiversity Data Centre database.

Buzzard, Kestrel, Peregrine and Sparrowhawk were all assessed for collision risk based on the extent of flights recorded. These species were considered at Low risk of mortality. Measures to reduce the suitability of hunting ground for Kestrel within the bat buffer zones for turbines will be implemented. Fatality monitoring and bird surveys will be implemented during the operational phase to monitor the real-time impact on Kestrel

to ensure that the projected mortality magnitude is consistent with the operational real-life mortality magnitude. The residual impact (mortality/collision risk) to is predicted to be Not Significant for all Birds of Prey.

Waders: Only one Annex I wader species was recorded during surveys and is also a red-list BoCCI species (Golden Plover). Three other red-list species were also recorded during surveys (Lapwing, Snipe and Woodcock). Due to low/no numbers recorded at the site Woodcock did not meet the threshold for collision risk assessment.

Three species of wader, Lapwing, Golden Plover and Snipe, was selected for collision risk assessment based on their presence at Gathabawn Windfarm site; no wader species were considered to be at significant risk. Worst-case effects to Golden Plover were evaluated as being of Low magnitude and therefore a risk of slight significant effect. With the monitoring and habitat management measures deployed, the residual impact to Golden Plover will be Not Significant.

The habitats occurring within and surrounding the windfarm site are sub-optimal for sensitive waders such as Golden Plover.

Passerines: Three Red-list species (Meadow Pipit, Redwing and Yellowhammer) and eleven Amber-list species (Willow Warbler, Starling, Linnet, Swallow, Goldcrest, Greenfinch, House Martin, House Sparrow, Skylark, Tree Sparrow and Wheatear) were recorded during field surveys. These species were identified to be at risk to only slight/not significant effects as result of the construction works.

Waterbirds: Habitat within and associated with the Gathabawn Windfarm Project (Ballylehaun, Ballyring) site is generally unsuitable to support water bird species. However a number of species were recorded in the area including four species of waterbird, Black-headed Gull, Lesser Black-backed Gull, Mute Swan and Whooper Swan, that were selected for collision risk assessment based on their presence at Gathabawn Windfarm site and their status. Collision Risk Assessment for these species gives a Not Significant impact. The Windfarm was considered to pose negligible to no magnitude of effect on other waterbird species (Cormorant, Herring Gull and Mallard).

Overall, it is considered that the proposed Gathabawn Windfarm Project (Ballylehaun, Ballyring) Project will result in Neutral to Not Significant effects on Bird of Prey, Passerine, Wader and Waterbird species receptors.

Gathabawn Windfarm Project (Ballylehaun, Ballyring, Candidate Gathabawn Grid Connection)

With the exception of watercourse crossings discussed below, no additional features of potential value for Birds were identified within areas potentially affected by the wider Gathabawn Windfarm Project (Ballylehaun, Ballyring, Candidate Gathabawn Grid Connection) and impacts are therefore, likewise, assessed as Not Significant.

The Candidate Gathabawn Grid Connection will involve the presence of construction equipment, activities and drilling within 100m of the River Nore. Therefore, these crossings may result in the potential for disturbance and displacement to Kingfisher that may be present and also potential impacts to prey though impacts to water quality. Any pollution events associated with construction activities would pose low to moderate to Very High impacts to watercourses hosting Kingfisher and impacts could be Very High in nature to downstream water quality

With the adoption of appropriate mitigation measures impacts are assessed as Slight and Not Significant.

AQUATIC HABITATS & SPECIES:

Gathabawn Windfarm Project (Ballylehaun, Ballyring).

A number Aquatic invertebrates of conservation concern (salmonoids and lamprey sp.) were recorded during targeted aquatic surveys in downslope watercourses. Due to separation distances of the Gathabawn Windfarm Project (Ballylehaun, Ballyring) Project from local streams and rivers, and in the absence of instream works, it is considered that the magnitude of any impacts would be low – negligible to watercourses. Therefore, given the hydrological separation distance, the extent of a worst-case scenario pollution or sediment release event, the impact would be negative, temporary to short term and of moderate significance.

Worst case scenario impacts did consider surface run-off into the watercourses but did not elevate any likely connectivity or impact magnitude beyond negligible levels. As such, due to limited connectivity to aquatic receptors, the absence of instream or watercourse crossing works associated with the proposed construction works, it was considered that the proposed Gathabawn Windfarm Project (Ballylehaun, Ballyring) Project will result in no impacts or Not Significant effects on aquatic Species or habitat receptors.

Gathabawn Windfarm Project (Ballylehaun, Ballyring, Candidate Gathabawn Grid Connection)

With the exception of watercourse crossings discussed below, no additional features of potential value relating to Aquatic Habitats and Species were identified within areas potentially affected by the wider Gathabawn Windfarm Project (Ballylehaun, Ballyring, Candidate Gathabawn Grid Connection) and impacts are therefore, likewise, assessed as Not Significant.

The Candidate Gathabawn Grid Connection will involve the presence of construction equipment, activities and drilling within 100m of the River Nore. Therefore, these crossings may result in impacts to water quality and water quality dependent habitats and species. Any pollution events associated with the watercourse crossings would pose low to moderate to Very High impacts to watercourses hosting aquatic habitats and species. Given the hydrological separation distance and the extent of a worst-case scenario pollution or sediment release event, the impact would be Very High in nature to downstream water quality.

With the adoption of appropriate mitigation measures impacts are assessed as Slight and Not Significant.

DESIGNATED SITES:

Gathabawn Windfarm Project (Ballylehaun, Ballyring).

No designated site overlaps with or is directly connected to the location of the Gathabawn Windfarm Project (Ballylehaun, Ballyring) although Cullahill Mountain SAC lies in close proximity to the Ballylehaun element of the Project and the River Barrow and River Nore SAC, River Nore SPA and Abbeyleix Woodland Complex pNHA lie downstream.

Due to the proximity of the Gathabawn Windfarm Project (Ballylehaun, Ballyring) to Cullahill Mountain SAC, air quality effects and air pollution during construction has the potential to affect sensitive habitats, leading to long-term habitat degradation of the site.

In addition, there is potential for indirect effects via surface water or groundwater pathways to downslope watercourses which eventually drain into the River Barrow and River Nore SAC, River Nore SPA and Abbeyleix Woodland Complex pNHA . These sites were screened in for further detailed examination as it was considered there was potential for significant impacts as a result of reductions in water quality, changes in flow rates or risk of spreading invasive species, as a result of the development of the Gathabawn Windfarm Project (Ballylehaun, Ballyring) .

With the implementation of mitigation measures to reduce potential air pollution and dust control and protect water quality, the installation of the drainage network at the windfarm and the implementation of the Sediment & Erosion/Storm Water Control Plan (part of the Environmental Management Plan for the

Project), and measures to control the risk of spreading invasive species, all impacts to designated sites will be Not Significant.

Gathabawn Windfarm Project (Ballylehaun, Ballyring, Candidate Gathabawn Grid Connection)

With the exception of watercourse crossings discussed below, no additional features relating to Designated Sites were identified within areas potentially affected by the wider Gathabawn Windfarm Project (Ballylehaun, Ballyring, Candidate Gathabawn Grid Connection) and impacts are therefore, likewise, assessed as Not Significant.

The Candidate Gathabawn Grid Connection will involve the presence of construction equipment, activities and drilling within 100m of the River Nore.

In relation to the Special Conservation Interest bird species (Kingfisher) of the River Nore SPA, and the Qualifying Interests of the River Barrow and River Nore SAC due to the scale of drilling excavations and storage/movement of overburden at the Candidate Gathabawn Grid Connection, the use of machinery run on hydrocarbons, and the use of concrete for foundation construction, that there is potential for construction works to release sediment or contaminants to downslope watercourses, and in the absence of mitigation measures these effects could be significant. Any such pollution event would pose low to moderate to Very High impacts to watercourses hosting this QIs ex-situ of the SAC. Given the hydrological separation distance and the extent of a worst-case scenario pollution or sediment release event, the impact would be Very High in nature to downstream water quality for QIs and SCIs

With the adoption of appropriate mitigation measures impacts are assessed as Slight and Not Significant

CONCLUSION:

Overall, it is evaluated that the residual impact on the Environmental Factor, Biodiversity, will be Neutral and Not Significant. This is based on receptors being unlikely to experience direct impacts above negligible magnitude and indirect impacts unlikely to result in adverse effects due to the extent of potential impact sources being short-term or temporary in nature and the mitigation measures proposed addressing worst-case scenario prevention and response measures.

Therefore, based on ecological receptors identified, their conservation status and sensitivity to impacts, informed by the best-evidence and scientific knowledge at the time of writing, the nature of the duly considered impacts magnitude, the unlikelihood for adverse effects and the proposed mitigation measures it is evaluated that the proposed Gathabawn Windfarm Project (Ballylehaun, Ballyring) and Gathabawn Windfarm Project (Ballylehaun, Ballyring, Candidate Gathabawn Grid Connection) will not result in any significant adverse effects on ecological receptors within the receiving environment as a result of its Construction, Operational or Decommissioning phase works or in-combination with other projects.

EIAR 13.7 Glossary, List of Abbreviations

Glossary of Terms

Term	Definition
Afforestation	The establishment of a forest or stand of trees (forestation) in an area where there was no previous tree cover.
Appropriate Assessment	An assessment required by the EU Habitats Directive where a project (or plan) would be likely to have a significant effect on a European site, either alone or in combination with other plans or projects.
Gathabawn Windfarm	Twelve wind turbines are proposed for two areas – seven turbines in the Ballylehaun area and five turbines in the Ballyring area. In addition to the turbines and their hardstanding areas, the windfarm also includes site access roads, two Control Buildings; a met mast, underground cabling, temporary works to facilitate turbine deliveries, and other associated and ancillary works.
Candidate Gathabawn Grid Connection	Underground cabling between the Ballylehaun and Ballyring Areas (Ballylehaun-Ballyring UGC), underground cabling from the Ballyring Area (from Ballyring Control Building) to a new substation at Parksgrove (Ballyring-Parksgrove UGC), the Parksgrove Substation, and underground cabling from the substation to the existing Eirgrid Ballyragget Substation in Moatpark (Parksgrove-Moatpark UGC). The Candidate Gathabawn Grid Connection is not included as part of this Planning Application, it will be subject of a separate Planning Application, at a future date. The Candidate Gathabawn Grid Connection is considered in this EIA Report in order to facilitate the cumulative evaluation of the Whole Project.
Baseline Environment	The conditions that would pertain in the absence of the proposed project at the time that the project would be constructed / operated / decommissioned. The definition of these baseline conditions should be informed by changes arising from other causes (e.g. other consented developments).
Biodiversity	The biological diversity of the earth's living resources. The total variability among organisms and ecosystems.
Catchment	A catchment is a hydrological unit. Each drop of precipitation that falls into a catchment area eventually ends up in the same river. Catchment areas are separated from each other by watershed.
Climate Change	A change in global or regional climate patterns, in particular a change apparent from the mid to late 20th century onwards and attributed largely to the increased levels of atmospheric carbon dioxide produced by the use of fossil fuels.
Conservation Objective	Objective for the conservation of biodiversity (e.g. specific objective within a management plan or broad objectives of policy).
Conservation Status	The state of a species or habitat including for example, extent, abundance, distribution and their trends.
Couches	Overground nest-like structure used by Otter for resting and/or breeding
Degradation	The condition or process of degrading or being degraded
Designated Site	General term for sites which have been designated for nature conservation and for which legal protection has been conferred onto the sites. In Ireland, these included Special Areas of Conservation and Special Protection Areas. In addition to Natural Heritage Areas designated under national legislation.
Displacement	The action of moving something from its place or position
Distribution	The geographical presence of a feature. This can depend on factors such as climate and altitude

Disturbance	Disturbance is a temporary change in environmental conditions that causes a pronounced change in an ecosystem
EIA	Environmental Impact Assessment
Enhancement	The genuine enhancement of the natural heritage interest of a site or area because the project includes improved management or new habitats or features, which are better than the prospective management, or the habitats or features present there now. There is, therefore, a net or new benefit to the natural heritage
Fauna	Fauna is all of the animal life of any particular region or time
Flora	Flora is the plant life occurring in a particular region or time
Flora Protection Order	The current list of plant species protected by Section 21 of the Wildlife Act, 1976 is set out in the Flora (Protection) Order, 2015, which supersedes orders made in 1980, 1987 and 1999.
Fragmentation	The breaking up of a habitat, ecosystem or land-use type into smaller parcels with a consequent impairment of ecological function
Habitat	The place or type of site where an organism or population naturally occurs. Often used in the wider sense referring to major assemblages of plants and animals found together
Holt	Created or existing underground shelter used by Otter for resting and/or breeding
Natura Impact Statement	Under the European Communities (Birds and Natural Habitats) Regulations 2011 (SI 477 of 2011), an EcIA report including the scientific assessment of a plan or project in relation to relevant Natura 2000 sites and other information required to enable a competent authority to carry out an Appropriate Assessment
Natural Heritage Area	The basic designation for wildlife in Ireland is the Natural Heritage Area (NHA). This is an area considered important for the habitats present or which holds species of plants and animals whose habitat needs protection.
Proposed Natural Heritage Area	Proposed NHAs (pNHAs) were published on a non-statutory basis in 1995 and have not since been statutorily proposed or designated. These sites are of significance for wildlife and habitats are subject to limited protection, in the form of agrienvironmental farm planning schemes, NPWS approval for afforestation schemes on pNHA lands and recognition of the ecological value of pNHAs by Planning and Licencing Authorities
Qualifying Interest	Habitats listed on Annex I and Species listed on Annex II of the EU Habitats Directive for which Special Areas of Conservation have been designated
Riparian	Relating to or situated on the banks of a river
Roost	Resting place for a bird or bat
SAC/cSAC	Site designated according to the habitats directive. Special area of conservation means a site of Community importance designated by the Member States through a statutory, administrative and/or contractual act where the necessary conservation measures are applied for the maintenance or restoration, at a favourable conservation status, of the natural habitats and/or the populations of the species for which the site is designated
Sett	Series of underground tunnels and chambers of varying complexity used by Badgers for resting and breeding
Special Protection Area	Area classified under Article 4 of the birds directive (Council Directive 79/409/EEC of 2 April 1979 on the conservation of wild birds).
Special Conservation Interest	Species listed on Annex I of the EU Birds Directive as well as wetland habitats for which Special Protection Areas have been designated for the conservation of birds

List of Abbreviations

Abbreviation	Full Term
AA	Appropriate Assessment
CSZ	Core Sustenance Zone
CWA	Construction Works Area
DBS	Devils-Bit Scabious
EIA	Environmental Impact Assessment
EMF	Electromagnetic Fields
EMP	Environmental Management Plan
EPA	Environmental Protection Agency
FPM	Freshwater Pearl Mussel
FPO	Flora Protection Order
HDD	Horizontal Directional Drilling
HR	Haul Route works location
IAPS	Invasive Alien Plant Species
IFI	Inland Fisheries Ireland
IUCN	International Union for Conservation of Nature
KER	Key Ecological Receptor
NBDC	National Biodiversity Data Centre
NHA	Natural Heritage Area
NPWS	National Parks and Wildlife Service
OHL	Overhead Line
OS	Ordnance Survey
pNHA	Proposed Natural Heritage Area
PRA	Preliminary Roost Assessment
QI	Qualifying Interest
SAC	Special Area of Conservation
SCI	Special Conservation Interest
SPA	Special Protection Area
SPR	Source-Pathway-Receptor
VP	Vantage Point
WFD	Water Framework Directive
WWTP	Wastewater Treatment Plant

EIAR 13.8 Reference List

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EIAR Chapter 13: Biodiversity

Figure 13.1.1 - Terrestrial Habitats (Map 1 of 2)

Legend:

- Gathabawn Turbine
- 50m Study Area from Proposed Gathabawn Windfarm Construction Works Area
- 50m Study Area from Candidate Gathabawn Grid Connection Construction Works Area
- BC1 - Arable crops
- BL1 - Stone walls and other stonework
- BL1/WL1 - Stone walls and other stonework/Hedgerows
- BL3 - Buildings and artificial surfaces
- BL3/GA2 - Buildings and artificial surfaces/Amenity grassland
- ED2 - Spoil and bare ground
- ED3 - Recolonising bare ground
- ED3/GS2 - Recolonising bare ground/Dry meadows and grassy verges
- ED5 - Refuse and other waste
- ER2 - Exposed calcareous rock
- FL8 - Other artificial lakes and ponds
- FW1 - Eroding/upland rivers
- FW4 - Drainage ditches
- GA1 - Improved agricultural grassland
- GA1/ER2 - Improved agricultural grassland/Exposed calcareous rock
- GA1/ER2/WD5 - Improved agricultural grassland/Exposed calcareous rock/Scattered trees and parkland
- GA1/HD1 - Improved agricultural grassland/Dense bracken
- GA1/WS1 - Improved agricultural grassland/Scrub
- GA2 - Amenity grassland
- GS1 - Dry calcareous and neutral grassland
- GS2 - Dry meadows and grassy verges
- GS4/WS1 - Wet grassland/Scrub
- WD1 - (Mixed) broadleaved woodland
- WD4 - Conifer plantation
- WL1 - Hedgerows
- WL2 - Treelines
- WL2/BL1 - Treelines/Stone walls and other stonework
- WN2 - Oak-ash-hazel woodland
- WS1 - Scrub
- WS3 - Ornamental/non-native shrub
- Invasive Species - Japanese Knotweed

T1 T2 T3 T4 T5 T6 T7 T8 T9 T10 T11 T12

Location of Japanese Knotweed

N

EIAR Chapter 13: Biodiversity

Figure 13.1.2 - Terrestrial Habitats (Map 2 of 2)

Legend:

- 50m Study Area from Candidate Gathabawn Grid Connection Construction Works Area
- BC1 - Arable crops
- BL1 - Stone walls and other stonework
- BL3 - Buildings and artificial surfaces
- BL3/GA2 - Buildings and artificial surfaces/Amenity grassland
- ED2 - Spoil and bare ground
- ED3 - Recolonising bare ground
- FW1 - Eroding/upland rivers
- FW2 - Depositing/lowland rivers
- GA1 - Improved agricultural grassland
- GS2 - Dry meadows and grassy verges
- WD1 - (Mixed) broadleaved woodland
- WD4 - Conifer plantation
- WL1 - Hedgerows
- WL2 - Treelines

N

EIAR Chapter 13: Biodiversity

Figure 13.2 - Invertebrates, Amphibians and Reptiles

Legend:

- Gathabawn Turbine
- Proposed Gathabawn Windfarm Construction Works Area
- 50m Study Area from Proposed Gathabawn Windfarm Construction Works Area
- Candidate Gathabawn Grid Connection Construction Works Area
- 50m Study Area from Candidate Gathabawn Grid Connection Construction Works Area
- Amphibian Nocturnal Survey 2025
- Amphibian Suitability Survey 2025
- Reptile Mat Deployment Survey 2025 - Good Suitability
- Reptile Survey 2025 - Good Suitability
- Reptile Survey 2025 - Unknown Suitability
- Smooth Newt
- Larvel Web Search 2026

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Figure 13.3 - Terrestrial Mammals

Legend:

- Proposed Gathabawn Windfarm Construction Works Area
- 100m Study Area from Proposed Gathabawn Windfarm Construction Works Area
- Candidate Gathabawn Grid Connection Construction Works Area
- 100m Study Area from Candidate Gathabawn Grid Connection Construction Works Area
- Camera Trap - Spring 2025
- Camera Trap - Autumn 2025
- Otter Transect 2025
- Otter Transect Suitability 2025
- General Mammal Walkover Survey
- Secondary Badger Evidence
- Secondary Fox Evidence
- Otter Spraints at the River Nore
- Aquatic Survey Sites
- EPA Waterbodies

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Figure 13.4 - Bats

Legend:

- Proposed Gathabawn Windfarm Construction Works Area
- 500m Study Area from Proposed Gathabawn Windfarm Construction Works Area
- Candidate Gathabawn Grid Connection Construction Works Area
- 500m Study Area from Candidate Gathabawn Grid Connection Construction Works Area
- 2025 Preliminary Roost Assessment Locations - Low
- 2025 Preliminary Roost Assessment Locations - Moderate
- 2025 Preliminary Roost Assessment Locations - Negligible
- 2025 Preliminary Roost Assessment Locations - High
- 2025 Preliminary Roost Assessment Locations - PRF-I
- 2025 Preliminary Roost Assessment Locations - PRF-M
- 2025 Static Detector Locations - Spring
- 2025 Static Detector Locations - Summer
- 2025 Static Detector Locations - Autumn
- Bat Buffer Zone
- 2025 Bat Transects
- 2026 Vantage Points

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Figure 13.5.1 - Birds: Raptor Surveys

Legend:

- Proposed Gathabawn Windfarm Construction Works Area
- 5km Study Area from Proposed Gathabawn Windfarm Construction Works Area
- Candidate Gathabawn Grid Connection Construction Works Area
- 5km Study Area from Candidate Gathabawn Grid Connection Construction Works Area
- Barn Owl Study
- Incidental Barn Owl sighting
- Hen Harrier Survey
- Raptor Suitability - Low
- Raptor Suitability - Intermediate
- Raptor Suitability - High
- Peregrine Survey
- Kestrel Survey

N

EIAR Chapter 13: Biodiversity

Figure 13.5.2 - Birds: Breeding Wader Survey

Legend:

- Proposed Gathabawn Windfarm Construction Works Area
- 5km Study Area from Proposed Gathabawn Windfarm Construction Works Area
- Candidate Gathabawn Grid Connection Construction Works Area
- 5km Study Area from Candidate Gathabawn Grid Connection Construction Works Area
- Breeding Wader Survey Area

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Figure 13.5.3 - Birds: iWEBS Survey Locations

Legend:

- Proposed Gathabawn Windfarm Construction Works Area
- 5km Study Area from Proposed Gathabawn Windfarm Construction Works Area
- Candidate Gathabawn Grid Connection Construction Works Area
- 5km Study Area from Candidate Gathabawn Grid Connection Construction Works Area
- iWEBS Survey Locations 2022-2023
- iWEBS Survey Locations 2025-2026
- Kingfisher Survey 2025-2026
- Kingfisher Sighting
- Nore Waterbird Vantage Point 2026
- Swan Vantage Point 2022

N

EIAR Chapter 13: Biodiversity

Figure 13.5.4 - Birds: Vantage Point Locations and Transect Surveys

Legend:

- Proposed Gathabawn Windfarm Construction Works Area
- Candidate Gathabawn Grid Connection Construction Works Area
- Vantage Locations
  - Winter 2022-2023
  - Winter 2025-2026
  - Breeding 2025
  - Breeding 2026
- Additional Vantage Point location for Vantage Point Winter 2022-2023
- Transect Surveys 2022-2023
- Transect Surveys 2025-2026

VP1
VP2
VP3
VP4
VP5
VP6
VP7
T1
T2
T3
T4
T5
T6
T7
T8
T9
T10
T11
T12

N

EIAR Chapter 13: Biodiversity

Figure 13.6 - Aquatic Habitats & Species

Legend:

- Proposed Gathabawn Windfarm
- Candidate Gathabawn Grid Connection
- EPA Waterbodies
- Aquatic Survey Sites & Electro-Fishing Sites
- EPA Monitoring Station
- Wetland Areas of Biodiversity Importance
- eDNA Sample Location

WFD SubBasins:

- Gorteenahilla_010
- Goul_050
- Goul_060
- Nore_120
- Nore_130
- Nore_140
- Nore_150

Source: Environmental Protection Agency

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Figure 13.7.1 - European Sites (SPA & SAC)

Legend:

- Proposed Gathabawn Windfarm
- Candidate Gathabawn Grid Connection
- Special Protection Area (SPA)
- Special Area of Conservation (SAC)
- EPA Waterbodies

WFD SubCatchments:

- Goul_SC_010
- Nore_SC_070
- Nore_SC_080
- Nore_SC_090
- Nore_SC_100
- Nore_SC_110
- Nore_SC_120
- Nore_SC_130

Source:
-Environmental Protection Agency
-National Parks & Wildlife Service

Lisbigney Bog SAC (000869)
Nore_SC_060
River Barrow and River Nore SAC (002162)
Galmoy Fen SAC (001858)
River Nore SPA (004233)
Cullahill Mountain SAC (000831)
Nore_SC_080
Nore_SC_070
Goul_SC_010
Spahill And Clomantagh Hill SAC (000849)
The Loughans SAC (000407)
Nore_SC_100
Nore_SC_090
Goul_SC_110
Goul_SC_120
Goul_SC_130
Killenaule
COUNTY KILKENNY
Thomastown
Graiguenamanagh
N

EIAR Chapter 13: Biodiversity

Figure 13.8 - Designated Sites (pNHA)

Legend:

- Proposed Gathabawn Windfarm
- Candidate Gathabawn Grid Connection
- Protected Natural Heritage Area (pNHA)
- EPA Waterbodies

WFD SubCatchments:

- Goul_SC_010
- Nore_SC_070

Source:
-Environmental Protection Agency
-National Parks & Wildlife Service

Cuffsborough pNHA (000418)

Grantstown Wood And Lough pNHA (000417)

Coolacurragh Wood pNHA (000862)

Lisbigney Bog pNHA (000869)

River Nore/Abbeyleix Woods Complex pNHA (002076)

The Curragh And Goul River Marsh pNHA (000420)

Galmoy Fen pNHA (001858)

Cullahill Mountain pNHA (000831)

Goul_SC_010

Spahill And Clomantagh Hill pNHA (000849)

Nore_SC_070

Inchbeg pNHA (000836)

The Loughans pNHA (000407)

Ardaloo Fen pNHA (000821)

N

Figure 13.9.1: Other Projects Scoped-In for the Biodiversity Cumulative Evaluations

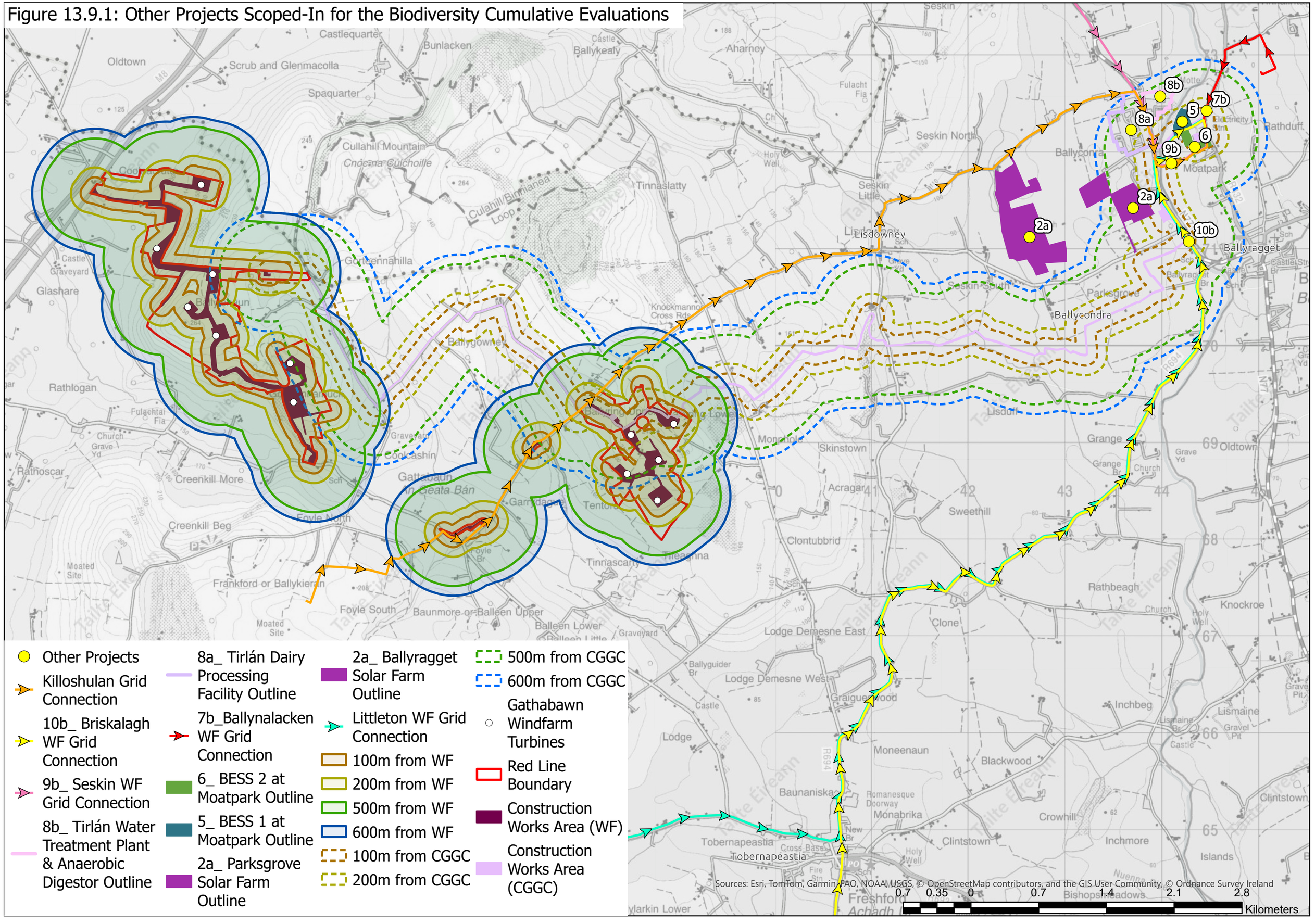


Figure 13.9.2: Other Projects Scoped-In for the Biodiversity Cumulative Evaluations

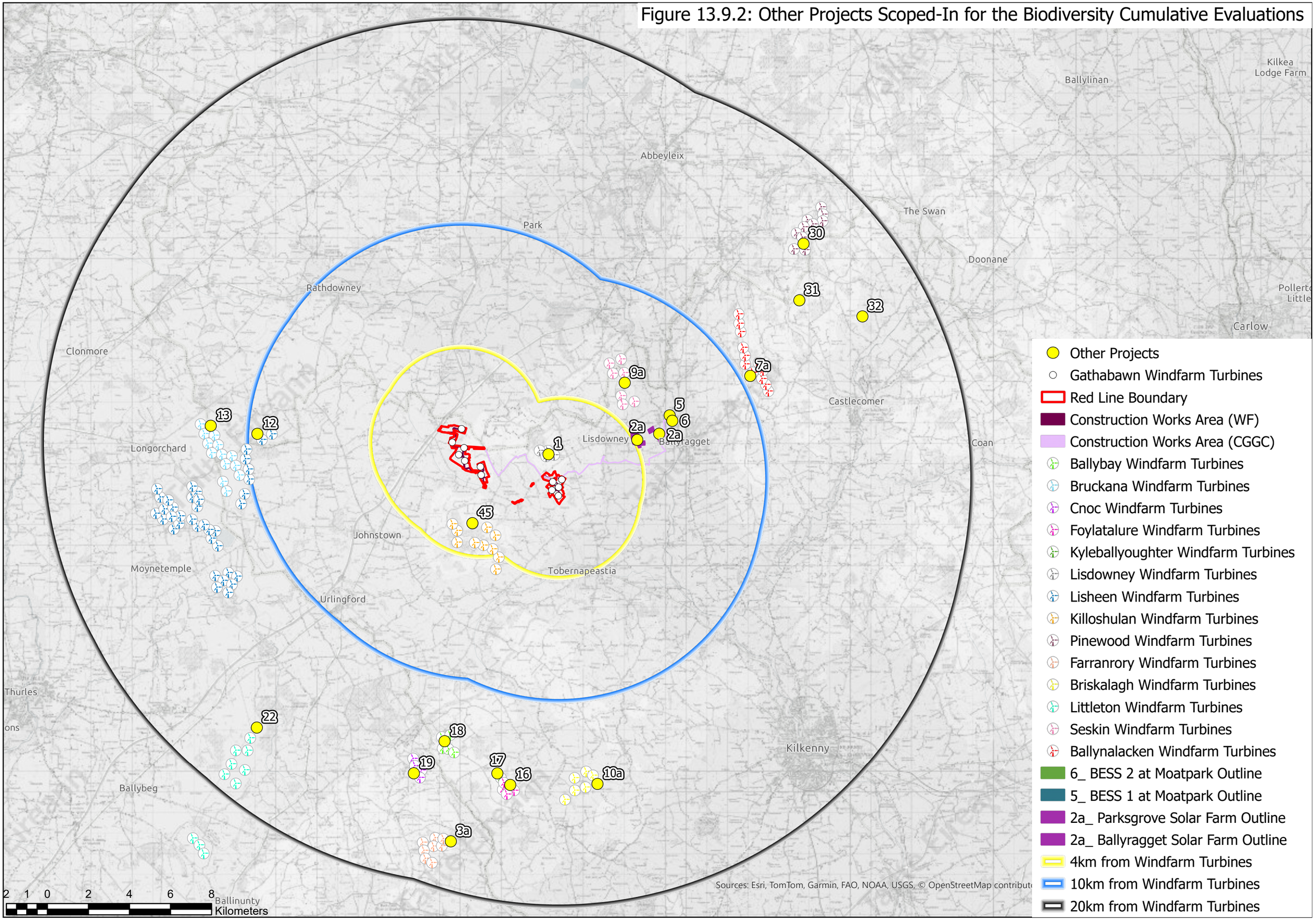
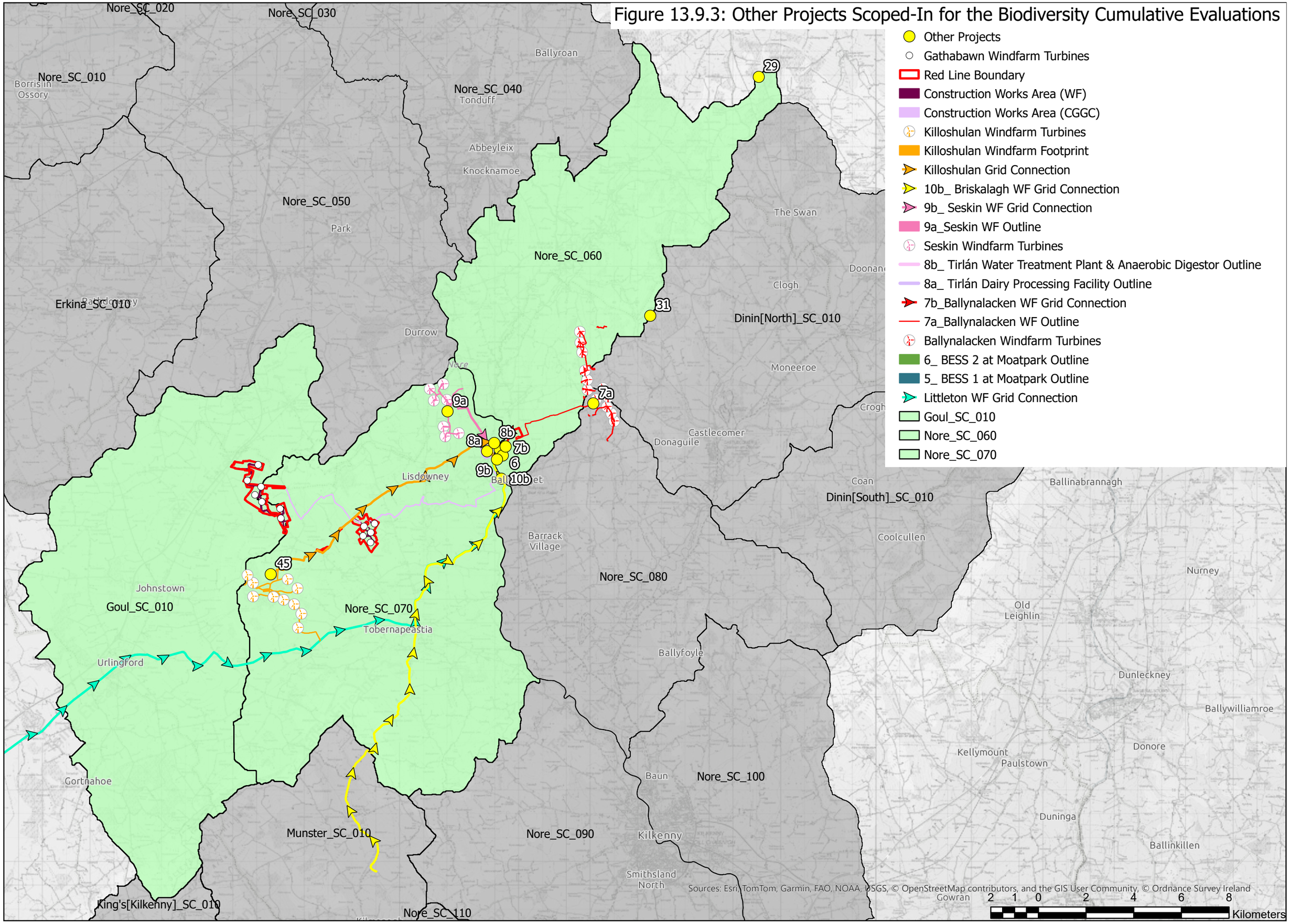


Figure 13.9.3: Other Projects Scoped-In for the Biodiversity Cumulative Evaluations



Appendix to Chapter 13: Biodiversity

Appendix 13.1: Methodology for the evaluation of Biodiversity

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A13.1 Methodology Applied during the Preparation of Chapter 13: Biodiversity

The criteria used for the scoping and subsequent impact evaluation in this report is based on *Environmental Impact Assessment of Projects: Guidance on the preparation of Environmental Impact Assessment Report* (EU, 2017), Guidelines on the information to be contained in Environmental Impact Assessment Reports (EIAR) (EPA, 2022).

A13.1.1 Legislation & Regulations

The following legislation and regulations are relevant to Biodiversity and have been taken into account in this EIA Report:

- Kilkenny County Development Plan 2021-2027
- Natura Impact Report in Support of the Appropriate Assessment for the Chief Executive's Draft Kilkenny City and County Development Plan 2021-2027
- National Biodiversity Action Plan (2017-2021)
- The All-Ireland Pollinator Plan 2021-2025
- EU Birds Directive (2009) Directive 2009/147/EC
- EU Habitats Directive (1992) Council Directive 92/43/EEC
- EC (Birds and Natural Habitats) Regulations 2011 (as amended)
- Water Framework Directive (2000) Directive 2000/60/EC
- Irish Wildlife Acts 1976 to 2018
- The International Convention on Wetlands of International Importance especially as Waterfowl Habitat 1971
- Irish Statute Book (various) European Communities (Natural Habitats) Regulations 1997 (S.I. 94/97) as amended

A13.1.2 Guidance Documents

The recommendations in the guidelines listed below, have been considered during the preparation of this chapter:

<u>Ecological Evaluation</u>

- National Roads Authority (2008) *Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes*
- Chartered Institute of Ecology and Environmental Management (2016 & 2018) *Guidelines for Ecological Impact Assessment in the UK and Ireland*
- Environment Agency (2014) *UK Pollution Prevention Guidelines (PPG)*
- Environmental Protection Agency (2022) *Guidelines on the Information to be contained in EIA Reports*

<u>General Breeding and Wintering Birds, and other Bird Species Groups</u>

- Birdwatch Ireland (2010) *An assessment of the effects of Arterial Drainage Maintenance on Kingfisher and other riparian birds*
- Birdwatch Ireland (2012) *Guidelines for Countryside Bird Survey Participants*
- Gilbert *et al*. (2021) *Birds of Conservation Concern in Ireland 2020-2026*
- Cummins *et al.* (2010) *Assessment of the distribution and abundance of Kingfisher and other riparian birds on six SAC river systems in Ireland,* Birdwatch Ireland
- Crowe *et al*. (2017) *Countryside Bird Survey Report 1998-2013*, BirdWatch Ireland
- Bibby *et al.* (2000) *Bird Census Techniques*, 2nd Edition. Academic Press, London

- NatureScot (formerly SNH) (2017) *Recommended bird survey methods to inform impact assessment of onshore Wind Farms*. Version 2. SNH, Battleby

Raptors

- Gilbert *et al*. (2021) *Birds of Conservation Concern in Ireland 2020-2026*
- Hardey et al. (2013) *Raptors: a field guide to survey and monitoring,* (3rd Edition)
- Transport Infrastructure Ireland (2017) *Barn Owl Surveying Standards for National Road Projects,* TII Publications, Transport Infrastructure Ireland, Dublin
- Shawyer (2011) *Barn Owl Survey Methodology and Techniques for use in Ecological Assessment: developing best practice in survey and reporting*. IEEM,Winchester

Waders and Waterbirds

- O'Brien & Smith (1992) *Changes in the status of waders breeding on wet lowland grasslands in England and Wales between 1982 and 1989*
- Heward *et al*. (2015) *Current status and recent trend of the Eurasian Woodcock Scolopax rusticola as a breeding bird in Britain*, Bird Study, 62**:** 535-551.
- Hoodless *et al*. (2006*) Development of a survey method for breeding Woodcock and its application to assessing the status of the British population*
- National Roads Authority (2008) *Guidelines for the Crossing of Watercourses During the Construction of National Road Schemes,* National Roads Authority.
- I-WeBS (2008) *Counter Manual. Guidelines for Irish Wetland Bird Survey Counters*, BirdWatch Ireland & National Parks and Wildlife Service, Dublin

Terrestrial Habitats

- Fossitt, J. (2000) *A Guide to the Habitats of Ireland*
- Smith *et al.* (2011) *Best Practice Guidance for Habitat Survey and Mapping*, Heritage Council Ireland.
- National Parks and Wildlife Service (2019 *The Status of Protected EU Habitats and Species in Ireland. Volume 1: Summary Overview.* Unpublished NPWS Report (NPWS_2019_Vol1_Summary_Article17.pdf)

Bats

- Bat Conservation Ireland (2026) *Bat Survey, Assessment and Mitigation Guidelines for Onshore Wind Farms in Ireland*. Bat Conservation Ireland, Ireland.
- Billington *et al*. (1997) *The Conservation of Bats in Bridges Project*. Natural England
- Collins (2023) *Bat Surveys for Professional Ecologists: Good Practice Guidelines* (4th Ed.) The Bat Conservation Trust, London.
- National Road Authority (2006) *Guidelines for the treatment of bats during the construction of National Road scheme*
- Lundy *et al*. (2011) *Landscape conservation for Irish bats & species-specific roosting characteristics*, Bat Conservation Ireland
- Hundt (2012) *Bat Activity Index*
- Russ (2012) *British Bat Calls: A Guide to Species Identification*
- NatureScot (2021) *Bats and onshore wind turbines - survey, assessment and mitigation*
- Kelleher C., Marnell F. and Mullen E, (2022) *Bat Mitigation Guidelines for Ireland V2*, Irish Wildlife Manuals, No. 134. National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland
- Bat Conservation Ireland (2013) *Irish Bats in Flight*, Department of Environment, Heritage and Local Government

Terrestrial Mammals

- Marnell *et al.* (2019) *Red List No. 12: Terrestrial Mammals*, National Parks and Wildlife Service
- Lysaght and Marnell (2016) *Atlas of Mammals in Ireland 2010-2015*
- Lawton *et al*. (2020) *Irish Wildlife Manual 121*, All-Ireland Squirrel and Pine Marten Survey 2010
- National Roads Authority (2005) *Guidelines for the Treatment of Badgers prior to the Construction of National Road Schemes*
- Sleeman *et al.* (2009) *How many Eurasian badgers are there in Ireland?* European Journal of Wildlife Research
- National Roads Authority (2006) *Guidelines for the Treatment of Otters prior to the Construction of National Road Schemes*
- Highways Agency (1999) *The Good Roads Guide: Nature Conservation Advice in Relation to Otters Design Manual for roads and Bridges* (DMRB Vol 10 S. 4 Part 4 HA 81/99)
- Reid *et al.* (2013) *Irish Wildlife Manuals No. 76*, National Otter Survey of Ireland 2010/12

Reptiles & Amphibians

- National Roads Authority (2008) *Ecological Surveying Techniques for Protected Flora and Fauna During the Planning of National Road Schemes*

Aquatic Habitats & Species

- National Roads Authority (2005) *Guidelines for the Crossing of Watercourses during the Construction of National Road Schemes*
- Inland Fisheries Ireland (2016) *Guidelines on Protection of Fisheries during Construction Works in and Adjacent to Waters*
- Eastern Regional Fisheries Board (n.d.) *Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites*
- Construction Industry Research and Information Association (2006) *Guidance on 'Control of Water Pollution from Linear Construction Projects'*
- Construction Industry Research and Information Association (2001) *Control of Water Pollution from Construction Sites - Guidance for Consultants and Contractors*
- Meehan (2013) *National Smooth Newt Survey 2013 Report*, Irish Wildlife Trust.
- National Biodiversity Data Centre (2021) *Data for records of Common Frog held by NDBC*.
- National Roads Authority (2008) *Ecological Surveying Techniques for Protected Flora and Fauna During the Planning of National Road Schemes* were followed when carrying out surveys.

Invasive Species

- Kelly *et al*. (2013a) *The economic cost of invasive species and non-native species in Ireland and Northern Ireland*, A report prepared for the N.I. Environment Agency and NPWS
- Kelly, *et al.* (2013b) *Risk analysis and prioritisation for invasive and non-native species in Ireland and Northern Ireland*, A report prepared for the N.I. Environment Agency and NPWS.
- O'Flynn *et al.* (2014) *Ireland's invasive and non-native species – trends in introductions*, NBDC Series No. 2.

Terrestrial Invertebrates

- National Biodiversity Data Centre (2015) *Marsh Fritillary Monitoring Scheme*
- Fowles & Smith (2006) *Mapping the habitat quality of patch networks for the marsh fritillary*

A13.1.3 Methodology used to Describe the Baseline Environment and to Evaluate Effects

A combination of NRA guidance (NRA, 2009) and methodology developed by Percival (2007) was used to evaluate the sensitivity of ecological receptors, the magnitude of impacts and the resultant significance of likely or potential effects to relevant aspects of Biodiversity as a result of the development of the Gathabawn Windfarm Project.

Potential impacts on receptors were assessed using the '*Guidelines for Ecological Impact Assessment in the UK and Ireland'* (CIEEM, 2018) and '*Guidelines on the information to be contained in Environmental Impact Assessment Reports'* (EPA, 2022). Reference was also made to Reason and Wray (2025), SNH (2021) and Collins (2023) with regards to the evaluation of bat roosts and commuting routes/foraging areas.

A13.1.3.1 Determining the Importance of the Biodiversity resources (NRA, 2009)

The importance of biodiversity resources within the study areas for the Gathabawn Windfarm has been derived from NRA guidance (2009), as outlined in the table below.

Table 1: NRA Evaluation Guidance (NRA, 2009)

Resource Evaluation	**NRA Criteria**
International Importance	● 'European Site' including Special Area of Conservation (SAC), Site of Community Importance (SCI), Special Protection Area (SPA) or proposed Special Area of Conservation. ● Proposed Special Protection Area (SPA) or Important Bird Area (IBA). Site that fulfils the criteria for designation as a 'European Site' (see Annex III of the Habitats Directive, as amended). Features essential to maintaining the coherence of the Natura 2000 Network. ● Site containing 'best examples' of the habitat types listed in Annex I of the Habitats Directive. ● 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. ● Ramsar Site (Convention on Wetlands of International Importance Especially Waterfowl Habitat 1971). World Heritage Site (Convention for the Protection of World Cultural & Natural Heritage, 1972). ● Biosphere Reserve (UNESCO Man & The Biosphere Programme). Site hosting significant species populations under the Bonn Convention (Convention on the Conservation of Migratory Species of Wild Animals, 1979). ● Site hosting significant populations under the Berne Convention (Convention on the Conservation of European Wildlife and Natural Habitats, 1979). ● Biogenetic Reserve under the Council of Europe. European Diploma Site under the Council of Europe. ● Salmonid water designated pursuant to the European Communities (Quality of Salmonid Waters) Regulations, 1988, (S.I. No. 293 of 1988).
National Importance	● Site designated or proposed as a Natural Heritage Area (NHA). ● Statutory Nature Reserve. ● Refuge for Fauna and Flora protected under the Wildlife Acts. ● National Park. ● Undesignated site fulfilling the criteria for designation as a Natural Heritage Area (NHA); ● 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.

Resource Evaluation	**NRA Criteria**
County Importance	● Area of Special Amenity. ● Area subject to a Tree Preservation Order. ● Area of High Amenity, or equivalent, designated under the County Development Plan. ● 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. ● 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. ● County important populations of species, viable areas of semi-natural habitats or natural heritage features identified in the National or Local BAP, if this has been prepared. ● Sites containing semi-natural habitat types with high biodiversity in a county context and a high degree of naturalness, or populations of species that are uncommon within the county. ● Sites containing habitats and species that are rare or are undergoing a decline in quality or extent at a national level.
Local Importance (Higher Value)	● Locally important populations of priority species or habitats or natural heritage features identified in the Local BAP, if this has been prepared; ● Resident or regularly occurring populations (assessed to be important at the Local level) of the following: Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; Species 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. ● 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; ● 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.
Local Importance (Lower Value)	● Sites containing small areas of semi natural habitat that are of some local importance for wildlife; ● Sites or features containing non-native species that is of some importance in maintaining habitat links.

A13.1.3.2 Determining the Sensitivity of Biodiversity Receptors

Guidance from Percival (2007) and NRA (2009) has been used to evaluate the sensitivity of bird species to the proposed development. This rating system has also been used as a general guide for other biodiversity receptors throughout this report.

Table 2: Bird Sensitivity Rating Equivalency (Percival 2007 and NRA 2009 combined)

Sensitivity of Bird receptor	Percival 2007 criteria	NRA Resource Evaluation	NRA Criteria	Combined Criteria
Very High	Species is cited interest of SPA. Species present in Internationally important numbers.	International Importance	Resident or regularly occurring populations (assessed to be important at the national level) of the following: Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive.	• Species is cited interest of SPA. • Species present in Internationally important numbers. • Resident or regularly occurring populations (assessed to be important at the national level) of the following: Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive.
High	Other non-cited species which contribute to integrity of SPA. Ecologically sensitive species (<300 breeding pairs in UK) and less common birds of prey. Species listed on Annex 1 of the EU bird's directive. Regularly occurring relevant migratory species which are rare or vulnerable.	National Importance	Resident or regularly occurring populations (assessed to be important at the national level) of the following: Species protected under the Wildlife Acts; and/or Species listed on the relevant Red Data list.	• Other non-cited species which contribute to integrity of SPA • Ecologically sensitive species (<100 breeding pairs nationally to align with "Birds of Conservation 2020-2026" (Gilbert et al., 2021) and less common birds of prey. • Species listed on Annex 1 of the EU Bird's Directive. • Regularly occurring relevant migratory species which are rare or vulnerable. • Resident or regularly occurring populations (assessed to be important at the national level) of the following: Species protected under the Wildlife Acts; and/or Includes species listed on the relevant Red Data list that have experienced recent population declines or range contraction (BoCCI Red List).
Medium	Species present in regionally important numbers (>1% of regional population). Species occurring within SPA's but not	County Importance	Resident or regularly occurring populations (assessed to be important at the County level) of the following: Species of bird, listed in Annex I and/or referred	• Species present in regionally important numbers (>1% of regional population). • Species occurring within SPA's but not crucial to the integrity of the site. • Resident or regularly occurring populations (assessed to be important at the County level)

Sensitivity of Bird receptor	Percival 2007 criteria	NRA Resource Evaluation	NRA Criteria	Combined Criteria
	crucial to the integrity of the site. Species listed as priority species in the UK BAP subject to special conservation measures.		to in Article 4(2) of the Birds Directive; County important populations of species. Sites containing habitats and species that are rare or are undergoing a decline in quality or extent at a national level.	of the following: Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; • County important populations of species. • Species that are rare or are undergoing a decline in quality or extent at a national level. This includes all other BoCCI Red-listed species not included under "High" sensitivity and Amber-listed species that have experienced recent population declines or range contraction.
Low	Species covered above which are present very infrequently or in very low numbers. Any other species of conservation interest not covered above, e.g. species listed on the red or amber lists of the BoCCI.	Local Importance (High Value)	Locally important populations of priority species or habitats or natural heritage features identified in the Local BAP, if this has been prepared; Resident or regularly occurring populations (assessed to be important at the Local level) of the following: Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; Species protected under the Wildlife Acts; and/or Species listed on the relevant Red Data list.	• Locally important populations of priority species identified in the Local BAP, if this has been prepared. • Resident or regularly occurring populations (assessed to be important at the Local level) of the following: Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; Species protected under the Wildlife Acts; and/or Species listed on the relevant Red Data list. • Amber listed species (BoCCI) excluding those under "Medium" sensitivity which have experiences population decline/range contraction.
Negligible	Species that remain common and widespread.	Local Importance (Low Value)	N/A.	• Species that remain common and widespread. • Green Listed Species.

A13.1.3.3 Determining Magnitude of Impacts to Biodiversity Receptors (Percival, 2007)

A definition of terms used in respect of magnitude for bird species evaluations is outlined in the table below. This rating system has also been used as a general guide for magnitude quantification for other biodiversity receptors throughout this report.

Table 3: Determining Magnitude of Impacts (Percival, 2007)

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

A13.1.3.4 Determining Risk of Effect on Biodiversity Receptors (Percival, 2007)

The guidance probability rating definitions used to inform bird species evaluations in conjunction with the probability definitions, as outlined in Table 5, are outlined in Table 4 below. In some instances, consideration of a species sensitivity and or separation distance has merited an evaluation of less than LOW in respect of the probability of impacts, this is referenced in the text where applicable. This rating system has also been used as a general guide for determining risk in relation to other biodiversity receptors throughout this report.

Table 4: Birds – Risk classifications or likelihood that an impact will occur (Percival, 2007)

Probability	Description	Comments
High	Impact is likely to occur (>50% likelihood).	Species known to be vulnerable to specific impact.
Medium	Impact may occur (5-50% likelihood).	Species may be affected by specific impact.
Low	Impact is very unlikely (<5% likelihood).	Species known to be tolerant to specific impact.

The EPA also define the probability of effects, in the Guidelines on the Information to be contained in Environmental Impact Assessment Reports (EPA, 2022), as outlined in the table below.

Table 5: Probability of Effects (EPA, 2022)

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

A13.1.3.5 Determining Significance of Effect to Birds (Percival 2007 & EPA 2022 combined)

The Percival significance matrix used for bird species evaluations is provided in the table below. This matrix has also been used as a guide for determining the significance of impacts in relation to other biodiversity receptors throughout this report. The Equivalent EPA significance ratings have been applied to the table by the authors.

Table 6: Determining the Significance of Impacts (Percival 2007 with equivalent EPA Significance Ratings)

Significance		**Sensitivity**			
		Very High	**High**	**Medium**	**Low**
Magnitude	**Very High**	Very high/ Very significant	Very high/ Very significant	High/ Significant effects	Medium/ Moderate effects
	High	Very high/ Very significant	Very high/ Very significant	Medium/ Moderate effects	Low/ Slight effects
	Medium	Very high/ Very significant	High/ Significant effects	Low/ Slight effects	Very low/ Not Significant
	Low	Medium/ Moderate effects	Low/Slight effects	Low/Slight effects	Very low/ Not Significant
	Negligible	Low/ Slight effects	Very low/ Not Significant	Very low/ Not Significant	Very low/ Not Significant

Note: Very Low' significance (as per Percival 2007) is considered equivalent to the EPA definitions for 'Not Significant', or 'Imperceptible' or 'Neutral' depending on the context of the magnitude of the impact or the sensitivity of the receptor, determined by the authors based on their professional ecological judgement and experience. Similarly, the significance of impacts where the magnitude is Negligible is determined by the authors based on the context of the impact and their professional ecological judgement and experience. The application of the matrix above has been used as a guideline for determining receptor sensitivity and magnitude with full consideration of impact character, duration and overall context in relation to the ecological baseline in line with CIEEM guidance in assigning significant effect (CIEEM, 2018).

A13.1.3.6 EPA EIAR Guidance Definitions of Effects

Tables 7 to 9 outline the EPA evaluation criteria utilised in this appraisal of the Environmental Factor, Biodiversity. These criteria are included in the Guidelines on the Information to be contained in Environmental Impact Assessment Reports (EPA, 2022).

Table 7: Quality of Effects (EPA, 2022)

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

Table 8: Duration of Effects (EPA, 2022)

Duration of Effect	Description
Momentary Effects	Effects lasting from seconds to minutes.
Brief Effects	Effects lasting less than a day.
Temporary Effects	Effects lasting less than a year.
Short-term Effects	Effects lasting one to seven years.
Medium-term Effects	Effects lasting seven to fifteen years.
Long-term Effects	Effects lasting fifteen to sixty years.
Permanent Effects	Effects lasting over sixty years.

Table 9: Significance of Effects (EPA, 2022)

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

A13.1.4 Methodology – Desktop Review

A desktop review of secondary data was carried out to formulate the baseline and background of the proposed Gathabawn Windfarm Project. As mentioned in Section 13.1.2 of Chapter 13, sources reviewed include consultation responses from the DAU, IFI, and NPWS, Kilkenny City and County Development Plan 2021-2027 and the Laois County Development plan 2021-2027.

A13.1.4.1 Designated Sites – Desktop Review

A desktop review was conducted to inform scoping and identify features of ecological importance. A precautionary approach was adopted when identifying relevant European and National statutory sites, assessing all European and National sites surrounding the Gathabawn Windfarm to assess if they are within the Zone of Influence (ZoI) based on the Source-Pathway-Receptor (S-P-R) model (Office of the Planning Regulator (OPR), 2021a). Special Areas of Conservation (SACs), Special Protection Areas (SPAs), Natural Heritage Areas (NHAs) and Proposed Natural Heritage Areas (pNHAs) that could potentially be affected were identified using the S-P-R approach. This information was obtained by accessing the website of the National Parks and Wildlife Service (NPWS) of the Department of the Environment, Heritage and Local Government.

Other potential sites of conservation interest were identified by an examination of NPWS and EPA maps browser and detailed aerial photography (Bing maps).

The database of the National Biodiversity Data Centre (NBDC) was also consulted to assess the presence of rare plant and faunal species and records of protected species reported within the primary 10km squares in which the Gathabawn Windfarm Project is located (S36 and S37 (Proposed Gathabawn Windfarm); S36, S37, S46 and S47 (Candidate Gathabawn Grid Connection)) This data is presented in Appendix 13.3: Species Records held by NBDC.

A data request was also sent to NPWS GIS division on 24th November 2021 and 31st May 2022, and received a response on 29th November 2021 and 23rd June 2022 respectively for a full inventory of all protected and rare species recorded within the 10km grid squares overlapping the Gathabawn Windfarm site. An updated data request was sent to NPWS on 17th November 2025 for 10km squares S26, S27, S36 and S37; a response was received on the 18th November 2025 for the grid squares associated with the finalised Gathabawn Windfarm layout.

Due to the conditions of the data request with regard to the presentation of sensitive data as defined (https://www.npws.ie/sites/default/files/general/npws-sensitive-species.pdf), not all records are presented. In addition, the spatial resolution of each record is presented at 10km scale in line with the condition that "data are provided on the understanding that users will not use the information to the detriment of individual species or habitats, biodiversity or the environment in general".

A13.1.4.2 Birds – Desktop Review

Recommended bird survey methods to inform impact assessment of onshore wind farms (SNH, 2017) were reviewed. The methodology detailed in the document for the basic requirements to undertake Vantage Point (VP) counts were adhered to when undertaking VP counts.

The proposed development is located in the NBDC 10km grid squares S36 and S37.

NBDC records pertaining to the region in which the proposed Gathabawn Windfarm is located were consulted for observations of protected birds. A data request was also sent to NPWS GIS division in November 2021 and May 2022, with an update request sent in November 2025, for a full inventory of all protected and rare bird species recorded within the S36 and S37 10km squares overlapping the Gathabawn Windfarm.

The Bird Sensitivity to Wind Energy by Birdwatch Ireland was consulted via the NBDC records.

Best Practice survey methodologies for all bird species likely to occur within the proposed project area were reviewed, and these methodologies are detailed in this appendix.

A13.1.4.3 Bats – Desktop Review

National landscape suitability maps for Irish bat species (Lundy *et al*., 2011) were reviewed using the Map Viewer of the NBDC. See Appendix 13.5: Bat Survey Data. Records of known bat roosts within 10km of the Gathabawn Windfarm were obtained from the NBDC maps at the outset of the project (Lundy *et al.,* 2011). This data is presented in Appendix 13.3: Species Records held by NBDC.

A13.1.4.4 Aquatic Ecology – Desktop Review

A comprehensive desktop review was carried out to identify watercourses that drain the Gathabawn Windfarm Project. Information on water quality of the relevant watercourses was obtained from the EPA website and Chapter 8: Water.

Riverine survey sites were present on the Coolnacrutta Stream (EPA code: 15C50), River Goul (15G02), Lismaine Stream (15L16), Gorteenahilla River (15G08), Nuenna River (15N02), Gorteennamuck Stream (15G39), Ballyring Upper Stream (15B73), Lisdowney Stream (15L02), Ballyconra Stream (15B86) and River Nore (15N01) within the Goul_SC_010 and Nore_SC_070 river sub-catchments (Appendix 13.8). A small pond adjacent to the site boundary was also surveyed. Two survey sites, B6 on the Nuenna River and C6 on the River Nore were located within the River Barrow and River Nore SAC (002162). Numerous other survey sites shared downstream hydrological connectivity to this site as well as the River Nore SPA (004233) (Appendix 13.8).

A13.1.4.5 Habitat Ecology – Desktop Review

Satellite maps, available at https://www.google.com/maps/, were reviewed in addition to Fossitt's *A Guide to Habitats in Ireland* (Fossitt, 2000) to identify the size of the survey area and the habitats present within and adjacent to the Gathabawn Windfarm Project. GIS was used to inform the size and scope of the field survey area to appropriately assess the habitats present within and adjacent to the Gathabawn Windfarm. Information on plant species listed under the Habitats Directive or the Flora Protection Order (FPO) 2022 present within the Gathabawn Windfarm was obtained from the updated NPWS data request, received in November 2025, and the available reporting and map viewer for protected flora. A list of protected plant species recorded within the 10km grid squares in which the Gathabawn Windfarm Project is located was procured from the NBDC maps.

A13.1.4.6 Mammal Ecology – Desktop Review

Utilising satellite maps available at https://www.google.com/maps/, a desktop review was undertaken to identify suitable habitat for mammals within the Gathabawn Windfarm Project site. A data request was also sent to NPWS GIS division in November 2021 and May 2022, with an update request sent in November 2025 for a full inventory of all protected and rare species recorded within the 10km squares overlapping the Gathabawn Windfarm. The database of the NBDC was also consulted to assess the presence of rare mammal species reported within the 10km grid squares overlapping Gathabawn Windfarm Project site. The NPWS 'Ireland Red List No. 12: Terrestrial Mammals' (Marnell *et al*., 2019) was consulted in addition to the 'Irish Wildlife Manuals No. 76, Otter Survey of Ireland 2023-24 (Reid *et al*., 2025), '*Atlas of Mammals in Ireland 2010-2015'* (Lysaght & Marnell, 2016), and '*Irish Wildlife Manual 121, All-Ireland Squirrel and Pine Marten Survey 2019*' (Lawton *et al*., 2020).

A13.1.4.7 Amphibian and Reptile Ecology – Desktop Review

A comprehensive desktop review was carried out to identify waterbodies located within or adjacent to the Gathabawn Windfarm Project. The database of the NBDC was consulted to assess the presence of amphibian and reptile species reported within the grid squares overlapping the Gathabawn Windfarm Project. Satellite mapping was also consulted to assess suitable habitat for reptiles and amphibians within or adjacent to the Gathabawn Windfarm Project.

A13.1.4.8 Terrestrial Invertebrate Ecology – Desktop Review

Utilising satellite maps available at https://www.google.com/maps/, a desktop review was undertaken to identify suitable habitat for rare and protected invertebrates within the Gathabawn Windfarm Project site. A data request was also sent to NPWS GIS division in November 2021 and May 2022, with an update request sent in November 2025 for a full inventory of all protected and rare species recorded within the 10km squares overlapping the Gathabawn Windfarm site. The database of the NBDC was also consulted to assess the presence of rare invertebrate species and records of protected species reported within the 10km grid squares overlapping the Gathabawn Windfarm Project.

A13.1.5 Methodology – Fieldwork

The following surveys were carried out at the Gathabawn Windfarm Project.

A13.1.5.1 Habitats – Fieldwork

All habitat surveys undertaken followed best practice guidance (Smith *et al.,* 2011; CIEEM, 2018) and utilised the habitat classification presented in Fossitt (2000). All habitats within a 50m buffer of the Gathabawn Windfarm Project were surveyed and classified to level 3. Habitat surveys were undertaken in August 2026. Nomenclature for vascular plants follows Parnell and Curtis (2012). Aerial photography assisted habitat delineation and interpretation, and plant identification and nomenclature followed Parnell & Curtis (2012) and Stace (2010). The predominant plant species for each habitat type were recorded to accurately determine habitats present within the study area.

Particular attention was paid to searching for suitable habitat for rare or protected flora species, to determine whether they were present within, or close to, the Gathabawn Windfarm. These surveys also included the search for any Invasive Alien Plant Species (IAPS) listed under the Third Schedule of the European Communities Regulations 2011 (S.I. 477 of 2015, as amended), the First Schedule of the European Union (Invasive Alien Species) Regulations 2024 (S.I. 347) and any other High Impact invasive species. The surveys were carried out in good weather with no constraints.

A13.1.5.2 Birds – Fieldwork

A13.1.5.2.1 Breeding Season Bird Surveys

Countryside Bird Surveys

A total of five transects were surveyed in the breeding season 2025 (April and May), and five transects were surveyed in the breeding season 2026 (April, May and June) at the Gathabawn Windfarm.

The methodology followed the standardised line transect methodology for surveying birds (BirdWatch Ireland, 2012). All birds were recorded on standardised recording sheets in four distance categories from the transect route (0-25m; 25-100m; 100+m and in flight) (see Appendix 13.6).

The conservation status of each species recorded during the field surveys was assessed using the Birds of Conservation Concern in Ireland (BoCCI) list (Gilbert *et al.*, 2021) in addition to relevant national or international legal designations.

When developing the transect routes for breeding bird surveys at Gathabawn Windfarm, focus was put on key linear habitat features in the wider landscape, these include foraging and commuting connectivity features; hedgerows, tree lines, watercourses, and woodland (SNH, 2010). The transect surveys were designed to ensure that all areas and main features of the sites are sampled within the survey period.

All species encountered, visually and aurally, within 0–25m and 25–100m of the transect route were recorded and their abundance noted. All species which occur more than 100m from the transect route, or flying over the site, hence not using it, were also noted, but not included in the abundance analysis. Any 'flight paths' of note were recorded and geo-referenced. The surveys were carried out in acceptable weather conditions as per best practice (dry weather, calm winds, high visibility) (CBS, 2012).

The methodology indicated above closely follows the standardised CBS methodological approach and is employed for use here for a number of reasons, as follows:

- Standardised CBS methods are based on best practice methods developed over many years – the CBS is supported by NPWS as the basis for national bird population monitoring;
- Application of a standardised approach allows comparisons between sites and years;

- Adoption of the CBS methodology also allows annual variation in bird occurrence from transects to be compared to the national CBS dataset, which may be important in identifying underlying, broad-scale patterns of bird occurrence; and
- Allowing for the calculation of bird-density estimates, rather than simple presence/absence data, thereby permitting the importance of the observed bird community to be determined.
- The primary target of these surveys were passerine species. Other species of conservation concern were also recorded for activity, including waders, gulls, raptors and waterfowl.

For General Birds Survey Results see Appendix 13.6: General Bird Fieldwork and Survey Results.

VP Surveys

VP are fixed locations, which are strategically positioned to provide a maximum viewshed of the survey area from a minimum number of locations. The selection of VP locations was based on viewshed analysis, ensuring adequate coverage of the Gathabawn Windfarm where turbines may be positioned and extended to a 500m radius from the outermost turbine perimeter (blade radius), as stated by Best Practice Guidance (SNH, 2017). A precautionary 600m zone was assigned to account for any design flexibility over the two-year monitoring period and updated guidance from Nature Scot in 2025 (SNH, 2017). The viewshed of a given VP extended to a distance no greater than 2km, and included an arc no greater than 180 degrees, as per SNH (2017). A total of six VPs were selected to cover the required viewshed (600m) from proposed turbine locations for the breeding seasons 2025 and 2026.

The SNH (2017) Best Practice Guidance recommends a minimum of 72 hours per VP location divided between seasons (36 hours breeding and 36 hours non-breeding) per year. A minimum of 36 hours per VP were carried out between the breeding season 2025 and breading season 2026. This implies a monthly survey effort of six hours per VP, which is divided into two observation periods of three hours each. As long as the cumulative total of 36 hours is achieved, variations in the monthly effort allocation are acceptable.

All target species (Annex I listed, red and amber species of conservation concern) were recorded in addition to commoner species potentially sensitive to the development. Details recorded included flightlines mapped, flight duration, direction and heights. This information was suitable to inform collision risk analysis with the proposed turbine layout.

Table 10: Gathabawn Windfarm Breeding 2025 and 2026 VP Hours

VP	Breeding 2025								
	Apr	May	Jun	Jul	Aug	Sep	Oct	Total	
1	6	3	5	10	2	10	0	**36**	
2	4	4	2	13	7	6	0	**36**	
3	0	0	12	12	3	3	6	**36**	
4	0	6	6	12	7	2	3	**36**	
5	0	3	9	12	4	8	0	**36**	
6	0	6	0	20.5	8	6	0	**40.5**	
Total	**10**	**22**	**34**	**79.5**	**31**	**35**	**9**	**220.5**	

VP	Breeding 2026						
	Apr	May	Jun	Jul	Aug	Sep	Total
1	6	6	8	4	12	0	**36**
2	6	6	6	4	14	0	**36**
3	9	3	6	6	12	0	**36**
4	6	3	9	6	12	0	**36**
5	6	6	6	6	12	0	**36**

6	6	6	6	6	12	0	**36**
Total	**39**	**30**	**41**	**32**	**74**	**0**	**216**

For VP Survey results see Appendix 13.6.

Breeding Woodcock Surveys

Breeding Woodcock surveys were carried out in May and June 2025 and May 2026 as per best practice (Hoodless *et al.,* 2009). The standardised methodology was used for surveying breeding Woodcock (Hoodless *et al.,* 2009; Gilbert *et al.,* 2011; Heward *et al.,* 2015). The scale of survey requirements is based upon the extent of the woodland on or adjacent to the Gathabawn Windfarm. The survey took place within a study area composed of the Gathabawn turbines and a 500m buffer. These surveys were informed by the best practice guidelines and were carried out in suitable weather conditions, avoiding heavy wind and rain (Heward *et al.,* 2015). The surveys were conducted at least 15 minutes before sunset and lasting one hour after sunset (Hoodless *et al.,* 2009). All Woodcocks seen or heard were recorded and mapped, with an emphasis on recording any activity suggesting breeding within or near the Gathabawn Windfarm Project site (e.g., roding males, roding displays over suitable habitat and proximity to nesting cover).

For Breeding Woodcock Survey results see Appendix 13.6.

Breeding Wader Surveys

To assess the presence of breeding lowland wader species, including Snipe, at the Gathabawn Windfarm Project site suitable peatland or wetland habitat were surveyed. The survey involved visits in June and July 2021, and April, May and June 2022. This involved a single observer walking through the survey area covering ground with a constant search effort within 100 m of all suitable breeding habitat and avoiding unsuitable weather (e.g., heavy showers and strong winds). All wader species and other wetland birds (e.g., wildfowl, rails, gulls and terns) along with any other SCIs were recorded along with behaviour indicative of breeding (e.g., display, alarm-calling, nest-scraping), in line with accepted criteria for territory mapping, SCIs within 500 m of the Gathabawn Windfarm Project.

For Breeding Wader results see Appendix 13.6.

Breeding Raptor Surveys

Kestrel and Peregrine nest suitability surveys were conducted in April 2025 and April 2026 for breeding covering the area within a 2km buffer from the Gathabawn Windfarm Turbines (SNH, 2017). This assessment included potential nest sites, such as cliffs, quarries, buildings and other man-made structures, and the old tree nests of other bird species (Hardey *et al.,* 2013).

Activity survey methods followed Hardey *et al.* (2013) in that sites with high or moderate suitability within 2km of the Gathabawn Windfarm Turbines were identified and surveyed via VPs for breeding activity (aerial displays, calling) in May, June and July 2025 and 2026. All raptors seen or heard were recorded and mapped, with emphasis on recording any activity suggesting breeding. Target habitat surveyed included ruins, derelict housing, active quarries, tree holes/hollows, modern and traditional agricultural buildings, sheds, and clear fell areas. These surveys were based on best practice disturbance buffers (Goodship & Furness, 2022) and core foraging zones for these species (SNH, 2016).

For Raptor Breeding Survey Results see Appendix 13.6. Any sightings or records of active nest sites are provided in a redacted section of Appendix 13.6 in line with data protection restrictions of protected bird species breeding locations.

Barn Owl Surveys

Suitability surveys for breeding Barn Owl were undertaken in April 2025 and April 2026. This survey followed Barn Owl surveying standards for national road projects (TII, 2026) and other relevant best practice guidance (Shawyer, 2011; Lusby & O'Clery, 2014). The suitability survey involved checking for signs of occupation by Barn Owls such as pellets, feathers and dropping ('whitewash'). Consideration was also given to the extent and distribution of suitable Barn Owl foraging habitat during field surveys (e.g., rough grassland). This was carried out throughout the Gathabawn Windfarm, and a precautionary 2km buffer from the Gathabawn Windfarm Turbines, with any buildings and other artificial habitats (e.g., quarries) identified as having high suitability for nesting and roosting Barn Owls subject to further surveys.

High and moderate suitable structures were surveyed in June and August 2025 and June, July and August 2026 utilising dusk activity monitoring in line with Barn Owl surveying standards for national road projects (TII, 2026). Surveys were carried out half an hour before sunset and lasted an hour after sunset (Shawyer, 2011; Lusby & O'Clery, 2014), with any Barn Owl activity (notably any activity suggestive of breeding) recorded and mapped. No thermal imaging or acoustic assistance equipment was utilised for these surveys.

For Barn Owl Survey Results see Appendix 13.6.

Watercourse Surveys

To record Kingfisher and other riparian bird species, a standard transect survey methodology was used (Cummins *et al.* 2010; Crowe *et al.* 2008). Monthly visits were undertaken in April and May 2025 and 2026 to the River Nore, Gorteenahilla River, Lisdowney Stream, Lismaine Stream, Ballyconra Stream and Ballyring Upper Stream . Observers recorded all riparian bird species seen or heard while walking along banks, with any relevant behaviours recorded (e.g., behaviour suggesting nearby breeding). Suitable nesting opportunities were also recorded and mapped.

These watercourses were selected due to their potential to support Kingfisher, Grey Wagtail and Dipper foraging and nesting habitats, and potential for greater prey item availability. Watercourse surveys followed best practice methodology (NRA, 2008) '*Guidelines for the Crossing of Watercourses During the Construction of National Road Schemes*'. Suitable watercourses were evaluated for any evidence of nest holes. In each case, banks were inspected for evidence of Kingfisher, Grey Wagtail and Dipper, and the general suitability of the banks. Target notes were made on bank suitability and any observed nest holes.

For Water Crossing Survey Results see Appendix 13.6.

A13.1.5.2.2	Winter Season Bird Surveys

Countryside Bird Surveys

A total of nine transects in the winter season 2022-2023 (November, December, January, February and March), and five transects in the non-breeding season 2025-2026 (November, December, January and February) at the Gathabawn Windfarm site. The methodology followed the standardised line transect methodology for surveying birds CBS Manual '*Guidelines for Countryside Bird Survey Participants'* (BirdWatch Ireland, 2012). However, as CBS is designed to record breeding (and therefore territorial) birds, the winter equivalent is modified following recommendation in Bibby *et al*. (2000) for wintering bird surveys. The main modification is that four monthly counts (November to February) are recommended throughout the winter period, as opposed to the two-visit (early and late) approach adopted by the CBS, and that all birds are recorded (CBS excludes recognisable juveniles). Due to a lack of capacity to undertake surveys in November and December 2022, extra compensatory surveys were conducted from January to March 2023. This does not undermine the sufficiency of the bird survey data as wintering transect surveys provide baseline information for the region and are not a legal requirement.

These transects, 1km in length which covered hedgerow, treeline and improved agricultural grassland habitat, were walked and all birds encountered (visually and aurally) were identified and their abundance recorded. The surveys were carried out in acceptable weather conditions as per best practice (dry weather, calm winds, high visibility) (CBS, 2012).

All birds were recorded on standardised recording sheets in four distance categories from the Gathabawn Windfarm (0-25m; 25-100n; 100+m and in flight).

The conservation status of each species recorded during the field surveys was assessed using the Birds of Conservation Concern in Ireland (BoCCI) list (Gilbert *et al.*, 2021) in addition to relevant national or international legal designations.

For General Birds Survey Results see Appendix 13.6.

VP Surveys

In the winter season 2022-2023, a total of six VPs were selected, and in the winter season 2025-2026, a total of six VPs were selected to cover the required viewshed (600m) from proposed turbine locations for the winter season 2022-2023.

The selection of VP locations was based on viewshed analysis, ensuring adequate coverage of the Gathabawn Windfarm where turbines may be positioned and extended to a 500m radius from the outermost turbine perimeter (blade radius), as stated by Best Practice Guidance (SNH, 2017). A precautionary 600m zone was assigned to account for any design flexibility over the two-year monitoring period. The viewshed of a given VP extended to a distance no greater than 2km, and included an arc no greater than 180 degrees, as per SNH (2017).

The additional VP location in winter 2022-2023 was to address the potential OHL crossing of the River Nore at the time of the surveys and is provided in the ecological baseline to inform the Whole Gathabawn Project receptors beyond the collision risk for the wind farm.

In the winter season 2025-2026, VP survey efforts were carried out at one VP location (GCVP). This VP was conducted adjacent to the River Nore to identify individuals commuting through the wider area of the Grid Connection. This VP provided coverage of all the lands where the Grid Connection intersects with the River Nore. Surveys from the VP were undertaken in accordance with best practice survey guidance (SNH, 2017) and were conducted in February, March and April 2026. Six dawn and six dusk surveys to each VP were undertaken over the three months.

See Table 11 below for the winter 2022-2023 and winter season 2025-2026 VP hours, and the winter 2025-2026 Water Connectivity VP hours surveyed. For Water Connectivity VP survey results, see Appendix 13.6.

Table 11: Gathabawn Windfarm Winter 2022-2023 and 2025-2026 VP Hours

VP	Winter 2022-2023								
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Total
1	6	3	6	6	9	0	0	6	36
2	6	3	6	6	3	12	0	0	36
3	6	3	6	6	6	6	12	0	45
4	6	0	0	10.75	12	12	0	0	40.75
5	6	0	6	11.5	6	6	0	0	35.5
6	6	0	6	18	0	0	6	0	36
7	6	6	0	18	0	0	6	0	36
Total	42	15	30	76.25	36	36	24	6	265.25

VP	Winter 2025-2026						
	Oct	Nov	Dec	Jan	Feb	Mar	Total
1	6	6	4	8	6	6	36
2	6	6	2	10	6	6	36
3	6	6	8	4	6	6	36
4	0	12	2	10	6	6	36
5	6	6	4	6	8	6	36
6	6	6	4	8	6	6	36
Total	30	42	24	46	38	36	216

VP	Winter 2025-2026 Water Connectivity VP						
	Feb	Mar	Apr	Total			
GCVP	6	18	12	36			

Hen Harrier Roost Surveys

Hen Harrier roost watch surveys were undertaken in the winter season 2022-2023, from October 2022 to March 2023, and in the winter season 2025-2026 from October 2025 to March 2026. Methods followed the '*Irish Hen Harrier Winter Survey*' Guidance (O' Donoghue, 2019; SNH, 2017). Areas of potential suitable habitat (rushy/tussocky grassland, and young conifer plantations) for roost locations within 2km of the wind farm element of the Gathabawn Windfarm Project were identified during daytime walkover surveys and for GIS analysis of satellite imagery of the Gathabawn Windfarm. These potential roosts were observed during a time associated with roost activity, i.e. the last hour before dusk and continued to at least 30 minutes after sunset (or until it was too dark to see) as recommended by best practice methods (Gilbert *et al.*, 2011). Methods followed best practice from O' Donoghue (2019) and SNH (2017), these included observers stationed in VPs around suspected roost areas recording the number of individuals, listening for calling, detection of juveniles and sings of occupancy. Additional information such as arrival/departure times, settling/rising times and direction of arrival/departure as well as general observations were also noted.

Wintering Wetland Bird Surveys

To assess the presence of wetland bird species in the study area throughout the winter 2022-2023 and winter 2025-2026 seasons, surveys took place in suitable areas, these included all lakes and suitable waterbodies (I-e. turloughs, flooded fields) within a study area of 5km from the Gathabawn Windfarm Turbines. Wintering wetland birds include wildfowl (ducks, geese, and swans), waders and other species typically associated with wetland habitats, such as herons, grebes, crakes, rails, and gulls. Wetland birds were surveyed in winter following the standardised approach used for the Irish Wetland Birds Survey (I-WeBS). Surveys included

observing from a VP over all lakes and suitable waterbodies (i.e. turloughs, flooded fields). Surveyors used binoculars and telescopes to record the count number, locations and time of sightings of species. Other species of conservation interest were also noted, along with their flight paths, during the walkover surveys. The I-WeBS methodology is detailed in the I-WeBS Counters Manual (BirdWatch Ireland, 2012) and these methods represent the recommended approach in the Nature Scot guidance documents (SNH, 2017) in relation to assessing impacts of onshore wind farm developments on wintering waterfowl.

A13.1.5.3 Bats – Fieldwork

Survey aims:

- Assess the bat roost suitability of bridges, buildings and mature trees that could be directly affected.
- Identify potential indirect effects on bats, e.g. from disruption of commuting routes/foraging routes, or lighting.

Survey of potential bat roosts

A general walkover was conducted throughout the 500m area, to include any forestry and suitable structures to identify any candidate roost features with low suitability or higher. A Preliminary Roost Assessment (PRA) and Ground-Level Tree Assessments (GLTA) were carried out for buildings, other structures and trees respectively within 500m of the proposed turbines, using binoculars (model: Steiner SkyHawk 3.0 10x42) to determine their suitability for bats. The aim of the ground-level inspections was to identify any Potential Roost Features (PRFs) (i.e., cavities or crevices on trunks or limbs) and evidence of bats (e.g., droppings, fur-oil stains at access points). Coniferous trees within plantations were not inspected in detail, based on them rarely supporting features large enough to be of potential suitability to bats, and because it is standard forestry practice to remove any trees that have obvious signs of damage and disease; as a result, trees within conifer plantations typically have negligible suitability for bats.

More specifically, the aims of undertaking PRAs of structures (buildings within the 500m of each turbine were to:

- Determine if bats are currently present or have been present in the past;
- Determine the bat species occupying the roost (if a roost is present);
- Estimate the number of bats occupying the roost (if a roost is present);
- Determine the roost category or categories, e.g. the purpose and, therefore, the importance of the structure as a roost (e.g. mating roost, non-breeding day roost, maternity roost etc.);
- Determine the roost entry and exit points within the structure;
- Determine the roost locations within the structure;
- Determine the commuting corridors used by bats leading to and from their roost(s), and to record associated vegetation, including linear habitat features, likely to be of importance to bats; and
- Assess the potential suitability of structures on site and up to 500 m from the Proposed site boundary to roosting bats.

The structures identified within the 500m buffer area were searched externally for bats or signs of their presence. Ground level areas of potential roost entrances were examined for the presence of droppings and feeding remains (e.g. moth wings, etc.). Structures were also examined for access/egress points, polishing or scratching, urine and oily residue stains, and for cavities suitable for roosting bats. Cavities and open areas were searched with a high-powered torch. As bats sometimes do not leave visible signs of their presence,

absence of evidence was not enough to reduce the suitability of a structure and was used only to inform a higher likelihood of any roost feature being an active roost.

The GLTA was applied to the three trees with suitability for bat roosting. PRFs were identified and were used to inform roost suitability.

No PRF inspections were conducted on any of the trees due to Health and Safety concerns regarding secure climbing footholds and unstable ground to use ladder.

Buildings, trees and other potential structures were subsequently categorised according to their potential to support roosting bats. Roosting potential for buildings is categorised as: negligible, low, moderate or high (Collins, 2023). Roosting potential for trees were categorised as: negligible, PRF-I or PRF-M and were considered in the 2025 and 2026 visits. These categorisations informed the number of emergence surveys required to confidently determine the presence or likely absence of roosting bats within structures subject to survey (Collins, 2023; see Table 11).

Bat Activity surveys

Emergence Surveys

General accepted guidelines (Mitchell-Jones and McLeish, 2004; Kelleher and Marnell, 2006; BCI, 2012; Natural England, 2012; Hundt, 2012) give detailed accounts of best practice methods for surveying bats while incorporating the highest health and safety standards. These were all assessed and used to formulate the survey strategy.

Emergence surveys were undertaken in line with best practice guidelines (Collins, 2023) in 2025. Emergence surveys were conducted with handheld bat detectors (e.g. Elekon Batlogger and Anabat Walkabout). Thermal camera equipment was used for transect and emergence surveys in 2025 per Collins (2023) guidance.

Surveyors were located at PRFs identified during the daytime roost inspection surveys with a focus on roosting features. The purpose was to identify any bat species, numbers, access points and roosting locations within the structure or tree.

Dusk emergence surveys were carried out in suitable weather conditions. Surveys were carried out with an appropriate number of surveyors to visually cover all the PRFs of the structure being surveyed. Surveys were carried out 15 minutes before sunset and completed 1.5 – 2 hours after sunset, as per best practice guidance (Collins, 2023; Marnell *et al.* 2022).

Where possible, species identification was made in the field, and any other relevant information was also noted. Surveyors were equipped with active full spectrum bat detectors and Night Vision Aids (NVAs). All bat echolocation was recorded for subsequent analysis to confirm species identifications using Kaleidoscope and Anabat Insight software. Each bat record was identified as “commuting”, “foraging” or “emerging” as per Collins, 2023.

If a bat was observed emerging from a structure, its emergence location, time of emergence, and species (if identifiable) was also recorded. General bat activity directly around the building/tree such as feeding and commuting, were also recorded.

Activity levels for bat calls were based on the frequency of calls recorded within specific time windows based on the Bat Activity Indices (Hundt, 2012). This approach uses standardised terms (e.g. occasional, frequent) to categorise bat activity indices within certain ranges; the average time interval between passes is also provided to give a more intuitive interpretation of the terms. Calls recorded were saved onto SD cards for post-survey analysis and quality control of identified bat species and to determine any cryptic calls.

These manual surveys were carried out by multiple ecologists (at least two at each survey location/structure) to ensure optimal detection of species that may be difficult to detect using full spectrum bat detectors (BCI,

2012). In accordance with best practice, it is also important to survey bats at the appropriate time of year and time of night/day. The times of all surveys adhered to the timing indicated in Tables 12 to 14.

Table 12: Surveys for buildings recommended as a result of PRA (Collins, 2023)

Low roost suitability/PRF-I	**Moderate roost suitability**	**High roost suitability/PRF-M**
May to August (structures) No further surveys required (trees)	May to September, with at least one of surveys between May and August	May to September, with at least one of surveys between May and August
One dusk visit (structures); None (trees)	Two dusk visits	Three dusk visits

Table 13: Timing and weather constraints to survey for bat activity (Collins, 2023).

Survey type	**Start time**	**End time**
Dusk Emergence	15 minutes before sunset	1.5-2hrs after sunset
Area	**Temperature minimum**	**Wind speed maximum**
Lowland	10 degrees Celsius	18km/hr
Upland	8 degrees Celsius	27km/hr

Table 14: Best practice time of year for bat activity surveys (Collins, 2023).

Survey type	**Start time**	**End time**
Dusk Emergence	15 minutes before sunset	1.5-2hrs after sunset
Area	**Temperature minimum**	**Wind speed maximum**
Lowland	10 degrees Celsius	18km/hr
Upland	8 degrees Celsius	27km/hr

Bat Transects

As per best practice guidelines, three seasons (spring, summer, and autumn) of transect surveys were conducted in 2025. The aim of these surveys is to identify bat species using the Gathabawn Windfarm site and to gather information on bat behaviour and important features used by bats (SNH, 2021). Three separate transect routes were chosen with reference to the proposed layout, desktop and walkover survey results as well as any health and safety considerations and access limitations. The location of transect surveys was designed to include habitats representative of the site and linear features which would be of particular interest to bat species within the Gathabawn Windfarm, such as buildings and linear habitats such as watercourses, hedgerows, treelines, and forestry edge.

Transects were recording bats in real time. Dusk surveys commenced 30 minutes before sunset and were completed for up to 3 hours after sunset. Surveyors were equipped with active full spectrum bat detectors (Elekon Batlogger and Anabat Walkabout), and all bat activity was recorded for subsequent analysis to confirm species identifications.

Calculation and comparison of bat activity indices

In order to standardise bat activity between the mid-summer and autumn survey periods, results are displayed as a 'Bat Activity Index', which is the total number of bat passes divided by the number of hours

per night (Hundt, 2012). This was calculated from sunset to sunrise, using publicly available data from www.timeanddate.com.

At present there is not a standard system for handheld detector surveys to categorise bat activity as low, moderate or high, because the results vary depending on the species involved and the location of the site. For the purposes of this report, we use a bespoke system to discuss and compare levels of bat activity at the site, as outlined in Table 15. This approach uses standardised terms (e.g. occasional, frequent) to categorise bat activity indices within certain ranges; the average time interval between passes is also provided to give a more-intuitive interpretation of the terms.

Table 15: Characterisation of Bat Activity Indices

Bat Activity Index	Average interval between calls	Terms of characterisation
<2	> 30 minutes	Negligible
2 - 12	5 – 30 minutes	Occasional
12 – 60	1 – 5 minutes	Frequent
>60	< 1 minute	Near-constant

Static Detector Activity Surveys

Bat Activity Surveys at the Gathabawn Windfarm Project site were undertaken using automated Anabat Express bat detectors (Titley Scientific). External microphones were mounted on canes at a height of approximately 1m in 2025. A total of 12 locations were chosen for the 2025 passive surveys, covering the twelve turbine locations and the habitats in the surrounding areas. In 2025, 12 static detectors were deployed in spring for between 14 and 18 nights, summer for 15 nights and autumn for 12 nights.

Static detector data was not recorded for T4 and T6 in summer 2025 due to a missing detector at T4 and corrupted data at T6. Static detector data was only recorded for eight nights at T6 in spring 2025, two of the 12 nights in autumn 2025 for T5, and for four of the 12 nights for T9 in autumn due to SD card errors. Per BCI (2026), any deployment with less than 7 nights of activity with suitable weather were considered insufficient to inform baseline activity levels for these turbines.

However, based on professional judgement, and with reference to relevant guidance (Collins, 2023), despite the deployments being insufficient, the survey efforts are considered sufficient to provide a good representation of bat activity during their most active periods to inform the magnitude of the potential effects (Collins, 2023).

Surveys were carried out during suitable weather conditions, i.e. minimum temperatures above 10°C, average winds of less than 4m/s and little or no rainfall. There was wet weather, below minimum temperatures, or high winds on some of the survey nights, so the survey was extended until a suitable number of nights of suitable conditions were obtained. Results of this survey are still considered viable for the revised appraisal given little or no change to baseline habitat structure has occurred in the interim.

Species identification and interpretation of data

Sonograms from Anabat Express detectors were obtained in the 'zero-crossing' format in 2025 and viewed using Anabat Insight software. Species were identified with reference to "*British Bat Calls: A Guide to Species Identification*" (Russ, 2012) based primarily on frequency and call shape, but also with reference to call slope

for *Myotis* spp. Social calls were classified as unidentified bats unless they closely matched the examples provided in Russ (2012).

It is acknowledged that *Myotis spp.* can have very similar calls, and that the classification of sonograms can be imprecise, so all Myotis records in this document should be considered as conferred records, i.e. *Myotis cf daubentonii*. There can also be overlaps in call frequency between Pipistrellus spp. - calls with a CF component at 50 kHz may be either soprano pipistrelle or common pipistrelle, while calls at 40 kHz may be either common pipistrelle or Nathusius' pipistrelles – but in most cases, it is possible to determine the species based on call characteristics and/or other calls immediately before or after the recording. If a bat pass could not be confidently identified to species level it was recorded as an unidentified bat or identified only to genus level (e.g. *Myotis spp.*).

Use of a Frequency Scale for comparing bat activity

For the purposes of this assessment the 2025 data set is the most up to date and comprehensive data set and is the primary data source in this assessment. Detailed results of bat activity for each type of bat survey (e.g. transect surveys, passive surveys) are provided in Appendix 13.5. For the purposes of this report, we use a bespoke system to discuss and compare levels of bat activity at the Gathabawn Windfarm, as outlined in Table 16 below. This system is based on the professional judgement of the surveyor, and the results of peer reviewed research (Mathews *et al.* 2016). For ease of comparison, bat activity levels are classified into four categories based on a simple count of bat passes in any night, and cells are coloured using shades of blue. For the purposes of this assessment, any species that regularly has more than 50 bat passes per night or averaged 50 passes per night over the survey period (i.e. moderate to high activity) is considered to have a significant level of activity, which would warrant further consideration in an impact assessment. This corresponds with the threshold of 50 passes per night that was used in the Mathews *et al.* (2016) report.

Table 16: Terminology used to categorise bat activity levels

Category	Number of bat passes per night
Negligible	≤9
Low	10 - 49
Moderate	50 - 99
High	≥100

For Bat Roost Survey Results and Bat Activity Survey Results see Appendix 13.5: Bat Survey Data.

Valuation of ecological features and assessment of impacts

Impacts were assessed using the '*Guidelines for Ecological Impact Assessment in the UK and Ireland*' (CIEEM 2018) and '*Guidelines on the information to be contained in Environmental Impact Assessment Reports*' (EPA, 2022). Reference was also made to Reason and Wray (2025), SNH (2021) and Collins (2023) with regards to the evaluation of roosts and commuting routes/foraging areas.

A13.1.5.4 Terrestrial Mammals – Fieldwork

General mammal walkover surveys followed the NRA guidelines for multi-disciplinary walkover surveys outlined in '*Ecological Surveying Techniques for protected Flora and Fauna during the Planning of National Road Schemes*' (NRA, 2009) for the presence of Badgers (*Meles meles*), Otters (*Lutra lutra*) and other mammals. Surveys were undertaken within a 50m buffer of the Gathabawn Windfarm. Dedicated Badger surveys were undertaken in April and September 2025. Otter surveys were undertaken in April, July and September 2025 along watercourse crossings 150m upstream and downstream to identify any territories or

couching sites along the river banks connected to the Whole Gathabawn Windfarm Project. Camera trap surveys were undertaken at the Gathabawn Windfarm site in April, May and September 2025.

Otter surveys followed the NRA '*Guidelines for Treatment of Otters during Construction of National Road Schemes'* (NRA, 2006) and British Highways Agency's *Nature Conservation Advice in Relation to Otters HA8199* (Highways Agency, 1999). The presence of Otter was assessed through the recording of Otter signs within 150m upstream and downstream of each survey site. Notes on the location (ITM co-ordinates) of field signs were recorded, in addition to the quantity and visible constituents of spraint (i.e. remains of fish, crustaceans, molluscs, etc.) (Reid *et al.,* 2025).

Badger surveys followed the NRA '*Guidelines for the Treatment of Badgers Prior to Construction of National Road Schemes'* (NRA, 2005).

The following field signs of all mammals were recorded during terrestrial mammal surveys within the study area:

- Well-used pathways;
- Prints/tracks;
- Scat/spraints/droppings;
- Signs of feeding (foraged pinecones, Badger snuffle holes); and
- Places of shelter and features or areas likely to be of particular value as foraging resources (NRA 2004).

Photographs and detailed notes were also recorded for each feature and mapped using ArcGIS.

For Terrestrial Mammals Survey Results see Appendix 13.4: Invertebrates, Amphibians, Reptiles and Terrestrial Mammals Survey Data.

A13.1.5.5 Invertebrates, Reptiles & Amphibians – Fieldwork

'*Ecological Surveying Techniques for Protected Flora and Fauna During the Planning of National Road Schemes'* were followed when carrying out surveys (2009).

Walkover surveys were conducted to determine the presence and suitability of habitats for insects, invertebrates, amphibians, and reptiles.

Marsh Fritillary

Marsh Fritillary (*Euphydryas aurinia*) suitability surveys were undertaken in August 2025 following relevant guidance, specifically the '*Marsh Fritillary Monitoring Scheme'* (NBDC, 2015). Habitats were assessed for their suitability for Marsh Fritillary, specifically the presence of abundant Devils-bit Scabious (*Succisa pratensis*). Suitable habitat was searched for occupied larval webs during larval web search surveys, where the number was recorded in addition to the location. These surveys were conducted in September 2025 when webs will be most conspicuous and prior to the larvae entering hibernation.

List of survey efforts, results and incidental sightings are provided in Appendix 13.4.

Amphibians

Suitability surveys for amphibians, Smooth Newt (*Lissotriton vulgaris*) and Common Frog (*Rana temporaria*), were carried out during daylight hours in April and May 2025, where the surveyors located suitable waterbodies for amphibians to breed. Any areas of wetland with appropriate depth to support spawning individuals were noted during the daytime check.

After suitable waterbodies were identified, surveyors returned later in the season to conduct a night-time survey. This involved visual inspections of the waterbodies using head torches to look for signs of breeding amphibian activity. For larger waterbodies, it is necessary to walk transects along the water's edge where it is safe to do so. Activity surveys were conducted in May 2025.

Surveys followed the study area and safety guidance set by '*Guidelines for the crossing of watercourses during the construction of national road schemes*' (NRA, 2008) regarding surveying close to watercourses and the best practice methodology was adapted from the '*National Amphibian and Reptile Monitoring Programme*' created by the Amphibians and Reptile Conservation Trust (ARC, 2021). Watercourse edges were additionally observed for signs of amphibians during mammal and habitat surveys.

List of survey efforts, results and incidental sightings are provided in Appendix 13.4.

Reptiles

The activity surveys for Irelands only reptile, Common Lizard (*Zootoca vivipara*), were conducted in June, July August and September 2025. These involved walking chosen transect routes, observing natural habitats suitable for basking and leaving artificial refugia (black mats) in areas to encourage basking (scrub, heath, tall grass). The artificial mats were deployed in May 2025 prior to monitoring efforts to reduce any extent of disturbance impact on sightings. The mats were revisited throughout the survey period. Surveys followed the best practice methodology adapted from the '*National Amphibian and Reptile Monitoring Programme*' (ARC, 2021). Searches for Incidental evidence of reptiles during mammal and habitat surveys, such as droppings and visual sightings were also conducted. A list of survey efforts, results and incidental sightings are provided in Appendix 13.4.

Detailed Survey Results

For Marsh Fritillary Survey Results see Tables 15 and 16 in Appendix 13.4: Invertebrates, Amphibians, Reptiles and Terrestrial Mammals Survey Data. For Amphibian and Reptile Survey Results see Tables 17 - 20 in Appendix 13.4.

A13.1.5.6 Aquatic Ecology/Fisheries – Fieldwork

A13.1.5.6.1 Sensitive Species Data Request

A comprehensive desktop review of available data from the NPWS, NBDC, Inland Fisheries Ireland (IFI), Botanical Society of Britain and Ireland (BSBI), National Crayfish Plague Surveillance Programme (NCPSP), EPA and Triturus databases for the 10km grid squares containing and adjoining the developments (i.e. S36, S37, S46 and S47) identified a low number of records for rare and or protected aquatic species within the vicinity of the Gathabawn Windfarm.

A13.1.5.6.2 Selection of Watercourses for Assessment

All freshwater watercourses which could be affected directly or indirectly by the proposed development were considered as part of the current assessment. This included those in vicinity of the proposed turbine array, Candidate Gathabawn Grid Connection and other site infrastructure. Thus, a total of *n*=17 sites were selected for detailed aquatic assessment (see Appendix 13.8). The courses and nomenclature for the watercourses surveyed followed EPA mapping.

Surveys at these sites included a fisheries assessment (electro-fishing on 15 no. riverine sites, habitat appraisal of 16 no. riverine sites and 1 no. pond site), and, where suitable, biological water quality sampling (Q-sampling). White-clawed Crayfish (*Austropotamobius pallipes*) (sweep netting & hand searching) surveys were also undertaken at each site, in addition to macrophyte and aquatic bryophyte surveys. This holistic approach informed the overall aquatic ecological evaluation of each site in context of the Gathabawn Windfarm.

A13.1.5.6.3 Freshwater Pearl Mussel Surveys

Environmental DNA (eDNA) was used to determine the presence/absence of Freshwater Pearl Mussel in the River Goul (A4) and Nuenna River (B6) on the 31st of July 2025 (Appendix 13.8). These were analysed for Freshwater Pearl Mussel (*Margaritifera margaritifera*), White-clawed Crayfish and crayfish plague (*Aphanomyces astaci*) eDNA. The sites were strategically chosen to maximise longitudinal (instream) coverage within the survey area/catchment (i.e. facilitating a greater likelihood of species detection).

In accordance with laboratory guidance, a composite (500ml) water sample was collected from the sampling point, maximising the geographic spread at the site (20 x 25ml samples at each site), thus increasing the chance of detecting the target species' DNA. The composite sample was filtered and fixed on site using a sterile proprietary eDNA sampling kit. The sample was stored at room temperature and sent to the laboratory for analysis with 48 hours of collection. A total of *n*=12 qPCR replicates were analysed for the site. Given the high sensitivity of eDNA analysis, a single positive qPCR replicate is considered as proof of the species' presence (termed qPCR No Threshold, or qPCR NT). Whilst an eDNA approach is not currently quantitative, the detection of the target species' DNA indicates the presence of the species at and or upstream of the sampling point.

A13.1.5.6.4 Aquatic Site Surveys

Surveys of the watercourses within the vicinity of the Gathabawn Windfarm Project were conducted on the 29th, 30th and 31st of July 2025. Survey effort focused on both instream and riparian habitats in the vicinity of each survey site (Appendix 13.8: Aquatic Ecology Survey Results). The watercourses at each survey site were described in terms of the important aquatic habitats and species. This helped to evaluate species and habitats of ecological value in the vicinity of each site. The aquatic baseline prepared would inform mitigation for the proposed Gathabawn Windfarm.

A broad aquatic and riparian habitat assessment was conducted utilising elements of the methodology given in the Environment Agency's 'River Habitat Survey in Britain and Ireland Field Survey Guidance Manual 2003' (EA, 2003) and the Irish Heritage Council's 'A Guide to Habitats in Ireland' (Fossitt, 2000). This broad characterisation helped define the watercourses' conformity or departure from naturalness. All sites were assessed in terms of:

- Physical watercourse/waterbody characteristics (i.e. width, depth, channel form) including associated evidence of historical drainage;
- Substrate type and relative condition, listing substrate fractions in order of dominance (i.e. bedrock, boulder, cobble, gravel, sand, silt etc.);
- Flow type by proportion of riffle, glide and pool in the sampling area;
- An appraisal of the macrophyte and aquatic bryophyte community at each site; and
- Riparian vegetation composition.

A13.1.5.6.5 Catchment Wide Electro-Fishing

A catchment-wide electro-fishing (CWEF) survey of the watercourses within the vicinity of the Gathabawn Windfarm Project (n=15 riverine sites) were conducted in July 2025, under the conditions of a Department of Communications, Climate Action & Environment (DCCAE) 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 (*Lampetra spp.*), 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

Appendix 13.8: Aquatic Ecology Survey Results. The baseline assessment also considered the quality of spawning, nursery and holding habitat for salmonids and Lamprey within the vicinity of the survey sites.

Fisheries assessment of survey area

The proposed survey sites were located within the Goul_SC_010 and Nore_SC_070 river sub-catchments (Appendix 13.8). A small pond adjacent to the site boundary was also surveyed. Survey sites B6 on the Nuenna River and C6 on the River Nore were located within the River Barrow and River Nore SAC (002162). Numerous other survey sites shared downstream hydrological connectivity to this SAC as well as the River Nore SPA (004233).

Fish Stock Assessment (Electro-Fishing)

A single anode Smith-Root LR24 backpack (12V DC input; 300V, 100W DC output) was used to electro-fish riverine sites on the 29th, 30th and 31st July 2025 following notification to IFI and under the conditions of a Department of Climate, Energy and the Environment (DCEE) licence. To collate a more accurate baseline of the proposed receiving watercourse, the electro-fishing survey was undertaken across 15 no. riverine sites (see Appendix 13.8).

Both river and holding tank water temperature was monitored continually throughout the survey to ensure temperatures of 20°C were not exceeded, thus minimising stress to the captured fish due to low dissolved oxygen levels. A portable battery-powered aerator was also used to further reduce stress to any captured fish contained in the holding tank. Salmonids, European Eel and other captured fish species were transferred to a holding container with oxygenated fresh river water following capture. To reduce fish stress levels, anaesthesia was not applied to captured fish. All fish were measured to the nearest millimetre and released in-situ following a suitable recovery period.

As three primary species groups were targeted during the survey, i.e., salmonids, lamprey, and eel, the electro-fishing settings were tailored for each species. By undertaking electro-fishing using the rapid electro-fishing technique (see methodology below), the broad characterisation of the fish community at each sampling reach could be determined as a longer representative length of channel was surveyed. Electro-fishing methodology followed accepted European standards (CEN, 2003) and adhered to best practice (e.g., CFB, 2008).

Salmonids and European Eel

For salmonid species and European Eel, as well as all other incidental species, electro-fishing was carried out in an upstream direction for a 10-minute CPUE, an increasingly common standard approach for wadable streams (Matson *et al*., 2018). A total of approx. 30-75m channel length was surveyed at each site, where feasible, in order to gain a better representation of fish stock assemblages.

Relative conductivity of the water at each site was checked in-situ with a conductivity meter and the electro-fishing backpack was energised with the appropriate voltage and frequency to provide enough draw to attract salmonids and European Eel to the anode without harm. For the moderate to high conductivity waters of the sites (most draining calcareous geologies) a voltage of 220-275v, frequency of 30-35Hz and pulse duration of 3.5-4ms was utilised to draw fish to the anode without causing physical damage.

Lamprey

Electro-fishing for lamprey ammocoetes was conducted using targeted quadrat-based electro-fishing (as per Harvey & Cowx, 2003) in objectively suitable areas of sand/silt, where encountered. As lamprey take longer to emerge from silts and require a more persistent approach, they were targeted at a lower frequency (30Hz) burst DC pulse setting which also allowed detection of European Eel in sediment, if present. Settings for lamprey followed those recommended and used by Harvey & Cowx (2003), APEM (2004) and Niven &

McAuley (2013). Using this approach, the anode was placed under the water's surface, approximately 10-15cm above the sediment, to prevent immobilising lamprey ammocoetes within the sediment. The anode was energised with 100V of pulsed DC for 15-20 seconds and then turned off for approximately five seconds to allow ammocoetes to emerge from their burrows. The anode was switched on and off in this way for approximately two minutes. Immobilised ammocoetes were collected by a second operator using a fine-mesh hand net as they emerged.

Lamprey species were identified to species level, where possible, with the assistance of a hand lens, through external pigmentation patterns and trunk myomere counts as described by Potter & Osborne (1975) and Gardiner (2003).

Fisheries Habitat

A fisheries habitat appraisal of 17 no. sites was undertaken to establish their importance for salmonid, lamprey, European Eel and other fish species. The appraisals of salmonids and lamprey were cognisant of species-specific habitat requirements and preferences as outlined in O'Grady (2006), Hendry *et al*. (2003), Armstrong *et al*. (2003), Harvey & Cowx (2003), Maitland (2003) and Hendry & Cragg-Hine (1997). River habitat surveys and fisheries assessments were also carried out utilising elements of the approaches in the River Habitat Survey Methodology (EA, 2003) and Fishery Assessment Methodology (O'Grady, 2006) to broadly characterise the riverine sites (i.e. channel profile, substrata etc.).

Biosecurity

A strict biosecurity protocol following IFI (2010) and the Check-Clean-Dry approach was adhered to during surveys for all equipment and PPE used. Disinfection of all equipment and PPE before and after use with Virkon™ was conducted to prevent the transfer of pathogens or invasive propagules between survey sites. Surveys were undertaken at sites in a downstream order to minimise the risk of upstream propagule mobilisation. Particular cognisance was given towards preventing the spread or introduction of highly virulent crayfish plague (*Aphanomyces astaci*). Any aquatic invasive species or pathogens recorded within or adjoining the survey areas were geo-referenced. All Triturus staff are certified in 'Good fieldwork practice: slowing the spread of invasive non-native species' by the University of Leeds.

A13.1.5.6.6 White-clawed Crayfish Survey

White-clawed Crayfish surveys were undertaken at the aquatic survey sites in July 2025 under a National Parks and Wildlife (NPWS) open national licence (C164/2025) as prescribed by Sections 9, 23 and 34 of the Wildlife Act (1976-2023), to capture and release crayfish to their site of capture. As per Inland Fisheries Ireland aquatic biosecurity recommendations, the crayfish sampling started at the uppermost site(s) of each catchment or sub-catchment in the survey area to minimise the risk of transfer invasive propagules (including crayfish plague) in an upstream direction.

Hand-searching of instream refugia and sweep netting was undertaken according to Reynolds *et al.* (2010). An appraisal of White-clawed Crayfish habitat at each site was conducted based on physical habitat attributes (Gammell *et al.,* 2021; Peay, 2003), water chemistry and incidental records in mustelid spraint. Additionally, a desktop review of crayfish records within the wider survey area was completed.

A13.1.5.6.7 Biological Water Quality (Q-Sampling)

The 14 no. riverine survey sites were assessed for biological water quality through Q-sampling in July 2025. All samples were taken with a standard kick sampling hand net (250mm width, 500µm mesh size) from areas of riffle/glide utilising a 2-minute kick sample, as per EPA methodology (Feeley *et al*., 2020). Large cobble was also washed at each site for 1-minute (where present) to collect attached macro-invertebrates (as per Feeley *et al*., 2020). Samples were elutriated and fixed in 70% ethanol for subsequent laboratory identification to species level. Samples were converted to Q-ratings as per Toner *et al*. (2005) and assigned to WFD status

classes (Table 14). Any rare invertebrate species were identified from the NPWS Red List publications for beetles (Foster *et al.,* 2009), mayflies (Kelly-Quinn & Regan, 2012), stoneflies (Feeley *et al.,* 2020) and other relevant taxa (i.e. Byrne *et al*., 2009; Nelson *et al.,* 2011).

Table 17: Reference categories for EPA Q-ratings (Q1 to Q5) (Toner *et al.,* 2005)

Q Value	WFD Status	Pollution status	Condition
Q5 or Q4-5	High status	Unpolluted	Satisfactory
Q4	Good status	Unpolluted	Satisfactory
Q3-4	Moderate status	Slightly polluted	Unsatisfactory
Q3 or Q2-3	Poor status	Moderately polluted	Unsatisfactory
Q2, Q1-2 or Q1	Bad status	Seriously polluted	Unsatisfactory

A13.1.5.6.8 Lacustrine macro-invertebrate communities

Pond site P1 was sampled for macro-invertebrates via sweep netting. A standard pond net (250mm width, mesh size 500µm) was used to sweep macrophytes to capture macro-invertebrates. The net was also moved along the canal bed to collect epibenthic and epiphytic invertebrates from the substratum (as per Cheal *et al*., 1993). A three-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 site to get a representative sample for sub-habitats.

A13.1.5.6.9 Macrophyte and aquatic bryophytes

Surveys of the macrophyte and aquatic bryophyte community were conducted by instream wading at each of the survey sites, with specimens collected (by hand or via grapnel) for on-site identification. An assessment of the aquatic vegetation community helped to identify any rare macrophyte species listed under the Flora (Protection) Order, 2022, Irish Red list for vascular plants (Wyse-Jackson *et al.,* 2016) and or aquatic bryophytes (Lockhart *et al*., 2012), or habitats corresponding to the Annex I habitats such as floating river vegetation (3260) or hydrophilous tall herb (6430).

A13.1.5.6.10 eDNA Surveys

To further validate site surveys and to detect potentially cryptically low populations of high conservation value aquatic species within the survey area, composite water samples were collected from the River Goul (A4) and Nuenna River (B6) on the 31st of July (Appendix 13.8). These were analysed for Freshwater Pearl Mussel, White-clawed Crayfish and crayfish plague eDNA. The sites were strategically chosen to maximise longitudinal (instream) coverage within the survey area/catchment (i.e. facilitating a greater likelihood of species detection).

In accordance with laboratory guidance, a composite (500ml) water sample was collected from the sampling point, maximising the geographic spread at the site (20 x 25ml samples at each site), thus increasing the chance of detecting the target species' DNA. The composite sample was filtered and fixed on site using a sterile proprietary eDNA sampling kit. The sample was stored at room temperature and sent to the laboratory for analysis with 48 hours of collection. A total of *n*=12 qPCR replicates were analysed for the site. Given the high sensitivity of eDNA analysis, a single positive qPCR replicate is considered as proof of the species' presence (termed qPCR No Threshold, or qPCR NT). Whilst an eDNA approach is not currently quantitative, the detection of the target species' DNA indicates the presence of the species at and or upstream of the

sampling point. Please refer to Appendix 13.8: Aquatic Ecology Survey Results for full eDNA laboratory analysis methodology.

A13.1.5.6.11 Aquatic Ecological Evaluation

The evaluation of aquatic ecological receptors contained within this report uses the geographic scale and criteria defined in the 'Guidelines for Assessment of Ecological Impacts of National Road Schemes' (NRA, 2009).

Detailed Survey Results

For number and classification of watercourse crossings, see Appendix 13.8.

A13.1.5.6.12 Conceptual Site Model Methodology

The scoping exercise and impact evaluation in this EIAR are carried out in accordance with the principles of the Conceptual Site Model technique, which is a standard tool used in environmental assessment. Conceptual Site Modelling (CSM) is a representation of the biological, physical and chemical processes that determine the ways that an impact (such as a pollutant, contaminant, emission, intrusion, etc) moves from the source of the impact through an environmental media to environmental receptors. Environmental media includes soil, water and air that have the capacity to act as pathways and transport contaminants to sensitive receptors such as plants, animals and humans.

Therefore, the application of Conceptual Site Modelling in this EIA Report, involves identifying the source of an impact, the receptor of an impact, and the pathways or linkages between the source and the receptor, per:

- the 'source' is the origin of an impact and is associated with the project, and could relate to the activities, stressors or processes associated with the project;
- the 'pathway' is the means by which the impact can reach and affect a receptor; and
- the 'receptor' is the aspect of the environment which could be harmed by the impact.

For an effect to occur, all three elements (source, pathway, and receptor) of this mechanism must be in place.

By way of example, the source-pathway-receptor elements are provided below for the impact "Increased suspended solids in downstream waterbodies":

- the source of impact in this example could be earthworks during construction of hardstands which can be a source of sediment;
- the pathway in this example is rainwater runoff from the site which could carry the sediment as suspended solids, and
- the receptor could be a downslope waterbody.

A13.1.6 Methodology for Analysing the Evolution of the Baseline Environment

The expected evolution of the baseline, i.e. how the current state of the environment is expected to change in the future, is critical to understanding how a project might impact a changing environment.

In this EIAR, the evolution of the baseline environment is examined in relation to three periods which correspond to the lifecycle stages of the Gathabawn Windfarm Project – (i) medium term to cover off potential construction period, i.e. appropriate period of 10 years; (ii) long term to cover off potential operational/decommissioning periods for the windfarm, which is expected to be permitted for c.35 years; and (iii) permanent in relation to the substation and grid connection which will become assets on the national electricity system following their construction and commissioning.

The analysis of the evolution of the baseline environment is carried without the existing of the project (the 'Do Nothing Scenario').

Appendix to Chapter 13: Biodiversity

Appendix 13.2: Statements of Authority

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A13.2 Statements of Authority

Conor Daly MSc BSc ACIEEM is an Ecologist with INIS who was awarded an MSc in Biodiversity and Conservation and an Honours BSc in Zoology. Conor has conducted bird surveys for this project. Conor has been conducting ecological surveys for projects since 2021 for a variety of projects, including industrial estates and Windfarms (Small-Large). Conor has experience in Raptor conservation, with ample experience with pressures and threats to bird of prey species and has provided reports for EIAR and NIS reports while working with Inis Environmental Ltd.

Cillian Burke BSc ACIEEM is an Ecologist with Inis Environmental Consultants Ltd. with a BSc (Hons) in Environmental Science from Galway University. Cillian has experience in undertaking multi-disciplinary surveys including habitat classification, ornithology vantage point surveys, breeding wader surveys, Ecological Clerk of Works and bat surveys, and has authored ecological reports including EIARs, AA Screening Reports, NIS, EcIA and Biodiversity Net Gain (BNG) Reports.

Katie Sullivan BA MSc ACIEEM is the quality control manager and a field ecologist who was awarded a BA in Natural Sciences (Zoology) from Trinity College Dublin and an MSc in Wildlife Conservation and Management from UCD, where their research focused on modelling the impacts of result-based agri-environmental schemes on pollinator communities in semi-natural grasslands.

Ross Macklin BSc MCIEEM MIFM HDip (GIS) PDip (IPM) is an ecologist with over 16 years' professional experience in Ireland. They specialize in freshwater fisheries ecology, biology and water quality. They have considerable experience in a wide range of ecological and environmental projects including EIAR, EcIA, AA/NIS, CEMP reporting, as well as biodiversity, water quality monitoring, invasive species and fisheries management. They also have expert identification skills in macrophytes, freshwater invertebrates, protected aquatic habitats and protected aquatic species including freshwater pearl mussel. Their 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. They are currently completing their PhD on the ecology and impact of Common Carp *Cyprinus carpio* in Irish waters.

Bill Brazier BSc. (Hons) MIFM is an aquatic ecologist with over 10 years' professional experience in Ireland. They specialise in freshwater fisheries ecology, biology and water quality. They have considerable experience in a wide range of ecological and environmental projects including EIAR, EcIA and AA/NIS reporting, as well as biodiversity, invasive species and fisheries management. Their diverse project list includes work on renewable energy developments, flood relief schemes, road schemes, blueways/greenways and biodiversity projects. They are currently completing their PhD on the genetics, reproductive biology and invasive potential impact of Common Carp *Cyprinus carpio* in Irish waters. Additionally, Bill runs the highly respected *Off the Scale* magazine, Ireland's most-read recreational angling publication and is the national coordinator for the novel Anglers National Line Recycling Scheme (ANLRS).

Peter O'Connor MSc BA is the lead GIS Specialist at INIS and will oversee the completion of all mapping associated with this project. They have conducted Viewshed Analysis in support of selected Vantage points for SNH-based surveys. This involved the complex use of Digital Terrain Models, or Digital Elevation Models, in addition to bespoke Viewshed Analysis plugins for QGIS. Peter was responsible for all data capture and integration into project mapping of field data (habitats, Birds, Bats, Invasive Species, et c) for both the EIAR Biodiversity Chapter supporting Figures (Map books and Appendices) and Appropriate Assessment supporting maps.

James O'Connell BSc ACIEEM is an Ecologist with INIS, holding a BSc (Hons) in Wildlife Biology from IT Tralee. They started out their ecology career on Hen Harriers surveys, and in the following years expanded on their professional career by working on research projects with Estación Biológica de Doñana (EBD) and Inland Fisheries Ireland (IFI). Currently, they are an Assistant Ecologist with Inis Environmental Consultants Ltd., carrying out ornithological field surveys on proposed and established windfarm sites around Ireland.

Siddharth Sonny MSc BSc was an Assistant Ecologist at INIS Environmental Consultants Ltd, where they actively contributed to both fieldwork and GIS teams. Possessing a Bachelor of Science in Zoology from Sacred Heart College, Kerala, India (2017) and a Master of Science in Coastal and Marine Environment Science Policy and Practices from the University of Galway (2019). Siddharth had undertaken numerous ornithological and mammal surveys integral to diverse projects spanning the geographical landscape of Ireland. Their expertise encompassed a wide spectrum of survey methodologies, including but not limited to Vantage Point surveys, breeding/winter bird transects, I-WeBS, and bat surveys, all executed in adherence to the highest industry standards. Siddharth was also a Qualifying member of CIEEM and has been a practicing ecologist with Inis from 2022 to 2025.

Kevin Mc Elduff BSc ACIEEM is an ecologist. Kevin is Project Manager, Field Team Lead and Ecologist with INIS Environmental Consultants Ltd. and has a BSc (Hons) in Environmental Science from the University of Galway. He has managed multiple large-scale, multi-disciplinary developments across the country. Kevin has comprehensive experience in writing and reviewing several report types, which include Appropriate Assessment Screening Reports (AASR), Natura Impact Statements (NIS) and Ecological Impact Assessments (EcIA/ EIAR). He has extensive experience in ecological field surveys, including habitat classification, mammal surveys, vantage point surveys, invertebrate surveys, Ecological Clerk of Works, breeding wader surveys and bat surveys. He is also skilled in the use of QGIS.

Chris McKiernan BSc ACIEEM has over 4 years of experience carrying out professional ornithology surveys in Ireland on a variety of projects. They received a BSc in Ecology and Environmental Biology from UCC in 2020. They have been heavily involved in carrying out and coordinating hen harrier surveys with INIS, for both breeding and wintering. Chris also carried out many of the other surveys for INIS, including Vantage Point surveys, I-WeBS, Woodcock surveys, Red Grouse surveys, Breeding Raptor (Kestrel, Peregrine, Barn Owl, Merlin) surveys, CBS transects, mammal walkover surveys and bat surveys.

Chloe Finn BSc is an assistant field ecologist. They are a Qualifying member of CIEEM. BSc (Hons.) in Ecology and Environmental Biology, UCC. They have conducted ornithological surveys since 2025 for a range of sustainable development projects, including both small and large-scale wind farms across Ireland. Their experience includes VP surveys, breeding raptor surveys, Hen Harrier roost surveys and I-WeBS. They have completed bat transects, NBWs, roost emergence surveys on trees and buildings, and static detector deployment. They have conducted bioacoustics analysis for small-large renewable and local developments in Cork, Clare, Roscommon and Tipperary since 2025. They have utilised thermal imaging equipment for bat emergence surveys following best practice methods.

Katie Power BSc is an assistant ecologist. They have conducted ornithological surveys with Inis Environmental Ltd. since 2025, following best practice guidance for a variety of wind farm projects (small-large). They have experience with breeding raptor surveys, I-WeBS and roost surveys for small- and large-scale projects across Ireland. They have conducted Otter watercourse surveys for grid connection routes for a medium-sized wind farm development since 2025. They have experience in mammal camera trap analysis since 2025. They have conducted roost emergence activity surveys for conservation groups and on various wind farm projects (small – large) across Ireland since 2021. They have experience in NBWs and PRAs. As part of the bat team, Katie has completed bioacoustics analysis to identify bat species for nine medium – large wind farm projects across Ireland.

Darren McCartney BSc ACIEEM is an Ecologist who works within the fieldwork and GIS teams at Inis Environmental Consultants Ltd. They have completed a BSc (Hons) in Applied Archaeology from IT Sligo, which involved several ecological and environmental modules. As well as experience working with ArcGIS and QGIS applications, they have completed several different survey types for birds, mammals, habitats and invertebrates. While working in the field, Darren has conducted surveys for Vantage Point counts, a number of raptor species in breeding and winter seasons, bat roost and transect surveys, general mammal surveys, habitat surveys in line with Fossitt and I-WeBS survey, among others, all to Best Practice standards. Darren is also a Qualifying member of CIEEM.

Heather Murray MSc BSc ACIEEM is an Ecologist at INIS Environmental Consultants Ltd. Heather holds a BSc (Hons) in Animal and Conservation Biology from Edinburgh Napier University and a MSc in Environmental Management from the University of Stirling. They have completed several different ecological surveys including vantage point surveys, breeding bird transects, I-WeBS, and habitat surveys. In addition to this, Heather is also experienced in conducting bat transects, emergence and re-entry surveys on trees and buildings, static detector deployment and bioacoustics analysis as part of their role in the bat team. Heather also specialises in using thermal cameras for bat emergence surveys and analysing video footage obtained from the cameras.

Brian O'Connor is an ornithological/ecological surveyor who conducted surveys in winter 2022-2023. Brian has Grade 1 Second Class Honours in Wildlife Biology. Brian has extensive experience in areas such as Ecology, Environmental Impact Assessments, Species Identification and Geographical Information Systems. Brian has considerable experience in Report Writing. Brian has worked on many projects as a freelance ornithological/ecological surveyor. Brian has recorded for 'Flora of County Wexford', submitted records to the National Biodiversity Data Centre, is a member of Birdwatch Ireland and contributed to 'Bird Atlas 2007-2011', 'Atlas of Mammals in Ireland 2010-2015' and the 'All Ireland Butterfly Atlas 2021'.

Emily Marsh MSc BSc PGDip was an Assistant Ecologist with Inis Environmental Consultants Ltd. they undertook a diverse range of ecological-based surveys, including habitats (using the Irish Habitat Classification System (Fossitt, 2000), bird surveys (following various Best Practice survey methods (e.g. SNH, 2017; Hardey et al., 2013, etc,), mammals (again following Best Practice survey methods (e.g. TII, 2009) and Bats (SNH, 2021; Collins, 2016).

Daelyn Purcell BSc serves as an Ecologist within Inis Environmental Consultants Ltd., holding a BSc (Hons) in Wildlife Biology from the Institute of Technology Tralee. Daelyn's expertise lies within the area of ornithology, with six years' experience conducting various ornithological surveys in line with best practice guidelines through Inis Environmental, other various Ecological Consultancies and has worked on several conservation projects with Birdwatch Ireland in previous years. Daelyn also has experience with terrestrial mammal surveys and habitat classification. Daelyn is also a qualifying member of CIEEM.

Sarah Ní Cheallaigh BSc is an assistant field ecologist and part of the quality control team. They are a Qualifying member of CIEEM. They received a Bachelor's (Hons) degree in Ecology and Environmental Biology in 2025. Their thesis explored the effectiveness of the presence of visitors and their escort rangers in helping to protect a Wildlife Management Area (WMA) in Tanzania.

Calum McSorley MSc BSc was the lead bat ecologist at Inis Environmental Consultants and has a BSc in Environmental Science from National University of Ireland Galway and an MSc in Ecological Management and Conservation Biology from Queen's University Belfast. Calum has extensive bat surveying experience including roost assessments, emergence/re-entry surveys, static detector deployments and various exclusion practices. They also have experience in a range of other ecological surveys including habitat classification, mammal surveys, amphibian surveys and reptile surveys.

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Appendix 13.3: Species Records held by NBDC

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A13.3.1 National Biodiversity Data Centre Data Results

A13.3.1.1 NBDC Protected and Invasive Species Records for the Target Grid Square S36

Grid Square S36			
Species	**Numbers**	**Most Recent Record**	**Designations**
Birds			
Barn Owl (*Tyto alba*)	2	31/07/2023	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
Bar-tailed Godwit (*Limosa lapponica*)	2	31/12/2011	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List=
Black-headed Gull (*Chroicocephalus ridibundus*)	15	20/01/2023	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Common Gull (*Larus canus*)	1	20/01/2023	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Coot (*Fulica atra*)	9	31/12/2011	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern – Amber List
Curlew (*Numenius arquata*)	9	20/01/2023	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
Gadwall (*Mareca strepera*)	2	31/12/2011	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Goldcrest (*Regulus regulus*)	22	31/12/2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Plover (*Pluvialis apricaria*)	3	06/12/2021	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species || Protected Species: EU Birds Directive >> Annex II, Section II Bird Species || Protected Species:

Grid Square S36			
Species	**Numbers**	**Most Recent Record**	**Designations**
			EU Birds Directive >> Annex III, Section III Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
Greenfinch (*Chloris chloris*)	25	01/02/2021	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Grey Wagtail (*Motacilla cinerea*)	13	01/02/2021	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
Herring Gull (*Larus argentatus*)	3	24/03/2024	Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
House Martin (*Delichon urbicum*)	19	03/08/2024	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
House Sparrow (*Passer domesticus*)	28	31/05/2021	Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Kestrel (*Falco tinnunculus*)	16	03/08/2024	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
Lapwing (*Vanellus vanellus*)	15	23/12/2022	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
Lesser Black-backed Gull (*Larus fuscus*)	11	20/01/2023	Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Linnet (*Linaria cannabina*)	24	14/07/2021	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Little Egret (*Egretta garzetta*)	2	31/12/2011	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species
Little Grebe (*Tachybaptus ruficollis*)	3	31/12/2011	Protected Species: Wildlife Acts
Mallard (*Anas platyrhynchos*)	9	23/12/2022	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section I Bird Species ||

Grid Square S36			
Species	**Numbers**	**Most Recent Record**	**Designations**
			Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Meadow Pipit (*Anthus pratensis*)	22	31/12/2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
Mistle Thrush (*Turdus viscivorus*)	20	01/02/2021	Protected Species: Wildlife Acts
Mute Swan (*Cygnus olor*)	7	23/12/2022	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Peregrine (*Falco peregrinus*)	6	23/12/2022	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species
Pheasant (*Phasianus colchicus*)	24	26/04/2020	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section I Bird Species
Redwing (*Turdus iliacus*)	11	31/12/2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
Robin (*Erithacus rubecula*)	31	01/02/2021	Protected Species: Wildlife Acts
Rock Dove (*Columba livia*)	3	17/04/2019	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species
Sand Martin (*Riparia riparia*)	5	31/12/2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Shoveler (*Spatula clypeata*)	1	08/03/2004	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section III Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
Skylark (*Alauda arvensis*)	13	31/12/2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Snipe (*Gallinago gallinago*)	10	06/01/2025	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section III Bird Species ||

Grid Square S36			
Species	**Numbers**	**Most Recent Record**	**Designations**
			Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
Spotted Flycatcher (*Muscicapa striata*)	7	31/12/2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Starling (*Sturnus vulgaris*)	33	07/02/2024	Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Stock Dove (*Columba oenas*)	11	31/12/2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
Stonechat (*Saxicola rubicola*)	8	31/12/2011	Protected Species: Wildlife Acts
Swallow (*Hirundo rustica*)	23	18/04/2023	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Swift (*Apus apus*)	9	23/07/2021	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
Teal (*Anas crecca*)	7	20/01/2023	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Wigeon (*Mareca penelope*)	7	20/01/2023	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Willow Warbler (*Phylloscopus trochilus*)	17	31/12/2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Yellowhammer (*Emberiza citrinella*)	20	10/11/2021	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
Terrestrial Mammals			
Badger (*Meles meles*)	110	31/12/2016	Protected Species: Wildlife Acts

Grid Square S36			
Species	**Numbers**	**Most Recent Record**	**Designations**
Hedgehog (*Erinaceus europaeus*)	1	29/06/2021	Protected Species: Wildlife Acts
Otter (*Lutra lutra*)	2	09/10/2015	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex II || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts
Pine Marten (*Martes martes*)	3	31/12/2012	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex V || Protected Species: Wildlife Acts
Red Deer (*Cervus elaphus*)	1	30/04/2011	Protected Species: Wildlife Acts
Red Squirrel (*Sciurus vulgaris*)	5	03/04/2016	Protected Species: Wildlife Acts
Bats			
Brown Long-eared Bat (*Plecotus auritus*)	2	11/08/2018	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts
Common Pipistrelle (*Pipistrellus pipistrellus sensu stricto*)	125	03/08/2019	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts
Leisler's Bat (*Nyctalus leisleri*)	18	03/08/2019	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts
Natterer's Bat (*Myotis nattereri*)	1	11/08/2018	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts
Pipistrelle (*Pipistrellus pipistrellus sensu lato*)	23	31/07/2023	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts
Soprano Pipistrelle (*Pipistrellus pygmaeus*)	18	31/07/2023	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts
Invasive Species			
American Mink (*Neovison vison*)	2	17/01/2010	Invasive Species: EU Invasive Alien Species Regulation No. 1143/2014 || Invasive Species: Regulation S.I. 477/2011 (Ireland) || Invasive Species: High Risk Invasive Species (2013 Report) || Invasive Species: Regulation S.I. 374/2024 (Ireland) || Invasive Species: The Wildlife (Northern Ireland) Order 1985
Brown Rat (*Rattus norvegicus*)	2	16/03/2013	Invasive Species: High Risk Invasive Species (2013 Report)
Fallow Deer (*Dama dama*)	3	16/12/1991	Invasive Species: Regulation S.I. 477/2011 (Ireland) || Invasive Species: High Risk Invasive Species (2013 Report) || Invasive Species: Regulation S.I. 374/2024 (Ireland) || Protected Species: Wildlife Acts

Grid Square S36			
Species	**Numbers**	**Most Recent Record**	**Designations**
Grey Squirrel (*Sciurus carolinensis*)	3	31/12/2012	Invasive Species: EU Invasive Alien Species Regulation No. 1143/2014 || Invasive Species: Regulation S.I. 477/2011 (Ireland) || Invasive Species: High Risk Invasive Species (2013 Report) || Invasive Species: Regulation S.I. 374/2024 (Ireland)
Giant Hogweed (*Heracleum mantegazzianum*)	1	02/07/2019	Invasive Species: EU Invasive Alien Species Regulation No. 1143/2014 || Invasive Species: Regulation S.I. 477/2011 (Ireland) || Invasive Species: High Risk Invasive Species (2013 Report) || Invasive Species: Regulation S.I. 374/2024 (Ireland)
Japanese Knotweed (*Fallopia japonica*)	1	25/05/2010	Invasive Species: EU Invasive Alien Species Regulation No. 1143/2014 || Invasive Species: Regulation S.I. 477/2011 (Ireland) || Invasive Species: High Risk Invasive Species (2013 Report) || Invasive Species: Regulation S.I. 374/2024 (Ireland) || Invasive Species: The Wildlife (Northern Ireland) Order 1985

A13.3.1.2 NBDC Protected and Invasive Species Records for the Target Grid Square S37

Grid S37				
Species		**Numbers**	**Most Recent Record**	**Designations**
Amphibians				
Common Frog (*Rana temporaria*)	6	15/08/2019	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex V || Protected Species: Wildlife Acts	
Smooth Newt (*Lissotriton vulgaris*)	1	13/07/2016	Protected Species: Wildlife Acts	
Invertebrates				
Marsh Fritillary (*Euphydryas aurinia*)	20	06/06/2023	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex II || Threatened Species: Vulnerable	
Birds				
Barn Owl (*Tyto alba*)	7	26/05/2025	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List	
Bewick's Swan (*Cygnus columbianus bewickii*)	1	31/12/2001	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List	
Black-headed Gull (*Chroicocephalus ridibundus*)	9	20/08/2023	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List	
Common Gull (*Larus canus*)	2	07/11/2023	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List	
Common Sandpiper (*Actitis hypoleucos*)	1	14/04/2010	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List	
Coot (*Fulica atra*)	5	18/02/2024	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List	
Cormorant (*Phalacrocorax carbo*)	37	04/01/2025	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List	

Grid S37				
Species		**Numbers**	**Most Recent Record**	**Designations**
Curlew (*Numenius arquata*)	13	11/02/2024	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List	
Dunlin (*Calidris alpina*)	8	18/02/2024	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List	
Gadwall (*Mareca strepera*)	2	07/11/2023	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List	
Goldcrest (*Regulus regulus*)	31	13/08/2023	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List	
Golden Plover (*Pluvialis apricaria*)	17	06/10/2024	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species || Protected Species: EU Birds Directive >> Annex II, Section II Bird Species || Protected Species: EU Birds Directive >> Annex III, Section III Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List	
Great Spotted Woodpecker (*Dendrocopos major*)	1	13/06/2022	Protected Species: Wildlife Acts	
Greenfinch (*Chloris chloris*)	48	01/08/2025	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List	
Greenland White-fronted Goose (*Anser albifrons flavirostris*)	2	31/12/2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List	
Grey Wagtail (*Motacilla cinerea*)	32	06/10/2024	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List	
Greylag Goose (*Anser anser*)	3	06/03/2019	Invasive Species: Regulation S.I. 477/2011 (Ireland) || Invasive Species: Regulation S.I. 374/2024 (Ireland) || Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List	

Grid S37				
Species		**Numbers**	**Most Recent Record**	**Designations**
Hen Harrier (*Circus cyaneus*)	2	29/10/2019	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List	
Herring Gull (*Larus argentatus*)	2	06/03/2020	Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List	
House Martin (*Delichon urbicum*)	27	01/08/2025	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List	
House Sparrow (*Passer domesticus*)	28	01/08/2025	Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List	
Jack Snipe (*Lymnocryptes minimus*)	1	28/11/2024	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section III Bird Species	
Kestrel (*Falco tinnunculus*)	43	17/07/2025	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List	
Kingfisher (*Alcedo atthis*)	27	30/01/2023	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List	
Lapwing (*Vanellus vanellus*)	38	09/01/2025	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List	
Lesser Black-backed Gull (*Larus fuscus*)	11	07/11/2023	Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List	
Linnet (*Linaria cannabina*)	18	29/04/2025	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List	
Little Egret (*Egretta garzetta*)	43	04/01/2025	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species	
Little Grebe (*Tachybaptus ruficollis*)	9	04/01/2025	Protected Species: Wildlife Acts	

Grid S37				
Species		**Numbers**	**Most Recent Record**	**Designations**
Mallard (*Anas platyrhynchos*)	14	04/01/2025		Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section I Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Meadow Pipit (*Anthus pratensis*)	28	25/10/2024		Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
Merlin (*Falco columbarius*)	5	13/10/2024		Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Mistle Thrush (*Turdus viscivorus*)	47	03/01/2025		Protected Species: Wildlife Acts
Mute Swan (*Cygnus olor*)	41	04/01/2025		Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Peregrine (*Falco peregrinus*)	8	01/01/2024		Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species
Pheasant (*Phasianus colchicus*)	22	01/01/2021		Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section I Bird Species
Pink-footed Goose (*Anser brachyrhynchus*)	2	31/10/2020		Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section II Bird Species
Pintail (*Anas acuta*)	8	14/01/2024		Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Pochard (*Aythya ferina*)	2	18/02/2023		Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List

Grid S37				
Species		**Numbers**	**Most Recent Record**	**Designations**
Redshank (*Tringa totanus*)	4	14/01/2024	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List	
Redwing (*Turdus iliacus*)	27	04/01/2025	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List	
Robin (*Erithacus rubecula*)	54	04/01/2025	Protected Species: Wildlife Acts	
Rock Dove (*Columba livia*)	7	27/02/2024	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species	
Ruff (*Calidris pugnax*)	3	23/10/2022	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List	
Sand Martin (*Riparia riparia*)	15	21/03/2020	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List	
Shelduck (*Tadorna tadorna*)	4	18/02/2024	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List	
Shoveler (*Spatula clypeata*)	6	14/01/2024	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section III Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List	
Skylark (*Alauda arvensis*)	19	19/04/2024	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List	
Snipe (*Gallinago gallinago*)	30	01/08/2025	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section III Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List	
Sparrowhawk (*Accipiter nisus*)	12	01/08/2025	Protected Species: Wildlife Acts	
Spotted Flycatcher (*Muscicapa striata*)	11	01/08/2022	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List	

Grid S37				
Species		**Numbers**	**Most Recent Record**	**Designations**
Starling (*Sturnus vulgaris*)	28	04/01/2025	Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List	
Stock Dove (*Columba oenas*)	8	31/07/1991	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List	
Stonechat (*Saxicola rubicola*)	16	18/02/2024	Protected Species: Wildlife Acts	
Swallow (*Hirundo rustica*)	53	22/09/2024	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List	
Swift (*Apus apus*)	15	10/05/2025	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List	
Teal (*Anas crecca*)	10	14/01/2024	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List	
Tree Sparrow (*Passer montanus*)	2	12/01/2021	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List	
Tufted Duck (*Aythya fuligula*)	1	10/12/2020	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List	
Wheatear (*Oenanthe oenanthe*)	4	06/10/2024	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List	
White-fronted Goose (*Anser albifrons*)	6	04/12/2022	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section II Bird Species || Protected Species: EU Birds Directive >> Annex III, Section III Bird Species	
Whooper Swan (*Cygnus cygnus*)	36	04/01/2025	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List	
Wigeon (*Mareca penelope*)	7	14/01/2024	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section II Bird Species ||	

Grid S37				
Species		**Numbers**	**Most Recent Record**	**Designations**
			Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List	
Willow Warbler (*Phylloscopus trochilus*)	19	02/06/2023	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List	
Woodcock (*Scolopax rusticola*)	7	02/05/2021	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section III Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List	
Yellowhammer (*Emberiza citrinella*)	46	10/05/2025	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List	
Terrestrial Mammals				
Badger (*Meles meles*)	128	14/01/2018	Protected Species: Wildlife Acts	
Hedgehog (*Erinaceus europaeus*)	3	20/10/2012	Protected Species: Wildlife Acts	
Otter (*Lutra lutra*)	7	27/09/2018	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex II || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts	
Pine Marten (*Martes martes*)	5	11/05/2021	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex V || Protected Species: Wildlife Acts	
Red Squirrel (*Sciurus vulgaris*)	14	28/10/2015	Protected Species: Wildlife Acts	
Bats				
Brown Long-eared Bat (*Plecotus auritus*)	3	08/08/2009	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts	
Common Pipistrelle (*Pipistrellus pipistrellus sensu stricto*)	7	08/08/2009	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts	
Daubenton's Bat (*Myotis daubentonii*)	2	08/08/2009	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts	

Grid S37				
Species		**Numbers**	**Most Recent Record**	**Designations**
Leisler's Bat (*Nyctalus leisleri*)	5	08/08/2009	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts	
Pipistrelle (*Pipistrellus pipistrellus sensu lato*)	1	31/07/2006	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts	
Soprano Pipistrelle (*Pipistrellus pygmaeus*)	3	08/08/2009	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts	
Invasives				
American Mink (*Neovison vison*)	7	07/05/2017	Invasive Species: EU Invasive Alien Species Regulation No. 1143/2014 || Invasive Species: Regulation S.I. 477/2011 (Ireland) || Invasive Species: High Risk Invasive Species (2013 Report) || Invasive Species: Regulation S.I. 374/2024 (Ireland) || Invasive Species: The Wildlife (Northern Ireland) Order 1985	
Fallopia japonica x sachalinensis = F. x bohemica	1	13/05/2016	Invasive Species: EU Invasive Alien Species Regulation No. 1143/2014 || Invasive Species: Regulation S.I. 477/2011 (Ireland) || Invasive Species: High Risk Invasive Species (2013 Report) || Invasive Species: Regulation S.I. 374/2024 (Ireland)	
Grey Squirrel (*Sciurus carolinensis*)	2	31/12/2007	Invasive Species: EU Invasive Alien Species Regulation No. 1143/2014 || Invasive Species: Regulation S.I. 477/2011 (Ireland) || Invasive Species: High Risk Invasive Species (2013 Report) || Invasive Species: Regulation S.I. 374/2024 (Ireland)	
Japanese Knotweed (*Fallopia japonica*)	4	19/01/2015	Invasive Species: EU Invasive Alien Species Regulation No. 1143/2014 || Invasive Species: Regulation S.I. 477/2011 (Ireland) || Invasive Species: High Risk Invasive Species (2013 Report) || Invasive Species: Regulation S.I. 374/2024 (Ireland) || Invasive Species: The Wildlife (Northern Ireland) Order 1985	
Rhododendron ponticum	2	02/02/2020	Invasive Species: Regulation S.I. 477/2011 (Ireland) || Invasive Species: Detailed Risk Assesment || Invasive Species: High Risk Invasive Species (2013 Report) || Invasive Species: Regulation S.I. 374/2024 (Ireland) || Invasive Species: Detailed Risk Assesment >> High Risk	

A13.3.1.3 NBDC Protected and Invasive Species Records for the Target Grid Square S46

Grid Square S46			
Species	**Numbers**	**Most Recent Record**	**Designations**
Amphibians			

Grid Square S46			
Species	**Numbers**	**Most Recent Record**	**Designations**
Common Frog (*Rana temporaria*)	1	19/04/2014	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex V || Protected Species: Wildlife Acts
Smooth Newt (*Lissotriton vulgaris*)	1	19/04/2014	Protected Species: Wildlife Acts
Birds			
Balearic Shearwater (*Puffinus mauretanicus*)	1	30/03/2019	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species || Threatened Species: OSPAR Convention || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
Barn Owl (*Tyto alba*)	11	07/01/2023	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
Black-headed Gull (*Chroicocephalus ridibundus*)	7	31/12/2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Coot (*Fulica atra*)	7	25/01/2023	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Cormorant (*Phalacrocorax carbo*)	5	24/11/2022	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Curlew (*Numenius arquata*)	17	23/12/2022	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
Dunlin (*Calidris alpina*)	1	05/12/2022	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
Goldcrest (*Regulus regulus*)	25	04/11/2023	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Golden Plover (*Pluvialis apricaria*)	10	25/01/2023	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species || Protected Species: EU Birds Directive >> Annex II, Section II Bird Species || Protected Species: EU Birds

Grid Square S46			
Species	**Numbers**	**Most Recent Record**	**Designations**
			Directive >> Annex III, Section III Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
Great Spotted Woodpecker (*Dendrocopos major*)	10	06/06/2024	Protected Species: Wildlife Acts
Greenfinch (*Chloris chloris*)	17	04/11/2023	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Grey Wagtail (*Motacilla cinerea*)	18	04/11/2023	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
Herring Gull (*Larus argentatus*)	1	14/08/2019	Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
House Martin (*Delichon urbicum*)	15	30/07/2024	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
House Sparrow (*Passer domesticus*)	20	19/07/2024	Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Kestrel (*Falco tinnunculus*)	20	31/05/2021	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
Kingfisher (*Alcedo atthis*)	18	22/09/2025	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Lapwing (*Vanellus vanellus*)	25	25/01/2023	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
Lesser Black-backed Gull (*Larus fuscus*)	2	31/12/2011	Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Linnet (*Linaria cannabina*)	10	14/08/2019	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Little Egret (*Egretta garzetta*)	19	04/11/2023	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species

Grid Square S46			
Species	**Numbers**	**Most Recent Record**	**Designations**
Little Grebe (*Tachybaptus ruficollis*)	7	31/12/2011	Protected Species: Wildlife Acts
Mallard (*Anas platyrhynchos*)	22	25/01/2023	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section I Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Meadow Pipit (*Anthus pratensis*)	12	23/05/2017	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
Mistle Thrush (*Turdus viscivorus*)	22	04/11/2023	Protected Species: Wildlife Acts
Mute Swan (*Cygnus olor*)	27	25/01/2023	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Peregrine (*Falco peregrinus*)	2	07/08/2023	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species
Pheasant (*Phasianus colchicus*)	21	20/04/2021	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section I Bird Species
Redshank (*Tringa totanus*)	2	05/12/2022	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
Redwing (*Turdus iliacus*)	7	31/12/2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
Robin (*Erithacus rubecula*)	34	19/07/2024	Protected Species: Wildlife Acts
Rock Dove (*Columba livia*)	8	31/12/2011	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species
Sand Martin (*Riparia riparia*)	46	23/04/2021	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Shoveler (*Spatula clypeata*)	2	24/11/2022	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section III Bird Species || Threatened

Grid Square S46			
Species	**Numbers**	**Most Recent Record**	**Designations**
			Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
Skylark (*Alauda arvensis*)	9	23/05/2017	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Snipe (*Gallinago gallinago*)	6	05/11/2020	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section III Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
Sparrowhawk (*Accipiter nisus*)	7	10/04/2018	Protected Species: Wildlife Acts
Spotted Flycatcher (*Muscicapa striata*)	4	31/07/1991	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Starling (*Sturnus vulgaris*)	24	19/07/2024	Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Stock Dove (*Columba oenas*)	6	20/03/2018	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
Stonechat (*Saxicola rubicola*)	5	22/09/2025	Protected Species: Wildlife Acts
Swallow (*Hirundo rustica*)	32	30/07/2024	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Swift (*Apus apus*)	10	30/07/2024	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
Teal (*Anas crecca*)	6	25/01/2023	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Tree Sparrow (*Passer montanus*)	2	09/06/2013	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List

Grid Square S46			
Species	**Numbers**	**Most Recent Record**	**Designations**
Whooper Swan (*Cygnus cygnus*)	9	25/01/2023	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Wigeon (*Mareca penelope*)	7	25/01/2023	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Willow Warbler (*Phylloscopus trochilus*)	17	23/04/2021	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Yellowhammer (*Emberiza citrinella*)	17	19/07/2024	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
Terrestrial Mammals			
Badger (*Meles meles*)	132	31/12/2016	Protected Species: Wildlife Acts
Hedgehog (*Erinaceus europaeus*)	18	24/07/2025	Protected Species: Wildlife Acts
Otter (*Lutra lutra*)	4	16/04/2013	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex II || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts
Pine Marten (*Martes martes*)	8	23/08/2021	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex V || Protected Species: Wildlife Acts
Pygmy Shrew (*Sorex minutus*)	1	02/08/2012	Protected Species: Wildlife Acts
Red Squirrel (*Sciurus vulgaris*)	4	18/01/2023	Protected Species: Wildlife Acts
Bats			
Brown Long-eared Bat (*Plecotus auritus*)	4	11/09/2018	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts
Common Pipistrelle (*Pipistrellus pipistrellus sensu stricto*)	3	11/08/2021	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts

Grid Square S46			
Species	**Numbers**	**Most Recent Record**	**Designations**
Daubenton's Bat (*Myotis daubentonii*)	230	18/08/2021	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts
Leisler's Bat (*Nyctalus leisleri*)	3	10/08/2018	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts
Natterer's Bat (*Myotis nattereri*)	2	11/09/2018	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts
Soprano Pipistrelle (*Pipistrellus pygmaeus*)	5	10/08/2018	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts
Invasives			
American Mink (*Neovison vison*)	2	10/10/2012	Invasive Species: EU Invasive Alien Species Regulation No. 1143/2014 || Invasive Species: Regulation S.I. 477/2011 (Ireland) || Invasive Species: High Risk Invasive Species (2013 Report) || Invasive Species: Regulation S.I. 374/2024 (Ireland) || Invasive Species: The Wildlife (Northern Ireland) Order 1985
Brown Rat (*Rattus norvegicus*)	3	13/10/2013	Invasive Species: High Risk Invasive Species (2013 Report)
Canadian Waterweed (*Elodea canadensis*)	4	31/12/1999	Invasive Species: Regulation S.I. 477/2011 (Ireland) || Invasive Species: High Risk Invasive Species (2013 Report) || Invasive Species: The Wildlife (Northern Ireland) Order 1985
Cherry Laurel (*Prunus laurocerasus*)	3	02/08/2012	Invasive Species: High Risk Invasive Species (2013 Report)
Giant Hogweed (*Heracleum mantegazzianum*)	1	01/06/2021	Invasive Species: EU Invasive Alien Species Regulation No. 1143/2014 || Invasive Species: Regulation S.I. 477/2011 (Ireland) || Invasive Species: High Risk Invasive Species (2013 Report) || Invasive Species: Regulation S.I. 374/2024 (Ireland)
Grey Squirrel (*Sciurus carolinensis*)	11	01/08/2017	Invasive Species: EU Invasive Alien Species Regulation No. 1143/2014 || Invasive Species: Regulation S.I. 477/2011 (Ireland) || Invasive Species: High Risk Invasive Species (2013 Report) || Invasive Species: Regulation S.I. 374/2024 (Ireland)
Himalayan Balsam (*Impatiens glandulifera*)	9	17/01/2025	Invasive Species: EU Invasive Alien Species Regulation No. 1143/2014 || Invasive Species: Regulation S.I. 477/2011 (Ireland) || Invasive Species: Detailed Risk Assessment || Invasive Species: High Risk Invasive Species (2013 Report) || Invasive Species: Regulation S.I. 374/2024 (Ireland) || Invasive Species: Detailed Risk Assessment >> High Risk

Grid Square S46			
Species	**Numbers**	**Most Recent Record**	**Designations**
Japanese Knotweed (*Fallopia japonica*)	2	26/06/2015	Invasive Species: EU Invasive Alien Species Regulation No. 1143/2014 || Invasive Species: Regulation S.I. 477/2011 (Ireland) || Invasive Species: High Risk Invasive Species (2013 Report) || Invasive Species: Regulation S.I. 374/2024 (Ireland) || Invasive Species: The Wildlife (Northern Ireland) Order 1985
Sika Deer (*Cervus nippon*)	1	15/10/2014	Invasive Species: EU Invasive Alien Species Regulation No. 1143/2014 || Invasive Species: Regulation S.I. 477/2011 (Ireland) || Invasive Species: High Risk Invasive Species (2013 Report) || Invasive Species: Regulation S.I. 374/2024 (Ireland) || Protected Species: Wildlife Acts

A13.3.1.4 NBDC Protected and Invasive Species Records for the Target Grid Square S47

Grid Square S47				
Species		**Numbers**	**Most Recent Record**	**Designations**
Amphibians				
Common Frog (*Rana temporaria*)	13	15/03/2011	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex V || Protected Species: Wildlife Acts	
Invertebrates				
Marsh Fritillary (*Euphydryas aurinia*)	16	27/05/2023	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex II || Threatened Species: Vulnerable	
Birds				
Barn Owl (*Tyto alba*)	2	11/08/2021	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List	
Bar-tailed Godwit (*Limosa lapponica*)	1	31/12/2001	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List	
Black-headed Gull (*Chroicocephalus ridibundus*)	9	13/11/2014	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List	
Common Sandpiper (*Actitis hypoleucos*)	2	14/04/2010	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List	
Coot (*Fulica atra*)	3	31/12/2001	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List	
Cormorant (*Phalacrocorax carbo*)	7	27/11/2023	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List	
Curlew (*Numenius arquata*)	8	31/12/2011	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List	
Goldcrest (*Regulus regulus*)	61	18/02/2024	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List	

Grid Square S47				
Species		**Numbers**	**Most Recent Record**	**Designations**
Golden Plover (*Pluvialis apricaria*)	7	19/12/2022	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species || Protected Species: EU Birds Directive >> Annex II, Section II Bird Species || Protected Species: EU Birds Directive >> Annex III, Section III Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List	
Great Spotted Woodpecker (*Dendrocopos major*)	10	11/06/2024	Protected Species: Wildlife Acts	
Greenfinch (*Chloris chloris*)	33	12/06/2022	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List	
Grey Wagtail (*Motacilla cinerea*)	52	25/05/2025	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List	
Herring Gull (*Larus argentatus*)	2	12/06/2022	Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List	
House Martin (*Delichon urbicum*)	29	19/05/2025	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List	
House Sparrow (*Passer domesticus*)	47	20/05/2024	Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List	
Kestrel (*Falco tinnunculus*)	24	31/08/2025	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List	
Kingfisher (*Alcedo atthis*)	30	04/03/2024	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List	
Lapwing (*Vanellus vanellus*)	17	19/12/2022	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List	
Lesser Black-backed Gull (*Larus fuscus*)	4	08/05/2023	Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List	
Linnet (*Linaria cannabina*)	24	19/07/2023	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List	
Little Egret (*Egretta garzetta*)	17	02/04/2025	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species	

Grid Square S47				
Species		**Numbers**	**Most Recent Record**	**Designations**
Little Grebe (*Tachybaptus ruficollis*)	5	31/12/2011	Protected Species: Wildlife Acts	
Mallard (*Anas platyrhynchos*)	37	29/03/2023	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section I Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List	
Meadow Pipit (*Anthus pratensis*)	31	19/07/2023	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List	
Mistle Thrush (*Turdus viscivorus*)	44	19/02/2024	Protected Species: Wildlife Acts	
Mute Swan (*Cygnus olor*)	21	19/12/2022	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List	
Peregrine (*Falco peregrinus*)	2	31/10/2024	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species	
Pheasant (*Phasianus colchicus*)	33	08/05/2023	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section I Bird Species	
Quail (*Coturnix coturnix*)	1	31/07/1991	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List	
Red Kite (*Milvus milvus*)	1	01/07/2014	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List	
Redwing (*Turdus iliacus*)	22	04/03/2022	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List	
Robin (*Erithacus rubecula*)	77	18/02/2024	Protected Species: Wildlife Acts	
Rock Dove (*Columba livia*)	6	31/10/2024	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species	
Sand Martin (*Riparia riparia*)	68	23/05/2023	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List	
Skylark (*Alauda arvensis*)	22	16/06/2023	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List	

Grid Square S47				
Species		**Numbers**	**Most Recent Record**	**Designations**
Snipe (*Gallinago gallinago*)	19	18/02/2024	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section III Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List	
Sparrowhawk (*Accipiter nisus*)	11	21/12/2021	Protected Species: Wildlife Acts	
Spotted Flycatcher (*Muscicapa striata*)	21	19/07/2023	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List	
Starling (*Sturnus vulgaris*)	48	18/02/2024	Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List	
Stock Dove (*Columba oenas*)	9	31/07/1991	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List	
Stonechat (*Saxicola rubicola*)	7	04/03/2022	Protected Species: Wildlife Acts	
Swallow (*Hirundo rustica*)	61	20/05/2024	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List	
Swift (*Apus apus*)	13	11/08/2025	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List	
Teal (*Anas crecca*)	6	18/02/2024	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List	
Tree Sparrow (*Passer montanus*)	4	27/11/2022	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List	
Whooper (*Cygnus cygnus*)	2	17/12/2021	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List	
Wigeon (*Mareca penelope*)	1	31/12/2001	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List	

Grid Square S47				
Species		**Numbers**	**Most Recent Record**	**Designations**
Willow Warbler (*Phylloscopus trochilus*)	38	19/07/2023		Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Woodcock (*Scolopax rusticola*)	3	13/03/2018		Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section III Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
Yellowhammer (*Emberiza citrinella*)	24	13/05/2025		Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
Terrestrial Mammals				
Badger (*Meles meles*)	86	17/06/2018		Protected Species: Wildlife Acts
Hedgehog (*Erinaceus europaeus*)	15	04/10/2025		Protected Species: Wildlife Acts
Otter (*Lutra lutra*)	6	09/10/2015		Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex II || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts
Pine Marten (*Martes martes*)	7	15/04/2021		Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex V || Protected Species: Wildlife Acts
Pygmy Shrew (*Sorex minutus*)	2	03/08/2012		Protected Species: Wildlife Acts
Red Squirrel (*Sciurus vulgaris*)	7	05/12/2017		Protected Species: Wildlife Acts
Bats				
Brown Long-eared Bat (*Plecotus auritus*)	1	05/09/2018		Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts
Common Pipistrelle (*Pipistrellus pipistrellus sensu stricto*)	8	05/09/2018		Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts
Daubenton's Bat (*Myotis daubentonii*)	110	14/06/2022		Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts

Grid Square S47				
Species		**Numbers**	**Most Recent Record**	**Designations**
Leisler's Bat (*Nyctalus leisleri*)	7	05/09/2018	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts	
Natterer's Bat (*Myotis nattereri*)	1	02/08/2007	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts	
Pipistrelle (*Pipistrellus pipistrellus sensu lato*)	1	08/11/2021	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts	
Soprano Pipistrelle (*Pipistrellus pygmaeus*)	8	05/09/2018	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts	
Invasives				
American Mink (*Neovison vison*)	1	06/05/1991	Invasive Species: EU Invasive Alien Species Regulation No. 1143/2014 || Invasive Species: Regulation S.I. 477/2011 (Ireland) || Invasive Species: High Risk Invasive Species (2013 Report) || Invasive Species: Regulation S.I. 374/2024 (Ireland) || Invasive Species: The Wildlife (Northern Ireland) Order 1985	
Cherry Laurel (*Prunus laurocerasus*)	8	01/08/2023	Invasive Species: High Risk Invasive Species (2013 Report)	
Japanese Knotweed (*Fallopia japonica*)	1	13/07/2015	Invasive Species: EU Invasive Alien Species Regulation No. 1143/2014 || Invasive Species: Regulation S.I. 477/2011 (Ireland) || Invasive Species: High Risk Invasive Species (2013 Report) || Invasive Species: Regulation S.I. 374/2024 (Ireland) || Invasive Species: The Wildlife (Northern Ireland) Order 1985	

Appendix to Chapter 13: Biodiversity

Appendix 13.4: Invertebrates, Amphibians, Reptiles and Terrestrial Mammals Survey Data

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A13.3.1 Survey Data

Table 1: Mammal Walkover Survey Efforts 2024 and 2025

Date	Observer	Start Time	End Time
22/04/2025	KS	08:58	13:35
23/04/2025	KME & JOC	14:40	17:40
03/07/2025	KME	09:00	14:30
30/07/2025	KME	08:30	13:30
31/07/2025	KME	07:30	13:00
10/09/2025	DMC	09:00	13:00

Table 2: Badger Survey Efforts 2025

Date	Observer	Start Time	End Time
22/04/2025	KS	08:58	13:35
10/09/2025	DMC	09:00	13:00

Table 3: Otter Survey Efforts 2025

Date	Observer	Start Time	End Time
04/07/2025	KME	09:00	14:30
30/07/2025	KME	08:30	13:30
31/07/2025	KME	07:30	13:00
11/09/2025	KME & CMK	09:30	10:30

Table 4: Mammal Camera Trap Survey Efforts 2025

Surveyor	Trap No.	Date Deployed	Date Collected	ITM	Notes
KS	19072	22/04/2025	08/05/2025	633675.63, 670468.35	
KS	19068	22/04/2025	08/05/2025	633712.08, 671494.82	In ditch beside track
KS	19071	22/04/2025	08/05/2025	634903.24, 669795.64	
KS	19073	22/04/2025	08/05/2025	638807.98, 669197.33	
KS	19084	22/04/2025	08/05/2025	638519.65, 668811.42	Nil Sightings- no data
DMC	19073	10/09/2025	23/09/2025	638511.28, 668807.75	Placed beside mammal path in hedgerow

Surveyor	Trap No.	Date Deployed	Date Collected	ITM	Notes
DMC	19072	10/09/2025	23/09/2025	638336.09, 669159.65	Placed here to capture movement from woodland to west
DMC	19071	10/09/2025	23/09/2025	635032.35, 669619.94	Badger snuffle holes just adjacent field
DMC	19068	10/09/2025	23/09/2025	633739.16, 670331.46	
DMC	19076	10/09/2025	23/09/2025	633764.85, 671224.18	

Table 5: Marsh Fritillary Suitability Survey Efforts 2025

Date	Observer	Cloud	Precipitation	Wind Speed	Wind Direction	Temperature
15/08/2025	KME	3/8	None	F1	S	19

Table 6: Marsh Fritillary Larval Web Survey Efforts 2025 and 2026

Date	Observer	Cloud	Precipitation	Wind Speed	Wind Direction	Temperature
23/09/2025	KME	2/8	None	F1	SSE	11
17/09/2026	MMcK	6/8	None	F3	W	14

Table 7: Amphibian Suitability Survey Efforts 2025

Date	Observer	Cloud	Visibility	Precipitation	Wind Speed	Wind Direction	Temperature
25/04/2025	CMCK & KME	8/8	3	Moderate rain	F3	SE	11
22/05/2025	CMCK & KME	2/8	5	None	F1	S	13

Table 8: Amphibian Nocturnal Survey Efforts 2025

Date	Observer	Cloud	Visibility	Precipitation	Wind Speed	Wind Direction	Temperature
01/05/2025	JOC & MVA	5	2/8	None	F2	N	13
22/05/2025	CMCK & KME	5	2/8	None	F1	S	13

Table 9: Reptile Mat Deployment Survey Efforts 2025

Date	Observer	Cloud	Visibility	Precipitation	Wind Speed	Wind Direction	Temperature
22/05/2025	KME	0/8	16	None	F2	WNW	20

Table 10: Reptile Survey Efforts 2025

Date	Observer	Cloud	Visibility	Precipitation	Wind Speed	Wind Direction	Temperature
24/06/2025	JOC	7/8	10	None	F3	W	19

Date	Observer	Cloud	Visibility	Precipitation	Wind Speed	Wind Direction	Temperature
15/07/2025	AH	5/8	20	None	F5	SW	17
13/08/2025	SS	6/8	20	None	F2	SSW	21
23/09/2025	KME	2/8	16	None	F1	SSE	11

A13.3.2 Results

Table 11: Mammal Walkover Survey Results 2025

Date	Survey	Species	Field Sign	ITM	Notes
22/04/2025	General Mammal Walkover	Other (specify in notes)	Path	633715.49, 671513.76	Mammal track worn through grass leading through hedge. Likely Red Fox
22/04/2025	General Mammal Walkover	Other (specify in notes)	Path	633929.84, 671312.34	Well-defined mammal track from woods
22/04/2025	General Mammal Walkover	Other (specify in notes)	Path	633726, 671116.84	Track following hedgerow/ field boundary
22/04/2025	General Mammal Walkover	Other (specify in notes)	Path	633710.93, 670519.69	Several well-defined tracks throughout the treeline used by both livestock and other mammals
22/04/2025	General Mammal Walkover	Other (specify in notes)	Path	634958.35, 669898.32	Well-defined trail following linear features from road to T7 location
23/04/2025	General Mammal Walkover	Otter	Active holt	*Redacted*	*Redacted*
03/07/2025	General Mammal Walkover	Nil Sightings	Nil Sightings	637965.97, 669394.33	
30/07/2025	General Mammal Walkover	Nil Sightings	Nil Sightings	638134.69, 669328.32	
31/07/2025	General Mammal Walkover	Nil Sightings	Nil Sightings	644082.4, 671034.52	
10/09/2025	General Mammal Walkover	Nil Sightings	Other (specify in notes)	638738.73, 668516.96	No access, cattle in field
10/09/2025	General Mammal Walkover	Nil Sightings	Other (specify in notes)	638157.33, 669308.18	No access cattle in field
10/09/2025	General Mammal Walkover	Nil Sightings	Other (specify in notes)	638171.54, 669409.13	No access cattle in field
10/09/2025	General Mammal Walkover	Nil Sightings	Other (specify in notes)	634604.8, 669641.77	Cattle in field no access
10/09/2025	General Mammal Walkover	Nil Sightings	Other (specify in notes)	634315.11, 669752.17	No access cattle in field
10/09/2025	General Mammal Walkover	Nil Sightings	Other (specify in notes)	634177.62, 669716.29	No access cattle in field
10/09/2025	General Mammal Walkover	Nil Sightings	Other (specify in notes)	633723.46, 670661.71	No access cattle in field
10/09/2025	General Mammal Walkover	Nil Sightings	Other (specify in notes)	634374.35, 670553.01	No access cattle in field

Date	Survey	Species	Field Sign	ITM	Notes
10/09/2025	General Mammal Walkover	Nil Sightings	Other (specify in notes)	634705.59, 670531.48	No access cattle in field

Table 12: Badger Survey Results 2025

Date	Survey	Species	Field Sign	ITM	Notes
10/09/2025	Badger	Badger	Snuffle holes	635106.02, 669531.64	
10/09/2025	Badger	Badger	Snuffle holes	635170.55, 669444.17	
10/09/2025	Badger	Badger	Snuffle holes	635136.36, 669193.28	
10/09/2025	Badger	Badger	Snuffle holes	633748.11, 671145.24	
10/09/2025	Badger	Badger	Multiple paths into dense blackthorn scrub	633745.21, 671146.4	

Table 13: Otter Survey Results 2025

Date	Survey	Species	Field Sign	ITM	Notes
04/07/2025	Otter	Nil Sightings	Nil Sightings	644026, 671505.08	
30/07/2025	Otter	Nil Sightings	Nil Sightings	639117.57, 669643.53	
31/07/2025	Otter	Nil Sightings	Nil Sightings	644179.18, 671267.99	
11/09/2025	Otter	Nil Sightings	Nil Sightings	636077, 669700	
22/09/2026	Otter	Otter	Old Spraint	637018, 668254	
22/09/2026	Otter	Nil Sightings	Nil Sightings	637539, 669054	
22/09/2026	Otter	Otter	Fresh Spraint	642000, 670183	
22/09/2026	Otter	Nil Sightings	Nil Sightings	642627, 669930	

Table 14: Mammal surveys incidentals

Date	Survey	Species	Field Sign	ITM/10km OS Grid Square	Notes
22/04/2025	Badger	Red Fox	Live Sightings	633804.35, 671211.74	
22/04/2025	Badger	Red Fox	Live Sightings	633826.2, 670861.21	
22/04/2025	Badger	Rabbit	Live Sightings	633822.3, 670760.03	
22/04/2025	Badger	Snipe	Live Sightings	635134.89, 670112.02	
01/05/2025	Badger	Red Fox	Foot prints	638557.21, 669599.1	

Date	Survey	Species	Field Sign	ITM/10km OS Grid Square	Notes
01/05/2025	Kingfisher	Otter	Otter tracks on muddy riverbank	S47	
02/05/2025	Static Detector Deployment	Badger	Possible Badger sett	S37	Burrow, no snuffle holes or scatt evidence.
02/05/2025	Bat Transect	Badger	Live Sighting	S36	
09/05/2025	Kingfisher	Otter	Otter spraint	S47	On willow tree washed up in the river.
09/05/2025	Kingfisher	Otter	Otter spraint	S47	
18/09/2026	Habitat	Otter	Slide	S47	

Table 15: Mammal Camera Trap Survey Results 2025

Date of Recording	Survey	Species	Number	Trap No.	ITM	Notes
24/04/2025	Mammal Camera Traps	Red Fox	1	19072	633675.63, 670468.35	
24/04/2025	Mammal Camera Traps	Red Fox	1	19072	633675.63, 670468.35	
02/05/2025	Mammal Camera Traps	Badger	1	19072	633675.63, 670468.35	
05/05/2025	Mammal Camera Traps	Badger	1	19072	633675.63, 670468.35	
30/04/2025	Mammal Camera Traps	Badger	1	19068	633712.08, 671494.82	
28/04/2025	Mammal Camera Traps	Badger	1	19071	634903.24, 669795.64	
12/09/2025	Mammal Camera Traps	Badger	1	19068	633739.16, 670331.46	
12/09/2025	Mammal Camera Traps	Badger	1	19068	633739.16, 670331.46	
12/09/2025	Mammal Camera Traps	Badger	1	19068	633739.16, 670331.46	
12/09/2025	Mammal Camera Traps	Badger	1	19068	633739.16, 670331.46	
15/09/2025	Mammal Camera Traps	Hare	1	19068	633739.16, 670331.46	
20/09/2025	Mammal Camera Traps	Hare	1	19068	633739.16, 670331.46	
20/09/2025	Mammal Camera Traps	Hare	1	19068	633739.16, 670331.46	
20/09/2025	Mammal Camera Traps	Hare	1	19068	633739.16, 670331.46	
20/09/2025	Mammal Camera Traps	Hare	1	19068	633739.16, 670331.46	
20/09/2025	Mammal Camera Traps	Hare	1	19068	633739.16, 670331.46	
20/09/2025	Mammal Camera Traps	Hare	1	19068	633739.16, 670331.46	
20/09/2025	Mammal Camera Traps	Hare	1	19068	633739.16, 670331.46	

Date of Recording	Survey	Species	Number	Trap No.	ITM	Notes
20/09/2025	Mammal Camera Traps	Hare	1	19068	633739.16, 670331.46	
21/09/2025	Mammal Camera Traps	Badger	1	19068	633739.16, 670331.46	
22/09/2025	Mammal Camera Traps	Red Fox	1	19068	633739.16, 670331.46	
	Mammal Camera Traps	Nil Sightings		19071	635032.35, 669619.94	Camera disturbed by cattle on first night
	Mammal Camera Traps	Nil Sightings		19073	638511.28, 668807.75	Camera disturbed by cattle on fourth night
19/09/2025	Mammal Camera Traps	Brown Rat	1	19076	633764.85, 671224.18	

Table 16: Marsh Fritillary Suitability Survey Results 2025

Date	Habitat Type	Abundance of Devils bit Scabious	Average Vegetation Height (cm)	Animal Poaching	No of Occupied Webs	Notes
15/08/2025	WS1/ED3	Rare	<5cm	No livestock hoof marks	0	Nil Sightings of Devil's-bit Scabious plants.
15/08/2025	GA1	Rare	<5cm	No livestock hoof marks	0	Nil Sightings of Devil's-bit Scabious plants.
15/08/2025	GA1	Rare	<5cm	No livestock hoof marks	0	Nil Sightings of Devil's-bit Scabious plants.
15/08/2025	GA1	Rare	<5cm	No livestock hoof marks	0	Nil Sightings of Devil's-bit Scabious plants.
15/08/2025	GA1	Rare	<5cm	No livestock hoof marks	0	Nil Sightings of Devil's-bit Scabious plants.
15/08/2025	GA1	Rare	<5cm	No livestock hoof marks	0	Nil Sightings of Devil's-bit Scabious plants.
15/08/2025	ED3/ ED2/ WS1	Rare	<5cm	No livestock hoof marks	0	Nil Sightings of Devil's-bit Scabious plants.

Date	Habitat Type	Abundance of Devils bit Scabious	Average Vegetation Height (cm)	Animal Poaching	No of Occupied Webs	Notes
15/08/2025	GA1	Rare	<5cm	No livestock hoof marks	0	Nil Sightings of Devil's-bit Scabious plants.
15/08/2025	GA1	Rare	<5cm	No livestock hoof marks	0	Nil Sightings of Devil's-bit Scabious plants.
15/08/2025	GA1	Rare	<5cm	No livestock hoof marks	0	Nil Sightings of Devil's-bit Scabious plants.
15/08/2025	GS4	Rare	<5cm	No livestock hoof marks	0	Nil Sightings of Devil's-bit Scabious plants.
15/08/2025	GA1	Rare	<5cm	No livestock hoof marks	0	Nil Sightings of Devil's-bit Scabious plants.
15/08/2025	GA1	Rare	<5cm	No livestock hoof marks	0	Nil Sightings of Devil's-bit Scabious plants.
15/08/2025	GA1	Rare	<5cm	No livestock hoof marks	0	Nil Sightings of Devil's-bit Scabious plants.
15/08/2025	GA1	Rare	<5cm	No livestock hoof marks	0	Nil Sightings of Devil's-bit Scabious plants.
15/08/2025	GA1	Rare	<5cm	No livestock hoof marks	0	Nil Sightings of Devil's-bit Scabious plants.
15/08/2025	GA1	Rare	<5cm	No livestock hoof marks	0	Nil Sightings of Devil's-bit Scabious plants.
15/08/2025	GA1	Rare	<5cm	No livestock hoof marks	0	Nil Sightings of Devil's-bit Scabious plants.
15/08/2025	GA1	Rare	<5cm	No livestock hoof marks	0	Nil Sightings of Devil's-bit Scabious plants.
15/08/2025	GA1	Rare	<5cm	No livestock hoof marks	0	Nil Sightings of Devil's-bit Scabious plants.
15/08/2025	GA1	Rare	<5cm	No livestock hoof marks	0	Nil Sightings of Devil's-bit Scabious plants.
15/08/2025	GA1	Rare	<5cm	No livestock hoof marks	0	Nil Sightings of Devil's-bit Scabious plants.
15/08/2025	GA1	Rare	<5cm	No livestock hoof marks	0	Nil Sightings of Devil's-bit Scabious plants.

Date	Habitat Type	Abundance of Devils bit Scabious	Average Vegetation Height (cm)	Animal Poaching	No of Occupied Webs	Notes
15/08/2025	GA1	Rare	<5cm	No livestock hoof marks	0	Nil Sightings of Devil's-bit Scabious plants.
15/08/2025	GA1	Rare	<5cm	No livestock hoof marks	0	Nil Sightings of Devil's-bit Scabious plants.
15/08/2025	GA1	Rare	<5cm	No livestock hoof marks	0	Nil Sightings of Devil's-bit Scabious plants.
15/08/2025	WS1	Rare	<5cm	No livestock hoof marks	0	Nil Sightings of Devil's-bit Scabious plants.
15/08/2025	GA1	Rare	<5cm	No livestock hoof marks	0	Nil Sightings of Devil's-bit Scabious plants.
15/08/2025	GA1	Rare	<5cm	No livestock hoof marks	0	Nil Sightings of Devil's-bit Scabious plants.
15/08/2025	GA1	Rare	<5cm	No livestock hoof marks	0	Nil Sightings of Devil's-bit Scabious plants.
15/08/2025	GA1	Rare	<5cm	No livestock hoof marks	0	Nil Sightings of Devil's-bit Scabious plants.
15/08/2025	GA1	Rare	<5cm	No livestock hoof marks	0	Nil Sightings of Devil's-bit Scabious plants.
15/08/2025	GA1	Rare	<5cm	No livestock hoof marks	0	Nil Sightings of Devil's-bit Scabious plants.
15/08/2025	GA1	Rare	<5cm	No livestock hoof marks	0	Nil Sightings of Devil's-bit Scabious plants.
15/08/2025	GA1	Rare	<5cm	No livestock hoof marks	0	Nil Sightings of Devil's-bit Scabious plants.
15/08/2025	GA1	Rare	<5cm	No livestock hoof marks	0	Nil Sightings of Devil's-bit Scabious plants.
15/08/2025	GA1	Rare	<5cm	No livestock hoof marks	0	Nil Sightings of Devil's-bit Scabious plants.
15/08/2025	GA1	Rare	<5cm	No livestock hoof marks	0	Nil Sightings of Devil's-bit Scabious plants.
15/08/2025	GA1	Rare	<5cm	No livestock hoof marks	0	Nil Sightings of Devil's-bit Scabious plants.

Date	Habitat Type	Abundance of Devils bit Scabious	Average Vegetation Height (cm)	Animal Poaching	No of Occupied Webs	Notes
15/08/2025	GA1	Rare	<5cm	No livestock hoof marks	0	Nil Sightings of Devil's-bit Scabious plants.
15/08/2025	GA1	Rare	<5cm	No livestock hoof marks	0	Nil Sightings of Devil's-bit Scabious plants.
15/08/2025	GA1	Rare	<5cm	No livestock hoof marks	0	Nil Sightings of Devil's-bit Scabious plants.
15/08/2025	GA1	Rare	<5cm	No livestock hoof marks	0	Nil Sightings of Devil's-bit Scabious plants.
15/08/2025	GA1	Rare	<5cm	No livestock hoof marks	0	Nil Sightings of Devil's-bit Scabious plants.
15/08/2025	GA1	Rare	<5cm	No livestock hoof marks	0	Nil Sightings of Devil's-bit Scabious plants.
15/08/2025	GA1	Rare	<5cm	No livestock hoof marks	0	Nil Sightings of Devil's-bit Scabious plants.
15/08/2025	GA1	Rare	<5cm	No livestock hoof marks	0	Nil Sightings of Devil's-bit Scabious plants.
15/08/2025	GA1	Rare	<5cm	No livestock hoof marks	0	Nil Sightings of Devil's-bit Scabious plants.
15/08/2025	GA1	Rare	<5cm	No livestock hoof marks	0	Nil Sightings of Devil's-bit Scabious plants.
15/08/2025	GA1	Rare	<5cm	No livestock hoof marks	0	Nil Sightings of Devil's-bit Scabious plants.
15/08/2025	GA1	Rare	<5cm	No livestock hoof marks	0	Nil Sightings of Devil's-bit Scabious plants.
15/08/2025	GA1	Rare	<5cm	No livestock hoof marks	0	Nil Sightings of Devil's-bit Scabious plants.
15/08/2025	GA1	Rare	<5cm	No livestock hoof marks	0	Nil Sightings of Devil's-bit Scabious plants.
15/08/2025	GA1	Rare	<5cm	No livestock hoof marks	0	Nil Sightings of Devil's-bit Scabious plants.
15/08/2025	GA1	Rare	<5cm	No livestock hoof marks	0	Nil Sightings of Devil's-bit Scabious plants.

Date	Habitat Type	Abundance of Devils bit Scabious	Average Vegetation Height (cm)	Animal Poaching	No of Occupied Webs	Notes
15/08/2025	GA1	Rare	<5cm	No livestock hoof marks	0	Nil Sightings of Devil's-bit Scabious plants.

Table 17: Marsh Fritillary Larval Web Survey Results 2025

Date	Habitat Type	Abundance of Devils bit Scabious	Average Vegetation Height (cm)	Animal Poaching	No of Occupied Webs	Notes
23/09/2025	GA1	Rare	12 to 25cm	No livestock hoof marks	0	No Devil's-bit Scabious present
23/09/2025	GA1	Rare	12 to 25cm	No livestock hoof marks	0	
23/09/2025	GA1	Rare	12 to 25cm	No livestock hoof marks	0	
23/09/2025	GA1	Rare	12 to 25cm	No livestock hoof marks	0	
23/09/2025	GA1	Rare	12 to 25cm	No livestock hoof marks	0	
23/09/2025	GA1	Rare	12 to 25cm	No livestock hoof marks	0	
23/09/2025	GA1	Rare	12 to 25cm	No livestock hoof marks	0	
23/09/2025	GA1	Rare	12 to 25cm	No livestock hoof marks	0	
23/09/2025	GA1	Rare	12 to 25cm	No livestock hoof marks	0	
23/09/2025	GA1	Rare	12 to 25cm	No livestock hoof marks	0	
23/09/2025	GA1	Rare	12 to 25cm	No livestock hoof marks	0	
23/09/2025	GA1	Rare	12 to 25cm	No livestock hoof marks	0	

Date	Habitat Type	Abundance of Devils bit Scabious	Average Vegetation Height (cm)	Animal Poaching	No of Occupied Webs	Notes
23/09/2025	GA1	Rare	12 to 25cm	No livestock hoof marks	0	
23/09/2025	WS1/ ED2	Rare	12 to 25cm	No livestock hoof marks	0	
23/09/2025	GA1	Rare	12 to 25cm	No livestock hoof marks	0	
23/09/2025	GA1	Rare	12 to 25cm	No livestock hoof marks	0	
23/09/2025	GA1	Rare	12 to 25cm	No livestock hoof marks	0	
23/09/2025	GA1	Rare	12 to 25cm	No livestock hoof marks	0	
23/09/2025	GA1	Rare	12 to 25cm	No livestock hoof marks	0	
23/09/2025	GA1	Rare	12 to 25cm	No livestock hoof marks	0	
23/09/2025	GA1	Rare	12 to 25cm	No livestock hoof marks	0	
23/09/2025	GA1	Rare	12 to 25cm	No livestock hoof marks	0	
23/09/2025	GA1	Rare	12 to 25cm	No livestock hoof marks	0	
23/09/2025	GA1	Rare	12 to 25cm	No livestock hoof marks	0	
23/09/2025	GA1	Rare	12 to 25cm	No livestock hoof marks	0	
23/09/2025	GA1	Rare	12 to 25cm	No livestock hoof marks	0	
23/09/2025	GA1	Rare	12 to 25cm	No livestock hoof marks	0	
23/09/2025	GA1	Rare	12 to 25cm	No livestock hoof marks	0	

Date	Habitat Type	Abundance of Devils bit Scabious	Average Vegetation Height (cm)	Animal Poaching	No of Occupied Webs	Notes
23/09/2025	GA1	Rare	12 to 25cm	No livestock hoof marks	0	
23/09/2025	GA1	Rare	12 to 25cm	No livestock hoof marks	0	
23/09/2025	GA1	Rare	12 to 25cm	No livestock hoof marks	0	
23/09/2025	GA1	Rare	12 to 25cm	No livestock hoof marks	0	
23/09/2025	GA1	Rare	12 to 25cm	No livestock hoof marks	0	
23/09/2025	GA1	Rare	12 to 25cm	No livestock hoof marks	0	
23/09/2025	GA1	Rare	12 to 25cm	No livestock hoof marks	0	
23/09/2025	GA1	Rare	12 to 25cm	No livestock hoof marks	0	
23/09/2025	GA1	Rare	12 to 25cm	No livestock hoof marks	0	
23/09/2025	GA1	Rare	12 to 25cm	No livestock hoof marks	0	
23/09/2025	GA1	Rare	12 to 25cm	No livestock hoof marks	0	
23/09/2025	GA1	Rare	12 to 25cm	No livestock hoof marks	0	
23/09/2025	GA1	Rare	12 to 25cm	No livestock hoof marks	0	
23/09/2025	GA1	Rare	12 to 25cm	No livestock hoof marks	0	
23/09/2025	GA1	Rare	12 to 25cm	No livestock hoof marks	0	
23/09/2025	GA1	Rare	12 to 25cm	No livestock hoof marks	0	

Date	Habitat Type	Abundance of Devils bit Scabious	Average Vegetation Height (cm)	Animal Poaching	No of Occupied Webs	Notes
23/09/2025	GA1	Rare	12 to 25cm	No livestock hoof marks	0	
23/09/2025	GA1	Rare	12 to 25cm	No livestock hoof marks	0	
23/09/2025	GA1	Rare	12 to 25cm	No livestock hoof marks	0	
23/09/2025	GA1	Rare	12 to 25cm	No livestock hoof marks	0	
23/09/2025	GA1	Rare	12 to 25cm	No livestock hoof marks	0	
23/09/2025	GA1	Rare	12 to 25cm	No livestock hoof marks	0	
23/09/2025	GA1	Rare	12 to 25cm	No livestock hoof marks	0	
23/09/2025	GA1	Rare	12 to 25cm	No livestock hoof marks	0	
23/09/2025	GA1	Rare	12 to 25cm	No livestock hoof marks	0	
23/09/2025	GA1	Rare	12 to 25cm	No livestock hoof marks	0	
23/09/2025	GA1	Rare	12 to 25cm	No livestock hoof marks	0	
23/09/2025	WS1	Rare	12 to 25cm	No livestock hoof marks	0	
23/09/2025	GA1	Rare	12 to 25cm	No livestock hoof marks	0	
23/09/2025	WS1	Rare	12 to 25cm	No livestock hoof marks	0	
23/09/2025	WS1	Rare	12 to 25cm	No livestock hoof marks	0	
23/09/2025	GA1	Rare	12 to 25cm	No livestock hoof marks	0	

Date	Habitat Type	Abundance of Devils bit Scabious	Average Vegetation Height (cm)	Animal Poaching	No of Occupied Webs	Notes
23/09/2025	GA1	Rare	12 to 25cm	No livestock hoof marks	0	
23/09/2025	GA1	Rare	12 to 25cm	No livestock hoof marks	0	
23/09/2025	GA1	Rare	12 to 25cm	No livestock hoof marks	0	
23/09/2025	GA1	Rare	12 to 25cm	No livestock hoof marks	0	
23/09/2025	GA1/WS1	Rare	12 to 25cm	No livestock hoof marks	0	
23/09/2025	GA1	Rare	12 to 25cm	No livestock hoof marks	0	
23/09/2025	GA1	Rare	12 to 25cm	No livestock hoof marks	0	
23/09/2025	GA1	Rare	12 to 25cm	No livestock hoof marks	0	
23/09/2025	GA1	Rare	12 to 25cm	No livestock hoof marks	0	
23/09/2025	GA1	Rare	12 to 25cm	No livestock hoof marks	0	
23/09/2025	GA1	Rare	12 to 25cm	No livestock hoof marks	0	
23/09/2025	GA1	Rare	12 to 25cm	No livestock hoof marks	0	
23/09/2025	GA1	Rare	12 to 25cm	No livestock hoof marks	0	
23/09/2025	GA1	Rare	12 to 25cm	No livestock hoof marks	0	
23/09/2025	GA1	Rare	12 to 25cm	No livestock hoof marks	0	

Date	Habitat Type	Abundance of Devils bit Scabious	Average Vegetation Height (cm)	Animal Poaching	No of Occupied Webs	Notes
23/09/2025	GA1	Rare	12 to 25cm	No livestock hoof marks	0	
23/09/2025	GA1	Rare	12 to 25cm	No livestock hoof marks	0	
23/09/2025	GA1	Rare	12 to 25cm	No livestock hoof marks	0	
23/09/2025	GA1	Rare	12 to 25cm	No livestock hoof marks	0	
23/09/2025	GA1	Rare	12 to 25cm	No livestock hoof marks	0	
23/09/2025	GA1	Rare	12 to 25cm	No livestock hoof marks	0	
23/09/2025	GA1	Rare	12 to 25cm	No livestock hoof marks	0	
23/09/2025	GA1	Rare	12 to 25cm	No livestock hoof marks	0	
23/09/2025	GA1	Rare	12 to 25cm	No livestock hoof marks	0	
23/09/2025	GA1/WS1	Rare	12 to 25cm	No livestock hoof marks	0	
23/09/2025	WD1	Rare	12 to 25cm	No livestock hoof marks	0	
23/09/2025	GA1	Rare	12 to 25cm	No livestock hoof marks	0	
23/09/2025	GA1	Rare	12 to 25cm	No livestock hoof marks	0	
23/09/2025	GA1	Rare	12 to 25cm	No livestock hoof marks	0	
23/09/2025	GA1	Rare	12 to 25cm	No livestock hoof marks	0	

Date	Habitat Type	Abundance of Devils bit Scabious	Average Vegetation Height (cm)	Animal Poaching	No of Occupied Webs	Notes
23/09/2025	GA1	Rare	12 to 25cm	No livestock hoof marks	0	
23/09/2025	GA1	Rare	12 to 25cm	No livestock hoof marks	0	
23/09/2025	GA1	Rare	12 to 25cm	No livestock hoof marks	0	
23/09/2025	GA1	Rare	12 to 25cm	No livestock hoof marks	0	
23/09/2025	GA1	Rare	12 to 25cm	No livestock hoof marks	0	
23/09/2025	GA1	Rare	12 to 25cm	No livestock hoof marks	0	
23/09/2025	GA1	Rare	12 to 25cm	No livestock hoof marks	0	
23/09/2025	GA1	Rare	12 to 25cm	No livestock hoof marks	0	
23/09/2025	GA1	Rare	12 to 25cm	No livestock hoof marks	0	
23/09/2025	GA1	Rare	12 to 25cm	No livestock hoof marks	0	
23/09/2025	GA1	Rare	12 to 25cm	No livestock hoof marks	0	
23/09/2025	GA1	Rare	12 to 25cm	No livestock hoof marks	0	
23/09/2025	GA1	Rare	12 to 25cm	No livestock hoof marks	0	
23/09/2025	GA1	Rare	12 to 25cm	No livestock hoof marks	0	
23/09/2025	GA1	Rare	12 to 25cm	No livestock hoof marks	0	
23/09/2025	GA1	Rare	12 to 25cm	No livestock hoof marks	0	

Date	Habitat Type	Abundance of Devils bit Scabious	Average Vegetation Height (cm)	Animal Poaching	No of Occupied Webs	Notes
23/09/2025	GA1	Rare	12 to 25cm	No livestock hoof marks	0	
23/09/2025	GA1	Rare	12 to 25cm	No livestock hoof marks	0	
23/09/2025	GA1	Rare	12 to 25cm	No livestock hoof marks	0	
23/09/2025	GA1	Rare	12 to 25cm	No livestock hoof marks	0	
17/09/2026	GA1	Rare	>25cm	Hoof marks confined to tracks	0	Low Suitability

Table 18: Amphibian Suitability Survey Results 2025

Date	Time of Sighting	ITM	Site Type	Site Suitability	Notes
25/04/2025	10:12	644879.9, 672970.46	Exposed	Poor	Shown as waterbody on EPA maps website. Agricultural grassland with no standing water present, negligible suitability
25/04/2025	10:29	644386.29, 673061.33	River	Good	Fast flow rate at this location. However, areas of low flow rate which may be of suitability for amphibians
25/04/2025	11:10	644175.66, 671278.41	River	Good	
25/04/2025	11:32	642149.11, 671866.07	River	Good	
25/04/2025	11:56	641033.14, 671334.7	River	Good	
25/04/2025	12:39	638672.44, 668615.13	Pond	Good	
25/04/2025	13:01	637170.85, 670107.81	River	Good	
25/04/2025	13:20	636079.39, 669685.55	River	Good	
25/04/2025	13:33	635302.2, 670354.19	River	Good	
25/04/2025	13:42	635367.17, 670329.5	River	Good	
25/04/2025	13:49	634979.79, 670494.32	River	Good	
25/04/2025	14:12	644525.42, 672743.08	River	Good	
22/05/2025	22:38	638671.68, 668626.04	Pond	Good	Nil Sightings. Excellent newt spawning habitat

Date	Time of Sighting	ITM	Site Type	Site Suitability	Notes
22/05/2025	23:05	637184.44, 670111.02	River	Poor	Nil Sightings
22/05/2025	23:15	636081.18, 669678.27	River	Poor	Nil Sightings
22/05/2025	23:22	635331.28, 670346.35	River	Poor	Nil Sightings
22/05/2025	23:30	634978.16, 670502.33	River	Poor	Nil Sightings

Table 19: Amphibian Nocturnal Survey Results 2025

Date	Time of Sighting	ITM	Site Type	Site Suitability	Species	Life Stage	Spawn Count	Number of adults	Sex	Notes
01/05/2025	21:18	644878.76, 672976.31	Exposed	Poor						Nil Sightings, field is dry.
01/05/2025	21:33	644524.38, 672742.22	Ditch	Good						Nil Sightings
01/05/2025	21:56	642148.03, 671861	Ditch	Good						Nil Sightings
01/05/2025	22:17	638695.13, 668611.04	Quarry	Good	Smooth Newt	Adult		4	Both	3 males, 1 female
01/05/2025	22:21	638671.27, 668621.14	Quarry	Good	Smooth Newt	Adult		3	Both	2 males, 1 female
01/05/2025	22:23	638656.01, 668611.75	Quarry	Good	Smooth Newt	Adult		5		At least 1 female
01/05/2025	22:52	635302.11, 670356.83	Ditch	Good						Nil Sightings
22/05/2025	22:38	638671.68, 668626.04	Pond	Good						Nil Sightings. Excellent newt spawning habitat
22/05/2025	23:05	637184.44, 670111.02	River	Poor						Nil Sightings
22/05/2025	23:15	636081.18, 669678.27	River	Poor						Nil Sightings

Date	Time of Sighting	ITM	Site Type	Site Suitability	Species	Life Stage	Spawn Count	Number of adults	Sex	Notes
22/05/2025	23:22	635331.28, 670346.35	River	Poor						Nil Sightings
22/05/2025	23:30	634978.16, 670502.33	River	Poor						Nil Sightings

Table 20: Reptile Mat Deployment Survey Results 2025

Date	Time of Sighting	ITM	Site Type	Site Suitability
22/05/2025	10:58	634102.97, 670780.73	Artificial Cover	Good
22/05/2025	11:20	634059.6, 670284.49	Artificial Cover	Good
22/05/2025	12:41	638716.59, 668629.46	Artificial Cover	Good
22/05/2025	12:54	638664.64, 668659.66	Artificial Cover	Good
22/05/2025	13:07	638684.47, 668669.15	Artificial Cover	Good

Table 21: Reptile Survey Results 2025

Date	Time of Sighting	ITM	Site Type	Site Suitability	Notes
24/06/2025	10:49	638718.05, 668629.14	Quarry	Unknown	Nil Sightings
24/06/2025	10:51	638664.73, 668658.65	Quarry	Unknown	Nil Sightings
24/06/2025	10:55	638688.48, 668667.28	Quarry	Unknown	Nil Sightings
24/06/2025	14:33	634058.8, 670283.78	Exposed	Unknown	Nil Sightings
24/06/2025	15:06	634105.3, 670780.43	Exposed	Unknown	Nil Sightings
15/07/2025	15:09	638716.39, 668628.28	Artificial Cover	Good	Nil Sightings, reptile mat 3
15/07/2025	15:12	638664.53, 668659.31	Artificial Cover	Good	Nil Sightings, reptile mat 4
15/07/2025	15:15	638684.95, 668668.91	Artificial Cover	Good	Nil Sightings, reptile mat 5
15/07/2025	17:09	634067.94, 670280.17	Natural Cover	Good	Reptile mat 2 could not be found
15/07/2025	17:17	634101.28, 670778.82	Natural Cover	Good	Reptile mat 1 could not be found
13/08/2025	13:16	633182.22, 671540.92	Natural Cover	Good	Nil Sighting. Stones suitable for Common Lizards with crevices to hide. No mat deployed here, but area is suitable for Common Lizard activity. Habitat: Stone wall, improved agricultural grassland, hedgerows
13/08/2025	13:54	633913.15, 670841.97	Natural Cover	Good	Nil Sighting. Stones covered in grass with sufficient cover present in the area. Suitable for Common Lizards. No mats deployed here
13/08/2025	14:03	634102.09, 670781.65	Natural Cover	Good	Nil Sighting. Reptile Mat 1 displaced

Date	Time of Sighting	ITM	Site Type	Site Suitability	Notes
13/08/2025	14:18	634059.42, 670284.52	Natural Cover	Unknown	Nil Sighting. Reptile mat 2 displaced
13/08/2025	14:19	634055.54, 670278.87	Natural Cover	Good	Nil Sighting. Stone surrounded by GA1. Potential for Common Lizard activity
13/08/2025	14:23	634081.28, 670286.6	Natural Cover	Good	Nil Sighting. Stones present under trees. Has plenty of cover. Ideal for Common Lizards
13/08/2025	14:27	634125.16, 670282.11	Natural Cover	Good	Nil Sighting. Stone wall with crevices present, surrounded by hedges and GA1. No mat deployed here but area ideal for Common Lizards
13/08/2025	15:42	638716.12, 668629.74	Artificial Cover	Good	Nil Sighting at reptile Mat 3
13/08/2025	15:56	638663.63, 668659.08	Artificial Cover	Good	Nil Sighting at reptile Mat 4
13/08/2025	15:59	638685.08, 668668.68	Artificial Cover	Good	Nil Sighting at reptile Mat 5
23/09/2025	09:30	638715.58, 668627.83	Artificial Cover	Good	Nil Sightings
23/09/2025	09:35	638664.97, 668660.38	Artificial Cover	Good	Nil Sightings
23/09/2025	09:40	638684.13, 668668.2	Artificial Cover	Good	Nil Sightings
23/09/2025	09:45	638664.69, 668610.8	Quarry	Good	Nil Sightings
23/09/2025	11:45	634102.65, 670781.32	Artificial Cover	Good	Nil Sightings
23/09/2025	11:50	634105.48, 670725.45	Natural Cover	Good	Dry stonewall. Nil Sightings
23/09/2025	12:20	634058.39, 670283.52	Artificial Cover	Good	Nil Sightings
23/09/2025	12:25	634091.65, 670286.28	Natural Cover	Good	Rocky outcrop. Nil Sightings

A13.3.3 Otter Sensitive Data

Table 22: *Redacted* Mammal Walkover Survey Results 2025

Date	Survey	Species	Field Sign	10km OS Grid Square	Notes
23/04/2025	General Mammal Walkover	Otter	Active holt	S47	Potential Otter holt. Could only observe through binoculars from the eastern bank of the river; the farmer who owned the land to the west would not allow us to access his land. Soil around apparent holt entrance looked disturbed and churned up
01/05/2025	Kingfisher	Otter	Possible Otter holt	S47	Possible otter holt - looks active, tracks heading down to river
01/05/2025	Kingfisher	Otter	Otter tracks on muddy riverbank	S47	
02/05/2025	Static Detector Deployment	Badger	Possible Badger sett	S37	Burrow, no snuffle holes or scatt evidence.
02/05/2025	Bat Transect	Badger	Live Sighting	S36	
09/05/2025	Kingfisher	Otter	Otter spraint	S47	On willow tree washed up in the river.
09/05/2025	Kingfisher	Otter	Otter spraint	S47	
18/09/2026	Habitat	Otter	Slide	S47	

Appendix to Chapter 13: Biodiversity

Appendix 13.5: Bat Survey Data

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A13.5.1 Survey Data

Table 1: Bat Transects Efforts.

Date	Transect No	Observer	Cloud	Precipitation	Wind Speed	Wind Direction	Temperature	Start Time	End Time	Sunset
23/04/2025	1	KME & JOC	8/8	None	F1	ESE	11	20:43	22:39	20:43
23/04/2025	2	KME & JOC	8/8	None	F1	E	12	22:53	23:53	20:43
08/05/2025	3	JOC & CMCK	1/8	None	F1	E	9	21:09	22:39	21:09
09/06/2025	1	SS	0/8	None	F2	SE	20	21:03	22:13	21:03
09/06/2025	2	SS	0/8	None	F2	SE	19	22:47	23:16	21:03
10/06/2025	3	SS and KME	1/8	None	F1	E	9	21:09	22:39	21:09
11/08/2025	3	SS & CMCK	1/8	None	F2	SE	20	21:04	22:15	21:04
12/08/2025	1	SS & CMCK	0/8	None	F2	SE	20	21:03	22:13	21:03
12/08/2025	2	SS	0/8	None	F2	SE	19	22:47	23:16	21:03

Table 2: Bat Emergence Efforts.

Structure	Date	Surveyor	Detector Model	Thermal Camera	Rain	Cloud	Wind Speed	Wind Direction	Start Temp	End Temp	Sunset/ Sunrise	Start Time	End Time	Duration of survey (s)
BL8	22/07/2025	SS	Anabat Walkabout	Y	None	7/8	F1	WNW	16	15	21:38	21:08	23:08	7200
BL8	22/07/2025	AH	Elekon Batlogger	Y	None	7/8	F1	WNW	16	15	21:38	21:08	23:08	7200
BL8	21/08/2025	SNC	Anabat Walkabout	Y	None	1/8	F1	NNE	17	16	20:42	20:27	22:12	6300
BL8	21/08/2025	CF	Elekon Batlogger	Y	None	1/8	F1	NNE	17	16	20:42	20:27	22:12	6300
BL11	21/07/2025	SS	Anabat Walkabout	Y	None	7/8	F3	NW	16	15	21:40	21:10	23:10	7200
BL11	21/07/2025	AH	Elekon Batlogger	Y	None	7/8	F3	NW	16	15	21:40	21:10	23:10	7200
BL14	23/07/2025	AH	Elekon Batlogger	Y	None	8/8	F2	NNW	15	14	21:36	21:06	23:06	7200
BL14	23/07/2025	SS	Anabat Walkabout	Y	None	8/8	F2	NNW	15	14	21:36	21:06	23:06	7200
BL14	20/08/2025	SNC	Anabat Walkabout	Y	None	8/8	F2	NE	16	13	20:44	20:29	22:14	6300
BL14	20/08/2025	CF	Elekon Batlogger	Y	None	8/8	F2	NE	16	13	20:44	20:29	22:14	6300

Table 3: Bat Static Detector Deployments.

Deployment Date	Deployment Duration	Weather Station Deployed	Detector No	Turbine No	ITM	Approx height of mic	Habitat	Linear Feature	LF Distance	Anthropogenic Feature	AF Distance	Notes
24/04/2025	14 nights	N	Ba015	T8	638413.72, 669066.95	90cm	Grazing	Hedgerow	0	None	0	
24/04/2025	14 nights	N	Ba041	T11	638404.8, 668667.43	90cm	Grazing	None	0	Fenceline	30cm	
24/04/2025	14 nights	Y	Ba070	T12	638802.37, 668329.64	90cm	Grazing	Ditch	1m	None	0	
24/04/2025	14 nights	N	Ba068	T10	638772.98, 668875.22	90cm	Grazing	Hedgerow	1m	None	0	
02/05/2025	18 nights	N	Ba012	T9	638896.31, 669235.44	90cm	Grazing	Hedgerow	0	None	0	
02/05/2025	18 nights	N	Ba042	T1	634027.87, 671639.99	1m	Grazing	Hedgerow	0	None	0	
02/05/2025	18 nights	Y	Ba075	T2	633666.25, 671017.55	90cm	Grazing	Hedgerow	1m	None	0	
02/05/2025	18 nights	N	Ba001	T3	634102.55, 670736.05	90cm	Grazing	Hedgerow	1m	None	0	Stonewall
02/05/2025	18 nights	N	Ba005	T5	634228.93, 670098.4	90cm	Rough Grazing	Hedgerow	1m	None	0	Stonewall
02/05/2025	18 nights	N	Ba010	T4	633818.16, 670303.74	90cm	Rough Grazing	None	0	Fenceline	50cm	
22/05/2025	18 nights	N	Ba042	T7	634868, 669845	1m	Grazing	Hedgerow	0m	None	N/A	
22/05/2025	18 nights	N	Ba001	T6	635036, 669483	1m	Grazing	Hedgerow	0m	None	N/A	
09/06/2025	15 nights	Y	Ba068	T2	633660.08, 671023.6	1m	Grazing	Hedgerow	0m	None	N/A	
09/06/2025	15 nights	N	Ba004	T1	634028.05, 671644.13	1m	Grazing	Hedgerow	0m	None	N/A	
09/06/2025	15 nights	N	Ba099	T3	634109.8, 670741.61	1m	Grazing	Hedgerow	0m	None	N/A	

Deployment Date	Deployment Duration	Weather Station Deployed	Detector No	Turbine No	ITM	Approx height of mic	Habitat	Linear Feature	LF Distance	Anthropogenic Feature	AF Distance	Notes
09/06/2025	15 nights	N	Ba100	T4	633816.73, 670299.35	1m	Grazing	Hedgerow	~25m	None	N/A	
09/06/2025	15 nights	N	Ba062	T5	634229.46, 670095.23	1m	Grazing	Hedgerow	0m	None	N/A	
09/06/2025	15 nights	N	Ba001	T6	635037.58, 669467.42	1m	Grazing	Hedgerow	0m	None	N/A	
09/06/2025	15 nights	N	Ba042	T7	634876.22, 669838.43	1m	Grazing	Hedgerow	0m	None	N/A	
09/06/2025	15 nights	N	Ba060	T8	638414.83, 669068.01	1m	Grazing	Hedgerow	0m	None	N/A	
09/06/2025	15 nights	N	Ba065	T9	638895.57, 669234.06	1m	Grazing	Hedgerow	0m	None	N/A	
09/06/2025	15 nights	N	Ba061	T11	638400.34, 668669.22	1m	Grazing	None	~25m	None	N/A	
09/06/2025	15 nights	N	Ba046	T10	638774.72, 668873.99	1m	Grazing	Hedgerow	0m	None	N/A	
09/06/2025	15 nights	N	Ba041	T12	638798.88, 668333.28	1m	Grazing	Ditch	0m	None	N/A	
15/08/2025	12 nights	Y	Ba10	T9	638895.88, 669233.82	1m	Grazing	Hedgerow	0m	None	N/A	
15/08/2025	12 nights	Y	Ba75	T8	638411.9, 669070.39	1m	Grazing	Hedgerow	0m	None	N/A	
15/08/2025	12 nights	Y	Ba61	T12	638801.11, 668333.39	1m	Grazing	Ditch	0m	None	N/A	
15/08/2025	12 nights	Y	Ba93	T10	638776.56, 668870.43	1m	Grazing	Hedgerow	0m	None	N/A	
15/08/2025	12 nights	Y	Ba96	T11	638399.63, 668670.68	1m	Grazing	Ditch	20m	None	N/A	
15/08/2025	12 nights	Y	Ba64	T6	635037.43, 669457.7	1m	Grazing	Ditch	0m	None	N/A	Weather Station Ba091

Deployment Date	Deployment Duration	Weather Station Deployed	Detector No	Turbine No	ITM	Approx height of mic	Habitat	Linear Feature	LF Distance	Anthropogenic Feature	AF Distance	Notes
15/08/2025	12 nights	Y	Ba63	T7	634873.31, 669835.27	1m	Grazing	Ditch	0m	None	N/A	
15/08/2025	12 nights	Y	Ba47	T3	634112.35, 670747.99	1m	Grazing	Ditch	0m	None	N/A	
15/08/2025	12 nights	Y	Ba44	T5	634227.34, 670094.1	1m	Grazing	Ditch	0m	None	N/A	
15/08/2025	12 nights	Y	Ba67	T4	633819.39, 670296.03	1m	Grazing	Ditch	30m	None	N/A	
15/08/2025	12 nights	Y	Ba07	T2	633659.27, 671021.63	1m	Grazing	Ditch	0m	None	N/A	
15/08/2025	12 nights	Y	Ba03	T1	634031.92, 671640.65	1m	Grazing	Ditch	0m	None	N/A	

Table 4: Bat Static Detector Weather Data (Durrow Weather Station).

Date	Avg. Rainfall	Max Temp.
24/04/2025	6.2	14.2
25/04/2025	6.9	16.7
26/04/2025	0	18.1
27/04/2025	0	17.3
28/04/2025	0	17
29/04/2025	0	21.3
30/04/2025	0	23.2
01/05/2025	0	20.7
02/05/2025	0	17.2
03/05/2025	0	16.9
04/05/2025	0	15.5
05/05/2025	0	14.5
06/05/2025	0	17.9
07/05/2025	0	19.8
08/05/2025	0	18.1
09/05/2025	0	19
10/05/2025	0	20.5
11/05/2025	0.1	20.3
12/05/2025	0	18.3
13/05/2025	0	24.2
14/05/2025	0	22.9
15/05/2025	0	22.1
16/05/2025	0	22.7
17/05/2025	0	22
18/05/2025	0	22.6
19/05/2025	0.1	19.5
22/05/2026	0	21.6
23/05/2026	0.7	18
24/05/2026	1.2	18.2
25/05/2026	0.7	16.2
26/05/2026	5.4	15.4
27/05/2026	11.2	15.4
28/05/2026	3.2	19.1
29/05/2026	2.1	19.5
30/05/2026	0	21.9
31/05/2026	1.6	19.1
01/06/2026	0.2	17.7
02/06/2026	9.1	16.9
03/06/2026	0.2	15
04/06/2026	3.9	15.2
05/06/2026	2.2	16.5
06/06/2026	8.4	15.2
07/06/2026	0.9	15
08/06/2026	0.6	14.5

Date	Avg. Rainfall	Max Temp.
09/06/2025	0.2	16.3
10/06/2025	0	18.8
11/06/2025	3.7	17.8
12/06/2025	4.6	16.9
13/06/2025	0.4	19.6
14/06/2025	13	18.3
15/06/2025	0	19.8
16/06/2025	0.1	22.5
17/06/2025	0.6	21.8
18/06/2025	0	24.5
19/06/2025	0.3	25.1
20/06/2025	0	27
21/06/2025	0	24.3
22/06/2025	4	18.8
23/06/2025	0	19.4

Table 5: Bat Static Detector Weather Data (Kilkenny (Greenshill) Weather Station).

Date	Avg. Rainfall	Max Temp.
15/08/2025	0	25.8
16/08/2025	0	25.2
17/08/2025	0	23.8
18/08/2025	0.9	19.7
19/08/2025	0	21.9
20/08/2025	0	18.3
21/08/2025	0	21.4
22/08/2025	0.1	21.4
23/08/2025	0	23.3
24/08/2025	0	22.5
25/08/2025	1.8	22.6
26/08/2025	13.8	20.2

A13.5.2 Results

Table 6: Bat Transects Results 2025.

Transect Number	Date	Species	Behaviour	Occurrence (no. of flights)
1	23/04/2025	Common Pipistrelle	Commuting	2
			Foraging	13
		Leisler's Bat	Commuting	1
		Soprano Pipistrelle	Commuting	1
2	23/04/2025	Common Pipistrelle	Commuting	3
			Foraging	24
		Soprano Pipistrelle	Foraging	2
3	08/05/2025	Common Pipistrelle	Commuting	5
			Foraging	47
		Soprano Pipistrelle	Commuting	4
			Foraging	12
1	09/06/2025	Soprano Pipistrelle	Commuting	4
			Foraging	13
2	09/06/2025	Soprano Pipistrelle	Commuting	1
			Foraging	4
		Common Pipistrelle	Commuting	1
3	10/06/2025	Common Pipistrelle	Foraging	10
		Soprano Pipistrelle	Commuting	1
			Foraging	22
3	11/08/2025	Common Pipistrelle	Commuting	3
			Foraging	8
		Leisler's Bat	Commuting	2
		Soprano Pipistrelle	Commuting	3
			Foraging	3
		Nathusius' Pipistrelle	Commuting	1
1	12/08/2025	Soprano Pipistrelle	Commuting	5
			Foraging	32
		Common Pipistrelle	Commuting	3
			Foraging	20
		Leisler's Bat	Commuting	1
			Foraging	20

Table 7: PRA Results 2025 & 2026.

Code	Year of Survey	ITM Grid Ref		Description	Suitability Rating
Buildings					
BL1	2025	633421	671482	Cow shed	Negligible
BL2	2025	633414	671507	Small stone shed with metal roof	Negligible
BL3	2025	633405	671508	Small stone building	Negligible
BL4	2025	633394	671509	Small building with metal roof	Negligible
BL5	2025	633379	671504	Concrete storage building	Negligible
BL6	2025	633377	671483	Stone storage building with metal roof	Negligible
BL7	2025	633376	671514	Residential building, no access points	Negligible
BL8	2025	638938	668956	Abandoned stone farmhouse, roof partially collapsed	Moderate
BL9	2025	635164	668991	Metal storage shed	Negligible
BL10	2025	634642	670309	Farm storage sheds, collapsed roof	Negligible
BL11	2025	633260	671035	Metal farm building with small stone room on north-west side	Low
BL12	2025	633130	670829	Metal farm building	Negligible
BL13	2025	638570	668959	Residential house, no access points	Negligible
BL14	2025	638567	668947	Stone farm building, multiple access points	Moderate
BL15	2025	638565	668920	Concrete shed, collapsed roof	Negligible
BL16	2025	638591	668931	Metal storage shed	Negligible
GC_BL1	2026	640958	670440		High
GC_BL2	2026	640930	670426		High
GC_BL3	2026	640936	670452		Moderate
GC_BL4	2026	640925	670442		Moderate
GC_BL5	2026	640937	670466		Low
GC_BL6	2026	641101	670118		Moderate
GC_BL7	2026	641100	670133		Low
Trees					
TR1	2025	638660	669373	Large tree with ivy cover	PRF-I
TR2	2025	638287	669146	Large tree with ivy cover	PRF-I
TR3	2025	638538	668958	Large tree with ivy cover	PRF-I
GC_TR2	2026	639465.34	669605.44	*Fagus sylvatica*	PRF-M
GC_TR8	2026	639522.11	669620.5	*Fagus sylvatica*	PRF-I
GC_TR5	2026	639462.91	669666.95	*Fraxinus excelsior*	PRF-M
GC_TR32	2026	641219.68	669990.08	*Fraxinus excelsior*	PRF-I

Code	Year of Survey	ITM Grid Ref		Description	Suitability Rating
GC_TR32	2026	641214.68	670010.6	*Fraxinus excelsior*	PRF-I
GC_TR31	2026	641210.96	670033.28	*Fraxinus excelsior*	PRF-M
GC_TR30	2026	641208.05	670053.98	*Fraxinus excelsior*	PRF-M
GC_TR29	2026	641193.74	670060.55	*Fraxinus excelsior*	PRF-M
GC_TR19	2026	641015.11	670323.12	*Acer pseudoplatanus*	PRF-M
GC_TR18	2026	640964.59	670377.87	*Fraxinus excelsior*	PRF-M
GC_TR17	2026	640953.92	670378.47	*Fraxinus excelsior*	PRF-M
GC_TR47	2026	644043.96	671303.26	*Fraxinus excelsior*	PRF-M
GC_TR51	2026	643948.78	671529.39	*Fraxinus excelsior*	PRF-M
GC_TR52	2026	643899.88	671654.03	*Acer pseudoplatanus*	PRF-M
GC_TR57	2026	643870.62	671821.01	*Poplar*	PRF-M
GC_TR58	2026	643870.85	671840.24	*Poplar*	PRF-M
Watercourse Crossings					
WC1	2026	635337	670343	Gorteennamuck (15G39)	Moderate
WC2	2026	636082	669684	Gorteenahilla (15G08)	Low
GC_WC1	2026	639479.91	669602.11		Negligible
GC_WC2	2026	639530.12,	669607.4		Moderate

Table 8: Emergence Survey Results 2025.

Date	Species	Behaviour	Occurrence (no. of flight passes)
BL8			
22/07/2025	Common Pipistrelle	Commuting	5
		Emerging	0
		Foraging	19
	Leisler's Bat	Commuting	2
		Emerging	0
		Foraging	6
	Soprano Pipistrelle	Commuting	18
		Emerging	37
		Foraging	44
21/08/2025	Common Pipistrelle	Commuting	20
		Emerging	0
		Foraging	51
	Leisler's Bat	Emerging	0
		Foraging	0
		Commuting	6
	Myotis sp.	Emerging	0
		Foraging	0
		Commuting	1
	Soprano Pipistrelle	Emerging	0
		Commuting	2
		Foraging	6
BL11			
21/07/2025	Common Pipistrelle	Commuting	3
		Emerging	0
		Foraging	6

Date	Species	Behaviour	Occurrence (no. of flight passes)
	Leisler's Bat	Foraging	0
		Emerging	0
		Commuting	5
	Soprano Pipistrelle	Commuting	16
		Emerging	0
		Foraging	24
BL14			
23/07/2025	Common Pipistrelle	Commuting	4
		Emerging	0
		Foraging	57
	Leisler's Bat	Commuting	1
		Emerging	0
		Foraging	8
	Myotis sp.	Commuting	2
		Emerging	0
		Foraging	2
	Soprano Pipistrelle	Commuting	13
		Emerging	1
		Foraging	180
20/08/2025	Common Pipistrelle	Commuting	21
		Emerging	0
		Foraging	7
	Myotis sp.	Commuting	2
		Emerging	0
		Foraging	0
	Soprano Pipistrelle	Commuting	6
		Emerging	0
		Foraging	10

Table 9: Static Detector Deployment Spring A (24th April to 7th May) Results 2025.

Spring	ITM	24	25	26	27	28	29	30	1	2	3	4	5	6	7	Total Bat Records	Peak passes per night	Avg. Passes per night	Bat Activity Level
Turbine 11																			
Brown Long-eared Bat	638404.8, 668667.43			1											2	3	2	0.214286	Negligible
Common Pipsitrelle	638404.8, 668667.43			14	16	11	13	8	8	7	1	1	7	16	21	123	21	8.785714	Negligible
Leisler's Bat	638404.8, 668667.43			4	4		4	7								19	7	1.357143	Negligible
Soprano Pipistrelle	638404.8, 668667.43			4	1	5	4	2	4	2				3	5	30	5	2.142857	Negligible
Turbine 12																			
Brown Long-eared Bat	638802.37, 668329.64				1			1	1							3	1	0.214286	Negligible
Common Pipsitrelle	638802.37, 668329.64		1	29	23	6	15	23	43	10	21		2	16	35	224	43	16	Low
Leisler's Bat	638802.37, 668329.64			23	13	8	6	7	4		6	1	4	2	7	81	23	5.785714	Negligible
Soprano Pipistrelle	638802.37, 668329.64		1	19	13	12	13	12	3	4	4	2		11	43	137	43	9.785714	Low
Myotis sp.	638802.37, 668329.64					1	3	1								5	3	0.357143	Negligible
Nathusius's pipistrelle	638802.37, 668329.64								1		1					2	1	0.142857	Negligible
Turbine 10																			
Brown Long-eared Bat	638772.98, 668875.22			1	3	7	3	3	2	1		1	6		2	29	7	2.071429	Negligible
Common Pipsitrelle	638772.98, 668875.22			217	340	90	173	194	25	36	25	4	24	300	132	1560	340	111.4286	High
Leisler's Bat	638772.98, 668875.22	1		379	425	43	40	40	13	5	8	1	5	23	5	988	425	70.57143	Moderate

Spring	ITM	24	25	26	27	28	29	30	1	2	3	4	5	6	7	Total Bat Records	Peak passes per night	Avg. Passes per night	Bat Activity Level
Soprano Pipistrelle	638772.98, 668875.22			27	51	62	58	28	13	16	11			101	31	398	101	28.42857	Low
Myotis sp.	638772.98, 668875.22				2				1			2	4		2	11	4	0.785714	Negligible
Turbine 8																			
Brown Long-eared Bat	638413.72, 669066.95							1				1				2	1	0.142857	Negligible
Common Pipsitrelle	638413.72, 669066.95		15	28	32	136	182	99	22	46	31	6	11	231	85	924	231	66	Moderate
Leisler's Bat	638413.72, 669066.95		3	35	21	13	17	33	11	8	4		2	16	4	167	35	11.92857	Low
Soprano Pipistrelle	638413.72, 669066.95		14	9	6	24	58	19	5	42	79	4	2	57	37	356	79	25.42857	Low
Myotis sp.	638413.72, 669066.95			1			1	1								3	1	0.214286	Negligible

Table 10: Static Detector Deployment Spring B (2nd May to 19th May) Results 2025.

Spring	ITM	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	Total Records	Peak Passes per night	Avg. Passes per night	Bat Activity Level
Turbine 9																							
Brown Long-eared Bat	638896.31, 669235.44				1			2		1				1	1					6	2	0.333	Negligible
Common Pipistrelle	638896.31, 669235.44	30	9	2	22	248	355	81	16	490	23	262	130	223	38	28	67	53	125	2202	490	122.333	High
Leisler's Bat	638896.31, 669235.44	14	18	8	26	30	22	32	8	29		29	18	23	11	26	7	15	7	323	32	17.94444	Low
Soprano Pipistrelle	638896.31, 669235.44	30	2			39	13	6	5	26	5	20	1	6	6	3	6	6	27	201	39	11.16667	Low

Spring	ITM	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	Total Records	Peak Passes per night	Avg. Passes per night	Bat Activity Level
Myotis sp.	638896.31, 669235.44			1				1		1					1			1		5	1	0.277778	Negligible
Nathusius's pipistrelle	638896.31, 669235.44					1														1	1	0.055556	Negligible
Turbine 5																							
Common Pipistrelle	634228.93, 670098.4							1												1	1	0.055556	Negligible
Leisler's Bat	634228.93, 670098.4	1																		1	1	0.055556	Negligible
Turbine 1																							
Brown Long-eared Bat	634027.87, 671639.99									1										1	1	0.055556	Negligible
Common Pipistrelle	634027.87, 671639.99	18	4	2	3	23	62	50	3	32	72	50	31	11	56	64	27	38	12	558	72	31	Low
Leisler's Bat	634027.87, 671639.99	5	5	3	1	2	1	1		2	5	8	7	5	5	4	9	10	24	97	24	5.388889	Negligible
Soprano Pipistrelle	634027.87, 671639.99	5	2	1		10	18	19	1	5	9	5	6	5	16	21	3	9	4	139	21	7.722222	Negligible
Turbine 2																							
Common Pipistrelle	633666.25, 671017.55	48	24	7	3	68	164	37	11	72	729	38	34	10	81	77	33	56	5	1497	729	83.16667	Moderate
Leisler's Bat	633666.25, 671017.55	3	8	1		1	2		2	3	4	2	2	5	5	4	8	10	23	83	23	4.611111	Negligible
Soprano Pipistrelle	633666.25, 671017.55	11	9	4	4	7	37	5	3	24	166	7	3	2	12	17	7	13	2	333	166	18.5	Low
Myotis sp.	633666.25, 671017.55						1				1									2	1	0.111111	Negligible
Turbine 3																							

Spring	ITM	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	Total Records	Peak Passes per night	Avg. Passes per night	Bat Activity Level
Brown Long-eared Bat	634102.55, 670736.05												1							1	1	0.055556	Negligible
Common Pipistrelle	634102.55, 670736.05	47	4		3	54	31		3	31	130	53	82	26	31	42	3	21	1	562	130	31.22222	Low
Leisler's Bat	634102.55, 670736.05	9	3		4	2	4	3	2	10	3	4	3	8	6	25	9	22	5	122	25	6.777778	Negligible
Soprano Pipistrelle	634102.55, 670736.05	7	1			3	7		2	6	4	5	4		7	7	2	2		57	7	3.166667	Negligible
Myotis sp.	634102.55, 670736.05					1				1										3	1	0.166667	Negligible
Turbine 4																							
Brown Long-eared Bat	633818.16, 670303.74					1				1			1	2						5	2	0.277778	Negligible
Common Pipistrelle	633818.16, 670303.74	127	21		50	273	60	5	2	109	1	170	276	514	102	418	11	104	5	2248	514	124.8889	High
Leisler's Bat	633818.16, 670303.74	26	11	2	1	8	9	9		42	30	11	24	120	22	24	13	81	1	434	120	24.11111	Low
Soprano Pipistrelle	633818.16, 670303.74	15		1		19	5	2		11	2	15	16	218	22	16	2	2		346	218	19.22222	Low

Table 11: Static Detector Deployment Spring C (22nd May to 8th June) Results 2025.

Spring	ITM	22	23	24	25	26	27	28	29	30	31	1	2	3	4	5	6	7	8	Total Bat Records	Peak Passes per night	Passes per night	Bat Activity Level
Turbine 7																							
Brown Long-eared Bat	634868, 669845																	1		1	1	0.055556	Negligible
Common Pipistrelle	634868, 669845	20	2	1		1			3	2					13	9	1	6	7	65	20	3.611111	Negligible
Soprano Pipistrelle	634868, 669845	2				1									1			1	2	7	2	0.388889	Negligible
Turbine 6																							
Common Pipistrelle	635036, 669483	N/A	N/A	N/A	14	35	1		111	93		N/A	N/A	N/A	N/A	N/A	N/A	13	N/A	267	111	14.83333	Low
Leisler's Bat	635036, 669483	N/A	N/A	N/A	53	50	3	1	42	92		N/A	N/A	N/A	N/A	N/A	N/A	22	N/A	263	92	14.61111	Low
Soprano Pipistrelle	635036, 669483	N/A	N/A	N/A		16			23	18		N/A	N/A	N/A	N/A	N/A	N/A		N/A	57	23	3.166667	Negligible
Myotis sp.	635036, 669483	N/A	N/A	N/A						1		N/A	N/A	N/A	N/A	N/A	N/A		N/A	1	1	0.055556	Negligible

Table 12: Static Detector Deployment Summer Survey Results 2025.

Summer	ITM	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	Total Bat Records	Peak passes per night	Passes per night	Bat Activity Level
Turbine 1																				
Brown Long-eared Bat	634028.05, 671644.13															3	3	3	0.2	Negligible
Common Pipistrelle	634028.05, 671644.13		2	5	6	6	10	28	10	19	15	17	4	2	3	3	130	28	8.666667	Negligible
Leisler's Bat	634028.05, 671644.13		12	13	21	18	50	50	26	38	26	20	40	30	2	33	379	50	25.26667	Low
Myotis sp.	634028.05, 671644.13		1				2	3			1	1		3		1	12	3	0.8	Negligible
Soprano Pipistrelle	634028.05, 671644.13					2				6	3	1	1	1		1	15	6	1	Negligible
Turbine 2																				
Brown Long-eared Bat	633660.08, 671023.6			1													1	1	0.066667	Negligible
Common Pipistrelle	633660.08, 671023.6	141		16		17	2	11	2	23	2	11	1	5	141	12	384	141	25.6	Low
Leisler's Bat	633660.08, 671023.6	7	1	7		3	5	3	1	1	1	10	2	5	5	6	57	10	3.8	Negligible
Myotis sp.	633660.08, 671023.6	1													1		2	1	0.133333	Negligible
Soprano Pipistrelle	633660.08, 671023.6	21	1	2	1	3	1	16	2	15	2	13		4	51	7	139	51	9.266667	Low
Turbine 3																				

Summer	ITM	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	Total Bat Records	Peak passes per night	Passes per night	Bat Activity Level
Brown Long-eared Bat	634109.8, 670741.61									1							1	1	0.066667	Negligible
Common Pipistrelle	634109.8, 670741.61			7		3	1	5		16	12	1				1	46	16	3.066667	Negligible
Leisler's Bat	634109.8, 670741.61		5	3		8	3	5	4	8	10	2	6		3		57	10	3.8	Negligible
Soprano Pipistrelle	634109.8, 670741.61					2		1		2	3						8	3	0.533333	Negligible
Turbine 4																				
N/A	633816.73, 670299.35	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0		N/A
Turbine 5																				
Brown Long-eared Bat	634229.46, 670095.23				1												1	1	0.066667	Negligible
Common Pipistrelle	634229.46, 670095.23	1	102	21	20	151	21	65	36	46	122	36	61	4	8	10	704	151	46.93333	Low
Leisler's Bat	634229.46, 670095.23		12	3	2	11	1	4	1		2		6	2		1	45	12	3	Negligible
Soprano Pipistrelle	634229.46, 670095.23		1	2		36	6	40		71	34	29	26		5		250	71	16.66667	Low
Turbine 6																				
N/A	635037.58, 669467.42	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0		N/A
Turbine 7																				

Summer	ITM	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	Total Bat Records	Peak passes per night	Passes per night	Bat Activity Level
Common Pipistrelle	634876.22, 669838.43	1	19	3		13	1	27	5	8	19	4	8	1		3	112	27	7.4666	Negligible
Leisler's Bat	634876.22, 669838.43	1	1			1	5	3	1	2	7	1	1				23	7	1.5333	Negligible
Soprano Pipistrelle	634876.22, 669838.43	1	4	1	1	5	1	8	11	8	6	1	7	6	3	3	66	11	4.4	Negligible
Myotis sp.	634876.22, 669838.43		4	1	1	1	6	9		3	1		3	1			30	9	2	Negligible
Turbine 8																				
Brown Long-eared Bat	638414.83, 669068.01															8	8	8	0.533333	Negligible
Common Pipistrelle	638414.83, 669068.01	9	10	32		92	31	97	176	33	22	12	11	53	2	16	596	176	39.73333	Low
Leisler's Bat	638414.83, 669068.01	1	1	4	1	4	2	2	3		3	2	1	3	2	3	32	4	2.133333	Negligible
Soprano Pipistrelle	638414.83, 669068.01		1	2		8	1	6	5	1	6			2		1	33	8	2.2	Negligible
Myotis sp.	638414.83, 669068.01	1												6	8		15	8	1	Negligible
Turbine 9																				
Common Pipistrelle	638895.57, 669234.06		204	98		388	29	192	26	362	175	110	136	7	5	10	1742	388	116.1333	High
Leisler's Bat	638895.57, 669234.06		3	9		9		5	4		9	9	2	1			51	9	3.4	Negligible
Soprano Pipistrelle	638895.57, 669234.06		17	1		32		15	4	3	28	14	9	7	1	4	135	32	9	Negligible

Summer	ITM	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	Total Bat Records	Peak passes per night	Passes per night	Bat Activity Level
Myotis sp.	638895.57, 669234.06							1	1	1	1	1	1		1	2	9	2	0.6	Negligible
Turbine 10																				
Brown Long-eared Bat	638774.72, 668873.99					1											1	1	0.066667	Negligible
Common Pipistrelle	638774.72, 668873.99	4	81	10	2	62	42	49	211	20	341	424	246	229	12	373	2106	424	140.4	High
Leisler's Bat	638774.72, 668873.99		2	14		5	2	9	12	1	7	4	6	3	4	4	73	14	4.866667	Negligible
Soprano Pipistrelle	638774.72, 668873.99	1	13	6		43	2	18	5	2	108	111	15	44	1	81	450	111	30	Low
Myotis sp.	638774.72, 668873.99												1				1	1	0.066667	Negligible
Turbine 11																				
Brown Long-eared Bat	638400.34, 668669.22		1			3						1					5	3	0.333333	Negligible
Common Pipistrelle	638400.34, 668669.22	1	9	5	1	9	3	8	7	4	4	11	11	4		6	83	11	5.533333	Negligible
Leisler's Bat	638400.34, 668669.22		5	3	1	2	18	4	15	1	3		4	2	2	2	62	18	4.133333	Negligible
Soprano Pipistrelle	638400.34, 668669.22		2	1		2	1	1		1	4	1	4			1	18	4	1.2	Negligible
Myotis sp.	638400.34, 668669.22												1				1	1	0.066667	Negligible
Turbine 12																				

Summer	ITM	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	Total Bat Records	Peak passes per night	Passes per night	Bat Activity Level
Brown Long-eared Bat	638798.88, 668333.28								1								1	1	0.066667	Negligible
Common Pipistrelle	638798.88, 668333.28	3	37	32	4	80	7	11	23	10	16	48	119	43	8	36	477	119	31.8	Low
Leisler's Bat	638798.88, 668333.28		1	6			4	1	2					1		4	19	6	1.266667	Negligible
Soprano Pipistrelle	638798.88, 668333.28	1	35	21	14	21	12	12	48	5	9	65	127	86	2	45	503	127	33.53333	Low
Myotis sp.	638798.88, 668333.28		1										1				2	1	0.133333	Negligible

Table 13: Static Detector Deployment Autumn Survey Results 2025.

Autumn	ITM	15	16	17	18	19	20	21	22	23	24	25	26	Total Bat Records	Peak passes per night	Passes per night	Bat Activity Level
Turbine 1																	
Common Pipistrelle	634031.92, 671640.65	65	28	54	116	74	47	57	45	6		1	1	494.00	116.0	41.17	Low
Leisler's Bat	634031.92, 671640.65	18	50	14	22	5	3	4	22	8		1		147.00	50.0	12.25	Low
Myotis sp.	634031.92, 671640.65		1	4			1							6.00	4.0	0.50	Negligible
Soprano Pipistrelle	634031.92, 671640.65	28	9	5	27	11	9	28	9	2			1	129.00	28.0	10.75	Low
Turbine 2																	
Common Pipistrelle	633659.27, 671021.63	69	33	158	72	123	107	93	141	15	9	6	2	828.00	158.00	69.00	Moderate
Leisler's Bat	633659.27, 671021.63	13	36	26	11	11	10	11	97	13	8	4		240.00	97.00	20.00	Low
Myotis sp.	633659.27, 671021.63						1	1	1					3.00	1.00	0.25	Negligible
Soprano Pipistrelle	633659.27, 671021.63	38	23	38	59	58	26	51	48	12	3	4	3	363.00	59.00	30.25	Low
Turbine 3																	
Common Pipistrelle	634112.35, 670747.99				241	23	462	458	817	211	13	7		2232.00	817.00	186.00	High
Leisler's Bat	634112.35, 670747.99				18	3	6	6	281	14		6		334.00	281.00	27.83	Low
Myotis sp.	634112.35, 670747.99					1		1		2	1			5.00	2.00	0.42	Negligible
Soprano Pipistrelle	634112.35, 670747.99				44	5	7	155	266	43	2	2		524.00	266.00	43.67	Low
Turbine 4																	
Brown Long-eared Bat	633819.39, 670296.03				5	19	51	8	19	16	1	1		120.00	51.00	10.00	Low
Common Pipistrelle	633819.39, 670296.03	69	43	129	649	206	104	70	287	31	3			1591.00	649.00	132.58	High

Autumn	ITM	15	16	17	18	19	20	21	22	23	24	25	26	Total Bat Records	Peak passes per night	Passes per night	Bat Activity Level
Leisler's Bat	633819.39, 670296.03	6	2	2	135	454	415	15	176	96	1			1302.00	454.00	108.50	High
Myotis sp.	633819.39, 670296.03	2		1	1	1							2	7.00	2.00	0.58	Negligible
Nathusius's pipistrelle	633819.39, 670296.03						27	2	18					47.00	27.00	3.92	Negligible
Soprano Pipistrelle	633819.39, 670296.03	33	17	56	287	46	15	13	66	11	7	2		553.00	287.00	46.08	Low
Turbine 5																	
Brown Long-eared Bat	634227.34, 670094.1	7		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	7.00	7.00	0.58	Negligible
Common Pipistrelle	634227.34, 670094.1	35		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	35.00	35.00	2.92	Negligible
Leisler's Bat	634227.34, 670094.1	9		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	9.00	9.00	0.75	Negligible
Myotis sp.	634227.34, 670094.1	1		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1.00	1.00	0.08	Negligible
Nathusius's pipistrelle	634227.34, 670094.1	1		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1.00	1.00	0.08	Negligible
Soprano Pipistrelle	634227.34, 670094.1	15		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	15.00	15.00	1.25	Negligible
Turbine 6																	
Common Pipistrelle	635037.43, 669457.7	5		3			1	4						13.00	5.00	1.08	Negligible
Soprano Pipistrelle	635037.43, 669457.7	2		1										3.00	2.00	0.25	Negligible
Turbine 7																	
Common Pipistrelle	634873.31, 669835.27	3	2	1	1	1		4						12.00	4.00	1.00	Negligible
Soprano Pipistrelle	634873.31, 669835.27	1	1					2						4.00	2.00	0.33	Negligible
Turbine 8																	

Autumn	ITM	15	16	17	18	19	20	21	22	23	24	25	26	Total Bat Records	Peak passes per night	Passes per night	Bat Activity Level
Brown Long-eared Bat	638411.9, 669070.39	59	13	6	2	6	13	13	13	7	2		1	135.00	59.00	11.25	Low
Common Pipistrelle	638411.9, 669070.39	193	475	367	221	1689	1557	139	739	310	58	125	10	5883.00	1689.00	490.25	High
Leisler's Bat	638411.9, 669070.39	10	1	1	3	11	55	15	26	2		3	4	131.00	55.00	10.92	Low
Soprano Pipistrelle	638411.9, 669070.39	54	126	150	41	255	232	18	111	107	18	27	6	1145.00	255.00	95.42	Moderate
Myotis sp.	638411.9, 669070.39	27	20	35	3	24	4		1		4	1	1	120.00	35.00	10.00	Low
Turbine 9																	
Common Pipistrelle	638895.88, 669233.82	5	2	3	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	11.00	5.00	0.92	Negligible
Leisler's Bat	638895.88, 669233.82		1	1		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2.00	1.00	0.17	Negligible
Soprano Pipistrelle	638895.88, 669233.82	1		1	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	3.00	1.00	0.25	Negligible
Turbine 10																	
Brown Long-eared Bat	638776.56, 668870.43	6	11	11	2	1	1				1			33.00	11.00	2.75	Negligible
Common Pipistrelle	638776.56, 668870.43	246	306	326	367	74	42	19	17	41	8	1	43	1490.00	367.00	124.17	High
Leisler's Bat	638776.56, 668870.43	11	3	1	3	1	4	3	1	3	3		11	44.00	11.00	3.67	Negligible
Soprano Pipistrelle	638776.56, 668870.43	162	82	112	49	32	19	8	9	18	4	2	3	500.00	162.00	41.67	Low
Myotis sp.	638776.56, 668870.43	33	23	25	6	6	8	1	2	1	1		1	107.00	33.00	8.92	Negligible
Turbine 11																	
Brown Long-eared Bat	638399.63, 668670.68	6						1	1	3		1		12.00	6.00	1.00	Negligible
Common Pipistrelle	638399.63, 668670.68	19	11	16	12	16	4	11	15	15	3	6	6	134.00	19.00	11.17	Low

Autumn	ITM	15	16	17	18	19	20	21	22	23	24	25	26	Total Bat Records	Peak passes per night	Passes per night	Bat Activity Level
Leisler's Bat	638399.63, 668670.68	18	3	4	3	7	1	6	7	8	4	17	8	86.00	18.00	7.17	Negligible
Myotis sp.	638399.63, 668670.68	1	3	2	2	6	6	2	1	1	3	1	3	31.00	6.00	2.58	Negligible
Nathusius's pipistrelle	638399.63, 668670.68						1							1.00	1.00	0.08	Negligible
Soprano Pipistrelle	638399.63, 668670.68	13	8	11	9	7	4	4	5	6	2	2	3	74.00	13.00	6.17	Negligible
Turbine 12																	
Brown Long-eared Bat	638801.11, 668333.39	3		5	13	10	9	2		2			1	45.00	13.00	3.75	Negligible
Common Pipistrelle	638801.11, 668333.39	26	38	16	54	25	8	16	73	24	30	9	6	325.00	73.00	27.08	Low
Leisler's Bat	638801.11, 668333.39	6	8	39	35	35	40	9	4	13	1		5	195.00	40.00	16.25	Low
Soprano Pipistrelle	638801.11, 668333.39	17	43	19	35	10	8	7	27	19	11	6	3	205.00	43.00	17.08	Low
Myotis sp.	638801.11, 668333.39	1	9	4	8	1	6	6	3	3	3		2	53.00	9.00	4.42	Negligible

Appendix to Chapter 13: Biodiversity

A13.6: Bird Survey Data

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A13.6.1 Survey Efforts

Table 1: Winter Transects Efforts 2022-2023

Date	Observer	Transect Number	Cloud	Rain	Wind Speed	Visibility	Start Time	Finish Time
14/12/2022	KME	1	1/8	Dry	F1	1	09:50	10:20
17/01/2023	DMC	1	1/8	Dry	F1	1	11:15	11:35
17/01/2023	SID	1	3/8	Dry	F1	1	15:35	16:10
23/02/2023	BOC	1	1/8	Dry	F2	1	15:45	16:35
15/12/2022	KME	2	1/8	Dry	F1	1	14:26	14:56
17/01/2023	DMC	2	1/8	Dry	F1	1	11:58	12:12
20/01/2023	HM	2	5/8	Dry	F1	2	08:44	09:40
27/02/2023	BOC	2	3/8	Dry	F3	1	11:00	11:45
02/11/2022	KME	3	3/8	3	F3	2	12:10	14:40
07/12/2022	DMC	3	1/8	Dry	F1	1	14:45	15:02
17/01/2023	DMC	3	1/8	Dry	F1	1	12:53	13:07
20/01/2023	HM	3	5/8	Dry	F1	2	08:44	09:40
17/01/2023	DMC	4	1/8	Dry	F1	1	13:07	13:24
17/01/2023	SID	4	3/8	Dry	F1	1	04:03	16:40
18/01/2023	HM	4	5/8	Dry	F2	2	09:15	10:00
23/02/2023	BOC	4	1/8	Dry	F2	1	11:00	11:55
17/01/2023	HM	5	2 /8	Dry	F1	5	09:28	10:30
13/02/2023	KME	5	3/8	Dry	F2	1	07:26	07:56
23/02/2023	BOC	5	1/8	Dry	F2	1	12:15	13:10
20/01/2023	HM	6	5/8	Dry	F1	2	09:43	10:38
16/02/2023	KME	6	3/8	Dry	F1	1	13:38	14:08
27/02/2023	BOC	6	3/8	Dry	F2	1	11:50	12:30
07/03/2023	KME	6	6/8	None	F2	16	16:40	17:10
03/11/2022	KME	7	3/8	Drizzle	F1	1	11:55	14:25
03/01/2023	KME	7	3/8	Dry	F2	1	14:26	14:56
18/01/2023	KME	7	3/8	Dry	F3	1	15:02	15:32
17/02/2023	KME	7	3/8	Dry	F2	1	07:12	07:42
04/01/2023	KME	8	3/8	Dry	F1	1	15:36	16:06
19/01/2023	KME	8	1/8	Dry	F1	1	14:27	14:57
26/02/2023	BOC	8	3/8	Dry	F3	1	11:40	12:30
27/02/2023	KME	8	1/8	Dry	F1	1	12:00	12:30

Date	Observer	Transect Number	Cloud	Rain	Wind Speed	Visibility	Start Time	Finish Time
17/01/2023	KME	9	1/8	Dry	F1	1	15:17	15:47
20/01/2023	HM	9	5/8	Dry	F1	2	11:30	12:15
20/01/2023	HM	9	5/8	Dry	F1	2	11:30	12:15
27/02/2023	KME	9	1/8	Dry	F1	1	12:44	13:14

Table 2: Winter Transects Efforts 2025-2026

Date	Transect Number	Observer	Start Time	End Time	Duration of Survey (sec)	Rain	Cloud	Visibility (km)	Wind Speed	Wind Direction	Temperature
17/11/2025	1	SS	15:25	15:50	1500	None	2/8	32	F1	NNW	7
24/11/2025	1	KME	14:38	15:03	1500	None	5/8	16	F3	NW	8
17/12/2025	1	KME	12:01	12:26	1500	Light rain	8/8	2	F3	SSW	12
25/02/2026	1	KME	16:06	16:31	1500	None	7/8	16	F2	SSW	13
26/11/2025	2	KME	10:16	10:41	1500	Light rain	8/8	11	F3	S	10
17/12/2025	2	CMCK	15:42	16:12	1800	Occasional showers	8/8	5	F3	SSW	9
14/01/2026	2	KME	12:29	12:54	1500	Moderate rain	8/8	3	F3	S	7
11/02/2026	2	SS	16:00	16:30	1800	Drizzle	8/8	17	F1	SSW	9
18/11/2025	3	SS	15:04	15:46	2520	None	5/8	28	F2	WNW	6
16/12/2025	3	CMCK	15:33	16:00	1620	None	0/8	10	F1	SSW	6
22/01/2026	3	CMCK	13:42	14:12	1800	None	7/8	10	F1	SE	6
20/02/2026	3	SS	16:20	16:50	1800	None	7/8	27	F2	W	10
12/11/2025	4	KME	13:50	15:10	4800	None	8/8	8	F2	N	11
11/12/2025	4	CMCK	15:45	16:15	1800	Light rain	8/8	2	F3	S	11
28/01/2026	4	CF	08:24	08:50	1560	None	7/8	18	F4	SE	5
13/02/2026	4	SS	15:33	16:00	1620	None	8/8	31	F3	N	5
07/11/2025	5	KME	14:54	15:19	1500	Light rain	8/8	9	F3	SE	11
18/12/2025	5	SS	08:51	09:20	1740	None	7/8	16	F1	S	11
29/01/2026	5	CF	08:31	09:00	1740	None	7/8	15	F4	SE	6
09/02/2026	5	SS	15:30	16:00	1800	None	8/8	17	F1	ESE	8

Table 3: Breeding Transects Survey Efforts.

Date	Transect Number	Observer	Start Time	End Time	Duration of Survey (sec)	Rain	Cloud	Visibility (km)	Wind Speed	Wind Direction	Temperature
09/04/2025	2	SS	08:10	08:50	1800	None	0/8	15	F1	NNE	6
07/05/2025	1	CMCK	07:30	08:00	1800	None	5/8	10	F1	NW	4
07/05/2025	3	CMCK	08:30	09:00	1800	None	7/8	10	F1	NW	10
20/05/2025	3	KME	05:56	06:21	1500	None	8/8	11	F1	SE	8
20/05/2025	4	CMCK	06:45	07:20	2100	None	7/8	5	F1	ESE	8
20/05/2025	5	CMCK	07:40	08:15	2100	Light rain	7/8	5	F1	ESE	8
21/05/2025	4	CMCK	06:43	07:15	1920	Drizzle	8/8	2	F1	NNW	8
21/05/2025	5	CMCK	07:40	08:15	2100	Drizzle	8/8	2	F1	NNW	8
28/05/2025	1	KME	04:45	05:10	1500	None	2/8	16	F1	W	10
28/05/2025	2	KME	05:28	05:53	1500	None	2/8	16	F1	W	10
22/04/2026	1	SS	08:45	08:15	1800	None	6/8	27	F2	E	8
23/04/2026	2	SS	08:30	09:11	2460	None	4/8	27	F3	ESE	11
28/04/2026	3	SS	08:29	09:00	1860	None	0/8	21	F1	NNE	9
29/04/2026	4	SS	08:08	08:30	1320	None	1/8	24	F1	NE	8
29/04/2026	5	KME	08:18	08:43	1500	None	0/8	12	F1	NE	6
20/05/2026	1	KME	07:24	07:49	1500	None	5/8	11	F3	SW	11
21/05/2026	3	KME	07:10	07:35	1500	None	8/8	6	F2	S	13
04/06/2026	4	SS	07:45	08:05	1500	None	8/8	18	F4	W	12
16/06/2026	2	CMCK	06:52	07:22	1800	Drizzle	8/8	10	F2	SW	10
17/06/2026	5	CMCK	07:00	07:35	2100	None	6/8	15	F1	SW	12

Table 4: Breeding Barn Owl Survey Efforts.

Survey	Date	Observer	Start Time	End Time	Duration of Survey (sec)	Rain	Cloud	Visibility (km)	Wind Speed	Wind Direction	Temperature
Suitability	08/04/2025	SS	08:00	14:30	23400	None	3/8	14	F1	E	5
Activity	25/06/2025	OC	21:28	22:58	5400	None	8/8	10	F2	S	16
Activity	13/08/2025	SS	20:30	22:00	5400	None	3/8	20	F2	S	20
Activity	27/08/2025	AH	19:59	21:54	6900	None	4/8	20	F4	SE	14
Suitability	21/04/2026	SS	10:20	15:20	18000	Occasional showers	8/8	28	F2	E	10
Activity	29/06/2026	KME	21:28	22:58	5400	None	7/8	12	F2	S	14
Activity	14/07/2026	MVA and CMCK	21:17	22:47	5400	None	1/8	5	F1	E	21
Activity	26/08/2026	CB	20:00	21:30	5400	none	1/8	7	F2	ESE	18

Table 5: Breeding Kestrel Survey Efforts.

Survey	Date	Observer	Start Time	End Time	Duration of Survey (sec)	Rain	Cloud	Visibility (km)	Wind Speed	Wind Direction	Temperature
Suitability	08/04/2025	SS	08:00	14:30	23400	None	3/8	14	F1	E	5
Activity	21/05/2025	SS	11:30	17:55	23100	None	0/8	15	F2	N	16
Activity	25/06/2025	JOC	12:50	14:50	7200	None	6/8	10	F2	S	16
Activity	10/07/2025	PB	09:15	11:15	7200	None	2/8	20	F1	E	19
Activity	10/07/2025	PB	11:30	13:00	5400	None	2/8	20	F1	ENE	24
Activity	10/07/2025	PB	13:15	15:15	7200	None	2/8	20	F1	SE	26
Suitability	21/04/2026	SS	10:20	15:20	18000	Occasional showers	8/8	28	F2	E	10
Activity	11/05/2026	SS	14:20	16:20	7200	Occasional showers	8/8	28	F2	N	13
Activity	17/06/2026	SS	10:20	12:20	7200	None	5/8	27	F2	SW	17
Activity	17/06/2026	SS	12:22	14:22	7200	None	5/8	27	F2	SW	17
Activity	28/07/2026	KME	12:25	13:55	5400	None	5/8	16	F3	SSW	23
Activity	28/07/2026	KME	14:00	15:30	5400	None	5/8	16	F3	SSW	23
Activity	28/07/2026	KME	15:39	17:09	5400	None	5/8	16	F3	SSW	23

Table 6: Breeding Peregrine Survey Efforts.

Survey	Date	Observer	Start Time	End Time	Duration of Survey (sec)	Rain	Cloud	Visibility (km)	Wind Speed	Wind Direction	Temperature
Suitability	08/04/2025	SS	08:00	14:30	23400	None	3/8	14	F1	E	5
Activity	07/05/2025	JOC	09:40	11:40	7200	None	1/8	10	F1	E	12
Activity	07/05/2025	JOC	11:50	13:50	7200	None	2/8	10	F1	E	15
Activity	07/05/2025	JOC	14:05	16:05	7200	None	6/8	10	F1	E	16
Activity	21/05/2025	SS	11:30	17:55	23100	None	0/8	15	F2	N	16
Activity	25/06/2025	JOC	09:30	11:00	5400	None	6/8	10	F2	S	16
Activity	25/06/2025	JOC	11:10	12:40	4800	None	6/8	10	F2	S	16
Suitability	21/04/2026	SS	10:20	15:20	18000	Occasional showers	8/8	28	F2	E	10
Activity	11/05/2026	SS	12:50	14:15	5100	Occasional showers	8/8	28	F2	N	13
Activity	17/06/2026	SS	09:11	09:35	1440	None	5/8	27	F2	SW	17
Activity	17/06/2026	SS	09:45	10:17	1920	None	5/8	27	F2	SW	17
Activity	17/06/2026	SS	10:20	12:20	7200	None	5/8	27	F2	SW	17
Activity	17/06/2026	SS	12:22	14:22	7200	None	5/8	27	F2	SW	17

Table 7: Hen Harrier Roost Survey Efforts.

Date	Observer	Start Time	End Time	Sunrise/Sunset	Duration of Survey (sec)	Rain	Cloud	Visibility (km)	Wind Speed	Wind Direction	Temperature
26/10/2022	KME	08:00	11:00	08:10	10800	Dry	6/8	2	F2	SW	12
10/11/2022	KME	13:45	16:45	16:41	10800	Dry	5/8	14	F2	SW	12
05/01/2023	KME	07:56	10:56	08:53	10800	Dry	7/8	14	F3	S	10
17/01/2023	HM	15:50	17.:20	16:20	5400	Dry	2/8	2	F1	NE	1
15/02/2023	KME	17:10	18:40	17:40	5400	Dry	5/8	16	F2	SW	9
21/03/2023	KME	18:13	19:43	18:43	5400	Occasional showers	7/8	11	F3	S	9
06/10/2025	KME SS	18:24	19:54	5400	18:54	None	6/8	16	F3	SSW	15
26/11/2025	CF & KP	15:40	17:10	5400	16:22	None	8/8	5	F3	SW	12
17/12/2025	KME	15:44	17:14	5400	16:14	Occasional showers	8/8	12	F3	S	10
26/01/2026	KME	16:33	18:03	5400	17:03	None	8/8	6	F2	SE	8
25/02/2026	KME SS	17:29	19:01	5400	18:01	Occasional showers	5/8	16	F2	SSW	12
09/03/2026	KME	17:52	19:22	5400	18:22	None	3/8	16	F1	SW	11

Table 8: Breeding Woodcock Survey Efforts.

Date	Observer	Start Time	End Time	Duration of Survey (sec)	Rain	Cloud	Visibility (km)	Wind Speed	Wind Direction	Temperature
06/05/2025	JOC	20:36	22:06	5400	None	1/8	5	F1	E	11
20/05/2025	SS	20:15	21:30	4500	Drizzle	8/8	10	F2	S	12
23/06/2025	JOC	21:28	22:58	5400	None	8/8	5	F3	SW	16
14/05/2026	SS & DP	21:04	22:19	4500	None	2/8	27	2	NNW	9
28/05/2026	KME	21:25	22:40	4500	None	5/8	16	F3	SSW	16

Table 9: Kingfisher Survey Efforts.

Date	Observer	Start Time	End Time	Duration of Survey (sec)	Rain	Cloud	Visibility (km)	Wind Speed	Wind Direction	Temperature
23/04/2025	KME & JOC	14:40	17:40	10800	None	8/8	16	F1	NE	12
28/04/2026	KME	09:00	14:30	19800	None	0/8	16	F2	ENE	14
21/05/2026	SS KP	10:30	14:30	14400	None	8/8	12	F2	SSW	15

Table 10: Nore Waterbirds VP Survey Efforts.

Date	Observer	Start Time	End Time	Duration of Survey (sec)	Rain	Cloud	Visibility (km)	Wind Speed	Wind Direction	Temperature
09/02/2026	KME	15:00	18:00	10800	None	8/8	12	F3	ESE	9
10/02/2026	KME	07:24	10:24	10800	Occasional showers	8/8	11	F1	ESE	7
02/03/2026	SS	15:40	18:40	10800	None	5/8	24	F2	W	8
03/03/2026	SS	06:40	09:40	10800	None	2/8	21	F2	NNE	1
09/03/2026	SS	15:52	18:52	10800	None	2/8	17	F2	SW	8
10/03/2026	SS	06:25	09:25	10800	Occasional showers	8/8	13	F2	S	8
19/03/2026	SS	16:10	19:10	10800	None	4/8	28	F1	SE	16
20/03/2026	SS	06:00	09:00	10800	None	6/8	25	F1	SSE	4
13/04/2026	SS	17:55	20:55	10800	None	4/8	23	F2	S	10
14/04/2026	SS	06:03	09:03	10800	Light rain	8/8	12	F2	SE	9
21/04/2026	KME	18:09	21:09	10800	None	2/8	16	F3	E	11
22/04/2026	KME	05:45	08:45	10800	None	4/8	14	F3	ENE	6

Table 11: I-WeBS Winter 2022-2023 Survey Efforts.

Date	Observer	Surveyor Location (ITM)	Start Time	End Time	Duration of Survey (sec)	Rain	Cloud	Visibility (km)	Wind Speed	Wind Direction	Temperature
25/10/2022	KME	638167, 666023	8:00	13:30	19800	Dry	4/8	10	F2	S	13
		638167, 666023									
		638167, 666023									
		639629, 668426									
		639528, 669618									
		644394, 673085									
26/10/2022	KME	638167, 666023	11:30	14:00	9000	Dry	5/8	10	F2	SW	12
		638167, 666023									
		638175, 667375									
		639629, 668426									
		639528, 669618									
		644394, 673085									
08/11/2022	KME	634635, 675175	8:00	10:45	9900	Occasional showers	5/8	12	F2	S	8
		632843, 671351									
		644394, 673085									

Date	Observer	Surveyor Location (ITM)	Start Time	End Time	Duration of Survey (sec)	Rain	Cloud	Visibility (km)	Wind Speed	Wind Direction	Temperature
		644394, 673085									
		638164, 666023									
10/11/2022	KME	634635, 675175	10:20	12:20	7200	Occasional showers	5/8	14	F2	S	8
		632843, 671351									
		644394, 673085									
		644394, 673085									
05/01/2023	KME	638159, 666027	11:26	13:56	9000	None	5/8	14	F3	S	11
		639636, 668426									
		644394, 673085									
		632853, 671349									
		635190, 675831									
17/01/2023	HM	640617, 664678	11:00	14:00	10800	Dry	8/8	2	F1	SW	1
		638186, 667376									
		634424, 674906									
		632980, 674047									
		633059, 674160									
17/01/2023	DMC	628338, 670759	13:50	15:45	6900	None	1/8	16	F2	W	2
		638147, 666024									
		641491, 664546									
		643962, 669435									
		644627, 670616									
20/01/2023	HM	638165, 667370	13:42	15:40	7080	Dry	8/8	2	F1	SW	4
		640633, 664911									
		642197, 676267									
		634436, 674904									
		632987, 674041									
		633054, 674156									
15/02/2023	KME	638159, 666027	12:22	16:52	16200	None	3/8	16	F2	SSW	10
		639636, 668426									
		644394, 673085									
		635190, 675831									
		632853, 671349									
		628332, 670773									
27/02/2023	KME	632853, 671349	10:00	11:43	6180	None	7/8	16	F1	E	4
		628332, 670773									

Date	Observer	Surveyor Location (ITM)	Start Time	End Time	Duration of Survey (sec)	Rain	Cloud	Visibility (km)	Wind Speed	Wind Direction	Temperature
		635190, 675831									
		644394, 673085									
		639636, 668426									
		638159, 666027									
27/02/2023	BOC	644079, 669728	13:05	15:45	9600	None	5/8	>20	F3	E	8
		644383, 670930									
21/03/2023	KME	632853, 671349	13:33	18:03	16200	Occasional showers	6/8	12	F3	S	11
		628332, 670773									
		638159, 666027									
		639636, 668426									
		635190, 675831									

Table 12: I-WeBS Winter 2025-2026 Survey Efforts.

Date	Observer	Surveyor Location (ITM)	Start Time	End Time	Duration of Survey (sec)	Rain	Cloud	Visibility (km)	Wind Speed	Wind Direction	Temperature
07/10/2025	KME	634583.78, 675188.75	09:50	15:20	19800	None	8/8	16	F2	SSW	14
		628206.78, 670902.37									
		638139.53, 666022.01									
		641997.90, 667430.54									
		639688.69, 668362.29									
		632768.23, 671341.62									
		639536.98, 669605.76									
		641122.22, 669039.93									
		642117.32, 667579.40									
		642944.80, 665991.74									
		640902.83, 664830.53									
		640294.02, 664979.06									
		637889.93, 664787.23									
		638980.04, 666780.11									
		637529.55, 669055.82									
		636720.33, 675445.87									
29/10/2025	KME	634564.20, 675206.55	10:18	15:48	19800	None	3/8	16	F2	SSW	7
		634365.24, 674892.58									
		632757.92, 671329.90									

Date	Observer	Surveyor Location (ITM)	Start Time	End Time	Duration of Survey (sec)	Rain	Cloud	Visibility (km)	Wind Speed	Wind Direction	Temperature
		632267.69, 671117.23									
		628202.86, 670894.47									
		634626.16, 664905.83									
		638137.60, 666020.58									
		638981.94, 666779.72									
		639688.24, 668355.97									
		641983.91, 667425.73									
		642120.57, 667581.66									
		636730.65, 667963.17									
		635943.09, 674895.63									
06/11/2025	KME	628219.83, 670911.63	10:25	15:55	19800	None	4/8	14	F2	SSE	14
		632275.37, 671116.21									
		632742.10, 671333.94									
		633755.41, 669418.27									
		637023.45, 668248.83									
		638139.74, 666017.62									
		639687.71, 668350.00									
		642002.49, 667433.12									
		642121.71, 667583.31									
		636076.62, 669685.80									
		636353.11, 675199.86									
26/11/2025	KME	632733.18, 671213.47	11:00	15:30	16200	Light rain	8/8	11	F3	SSW	11
		632391.84, 670965.77									
		628190.05, 670898.12									
		638137.86, 666031.57									
		638824.78, 665079.77									
		640297.56, 664968.48									
		640530.76, 664841.01									
		640642.24, 664879.18									
		642036.32, 667455.23									
		642121.43, 667577.11									
		639681.03, 668351.22									
		639536.63, 669606.80									
		636474.44, 675271.32									
02/12/2025	SS	638994.61, 666784.22	08:30	11:30	10800	None	5/8	25	F1	SSW	8

Date	Observer	Surveyor Location (ITM)	Start Time	End Time	Duration of Survey (sec)	Rain	Cloud	Visibility (km)	Wind Speed	Wind Direction	Temperature
		638149.92, 666051.12									
		640275.46, 664978.60									
		640652.83, 664774.80									
		642133.55, 667569.52									
		641942.47, 667469.29									
		643780.06, 669325.51									
		641025.73, 671313.99									
		632986.15, 674019.56									
		631801.28, 674071.78									
		630560.48, 670377.38									
17/12/2025	SS	643142.48, 670724.87	10:10	13:30	12000	None	7/8	16	F1	S	11
		641453.09, 671066.01									
		641886.81, 667494.68									
		641437.36, 664518.06									
		640908.59, 664823.14									
		640639.19, 664898.97									
		640329.44, 664993.49									
		638167.72, 666021.20									
		630847.22, 668435.91									
		632703.58, 671194.08									
		633777.08, 669486.35									
		636731.98, 667975.62									
		636982.97, 668279.90									
		637511.48, 669040.55									
		639503.76, 669693.60									
		639683.11, 668329.61									
		631790.28, 674066.24									
		634295.28, 674851.43									
15/01/2026	SS	643837.12, 665900.89	10:30	14:00	12600	None	2/8	23	F1	SSE	4
		640658.09, 664644.87									
		641931.35, 667695.12									
		642150.13, 667569.56									
		640638.91, 664899.46									
		638201.62, 666011.69									
		637011.01, 668235.27									

Date	Observer	Surveyor Location (ITM)	Start Time	End Time	Duration of Survey (sec)	Rain	Cloud	Visibility (km)	Wind Speed	Wind Direction	Temperature
		640556.58, 671880.38									
		633742.10, 669463.98									
		630576.88, 670327.42									
		630565.96, 670348.27									
		631525.46, 673545.53									
		632982.22, 673940.54									
29/01/2026	SS	642508.37, 667896.30	11:00	15:00	14400	None	8/8	13	F1	SE	7
		642153.51, 667561.37									
		639698.92, 668376.69									
		636734.87, 667941.21									
		638166.62, 665991.40									
		628217.91, 670850.38									
		630584.63, 670319.03									
		630974.76, 672910.39									
		631795.37, 674049.42									
		634316.56, 674879.91									
		637403.91, 672458.83									
		638155.89, 672268.60									
		640552.87, 671876.59									
		640303.91, 664967.21									
09/02/2026	SS	643823.58, 669382.55	13:30	17:30	14400	Light rain	8/8	15	F1	E	8
		630574.63, 670309.86									
		628182.58, 670893.04									
		638144.07, 666005.19									
		639748.24, 668304.41									
		641923.94, 667699.51									
		642621.04, 670656.62									
		641050.54, 673301.32									
		638168.13, 673316.49									
		631818.43, 674096.41									
		635329.88, 670374.20									
		636726.65, 667988.85									
		640326.83, 664958.63									
26/02/2026	KME	639709.30, 668367.26	11:23	14:53	12600	None	8/8	16	F4	S	9
		638137.95, 666021.36									

Date	Observer	Surveyor Location (ITM)	Start Time	End Time	Duration of Survey (sec)	Rain	Cloud	Visibility (km)	Wind Speed	Wind Direction	Temperature
		641941.46, 667497.89									
		628192.01, 670901.96									
		636388.28, 675231.17									
12/03/2026	KME	632694.87, 671331.59	09:40	14:40	18000	Heavy rain	8/8	8	F5	SW	10
		628200.91, 670900.49									
		638139.46, 666027.91									
		641955.79, 667508.05									
		639721.74, 668374.86									
		639534.16, 669613.59									
		641036.65, 671339.63									
		638376.35, 672509.63									
		637418.56, 672440.47									
		636732.66, 667966.96									
		633748.32, 669414.52									
		636244.02, 675134.08									
25/03/2026	SS	641591.98, 664464.29	06:20	12:00	18000	None	4/8	20	F2	WNW	4
		640375.57, 664881.68									
		642128.46, 667517.22									
		642102.46, 667586.26									
		641096.51, 669021.32									
		641037.93, 671282.48									
		632966.32, 673885.55									
		631479.01, 673564.19									
		630580.87, 670305.61									
		628200.75, 670888.51									
		639053.14, 666817.53									
		638138.39, 666010.30									

Table 13: VP Winter 2022-2023 Survey Efforts.

Date	Observer	VP Number	Start Time	End Time	Duration of Survey (sec)	Rain	Cloud	Visibility (km)	Wind Speed	Wind Direction	Temperature
14/10/2022	KME	1	08:10	14:40	21600	None	5/8	10	F3	S	13
02/11/2022	KME	1	08:40	11:40	10800	Occasional showers	8/8	8	F3	S	11
14/12/2022	KME	1	10:31	17:01	21600	None	2/8	16	F2	N	-2
16/01/2023	KME	1	07:45	14:15	21600	None	1/8	16	F1	NW	-2
16/02/2023	KME	1	07:05	13:35	21600	None	6/8	>12	F1	W	5
21/02/2023	BOC	1	07:12	07:12	10800	None	6/8	>20	F4	SW	6
30/05/2023	KME	1	08:16	14:46	21600	None	1/8	16	F1	NE	10
12/10/2022	KME	2	10:02	16:42	21600	None	8/8	10	F3	SW	14
03/11/2022	KME	2	08:25	11:25	10800	None	6/8	16	F2	SE	7
15/12/2022	KME	2	07:50	14:20	21600	None	3/8	16	F2	N	-3
17/01/2023	KME	2	08:21	14:51	21600	None	2/8	12	F1	NW	-4
21/02/2023	BOC	2	00:00	00:00	10800	None	7/8	>20	F4	SW	9
07/03/2023	KME	2	09:40	16:10	21600	None	4/8	16	F2	N	2
23/03/2023	KME	2	09:31	16:01	21600	Occasional showers	6/8	12	F4	SSW	12
06/10/2022	EM	3	09:15	15:45	21600	Occasional showers	7/8	10	F3	SW	13
04/11/2022	KME	3	08:22	14:52	21600	None	7/8	13	F2	SW	9
07/12/2022	DMC	3	08:06	14:36	21600	None	1/8	16	F1	N	0
18/01/2023	KME	3	08:18	14:48	21600	None	4/8	16	F3	NW	0
17/02/2023	KME	3	08:00	14:30	21600	None	7/8	>16	F3	W	11
24/03/2023	KME	3	08:17	14:47	21600	Occasional showers	7/8	16	F4	SSW	9
11/04/2023	KME	3	11:24	14:24	10800	Occasional showers	8/8	12	F2	SSE	7
12/04/2023	KME	3	07:56	10:56	10800	Occasional showers	8/8	12	F2	WNW	3
19/10/2022	KME	4	09:26	15:56	21600	None	7/8	8	F3	E	13
17/01/2023	SID	4	12:20	17:00	16200	None	1/8	16	F1	WSW	-1
19/01/2023	KME	4	07:52	14:22	21600	None	2/8	16	F1	WNW	1
23/02/2023	BOC	4	09:36	09:36	10800	None	6/8	>20	F3	SW	6
24/02/2023	BOC	4	02:24	02:24	10800	Occasional showers	7/8	>20	F4	NE	10
26/02/2023	BOC	4	10:48	10:48	10800	None	6/8	>20	F4	E	7

Date	Observer	VP Number	Start Time	End Time	Duration of Survey (sec)	Rain	Cloud	Visibility (km)	Wind Speed	Wind Direction	Temperature
02/03/2023	KME	4	10:28	16:58	21600	None	5/8	16	F1	ENE	7
30/03/2023	MGW	4	10:10	13:10	10800	Light	4/8	14	F4	SW	11
30/03/2023	MGW	4	13:40	16:40	10800	Light	1/8	16	F4	SW	13
20/01/2023	SID	5	08:45	15:15	21600	None	7/8	14	F1	SE	-2
13/10/2022	KME	5	07:59	14:39	21600	None	3/8	8	F3	SW	13
05/12/2022	KME	5	10:15	16:45	21600	Occasional showers	6/8	15	F2	NW	6
16/01/2023	HM	5	11:00	14:00	10800	Dry	1/8	2	F1	SW	0
16/01/2023	HM	5	14:30	17:00	9000	Dry	4/8	2	F1	SW	2
17/01/2023	HM	5	14:06	15:06	3600	Dry	8/8	2	F1	SW	2
13/02/2023	KME	5	08:21	14:51	21600	None	5/8	12	F2	SE	7
24/03/2023	MGW	5	09:10	12:10	10800	Light	7/8	16	F4	SW	10
24/03/2023	MGW	5	12:40	15:40	10800	Light	7/8	16	F5	SW	12
20/10/2022	KME	6	08:00	14:30	21600	None	8/8	6	F2	SE	12
06/12/2022	KME	6	07:30	14:00	21600	None	3/8	16	F2	N	5
03/01/2023	KME	6	07:45	14:15	21600	Occasional showers	8/8	>11	F2	SSE	8
18/01/2023	HM	6	11:10	14:10	10800	Dry	4/8	2	F1	SW	1
18/01/2023	HM	6	14:40	16:40	7200	Dry	4/8	2	F1	SW	1
19/01/2023	SID	6	09:30	16:00	21600	None	1/8	16	F1	WNW	-2
19/01/2023	SID	6	16:00	17:00	3600	None	3/8	16	F1	WNW	-2
19/04/2023	KME	6	07:45	14:15	21600	None	1/8	14	F1	ENE	6
18/10/2022	KME	7	08:15	14:45	21600	None	1/8	5	F3	SE	12
07/11/2022	KME	7	10:32	17:02	21600	Drizzle/rain	7/8	11	F3	SW	10
04/01/2023	KME	7	09:14	15:16	21600	None	6/8	>11	F2	WSW	11
18/01/2023	SID	7	09:00	15:30	21600	None	1/8	16	F1	WNW	1
19/01/2023	HM	7	10:55	13:55	10800	Dry	3/8	2	F1	SW	1
19/01/2023	HM	7	14:25	17:25	10800	Dry	3/8	2	F1	SW	4
11/04/2023	KME	7	07:52	10:52	10800	Occasional showers	8/8	12	F2	SE	6
12/04/2023	KME	7	11:26	14:26	10800	Occasional showers	8/8	12	F2	WNW	5

Table 14: VP Breeding 2025 Survey Efforts.

Date	Observer	VP Number	Start Time	End Time	Duration of Survey (sec)	Rain	Cloud	Visibility (km)	Wind Speed	Wind Direction	Temperature
07/04/2025	SS	1	07:15	10:15	10800	None	0/8	8	F1	ENE	1
09/04/2025	SS	1	09:25	12:25	10800	None	0/8	15	F1	NNE	17
20/05/2025	SS	1	17:00	20:00	10800	None	8/8	10	F2	S	14
09/06/2025	SS	1	15:30	18:30	10800	Occasional showers	8/8	10	F3	SSW	11
26/06/2025	DP	1	14:30	16:30	7200	None	6/8	20	F4	SW	17
09/07/2025	SS	1	16:30	19:30	10800	None	0/8	20	F2	W	23
09/07/2025	SS	1	20:00	21:00	3600	None	0/8	20	F2	W	22
21/07/2025	AH	1	13:30	15:30	7200	None	7/8	20	F4	NW	17
21/07/2025	AH	1	16:00	17:00	3600	None	7/8	20	F4	NW	17
24/07/2025	AH	1	10:00	12:00	7200	None	3/8	5	F2	NNW	15
24/07/2025	AH	1	12:30	13:30	3600	None	4/8	6	F2	NNW	17
13/08/2025	SS	1	16:20	18:20	7200	None	6/8	20	F2	SSW	25
04/09/2025	KME	1	07:44	09:44	7200	Occasional showers	5/8	16	F1	WSW	9
04/09/2025	KME	1	10:14	12:14	7200	None	4/8	16	F1	WSW	15
10/09/2025	KME	1	09:05	11:05	7200	Light rain	8/8	12	F1	S	13
10/09/2025	KME	1	11:35	13:35	7200	Occasional showers	5/8	16	F3	S	13
11/09/2025	KME	1	10:42	12:42	7200	Occasional showers	6/8	16	F4	WSW	13
25/04/2025	JOC	2	09:45	11:45	7200	Occasional showers	8/8	5	F3	SE	11
25/04/2025	JOC	2	12:15	14:15	7200	Occasional showers	8/8	5	F3	SE	12
07/05/2025	CMCK	2	09:30	11:30	7200	None	6/8	15	F1	NW	11
07/05/2025	CMCK	2	12:00	14:00	7200	None	4/8	15	F1	NW	14
09/06/2025	SS	2	18:45	19:45	3600	Occasional showers	8/8	7	F3	SW	16
10/06/2025	SS	2	19:05	20:05	3600	None	8/8	15	F2	SW	18
07/07/2025	KME	2	11:07	13:07	7200	None	3/8	16	F3	NW	17
08/07/2025	SS	2	10:15	13:15	10800	Drizzle	8/8	3	F2	SW	16
11/07/2025	PB	2	08:50	11:50	10800	None	2/8	20	F1	SSE	19
17/07/2025	AH	2	13:50	14:50	3600	Moderate rain	8/8	3	F3	SSE	17

Date	Observer	VP Number	Start Time	End Time	Duration of Survey (sec)	Rain	Cloud	Visibility (km)	Wind Speed	Wind Direction	Temperature
22/07/2025	AH	2	11:00	13:00	7200	None	8/8	20	F3	WNW	16
22/07/2025	AH	2	13:30	15:30	7200	None	8/8	20	F3	WNW	16
05/08/2025	KME	2	07:26	10:26	10800	None	3/8	16	F2	W	14
12/08/2025	SS	2	17:15	20:15	10800	None	0/8	20	F2	SE	28
13/08/2025	SS	2	18:30	19:30	3600	None	5/8	20	F2	SSW	22
11/09/2025	CMCK	2	12:00	14:00	7200	Occasional showers	7/8	5	F4	WSW	13
12/09/2025	KME	2	09:50	11:50	7200	None	4/8	16	F3	SW	12
12/09/2025	KME	2	12:20	14:20	7200	None	6/8	16	F3	SW	14
10/06/2025	KME	3	16:45	19:45	10800	None	6/8	16	F1	SSW	18
26/06/2025	JOC	3	09:45	12:45	10800	None	5/8	10	F3	W	14
26/06/2025	JOC	3	13:15	16:15	10800	None	7/8	10	F3	SW	16
27/06/2025	JOC	3	09:50	12:50	10800	None	7/8	10	F3	S	17
07/07/2025	PB	3	10:00	12:00	7200	None	6/8	20	F2	NNW	15
07/07/2025	PB	3	12:15	14:15	7200	None	5/8	20	F2	NNW	17
08/07/2025	SS	3	14:30	16:30	7200	None	8/8	15	F2	W	19
22/07/2025	SS	3	18:15	20:15	7200	None	8/8	10	F2	WNW	17
23/07/2025	AH	3	12:00	15:00	10800	None	8/8	20	F3	NW	17
23/07/2025	AH	3	15:30	16:30	3600	None	8/8	20	F3	NW	17
26/08/2025	AH	3	15:30	18:30	10800	Occasional showers	5/8	20	F4	SE	18
04/09/2025	CMCK	3	11:00	14:00	10800	Occasional showers	6/8	10	F3	WSW	14
01/10/2025	KME	3	08:29	11:29	10800	None	7/8	14	F2	S	14
01/10/2025	KME	3	11:59	12:59	3600	None	8/8	11	F3	S	16
06/10/2025	SS	3	14:30	16:30	7200	None	6/8	31	F2	SSW	14
15/05/2025	MVA	4	09:36	12:36	10800	None	0/8	5	F1	ENE	16
15/05/2025	MVA	4	13:06	16:06	10800	None	0/8	5	F1	ENE	20
20/06/2025	KME	4	08:50	10:50	7200	None	3/8	16	F2	ESE	20
20/06/2025	KME	4	11:20	14:20	10800	None	3/8	16	F2	ESE	24
20/06/2025	KME	4	14:50	15:50	3600	None	2/8	16	F2	ESE	25
11/07/2025	PB	4	12:20	14:20	7200	None	1/8	20	F1	S	26
14/07/2025	SS	4	14:00	15:30	5400	Occasional showers	5/8	10	F3	SSW	15
15/07/2025	SS	4	09:30	12:00	9000	Moderate rain	8/8	4	F4	SW	13

Date	Observer	VP Number	Start Time	End Time	Duration of Survey (sec)	Rain	Cloud	Visibility (km)	Wind Speed	Wind Direction	Temperature
21/07/2025	SS	4	17:05	20:05	10800	Occasional showers	8/8	12	F3	WNW	18
28/07/2025	KME	4	08:04	11:04	10800	Occasional showers	8/8	16	F2	WNW	15
05/08/2025	KME	4	10:56	13:56	10800	None	2/8	16	F2	W	17
21/08/2025	KME	4	08:48	09:48	3600	None	5/8	16	F1	NNE	14
21/08/2025	KME	4	09:48	10:48	3600	None	5/8	16	F1	NNE	14
21/08/2025	KME	4	11:18	13:18	7200	None	7/8	16	F2	NE	17
25/09/2025	KME	4	08:08	10:08	7200	None	6/8	16	F1	SE	9
02/10/2025	KME	4	08:10	11:10	10800	Drizzle	8/8	16	F3	S	14
08/05/2025	CMCK	5	17:30	20:30	10800	None	6/8	15	F1	SE	14
13/06/2025	KME	5	06:30	09:30	10800	None	6/8	12	F2	S	16
23/06/2025	KME	5	07:27	10:27	10800	None	7/8	16	F3	WSW	13
23/06/2025	KME	5	10:57	13:57	10800	None	5/8	16	F3	WSW	15
09/07/2025	PB	5	09:15	12:15	10800	None	7/8	20	F1	W	17
09/07/2025	PB	5	12:45	15:45	10800	None	3/8	20	F1	W	20
22/07/2025	SS	5	15:54	17:54	7200	Occasional showers	8/8	10	F2	W	19
23/07/2025	SS	5	16:00	19:00	10800	Occasional showers	8/8	6	F2	NNW	18
23/07/2025	SS	5	19:30	20:30	3600	Occasional showers	8/8	4	F2	NW	16
27/08/2025	AH	5	09:50	11:50	7200	Occasional showers	7/8	20	F4	WSW	14
27/08/2025	AH	5	12:20	14:20	7200	Occasional showers	7/8	20	F4	WSW	14
12/09/2025	CMCK	5	12:00	14:00	7200	Occasional showers	6/8	10	F3	WSW	13
24/09/2025	CMCK	5	10:15	12:15	7200	None	2/8	15	F1	SE	10
24/09/2025	CMCK	5	12:45	14:45	7200	None	5/8	15	F1	SE	16
25/09/2025	KME	5	10:38	12:38	7200	None	4/8	16	F2	SE	14
20/05/2025	CMCK	6	08:53	11:53	10800	Occasional showers	8/8	5	F2	ESE	9
21/05/2025	CMCK	6	09:00	12:00	10800	Drizzle	8/8	2	F1	NNW	9
01/07/2025	SS	6	10:00	13:00	10800	Occasional showers	8/8	10	F2	N	15

Date	Observer	VP Number	Start Time	End Time	Duration of Survey (sec)	Rain	Cloud	Visibility (km)	Wind Speed	Wind Direction	Temperature
01/07/2025	SS	6	13:30	16:30	10800	Occasional showers	8/8	10	F2	N	16
08/07/2025	PB	6	09:00	12:00	10800	None	8/8	10	F1	SW	14
08/07/2025	PB	6	12:30	15:30	10800	Drizzle	8/8	10	F1	WNW	17
15/07/2025	AH	6	10:50	15:30	16800	None	8/8	20	F5	SW	15
15/07/2025	AH	6	11:00	13:00	7200	None	8/8	20	F5	SW	15
15/07/2025	AH	6	13:30	15:30	7200	None	8/8	20	F5	SW	15
26/08/2025	KME	6	08:30	10:30	7200	None	4/8	11	F2	S	16
28/08/2025	AH	6	10:50	13:50	10800	Occasional showers	7/8	15	F4	SE	14
28/08/2025	AH	6	14:20	15:20	10800	Occasional showers	7/8	15	F4	SE	14
29/09/2025	CMCK	6	15:18	17:18	7200	None	7/8	10	F2	SSW	15
30/09/2025	CMCK	6	10:00	12:00	7200	None	7/8	10	F1	S	12
30/09/2025	CMCK	6	12:30	14:30	7200	None	5/8	10	F1	S	17

Table 15: VP Winter 2025-2026 Survey Efforts.

Date	Observer	VP Number	Start Time	End Time	Duration of Survey (sec)	Rain	Cloud	Visibility (km)	Wind Speed	Wind Direction	Temperature
16/10/2025	KME	1	08:31	11:31	10800	None	8/8	11	F1	NNE	9
16/10/2025	KME	1	12:01	15:01	10800	None	8/8	16	F2	SSW	14
27/11/2025	KME	1	09:34	12:34	10800	None	3/8	16	F3	SSW	13
27/11/2025	KME	1	13:04	14:04	3600	Occasional showers	7/8	16	F3	SSW	14
27/11/2025	KME	1	14:23	16:23	7200	None	3/8	16	F3	SSW	14
16/12/2025	CMCK	1	10:40	12:40	7200	None	0/8	10	F1	SSW	0
18/12/2025	SS	1	10:30	12:30	7200	Drizzle	8/8	23	F2	S	9
13/01/2026	SS	1	10:50	12:50	7200	None	1/8	37	F1	WNW	5
20/01/2026	CMCK	1	11:35	13:35	7200	Occasional showers	7/8	10	F4	SE	6
20/01/2026	CMCK	1	14:05	16:05	7200	None	6/8	10	F4	SE	8
30/01/2026	CF	1	08:30	10:30	7200	None	7/8	8	F3	SSE	6
26/02/2026	KME	1	09:23	11:23	7200	Light rain	8/8	8	F4	S	9
27/02/2026	KME	1	09:37	11:37	7200	None	3/8	16	F2	NNW	9

Date	Observer	VP Number	Start Time	End Time	Duration of Survey (sec)	Rain	Cloud	Visibility (km)	Wind Speed	Wind Direction	Temperature
27/02/2026	KME	1	12:07	14:07	7200	None	7/8	16	F2	NNW	10
09/03/2026	SS	1	13:24	15:24	7200	None	8/8	13	F2	SW	10
13/03/2026	KME	1	08:46	11:46	10800	Occasional showers	6/8	16	F4	WSW	4
13/03/2026	KME	1	12:16	13:16	3600	Occasional showers	8/8	16	F4	SW	6
09/10/2025	KME	2	09:14	12:14	10800	None	8/8	16	F2	W	13
09/10/2025	KME	2	12:44	15:44	10800	None	8/8	16	F2	W	13
12/11/2025	KME	2	09:12	11:12	7200	None	8/8	4	F1	N	6
12/11/2025	KME	2	11:42	13:42	7200	None	7/8	5	F1	ENE	8
18/11/2025	SS	2	10:10	12:10	7200	None	2/8	28	F2	W	7
16/12/2025	CMCK	2	13:15	15:15	7200	None	0/8	10	F1	SSW	6
08/01/2026	SS	2	10:15	12:15	7200	None	8/8	17	F1	N	4
08/01/2026	SS	2	12:45	14:45	7200	None	8/8	16	F1	NE	4
14/01/2026	KME	2	10:03	12:03	7200	Occasional showers	8/8	11	F3	S	6
27/01/2026	CMCK	2	10:55	12:55	7200	Occasional showers	3/8	15	F4	SE	8
27/01/2026	CMCK	2	13:25	15:25	7200	Occasional showers	8/8	5	F4	SE	8
11/02/2026	SS	2	09:00	12:00	10800	Light rain	8/8	19	F1	SSW	8
11/02/2026	SS	2	12:30	15:30	10800	None	8/8	15	F1	SSW	10
05/03/2026	SS	2	10:00	12:00	7200	Moderate rain	8/8	6	F3	WNW	9
19/03/2026	SS	2	11:00	14:00	10800	None	0/8	27	F1	ENE	15
19/03/2026	SS	2	14:30	15:30	3600	None	1/8	28	F1	ESE	16
07/10/2025	SS	3	14:20	16:20	7200	None	8/8	31	F2	SW	14
09/10/2025	SS	3	11:50	13:50	7200	None	8/8	27	F2	SW	15
20/10/2025	SS	3	14:55	16:55	7200	None	6/8	22	F1	NW	13
07/11/2025	KME	3	10:00	13:00	10800	Light rain	8/8	9	F2	SE	12
07/11/2025	KME	3	13:30	14:30	3600	Moderate rain	8/8	8	F3	SE	11
18/11/2025	SS	3	12:40	14:40	7200	None	2/8	28	F2	W	7
04/12/2025	SS	3	11:09	13:09	7200	None	1/8	28	F1	WSW	6
11/12/2025	CMCK	3	11:00	13:00	7200	Drizzle	8/8	2	F3	S	11
11/12/2025	CMCK	3	13:30	15:30	7200	Light rain	8/8	3	F3	S	12

Date	Observer	VP Number	Start Time	End Time	Duration of Survey (sec)	Rain	Cloud	Visibility (km)	Wind Speed	Wind Direction	Temperature
17/12/2025	KME	3	13:16	15:16	7200	Occasional showers	8/8	6	F3	S	12
14/01/2026	KME	3	13:19	15:19	7200	Moderate rain	8/8	6	F3	S	6
22/01/2026	CMCK	3	11:28	13:28	7200	None	5/8	10	F1	WSW	5
10/02/2026	SS	3	10:00	13:00	10800	Light rain	8/8	10	F1	SE	8
10/02/2026	SS	3	13:30	16:30	10800	None	8/8	10	F1	SE	8
11/03/2026	SS	3	09:35	12:35	10800	None	6/8	27	F3	W	8
11/03/2026	SS	3	13:05	16:05	10800	None	4/8	21	F3	W	10
04/11/2025	KME	4	09:30	12:30	10800	Occasional showers	8/8	11	F3	S	14
04/11/2025	KME	4	13:00	16:00	10800	Occasional showers	8/8	12	F2	S	14
13/11/2025	KME	4	08:34	11:34	10800	None	4/8	11	F1	S	9
13/11/2025	KME	4	12:04	15:04	10800	None	6/8	16	F1	SSE	13
04/12/2025	SS	4	13:16	15:16	7200	None	1/8	29	F1	WSW	6
02/01/2026	SS	4	11:36	13:36	7200	None	2/8	36	F1	NW	3
02/01/2026	SS	4	14:07	16:07	7200	None	2/8	36	F1	NW	4
29/01/2026	CF	4	09:20	12:20	10800	Light rain	8/8	10	F4	SE	7
29/01/2026	CF	4	12:50	15:50	10800	None	8/8	15	F4	SE	8
13/02/2026	SS	4	12:00	15:00	10800	None	8/8	31	F1	NNE	4
24/02/2026	KME	4	10:25	13:25	10800	None	8/8	16	F2	S	11
10/03/2026	SS	4	09:55	12:55	10800	Occasional showers	8/8	15	F3	S	9
20/03/2026	SS	4	09:30	12:30	10800	None	6/8	26	F1	SSE	11
09/10/2025	SS	5	10:20	12:20	7200	None	8/8	27	F2	WNW	13
20/10/2025	KME	5	13:50	15:50	7200	None	6/8	16	F3	NW	12
31/10/2025	KME	5	07:58	09:58	7200	Moderate rain	8/8	8	F3	S	8
18/11/2025	KME	5	09:10	12:10	10800	None	2/8	16	F2	WSW	5
18/11/2025	KME	5	13:09	16:09	10800	None	8/8	16	F2	ENE	11
17/12/2025	CMCK	5	10:45	12:45	7200	Occasional showers	8/8	5	F4	SSW	9
17/12/2025	CMCK	5	13:15	15:15	7200	Occasional showers	8/8	2	F4	SSW	9
14/01/2026	SS	5	12:07	14:07	7200	Drizzle	8/8	19	F2	S	6

Date	Observer	VP Number	Start Time	End Time	Duration of Survey (sec)	Rain	Cloud	Visibility (km)	Wind Speed	Wind Direction	Temperature
27/01/2026	CF	5	10:40	12:40	7200	None	6/8	20	F4	SE	7
30/01/2026	CF	5	11:00	13:00	7200	None	4/8	18	F3	SSE	8
03/02/2026	Ss	5	10:30	12:30	7200	Drizzle	8/8	15	F2	E	6
20/02/2026	SS	5	13:00	16:00	10800	Light rain	8/8	23	F2	W	10
25/02/2026	KME	5	13:01	16:01	10800	None	8/8	16	F2	SSW	13
13/03/2026	SS	5	10:15	13:15	10800	Occasional showers	8/8	22	F3	WSW	5
13/03/2026	SS	5	13:45	16:45	10800	Occasional showers	8/8	14	F3	W	6
10/10/2025	SS	6	10:30	12:30	7200	None	8/8	29	F1	W	10
10/10/2025	SS	6	13:00	15:00	7200	None	8/8	29	F1	WNW	13
17/10/2025	KME	6	08:25	10:25	7200	None	7/8	16	F2	E	10
17/11/2025	SS	6	10:45	13:45	10800	None	0/8	32	F1	NNE	6
17/11/2025	SS	6	14:15	15:15	3600	None	0/8	29	F1	N	8
24/11/2025	KME	6	12:13	14:13	7200	None	3/8	16	F3	NNW	8
01/12/2025	SS	6	10:00	12:00	7200	None	8/8	18	F1	SE	8
01/12/2025	SS	6	12:30	14:30	7200	None	7/8	17	F1	SSE	9
14/01/2026	SS	6	10:00	12:00	7200	None	8/8	19	F2	S	6
28/01/2026	CF	6	09:16	12:16	10800	None	5/8	20	F4	SE	7
28/01/2026	CF	6	12:46	15:46	10800	Drizzle	5/8	20	F4	SE	8
03/02/2026	SS	6	12:45	14:45	7200	Light rain	8/8	15	F2	E	6
25/02/2026	SS	6	12:30	14:30	7200	Occasional showers	8/8	23	F1	SSW	12
25/02/2026	SS	6	15:00	17:00	7200	None	8/8	24	F1	SSW	13
04/03/2026	SS	6	09:45	12:45	10800	None	8/8	15	F3	SSE	10
04/03/2026	SS	6	13:15	16:15	10800	None	8/8	22	F3	SSE	11

Table 16: VP Breeding 2026 Survey Efforts.

Date	Observer	VP Number	Start Time	End Time	Duration of Survey (sec)	Rain	Cloud	Visibility (km)	Wind Speed	Wind Direction	Temperature
22/04/2026	KME	1	09:51	12:51	10800	None	4/8	16	F4	E	10
30/04/2026	SS	1	08:45	11:45	10800	Occasional showers	8/8	26	F2	E	11
20/05/2026	KME	1	08:03	10:03	7200	Occasional showers	8/8	9	F3	SW	12
26/05/2026	CF	1	09:12	11:12	7200	None	0/8	20	F1	ENE	22
26/05/2026	CF	1	11:42	13:12	5400	None	0/8	20	F1	ENE	27
26/05/2026	CF	1	13:25	13:55	1800	None	0/8	20	F1	ENE	28
08/06/2026	KME	1	14:57	16:57	7200	Occasional showers	5/8	12	F2	WSW	15
25/06/2026	MVA	1	14:30	16:30	7200	None	5/8	5	F2	SE	30
25/06/2026	MVA	1	17:00	19:00	7200	None	5/8	5	F2	SE	30
29/06/2026	MVA	1	18:00	20:00	7200	Occasional showers	8/8	5	F2	S	15
02/07/2026	KME	1	08:47	11:47	10800	None	5/8	16	F2	WNW	14
02/07/2026	KME	1	12:17	13:17	3600	None	4/8	16	F2	W	16
14/08/2026	SS	1	07:32	09:32	7200	Light rain	8/8	20	F3	NW	17
17/08/2026	SS	1	14:25	16:25	7200	None	7/8	35	F1	W	22
21/08/2026	CMCK	1	05:50	07:50	7200	None	7/8	5	F2	NW	8
21/08/2026	CMCK	1	08:20	10:20	7200	None	7/8	5	F2	NW	10
24/08/2026	CMCK	1	16:36	18:36	7200	None	6/8	10	F3	SE	21
24/08/2026	CMCK	1	19:06	21:06	7200	None	8/8	10	F2	SE	19
22/04/2026	SS	2	09:40	12:40	10800	None	3/8	27	F3	E	9
22/04/2026	SS	2	13:10	16:10	10800	None	8/8	27	F3	ESE	12
13/05/2026	SS	2	17:24	20:24	10800	Occasional showers	4/8	17	F3	NW	11
18/05/2026	SS	2	16:58	19:58	10800	Light rain	8/8	8	F2	SSE	10
03/06/2026	SS	2	10:20	12:20	7200	None	8/8	17	F3	WSW	16
08/06/2026	SS	2	11:30	13:30	7200	Occasional showers	7/8	18	F1	WSW	14
22/06/2026	CMCK	2	13:30	15:30	7200	None	7/8	15	F2	ENE	22
08/07/2026	SS	2	11:40	13:40	7200	None	2/8	24	F2	S	23
23/07/2026	KME	2	12:43	14:43	7200	None	8/8	12	F1	N	23
06/08/2026	MVA	2	18:00	20:00	7200	None	7/8	5	F2	WNW	18
14/08/2026	MVA	2	13:15	15:15	7200	None	5/8	10	F2	NW	21

Date	Observer	VP Number	Start Time	End Time	Duration of Survey (sec)	Rain	Cloud	Visibility (km)	Wind Speed	Wind Direction	Temperature
20/08/2026	SS	2	05:45	07:45	7200	Drizzle	8/8	21	F2	NW	12
20/08/2026	SS	2	08:15	10:15	7200	Drizzle	6/8	13	F2	NNW	14
25/08/2026	CMCK	2	16:34	18:34	7200	Light rain	8/8	2	F2	ESE	18
25/08/2026	CMCK	2	19:04	21:04	7200	Moderate rain	8/8	2	F2	ESE	16
26/08/2026	CD	2	05:50	07:50	7200	None	8/8	5	F1	SE	8
23/04/2026	SS	3	09:50	12:50	10800	None	3/8	27	F3	ESE	12
23/04/2026	SS	3	13:20	16:20	10800	None	3/8	27	F3	ESE	16
30/04/2026	KME	3	09:58	12:58	10800	Occasional showers	8/8	14	F2	E	13
19/05/2026	SS	3	18:00	19:45	6300	Occasional showers	8/8	16	F2	SW	12
27/05/2026	KS	3	09:25	10:40	4500	None	0/8	16	F1	NE	20
10/06/2026	SS	3	10:20	13:20	10800	None	5/8	18	F2	W	12
10/06/2026	SS	3	13:50	14:50	3600	None	5/8	18	F2	W	12
16/06/2026	CMCK	3	08:00	10:00	7200	Occasional showers	8/8	10	F1	SW	13
14/07/2026	MVA	3	18:00	20:00	7200	None	1/8	10	F2	E	28
15/07/2026	CMCK	3	13:15	15:15	7200	None	2/8	20	F2	E	26
15/07/2026	CMCK	3	15:45	17:45	7200	None	3/8	20	F2	E	25
10/08/2026	MVA	3	17:06	19:06	7200	None	5/8	5	F1	SE	20
10/08/2026	MVA	3	19:36	21:36	7200	None	2/8	5	F1	SE	18
14/08/2026	MVA	3	10:45	12:45	7200	None	4/8	10	F2	NW	19
14/08/2026	SS	3	05:28	07:28	7200	None	8/8	18	F2	WNW	17
27/08/2026	KME	3	06:02	09:02	10800	None	4/8	12	F1	NE	14
27/08/2026	KME	3	09:32	10:32	3600	Drizzle	8/8	6	F2	ENE	16
27/04/2026	SS	4	13:00	16:00	10800	None	8/8	29	F1	N	15
27/04/2026	SS	4	16:30	19:30	10800	None	8/8	29	F1	N	12
20/05/2026	SS	4	10:40	13:40	10800	Occasional showers	7/8	20	F3	WSW	15
03/06/2026	KME	4	09:45	12:45	10800	Occasional showers	7/8	16	F4	W	16
12/06/2026	SS	4	07:00	10:00	10800	Occasional showers	5/8	20	F3	W	16
24/06/2026	KME	4	12:01	15:01	10800	None	1/8	12	F1	E	23
17/07/2026	MVA	4	12:00	14:00	7200	None	1/8	26	F1	NNW	26

Date	Observer	VP Number	Start Time	End Time	Duration of Survey (sec)	Rain	Cloud	Visibility (km)	Wind Speed	Wind Direction	Temperature
17/07/2026	MVA	4	14:30	16:30	7200	None	2/8	27	F1	NNW	27
21/07/2026	CMCK	4	19:00	21:00	7200	None	8/8	20	F2	N	20
10/08/2026	MVA	4	15:45	17:45	7200	None	6/8	36	F1	SE	22
13/08/2026	MVA	4	17:00	19:00	7200	None	7/8	10	F2	SW	27
13/08/2026	MVA	4	19:30	21:30	7200	None	5/8	10	F2	SW	24
19/08/2026	CMCK	4	14:40	16:40	7200	Occasional showers	5/8	10	F3	W	17
26/08/2026	CD	4	13:00	16:00	10800	None	3/8	20	F3	N	20
26/08/2026	CD	4	17:25	16:25	3600	Light rain	7/8	15	F4	NE	17
29/04/2026	SS	5	08:55	11:55	10800	None	1/8	24	F3	NE	8
29/04/2026	SS	5	12:25	15:25	10800	None	0/8	28	F3	NE	15
15/05/2026	SS	5	10:45	13:45	10800	Occasional showers	8/8	21	F2	NNW	9
15/05/2026	SS	5	14:15	15:15	3600	Occasional showers	8/8	21	F2	NNW	9
20/05/2026	SS	5	13:51	15:51	7200	Occasional showers	8/8	19	F2	SW	15
04/06/2026	SS	5	08:30	10:30	7200	None	8/8	18	F3	W	12
04/06/2026	SS	5	11:00	13:00	7200	None	6/8	19	F3	WNW	14
05/06/2026	KME	5	09:14	11:14	7200	None	4/8	16	F2	SSW	12
14/07/2026	CMCK	5	18:45	20:45	7200	None	0/8	15	F3	E	23
22/07/2026	CMCK	5	13:05	15:05	7200	None	3/8	15	F2	NNW	19
22/07/2026	CMCK	5	15:35	17:35	7200	None	3/8	15	F3	NNW	21
10/08/2026	SS	5	17:55	19:55	7200	None	3/8	35	F1	SE	22
17/08/2026	CMCK	5	12:10	14:10	7200	Occasional showers	6/8	10	F3	W	17
17/08/2026	CMCK	5	16:50	18:50	7200	None	8/8	10	F1	SW	21
17/08/2026	CMCK	5	19:21	21:21	7200	Occasional showers	8/8	10	F1	SW	19
19/08/2026	CMCK	5	12:10	14:10	7200	Occasional showers	6/8	10	F3	W	17
26/08/2026	DMC	5	06:00	08:00	7200	None	8/8	3	F2	NE	15
26/08/2026	DMC	5	08:30	10:30	7200	Drizzle	8/8	3	F2	NE	17
29/04/2026	KME	6	08:57	11:57	10800	None	0/8	12	F2	NE	8
29/04/2026	KME	6	12:31	15:31	10800	None	0/8	12	F3	ENE	16
27/05/2026	KME	6	07:22	09:22	7200	None	0/8	14	F1	NE	15

Date	Observer	VP Number	Start Time	End Time	Duration of Survey (sec)	Rain	Cloud	Visibility (km)	Wind Speed	Wind Direction	Temperature
28/05/2026	KME	6	16:37	19:37	10800	None	8/8	16	F3	SSW	17
28/05/2026	KME	6	20:07	21:07	3600	None	6/8	16	F3	SSW	16
09/06/2026	SS	6	10:50	12:20	5400	Occasional showers	8/8	17	F2	W	13
09/06/2026	SS	6	12:50	14:50	7200	None	4/8	17	F2	W	14
17/06/2026	CMCK	6	08:13	10:13	7200	None	6/8	15	F1	SW	15
17/06/2026	CMCK	6	10:43	11:13	1800	None	5/8	15	F1	SW	15
15/07/2026	MVA	6	13:40	15:40	7200	None	4/8	10	F2	ESE	25
15/07/2026	MVA	6	16:10	18:10	7200	None	3/8	10	F2	ESE	27
21/07/2026	DP	6	18:25	20:25	7200	None	6/8	20	F3	N	17
11/08/2026	SS	6	17:05	19:05	7200	None	6/8	33	F1	S	24
11/08/2026	SS	6	19:35	21:35	7200	None	6/8	30	F1	SSE	21
13/08/2026	SS	6	17:00	19:00	7200	None	6/8	37	F1	WSW	27
17/08/2026	SS	6	12:15	14:15	7200	None	7/8	33	F2	W	20
24/08/2026	MVA	6	06:00	08:00	7200	None	0/8	5	F1	E	8
24/08/2026	MVA	6	08:30	10:30	7200	None	1/8	5	F1	E	13
26/08/2026	CD	4	13:00	16:00	10800	None	7/8	15	F1	SE	18
26/08/2026	CD	4	13:00	16:00	10800	None	3/8	20	F3	N	20
26/08/2026	CD	4	17:25	16:25	3600	Light rain	7/8	15	F4	NE	17
26/08/2026	CD	2	05:50	07:50	7200	None	8/8	5	F1	SE	8
24/08/2026	CMCK	1	16:36	18:36	7200	None	6/8	10	F3	SE	21
24/08/2026	CMCK	1	16:36	18:36	7200	None	6/8	10	F3	SE	21
24/08/2026	CMCK	1	19:06	21:06	7200	None	8/8	10	F2	SE	19
24/08/2026	CMCK	1	19:06	21:06	7200	None	8/8	10	F2	SE	19
25/08/2026	CMCK	2	16:34	18:34	7200	Light rain	8/8	2	F2	ESE	18
25/08/2026	CMCK	2	19:04	21:04	7200	Moderate rain	8/8	2	F2	ESE	16
27/08/2026	KME	3	06:02	09:02	10800	None	4/8	12	F1	NE	14
27/08/2026	KME	3	09:32	10:32	3600	Drizzle	8/8	6	F2	ENE	16

A13.6.2 Survey Results

Table 17: Winter Transects Results 2022-2023.

Species	November	December	January	February	March	Total
Blackbird	19	9	53	28	3	**112**
Blackcap	0	0	0	2	0	**2**
Blue Tit	6	5	27	11	2	**51**
Bullfinch	1	0	11	4	0	**16**
Buzzard	1	0	2	5	0	**8**
Chaffinch	11	5	7	29	1	**53**
Coal Tit	4	3	12	5	0	**24**
Collared Dove	2	2	3	0	0	**7**
Dunnock	2	2	2	7	0	**13**
Feral Pigeon	0	5	0	0	0	**5**
Fieldfare	0	0	7	41	0	**48**
Goldcrest	0	0	1	3	0	**4**
Goldfinch	2	0	7	3	0	**12**
Great Tit	3	4	8	20	3	**38**
Greenfinch	0	1	4	0	0	**5**
Hooded Crow	0	2	14	5	0	**21**
House Sparrow	3	2	5	14	5	**29**
Jackdaw	12	18	11	12	2	**55**
Jay	2	0	3	0	0	**5**
Kestrel	0	0	4	0	0	**4**
Lesser Black-backed Gull	0	0	2	0	0	**2**
Linnet	0	0	1	0	0	**1**
Long-tailed Tit	2	0	6	0	0	**8**
Magpie	9	3	8	4	0	**24**
Meadow Pipit	2	1	1	0	0	**4**
Mistle Thrush	0	0	4	5	0	**9**
Peregrine	0	1	0	0	0	**1**
Pied Wagtail	2	3	6	4	1	**16**
Raven	1	0	4	1	0	**6**
Redwing	0	31	101	28	0	**160**
Robin	7	9	20	35	5	**76**
Rook	50	23	96	62	3	**234**
Sedge Warbler	0	0	0	1	0	**1**

Species	November	December	January	February	March	Total
Siskin	0	2	0	3	0	**5**
Skylark	0	0	1	2	0	**3**
Snipe	0	1	1	0	0	**2**
Song Thrush	2	4	19	8	2	**35**
Starling	0	30	65	464	0	**559**
Stonechat	0	0	1	0	0	**1**
Tree Sparrow	2	9	12	2	0	**25**
Woodpigeon	7	4	17	18	1	**47**
Wren	8	9	24	33	4	**78**
Yellowhammer	0	2	1	2		**5**
Total	**164**	**191**	**572**	**863**	**32**	**1822**

Table 18: Breeding Transects Results 2025.

Species	April	May	Total
Blackbird	3	98	**101**
Blackcap	0	16	**16**
Blue Tit	1	20	**21**
Bullfinch	0	3	**3**
Chaffinch	4	72	**76**
Chiffchaff	2	16	**18**
Cuckoo	0	4	**4**
Dunnock	0	17	**17**
Goldcrest	0	3	**3**
Goldfinch	0	8	**8**
Great Tit	0	21	**21**
Greenfinch	3	0	**3**
Hooded Crow	27	52	**79**
House Martin	0	20	**20**
House Sparrow	0	30	**30**
Jackdaw	4	78	**82**
Linnet	1	3	**4**
Long-tailed Tit	0	2	**2**
Magpie	0	15	**15**
Meadow Pipit	1	5	**6**
Mistle Thrush	0	2	**2**

Species	April	May	Total
Pheasant	0	4	**4**
Pied Wagtail	0	5	**5**
Raven	2	9	**11**
Robin	6	46	**52**
Rook	6	105	**111**
Siskin	1	3	**4**
Skylark	10	18	**28**
Song Thrush	0	25	**25**
Starling	0	74	**74**
Stonechat	0	11	**11**
Swallow	1	33	**34**
Whitethroat	0	1	**1**
Willow Warbler	2	23	**25**
Woodpigeon	3	45	**48**
Wren	4	82	**86**
Total	**81**	**969**	**1050**

Table 19: Winter Transects Results 2025-2026.

Species	November	December	January	February	Total
Blackbird	13	23	28	3	**67**
Black-headed Gull	0	0	3	2	**5**
Blue Tit	9	5	5	1	**20**
Bullfinch	5	3	1	1	**10**
Buzzard	1	0	0	1	**2**
Chaffinch	12	2	19	1	**34**
Coal Tit	0	0	2	0	**2**
Dunnock	12	2	0	1	**15**
Fieldfare	0	0	0	30	**30**
Goldcrest	0	1	0	0	**1**
Goldfinch	1	1	0	0	**2**
Great Tit	9	3	3	0	**15**
Hooded Crow	14	9	1	8	**32**
House Sparrow	12	0	0	9	**21**
Jackdaw	12	7	3	0	**22**
Kestrel	0	0	0	1	**1**

Species	November	December	January	February	Total
Lesser Black-backed Gull	30	6	0	14	**50**
Linnet	18	0	0	50	**68**
Magpie	5	8	0	7	**20**
Meadow Pipit	6	3	7	1	**17**
Mistle Thrush	2	1	1	0	**4**
Pheasant	1	0	0	0	**1**
Pied Wagtail	4	3	3	1	**11**
Raven	2	2	4	1	**9**
Redwing	0	0	11	0	**11**
Robin	14	10	10	6	**40**
Rook	18	33	27	136	**214**
Snipe	0	0	2	0	**2**
Song Thrush	4	6	7	0	**17**
Starling	36	46	186	0	**268**
Stonechat	1	0	1	0	**2**
Woodpigeon	18	12	7	8	**45**
Wren	18	10	4	2	**34**
Total	**277**	**196**	**335**	**284**	**1092**

Table 20: Breeding Transect Results 2026.

Species	April	May	June	Total
Blackbird	14	8	34	**56**
Blackcap	3	2	5	**10**
Blue Tit	10	6	0	**16**
Bullfinch	1	0	2	**3**
Buzzard	2	0	1	**3**
Chaffinch	9	10	14	**33**
Chiffchaff	2	1	2	**5**
Cuckoo	1	3	0	**4**
Dunnock	6	7	5	**18**
Goldcrest	1	0	1	**2**
Goldfinch	1	0	0	**1**
Great Tit	5	8	2	**15**
Hooded Crow	4	0	18	**22**
House Martin	0	13	0	**13**

Species	April	May	June	Total
House Sparrow	0	4	0	**4**
Jackdaw	2	10	25	**37**
Lesser Black-backed Gull	0	0	1	**1**
Linnet	0	0	4	**4**
Long-tailed Tit	0	4	8	**12**
Magpie	5	0	2	**7**
Meadow Pipit	1	0	13	**14**
Pied Wagtail	0	2	0	**2**
Raven	2	0	4	**6**
Robin	9	6	5	**20**
Rook	17	15	57	**89**
Skylark	6	1	37	**44**
Song Thrush	8	2	10	**20**
Starling	1	8	2	**11**
Stonechat	1	0	4	**5**
Swallow	2	8	0	**10**
Whitethroat	0	1	0	**1**
Willow Warbler	5	7	8	**20**
Woodpigeon	9	3	11	**23**
Wren	16	7	18	**41**
Total	**143**	**136**	**293**	**572**

Table 21: Breeding Barn Owl Activity and Suitability Results.

Date	Survey Type	Start Time	End Time	Duration of Survey (sec)	Location of Sighting (ITM)	Barn Owl Sighting	Barn Owl Evidence	Site Type	Suitability of the Site for Barn Owls	Notes
08/04/2025	Suitability	08:00	14:30	23400	633215.92, 670091.77	-	-	Derelict Building	High	No evidence found. But the building has good access and layers for nesting.
08/04/2025	Suitability	08:00	14:30	23400	633771.00, 669597.78	-	-	Active Barn	Intermediate	No evidence found.
08/04/2025	Suitability	08:00	14:30	23400	635186.04, 668926.55	-	-	Derelict house	High	No evidence found.
08/04/2025	Suitability	08:00	14:30	23400	635154.78, 668993.28	-	-	Barn	Intermediate	No evidence found. Barn seems actively used. Has potential for nesting Barn Owl

Date	Survey Type	Start Time	End Time	Duration of Survey (sec)	Location of Sighting (ITM)	Barn Owl Sighting	Barn Owl Evidence	Site Type	Suitability of the Site for Barn Owls	Notes
08/04/2025	Suitability	08:00	14:30	23400	637744.57, 669239.75	-	-	Old derelict building	Intermediate	No evidence found
08/04/2025	Suitability	08:00	14:30	23400	636938.55, 669521.98	-	-	Barn and old buildings	Intermediate	No evidence found
08/04/2025	Suitability	08:00	14:30	23400	639698.69, 669187.68	-	-	Barn	Low	No evidence found
08/04/2025	Suitability	08:00	14:30	23400	631912.97, 669448.42	-	-	Farm buildings	Intermediate	Few Farm buildings with nesting potential. No evidence found.
25/06/2025	Activity	21:28	22:58	5400	638578.73, 668929.36	Nil sightings	Nil sightings	Old farm buildings and dwelling house	-	
13/08/2025	Activity	20:30	22:00	5400	633215.27, 670082.00	Nil sightings	Nil sightings	Derelict building	-	
27/08/2025	Activity	19:59	21:54	6900	635164.24, 668988.66	Nil sightings	Nil sightings	Agricultural building	-	
27/08/2025	Activity	19:59	21:54	6900	635185.21, 668930.57	Nil sightings	Nil sightings	Old stone agricultural building	-	
21/04/2026	Suitability	10:20	15:20	18000	639372.19, 669886.53	-	-	Cottage ruins	Intermediate	
21/04/2026	Suitability	10:20	15:20	18000	637759.64, 669249.60	-	-	Ruins	Intermediate	
21/04/2026	Suitability	10:20	15:20	18000	635931.30, 669742.49	-	-	Shed	Low	
21/04/2026	Suitability	10:20	15:20	18000	636282.31, 669930.45	-	-	Shed	Intermediate	
21/04/2026	Suitability	10:20	15:20	18000	632448.73, 672176.90	-	-	Building	Low	
21/04/2026	Suitability	10:20	15:20	18000	631707.40, 669533.30	-	-	Ruins	Low	
21/04/2026	Suitability	10:20	15:20	18000	631926.55, 669446.40	-	-	Ruins	Low	
21/04/2026	Suitability	10:20	15:20	18000	632397.95, 669331.04	-	-	Ruins	Low	
21/04/2026	Suitability	10:20	15:20	18000	634134.18, 668930.46	-	-	Shed	Low	Can't take picture. Located beside house, residents home
21/04/2026	Suitability	10:20	15:20	18000	634738.70, 668751.00	-	-	Shed	Low	

Date	Survey Type	Start Time	End Time	Duration of Survey (sec)	Location of Sighting (ITM)	Barn Owl Sighting	Barn Owl Evidence	Site Type	Suitability of the Site for Barn Owls	Notes
21/04/2026	Suitability	10:20	15:20	18000	635191.40, 668918.35	-	-	Shed	Low	
21/04/2026	Suitability	10:20	15:20	18000	635756.52, 668475.15	-	-	Shed	Low	
29/06/2026	Activity	21:28	22:58	5400	636277.91, 669923.35	Nil sightings	Nil sightings	Derelict house	-	
14/07/2026	Activity	21:17	22:47	5400	637755.29, 669249.49	Nil sightings	Nil sightings	Old building	-	
26/08/2026	Activity	20:00	21:30	5400	639166.65, 669797.95	Nil sightings	Nil sightings	Derelict building	Intermediate	

Table 22: Breeding Kestrel Survey Results.

Date	Survey Types	Start Time	End Time	Duration of Survey (sec)	Location of Sighting (ITM)	Species	Evidence	Site Type	Suitability	Notes
08/04/2025	Suitability	08:00	14:30	23400	639882.48, 670812.65	-	-	Old corvid nest	Intermediate	No evidence found. Has nesting potential as there is no corvid disturbance in the area.
21/05/2025	Activity	11:30	17:55	21600	635187.34, 668925.76	Nil sightings	Nil sightings	Old derelict building	-	Jackdaws nesting in the structure
21/05/2025	Activity	11:30	17:55	21600	635152.33, 668992.57	Nil sightings	Nil sightings	Active Barn	-	Large number of corvids present in the area
21/05/2025	Activity	11:30	17:55	21600	636942.03, 669521.16	Nil sightings	Nil sightings	Old farm buildings	-	
21/05/2025	Activity	11:30	17:55	21600	637745.20, 669237.24	Nil sightings	Nil sightings	Derelict building	-	
21/05/2025	Activity	11:30	17:55	21600	633215.50, 670091.75	Nil sightings	Nil sightings	Derelict building	-	
25/06/2025	Activity	12:50	14:50	7200	635185.93, 668923.73	Nil sightings	Nil sightings	Derelict stone building	-	

Date	Survey Types	Start Time	End Time	Duration of Survey (sec)	Location of Sighting (ITM)	Species	Evidence	Site Type	Suitability	Notes
10/07/2025	Activity	09:15	11:15	7200	635077.90, 668925.13	Peregrine	Species present	Derelict house and barn	-	Flyover @ 10:30
10/07/2025	Activity	11:30	13:00	5400	633187.77, 670003.38	Nil sightings	Nil sightings	Derelict building	-	
10/07/2025	Activity	13:15	15:15	7200	632773.83, 671100.26	Nil sightings	Nil sightings	Derelict building	-	
21/04/2026	Suitability	10:20	15:20	18000	639372.24, 669896.35	-	-	Cottage ruins	Intermediate	
21/04/2026	Suitability	10:20	15:20	18000	639893.50, 670913.52	-	-	Tree	Low	Large solitary nest, seemingly vacant
21/04/2026	Suitability	10:20	15:20	18000	637751.39, 669240.13	-	-	Ruins	Intermediate	
21/04/2026	Suitability	10:20	15:20	18000	638348.34, 666636.73	-	-	Tree	Low	
21/04/2026	Suitability	10:20	15:20	18000	635446.49, 671369.43	-	-	Tree	Low	Large cavities in tree
21/04/2026	Suitability	10:20	15:20	18000	631785.07, 671067.59	-	-	Tree	Low	
21/04/2026	Suitability	10:20	15:20	18000	633228.01, 670091.96	-	-	Ruins	Low	Kestrel frequently spotted nearby
21/04/2026	Suitability	10:20	15:20	18000	635184.51, 668934.45	-	-	Shed	Low	
11/05/2026	Activity	14:20	16:20	7200	636415.98, 670108.53	Nil sightings	Nil sightings	Ruins	-	Visibility of BL6 also
17/06/2026	Activity	10:20	12:20	7200	637748.11, 669225.60	Nil sightings	Nil sightings	Cottage ruins	-	
17/06/2026	Activity	12:22	14:22	7200	639403.68, 669901.75	Nil sightings	Nil sightings	cottage ruins	-	
25/06/2025	Activity	12:50	14:50	7200	635185.93, 668923.73	Kestrel	Nil Sightings	Derelict Stone Building		Nil Sightings
28/07/2026	Activity	12:25	13:55	5400	635943.12, 669727.75	Nil sightings	Nil sightings	Shed	-	
28/07/2026	Activity	14:00	15:30	5400	635444.90, 671365.82	Nil sightings	Nil sightings	Tree	-	
28/07/2026	Activity	15:39	17:09	5400	630697.80, 669817.83	Nil sightings	Nil sightings	Round tower	-	

Table 23: Peregrine Survey Results.

Date	Survey Types	Start Time	End Time	Duration of Survey (sec)	Location of Sighting (ITM)	Species	Evidence	Site Type	Suitability	Notes
08/04/2025	Suitability	08:00	14:30	23400	635610.62, 668633.18	-	-	Church	Low	No evidence and very low suitability for nesting as there is no access or surface present for nesting.
08/04/2025	Suitability	08:00	14:30	23400	635530.88, 674038.68	-	-	Castle	High	No evidence found. High nesting potential for Peregrine and Kestrel.
08/04/2025	Suitability	08:00	14:30	23400	639063.59, 672688.25	-	-	Active quarry	High	No evidence seen.
08/04/2025	Suitability	08:00	14:30	23400	632511.23, 670900.16	-	-	Old derelict castle building	High	No evidence found. Suitable for both Peregrine and Kestrel.
08/04/2025	Suitability	08:00	14:30	23400	640253.47, 667607.01	-	-	Church	Low	No evidence found.
08/04/2025	Suitability	08:00	14:30	23400	*Redacted*	Peregrine	Species Present	*Redacted*	High	Two Peregrine seen perched on structure. Potential breeding pair.
08/04/2025	Suitability	08:00	14:30	23400	641071.94, 670996.69	-	-	Church	Low	No evidence found. No suitable nesting spots for Peregrine or Kestrel.
07/05/2025	Activity	09:40	11:40	7200	*Redacted*	Peregrine	Species present	*Redacted*	-	Female perched on castle ruins, preening herself. Arrived 09:50. Male arrived at 10:25, female went to a lower ledge on the castle at potential nest. Male left at 10:35. Female was still at nest when I left at 11:40.
07/05/2025	Activity	11:50	13:50	7200	632509.66, 670898.89	Nil sightings	Nil sightings	Ruins	-	Nil sightings. Strong corvid presence.
07/05/2025	Activity	14:05	16:05	7200	635530.83, 674035.69	Nil sightings	Nil sightings	Ruins	-	Nil sightings, strong corvid presence.
21/05/2025	Activity	11:30	17:55	23100	*Redacted*	Peregrine	Species present	*Redacted*	-	Female Peregrine seen perched on structure. No nest found or signs of nesting as

Date	Survey Types	Start Time	End Time	Duration of Survey (sec)	Location of Sighting (ITM)	Species	Evidence	Site Type	Suitability	Notes
										structure is full of Jackdaw nests.
21/05/2025	Activity	11:30	17:55	23100	632512.60, 670904.74	Nil sightings	Nil sightings	Old derelict building	-	Nil sighting. Site seems to be fully occupied by corvids.
21/05/2025	Activity	11:30	17:55	23100	635531.66, 674036.85	Nil sightings	Nil sightings	Old castle building	-	Nil sighting for raptors. Jackdaws nesting on the structure.
21/05/2025	Activity	11:30	17:55	23100	*Redacted*	Peregrine	Nest found	*Redacted*	-	Both male and female seen. Female was slightly hidden behind the rocks and grass growing around the rocks and was heard calling repeatedly. Male was spotted few meters away from nest
21/05/2025	Activity	11:30	17:55	23100	635611.55, 668631.29	Nil sightings	Nil sightings	Church	-	Nil sightings
25/06/2025	Activity	09:30	11:00	5400	*Redacted*	Peregrine	Species present	*Redacted*	-	Three juvenile Peregrine present at top of castle. 09:50 Two adults arrived to drop off food. All Peregrine flew from castle at 10:05. 10:25 Female Peregrine brought back crow to the vicinity of the castle.
25/06/2025	Activity	11:10	12:40	5400	*Redacted*	Peregrine	Species present	*Redacted*	-	One Juvenile present on ledge. 11:17 Female Peregrine brought food to juvenile
21/04/2026	Suitability	10:20	15:20	18000	640255.19, 667610.83	-	-	Church	Low	
21/04/2026	Suitability	10:20	15:20	18000	639379.88, 669892.71	-	-	Cottage ruins	Intermediate	
21/04/2026	Suitability	10:20	15:20	18000	637744.98, 669231.82	-	-	Ruins	Intermediate	
21/04/2026	Suitability	10:20	15:20	18000	*Redacted*	-	-	*Redacted*	High	Species previously present, disregarded rings present
21/04/2026	Suitability	10:20	15:20	18000	637716.19, 667160.20	-	-	Shed	Low	
21/04/2026	Suitability	10:20	15:20	18000	635940.97, 669728.43	-	-	Shed	Intermediate	Galvanise roof, but peregrine spotted close by

Date	Survey Types	Start Time	End Time	Duration of Survey (sec)	Location of Sighting (ITM)	Species	Evidence	Site Type	Suitability	Notes
21/04/2026	Suitability	10:20	15:20	18000	636289.78, 669937.96	-	-	Shed	High	Peregrine spotted close by
21/04/2026	Suitability	10:20	15:20	18000	635559.94, 674010.52	-	-	Building	Intermediate	
21/04/2026	Suitability	10:20	15:20	18000	632535.51, 670887.41	-	-	Building	Intermediate	
21/04/2026	Suitability	10:20	15:20	18000	630700.24, 669817.17	-	-	Round tower	Intermediate	
21/04/2026	Suitability	10:20	15:20	18000	635187.26, 668927.08	-	-	Shed	Low	
21/04/2026	Suitability	10:20	15:20	18000	635621.49, 668631.46	-	-	Shed	Low	
11/05/2026	Activity	12:50	14:15	5100	*Redacted*	Peregrine	Species present	*Redacted*	-	Sitting on nest
17/06/2026	Activity	09:11	09:35	1440	*Redacted*	Peregrine	Species present	*Redacted*	-	
17/06/2026	Activity	09:45	10:17	1920	*Redacted*	Peregrine	Species present	*Redacted*	-	Parents and chick spotted*
17/06/2026	Activity	10:20	12:20	7200	637756.65, 669230.43	Nil sightings	Nil sightings	Cottage ruins	-	
17/06/2026	Activity	12:22	14:22	7200	639403.25, 669917.88	Nil sightings	Nil sightings	Cottage ruins	-	

Table 24: Hen Harrier Roost Survey Results.

Date	Start Time	End Time	Duration of Survey (sec)	Sunrise/Sunset Time	Location (ITM)	Bird Number.	Sex	Settling/ Rising	Direction of Arrival/ Departure	Other Species/ Interactions	Species List	Notes
26/10/2022	08:00	11:00	10800	08:10	635363.70, 669908.80	Nil sightings	-	-	-	-	-	-
10/11/2022	13:45	16:45	10800	16:41	635363.70, 669908.80	Nil sightings	-	-	-	-	-	-
17/01/2023	15:50	17.:20	5400	16:20	633140.00, 671051.00	Nil sightings	-	-	-	-	-	-
05/01/2022	07:56	10:56	10800	08:53	635363.70, 669908.80	Nil sightings	-	-	-	-	-	-
15/02/2023	17:10	18:40	5400	17:40	635363.70, 669908.80	Nil sightings	-	-	-	-	-	-

21/03/2023	18:13	19:43	5400	18:43	635363.70, 669908.80	Nil sightings	-	-	-	-	-	-
06/10/2025	18:24	19:54	5400	18:54	635363.70, 669908.80	Nil sightings						
26/11/2025	15:40	17:10	5400	16:22	635363.70, 669908.80	Nil sightings						
17/12/2025	15:44	17:14	5400	16:14	633140.00, 671051.00	Nil sightings						
26/01/2026	16:33	18:03	5400	17:03	635363.70, 669908.80	Nil sightings						
25/02/2026	17:29	19:01	5400	18:01	635363.70, 669908.80	Nil sightings						
09/03/2026	17:52	19:22	5400	18:22	635363.70, 669908.80	Nil sightings						

Table 25: Breeding Woodcock Survey Results.

Date	Start Time	End Time	Duration of Survey (sec)	Sunset Time	Location (ITM)	Time of Sighting	Species	Evidence	Notes
06/05/2025	20:36	22:06	5400	21:06	639242.40, 668618.01	20:36	Nil sightings	-	-
20/05/2025	20:15	21:30	4500	20:30	639242.40, 668618.01	20:15	Nil sightings	-	-
23/06/2025	21:28	22:58	5400	21:58	639242.40, 668618.01	21:28	Nil sightings	-	-
14/05/2026	21:04	22:19	4500	21:19	639058.00, 668392.00	21:04	Nil sightings	-	-
28/05/2026	21:25	22:40	4500	21:40	639058.00, 668392.00	21:26	Nil sightings	-	-

Table 26: Kingfisher Survey Results.

Date	Start Time	End Time	Duration of Survey (sec)	Location (ITM)	Watercourse Name	Signs or Sightings	Nesting Potential	Notes
23/04/2025	14:40	17:40	10800	635321.90, 670344.22	Gorteenahilla	Nil sightings	Low	No evidence of Kingfisher or Otter on either side of WC crossing
23/04/2025	14:40	17:40	10800	636077.20, 669682.88	Gorteenahilla	Nil sightings	Low	No evidence of Kingfisher or Otter on either side of WC crossing
23/04/2025	14:40	17:40	10800	637153.30, 670063.72	Gorteenahilla	Nil sightings	Low	No evidence of Kingfisher or Otter
23/04/2025	14:40	17:40	10800	641032.76, 671336.39	Lisdowney	Nil sightings	Intermediate	No evidence of Kingfisher or Otter on either side of WC crossing

Date	Start Time	End Time	Duration of Survey (sec)	Location (ITM)	Watercourse Name	Signs or Sightings	Nesting Potential	Notes
23/04/2025	14:40	17:40	10800	642150.20, 671862.41	Nore	Nil sightings	Negligible	No evidence of Kingfisher or Otter on either side of WC crossing
23/04/2025	14:40	17:40	10800	644503.66, 672760.49	Nore	Nil sightings	Negligible	No evidence of Kingfisher or Otter on either side of WC crossing
23/04/2025	14:40	17:40	10800	644390.82, 673065.99	Nore	Nil sightings	High	No evidence of Kingfisher or Otter on either side of WC crossing
28/04/2026	09:00	14:30	19800	641443.36, 670994.58	Lisdowney	Nil sightings	High	Exposed steep clay bank, free from vegetation. No burrows present
01/05/2025	13:50	16:50	10800	644435.95, 672941.13	Nore	Suitable Nesting	High	Potential nesting hole
01/05/2025	13:50	16:50	10800	644439.08, 672928.74	Nore	Kingfisher	High	KF seen flying by 3 times throughout watch - 2 different birds
09/05/2025	11:25	14:25	10800	644336.72, 673215.42	Nore	Nil sightings	High	Tree branch in the middle of the river, with traces of whitewash. Nil sightings.
28/04/2026	09:00	14:30	10800	639513.31, 669608.26	Lismaine	Nil sightings	Low	Heavily vegetated, limited areas of bare soil bank
28/04/2026	09:00	14:30	10800	639448.89, 669607.06	Lismaine	Nil sightings	Negligible	Heavily vegetated, limited areas of bare soil bank
28/04/2026	09:00	14:30	10800	639304.41, 669609.97	Lismaine	Nil sightings	Negligible	Heavily vegetated, no areas of exposed soil bank
28/04/2026	09:00	14:30	10800	639166.35, 669633.16	Lismaine	Nil sightings	Negligible	Heavily vegetated, no areas of exposed soil bank
28/04/2026	09:00	14:30	10800	639055.64, 669673.49	Lismaine	Nil sightings	Negligible	Heavily vegetated, no areas of exposed soil bank
28/04/2026	09:00	14:30	10800	641443.36, 670994.58	Lisdowney	Suitable nesting	High	Exposed steep clay bank, free from vegetation. No burrows present
28/04/2026	09:00	14:30	10800	641516.41, 670920.02	Lisdowney	Suitable nesting	High	Exposed steep clay bank, free from vegetation. No burrows present
28/04/2026	09:00	14:30	10800	641539.94, 670907.98	Lisdowney	Suitable nesting	High	Exposed steep clay bank, free from vegetation. No burrows present
28/04/2026	09:00	14:30	10800	641545.47, 670879.43	Lisdowney	Suitable nesting	High	Exposed steep clay bank, free from vegetation. No burrows present
28/04/2026	09:00	14:30	10800	641565.45, 670844.4	Lisdowney	Suitable nesting	High	Exposed steep clay bank, free from vegetation. No burrows present
28/04/2026	09:00	14:30	10800	641623.67, 670759.69	Lisdowney	Suitable nesting	High	Exposed steep clay bank, free from vegetation. No burrows present

Date	Start Time	End Time	Duration of Survey (sec)	Location (ITM)	Watercourse Name	Signs or Sightings	Nesting Potential	Notes
28/04/2026	09:00	14:30	10800	641654.82, 670630.82	Lisdowney	Suitable nesting	High	Exposed steep clay bank, free from vegetation. No burrows present
28/04/2026	09:00	14:30	10800	641687.08, 670591.44	Lisdowney	Suitable nesting	High	Exposed steep clay bank, free from vegetation. No burrows present
28/04/2026	09:00	14:30	10800	641705.32, 670529.34	Lisdowney	Suitable nesting	High	Exposed steep clay bank, free from vegetation. No burrows present
28/04/2026	09:00	14:30	10800	641383.6, 671043.21	Lisdowney	Nil sightings	Negligible	Heavily vegetated, no areas of exposed soil bank
28/04/2026	09:00	14:30	10800	641340.77, 671092.17	Lisdowney	Nil sightings	Negligible	Heavily vegetated, no areas of exposed soil bank
28/04/2026	09:00	14:30	10800	641266.99, 671163.41	Lisdowney	Nil sightings	Negligible	Heavily vegetated, no areas of exposed soil bank
28/04/2026	09:00	14:30	10800	641185.56, 671254.94	Lisdowney	Nil sightings	Negligible	Heavily vegetated, no areas of exposed soil bank
28/04/2026	09:00	14:30	10800	641092.83, 671309.27	Lisdowney	Nil sightings	Negligible	Heavily vegetated, no areas of exposed soil bank
28/04/2026	09:00	14:30	10800	642630.09, 670640.42	Ballyconra	Nil sightings	Negligible	Heavily vegetated, no areas of exposed soil bank
28/04/2026	09:00	14:30	10800	642635.94, 670529.06	Ballyconra	Nil sightings	Negligible	Heavily vegetated, no areas of exposed soil bank
28/04/2026	09:00	14:30	10800	642631.39, 670415.35	Ballyconra	Nil sightings	Negligible	Heavily vegetated, no areas of exposed soil bank
28/04/2026	09:00	14:30	10800	642665.66, 670322.19	Ballyconra	Nil sightings	Negligible	Heavily vegetated, no areas of exposed soil bank
28/04/2026	09:00	14:30	10800	642590.29, 670702.63	Ballyconra	Nil sightings	Negligible	Heavily vegetated, no areas of exposed soil bank
28/04/2026	09:00	14:30	10800	642532.46, 670762.81	Ballyconra	Nil sightings	Negligible	Heavily vegetated, no areas of exposed soil bank
28/04/2026	09:00	14:30	10800	642479.02, 670848.1	Ballyconra	Nil sightings	Negligible	Heavily vegetated, no areas of exposed soil bank
28/04/2026	09:00	14:30	10800	642421.27, 670933.3	Ballyconra	Nil sightings	Negligible	Heavily vegetated, no areas of exposed soil bank
28/04/2026	09:00	14:30	10800	643956.81, 671679.14	Nore	Nil sightings	Negligible	High suitability area for foraging KF. However, no areas of exposed soil bank for nesting,
28/04/2026	09:00	14:30	10800	643934.33, 671818.86	Nore	Nil sightings	Negligible	High suitability area for foraging KF. However, no areas of exposed soil bank for nesting,

Date	Start Time	End Time	Duration of Survey (sec)	Location (ITM)	Watercourse Name	Signs or Sightings	Nesting Potential	Notes
28/04/2026	09:00	14:30	10800	643930.27, 671972.42	Nore	Nil sightings	Negligible	High suitability area for foraging KF. However, no areas of exposed soil bank for nesting,
28/04/2026	09:00	14:30	10800	643926.07, 672114.55	Nore	Nil sightings	Negligible	High suitability area for foraging KF. However, no areas of exposed soil bank for nesting,
28/04/2026	09:00	14:30	10800	644015.49, 671575.87	Nore	Nil sightings	Negligible	High suitability area for foraging KF. However, no areas of exposed soil bank for nesting,
28/04/2026	09:00	14:30	10800	644080.9, 671431.33	Nore	Nil sightings	Negligible	High suitability area for foraging KF. However, no areas of exposed soil bank for nesting,
28/04/2026	09:00	14:30	10800	644167.01, 671315.11	Nore	Nil sightings	Negligible	High suitability area for foraging KF. However, no areas of exposed soil bank for nesting,
21/05/2026	10:30	14:30	10800	637015.13, 668251.34	Gorteenahilla	Nil sightings	Negligible	Highly vegetated, no clay bank
21/05/2026	10:30	14:30	10800	637546.82, 669090.03	Ballyring Upper	Nil sightings	Negligible	Highly vegetated, no clay bank
21/05/2026	10:30	14:30	10800	637517.24, 669196.46	Ballyring Upper	Nil sightings	Negligible	Highly vegetated, no clay bank
21/05/2026	10:30	14:30	10800	637465.93, 669302.11	Ballyring Upper	Nil sightings	Negligible	Highly vegetated, no clay bank
21/05/2026	10:30	14:30	10800	637421.4, 669398.14	Ballyring Upper	Nil sightings	Negligible	Highly vegetated, no clay bank
21/05/2026	10:30	14:30	10800	637362.66, 669478.63	Ballyring Upper	Nil sightings	Negligible	Highly vegetated, no clay bank
21/05/2026	10:30	14:30	10800	637325.03, 669542.81	Ballyring Upper	Nil sightings	Negligible	Highly vegetated, no clay bank
21/05/2026	10:30	14:30	10800	637300.35, 669651.38	Ballyring Upper	Nil sightings	Negligible	Highly vegetated, no clay bank
21/05/2026	10:30	14:30	10800	639187.83, 669629.48	Lismaine	Nil sightings	Negligible	Highly vegetated, no clay bank
21/05/2026	10:30	14:30	10800	639124.03, 669634.72	Lismaine	Nil sightings	Negligible	Highly vegetated, no clay bank
21/05/2026	10:30	14:30	10800	639074.58, 669660.81	Lismaine	Nil sightings	Negligible	Highly vegetated, no clay bank
21/05/2026	10:30	14:30	10800	639255.69, 669618.61	Lismaine	Nil sightings	Negligible	
21/05/2026	10:30	14:30	10800	639333.39, 669608.63	Lismaine	Nil sightings	Negligible	

Date	Start Time	End Time	Duration of Survey (sec)	Location (ITM)	Watercourse Name	Signs or Sightings	Nesting Potential	Notes
21/05/2026	10:30	14:30	10800	639423.44, 669605.24	Lismaine	Nil sightings	Negligible	
21/05/2026	10:30	14:30	10800	639596.71, 669602.52	Lismaine	Nil sightings	Negligible	Vegetated
21/05/2026	10:30	14:30	10800	639650.47, 669550.37	Lismaine	Nil sightings	Negligible	Vegetated
21/05/2026	10:30	14:30	10800	639702.52, 669479.22	Lismaine	Nil sightings	Low	Exposed bank
21/05/2026	10:30	14:30	10800	639774.27, 669396.74	Lismaine	Nil sightings	Low	Exposed bank
21/05/2026	10:30	14:30	10800	639864.59, 669331.79	Lismaine	Nil sightings	Low	Exposed bank
21/05/2026	10:30	14:30	10800	639941.91, 669294.74	Lismaine	Suitable nesting	Intermediate	Tunnels present
21/05/2026	10:30	14:30	10800	640078.33, 669312.1	Lismaine	Suitable nesting	Intermediate	Tunnels present
21/05/2026	10:30	14:30	10800	640207.3, 669328.22	Lismaine	Suitable nesting	Intermediate	Tunnels present
21/05/2026	10:30	14:30	10800	640348.83, 669326.56	Lismaine	Suitable nesting	Intermediate	Tunnels present
21/05/2026	10:30	14:30	10800	640439.16, 669271.42	Lismaine	Suitable nesting	Intermediate	Tunnels present
21/05/2026	10:30	14:30	10800	641356.81, 671078.47	Lisdowney	Other (specify in notes)	Negligible	Highly vegetated
21/05/2026	10:30	14:30	10800	641284.44, 671137.55	Lisdowney	Other (specify in notes)	Negligible	Highly vegetated
21/05/2026	10:30	14:30	10800	641237.93, 671199.58	Lisdowney	Nil sightings	Negligible	High vegetated
21/05/2026	10:30	14:30	10800	641100.7, 671303.01	Lisdowney	Nil sightings	Negligible	Highly vegetated
21/05/2026	10:30	14:30	10800	641503.4, 670920.76	Lisdowney	Nil sightings	Negligible	Highly vegetated
21/05/2026	10:30	14:30	10800	641603.14, 670794.59	Lisdowney	Nil sightings	Low	Clay bank
21/05/2026	10:30	14:30	10800	641654.45, 670670.62	Lisdowney	Nil sightings	Low	Clay bank

Date	Start Time	End Time	Duration of Survey (sec)	Location (ITM)	Watercourse Name	Signs or Sightings	Nesting Potential	Notes
21/05/2026	10:30	14:30	10800	641711.47, 670535.65	Lisdowney	Nil sightings	Intermediate	Clay bank, suitable habitat
21/05/2026	10:30	14:30	10800	641801.52, 670410.14	Lisdowney	Nil sightings	Intermediate	Clay bank, suitable habitat
21/05/2026	10:30	14:30	10800	641894.8, 670313.91	Lisdowney	Nil sightings	Intermediate	Clay bank, suitable habitat
21/05/2026	10:30	14:30	10800	641951.98, 670216.45	Lisdowney	Nil sightings	Intermediate	Clay bank, suitable habitat
21/05/2026	10:30	14:30	10800	642040.52, 670161.68	Lisdowney	Nil sightings	Intermediate	Clay bank, suitable habitat
21/05/2026	10:30	14:30	10800	642099.08, 670103.54	Lisdowney	Nil sightings	Negligible	Heavily vegetated
21/05/2026	10:30	14:30	10800	642123.55, 670023.84	Lisdowney	Nil sightings	Negligible	Heavily vegetated
21/05/2026	10:30	14:30	10800	643920.85, 672036.43	Nore	Nil sightings	Negligible	Heavily vegetated
21/05/2026	10:30	14:30	10800	643926.27, 671971.86	Nore	Nil sightings	Negligible	Heavily vegetated
21/05/2026	10:30	14:30	10800	643932.84, 671895.11	Nore	Nil sightings	Negligible	Heavily vegetated
21/05/2026	10:30	14:30	10800	643936.61, 671812.55	Nore	Nil sightings	Negligible	Heavily vegetated
21/05/2026	10:30	14:30	10800	643939.61, 671731.35	Nore	Nil sightings	Negligible	Heavily vegetated
21/05/2026	10:30	14:30	10800	643969.86, 671643.19	Nore	Nil sightings	Negligible	Heavily vegetated
21/05/2026	10:30	14:30	10800	644003.21, 671571.85	Nore	Nil sightings	Negligible	Heavily vegetated
21/05/2026	10:30	14:30	10800	644035.98, 671516.56	Nore	Nil sightings	Negligible	Heavily vegetated
21/05/2026	10:30	14:30	10800	644070.75, 671446.37	Nore	Nil sightings	Negligible	Heavily vegetated
21/05/2026	10:30	14:30	10800	644103.03, 671381.7	Nore	Nil sightings	Negligible	Heavily vegetated
23/09/2026	09:30	11:30	7200	641910.48, 670274.26	Lisdowney	Nil sightings	Negligible	Heavily vegetated

Date	Start Time	End Time	Duration of Survey (sec)	Location (ITM)	Watercourse Name	Signs or Sightings	Nesting Potential	Notes
23/09/2026	09:30	11:30	7200	641919.20, 670248.27	Lisdowney	Nil sightings	Low	Uprooted tree with earth exposed
23/09/2026	09:30	11:30	7200	641939.09, 670232.37	Lisdowney	Nil sightings	Negligible	Heavily vegetated
23/09/2026	09:30	11:30	7200	641960.06, 670210.25	Lisdowney	Nil sightings	Negligible	Heavily vegetated
23/09/2026	09:30	11:30	7200	641980.27, 670194.11	Lisdowney	Nil sightings	Negligible	Heavily vegetated
23/09/2026	09:30	11:30	7200	642016.16, 670176.10	Lisdowney	Nil sightings	Negligible	Heavily vegetated
23/09/2026	09:30	11:30	7200	642043.23, 670163.20	Lisdowney	Nil sightings	Negligible	Heavily vegetated
23/09/2026	09:30	11:30	7200	642051.41, 670145.24	Lisdowney	Nil sightings	Negligible	Heavily vegetated
23/09/2026	09:30	11:30	7200	642065.01, 670130.44	Lisdowney	Nil sightings	Intermediate	Clay bank, suitable habitat
23/09/2026	09:30	11:30	7200	642088.45, 670123.27	Lisdowney	Nil sightings	Intermediate	Clay bank, suitable habitat
23/09/2026	09:30	11:30	7200	642102.03, 670103.45	Lisdowney	Nil sightings	Negligible	Heavily vegetated
23/09/2026	09:30	11:30	7200	642110.44, 670077.37	Lisdowney	Nil sightings	Negligible	Heavily vegetated
23/09/2026	09:30	11:30	7200	642625.11, 669934.25	Ballyconra	Nil sightings	Negligible	Drainage ditch; habitat and watercourse not suitable

Table 27: Nore Waterbird VP Surveys.

Species	February	March	April	Total
Black-headed Gull	0	328	0	**328**
Buzzard	4	1	1	**6**
Cormorant	1	1	5	**7**
Grey Heron	0	0	1	**1**
Lesser Black-backed Gull	336	0	1	**337**
Little Egret	0	0	1	**1**
Mute Swan	0	2	1	**3**
Sparrowhawk	0	0	1	**1**
Total	341	332	18	**691**

Table 28: I-WeBS Results and Peak Counts Per Effort 2022-2023.

Species	October			November			December	January				February			March		Overall Peak
	Effort 1	Effort 2	Peak	Effort 1	Effort 2	Peak	No efforts undertaken	Effort 1	Effort 2	Effort 3	Peak	Effort 1	Effort 2	Peak	Effort 1	Peak	
Black-headed Gull	0	0	0	0	0	0	-	0	9	0	9	0	0	0	0	0	**9**
Coot	0	0	0	1	0	1	-	3	0	0	3	3	1	3	1	1	**3**
Curlew	0	0	0	0	0	0	-	0	7	0	7	14	22	22	7	7	**22**
Dunlin	0	0	0	0	0	0	-	0	50	0	50	0	0	0	0	0	**50**
Grey Heron	1	2	2	3	1	3	-	2	0	1	2	0	2	2	0	0	**3**
Lapwing	0	0	0	6	0	6	-	15	29	0	29	50	64	64	50	50	**64**
Lesser Black-backed Gull	0	0	0	45	50	50	-	210	0	0	210	0	0	0	10	10	**210**
Little Egret	0	0	0	2	0	2	-	0	0	0	0	0	2	2	0	0	**2**
Mallard	2	1	2	2	0	2	-	6	0	0	6	0	14	14	16	16	**16**
Moorhen	1	0	1	0	0	0	-	0	0	0	0	0	0	0	0	0	**1**
Mute Swan	0	0	0	5	12	12	-	6	0	0	6	2	7	7	0	0	**12**
Snipe	0	0	0	0	0	0	-	1	0	0	1	0	10	10	0	0	**10**
Starling	0	0	0	0	0	0	-	0	40	0	40	0	0	0	0	0	**40**
Teal	0	0	0	5	6	6	-	20	60	0	60	25	10	25	30	30	**60**
Whooper Swan	0	0	0	0	0	0	-	11	17	0	17	28	14	28	18	18	**28**
Wigeon	0	0	0	25	0	25	-	48	70	0	70	100	60	100	80	80	**100**

Table 29: I-WeBS Results and Peak Counts Per Effort 2025-2026.

Species	October			November			December			January			February			March			Overall Peak
	Effort 1	Effort 2	Peak	Effort 1	Effort 2	Peak	Effort 1	Effort 2	Peak	Effort 1	Effort 2	Peak	Effort 1	Effort 2	Peak	Effort 1	Effort 2	Peak	
Black-headed Gull	0	0	0	34	14	34	0	67	67	0	30	30	50	12	50	27	10	27	**67**
Coot	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	12	0	12	**12**
Grey Heron	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	2	2	**2**
Lapwing	0	0	0	12	44	44	0	0	0	68	70	70	45	28	45	19	15	19	**70**
Lesser Black-backed Gull	28	71	71	96	135	135	0	8	8	0	0	0	45	34	45	54	1	54	**135**
Little Egret	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	0	1	1	**2**
Little Grebe	0	0	0	0	0	0	0	3	3	0	0	0	0	0	0	2	0	2	**2**
Mallard	0	0	0	24	58	58	0	0	0	0	0	0	0	39	39	21	0	21	**58**
Moorhen	2	2	2	0	0	0	5	10	10	0	0	0	0	0	0	0	0	0	**10**
Mute Swan	0	0	0	0	9	9	2	0	2	0	0	0	0	6	6	3	0	3	**9**
Shoveler	0	0	0	0	1	1	0	0	0	0	25	25	0	0	0	18	0	18	**25**
Snipe	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	**1**
Teal	0	0	0	8	43	43	20	2	20	0	40	40	0	23	23	21	5	21	**43**
Whooper Swan	0	9	9	24	34	34	0	0	0	0	0	0	0	2	2	50	0	50	**50**
Wigeon	0	0	0	30	55	55	70	0	70	0	55	55	105	118	118	208	15	208	**208**

Table 30: VP Species Counts Winter 2022-2023.

Species	October	November	December	January	February	March	April	May	Total
Black-headed Gull	0	0	25	49	38	0	0	0	**112**
Buzzard	3	1	6	15	6	13	8	4	**56**
Cormorant	0	0	0	3	0	0	0	0	**3**
Golden Plover	8	0	20	55	0	1295	0	0	**1378**
Grey Heron	1	1	0	1	0	0	0	0	**3**
Herring Gull	0	0	0	10	0	0	0	0	**10**
Kestrel	3	2	7	5	6	8	1	0	**32**
Lapwing	0	0	20	16	0	0	0	0	**36**
Lesser Black-backed Gull	0	0	640	57	4	6	0	0	**707**
Little Egret	0	0	0	4	0	0	0	0	**4**
Mallard	0	0	0	0	0	0	1	0	**1**
Mute Swan	0	0	0	6	0	4	0	0	**10**
Peregrine	0	0	0	0	1	0	0	0	**1**
Raven	0	0	7	0	0	0	0	0	**7**
Snipe	0	0	4	0	0	0	0	0	**4**
Sparrowhawk	0	0	0	0	1	1	3	0	**5**
Whooper Swan	3	0	0	0	0	0	0	0	**3**
Total	**18**	**4**	**729**	**221**	**56**	**1327**	**13**	**4**	**2372**

Table 31: VP Species Counts Breeding 2025.

Species	April	May	June	July	August	September	October	Total
Black-headed Gull	0	0	8	0	0	0	0	**8**
Buzzard	5	19	33	39	7	19	5	**127**
Golden Plover	0	0	0	0	0	28	0	**28**
Kestrel	0	1	0	18	4	8	0	**31**
Lesser Black-backed Gull	0	5	4	5	0	41	2	**57**
Peregrine	0	0	4	5	0	1	0	**10**
Raven	0	10	0	8	0	0	0	**18**
Snipe	0	0	0	0	1	0	0	**1**
Sparrowhawk	0	1	0	2	1	2	1	**7**
Total	**5**	**36**	**49**	**77**	**13**	**99**	**8**	**287**

Table 32: VP Species Counts Winter 2025-2026.

Species	October	November	December	January	February	March	Total
Black-headed Gull	0	0	3	5	59	22	**89**
Buzzard	4	7	1	10	12	7	**41**
Kestrel	7	2	7	4	0	4	**24**
Lapwing	8	0	0	0	0	0	**8**
Lesser Black-backed Gull	42	1	70	4	91	0	**208**
Mute Swan	8	0	0	0	0	0	**8**
Raven	0	0	1	12	0	0	**13**
Snipe	7	0	1	0	0	0	**8**
Sparrowhawk	0	1	1	6	1	0	**9**
Whooper Swan	0	6	0	0	0	0	**6**
Total	**76**	**17**	**84**	**41**	**163**	**33**	**414**

Table 33: VP Species Counts Breeding 2026.

Species	April	May	June	July	August	Total
Black-headed Gull	0	14	4	0	0	**18**
Buzzard	21	17	19	27	24	**108**
Grey Heron	0	0	0	1	0	**1**
Kestrel	1	4	7	2	7	**21**
Lesser Black-backed Gull	0	0	4	2	17	**23**
Mallard	0	2	0	0	0	**2**
Peregrine	0	2	1	2	4	**9**
Raven	0	0	8	8	47	**63**
Sparrowhawk	2	3	0	3	2	**10**
Total	**24**	**42**	**43**	**45**	**101**	**255**

Table 34: Nore Waterbird VP Flightline Data Winter 2025-2026.

Date	VP Number	Species	Number	Time of Sighting	<10m	10-20m	20-30m	30-40m	40-50m	50-200m	>200m	Total Duration (sec)	Notes
09/02/2026	GCVP	Buzzard	1	16:49		30	45	15				90	
09/02/2026	GCVP	Buzzard	1	17:00		20						20	
09/02/2026	GCVP	Lesser Black-backed Gull	16	17:14					10	35		45	
10/02/2026	GCVP	Lesser Black-backed Gull	63	07:43						45		45	
10/02/2026	GCVP	Lesser Black-backed Gull	25	07:45			5	30	10			45	
10/02/2026	GCVP	Buzzard	1	07:46		20						20	
10/02/2026	GCVP	Buzzard	1	07:46	5	25						30	
10/02/2026	GCVP	Lesser Black-backed Gull	4	07:49			5	25	5			35	
10/02/2026	GCVP	Lesser Black-backed Gull	18	07:49					15	30		45	
10/02/2026	GCVP	Lesser Black-backed Gull	9	07:52						60		60	
10/02/2026	GCVP	Cormorant	1	07:54	2	1						3	
10/02/2026	GCVP	Lesser Black-backed Gull	5	07:55			15	10	20			45	
10/02/2026	GCVP	Lesser Black-backed Gull	36	07:58				35	10			45	
10/02/2026	GCVP	Lesser Black-backed Gull	84	08:02				45	15			60	
10/02/2026	GCVP	Lesser Black-backed Gull	17	08:05			10	30	5			45	
10/02/2026	GCVP	Lesser Black-backed Gull	8	08:07				5	5	20		30	
10/02/2026	GCVP	Lesser Black-backed Gull	30	08:11						60		60	
10/02/2026	GCVP	Lesser Black-backed Gull	3	08:28			30	5	10			45	
10/02/2026	GCVP	Lesser Black-backed Gull	6	08:56						45		45	

Date	VP Number	Species	Number	Time of Sighting	<10m	10-20m	20-30m	30-40m	40-50m	50-200m	>200m	Total Duration (sec)	Notes
10/02/2026	GCVP	Lesser Black-backed Gull	10	09:15			5	40				45	
10/02/2026	GCVP	Lesser Black-backed Gull	2	09:53			5	20	15	5		45	
02/03/2026	GCVP	Black-headed Gull	40	18:20					180			180	
03/03/2026	GCVP	Black-headed Gull	1	07:15				120				120	
03/03/2026	GCVP	Black-headed Gull	13	07:34		50						50	
03/03/2026	GCVP	Black-headed Gull	7	07:42		80						80	
03/03/2026	GCVP	Black-headed Gull	7	07:58		60						60	
09/03/2026	GCVP	Buzzard	1	15:58					120			120	
09/03/2026	GCVP	Black-headed Gull	40	17:55				90				90	
09/03/2026	GCVP	Black-headed Gull	90	18:10					200			200	
09/03/2026	GCVP	Mute Swan	1	18:35		120						120	
10/03/2026	GCVP	Mute Swan	1	07:01		50						50	
10/03/2026	GCVP	Black-headed Gull	4	07:03				40				40	
10/03/2026	GCVP	Black-headed Gull	60	07:16	60							60	
10/03/2026	GCVP	Black-headed Gull	10	07:36		20						20	
10/03/2026	GCVP	Black-headed Gull	3	07:47			70					70	
19/03/2026	GCVP	Black-headed Gull	25	18:30			40					40	
20/03/2026	GCVP	Black-headed Gull	15	06:35			50					50	
20/03/2026	GCVP	Black-headed Gull	13	08:45				45				45	

Date	VP Number	Species	Number	Time of Sighting	<10m	10-20m	20-30m	30-40m	40-50m	50-200m	>200m	Total Duration (sec)	Notes
20/03/2026	GCVP	Cormorant	1	08:53			60					60	
13/04/2026	GCVP	Black-headed Gull	7	18:15				20				20	
14/04/2026	GCVP	Mute Swan	1	07:07	20							20	
14/04/2026	GCVP	Cormorant	1	08:04			20					20	
14/04/2026	GCVP	Cormorant	1	08:16		8						8	
14/04/2026	GCVP	Sparrowhawk	1	08:41	10							10	
21/04/2026	GCVP	Cormorant	1	18:21						45		45	
21/04/2026	GCVP	Buzzard	1	18:29			10	80				90	
21/04/2026	GCVP	Grey Heron	1	19:19			45	15				60	
21/04/2026	GCVP	Cormorant	1	20:04		10	25					35	
22/04/2026	GCVP	Lesser Black-backed Gull	1	06:27				45				45	
22/04/2026	GCVP	Cormorant	1	06:54						60		60	
22/04/2026	GCVP	Little Egret	1	07:13			20					20	

Table 35: VP Flightline Data Winter 2022-2023.

Date	VP Number	Species	Number	Time of Sighting	<10m	10-20m	20-30m	30-40m	40-50m	50-160m	>160m	Total Duration (sec)	Notes
14/10/2022	1	Buzzard	2	08:12	15	60						75	
14/10/2022	1	Golden Plover	8	14:23	10	110						120	
02/11/2022	1	Nil Sightings											
14/12/2022	1	Black-headed Gull	1	13:08			90					90	
14/12/2022	1	Lapwing	6	15:48			60					60	
16/01/2023	1	Buzzard	1	11:22		60						60	
16/01/2023	1	Buzzard	1	12:03		60	120					180	
16/01/2023	1	Buzzard	1	13:57		240						240	
16/02/2023	1	Black-headed Gull	2	09:09			30	60				90	
16/02/2023	1	Buzzard	1	12:24			60	60				120	
21/02/2023	1	Kestrel	1	12:49				10	45			55	

Date	VP Number	Species	Number	Time of Sighting	<10m	10-20m	20-30m	30-40m	40-50m	50-160m	>160m	Total Duration (sec)	Notes
30/05/2023	1	Buzzard	2	09:16		30	150					180	
30/05/2023	1	Buzzard	1	12:09				90	330			420	
30/05/2023	1	Buzzard	1	12:54					60	480		540	
12/10/2022	2	Nil Sightings											
03/11/2022	2	Buzzard	1	10:12		200	40					240	
03/11/2022	2	Kestrel	1	09:34		140	40					180	
03/11/2022	2	Kestrel	1	10:48		80						80	
15/12/2022	2	Black-headed Gull	2	12:29			60					60	
15/12/2022	2	Snipe	1	12:56			30					30	
15/12/2022	2	Golden Plover	20	13:03				120				120	
15/12/2022	2	Buzzard	1	13:11				180				180	
15/12/2022	2	Black-headed Gull	2	13:41				90				90	
15/12/2022	2	Kestrel	2	12:14			90					90	
15/12/2022	2	Lapwing	14	12:08		30	150					180	
15/12/2022	2	Snipe	1	08:32		20	70					90	
15/12/2022	2	Snipe	2	12:09		5	55					60	
17/01/2023	2	Kestrel	1	11:08		5	55					60	
17/01/2023	2	Lesser Black-backed Gull	7	11:16			60					60	
17/01/2023	2	Buzzard	1	13:57		15	45					60	
21/02/2023	2	Buzzard	1	14:09		18						18	
07/03/2023	2	Kestrel	1	11:18		180						180	
07/03/2023	2	Kestrel	1	11:25	30	210						240	
07/03/2023	2	Mute Swan	4	14:57				120				120	
07/03/2023	2	Buzzard	1	15:11	10	80						90	
23/03/2023	2	Buzzard	1	10:46	30	90						120	
23/03/2023	2	Kestrel	1	10:47		60						60	
23/03/2023	2	Kestrel	1	11:01		120						120	
06/10/2022	3	Kestrel	1	15:08			20	20	50	30	60	180	Kestrel being followed/mobbed by 2 Rooks
04/11/2022	3	Nil Sightings											
07/12/2022	3	Kestrel	1	08:27			40					40	

Date	VP Number	Species	Number	Time of Sighting	<10m	10-20m	20-30m	30-40m	40-50m	50-160m	>160m	Total Duration (sec)	Notes
07/12/2022	3	Lesser Black-backed Gull	34	08:33						120		120	
07/12/2022	3	Lesser Black-backed Gull	110	08:51						60			
07/12/2022	3	Lesser Black-backed Gull	24	08:51	10	50	30	30	60	60		240	
07/12/2022	3	Buzzard	1	09:02		10	20					30	
07/12/2022	3	Kestrel	1	09:22			10					10	
07/12/2022	3	Lesser Black-backed Gull	22	10:26	5	5	30					40	
07/12/2022	3	Lesser Black-backed Gull	50	10:36	1	4	25					30	
07/12/2022	3	Lesser Black-backed Gull	30	10:40	10	20						30	
07/12/2022	3	Raven	3	12:06		10						10	
07/12/2022	3	Raven	4	12:10				30	30			60	
07/12/2022	3	Lesser Black-backed Gull	70	12:19	5	5	10	30				50	
07/12/2022	3	Black-headed Gull	20	12:27	5	5	10					20	
07/12/2022	3	Lesser Black-backed Gull	100	12:51	5	5	20	20	20	50		120	
07/12/2022	3	Lesser Black-backed Gull	200	13:18	10	10	20					40	
07/12/2022	3	Buzzard	1	14:11			10	50				60	
18/01/2023	3	Kestrel	1	10:54		90						90	
17/02/2023	3	Kestrel	1	09:04		120						120	
17/02/2023	3	Buzzard	1	12:18			60					60	
17/02/2023	3	Buzzard	1	12:35			30	90				120	
24/03/2023	3	Lesser Black-backed Gull	6	13:26				180				180	
11/04/2023	3	Nil Sightings											
12/04/2023	3	Sparrowhawk	1	07:59		180						180	
12/04/2023	3	Sparrowhawk	1	08:25	30	30						60	
12/04/2023	3	Buzzard	1	08:42			90					90	

Date	VP Number	Species	Number	Time of Sighting	<10m	10-20m	20-30m	30-40m	40-50m	50-160m	>160m	Total Duration (sec)	Notes
12/04/2023	3	Sparrowhawk	1	08:43		30						30	
19/10/2022	4	Grey Heron	1	15:18		50	180	40				270	
17/01/2023	4	Nil Sightings											
19/01/2023	4	Nil Sightings											
23/02/2023	4	Peregrine	1	14:44				25				25	
24/02/2023	4	Kestrel	1	12:07	180			240				420	
24/02/2023	4	Kestrel	1	12:25		35						35	
24/02/2023	4	Buzzard	1	13:12						240		240	
26/02/2023	4	Buzzard	1	12:45		12						12	
26/02/2023	4	Kestrel	1	14:20						180		180	
26/02/2023	4	Kestrel	1	15:25	46							46	
26/02/2023	4	Lesser Black-backed Gull	1	15:35						80		80	
02/03/2023	4	Buzzard	1	11:09		30	210					240	
02/03/2023	4	Buzzard	1	12:03			120					120	
30/03/2023	4	Kestrel	1	11:01	120	100	30					250	
30/03/2023	4	Kestrel	2	11:20				45				45	Flying together, territory flight display.
30/03/2023	4	Kestrel	1	11:40				125	200			325	
30/03/2023	4	Buzzard	1	12:18	45	80						125	
30/03/2023	4	Buzzard	3	13:42		60	80	80	60	210		490	
30/03/2023	4	Buzzard	3	14:45			20	150	150			320	
13/10/2022	5	Nil Sightings											
05/12/2022	5	Buzzard	1	12:42			60					60	
05/12/2022	5	Buzzard	1	15:06			60	60				120	
16/01/2023	5	Golden Plover	25	12:20			15					15	
16/01/2023	5	Kestrel	1	12:22		6	15	9				30	
16/01/2023	5	Black-headed Gull	1	13:20				21				21	
16/01/2023	5	Buzzard	1	13:24		5						5	
16/01/2023	5	Golden Plover	30	13:32	10	15	11					36	
16/01/2023	5	Buzzard	1	14:40	5	10	75					90	
17/01/2023	5	Black-headed Gull	15	15:05						90		90	

Date	VP Number	Species	Number	Time of Sighting	<10m	10-20m	20-30m	30-40m	40-50m	50-160m	>160m	Total Duration (sec)	Notes
17/01/2023	5	Buzzard	2	15:06		15						15	
20/01/2023	5	Buzzard	1	12:45	40							40	
20/01/2023	5	Buzzard	1	13:10	30							30	
13/02/2023	5	Black-headed Gull	30	08:23			60	30				90	
13/02/2023	5	Black-headed Gull	6	08:31			45	45				90	
13/02/2023	5	Lesser Black-backed Gull	3	09:46		10	50					60	
13/02/2023	5	Sparrowhawk	1	13:25		30						30	
24/03/2023	5	Buzzard	1	09:25	35							35	
24/03/2023	5	Golden Plover	120	09:30			50	150	160	160		520	Landed on cultivated field.
24/03/2023	5	Golden Plover	210	09:40		50	100	200	250	250		850	Landed on cultivated field. (Map note 2)
24/03/2023	5	Buzzard	1	10:55			65					65	
24/03/2023	5	Golden Plover	220	11:10		60	130	100				290	Landed on cultivated field. (Map note 2)
24/03/2023	5	Golden Plover	180	11:20			70	115				185	Landed on cultivated field. (Map note 2)
24/03/2023	5	Sparrowhawk	1	12:45	20							20	
24/03/2023	5	Golden Plover	65	13:10				30				30	
24/03/2023	5	Golden Plover	130	13:30			110	320	110	110		650	Landed on cultivated field. (Map note 2)
24/03/2023	5	Golden Plover	220	14:05			60	70	100	100		330	Landed on cultivated field. (Map note 2)
24/03/2023	5	Golden Plover	150	14:35			60	60	170			290	Landed on cultivated field. (Map note 2)

Date	VP Number	Species	Number	Time of Sighting	<10m	10-20m	20-30m	30-40m	40-50m	50-160m	>160m	Total Duration (sec)	Notes
20/10/2022	6	Whooper Swan	3	09:14				40	310			350	
20/10/2022	6	Kestrel	1	09:16			180	60				240	
20/10/2022	6	Kestrel	1	13:48		100	140					240	
06/12/2022	6	Kestrel	1	08:59		60	30					90	
06/12/2022	6	Kestrel	1	09:04		30						30	
06/12/2022	6	Kestrel	1	09:13			30					30	
06/12/2022	6	Buzzard	1	12:26			60					60	
03/01/2023	6	Buzzard	1	08:04			60	60				120	
03/01/2023	6	Kestrel	1	08:09		30	180	30				240	
03/01/2023	6	Mute Swan	3	08:52				120				120	
03/01/2023	6	Kestrel	1	09:23			120					120	
03/01/2023	6	Black-headed Gull	3	12:11				120				120	
03/01/2023	6	Buzzard	1	13:54			60					60	
18/01/2023	6	Buzzard	1	11:15		12						12	
18/01/2023	6	Nil Sightings											
19/01/2023	6	Buzzard	1	14:10		40	80					120	
19/01/2023	6	Nil Sightings											
19/04/2023	6	Buzzard	1	08:15			60					60	
19/04/2023	6	Buzzard	1	08:19			30	30				60	
19/04/2023	6	Buzzard	1	13:06			30	90				120	
19/04/2023	6	Kestrel	1	13:44		120	120					240	
19/04/2023	6	Buzzard	1	13:56			30	60				90	
18/10/2022	7 (Grid Connection)	Buzzard	1	12:42	30	290						320	
07/11/2022	7 (Grid Connection)	Grey Heron	1	15:15			120					120	
04/01/2023	7 (Grid Connection)	Lesser Black-backed Gull	8	09:57		30	60					90	
04/01/2023	7 (Grid Connection)	Lesser Black-backed Gull	8	10:02		10	50					60	
04/01/2023	7 (Grid Connection)	Lesser Black-backed Gull	30	10:59			240					240	

Date	VP Number	Species	Number	Time of Sighting	<10m	10-20m	20-30m	30-40m	40-50m	50-160m	>160m	Total Duration (sec)	Notes
04/01/2023	7 (Grid Connection)	Little Egret	1	11:04	5	5	20					30	
04/01/2023	7 (Grid Connection)	Black-headed Gull	2	11:06				60				60	
04/01/2023	7 (Grid Connection)	Grey Heron	1	13:31	10	50						60	
04/01/2023	7 (Grid Connection)	Little Egret	1	13:32	10	80						90	
18/01/2023	7 (Grid Connection)	Herring Gull	10	12:45	60							60	
18/01/2023	7 (Grid Connection)	Black-headed Gull	4	13:10	60							60	
18/01/2023	7 (Grid Connection)	Lapwing	5	15:00	80							80	
18/01/2023	7 (Grid Connection)	Buzzard	1	15:15	200	400						600	
19/01/2023	7 (Grid Connection)	Black-headed Gull	1	11:07	4							4	
19/01/2023	7 (Grid Connection)	Black-headed Gull	3	11:15	13	4						17	
19/01/2023	7 (Grid Connection)	Black-headed Gull	1	11:15	10							10	
19/01/2023	7 (Grid Connection)	Black-headed Gull	2	11:20	10	12						22	
19/01/2023	7 (Grid Connection)	Black-headed Gull	1	11:27		15	12					27	
19/01/2023	7 (Grid Connection)	Black-headed Gull	1	11:50	35	12						47	
19/01/2023	7 (Grid Connection)	Lapwing	1	12:21	4							4	
19/01/2023	7 (Grid Connection)	Black-headed Gull	1	12:32		5	32					37	
19/01/2023	7 (Grid Connection)	Little Egret	1	12:41	15							15	

Date	VP Number	Species	Number	Time of Sighting	<10m	10-20m	20-30m	30-40m	40-50m	50-160m	>160m	Total Duration (sec)	Notes
19/01/2023	7 (Grid Connection)	Lapwing	5	12:49	20	5	5	10				40	
19/01/2023	7 (Grid Connection)	Black-headed Gull	1	14:28		32	10	10				52	
19/01/2023	7 (Grid Connection)	Lesser Black-backed Gull	1	14:37					32			32	
19/01/2023	7 (Grid Connection)	Cormorant	1	14:49					58			58	
19/01/2023	7 (Grid Connection)	Lapwing	5	15:07		28						28	
19/01/2023	7 (Grid Connection)	Lesser Black-backed Gull	3	15:08					10			10	
19/01/2023	7 (Grid Connection)	Little Egret	1	15:26	8							8	
19/01/2023	7 (Grid Connection)	Mute Swan	3	15:30			7					7	
19/01/2023	7 (Grid Connection)	Black-headed Gull	12	15:47	10	5	27					42	
19/01/2023	7 (Grid Connection)	Cormorant	2	16:17					25			25	
19/01/2023	7 (Grid Connection)	Black-headed Gull	1	16:30	3	4	8					15	
11/04/2023	7 (Grid Connection)	Mallard	1	10:33	10	20						30	
12/04/2023	7 (Grid Connection)	Buzzard	1	14:05			90					90	
12/04/2023	7 (Grid Connection)	Buzzard	1	14:14			30	30				60	
12/04/2023	7 (Grid Connection)	Buzzard	1	14:22		30	60					90	

Table 36: VP Flightline Data Breeding 2025.

Date	VP Number	Species	Number	Time of sighting	<10m	10-20m	20-30m	30-40m	40-50m	50-200m	>200m	Total Duration (sec)
07/04/2025	1	Buzzard	1	09:41				25	50			75
09/04/2025	1	Buzzard	1	09:36	5							5
09/04/2025	1	Buzzard	1	10:46	5	10	5	20	100	60	100	300
20/05/2025	1	Buzzard	1	17:32		10	10	20				40
09/06/2025	1	Nil Sightings		15:30								
26/06/2025	1	Buzzard	1	15:27			35					35
09/07/2025	1	Buzzard	1	17:25	10	10	25					45
09/07/2025	1	Buzzard	1	18:12		10	20	40				70
09/07/2025	1	Buzzard	1	19:17		10						10
09/07/2025	1	Buzzard	1	20:37	10	10	30					50
21/07/2025	1	Nil Sightings		15:30								
21/07/2025	1	Nil Sightings		17:00								
24/07/2025	1	Buzzard	1	10:00				150				150
24/07/2025	1	Buzzard	1	10:30			50	250				300
24/07/2025	1	Kestrel	1	13:05		35						35
13/08/2025	1	Nil Sightings		16:26								
04/09/2025	1	Nil Sightings		07:46								
04/09/2025	1	Buzzard	1	11:04	5	15						20
04/09/2025	1	Buzzard	1	11:30		15	120	45				180
10/09/2025	1	Buzzard	1	09:16		5						5
10/09/2025	1	Nil Sightings		11:35								
11/09/2025	1	Lesser Black-backed Gull	6	10:59	5							5
25/04/2025	2	Nil Sightings		09:45								
25/04/2025	2	Buzzard	2	13:30			30	100	200	390		720
07/05/2025	2	Sparrowhawk	1	09:55	5							5
07/05/2025	2	Raven	1	10:48		30						30
07/05/2025	2	Kestrel	1	10:54		5	10					15
07/05/2025	2	Raven	1	12:06			45					45
07/05/2025	2	Raven	1	12:27			60	30				90
07/05/2025	2	Raven	2	12:42			60	60	120			240
07/05/2025	2	Raven	5	12:50			60	120	120	60		360
07/05/2025	2	Buzzard	1	13:04		30						30

Date	VP Number	Species	Number	Time of sighting	<10m	10-20m	20-30m	30-40m	40-50m	50-200m	>200m	Total Duration (sec)
07/05/2025	2	Buzzard	1	13:07							20	20
09/06/2025	2	Nil Sightings		18:45								
10/06/2025	2	Buzzard	1	19:37		15	20					35
07/07/2025	2	Buzzard	1	11:19		15	45	15	15	270		360
07/07/2025	2	Buzzard	1	11:46	5	30	10					45
08/07/2025	2	Buzzard	1	10:38	10	15						25
08/07/2025	2	Buzzard	1	10:57	5	5	30					40
08/07/2025	2	Buzzard	1	11:01	7							7
08/07/2025	2	Buzzard	1	13:08	10	40	40	10				100
11/07/2025	2	Buzzard	1	10:09		50	25	25	47			147
11/07/2025	2	Raven	1	11:10			17					17
11/07/2025	2	Buzzard	1	11:29		50	50	50	56			206
17/07/2025	2	Nil Sightings		13:50								
22/07/2025	2	Nil Sightings		13:00								
22/07/2025	2	Nil Sightings		14:30								
05/08/2025	2	Snipe	1	07:28	3	2						5
05/08/2025	2	Kestrel	1	08:11		30	60					90
05/08/2025	2	Kestrel	1	08:20		150	20	10				180
05/08/2025	2	Kestrel	1	08:27		5						5
05/08/2025	2	Buzzard	1	09:42	5	30	10					45
05/08/2025	2	Buzzard	1	09:57		25	5					30
12/08/2025	2	Buzzard	1	18:57		10	10	40	20			80
13/08/2025	2	Nil Sightings		18:35								
11/09/2025	2	Buzzard	1	12:24		45						45
11/09/2025	2	Lesser Black-backed Gull	1	13:49				15	15	30		60
12/09/2025	2	Nil Sightings		09:50								
12/09/2025	2	Lesser Black-backed Gull	4	12:36		25						25
12/09/2025	2	Lesser Black-backed Gull	6	14:09		25	5					30
12/09/2025	2	Lesser Black-backed Gull	2	14:12		20						20
10/06/2025	3	Lesser Black-backed Gull	1	17:39			10	120	20			150

Date	VP Number	Species	Number	Time of sighting	<10m	10-20m	20-30m	30-40m	40-50m	50-200m	>200m	Total Duration (sec)
26/06/2025	3	Buzzard	1	09:57	10	20	20	50	50	150		300
26/06/2025	3	Buzzard	1	10:02		10	10	20	30	50		120
26/06/2025	3	Buzzard	1	10:07	20	30	330	400				780
26/06/2025	3	Peregrine	1	11:00		60	20	20	20	60	300	480
26/06/2025	3	Buzzard	1	11:15		60	120					180
26/06/2025	3	Buzzard	1	11:15			80	200	100	100		480
26/06/2025	3	Buzzard	1	12:03		120	180					300
26/06/2025	3	Buzzard	1	12:09		50	60	60	30	100	300	600
26/06/2025	3	Buzzard	2	12:09	60	140	600	100				900
26/06/2025	3	Buzzard	1	12:28	60	200	480	100				840
26/06/2025	3	Buzzard	1	13:32		30						30
26/06/2025	3	Buzzard	1	13:39		120	60					180
26/06/2025	3	Buzzard	1	13:38		20	280	100	300	200		900
26/06/2025	3	Buzzard	1	14:51		30	60	20	100	210		420
26/06/2025	3	Buzzard	1	15:07		60	100	60	200			420
27/06/2025	3	Lesser Black-backed Gull	2	10:14						120		120
27/06/2025	3	Buzzard	1	10:21	40	140	200	60	100			540
27/06/2025	3	Lesser Black-backed Gull	1	10:27						160		160
27/06/2025	3	Buzzard	1	10:45	50	150						200
27/06/2025	3	Buzzard	1	10:53	20	20	30	30	50	100		250
27/06/2025	3	Peregrine	3	11:08	10	20						30
27/06/2025	3	Buzzard	1	12:17		90	30					120
07/07/2025	3	Buzzard	1	10:04	7	10						17
07/07/2025	3	Kestrel	1	11:11				50	20	23		93
07/07/2025	3	Peregrine	1	11:27				40	47	100		187
07/07/2025	3	Buzzard	1	12:20	6	10						16
07/07/2025	3	Buzzard	1	13:01				50	23			73
07/07/2025	3	Buzzard	1	13:05				30	31			61
08/07/2025	3	Nil Sightings		14:32								
22/07/2025	3	Peregrine	1	18:28		20						20
22/07/2025	3	Buzzard	1	19:42			30	15				45
23/07/2025	3	Nil Sightings		14:00								
23/07/2025	3	Kestrel	1	15:40			10	35				45

Date	VP Number	Species	Number	Time of sighting	<10m	10-20m	20-30m	30-40m	40-50m	50-200m	>200m	Total Duration (sec)
23/07/2025	3	Peregrine	1	15:58		35						35
23/07/2025	3	Peregrine	1	16:03	15							15
23/07/2025	3	Lesser Black-backed Gull	2	16:13		65						65
23/07/2025	3	Lesser Black-backed Gull	2	16:17		45						45
23/07/2025	3	Lesser Black-backed Gull	1	16:19		10	45					55
26/08/2025	3	Buzzard	1	16:36		20						20
26/08/2025	3	Kestrel	1	17:03	25							25
04/09/2025	3	Buzzard	2	11:09			120	60	60			240
04/09/2025	3	Buzzard	1	12:39	15	45						60
04/09/2025	3	Lesser Black-backed Gull	1	13:37	5	5	20					30
04/09/2025	3	Kestrel	1	13:41	15	75						90
01/10/2025	3	Lesser Black-backed Gull	2	10:56			5	10				15
01/10/2025	3	Nil Sightings		11:59								
01/10/2025	3	Buzzard	1	12:42		5	15	10				30
01/10/2025	3	Buzzard	2	12:48			30	60	30			120
06/10/2025	3	Buzzard	1	15:00			15	55				70
06/10/2025	3	Buzzard	1	15:02			10					10
06/10/2025	3	Sparrowhawk	1	16:11		20						20
15/05/2025	4	Buzzard	1	09:45						76		76
15/05/2025	4	Buzzard	1	10:07						100	515	615
15/05/2025	4	Buzzard	1	10:46			20	10	20	47		97
15/05/2025	4	Buzzard	1	10:52						172		172
15/05/2025	4	Buzzard	1	11:12						70	65	135
15/05/2025	4	Buzzard	1	11:41		44						44
15/05/2025	4	Buzzard	1	11:50		25						25
15/05/2025	4	Buzzard	1	13:32					105			105
15/05/2025	4	Buzzard	2	14:07						100	287	387
15/05/2025	4	Buzzard	1	14:36							209	209
15/05/2025	4	Buzzard	1	15:55						156		156
20/06/2025	4	Buzzard	2	09:23	10	20	90	120				240

Date	VP Number	Species	Number	Time of sighting	<10m	10-20m	20-30m	30-40m	40-50m	50-200m	>200m	Total Duration (sec)
20/06/2025	4	Buzzard	1	10:01		20	5	5	150			180
20/06/2025	4	Buzzard	1	12:04		20	60	100				180
20/06/2025	4	Buzzard	1	12:23						420		420
20/06/2025	4	Buzzard	1	12:40						330		330
20/06/2025	4	Buzzard	1	14:14		20						20
20/06/2025	4	Black-headed Gull	8	14:57		35	10					45
11/07/2025	4	Buzzard	1	13:42			50	153				203
11/07/2025	4	Buzzard	1	14:04		50	34	75	75			234
14/07/2025	4	Buzzard	1	14:53	13	30						43
14/07/2025	4	Buzzard	1	14:59	20							20
14/07/2025	4	Buzzard	1	15:05	10	20						30
15/07/2025	4	Buzzard	1	11:25		20	20	40				80
21/07/2025	4	Nil Sightings		17:15								
28/07/2025	4	Nil Sightings		08:07								
05/08/2025	4	Buzzard	1	12:19				15	180	45		240
05/08/2025	4	Buzzard	1	13:35						360		360
05/08/2025	4	Buzzard	1	13:50						330		330
21/08/2025	4	Nil Sightings		08:52								
21/08/2025	4	Nil Sightings		09:48								
21/08/2025	4	Sparrowhawk	1	12:03	4	1						5
25/09/2025	4	Golden Plover	28	08:26						30		30
02/10/2025	4	Nil Sightings		08:14								
08/05/2025	5	Buzzard	1	19:19	15							15
08/05/2025	5	Buzzard	1	20:11	5							5
13/06/2025	5	Buzzard	1	09:11			15	105				120
23/06/2025	5	Buzzard	1	08:18	5	25						30
23/06/2025	5	Buzzard	1	12:25		30						30
23/06/2025	5	Buzzard	1	12:42			70	20				90
23/06/2025	5	Buzzard	1	13:14		45	15					60
09/07/2025	5	Buzzard	1	09:56			100	50	61			211
09/07/2025	5	Kestrel	1	10:18		50	50	100	34			234
09/07/2025	5	Kestrel	1	10:47		34	50	50				134
09/07/2025	5	Kestrel	1	11:34			20	24				44

Date	VP Number	Species	Number	Time of sighting	<10m	10-20m	20-30m	30-40m	40-50m	50-200m	>200m	Total Duration (sec)
09/07/2025	5	Kestrel	1	13:21		20	20	17				57
09/07/2025	5	Kestrel	6	14:22	50	57	150	50				307
09/07/2025	5	Raven	3	14:52		50	57	50				157
22/07/2025	5	Peregrine	1	16:02	10	20	20	30				80
22/07/2025	5	Buzzard	1	17:20	10	20	30					60
22/07/2025	5	Kestrel	1	17:30			80	40				120
23/07/2025	5	Buzzard	1	18:40		50	150	40				240
23/07/2025	5	Nil Sightings		19:35								
27/08/2025	5	Nil Sightings		11:50								
27/08/2025	5	Nil Sightings		14:20								
12/09/2025	5	Lesser Black-backed Gull	8	12:05	5	15	25					45
12/09/2025	5	Buzzard	1	12:31	30	150	120					300
12/09/2025	5	Buzzard	1	12:32		120	120					240
12/09/2025	5	Kestrel	1	12:35	30							30
12/09/2025	5	Peregrine	1	12:54			10					10
24/09/2025	5	Nil Sightings		12:15								
24/09/2025	5	Nil Sightings		14:45								
25/09/2025	5	Lesser Black-backed Gull	12	11:07						180		180
25/09/2025	5	Buzzard	1	11:22	10	35						45
25/09/2025	5	Buzzard	1	11:46		60	30					90
25/09/2025	5	Kestrel	1	11:59	5	45	10					60
25/09/2025	5	Kestrel	1	12:11	5	25						30
20/05/2025	6	Buzzard	1	10:07	30	30						60
20/05/2025	6	Lesser Black-backed Gull	1	10:18					60			60
20/05/2025	6	Buzzard	1	11:02		15	45					60
21/05/2025	6	Lesser Black-backed Gull	4	10:34			30					30
01/07/2025	6	Buzzard	1	11:37			20					20
01/07/2025	6	Buzzard	1	13:33	15	20	10					45
01/07/2025	6	Buzzard	1	13:47	20							20
08/07/2025	6	Raven	2	09:36						67		67
08/07/2025	6	Buzzard	1	11:35	19	20						39

Date	VP Number	Species	Number	Time of sighting	<10m	10-20m	20-30m	30-40m	40-50m	50-200m	>200m	Total Duration (sec)
08/07/2025	6	Raven	1	11:54						48		48
08/07/2025	6	Buzzard	1	12:56					21			21
08/07/2025	6	Sparrowhawk	1	13:29		20	23					43
08/07/2025	6	Buzzard	1	13:42		24	25	25				74
08/07/2025	6	Raven	1	13:47		48	20					68
08/07/2025	6	Buzzard	1	15:01			50	49				99
08/07/2025	6	Buzzard	1	15:10				28				28
08/07/2025	6	Sparrowhawk	1	15:25	32							32
15/07/2025	6	Buzzard	1	10:20			100	200				300
15/07/2025	6	Kestrel	1	11:36		15						15
15/07/2025	6	Kestrel	1	11:43		160						160
15/07/2025	6	Buzzard	1	12:09		10	35					45
15/07/2025	6	Kestrel	1	12:19		85						85
15/07/2025	6	Kestrel	1	13:58		170						170
15/07/2025	6	Buzzard	1	14:13		15						15
26/08/2025	6	Nil Sightings		08:33								
28/08/2025	6	Nil Sightings		13:50								
28/08/2025	6	Nil Sightings		15:20								
29/09/2025	6	Buzzard	1	15:34	15							15
29/09/2025	6	Buzzard	2	16:26	15	60	15					90
29/09/2025	6	Buzzard	1	16:38		30	60	30				120
29/09/2025	6	Lesser Black-backed Gull	1	17:02		15						15
29/09/2025	6	Sparrowhawk	1	17:08		15	30	15				60
29/09/2025	6	Buzzard	1	17:10		30						30
29/09/2025	6	Sparrowhawk	1	17:12	10							10
30/09/2025	6	Buzzard	2	10:27	30	60	30					120
30/09/2025	6	Kestrel	1	10:46	120	120						240
30/09/2025	6	Kestrel	1	11:09	5	10	5					20
30/09/2025	6	Kestrel	1	11:11		60	60	15	15			150
30/09/2025	6	Buzzard	1	13:31	15	45	15					75
30/09/2025	6	Kestrel	1	14:09	15	30	45	60	30			180

Table 37: VP Flightline Data Winter 2025-2026.

Date	VP Number	Species	Number	Time of Sighting	<10m	10-20m	20-30m	30-40m	40-50m	50-200m	>200m	Total Duration (sec)	Notes
16/10/2025	1	Snipe	1	09:30		15	15					30	
16/10/2025	1	Snipe	4	10:10		25	5					30	
16/10/2025	1	Nil Sightings		12:03									
27/11/2025	1	Buzzard	1	11:11		5	25					30	
27/11/2025	1	Buzzard	1	11:56		15	5					20	
27/11/2025	1	Nil Sightings		13:05									
27/11/2025	1	Nil Sightings		14:24									
16/12/2025	1	Raven	1	12:39		30	30					60	Calling occasionally
18/12/2025	1	Nil Sightings		10:30									
13/01/2026	1	Nil Sightings		10:50									
20/01/2026	1	Sparrowhawk	2	12:17		30	90	60				180	Pair interacting and circling together. Potential pair bonding or territorial dispute, more likely the former due to them sticking together the whole flight and lack of alarm/distress calling
20/01/2026	1	Sparrowhawk	1	15:34	15							15	
30/01/2026	1	Nil Sightings		10:30									
26/02/2026	1	Nil Sightings		09:24									
27/02/2026	1	Buzzard	1	09:56		25	5					30	
27/02/2026	1	Buzzard	1	11:09			20	5	5	420		450	
27/02/2026	1	Buzzard	1	12:40			30					30	
27/02/2026	1	Buzzard	1	12:57	10	20						30	

Date	VP Number	Species	Number	Time of Sighting	<10m	10-20m	20-30m	30-40m	40-50m	50-200m	>200m	Total Duration (sec)	Notes
09/03/2026	1	Nil Sightings		13:24									
13/03/2026	1	Nil Sightings		08:49									
13/03/2026	1	Nil Sightings		12:18									
09/10/2025	2	Snipe	2	11:31		10	10					20	
09/10/2025	2	Lesser Black-backed Gull	9	15:09					45	15		60	
09/10/2025	2	Lapwing	8	15:36		10	20					30	
12/11/2025	2	Nil Sightings		09:14									
12/11/2025	2	Nil Sightings		13:35									
18/11/2025	2	Nil Sightings		10:10									
16/12/2025	2	Lesser Black-backed Gull	1	13:58			15					15	
16/12/2025	2	Lesser Black-backed Gull	8	14:07		15	30					45	
16/12/2025	2	Lesser Black-backed Gull	9	14:08		15	30					45	Separate flock to bout 2 but circles with them before parting ways
16/12/2025	2	Lesser Black-backed Gull	5	14:14			30	30				60	
16/12/2025	2	Lesser Black-backed Gull	1	14:23			15					15	Flying towards some other gulls calling in the distance
16/12/2025	2	Lesser Black-backed Gull	20	14:28			25					25	
16/12/2025	2	Snipe	1	14:34	2	3						5	Alarm calling, flushed by something
16/12/2025	2	Lesser Black-backed Gull	1	14:45			15					15	
16/12/2025	2	Lesser Black-backed Gull	15	14:49				20				20	11 juveniles, 4 adults

Date	VP Number	Species	Number	Time of Sighting	<10m	10-20m	20-30m	30-40m	40-50m	50-200m	>200m	Total Duration (sec)	Notes
08/01/2026	2	Black-headed Gull	1	11:57			40					40	
08/01/2026	2	Sparrowhawk	1	14:23		15						15	
14/01/2026	2	Nil Sightings		10:05									
27/01/2026	2	Lesser Black-backed Gull	3	12:01		15						15	
27/01/2026	2	Raven	1	13:25			30					30	Struggling in the wind a bit
11/02/2026	2	Nil Sightings		09:00									
11/02/2026	2	Buzzard	1	14:05					40			40	
11/02/2026	2	Buzzard	1	14:25				180				180	
05/03/2026	2	Nil Sightings		10:00									
19/03/2026	2	Buzzard	3	11:45				120		180		300	
19/03/2026	2	Buzzard	2	12:09					260			260	
19/03/2026	2	Nil Sightings		14:00									
07/10/2025	3	Nil Sightings		14:22									
09/10/2025	3	Nil Sightings		11:52									
20/10/2025	3	Lesser Black-backed Gull	2	16:15			35					35	
20/10/2025	3	Lesser Black-backed Gull	21	16:42				55				55	5/21 juveniles
07/11/2025	3	Nil Sightings		10:02									
07/11/2025	3	Whooper Swan	6	13:59						60		60	
18/11/2025	3	Nil Sightings		12:40									
04/12/2025	3	Sparrowhawk	1	12:39			25					25	
11/12/2025	3	Kestrel	1	11:03	5							5	Perched in tree alarm calling occasionally. Harassed by JD and RO. Chased out and off VP.
11/12/2025	3	Nil Sightings		15:30									

Date	VP Number	Species	Number	Time of Sighting	<10m	10-20m	20-30m	30-40m	40-50m	50-200m	>200m	Total Duration (sec)	Notes
17/12/2025	3	Kestrel	1	13:46		10						10	
17/12/2025	3	Kestrel	1	13:50		80	10					90	
17/12/2025	3	Kestrel	1	13:58		190	20					210	
17/12/2025	3	Lesser Black-backed Gull	2	14:29			10	30	5			45	
17/12/2025	3	Kestrel	1	14:56	10	5						15	
14/01/2026	3	Nil Sightings		13:20									
22/01/2026	3	Sparrowhawk	1	12:00	10	10						20	Dives quickly in pursuit of something and fails, continues over scrub and forestry out of sight
10/02/2026	3	Nil Sightings		10:00									
10/02/2026	3	Buzzard	1	15:16					35			35	
10/02/2026	3	Buzzard	1	15:25					60			60	
11/03/2026	3	Nil Sightings		09:35									
11/03/2026	3	Buzzard	1	14:10						120		120	
11/03/2026	3	Buzzard	1	14:25						20		20	
04/11/2025	4	Nil Sightings		09:33									
04/11/2025	4	Nil Sightings		13:02									
13/11/2025	4	Sparrowhawk	1	11:07	5	15						20	
13/11/2025	4	Buzzard	1	12:08		30						30	
04/12/2025	4	Nil Sightings		13:16									
02/01/2026	4	Nil Sightings		11:36									
02/01/2026	4	Sparrowhawk	1	15:27		30						30	
29/01/2026	4	Raven	2	09:39		7						7	
29/01/2026	4	Kestrel	1	12:15	90	100						190	
29/01/2026	4	Kestrel	1	12:58	27	20						47	
29/01/2026	4	Raven	2	13:44	3	7	20					30	
29/01/2026	4	Raven	1	15:03	5	11						16	Calling
13/02/2026	4	Nil Sightings		12:00									
24/02/2026	4	Buzzard	1	10:56	10	110						120	

Date	VP Number	Species	Number	Time of Sighting	<10m	10-20m	20-30m	30-40m	40-50m	50-200m	>200m	Total Duration (sec)	Notes
24/02/2026	4	Buzzard	1	11:38			45	10	5			60	
24/02/2026	4	Buzzard	1	11:38		25	5					30	
24/02/2026	4	Buzzard	1	12:23			90	10	20			120	
10/03/2026	4	Nil Sightings		09:55									
20/03/2026	4	Nil Sightings		09:30									
09/10/2025	5	Buzzard	1	11:40		60				180		240	
20/10/2025	5	Lesser Black-backed Gull	8	13:57			45					45	
20/10/2025	5	Lesser Black-backed Gull	2	14:05	5	15	10					30	
20/10/2025	5	Kestrel	1	14:16	5	80	5					90	
20/10/2025	5	Kestrel	1	14:20	5	15	90	10				120	
20/10/2025	5	Buzzard	1	14:21						60		60	
20/10/2025	5	Kestrel	1	14:44	5	55						60	
20/10/2025	5	Kestrel	1	14:48	3	7						10	
20/10/2025	5	Kestrel	1	14:58		180	20	10				210	
20/10/2025	5	Kestrel	1	15:13	10	75	5					90	
31/10/2025	5	Nil Sightings		08:05									
18/11/2025	5	Lesser Black-backed Gull	1	09:54		25	5					30	
18/11/2025	5	Kestrel	1	11:41	3	17						20	
18/11/2025	5	Kestrel	1	11:50	5	40						45	
18/11/2025	5	Buzzard	1	15:07						210		210	
17/12/2025	5	Lesser Black-backed Gull	1	10:57	10	20						30	
17/12/2025	5	Lesser Black-backed Gull	1	11:01	10							10	
17/12/2025	5	Lesser Black-backed Gull	1	11:27		30						30	
17/12/2025	5	Buzzard	1	14:02	45	15	15					75	
17/12/2025	5	Lesser Black-backed Gull	5	14:22			30					30	
14/01/2026	5	Nil Sightings		12:07									
27/01/2026	5	Buzzard	1	11:29	10							10	
27/01/2026	5	Buzzard	1	12:08			42					42	Calling

Date	VP Number	Species	Number	Time of Sighting	<10m	10-20m	20-30m	30-40m	40-50m	50-200m	>200m	Total Duration (sec)	Notes
27/01/2026	5	Lesser Black-backed Gull	1	12:16		8						8	
30/01/2026	5	Black-headed Gull	1	11:12		6						6	
30/01/2026	5	Kestrel	1	11:29	16							16	Calling
30/01/2026	5	Kestrel	1	11:34	5	5						10	Mobbed by x2 HC
30/01/2026	5	Black-headed Gull	3	12:32		22						22	Calling
03/02/2026	5	Black-headed Gull	20	10:31			40					40	
03/02/2026	5	Black-headed Gull	1	11:53		30						30	
20/02/2026	5	Sparrowhawk	1	15:30		40						40	
25/02/2026	5	Lesser Black-backed Gull	28	13:19	10	30	5					45	
25/02/2026	5	Lesser Black-backed Gull	3	13:31	5	25						30	
25/02/2026	5	Lesser Black-backed Gull	2	13:44	3	7						10	
25/02/2026	5	Lesser Black-backed Gull	2	14:08		20	10					30	
25/02/2026	5	Lesser Black-backed Gull	54	14:10		15	75					90	
25/02/2026	5	Lesser Black-backed Gull	1	14:46		30						30	
25/02/2026	5	Lesser Black-backed Gull	1	14:58		30						30	
25/02/2026	5	Black-headed Gull	35	15:46	10	60	30	20				120	
13/03/2026	5	Black-headed Gull	2	11:07			40					40	
13/03/2026	5	Kestrel	2	14:20				180				180	
13/03/2026	5	Black-headed Gull	15	15:12			30					30	

Date	VP Number	Species	Number	Time of Sighting	<10m	10-20m	20-30m	30-40m	40-50m	50-200m	>200m	Total Duration (sec)	Notes
13/03/2026	5	Black-headed Gull	5	16:28	10							10	
10/10/2025	6	Nil Sightings		10:30									
10/10/2025	6	Buzzard	1	13:49						15		15	
10/10/2025	6	Buzzard	1	14:51							240	240	
10/10/2025	6	Kestrel	1	14:58		10						10	
17/10/2025	6	Mute Swan	4	09:06			20	20	50			90	
17/10/2025	6	Mute Swan	4	09:17						120		120	
17/11/2025	6	Nil Sightings		10:45									
17/11/2025	6	Nil Sightings		15:14									
24/11/2025	6	Buzzard	1	12:40	2	1						3	Perched in tree at end of this flightline
24/11/2025	6	Buzzard	1	12:42	3	2						5	Perched in tree at end of this flightline
24/11/2025	6	Buzzard	1	12:49	3	2						5	
01/12/2025	6	Nil Sightings		10:05									
01/12/2025	6	Black-headed Gull	3	12:35			30					30	
01/12/2025	6	Kestrel	1	14:00		25						25	
01/12/2025	6	Kestrel	1	14:10		15						15	Mobbed by crows
14/01/2026	6	Nil Sightings		10:00									
28/01/2026	6	Raven	1	09:59		12						12	Landed in field then onto fence post
28/01/2026	6	Raven	1	10:37		15						15	
28/01/2026	6	Raven	1	11:01		11						11	
28/01/2026	6	Buzzard	1	11:47			32					32	
28/01/2026	6	Buzzard	1	12:12	5	5						10	3rd BZ; joined both from previous bout
28/01/2026	6	Raven	1	13:02	6	10						16	

Date	VP Number	Species	Number	Time of Sighting	<10m	10-20m	20-30m	30-40m	40-50m	50-200m	>200m	Total Duration (sec)	Notes
28/01/2026	6	Raven	1	13:22	10	28						38	
28/01/2026	6	Buzzard	2	13:38		20	20	41				81	
28/01/2026	6	Buzzard	1	13:39			35					35	
28/01/2026	6	Buzzard	3	13:51			5	5	20			30	
28/01/2026	6	Raven	1	14:45		15						15	
03/02/2026	6	Black-headed Gull	3	14:38			45					45	
25/02/2026	6	Nil Sightings		12:30									
25/02/2026	6	Nil Sightings		15:00									
04/03/2026	6	Kestrel	1	14:22				30				30	
04/03/2026	6	Kestrel	1	14:30			45					45	

Table 38: VP Flightline Data Breeding 2026.

Date	VP Number	Species	Number	Time of sighting	<10m	10-20m	20-30m	30-40m	40-50m	50-200m	>200m	Total Duration (sec)	Notes
22/04/2026	1	Buzzard	1	12:16		5	10					15	
22/04/2026	1	Buzzard	1	12:29		10						10	
22/04/2026	1	Kestrel	1	12:43	3	4						7	
30/04/2026	1	Nil Sightings		08:45									
20/05/2026	1	Nil Sightings		08:06									
26/05/2026	1	Buzzard	1	10:32			9	10	60	10		89	
26/05/2026	1	Buzzard	1	10:43			15	40				55	
26/05/2026	1	Buzzard	1	10:51			50					50	
26/05/2026	1	Buzzard	1	11:46		2	18					20	
26/05/2026	1	Buzzard	2	12:59						200		200	
26/05/2026	1	Kestrel	1	13:09		25						25	
26/05/2026	1	Nil Sightings		13:55									Short break due to hot weather
08/06/2026	1	Buzzard	1	16:51	5	55	90					150	
25/06/2026	1	Kestrel	1	15:12		47						47	
25/06/2026	1	Kestrel	1	15:27		106						106	

Date	VP Number	Species	Number	Time of sighting	<10m	10-20m	20-30m	30-40m	40-50m	50-200m	>200m	Total Duration (sec)	Notes
25/06/2026	1	Buzzard	1	15:36		77						77	
25/06/2026	1	Buzzard	2	15:42					73			73	
25/06/2026	1	Buzzard	1	15:46						29		29	
25/06/2026	1	Lesser Black-backed Gull	1	16:01			27					27	
25/06/2026	1	Buzzard	1	16:11		20						20	Landed in tree
25/06/2026	1	Kestrel	1	16:17		125						125	
25/06/2026	1	Raven	2	16:17			32					32	
25/06/2026	1	Raven	4	16:23		35						35	
25/06/2026	1	Raven	1	17:10			60					60	
25/06/2026	1	Raven	1	18:01				60				60	
25/06/2026	1	Lesser Black-backed Gull	1	18:22		21						21	
25/06/2026	1	Kestrel	1	18:25			45					45	
25/06/2026	1	Lesser Black-backed Gull	1	18:40				58				58	
29/06/2026	1	Nil Sightings		18:00									Other species: WW, BC, MP, SL, R., HS, CH, WP, RO, HM, SG, M., B., WH, WR, GO, JD
02/07/2026	1	Lesser Black-backed Gull	1	09:19					15	30		45	
02/07/2026	1	Buzzard	1	09:56		75	35	10				120	
02/07/2026	1	Buzzard	1	10:30		35	10					45	
02/07/2026	1	Buzzard	1	11:01	5	70	15					90	
02/07/2026	1	Lesser Black-backed Gull	1	12:44		5	55					60	
02/07/2026	1	Buzzard	1	12:48	3	17						20	
14/08/2026	1	Buzzard	1	08:42						60		60	
14/08/2026	1	Sparrowhawk	1	09:15	18							18	

Date	VP Number	Species	Number	Time of sighting	<10m	10-20m	20-30m	30-40m	40-50m	50-200m	>200m	Total Duration (sec)	Notes
17/08/2026	1	Buzzard	1	15:32				20				20	
21/08/26	1	Lesser Black-backed Gull	3	06:49	30	45						75	Two adults and a juvenile. Flying low and slow mostly
21/08/26	1	Raven	3	10:07		15	15					30	Displaying and calling
24/08/2026	1	Buzzard	1	17:14	30	90	120					240	
24/08/2026	1	Buzzard	1	17:33	30	120	60					210	Perches on mast. Occasionally harassed by smaller birds
24/08/2026	1	Buzzard	1	19:14			30					30	Heard calling before entering view.
24/08/2026	1	Raven	2	20:23			15					15	Calling a lot as they fly
22/04/2026	2	Buzzard	1	09:42					60			60	Mobbed by crow
22/04/2026	2	Buzzard	2	09:55					120			120	
22/04/2026	2	Buzzard	1	10:09					120			120	
22/04/2026	2	Buzzard	1	10:30					90			90	
22/04/2026	2	Buzzard	1	10:32			5					5	
22/04/2026	2	Buzzard	2	10:36						70		70	
22/04/2026	2	Buzzard	1	11:26					90			90	
22/04/2026	2	Buzzard	1	11:30					250	50		300	
22/04/2026	2	Buzzard	1	12:25					60			60	
22/04/2026	2	Buzzard	1	12:33					50			50	
22/04/2026	2	Buzzard	2	14:42					120			120	

Date	VP Number	Species	Number	Time of sighting	<10m	10-20m	20-30m	30-40m	40-50m	50-200m	>200m	Total Duration (sec)	Notes
22/04/2026	2	Buzzard	1	15:28				80				80	
13/05/2026	2	Buzzard	1	17:31					45			45	
13/05/2026	2	Buzzard	1	17:40						30		30	
18/05/2026	2	Sparrowhawk	2	17:46		20						20	
18/05/2026	2	Sparrowhawk	1	18:11	10							10	
03/06/2026	2	Nil Sightings		10:20									
08/06/2026	2	Nil Sightings		11:30									
22/06/2026	2	Buzzard	1	13:49	5	10						15	Dives after something
22/06/2026	2	Buzzard	2	14:25		120	300	120	120	120	60	840	
22/06/2026	2	Buzzard	1	15:09			150					150	
08/07/2026	2	Kestrel	1	12:26		5						5	
08/07/2026	2	Buzzard	1	12:34			8					8	
08/07/2026	2	Buzzard	1	12:35			11					11	
23/07/2026	2	Buzzard	1	14:18		25	10					35	
06/08/2026	2	Raven	3	19:00		53						53	
06/08/2026	2	Sparrowhawk	1	19:08		36						36	
06/08/2026	2	Raven	1	19:16				54				54	
06/08/2026	2	Raven	1	19:36			53					53	
14/08/2026	2	Raven	2	13:40			24					24	
14/08/2026	2	Raven	2	14:09			40					40	
14/08/2026	2	Raven	1	14:25			20					20	
14/08/2026	2	Raven	3	15:10					100	70		170	
20/08/26	2	Buzzard	1	06:30				70				70	
20/08/26	2	Buzzard	1	06:40					95			95	
20/08/26	2	Peregrine	1	09:10				25				25	
26/08/2026	2	Nil Sightings		NA									
25/08/2026	2	Raven	1	16:49		10						10	
25/08/2026	2	Lesser Black-backed Gull	1	19:41		10						10	Calling as it flies
23/04/2026	3	Nil Sightings		09:50									
23/04/2026	3	Nil Sightings		13:20									
30/04/2026	3	Nil Sightings		10:00									
19/05/2026	3	Black-headed Gull	7	18:31			80					80	

Date	VP Number	Species	Number	Time of sighting	<10m	10-20m	20-30m	30-40m	40-50m	50-200m	>200m	Total Duration (sec)	Notes
27/05/2026	3	Peregrine	1	09:45		25						25	
27/05/2026	3	Peregrine	1	10:37			100	20	20			140	Mobbed by crows
27/05/2026	3	Kestrel	1	10:38		15						15	Flying below peregrine
27/05/2026	3	Kestrel	1	10:39		25						25	
10/06/2026	3	Nil Sightings		10:20									
10/06/2026	3	Buzzard	1	14:10					40			40	
10/06/2026	3	Buzzard	1	14:13				35				35	
16/06/2026	3	Black-headed Gull	1	8:22			15					15	Calling
16/06/2026	3	Lesser Black-backed Gull	1	8:24		20						20	
14/07/2026	3	Raven	1	18:38			47					47	
14/07/2026	3	Raven	1	18:55			58					58	
14/07/2026	3	Peregrine	2	19:25			100	207				307	
15/07/2026	3	Grey Heron	1	13:58			30					30	
15/07/2026	3	Buzzard	1	14:03	45	15						60	
15/07/2026	3	Buzzard	1	16:18	90	90						180	
10/08/2026	3	Raven	1	17:21				36	50	150		236	
10/08/2026	3	Peregrine	1	17:24					42			42	
10/08/2026	3	Raven	1	17:41			23					23	Landed on telegraph post
10/08/2026	3	Raven	1	17:44				53				53	
10/08/2026	3	Buzzard	2	18:23						182		182	
10/08/2026	3	Raven	1	18:52			43					43	
10/08/2026	3	Buzzard	1	18:52		20						20	
10/08/2026	3	Raven	1	20:00						94		94	
10/08/2026	3	Raven	4	21:03			90					90	
14/08/2026	3	Buzzard	1	11:15			177					177	
14/08/2026	3	Buzzard	1	11:25				100	120			220	
14/08/2026	3	Raven	2	11:25					150			150	
14/08/2026	3	Raven	1	11:35		75						75	

Date	VP Number	Species	Number	Time of sighting	<10m	10-20m	20-30m	30-40m	40-50m	50-200m	>200m	Total Duration (sec)	Notes
14/08/2026	3	Raven	1	11:36					94			94	
14/08/2026	3	Raven	3	11:52				96				96	
14/08/2026	3	Raven	1	11:53				53				53	
14/08/2026	3	Raven	2	12:19		32						32	
14/08/2026	3	Raven	1	12:23		30						30	
14/08/2026	3	Peregrine	1	06:01						25		25	
27/08/26	3	Lesser Black-backed Gull	6	07:31		10	35					45	
27/08/26	3	Nil Sightings		09:33									
27/04/2026	4	Sparrowhawk	1	16:34	45							45	
27/04/2026	4	Sparrowhawk	1	16:40	30							30	
27/04/2026	4	Buzzard	1	18:49						60		60	
20/05/2026	4	Nil Sightings		10:40									
03/06/2026	4	Nil Sightings		09:48									
12/06/2026	4	Black-headed Gull	1	09:32		20						20	
24/06/2026	4	Nil Sightings		12:04									
17/07/2026	4	Buzzard	1	12:44			15					15	
17/07/2026	4	Buzzard	1	13:03				15	15	94		124	
17/07/2026	4	Kestrel	1	13:25	30	40	52					122	
17/07/2026	4	Buzzard	1	14:49	24							24	Carrying prey
17/07/2026	4	Raven	1	15:00						330		330	
21/07/2026	4	Buzzard	1	19:11	30	90	30					150	Heard calling in distance occasionally
10/08/2026	4	Peregrine	1	17:36		15						15	
13/08/2026	4	Buzzard	1	17:07				44	50	150		244	
13/08/2026	4	Raven	1	17:34				122				122	
13/08/2026	4	Raven	2	17:34					56			56	
13/08/2026	4	Raven	4	17:47			83					83	
13/08/2026	4	Lesser Black-backed Gull	1	18:05		15						15	
13/08/2026	4	Nil Sightings		19:30									

Date	VP Number	Species	Number	Time of sighting	<10m	10-20m	20-30m	30-40m	40-50m	50-200m	>200m	Total Duration (sec)	Notes
19/08/2026	4	Buzzard	1	16:08	15	15	30					60	Calling occasionally
26/08/2026	4	Nil Sightings		15:00									
26/08/2026	4	Nil Sightings		17:25									
29/04/2026	5	Nil Sightings		08:55									
29/04/2026	5	Nil Sightings		12:25									
15/05/2026	5	Kestrel	1	11:20		70						70	
15/05/2026	5	Black-headed Gull	1	11:30		15						15	
15/05/2026	5	Black-headed Gull	4	14:58		50						50	
20/05/2026	5	Nil Sightings		13:51									
04/06/2026	5	Nil Sightings	1	08:30					50			50	
04/06/2026	5	Buzzard	1	11:41		30						30	
04/06/2026	5	Kestrel	1	12:51			50					50	
05/06/2026	5	Nil Sightings		11:15									
14/07/2026	5	Buzzard	1	20:04		60	120	60	60			300	
22/07/2026	5	Buzzard	1	13:11	60	120	60					240	
22/07/2026	5	Buzzard	1	14:13		15	15	15				45	
22/07/2026	5	Buzzard	1	15:57			10					10	
10/08/2026	5	Buzzard	1	18:38					20			20	
10/08/2026	5	Buzzard	1	19:36				30				30	
17/08/2026	5	Buzzard	1	18:03	30	15						45	
17/08/2026	5	Buzzard	1	19:38		30	15	15				60	
19/08/2026	5	Nil Sightings		14:10									
26/08/2026	5	Buzzard	1	07:02		30						30	
26/08/2026	5	Lesser Black-backed Gull	6	07:04			20					20	
26/08/2026	5	Nil Sightings		10:30									
29/04/2026	6	Buzzard	1	14:41		10	100	70				180	
29/04/2026	6	Buzzard	2	15:05	3	17						20	
27/05/2026	6	Nil Sightings		07:26									
28/05/2026	6	Buzzard	1	17:06		45	90	15				150	
28/05/2026	6	Buzzard	1	17:13		10	35					45	
28/05/2026	6	Buzzard	1	17:15						120		120	

Date	VP Number	Species	Number	Time of sighting	<10m	10-20m	20-30m	30-40m	40-50m	50-200m	>200m	Total Duration (sec)	Notes
28/05/2026	6	Buzzard	1	17:19	10	65	15					90	
28/05/2026	6	Buzzard	1	17:22						210		210	
28/05/2026	6	Buzzard	1	17:27		15						15	
28/05/2026	6	Buzzard	1	17:35		35						35	
28/05/2026	6	Black-headed Gull	2	17:37		5	40	15				60	
28/05/2026	6	Mallard	2	17:40	3	17						20	
28/05/2026	6	Buzzard	1	17:51		15	5					20	
28/05/2026	6	Buzzard	1	20:47		15						15	
09/06/2026	6	Nil Sightings		10:50									
09/06/2026	6	Peregrine	1	12:57			50					50	
09/06/2026	6	Buzzard	1	13:30	50							50	
09/06/2026	6	Buzzard	1	13:32		120						120	
09/06/2026	6	Kestrel	1	13:45		30						30	
09/06/2026	6	Kestrel	1	13:47		30						30	Mobbed by crows
09/06/2026	6	Black-headed Gull	2	14:49			40					40	
17/06/2026	6	Buzzard	1	9:02	60	60	120	120				360	
17/06/2026	6	Buzzard	1	9:24		60	120	120				300	
17/06/2026	6	Buzzard	1	9:46	30	30	60	15				135	
17/06/2026	6	Buzzard	1	10:48	120	120	60					300	
15/07/2026	6	Buzzard	1	13:52					94			94	
15/07/2026	6	Buzzard	1	13:52				70				70	
15/07/2026	6	Sparrowhawk	1	14:10						137	100	237	
15/07/2026	6	Buzzard	1	14:24			26					26	
15/07/2026	6	Buzzard	1	14:42						307		307	
15/07/2026	6	Sparrowhawk	1	15:14		37						37	
15/07/2026	6	Sparrowhawk	1	15:25						189		189	
15/07/2026	6	Buzzard	1	15:25			50					50	
15/07/2026	6	Raven	1	16:11			37					37	
15/07/2026	6	Raven	1	16:14	23	40						63	Landed in tree
15/07/2026	6	Buzzard	1	16:28						137		137	

Date	VP Number	Species	Number	Time of sighting	<10m	10-20m	20-30m	30-40m	40-50m	50-200m	>200m	Total Duration (sec)	Notes
15/07/2026	6	Raven	1	16:31		47						47	Landed in tree
15/07/2026	6	Buzzard	1	16:33	5							5	Must have been a BZ nest in these trees. There was at least 2 juveniles calling throughout survey, but only sometimes visible
15/07/2026	6	Raven	1	16:45	27							27	Landed in tree
15/07/2026	6	Buzzard	1	17:02						310		310	
15/07/2026	6	Buzzard	1	17:17		23						23	
15/07/2026	6	Raven	1	17:20	44							44	
15/07/2026	6	Buzzard	1	17:38						322		322	
21/07/2026	6	Nil Sightings		20:25									
11/08/2026	6	Buzzard	1	18:43					100			100	
11/08/2026	6	Nil Sightings		19:35									
13/08/2026	6	Buzzard	1	17:01						40		40	
13/08/2026	6	Kestrel	1	17:25		10						10	
13/08/2026	6	Kestrel	1	17:27			20					20	
17/08/2026	6	Buzzard	1	12:30					40			40	
17/08/2026	6	Buzzard	1	13:47			30					30	
24/08/2026	6	Buzzard	1	06:10		15						15	Landed on post
24/08/2026	6	Kestrel	1	06:25		300						300	
24/08/2026	6	Kestrel	1	06:37		50	38	20				108	
24/08/2026	6	Kestrel	1	09:57				69	50	100		219	
24/08/2026	6	Kestrel	1	09:59			35					35	

Date	VP Number	Species	Number	Time of sighting	<10m	10-20m	20-30m	30-40m	40-50m	50-200m	>200m	Total Duration (sec)	Notes
24/08/2026	6	Kestrel	1	10:09			97					97	
24/08/2026	6	Raven	1	10:22		20	40					60	Landed in tree
25/08/2026	2	Raven	1	16:49		10						10	25/08/2026
25/08/2026	2	Lesser Black-backed Gull	1	19:41		10						10	25/08/2026
26/08/2026	2	Nil Sightings		NA									26/08/2026
26/08/2026	4	Nil Sightings		15:00									26/08/2026
26/08/2026	4	Nil Sightings		17:25									26/08/2026
26/08/2026	5	Buzzard	1	07:02		30						30	26/08/2026
26/08/2026	5	Lesser Black-backed Gull	6	07:04			20					20	26/08/2026
26/08/2026	5	Nil Sightings		10:30									26/08/2026
27/08/2026	3	Lesser Black-backed Gull	6	07:31		10	35					45	27/08/2026
27/08/2026	3	Nil Sightings		09:33									27/08/2026

***Redacted* A13.6.3** Peregrine Sensitive Data

Table 39: *Redacted* Peregrine Survey Results.

Date	Survey Types	Start Time	End Time	Duration of Survey (sec)	Location of Sighting (10km OS Grid Square)	Species	Evidence	Site Type	Suitability	Notes
08/04/2025	Suitability	08:00	14:30	23400	S36	Peregrine	Species Present	Old derelict Castle building	High	Two Peregrine seen perched on structure. Potential breeding pair.
07/05/2025	Activity	09:40	11:40	7200	S36	Peregrine	Species present	Ruins	-	Female perched on castle ruins, preening herself. Arrived 09:50. Male arrived at 10:25, female went to a lower ledge on the castle at potential nest. Male left at 10:35. Female was still at nest when I left at 11:40.
21/05/2025	Activity	11:30	17:55	23100	S36	Peregrine	Species present	Old Castle structure	-	Female Peregrine seen perched on structure. No nest found or signs of nesting as structure is full of Jackdaw nests.
21/05/2025	Activity	11:30	17:55	23100	S37	Peregrine	Nest found	Active quarry	-	Both male and female seen. Female was slightly hidden behind the rocks and grass growing around the rocks and was heard calling repeatedly. Male was spotted few meters away from nest
25/06/2025	Activity	09:30	11:00	5400	S36	Peregrine	Species present	Ruins	-	Three juvenile Peregrine present at top of castle. 09:50 Two adults arrived to drop off food. All Peregrine flew from castle at 10:05. 10:25 Female Peregrine brought back crow to the vicinity of the castle.

Date	Survey Types	Start Time	End Time	Duration of Survey (sec)	Location of Sighting (10km OS Grid Square)	Species	Evidence	Site Type	Suitability	Notes
25/06/2025	Activity	11:10	12:40	5400	S37	Peregrine	Species present	Quarry	-	One Juvenile present on ledge. 11:17 Female Peregrine brought food to juvenile
21/04/2026	Suitability	10:20	15:20	18000	S36	-	-	Ruins	High	Species previously present, disregarded rings present
11/05/2026	Activity	12:50	14:15	5100	S36	Peregrine	Species present	Castle ruin	-	Sitting on nest
17/06/2026	Activity	09:11	09:35	1440	S37	Peregrine	Species present	Castle ruins	-	
17/06/2026	Activity	09:45	10:17	1920	S36	Peregrine	Species present	Castle ruins	-	Parents and chick spotted*

Ecopower Developments Ltd.

Gathabawn Wind Farm

Appendix 13.7 - Collision Risk Model

September 2026

This report considers the particular instructions and requirements of our client.

It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

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Quality Assurance

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The findings outlined within this report and the data we have provided are to our knowledge true and express our bona fide professional opinions. This report has been prepared and provided in accordance with the Chartered Institute of Ecology and Environmental Management (CIEEM) Code of Professional Conduct. Where pertinent CIEEM Guidelines used in the preparation of this report include the *Guidelines for Ecological Report Writing* (CIEEM, 2017a), and *Guidelines for Ecological Impact Assessment in the UK and Ireland. Terrestrial, Freshwater, Coastal and Marine* (CIEEM, 2024).

Due cognisance has been given at all times to the provisions of the *Wildlife Acts 1976 - 2024,* the *European Union (Natural Habitats) Regulations. SI 378/2005*, the *European Communities (Birds and Natural Habitats) Regulations 2011,* EU Regulation on Invasive Alien Species under *EU Regulation 1143/2014*, the EU Birds *Directive 2009/147/EC* and the EU *Habitats Directive 92/43/EEC*.

No method of assessment can completely remove the possibility of obtaining partially imprecise or incomplete information. Any limitation to the methods applied or constraints however are clearly identified within the main body of this document.

Notice

This Collision Risk Model (CRM) was produced by INIS Environmental Consultants Ltd. (INIS) on behalf of Ecopower Developments Ltd. (hereafter known as the Applicant) to accompany **EIAR Chapter 13. Biodiversity** for the proposed Gathabawn Wind Farm Project in County Kilkenny. The purpose of this CRM is to provide information on avian collision risk associated with the Gathabawn Wind Farm Project.

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APPENDIX A GATHABAWN WINDFARM - VANTAGE POINT SURVEY EFFORT
APPENDIX B COLLISION RISK MODEL SPREADSHEET OUTPUT

1. INTRODUCTION

Inis Environmental Consultants Ltd. (INIS) was commissioned to undertake an assessment of collision risk for potentially sensitive avian receptors at the proposed Gathabawn Windfarm Project in Co. Kilkenny (hereafter referred to as the 'proposed Project') using standardised Collision Risk Modelling (CRM) methods.

1.1. Constraints and Limitations

There are a number of constraints and limitations associated with pre-planning ecological assessments of potential development sites, as well as constraints and limitations inherent to the collection and analysis of field-based ecological data (Band, 2024; NatureScot, 2024; NatureScot, 2025).

The data evaluated here comprises:

- Bird flight data from timed Vantage Point (VP) watches (using six VPs), clipped to the proposed Project footprint with a 1km buffer and consisting of flights within the rotor-swept heights (10-200m). Flight duration (in seconds) for all bird observations, along with data relevant to each flight record (date, timing, weather conditions, VP location (number), etc.), are included;
- Vantage Point survey effort data (recorded as hours of observations) on a monthly basis during the breeding season (April to October for 2025 and April to August 2026) and wintering season (October 2022 to May 2023 and October 2025 to March 2026) for all VP survey work undertaken;
- Area viewed from each VP (in hectares) within the Flight Risk Area – this comprises an area with extending 600m from each turbine;
- Description and metrics for the wind farm as a whole, as well as for individual turbines.

This collision risk model relates specifically to the VP survey data. In particular, any variation in the flight data, coverage of the VPs surveyed during fieldwork, layout of the wind farm or individual turbine specifications, including upper and lower rotor swept heights, would require the outputs from this model to be amended.

Note that the methodology presented here involves using a 1km buffer to clip flight lines. This is beyond the minimum blade length plus 500m buffer extending from each turbine indicated by Best Practice guidelines (NatureScot, 2024). Therefore, the CRM results presented here include additional flightlines beyond the area that is calculated for collision risk. By including these additional flightlines, a substantially more conservative (i.e. higher) estimate of collision risk than is likely to be the case by incorporating additional flight lines within this extended buffer (the areal bird density calculations are based upon a survey area extending 600m from each turbine). This approach therefore allows a more robust evaluation of potential impacts (if any) arising from the data presented here.

For field-based surveys, the availability of suitable weather conditions for completing surveys, with good visibility and avoidance of strong winds or heavy rain, must be considered. The avian flight data presented here were all collected in suitable weather conditions, as determined by Best Practice guidance (NatureScot, 2017). In some circumstances, this required re-arrangement of monthly schedules, with some VPs being surveyed twice in one month to compensate for months when no survey work took place. These are clearly indicated within the data and are presented in **Appendix A**.

It should be noted that such scheduling falls well within the tolerances of Best Practice guidelines (SNH, 2017) for such survey work. In all cases, Best Practice guidance (SNH, 2017) on selection and surveying at VPs has been adhered to throughout the work being reported.

When recording birds in flight, exact determination of ground location and flight height, both of which are essential to calculating collision risk, can be subject to variation between observers. It is therefore required to allow some margin of error for determining the exact location of flying birds, and this has been included within the CRM presented here by the inclusion of all recorded flight lines in an expanded 1km buffer zone, and also including data from all flight lines that intersect with this extended buffer, i.e. if a flight line originated within the buffer zone, but flew beyond the 1km boundary, the flight was continuously recorded, and the time flying outside the buffer also included within the CRM calculations. Similarly for flight height, two hub heights are proposed – 82m for Turbine T6, T7 & T9, and 102m for all other turbines. This gives a rotor-swept height between 14m and 150m for T6, T7 & T9, and between 34m and 170m for all other turbines. However, all bird records consisting of flight heights between 10m and 200m are included in the model.

Collectively, the inclusion of these data will increase the estimation of collision risk, supporting more robust outputs and therefore interpretation of results than would otherwise be the case.

1.2. Statement of Authority

Dr Alex Copland BSc PhD MIEnvSc MCIEEM is a Technical Director with INIS and reviewed this report. He has over 30 years of professional experience working in both statutory agencies and private companies, in third-level research institutions and with environmental NGOs. He is proficient in experimental design and data analysis and has managed several large-scale, multi-disciplinary ecological projects. These have included research and targeted management work for species of conservation concern, the design and delivery of practical conservation actions with a range of stakeholders and end-users, education, and interpretation on the interface between people and the environment and the development of co-ordinated, strategic plans for birds and biodiversity.

He has authored numerous scientific papers, developed and contributed to evidence-based position papers, visions and strategies on birds and habitats in Ireland. He has supervised the successful completion of research theses for several post-graduate students, including doctoral candidates. He lectures to both undergraduate and post-graduate students at UCD, as well as being a collaborative researcher with both UCD and UCC. He also sits on the Editorial Panel of the scientific journal, *Irish Birds*, which publishes original ornithological research relevant to Ireland's avifauna.

1.3. Site and Project Description

The proposed Gathabawn Windfarm Project site is located entirely within County Kilkenny, with the nearest village is Gathabawn village which is 1km southeast from the nearest Ballylehaun turbine and 3km west from the nearest Ballyring turbine. Lisdowney village is also located 3km to the northeast of the nearest Ballyring turbine, and at least 6km from the Ballylehaun turbines. The town of Ballyragget is located 6km northeast of Ballyring and 10km east of Ballylehaun, while the town of Johnstown is located 6km from Ballylehaun and 9km from Ballyring.

The receiving environment for the Proposed Project is characterised as rural open countryside with lands enclosed by hedgerows or stone walls. There are farmsteads and one-off housing located along the local roads and generally the commercial, civic and community services are in the surrounding

small towns and villages. Farming in the area is predominantly grassland supporting dairy and beef cattle and to a lesser degree sheep farming and tillage.

The layout of the proposed Project consists of 12 turbines, of which one turbine option is being considered (i.e., Vestas 136). The proposed Project comprises five turbines in the Ballyring area and seven turbines in the Ballylehaun area.

The turbine specifications used in this CRM are shown in **Table 1.1**.

Table 1.1 *Turbine specification for VESTAS V-136 for the proposed Project*

Technical information	Turbine Option
Number of turbines	12
Number of blades per turbine	3
Rotor diameter	136m
Rotor radius	68m
Hub height	82m & 102m
Lowest swept area of blade	14m & 32m
Maximum tip height	150m and 170m
Rotor blade maximum chord	4.1m
Pitch angle of the blade during normal operation[1]	30°
Rotation speed	14rpm
Rotation period	4.29s
Turbine operation time[2]	85%

[1] *The pitch angle of the blade is determined by wind speed, which is variable depending upon geographical location, landscape, local topographic factors, etc. To maintain a constant operating speed for a turbine, altering the pitch angle of the blade is used. This is usually determined by wind speed, with higher wind speeds requiring greater pitch angle to "feather" the wind and thereby control the rotation speed. The figure of 30° used here is derived from Band (2012) which gives an average pitch along the blade length of between 15 – 30 degrees (30° results in greater likelihood of effects and is used within this model which has adopted a precautionary approach to the determination of risk).*

[2] *European Wind Energy Association (2020) gives the average operation time of a turbine of between 70% and 85% of the time; NatureScot (2024) recommends default of 85% which is used here.*

1.4. Background to bird species assessed

The species selected for collision risk modelling are shown in **Tables 1.2** (breeding season) and **Table 1.3** (non-breeding season). Whilst some birds can occur at a site all year round, there tends to be differing activity levels between breeding and non-breeding seasons. This can be seen by the differences in activity between **Table 1.2** and **Table 1.3** where, for example, Black-headed Gull *Chroicocephalus ridibundus* and Lesser Black-backed Gull *Larus argentatus* are more regularly observed in winter months compared to summer. Conversely, there is increased activity of Buzzard *Buteo buteo* and Peregrine *Falco peregrinus* during the breeding season.

Target species for the proposed Project are based upon likely collision risk as well as their status as Birds of Conservation Concern in Ireland (BoCCI) Red or Amber Lists (Gilbert *et al*., 2021). Target species were:

- All species of waterfowl;
- All species of raptors;
- All species of wader; and
- All species of gull.

From this target species list, ten species were recorded during VP Watches in the breeding season (see **Table 1.2**) with 12 species recorded during the winter season (see **Table 1.3**). From these species, only those with sufficient flight activity (defined here as a minimum total of five flights per season and a minimum of ten individuals of each species recorded during each season of analysis; numbers below these thresholds will exhibit negligible collision risk) are retained for analysis. This resulted in nine species being assessed for collision risk during the breeding season (Black-headed Gull, Buzzard, Golden Plover *Pluvialis apricaria*, Kestrel *Falco tinnunculus*, Lesser Black-backed Gull, Peregrine, Snipe *Gallinago gallinago* and Sparrowhawk *Accipiter nisus*; see **Table 1.2**) and 11 species being assessed during the wintering season (Black-headed Gull*,* Buzzard, Golden Plover, Kestrel, Lapwing *Vanellus vanellus*, Lesser Black-backed Gull, Mute Swan *Cygnus olor*, Peregrine, Snipe, Sparrowhawk and Whooper Swan *Cygnus cygnus*; **see Table 1.3**).

For the 11 species being assessed, biometric data is required for inputting to the CRMs. These are shown in **Table 1.4**, along with the recommended avoidance rates applied in the CRMs (NatureScot, 2025).

Table 1.2 *Breeding season flight data for target species from Vantage Point Surveys*

Species	Number of Bouts			Number of Individuals			Duration of Bouts (s)			Inclusion in CRM
	Ballylehaun	Ballyring	TOTAL	Ballylehaun	Ballyring	TOTAL	Ballylehaun	Ballyring	TOTAL	
Black-headed Gull *Chroicocephalus ridibundus*	**6**	**1**	**7**	**18**	**3**	**6**	**795**	**560**	**1,355**	**Yes**
Buzzard *Buteo buteo*	**103**	**97**	**200**	**108**	**108**	**216**	**13,994**	**20,148**	**34,142**	**Yes**
Golden Plover *Pluvialis apricaria*	**1**		**1**	**28**		**28**	**840**		**840**	**Yes**
Grey Heron *Ardea cinerea*		1	1		1	1		30	30	No
Kestrel *Falco tinnunculus*	**29**	**8**	**37**	**34**	**8**	**42**	**4,852**	**302**	**5,154**	**Yes**
Lesser Black-backed Gull *Larus fuscus*	**7**	**16**	**23**	**33**	**28**	**61**	**2,850**	**1,461**	**4,311**	**Yes**
Mallard *Anas platyrhnchos*	1		1	2		2	40		40	No
Peregrine *Falco peregrinus*	**4**	**5**	**9**	**4**	**5**	**9**	**155**	**857**	**1,012**	**Yes**
Snipe *Gallinago Gallinago*		**1**	**1**		**1**	**1**		**5**	**5**	**Yes**
Sparrowhawk *Accipiter nisus*	**8**	**3**	**11**	**8**	**4**	**12**	**646**	**136**	**782**	**Yes**

Table 1.3 *Wintering season flight data for target species from Ballyring Vantage Point Surveys*

Species	Number of Bouts			Number of Individuals			Duration of Bouts (s)			Inclusion in CRM
	Ballylehaun	Ballyring	TOTAL	Ballylehaun	Ballyring	TOTAL	Ballylehaun	Ballyring	TOTAL	
Black-headed Gull *Chroicocephalus ridibundus*	**6**	**14**	**20**	**28**	**138**	**166**	**1,010**	**10,828**	**11,838**	**Yes**
Buzzard *Buteo buteo*	**26**	**38**	**64**	**31**	**46**	**77**	**4,038**	**5,493**	**9,531**	**Yes**
Golden Plover *Pluvialis apricaria*	**2**	**10**	**12**	**28**	**1,350**	**1,378**	**3,360**	**542,005**	**545,365**	**Yes**
Grey Heron *Ardea cinerea*		1	1		1	1		270	270	No
Kestrel *Falco tinnunculus*	**14**	**31**	**45**	**15**	**33**	**48**	**1,685**	**3,697**	**5,382**	**Yes**
Lapwing *Vanellus vanellus*		**2**	**2**		**14**	**14**		**600**	**600**	**Yes**
Lesser Black-backed Gull *Larus fuscus*	**24**	**16**	**40**	**750**	**114**	**864**	**48,490**	**7,278**	**55,768**	**Yes**
Mute Swan *Cygnus olor*	**7**	**3**	**10**	**4**	**11**	**15**	**480**	**1,200**	**1,680**	**Yes**
Peregrine *Falco peregrinus*		**1**	**1**		**1**	**1**		**25**	**25**	**Yes**
Snipe *Gallinago Gallinago*		**7**	**7**		**12**	**12**		**435**	**435**	**Yes**
Sparrowhawk *Accipiter nisus*	**4**	**4**	**8**	**5**	**4**	**9**	**420**	**120**	**540**	**Yes**
Whooper Swan *Cygnus cygnus*	**1**	**1**	**2**	**6**	**3**	**9**	**360**	**1,050**	**1,410**	**Yes**

Table 1.4 *Bird species biometrics and avoidance rates for use in CRM*

Species	Assessment Season	Length (bill to tail)	Wingspan	Flight speed[2]	Collision Avoidance Rate (%)[3]	Flight type	Nocturnal Activity Factor
Black-headed Gull	Breeding + Winter	0.37m	1.10m	11.9ms^{-1}	99.2%	Flapping	1
Buzzard	Breeding + Winter	0.57m	1.28m	11.6ms^{-1}	98%	Gliding	1
Golden Plover	Breeding + Winter	0.29m	0.76m	17.9ms^{-1}	99.6%[4]	Flapping	5[5]
Kestrel	Breeding + Winter	0.35m	0.80m	10.1ms^{-1}	95%	Flapping	1
Lapwing	Winter	0.31m	0.87	11.9ms^{-1}	98%	Flapping	5[5]
Lesser Black-backed Gull	Breeding + Winter	0.64m	1.50m	11.9ms^{-1}	99.5%	Gliding	1
Mute Swan	Winter	1.60m	2.38m	16.2ms^{-1}	99.5%	Flapping	3[6]
Peregrine	Breeding + Winter	0.5m	1.15m	12.1ms^{-1}	98%	Gliding	1
Snipe	Breeding + Winter	0.28m	0.45m	17.1ms^{-1}	98%	Flapping	5[7]
Sparrowhawk	Breeding + Winter	0.38m	0.70m	10.0ms^{-1}	98%	Flapping	1
Whooper Swan	Winter	1.60m	2.35m	17.3ms^{-1}	99.5%	Flapping	**3**[8]

Data sourced from https://www.rspb.org.uk/birds-and-wildlife/wildlife-guides/bird-a-z/ [Accessed November 2025]

[2] Data sourced from Alerstam *et al*. (2007); for Golden Plover, data for Grey Plover *Pluvialis squatarola* are used.

[3] Avoidance rates sourced from NatureScot (2025).

[4] Avoidance Rate for Golden Plover is given by NatureScot (2025) as 98% (the default avoidance rate). However, recent studies, including a review of collision monitoring data from four UK wind farms, recommended the use of two avoidance rate values: 99.6% and 99.8% (Gittings, 2022); 99.6% is used here.

[5] Determined from Gillings & Sutherland (2007) (which indicates that nocturnal prey intake rates were higher than diurnal rates (likely due to reduced competition); no information on movement but assumption that nocturnal activity may equal diurnal activity on a precautionary basis).

[6] Determined from Włodarczyk (2017), which indicates that Mute Swan shows some activity at low light levels around dusk and dawn; as such, a precautionary approach has been taken here.

[7] Determined from McNeil & Rodríguez (1996) which indicates increased crepuscular and nocturnal Snipe activity over daytime periods.

[8] Determined from Larsen & Clausen (2002), which indicates that sunrise and sunset activity occurs; as such, a precautionary approach has been taken here.

2. METHODOLOGICAL APPROACH

Collision Risk Modelling adopts a mathematical approach to determining the likelihood of a bird species colliding with wind turbine rotors at a pre-defined site and is fully described by Band *et al*. (2024) and NatureScot (2024), with supporting information provided by NatureScot (2025). This determination is based upon field data collected at the proposed wind farm site. The output from the model indicates the number of birds likely to collide with rotors of all turbines within the wind farm per year of operation of the wind farm as a whole. The inverse of this (i.e., the number of years over which a single fatality would be likely) is also indicated.

Standardised field data collected following Best Practice methods on birds flying through the proposed site (SNH, 2017) are used to determine the number of flights through the wind farm in the absence of any avoidance (or attraction) behaviours. This is Stage A of the standardized CRM approach (NatureScot, 2024). The output of Stage A is reconciled against the cross-sectional area of the rotors (**Table 1.1**) to estimate the number of flights through the rotor-swept area (Stage B of the standardized CRM approach (NatureScot, 2024)).

Stage C of the standardized CRM (NatureScot, 2024) determines the probability of collision for a single rotor transit of a bird, using further data on the rotor characteristics (**Table 1.1**) as well as biometric data on the bird species themselves (**Table 1.4**).

These data from Stages A, B and C are then used to determine the number of bird flights through the rotors of all turbines within the area on an annual basis (CRM Stage D) as well as the proportion of time that the wind farm rotors are operational (**see Table 1.**1). Stage E applies an avoidance rate for birds (see **Table 1.4**), based on published data.

The final part of the CRM (Stage F) is to identify any uncertainties around the output from Stage E.

2.1. Collection of field data

The CRM is based upon data collected from VPs at the proposed Gathabawn Windfarm Project, during the breeding season (March to October inclusive in 2025 and April to August inclusive in 2026), and two wintering seasons (October 2022 to April 2023 and October 2025 to March 2026). These data are collected following Best Practice methods (SNH, 2017). For full details of sources of timing of survey efforts for the data used for this CRM, please see **Appendix A.**

Both areas are covered by three Vantage Points (VPs) each: VP1, VP2 and VP3 cover Ballyring; VP4, VP5 and VP6 cover Ballylehaun. As the two areas, Ballyring and Ballylehaun, are separated by c.3km, separate collision risk models have been prepared for each area with the results combined to determine overall collision risk. The data for the two areas, Ballyring and Ballylehaun, are tabulated together in this report to assist with interpretation; however, the output from the NatureSCot Band model (see **Appendix B**) is presented for each area separately.

2.2. CRM Stage A: Determination of Flight Activity

Stage A of the CRM determines the number of flights through the wind farm in the absence of any avoidance (or attraction) behaviours. This is expressed as the **Areal Bird Density** ($\mathbf{D_A}$), which is the time per unit area that a bird species may be present within the turbines are, and is derived from the Vantage Point data. $\mathbf{D_A}$ is presented as bird-seconds/km^2, and is calculated as follows:

$$D_A = b/(t \times A)$$

Where: b is the number of flight seconds from a vantage point;
t is the time (in seconds) that the vantage point is watched; and
A is the area of the vantage point viewshed (km^2)

D_A is therefore calculated for each species for each Vantage Point within each season. These data can be presented monthly, but with low levels of activity they can also be averaged over the whole season and across the whole site (including both Ballyring and Ballylehaun areas) for all Vantage Points (see **Tables 2.1a – 2.1k**; Note that VP1, VP2 and VP3 cover Ballyring; VP4, VP5 and VP6 cover Ballylehaun). For all species considered in the CRM, the mean bird density per season (breeding or non-breeding) has been used to determine **D_A**. These are shown in **Tables 2.1a – 2.1k** and in **Appendix B** for all species considered.

Note that best practice requires that all flight activity within the Flight Risk Area - an area equal to the rotor length plus 500m, extending from each turbine, is used to determine **D_A**. For the proposed Project this would make the area for data collection a maximum of 568m (see **Table 1.1** for the Turbine measurements). To ensure that all areas are covered within the CRM, this data used to determine **D_A** extends to 600m from the turbine bases. However, all flightlines that touch into a 1km buffer from the turbines are included in full (i.e. all flight times outside the 1km buffer are also include within the model). As a result, **D_A** is therefore higher than is required by the published methodology (NatureScot, 2024), which increases the value of the collision risk estimate provided by the model.

Table 2.1a *Determination of Flight Activity for Black-headed Gull*

Season / Year	VP	Survey Area (km^2)	Breeding			Non-breeding		
			Survey Time (s)	Time in Flight (s)	Areal Bird Density (bird-secs/km^2)	Survey Time (s)	Time in Flight (s)	Areal Bird Density (bird-secs/km^2)
Year 1	VP1	1.46	129,600	0	0	108,000	270	0.001712
	VP2	1.68	129,600	0	0	129,600	300	0.001378
	VP3	1.22	129,600	0	0	162,000	400	0.002024
	VP4	1.74	129,600	360	0.001596	146,700	0	0
	VP5	2.21	129,600	0	0	127,800	4,611	0.016326
	VP6	2.04	145,800	0	0	129,600	360	0.001362
Year 2	VP1	1.46	129,600	0	0	129,600	40	0.000211
	VP2	1.68	129,600	0	0	129,600	0	0
	VP3	1.22	129,600	560	0.003542	129,600	0	0
	VP4	1.74	129,600	20	0.000089	129,600	0	0
	VP5	2.21	129,600	215	0.000751	129,600	5,632	0.019664
	VP6	2.04	129,600	200	0.000672	129,600	225	0.000851
Mean bird density					**0.000554**	**Mean bird density**		**0.003627**

Table 2.1b *Determination of Flight Activity for Buzzard*

Season / Year	VP	Survey Area (km²)	Breeding			Non-breeding		
			Survey Time (s)	Time in Flight (s)	Areal Bird Density (bird-secs/km²)	Survey Time (s)	Time in Flight (s)	Areal Bird Density (bird-secs/km²)
Year 1	VP1	1.46	129,600	1,280	0.006765	108,000	750	0.004756
	VP2	1.68	129,600	2,453	0.011266	129,600	708	0.003252
	VP3	1.22	129,600	9,704	0.061374	162,000	270	0.001366
	VP4	1.74	129,600	5,538	0.024558	146,700	3,167	0.012407
	VP5	2.21	129,600	1,516	0.005293	127,800	370	0.001310
	VP6	2.04	145,800	1,451	0.004878	129,600	1,212	0.004584
Year 2	VP1	1.46	129,600	1,896	0.010020	129,600	810	0.004281
	VP2	1.68	129,600	3,614	0.016599	129,600	520	0.002388
	VP3	1.22	129,600	541	0.003422	129,600	900	0.005692
	VP4	1.74	129,600	653	0.002896	129,600	360	0.001596
	VP5	2.21	129,600	830	0.002898	129,600	627	0.002189
	VP6	2.04	129,600	3,676	0.013904	129,600	597	0.002258
Mean bird density					**0.013656**	**Mean bird density**		**0.003840**

Table 2.1c *Determination of Flight Activity for Golden Plover*

Season / Year	VP	Survey Area (km²)	Breeding			Non-breeding		
			Survey Time (s)	Time in Flight (s)	Areal Bird Density (bird-secs/km²)	Survey Time (s)	Time in Flight (s)	Areal Bird Density (bird-secs/km²)
Year 1	VP1	1.46	129,600	0	0	108,000	960	0.006088
	VP2	1.68	129,600	0	0	129,600	2,400	0.011023
	VP3	1.22	129,600	0	0	162,000	0	0
	VP4	1.74	129,600	840	0.003725	146,700	0	0
	VP5	2.21	129,600	0	0	127,800	542005	1.919023
	VP6	2.04	145,800	0	0	129,600	0	0
Year 2	VP1	1.46	129,600	0	0	129,600	0	0
	VP2	1.68	129,600	0	0	129,600	0	0
	VP3	1.22	129,600	0	0	129,600	0	0
	VP4	1.74	129,600	0	0	129,600	0	0
	VP5	2.21	129,600	0	0	129,600	0	0
	VP6	2.04	129,600	0	0	129,600	0	0
Mean bird density					**0.000310**	**Mean bird density**		**0.161345**

Table 2.1d *Determination of Flight Activity for Kestrel*

Season / Year	VP	Survey Area (km^2)	Breeding			Non-breeding		
			Survey Time (s)	Time in Flight (s)	Areal Bird Density (bird-secs/km^2)	Survey Time (s)	Time in Flight (s)	Areal Bird Density (bird-secs/km^2)
Year 1	VP1	1.46	129,600	35	0.000185	108,000	55	0.000349
	VP2	1.68	129,600	15	0.000069	129,600	1,100	0.005052
	VP3	1.22	129,600	45	0.000285	162,000	230	0.001164
	VP4	1.74	129,600	0	0.000000	146,700	1,300	0.005093
	VP5	2.21	129,600	2,521	0.008802	127,800	30	0.000106
	VP6	2.04	145,800	1,020	0.003429	129,600	1,230	0.004652
Year 2	VP1	1.46	129,600	202	0.001068	129,600	0	0.000000
	VP2	1.68	129,600	5	0.000023	129,600	0	0.000000
	VP3	1.22	129,600	0	0.000000	129,600	300	0.001897
	VP4	1.74	129,600	122	0.000541	129,600	237	0.001051
	VP5	2.21	129,600	100	0.000349	129,600	1015	0.003544
	VP6	2.04	129,600	849	0.003211	129,600	125	0.000473
Mean bird density					**0.001497**	**Mean bird density**		**0.001948**

Table 2.1e *Determination of Flight Activity for Lapwing*

Season / Year	VP	Survey Area (km^2)	Non-breeding		
			Survey Time (s)	Time in Flight (s)	Areal Bird Density (bird-secs/km^2)
Year 1	VP1	1.46	108,000	360	0.002283
	VP2	1.68	129,600	0	0.000000
	VP3	1.22	162,000	0	0.000000
	VP4	1.74	146,700	0	0.000000
	VP5	2.21	127,800	0	0.000000
	VP6	2.04	129,600	0	0.000000
Year 2	VP1	1.46	129,600	0	0.000000
	VP2	1.68	129,600	240	0.001102
	VP3	1.22	129,600	0	0.000000
	VP4	1.74	129,600	0	0.000000
	VP5	2.21	129,600	0	0.000000
	VP6	2.04	129,600	0	0.000000
Mean bird density			**Mean bird density**		**0.000282**

Table 2.1f *Determination of Flight Activity for Lesser Black-backed Gull*

Season / Year	VP	Survey Area (km^2)	Breeding			Non-breeding		
			Survey Time (s)	Time in Flight (s)	Areal Bird Density (bird-secs/km^2)	Survey Time (s)	Time in Flight (s)	Areal Bird Density (bird-secs/km^2)
Year 1	VP1	1.46	129,600	0	0	108,000	0	0
	VP2	1.68	129,600	380	0.001745	129,600	420	0.001929
	VP3	1.22	129,600	665	0.004206	162,000	44,300	0.224145
	VP4	1.74	129,600	0	0	146,700	80	0.000313
	VP5	2.21	129,600	2,520	0.008798	127,800	180	0.000637
	VP6	2.04	145,800	195	0.000656	129,600	0	0
Year 2	VP1	1.46	129,600	435	0.002299	129,600	0	0
	VP2	1.68	129,600	10	0.000046	129,600	2,495	0.011459
	VP3	1.22	129,600	0	0	129,600	1,245	0.007874
	VP4	1.74	129,600	15	0.000067	129,600	0	0
	VP5	2.21	129,600	120	0.000419	129,600	7,018	0.024503
	VP6	2.04	129,600	0	0	129,600	0	0
Mean bird density					**0.001520**	**Mean bird density**		**0.022572**

Table 2.1g *Determination of Flight Activity for Mute Swan*

Season / Year	VP	Survey Area (km^2)	Non-breeding		
			Survey Time (s)	Time in Flight (s)	Areal Bird Density (bird-secs/km^2)
Year 1	VP1	1.46	108,000	0	0
	VP2	1.68	129,600	480	0.002205
	VP3	1.22	162,000	0	0
	VP4	1.74	146,700	0	0
	VP5	2.21	127,800	0	0
	VP6	2.04	129,600	360	0.001362
Year 2	VP1	1.46	129,600	0	0
	VP2	1.68	129,600	0	0
	VP3	1.22	129,600	0	0
	VP4	1.74	129,600	0	0
	VP5	2.21	129,600	0	0
	VP6	2.04	129,600	840	0.003177
Mean bird density			**Mean bird density**		**0.000562**

Table 2.1h *Determination of Flight Activity for Peregrine*

Season / Year	VP	Survey Area (km²)	Breeding			Non-breeding		
			Survey Time (s)	Time in Flight (s)	Areal Bird Density (bird-secs/km²)	Survey Time (s)	Time in Flight (s)	Areal Bird Density (bird-secs/km²)
Year 1	VP1	1.46	129,600	0	0	108,000	0	0
	VP2	1.68	129,600	0	0	129,600	0	0
	VP3	1.22	129,600	667	0.004219	162,000	667	0.003375
	VP4	1.74	129,600	0	0	146,700	25	0.000098
	VP5	2.21	129,600	90	0.000314	127,800	0	0
	VP6	2.04	145,800	0	0	129,600	0	0
Year 2	VP1	1.46	129,600	0	0	129,600	0	0
	VP2	1.68	129,600	25	0.000115	129,600	0	0
	VP3	1.22	129,600	165	0.001044	129,600	0	0
	VP4	1.74	129,600	15	0.000067	129,600	0	0
	VP5	2.21	129,600	0	0	129,600	0	0
	VP6	2.04	129,600	50	0.000189	129,600	0	0
Mean bird density					**0.000496**	**Mean bird density**		**0.000289**

Table 2.1i *Determination of Flight Activity for Snipe*

Season / Year	VP	Survey Area (km²)	Breeding			Non-breeding		
			Survey Time (s)	Time in Flight (s)	Areal Bird Density (bird-secs/km²)	Survey Time (s)	Time in Flight (s)	Areal Bird Density (bird-secs/km²)
Year 1	VP1	1.46	129,600	0	0	108,000	0	0
	VP2	1.68	129,600	5	0.000023	129,600	240	0.001102
	VP3	1.22	129,600	0	0	162,000	0	0
	VP4	1.74	129,600	0	0	146,700	0	0
	VP5	2.21	129,600	0	0	127,800	0	0
	VP6	2.04	145,800	0	0	129,600	0	0
Year 2	VP1	1.46	129,600	0	0	129,600	150	0.000793
	VP2	1.68	129,600	0	0	129,600	45	0.000207
	VP3	1.22	129,600	0	0	129,600	0	0
	VP4	1.74	129,600	0	0	129,600	0	0
	VP5	2.21	129,600	0	0	129,600	0	0
	VP6	2.04	129,600	0	0	129,600	0	0
Mean bird density					**0.000002**	**Mean bird density**		**0.000175**

Table 2.1j *Determination of Flight Activity for Sparrowhawk*

Season / Year	VP	Survey Area (km^2)	Breeding			Non-breeding		
			Survey Time (s)	Time in Flight (s)	Areal Bird Density (bird-secs/km^2)	Survey Time (s)	Time in Flight (s)	Areal Bird Density (bird-secs/km^2)
Year 1	VP1	1.46	129,600	0	0	108,000	0	0
	VP2	1.68	129,600	0	0	129,600	0	0
	VP3	1.22	129,600	0	0	162,000	60	0.000304
	VP4	1.74	129,600	5	0.000022	146,700	0	0
	VP5	2.21	129,600	0	0	127,800	30	0.000106
	VP6	2.04	145,800	103	0.000346	129,600	0	0
Year 2	VP1	1.46	129,600	0	0	129,600	360	0.001903
	VP2	1.68	129,600	76	0.000349	129,600	15	0.000069
	VP3	1.22	129,600	0	0	129,600	45	0.000285
	VP4	1.74	129,600	75	0.000333	129,600	50	0.000222
	VP5	2.21	129,600	0	0	129,600	40	0.000140
	VP6	2.04	129,600	463	0.001751	129,600	0	0
Mean bird density					**0.000233**	**Mean bird density**		**0.000252**

Table 2.1k *Determination of Flight Activity for Whooper Swan*

Season / Year	VP	Survey Area (km^2)	Non-breeding		
			Survey Time (s)	Time in Flight (s)	Areal Bird Density (bird-secs/km^2)
Year 1	VP1	1.46	108,000	0	0
	VP2	1.68	129,600	0	0
	VP3	1.22	162,000	0	0
	VP4	1.74	146,700	0	0
	VP5	2.21	127,800	0	0
	VP6	2.04	129,600	1,050	0.003971
Year 2	VP1	1.46	129,600	0	0
	VP2	1.68	129,600	0	0
	VP3	1.22	129,600	360	0.002277
	VP4	1.74	129,600	0	0
	VP5	2.21	129,600	0	0
	VP6	2.04	129,600	0	0
Mean bird density			**Mean bird density**		**0.000521**

As stated, the CRM uses the monthly mean bird density on a monthly basis. In cases where there is overlap between months and season (e.g. April and October appearing in both breeding and non-breeding seasons) an average of the two season's mean values can be used (NatureSccot, 2024); these values are shown in **Appendix B**.

Weighting can be applied based on habitat variability across the site. In the case of the proposed Project, which is relatively small with homogenous habitat, no weighting needs to be applied as there is an equal likelihood of flightline occurring throughout the site for the two breeding or winter seasons.

The CRM methodology also allows for estimation of the proportion of birds flying at risk height ($\mathbf{Q_{2R}}$). For the VP data collected for the proposed Project, flight height data was collected in height bands of 0-10m, 10m-20m, 20m-30m, 30m-40m, 40m-50m 50m-200m and >200m. For the proposed Project, the lowest swept height of the turbine option is 14m (see **Table 1.1**) and the highest swept height is 170m (see **Table 1.1**). The proportion of data to include would therefore be part of the flight heights within the 10m-20m height band (6m of this 10m band has a turbine blade within it) and in the 50m-200m band. However, for the purposes of this assessment, all data in the 10-20m and 50-200m flight bands are retained within the model. Furthermore, all flights within the >200m height band are also included (i.e. the model output will produce a higher estimation of collision risk). As a result, for the collision risk models calculated here, $\mathbf{Q_{2R}}$ is considered to have a value of **1.**

Another factor in determining the number of flights through the rotors, based upon the aerial bird density, is the nocturnal activity of the target species. Clearly, it is not possible to undertake flightline surveys at night with any degree of accuracy, so a weighting factor is used, based upon the known behaviour of the individual bird species, to reflect the likely nocturnal activity. This factor is based upon a scale of 1 (0% nocturnal activity) to 5 (where nocturnal activity is considered to be at the same level as the daytime activity). For the proposed Project, the nocturnal activity factor ($\mathbf{f_{night}}$) for each of the species to be assessed is shown in **Table 1.4**, along with the source (where relevant) to determine these levels.

2.3. CRM Stage B: Estimating number of flights through the rotors

The total number of bird transits expected through rotors is proportional to the number and cross-sectional area of the rotors, and to the density of birds in the airspace at risk height ($\mathbf{D_A}$), incorporating the proportion of birds at collision height ($\mathbf{Q_{2R}}$) and the nocturnal activity factor ($\mathbf{f_{night}}$). These calculations are performed in the NatureScot collision risk model[1] (see **Appendix B**). The spreadsheet also considers daylight hours, based on the latitude for the proposed project.

2.4. CRM Stage C: Probability of single rotor transit collision

Stage C of the CRM uses information on the size and speed of the turbines, as well as biometric details on size and flight speed of a bird species to determine the risk of collision for a bird making a single flight through an operational rotor.

The bird is assumed to enter the rotor swept area at random anywhere on the disc. The calculations determine the collision risk at 20 locations along the length of the rotor blade (in intervals of 0.05R, where R is the radius of the rotor swept area) using numerical integration of various elements in relation to the rotors (notably, chord width and angular velocity of the blade) and the bird (such as the point at which the bird enters the rotor along the radius and the flight speed of the bird). These are calculated for both up-wind and down-wind flights and averaged to give a probability of collision assuming no avoiding action is taken.

These calculations are performed in the NatureScot collision risk model[1] (see **Appendix B**), where the relevant data on the turbines and bird species are entered, and the model estimates the probability of a collision when a bird flies through the rotor area.

2.5. CRM Stage D: Estimation of collisions per annum

Stage D combines the data from the three stages above and incorporates the likely operation time for the turbines (85%), to estimate the likely number of flights through the rotors for the whole wind farm in a year, assuming that no avoiding action is taken by the species being assessed. Outputs from Stage D are shown in **Appendix B**.

2.6. CRM Stage E: Estimation of collisions per annum with avoidance

It has been well documented that birds demonstrate avoidance of wind turbines. This includes macro-avoidance, where birds avoid the whole wind farm area, as well as micro-avoidance, where birds fly within the wind farm but avoid the turbines and blades. The documented level of avoidance for different species varies (NatureScot, 2025), and published avoidance rates for the bird species being assessed at the proposed Project are shown in **Table 1.4** (and repeated in **Table 2.2** below). These calculations are performed in the NatureScot collision risk model[2] (see **Appendix B**), where four avoidance rates (95%, 98%, 99% and 99.5%) are shown (except for Black-headed Gull, which has a default avoidance rate of 99.2%, which is presented in **Appendix B** in place of the 99% avoidance rate).

The final results from the CRM, using the default avoidance rates as recommended by the guidance (NatureScot, 2025) are shown in **Table 1.4** (and repeated in **Table 2.2** below)**.**

Table 2.2 *Estimated collision rates (collisions/annum) allowing for avoidance*

Species	Avoidance Rate (%)	Estimated Collision Rate/annum	No. of years/collision
Black-headed Gull	99.2%	0.3	3.33
Buzzard	98%	4.2	0.24
Golden Plover	99.6%	12.3	0.08
Kestrel	95%	1.6	0.63
Lapwing	98%	0.1	10
Lesser Black-backed Gull	99.5%	0.9	1.11
Mute Swan	99.5%	0.1	10
Peregrine	98%	0.2	5
Snipe	98%	0.0	N/A
Sparrowhawk	98%	0.1	10
Whooper Swan	99.5%	0.1	10

Of the 12 species assessed, Golden Plover has the highest rate with 12.3 estimated collisions per annum while Buzzard has an estimated collision rate of 4.2 birds/annum, Kestrel has an estimated

[1] https://www.nature.scot/doc/collision-risk-model-onshore-wind-farms-spreadsheet-2024 [accessed May 2026]
[2] https://www.nature.scot/doc/collision-risk-model-onshore-wind-farms-spreadsheet-2024 [accessed May 2026]

collision risk of 1.6 individuals/annum, Lesser Black-backed Gull has an estimated collision risk of 0.9 individuals per annum, Black-headed Gull has an estimated collision rate of 0.3/annum and Peregrine has an estimated collision risk of 0.2 birds/annum. All other species modelled for collision risk had collision rates of 0.1 birds/annum or lower.

2.7. CRM Stage F: Assessment of uncertainty in CRM outputs

The CRM guidance (NatureScot, 2024) several sources of variability or uncertainty in the data being collected and the resultant outputs from the model. Band (2024) highlights possible sources for many of these areas of uncertainty that could impact upon the outcome of the CRM. Due to these potential sources of uncertainty, the output from any CRM should convey the uncertainty in the collision risk estimate, by indicating, in addition to a 'best estimate', a range of confidence around that estimate. Though it is unlikely that these can be subject to detailed statistical analysis (with the exception of the survey data), the aim should be to reflect the range of uncertainty as it would impact on target species populations and/or growth rates. Information to include should reflect:

- uncertainty or variability in flight activity data, including imprecision on flight height estimates and lack of knowledge about nighttime behaviour;
- uncertainty due to the limitations of the collision model, including the variability of bird dimensions and flight speed, the simplification in shape of a bird and turbine blades;
- uncertainty arising from turbine options yet to be decided, in number, size and speed. These options should include a 'worst case' in terms of the option likely to present greatest bird collision risk; and
- uncertainty of avoidance behaviour of the bird species in question, noting any variability in this behaviour and drawing conclusions about the likely collision risk.

The errors in some of these elements may be quantified and combined to estimate the total error or uncertainty. Each error or uncertainty (e_1 to e_5) is expressed as a relative error, i.e. expressed as a fraction or percentage of the value to which it refers. These errors arise independently so, in combining errors, it is appropriate to take a root mean square approach to allow for the likelihood that some errors will offset others. Uncertainty (E) is therefore calculated as:

$$E = \sqrt{(e_1^2 + e_2^2 + e_3^2 + e_4^2 + e_5^2)}$$

2.7.1. Bird Density (e_1)

Bird density survey measurements showed variability between surveys (see **Tables 2.1a – 2.1m**). Band (2024) recommends that the relative error in the collision estimate in each period is presented. This is calculated for each species. The Areal Bird Density (as shown in **Tables 2.1a – 2.1k** and **Tables 2.2a – 2.2k**) are used to generate SE, using the following formula:

$$SE = \frac{s}{\sqrt{n}}$$

Where *s* is the standard deviations of the areal bird densities and *n* is the number of sampling elements (n=6 for one season and n=12 for two seasons). The relative error (RE) is therefore calculated as:

$$RE = \frac{(1.96 \times SE)}{\bar{x}}$$

Where $\bar{x}$ is the mean areal bird density across all seasons, and 1.96 provides a 95% confidence interval. The results of these calculations are presented in **Table 2.3** for all species.

Table 2.3 *Overall uncertainty factors associated with the collision risk model estimates*

Species	Bird Density (e_1)	No. active hours (e_2)	Proportion at risk height (e_3)	Turbine size and operation (e_4)	CRM limitations (e_5)	Overall Uncertainty (E)
Black-headed Gull	0.936	0.05	0.10	0	0.20	0.96
Buzzard	0.563	0.05	0.10	0	0.20	0.61
Golden Plover	1.897	0.05	0.10	0	0.20	1.91
Kestrel	0.524	0.05	0.10	0	0.20	0.57
Lapwing	1.166	0.05	0.10	0	0.20	1.19
Lesser Black-backed Gull	1.480	0.05	0.10	0	0.20	1.50
Mute Swan	1.049	0.05	0.10	0	0.20	1.07
Peregrine	1.076	0.05	0.10	0	0.20	1.10
Snipe	1.202	0.05	0.10	0	0.20	1.22
Sparrowhawk	0.816	0.05	0.10	0	0.20	0.85
Whooper Swan	1.320	0.05	0.10	0	0.20	1.34

As noted earlier, the data used for the CRM for the proposed Project in Gathabawn were selected from recorded Vantage Point survey data using a 1km buffer to clip flight lines. This is beyond the minimum rotor length plus 500m buffer extending from each turbine indicated by Best Practice guidelines (NatureScot, 2024). Therefore, the CRM results presented here indicate a substantially more conservative (i.e. higher) estimate of collision risk than is likely to be the case by incorporating additional flight lines within this extended buffer.

As part of the model, bird flights were considered to be of equal chance to be upwind or downwind when passing through the rotor area of the turbine. Whether a bird is flying upwind or downwind can have an effect on the speed at which they are travelling and therefore the time spent within the area of the rotor that a collision could occur. Due to turbine blade geometry, the risk of collision is higher for birds flying upwind than downwind, even if they are travelling at the same speed. Certain species may be transiting the area of the windfarm in a similar direction each time, and due to prevailing winds, may be more likely to be flying up or downwind each time. As this is not part of the recording of data, it has to be assumed there is an equal chance.

2.7.2. Nocturnal activity (e_2)

For many species of bird there is a very little literature on nighttime activity and due to the lack of nighttime surveying, estimates of nocturnal activity are used. A small sample size of studies results in nighttime activity factors which may not accurately reflect the actual activity of those species at night. Furthermore, species not typically active at night may still fly if flushed or disturbed from roosting places. As a result, it is likely that the uncertainty around nocturnal activity for the species assessed may vary on a species-by-species basis but, given the evidence-based approach used, a value for e_2 of 5% is applied for all species.

2.7.3. Proportion at risk height (e_3)

The CRM methodology also allows for estimation of the proportion of birds flying at risk height ($\mathbf{Q_{2R}}$). As discussed, for the VP data collected for the proposed Project, flightline data from the flight bands

between 10m and 200m were all retained for inclusion within the model, which extends below the lowest swept height of the turbines model proposed (14m; see **Table 1.1**) and substantially above the highest swept height (which is 170m; see **Table 1.1**). As a result, for the collision risk models calculated here, $\mathbf{Q_{2R}}$ is considered to have a value of **1**, and therefore presents a higher estimate of collision risk than is likely to be the case. Nevertheless, e_3 is still calculated at 10% to cover off any issues with observers missing species at the 10m level due to landscape structure.

2.7.4. Turbine size and time operational (e_4)

Only one turbine model has been proposed for the project, therefore there is no likely error or uncertainty associated with this.

An operational time of 85% has been used in this model. The European Wind Energy Association (2020) gives the average operation time of a turbine to be between 70% and 85% of the time and NatureScot (2024) recommends default of 85%.

Collectively, these data as presented are considered to be accurate (i.e. $e_4 = 0$)

2.7.5. Uncertainty due to CRM limitations (e_5)

The CRM uses specific data for consideration within the model, such as the length, wingspan and weight of the bird species being assessed. Clearly bird size differs around a mean size. For the size characteristics, the source data used in **Table 1.4** presents a range of length and wingspan. In order to ensure the CRM outputs presented here are robust, the longest length and wingspan are used in the model to return the higher estimate of collision risk. Similarly, flight speeds vary with wind conditions (whether the bird is flying upwind/downwind, wind speed etc.) and the bird's activity, so a mean airspeed has been used for the model.

Aspects of the turbine blade and operation are simplified for sake of the model. Rotor speed used in the modelling is a calculated mean over operational time. Turbines will operate within a cut-in (lowest wind speed viable for operation) and cut-out speed (speed at which the turbine is generating its full amount of power). This results in an uncertainty as the speed of the turbine's rotation will vary depending on wind speed at a particular point in time, with a collision more likely at higher operating speeds.

Additionally, the pitch of the blade is altered depending on the speed of the wind while the turbine is operating. In the case of this CRM, a pitch angle of 30 degrees was used. This figure is derived from Band (2012) which gives an average pitch along the blade length of between 25 – 30 degrees. Gittings (2025) suggests that monitoring data from onshore windfarms in Ireland shows pitch angles are rarely more than 9 degrees. As the 30 degrees of pitch has a greater likelihood of increased risk for collision.

Nevertheless, Band (2024) indicates that uncertainty arising from the CRM may be of an order of +/- 20%, and that has been used here (i.e. $e_5 = 20\%$)

2.7.6. Uncertainty due to avoidance behaviour

It is noted that the avoidance behaviour of bird species may be subject to several influencing factors. A good example is Golden Plover, where the avoidance Rate for Golden Plover is given by NatureScot (2025) as 98%. However, recent studies, including a review of collision monitoring data from four UK wind farms, recommended the use of two avoidance rate values: 99.6% and 99.8% (Gittings, 2022). An avoidance rate of 99.6% is used here; the 99.8% avoidance rate would give an estimated 6.1 collisions per annum.

There are similar issues using the 95% avoidance rate for Kestrel. This is largely due to their hovering behaviour during foraging, when they can spend long periods within the rotor collision risk area. Kestrels have been shown to be particularly susceptible to collision with turbines (NatureScot, 2025), which may be due to foraging behaviours when they tend to be looking down as they rise into the turbine swept area (Cullen *et al.*, 2019). However, where there are not suitable foraging habitats under the turbines the likelihood of collision would be substantially reduced. A 98% avoidance rate is the default avoidance rate for raptors (NatureScot, 2025), which would result in a reduction of collision risk to Kestrels by a magnitude of 2.5. Applying this reduction to the CRM outputs for Kestrel arising from the data presented here for the proposed Project would result in an estimated collision risk of c.0.6 collisions per annum.

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Appendix A GATHABAWN WINDFARM - VANTAGE POINT SURVEY EFFORT

Table A-1a *Vantage Point Survey hours for the two breeding seasons used for the CRM calculations*

VP	Breeding season 2025								Breeding season 2026							
	Apr	May	Jun	Jul	Aug	Sep	Oct	Total	Apr	May	Jun	Jul	Aug	Sep	Total
1	6	3	5	10	2	10	0	**36**	6	6	8	4	12	0	**36**
2	4	4	2	13	7	6	0	**36**	6	6	6	4	14	0	**36**
3	0	0	12	12	3	3	6	**36**	9	3	6	6	12	0	**36**
4	0	6	6	12	7	2	3	**36**	6	3	9	6	12	0	**36**
5	0	3	9	12	4	8	0	36	6	6	6	6	12	0	**36**
6	0	6	0	20.5	8	6	0	40.5	6	6	6	6	12	0	**36**
Total	**10**	**22**	**34**	**79.5**	**31**	**35**	**9**	**220.5**	**39**	**30**	**41**	**32**	**74**	**0**	**216**

Table A-1b *Vantage Point Survey hours for the two wintering seasons used for the CRM calculations*

VP	Winter season 2022/23								Winter season 2025/26							
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	Total	Oct	Nov	Dec	Jan	Feb	Mar	Total
1	6	3	6	6	9	0	0	**30**	6	6	4	8	6	6	**36**
2	6	3	6	6	3	12	0	**36**	6	6	2	10	6	6	**36**
3	6	3	6	6	6	6	12	**45**	6	6	8	4	6	6	**36**
4	6	0	0	10.75	12	12	0	**40.75**	0	12	2	10	6	6	**36**
5	6	0	6	11.5	6	6	0	**35.5**	6	6	4	6	8	6	**36**
6	6	0	6	18	0	0	6	**36**	6	6	4	8	6	6	**36**
Total	**36**	**9**	**30**	**58.25**	**36**	**36**	**18**	**223.25**	**30**	**42**	**24**	**46**	**38**	**36**	**216**

Appendix B COLLISION RISK MODEL SPREADSHEET OUTPUT

COLLISION RISK MODEL

Required input data is in orange boxes
Calculated output is in blue boxes
green boxes are for information only, to show variables used at each stage

Bird data		Value	Units
Species name		Black-headed Gull	
Bird length	L	0.37	m
Wingspan	W	1.1	m
Bird flight speed	v	11.9	m s^{-1}
Flight type, flapping or gliding		flapping	
% of flights upwind/downwind		50%	50%
Nocturnal activity ranking 1-5		1	
Nocturnal activity factor	f_{night}	0%	

Windfarm data		Value	Units
Site name		Gathabawn	
Latitude		52.78	degrees
No of turbines	T	12	
Width of windfarm	w	3	km

Turbine data		Value	Units
Model		V136	
Hub height		102	m
Rotor radius	R	68	m
No of blades	b	3	
Rotation speed	Ω	14	rpm
Max blade width	C	4.1	m
Blade pitch	λ	30	degrees
Risk height range		34-170	m

normal approach

Set to 'normal approach' to use survey data on bird density
Set to 'birds on migration' to use 'Migrant collision risk' sheet in place of Stage A

Stage A

				Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	year avge
Daytime bird density	D_A		birds/km^2	0.003627	0.003627	0.003627	0.002094	0.000561	0.000561	0.000561	0.000561	0.000561	0.002094	0.003627	0.003627	0.0021
Proportion at rotor risk height	Q_{kr}	100.00%														
At latitude 52.8		Daylight hours per month		254.5	275.1	366.5	417.3	488.6	503.6	506.8	457.0	382.1	330.7	263.4	239.1	4484.9
		Nighttime hours per month		489.5	396.9	377.5	302.7	255.4	216.4	237.2	287.0	337.9	413.3	456.6	504.9	4275.1

Stage B

No of turbines	T	12														
Rotor radius	R	68	m													
		Total rotor frontal area m^2	174321													
Nocturnal activity factor	f_{night}	0%														
Bird flight speed	v	11.9	m s^{-1}	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	year total
		Projected number of rotor transits		50.7	54.8	73.0	48.0	15.1	15.5	15.6	14.1	11.8	38.0	52.5	47.6	**437**

Stage C

No of blades	b	3		Bird length	l	0.37	m
Rotation speed	Ω	14	rpm	Wingspan	w	1.1	m
Rotor radius	R	68	m	Bird flight speed	v	11.9	m s^{-1}
Max blade width	C	4.1	m	Flight type		flapping	
Pitch	λ	30	degrees	% of flights upwind/downwind		50%	50%
Blade profile		see Blade profile sheet					

Single transit risk	upwind	12.12%
	downwind	6.31%
	weighted mean	**9.21%**

Stage D

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	year avge
Proportion of time operational	Q_{op}	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%
		Collision rates before avoidance												year total
		3.97	4.29	5.72	3.76	1.18	1.21	1.22	1.10	0.92	2.98	4.11	3.73	**34**

Stage E

Allow for large array correction? No
Width of windfarm w 3 km

			large array correction	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	per year
				Collision rates allowing for avoidance												
Avoidance rates modelled		95.00%	100.00%	0.20	0.21	0.29	0.19	0.06	0.06	0.06	0.06	0.05	0.15	0.21	0.19	**1.7**
		98.00%	100.00%	0.08	0.09	0.11	0.08	0.02	0.02	0.02	0.02	0.02	0.06	0.08	0.07	**0.7**
		99.20%	100.00%	0.03	0.03	0.05	0.03	0.01	0.01	0.01	0.01	0.01	0.02	0.03	0.03	**0.3**
		99.50%	100.00%	0.02	0.02	0.03	0.02	0.01	0.01	0.01	0.01	0.00	0.01	0.02	0.02	**0.2**

COLLISION RISK MODEL

Required input data is in orange boxes
Calculated output is in blue boxes
green boxes are for information only, to show variables used at each stage

Bird data		Value	Units
Species name		Buzzard	
Bird length	L	0.57	m
Wingspan	W	1.28	m
Bird flight speed	v	11.6	m s^{-1}
Flight type, flapping or gliding		gliding	
% of flights upwind/downwind		50%	50%
Nocturnal activity ranking 1-5		1	
Nocturnal activity factor	f_{night}	0%	

Windfarm data		Value	Units
Site name		Gathabawn	
Latitude		52.78	degrees
No of turbines	T	12	
Width of windfarm	w	3	km

Turbine data		Value	Units
Model		V136	
Hub height		102	m
Rotor radius	R	68	m
No of blades	b	3	
Rotation speed	Ω	14	rpm
Max blade width	C	4.1	m
Blade pitch	λ	30	degrees
Risk height range		34-170	m

normal approach

Set to 'normal approach' to use survey data on bird density
Set to 'birds on migration' to use 'Migrant collision risk' sheet in place of Stage A

Stage A

				Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	year avge
Daytime bird density	D_A		birds/km^2	0.00384	0.00384	0.00384	0.008748	0.013656	0.013656	0.013656	0.013656	0.013656	0.008748	0.00384	0.00384	0.0087
Proportion at rotor risk height	Q_{AR}	100.00%														
At latitude 52.8		Daylight hours per month		254.5	275.1	366.5	417.3	488.6	503.6	506.8	457.0	382.1	330.7	263.4	239.1	4484.9
		Nighttime hours per month		489.5	396.9	377.5	302.7	255.4	216.4	237.2	287.0	337.9	413.3	456.6	504.9	4275.1

Stage B

					Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	year total
No of turbines	T	12															
Rotor radius	R	68	m														
		Total rotor frontal area m^2		174321													
Nocturnal activity factor	f_{night}	0%															
Bird flight speed	v	11.6	m s^{-1}														
		Projected number of rotor transits			52.3	56.6	75.3	195.4	357.1	368.1	370.5	334.1	279.3	154.8	54.1	49.1	**2347**

Stage C

No of blades	b	3			Bird length	l	0.57	m
Rotation speed	Ω	14	rpm		Wingspan	w	1.28	m
Rotor radius	R	68	m		Bird flight speed	v	11.6	m s^{-1}
Max blade width	C	4.1	m		Flight type		gliding	
Pitch	λ	30	degrees	% of flights upwind/downwind			50%	50%
Blade profile		see Blade profile sheet						

Single transit risk	upwind	13.40%
	downwind	7.56%
	weighted mean	**10.48%**

				Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	year avge
Stage D																
Proportion of time operational	Q_{op}			85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%
				Collision rates before avoidance												year total
				4.66	5.04	6.71	17.41	31.82	32.80	33.01	29.77	24.89	13.80	4.82	4.38	**209**

Stage E

					Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	per year
Allow for large array correction?		No															
Width of windfarm	w	3	km														
			large array correction		Collision rates allowing for avoidance												
Avoidance rates modelled		95.00%	100.00%		0.23	0.25	0.34	0.87	1.59	1.64	1.65	1.49	1.24	0.69	0.24	0.22	**10.5**
		98.00%	100.00%		0.09	0.10	0.13	0.35	0.64	0.66	0.66	0.60	0.50	0.28	0.10	0.09	**4.2**
		99.00%	100.00%		0.05	0.05	0.07	0.17	0.32	0.33	0.33	0.30	0.25	0.14	0.05	0.04	**2.1**
		99.50%	100.00%		0.02	0.03	0.03	0.09	0.16	0.16	0.17	0.15	0.12	0.07	0.02	0.02	**1.0**

COLLISION RISK MODEL

Required input data is in orange boxes
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Bird data		Value	Units
Species name		Golden Plover	
Bird length	L	0.29	m
Wingspan	W	0.76	m
Bird flight speed	v	17.9	m s^{-1}
Flight type, flapping or gliding		flapping	
% of flights upwind/downwind		50%	50%
Nocturnal activity ranking 1-5		5	
Nocturnal activity factor	f_{night}	100%	

Windfarm data		Value	Units
Site name		Gathabawn	
Latitude		52.78	degrees
No of turbines	T	12	
Width of windfarm	w	3	km

Turbine data		Value	Units
Model		V136	
Hub height		102	m
Rotor radius	R	68	m
No of blades	b	3	
Rotation speed	Ω	14	rpm
Max blade width	C	4.1	m
Blade pitch	λ	30	degrees
Risk height range		34-170	m

normal approach

Set to 'normal approach' to use survey data on bird density
Set to 'birds on migration' to use 'Migrant collision risk' sheet in place of Stage A

Stage A

				Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	year avge
Daytime bird density	D_A		birds/km^2	0.16135	0.16135	0.16135	0.08083	0.00031	0.00031	0.00031	0.00031	0.00031	0.08083	0.16135	0.16135	0.0808
Proportion at rotor risk height	Q_{ar}	100.00%														
At latitude 52.8		Daylight hours per month		254.5	275.1	366.5	417.3	488.6	503.6	506.8	457.0	382.1	330.7	263.4	239.1	4484.9
		Nighttime hours per month		489.5	396.9	377.5	302.7	255.4	216.4	237.2	287.0	337.9	413.3	456.6	504.9	4275.1

Stage B

					Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	year total
No of turbines	T	12															
Rotor radius	R	68	m														
		Total rotor frontal area m^2		174321													
Nocturnal activity factor	f_{night}	100%															
Bird flight speed	v	17.9	m s^{-1}														
		Projected number of rotor transits			9915.0	8955.5	9915.0	4806.8	19.1	18.4	19.1	19.1	18.4	4967.0	9595.2	9915.0	**58164**

Stage C

No of blades	b	3		Bird length	l	0.29	m	
Rotation speed	Ω	14	rpm	Wingspan	w	0.76	m	
Rotor radius	R	68	m	Bird flight speed	v	17.9	m s^{-1}	
Max blade width	C	4.1	m	Flight type		flapping		
Pitch	λ	30	degrees	% of flights upwind/downwind		50%		50%
Blade profile		see Blade profile sheet						

Single transit risk	upwind	8.89%
	downwind	3.55%
	weighted mean	**6.22%**

Stage D

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	year avge
Proportion of time operational	Q_{op}	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%
		Collision rates before avoidance												year total
		524.03	473.32	524.03	254.05	1.01	0.97	1.01	1.01	0.97	262.52	507.13	524.03	**3074**

Stage E

Allow for large array correction? No
Width of windfarm w 3 km

			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	per year
	array correction		Collision rates allowing for avoidance												
Avoidance rates modelled	95.00%	100.00%	26.20	23.67	26.20	12.70	0.05	0.05	0.05	0.05	0.05	13.13	25.36	26.20	**153.7**
	98.00%	100.00%	10.48	9.47	10.48	5.08	0.02	0.02	0.02	0.02	0.02	5.25	10.14	10.48	**61.5**
	99.60%	100.00%	2.10	1.89	2.10	1.02	0.00	0.00	0.00	0.00	0.00	1.05	2.03	2.10	**12.3**
	99.80%	100.00%	1.05	0.95	1.05	0.51	0.00	0.00	0.00	0.00	0.00	0.53	1.01	1.05	**6.1**

COLLISION RISK MODEL

Required input data is in orange boxes
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Bird data		Value	Units
Species name		Kestrel	
Bird length	L	0.35	m
Wingspan	W	0.8	m
Bird flight speed	v	10.1	m s^{-1}
Flight type, flapping or gliding		flapping	
% of flights upwind/downwind		50%	50%
Nocturnal activity ranking 1-5		1	
Nocturnal activity factor	f_{night}	0%	

Windfarm data		Value	Units
Site name		Gathabawn	
Latitude		52.78	degrees
No of turbines	T	12	
Width of windfarm	w	3	km

Turbine data		Value	Units
Model		V136	
Hub height		102	m
Rotor radius	R	68	m
No of blades	b	3	
Rotation speed	Ω	14	rpm
Max blade width	C	4.1	m
Blade pitch	λ	30	degrees
Risk height range		34-170	m

normal approach

Set to 'normal approach' to use survey data on bird density
Set to 'birds on migration' to use 'Migrant collision risk' sheet in place of Stage A

Stage A

			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	year avge
Daytime bird density	D_A	birds/km^2	0.00195	0.00195	0.00195	0.00172	0.0015	0.0015	0.0015	0.0015	0.0015	0.00172	0.00195	0.00195	0.0017
Proportion at rotor risk height	Q_{2R}	100.00%													
At latitude 52.8		Daylight hours per month	254.5	275.1	366.5	417.3	488.6	503.6	506.8	457.0	382.1	330.7	263.4	239.1	4484.9
		Nighttime hours per month	489.5	396.9	377.5	302.7	255.4	216.4	237.2	287.0	337.9	413.3	456.6	504.9	4275.1

Stage B

No of turbines	T	12													
Rotor radius	R	68	m												
		Total rotor frontal area m^2	174321												
Nocturnal activity factor	f_{night}	0%													
Bird flight speed	v	10.1	m s^{-1}	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	year total
		Projected number of rotor transits		23.1	25.0	33.3	33.5	34.1	35.1	35.4	31.9	26.7	26.6	23.9	21.7	**350**

Stage C

No of blades	b	3		Bird length	l	0.35	m
Rotation speed	Ω	14	rpm	Wingspan	w	0.8	m
Rotor radius	R	68	m	Bird flight speed	v	10.1	m s^{-1}
Max blade width	C	4.1	m	Flight type		flapping	
Pitch	λ	30	degrees	% of flights upwind/downwind		50%	50%
Blade profile		see Blade profile sheet					

Single transit risk		
	upwind	13.39%
	downwind	7.46%
	weighted mean	**10.42%**

Stage D		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	year avge
Proportion of time operational	Q_{op}	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%
		Collision rates before avoidance												year total
		2.05	2.21	2.95	2.97	3.02	3.11	3.13	2.83	2.36	2.35	2.12	1.92	**31**

Stage E

Allow for large array correction?		No													
Width of windfarm	w	3	km												
			array correction	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	per year
				Collision rates allowing for avoidance												
Avoidance rates modelled		95.00%	100.00%	0.10	0.11	0.15	0.15	0.15	0.16	0.16	0.14	0.12	0.12	0.11	0.10	**1.6**
		98.00%	100.00%	0.04	0.04	0.06	0.06	0.06	0.06	0.06	0.06	0.05	0.05	0.04	0.04	**0.6**
		99.00%	100.00%	0.02	0.02	0.03	0.03	0.03	0.03	0.03	0.03	0.02	0.02	0.02	0.02	**0.3**
		99.50%	100.00%	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.01	0.01	0.01	0.01	0.01	**0.2**

COLLISION RISK MODEL

Required input data is in orange boxes
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Bird data		Value	Units
Species name		Lapwing	
Bird length	L	0.31	m
Wingspan	W	0.87	m
Bird flight speed	v	11.9	m s^{-1}
Flight type, flapping or gliding		flapping	
% of flights upwind/downwind		50%	50%
Nocturnal activity ranking 1-5		5	
Nocturnal activity factor	f_{night}	100%	

Windfarm data		Value	Units
Site name		Gathabawn	
Latitude		52.78	degrees
No of turbines	T	12	
Width of windfarm	w	3	km

Turbine data		Value	Units
Model		V136	
Hub height		102	m
Rotor radius	R	68	m
No of blades	b	3	
Rotation speed	Ω	14	rpm
Max blade width	C	4.1	m
Blade pitch	λ	30	degrees
Risk height range		34-170	m

normal approach

Set to 'normal approach' to use survey data on bird density
Set to 'birds on migration' to use 'Migrant collision risk' sheet in place of Stage A

Stage A

			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	year avge
Daytime bird density	D_A	birds/km^2	0.00028	0.00028	0.00028	0.00014	0	0	0	0	0	0.00014	0.00028	0.00028	0.0001
Proportion at rotor risk height	Q_{2R}	100.00%													
At latitude 52.8		Daylight hours per month	254.5	275.1	366.5	417.3	488.6	503.6	506.8	457.0	382.1	330.7	263.4	239.1	4484.9
		Nighttime hours per month	489.5	396.9	377.5	302.7	255.4	216.4	237.2	287.0	337.9	413.3	456.6	504.9	4275.1

Stage B

No of turbines	T	12	
Rotor radius	R	68	m
		Total rotor frontal area m^2	174321
Nocturnal activity factor	f_{night}	100%	
Bird flight speed	v	11.9	m s^{-1}

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	year total
Projected number of rotor transits	11.5	10.4	11.5	5.6	0.0	0.0	0.0	0.0	0.0	5.8	11.1	11.5	**67**

Stage C

No of blades	b	3	Bird length	l	0.31	m
Rotation speed	Ω	14	rpm	Wingspan	w	0.87	m
Rotor radius	R	68	m	Bird flight speed	v	11.9	m s^{-1}
Max blade width	C	4.1	m	Flight type		flapping	
Pitch	λ	30	degrees	% of flights upwind/downwind		50%	50%
Blade profile		see Blade profile sheet					

Single transit risk		
upwind	11.70%	
downwind	5.89%	
weighted mean	**8.80%**	

Stage D

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	year avge
Proportion of time operational	Q_{op}	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%

Collision rates before avoidance													year total
	0.86	0.78	0.86	0.42	0.00	0.00	0.00	0.00	0.00	0.43	0.83	0.86	5

Stage E

Allow for large array correction? No
Width of windfarm w 3 km

		array correction	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	per year
			Collision rates allowing for avoidance												
Avoidance rates modelled	95.00%	100.00%	0.04	0.04	0.04	0.02	0.00	0.00	0.00	0.00	0.00	0.02	0.04	0.04	**0.3**
	98.00%	100.00%	0.02	0.02	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.02	**0.1**
	99.00%	100.00%	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	**0.1**
	99.50%	100.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.0**

COLLISION RISK MODEL

Required input data is in orange boxes
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Bird data		Value	Units
Species name		esser Black-backed Gull	
Bird length	L	0.64	m
Wingspan	W	1.5	m
Bird flight speed	v	11.9	m s^{-1}
Flight type, flapping or gliding		gliding	
% of flights upwind/downwind		50%	50%
Nocturnal activity ranking 1-5		1	
Nocturnal activity factor	f_{night}	0%	

Windfarm data		Value	Units
Site name		Gathabawn	
Latitude		52.78	degrees
No of turbines	T	12	
Width of windfarm	w	3	km

Turbine data		Value	Units
Model		V136	
Hub height		102	m
Rotor radius	R	68	m
No of blades	b	3	
Rotation speed	Ω	14	rpm
Max blade width	C	4.1	m
Blade pitch	λ	30	degrees
Risk height range		34-170	m

normal approach

Set to 'normal approach' to use survey data on bird density
Set to 'birds on migration' to use 'Migrant collision risk' sheet in place of Stage A

Stage A

				Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	year avge
Daytime bird density	D_A		birds/km^2	0.02257	0.02257	0.01205	0.00152	0.00152	0.00152	0.00152	0.00152	0.00152	0.01205	0.02257	0.02257	0.0103
Proportion at rotor risk height	Q_{zR}	100.00%														
At latitude 52.8		Daylight hours per month		254.5	275.1	366.5	417.3	488.6	503.6	506.8	457.0	382.1	330.7	263.4	239.1	4484.9
		Nighttime hours per month		489.5	396.9	377.5	302.7	255.4	216.4	237.2	287.0	337.9	413.3	456.6	504.9	4275.1

Stage B

					Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	year total
No of turbines	T	12															
Rotor radius	R	68	m														
		Total rotor frontal area m^2		174321													
Nocturnal activity factor	f_{night}	0%															
Bird flight speed	v	11.9	m s^{-1}														
		Projected number of rotor transits			315.5	341.0	242.4	34.8	40.8	42.0	42.3	38.1	31.9	218.7	326.5	296.3	**1970**

Stage C

No of blades	b	3			Bird length	l	0.64	m
Rotation speed	Ω	14	rpm		Wingspan	w	1.5	m
Rotor radius	R	68	m		Bird flight speed	v	11.9	m s^{-1}
Max blade width	C	4.1	m		Flight type		gliding	
Pitch	λ	30	degrees	% of flights upwind/downwind			50%	50%
Blade profile		see Blade profile sheet						

Single transit risk		
upwind	13.59%	
downwind	7.77%	
weighted mean	**10.68%**	

Stage D		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	year avge
Proportion of time operational	Q_{op}	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%
		Collision rates before avoidance												year total
		28.64	30.96	22.01	3.16	3.70	3.82	3.84	3.46	2.90	19.86	29.64	26.90	**179**

Stage E

Allow for large array correction? No
Width of windfarm w 3 km

		array correction	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	per year
			Collision rates allowing for avoidance												
Avoidance rates modelled	95.00%	100.00%	1.43	1.55	1.10	0.16	0.19	0.19	0.19	0.17	0.14	0.99	1.48	1.35	**8.9**
	98.00%	100.00%	0.57	0.62	0.44	0.06	0.07	0.08	0.08	0.07	0.06	0.40	0.59	0.54	**3.6**
	99.00%	100.00%	0.29	0.31	0.22	0.03	0.04	0.04	0.04	0.03	0.03	0.20	0.30	0.27	**1.8**
	99.50%	100.00%	0.14	0.15	0.11	0.02	0.02	0.02	0.02	0.02	0.01	0.10	0.15	0.13	**0.9**

COLLISION RISK MODEL

Required input data is in orange boxes
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Bird data		Value	Units
Species name		Mute Swan	
Bird length	L	1.6	m
Wingspan	W	2.38	m
Bird flight speed	v	16.2	m s^{-1}
Flight type, flapping or gliding		flapping	
% of flights upwind/downwind		50%	50%
Nocturnal activity ranking 1-5		3	
Nocturnal activity factor	f_{night}	50%	

Windfarm data		Value	Units
Site name		Gathabawn	
Latitude		52.78	degrees
No of turbines	T	12	
Width of windfarm	w	3	km

Turbine data		Value	Units
Model		V136	
Hub height		102	m
Rotor radius	R	68	m
No of blades	b	3	
Rotation speed	Ω	14	rpm
Max blade width	C	4.1	m
Blade pitch	λ	30	degrees
Risk height range		34-170	m

normal approach

Set to 'normal approach' to use survey data on bird density
Set to 'birds on migration' to use 'Migrant collision risk' sheet in place of Stage A

Stage A

			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	year avge
Daytime bird density	D_A	birds/km^2	0.00056	0.00056	0.00056	0.00028	0	0	0	0	0	0.00029	0.00056	0.00056	0.0003
Proportion at rotor risk height	Q_{2R}	100.00%													
At latitude 52.8		Daylight hours per month	254.5	275.1	366.5	417.3	488.6	503.6	506.8	457.0	382.1	330.7	263.4	239.1	4484.9
		Nighttime hours per month	489.5	396.9	377.5	302.7	255.4	216.4	237.2	287.0	337.9	413.3	456.6	504.9	4275.1

Stage B

No of turbines	T	12	
Rotor radius	R	68	m
		Total rotor frontal area m^2	174321
Nocturnal activity factor	f_{night}	50%	
Bird flight speed	v	16.2	m s^{-1}

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	year total
Projected number of rotor transits	21.0	19.9	23.3	11.9	0.0	0.0	0.0	0.0	0.0	11.6	20.7	20.7	**129**

Stage C

No of blades	b	3		Bird length	l	1.6 m
Rotation speed	Ω	14	rpm	Wingspan	w	2.38 m
Rotor radius	R	68	m	Bird flight speed	v	16.2 m s^{-1}
Max blade width	C	4.1	m	Flight type		flapping
Pitch	λ	30	degrees	% of flights upwind/downwind		50% 50%
Blade profile		see Blade profile sheet				

Single transit risk	upwind	15.22%
	downwind	9.74%
	weighted mean	**12.48%**

Stage D

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	year avge
Proportion of time operational	Q_{op}	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%
														year total
		Collision rates before avoidance												
		2.23	2.11	2.47	1.27	0.00	0.00	0.00	0.00	0.00	1.23	2.19	2.19	**14**

Stage E

Allow for large array correction?		No	
Width of windfarm	w	3	km

		array correction	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	per year
			Collision rates allowing for avoidance												
Avoidance rates modelled	95.00%	100.00%	0.11	0.11	0.12	0.06	0.00	0.00	0.00	0.00	0.00	0.06	0.11	0.11	**0.7**
	98.00%	100.00%	0.04	0.04	0.05	0.03	0.00	0.00	0.00	0.00	0.00	0.02	0.04	0.04	**0.3**
	99.00%	100.00%	0.02	0.02	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.02	**0.1**
	99.50%	100.00%	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	**0.1**

COLLISION RISK MODEL

Required input data is in orange boxes
Calculated output is in blue boxes
green boxes are for information only, to show variables used at each stage

Bird data		Value	Units
Species name		Peregrine	
Bird length	L	0.5	m
Wingspan	W	1.15	m
Bird flight speed	v	12.1	m s^{-1}
Flight type, flapping or gliding		flapping	
% of flights upwind/downwind		50%	50%
Nocturnal activity ranking 1-5		1	
Nocturnal activity factor	f_{night}	0%	

Windfarm data		Value	Units
Site name		Gathabawn	
Latitude		52.78	degrees
No of turbines	T	12	
Width of windfarm	w	3	km

Turbine data		Value	Units
Model		V136	
Hub height		102	m
Rotor radius	R	68	m
No of blades	b	3	
Rotation speed	Ω	14	rpm
Max blade width	C	4.1	m
Blade pitch	λ	30	degrees
Risk height range		34-170	m

normal approach

Set to 'normal approach' to use survey data on bird density
Set to 'birds on migration' to use 'Migrant collision risk' sheet in place of Stage A

Stage A

				Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	year avge
Daytime bird density	D_A		birds/km^2	0.00029	0.00029	0.00029	0.00039	0.0005	0.0005	0.0005	0.0005	0.0005	0.00039	0.00029	0.00029	0.0004
Proportion at rotor risk height	Q_{AR}	100.00%														
At latitude 52.8		Daylight hours per month		254.5	275.1	366.5	417.3	488.6	503.6	506.8	457.0	382.1	330.7	263.4	239.1	4484.9
		Nighttime hours per month		489.5	396.9	377.5	302.7	255.4	216.4	237.2	287.0	337.9	413.3	456.6	504.9	4275.1

Stage B

					Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	year total
No of turbines	T	12															
Rotor radius	R	68	m														
		Total rotor frontal area m^2		174321													
Nocturnal activity factor	f_{night}	0%															
Bird flight speed	v	12.1	m s^{-1}														
		Projected number of rotor transits			4.1	4.4	5.9	9.1	13.5	13.9	14.0	12.7	10.6	7.2	4.3	3.9	**104**

Stage C

No of blades	b	3		Bird length	l	0.5	m	
Rotation speed	Ω	14	rpm	Wingspan	w	1.15	m	
Rotor radius	R	68	m	Bird flight speed	v	12.1	m s^{-1}	
Max blade width	C	4.1	m	Flight type		flapping		
Pitch	λ	30	degrees	% of flights upwind/downwind		50%		50%
Blade profile		see Blade profile sheet						

Single transit risk	
upwind	12.68%
downwind	6.88%
weighted mean	**9.78%**

Stage D

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	year avge
Proportion of time operational	Q_{op}	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%
		Collision rates before avoidance												year total
		0.34	0.37	0.49	0.76	1.12	1.16	1.17	1.05	0.88	0.60	0.35	0.32	**9**

Stage E

Allow for large array correction? No
Width of windfarm w 3 km

		array correction	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	per year
			Collision rates allowing for avoidance												
Avoidance rates modelled	95.00%	100.00%	0.02	0.02	0.02	0.04	0.06	0.06	0.06	0.05	0.04	0.03	0.02	0.02	**0.4**
	98.00%	100.00%	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.01	0.01	**0.2**
	99.00%	100.00%	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	**0.1**
	99.50%	100.00%	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	**0.0**

COLLISION RISK MODEL

Required input data is in orange boxes
Calculated output is in blue boxes
green boxes are for information only, to show variables used at each stage

Bird data		Value	Units
Species name		Snipe	
Bird length	L	0.28	m
Wingspan	W	0.45	m
Bird flight speed	v	17.1	m s^{-1}
Flight type, flapping or gliding		flapping	
% of flights upwind/downwind		50%	50%
Nocturnal activity ranking 1-5		5	
Nocturnal activity factor	f_{night}	100%	

Windfarm data		Value	Units
Site name		Gathabawn	
Latitude		52.77	degrees
No of turbines	T	12	
Width of windfarm	w	3	km

Turbine data		Value	Units
Model		V136	
Hub height		102	m
Rotor radius	R	68	m
No of blades	b	3	
Rotation speed	Ω	14	rpm
Max blade width	C	4.1	m
Blade pitch	λ	30	degrees
Risk height range		34-170	m

normal approach

Set to 'normal approach' to use survey data on bird density
Set to 'birds on migration' to use 'Migrant collision risk' sheet in place of Stage A

Stage A

				Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	year avge
Daytime bird density	D_A		birds/km^2	0.00018	0.00018	0.00018	8.9E-05	2E-06	2E-06	2E-06	2E-06	2E-06	8.9E-05	0.00018	0.00018	0.0001
Proportion at rotor risk height	$Q_{2/R}$	100.00%														
At latitude 52.8		Daylight hours per month		254.6	275.2	366.5	417.3	488.5	503.5	506.8	457.0	382.1	330.7	263.4	239.1	4484.8
		Nighttime hours per month		489.4	396.8	377.5	302.7	255.5	216.5	237.2	287.0	337.9	413.3	456.6	504.9	4275.2

Stage B

					Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	year total
No of turbines	T	12															
Rotor radius	R	68	m														
		Total rotor frontal area m^2		174321													
Nocturnal activity factor	f_{night}	100%															
Bird flight speed	v	17.1	m s^{-1}														
		Projected number of rotor transits			10.3	9.3	10.3	5.1	0.1	0.1	0.1	0.1	0.1	5.2	9.9	10.3	**61**

Stage C

No of blades	b	3		Bird length	l	0.28	m	
Rotation speed	Ω	14	rpm	Wingspan	w	0.45	m	
Rotor radius	R	68	m	Bird flight speed	v	17.1	m s^{-1}	
Max blade width	C	4.1	m	Flight type		flapping		
Pitch	λ	30	degrees	% of flights upwind/downwind		50%		50%
Blade profile		see Blade profile sheet						

Single transit risk	upwind	8.95%
	downwind	3.54%
	weighted mean	**6.24%**

Stage D

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	year avge
Proportion of time operational	Q_{op}	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%
		Collision rates before avoidance												year total
		0.55	0.49	0.55	0.27	0.01	0.01	0.01	0.01	0.01	0.28	0.53	0.55	**3**

Stage E

Allow for large array correction? No
Width of windfarm w 3 km

		array correction	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	per year
			Collision rates allowing for avoidance												
Avoidance rates modelled	95.00%	100.00%	0.03	0.02	0.03	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.03	0.03	**0.2**
	98.00%	100.00%	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	**0.1**
	99.00%	100.00%	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	**0.0**
	99.50%	100.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.0**

COLLISION RISK MODEL

Required input data is in orange boxes
Calculated output is in blue boxes
green boxes are for information only, to show variables used at each stage

Bird data		Value	Units
Species name		Sparrowhawk	
Bird length	L	0.38	m
Wingspan	W	0.7	m
Bird flight speed	v	10	m s^{-1}
Flight type, flapping or gliding		flapping	
% of flights upwind/downwind		50%	50%
Nocturnal activity ranking 1-5		1	
Nocturnal activity factor	f_{night}	0%	

Windfarm data		Value	Units
Site name		Gathabawn	
Latitude		52.78	degrees
No of turbines	T	12	
Width of windfarm	w	3	km

Turbine data		Value	Units
Model		V136	
Hub height		102	m
Rotor radius	R	68	m
No of blades	b	3	
Rotation speed	Ω	14	rpm
Max blade width	C	4.1	m
Blade pitch	λ	30	degrees
Risk height range		34-170	m

normal approach

Set to 'normal approach' to use survey data on bird density
Set to 'birds on migration' to use 'Migrant collision risk' sheet in place of Stage A

Stage A

				Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	year avge
Daytime bird density	D_A		birds/km^2	0.00025	0.00025	0.00025	0.00024	0.00023	0.00023	0.00023	0.00023	0.00023	0.00024	0.00025	0.00025	0.0002
Proportion at rotor risk height	Q_{aR}	100.00%														
At latitude 52.8		Daylight hours per month		254.5	275.1	366.5	417.3	488.6	503.6	506.8	457.0	382.1	330.7	263.4	239.1	4484.9
		Nighttime hours per month		489.5	396.9	377.5	302.7	255.4	216.4	237.2	287.0	337.9	413.3	456.6	504.9	4275.1

Stage B

					Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	year total
No of turbines	T	12															
Rotor radius	R	68	m														
		Total rotor frontal area m^2		174321													
Nocturnal activity factor	f_{night}	0%															
Bird flight speed	v	10	m s^{-1}														
		Projected number of rotor transits			3.0	3.2	4.3	4.7	5.3	5.4	5.4	4.9	4.1	3.7	3.1	2.8	**50**

Stage C

No of blades	b	3		Bird length	l	0.38	m		
Rotation speed	Ω	14	rpm	Wingspan	w	0.7	m		
Rotor radius	R	68	m	Bird flight speed	v	10	m s^{-1}		
Max blade width	C	4.1	m	Flight type		flapping			
Pitch	λ	30	degrees	% of flights upwind/downwind		50%		50%	
Blade profile		see Blade profile sheet							

Single transit risk	upwind	13.67%
	downwind	7.73%
	weighted mean	**10.70%**

Stage D

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	year avge
Proportion of time operational	Q_{op}	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%
		Collision rates before avoidance												year total
		0.27	0.29	0.39	0.43	0.48	0.49	0.50	0.45	0.37	0.34	0.28	0.25	5

Stage E

Allow for large array correction? No
Width of windfarm w 3 km

			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	per year
	array correction		Collision rates allowing for avoidance												
Avoidance rates modelled	95.00%	100.00%	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.01	**0.2**
	98.00%	100.00%	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	**0.1**
	99.00%	100.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.0**
	99.50%	100.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.0**

COLLISION RISK MODEL

Required input data is in orange boxes
Calculated output is in blue boxes
green boxes are for information only, to show variables used at each stage

Bird data		Value	Units
Species name		Whooper Swan	
Bird length	L	1.6	m
Wingspan	W	2.35	m
Bird flight speed	v	17.3	m s^{-1}
Flight type, flapping or gliding		flapping	
% of flights upwind/downwind		50%	50%
Nocturnal activity ranking 1-5		3	
Nocturnal activity factor	f_{night}	50%	

Windfarm data		Value	Units
Site name		Gathabawn	
Latitude		52.78	degrees
No of turbines	T	12	
Width of windfarm	w	3	km

Turbine data		Value	Units
Model		V136	
Hub height		102	m
Rotor radius	R	68	m
No of blades	b	3	
Rotation speed	Ω	14	rpm
Max blade width	C	4.1	m
Blade pitch	λ	30	degrees
Risk height range		34-170	m

normal approach

Set to 'normal approach' to use survey data on bird density
Set to 'birds on migration' to use 'Migrant collision risk' sheet in place of Stage A

Stage A

				Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	year avge
Daytime bird density	D_A		birds/km^2	0.00052	0.00052	0.00052	0.00026	0	0	0	0	0	0.00026	0.00052	0.00052	0.0003
Proportion at rotor risk height	Q_{AR}	100.00%														
At latitude 52.8		Daylight hours per month		254.5	275.1	366.5	417.3	488.6	503.6	506.8	457.0	382.1	330.7	263.4	239.1	4484.9
		Nighttime hours per month		489.5	396.9	377.5	302.7	255.4	216.4	237.2	287.0	337.9	413.3	456.6	504.9	4275.1

Stage B

					Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	year total
No of turbines	T	12															
Rotor radius	R	68	m														
		Total rotor frontal area m^2		174321													
Nocturnal activity factor	f_{night}	50%															
Bird flight speed	v	17.3	m s^{-1}														
		Projected number of rotor transits			20.8	19.7	23.1	11.8	0.0	0.0	0.0	0.0	0.0	11.2	20.5	20.4	**127**

Stage C

No of blades	b	3		Bird length	l	1.6	m	
Rotation speed	Ω	14	rpm	Wingspan	w	2.35	m	
Rotor radius	R	68	m	Bird flight speed	v	17.3	m s^{-1}	
Max blade width	C	4.1	m	Flight type		flapping		
Pitch	λ	30	degrees	% of flights upwind/downwind		50%		50%
Blade profile		see Blade profile sheet						

Single transit risk	upwind	14.49%
	downwind	9.10%
	weighted mean	**11.79%**

Stage D

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	year avge
Proportion of time operational	Q_{op}	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%
		Collision rates before avoidance												year total
		2.08	1.97	2.32	1.18	0.00	0.00	0.00	0.00	0.00	1.12	2.05	2.05	**13**

Stage E

Allow for large array correction? No
Width of windfarm w 3 km

Avoidance rates modelled		array correction	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	per year
			Collision rates allowing for avoidance												
	95.00%	100.00%	0.10	0.10	0.12	0.06	0.00	0.00	0.00	0.00	0.00	0.06	0.10	0.10	**0.6**
	98.00%	100.00%	0.04	0.04	0.05	0.02	0.00	0.00	0.00	0.00	0.00	0.02	0.04	0.04	**0.3**
	99.00%	100.00%	0.02	0.02	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.02	**0.1**
	99.50%	100.00%	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	**0.1**

Ecopower

Gathabawn Windfarm, Co. Kilkenny

Appendix 13.8: Aquatic Ecology Baseline & Fisheries Report

September 2026

This report considers the particular instructions and requirements of our client.

It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

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Quality Assurance

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The findings outlined within this report and the data we have provided are to our knowledge true and express our bona fide professional opinions. This report has been prepared and provided in accordance with the Chartered Institute of Ecology and Environmental Management (CIEEM) good practice guidelines. Where pertinent CIEEM Guidelines used in the preparation of this report include the *Guidelines for Ecological Report Writing* (CIEEM, 2017a), *Guidelines for Preliminary Ecological Appraisals* (CIEEM, 2017b) and *Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine*, (CIEEM, 2018). CIEEM Guidelines include model formats for Preliminary Ecological Appraisal and Ecological Impact Assessment. Also, where pertinent, evaluations presented herein take cognisance of recommended Guidance from the EPA such as *Guidelines on the information to be contained in Environmental Impact Assessment Reports* (EPA, 2022), and in respect of European sites, *Managing Natura 2000 sites. The provisions of Article 6 of the 'Habitats' Directive 92/43/EEC* (European Commission, 2018).

Due cognisance has been given at all times to the provisions of the *Wildlife Acts 1976-2024,* the *European Union (Natural Habitats) Regulations*, the *European Communities (Birds and Natural Habitats) Regulations 2011-2021,* EU Regulation on Invasive Alien Species under *EU Regulation 1143/2014*, the *EU Birds Directive 2009/147/EC* and *Habitats Directive 92/43/EEC*.

No method of assessment can completely remove the possibility of obtaining partially imprecise or incomplete information. Any limitation to the methods applied or constraints however are clearly identified within the main body of this document.

Version	**Date**		**Name**	**Signature**
1 (rebadge)	14/04/2026	**Report prepared by:**	Laura Stenson BSc. (Hons) ACIEEM	
1	16/04/2026	**Report checked by:**	Conor Daly MSc BSc ACIEEM	
Project Reference	**2214L**	**Title**	Ecopower: Gathabawn Windfarm, Co. Kilkenny – Aquatic Ecology Report	

Notice

This report was produced by INIS Environmental Consultants Ltd. (INIS) on behalf of **Ecopower** the client, for the specific purpose of assessing the aquatics and fisheries baseline at the **Gathabawn Windfarm, Co. Kilkenny**, with all reasonable skill, care and due diligence within the terms of the contract with the client, incorporating our terms and conditions and taking account of the resources devoted to it by agreement with the client.

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1. INTRODUCTION

1.1. Background

Triturus Environmental Ltd. were commissioned by Inis Environmental Consultants Ltd. to conduct baseline aquatic surveys to inform EIAR preparation for the proposed Gathabawn Windfarm development in north County Kilkenny, and undertake a baseline fisheries assessment of numerous watercourses in the vicinity of the Gathabawn Windfarm (**Figure 2.1**).

Undertaken on a catchment-wide scale, this report provides a baseline assessment of the aquatic ecology including fisheries and biological water quality, as well as protected species and habitats in the vicinity of the proposed development. Aquatic surveys were undertaken in July 2025. In order to gain an accurate overview of the existing and potential fisheries value of the watercourses within the vicinity of the proposed development a catchment-wide electro-fishing survey across 15 no. riverine sites was undertaken (**Table 2.1; Figure 2.2**). A fisheries appraisal of 1 no. riverine site (prohibitive depths) and 1 no. pond site was also undertaken. Electro-fishing helped to identify the importance of the watercourses as nurseries and habitats for salmonids, Lamprey (*Lampetra* sp.) and European Eel (*Anguilla anguilla*). Other species of lower conservation value were also recorded. The presence and or absence of fish populations and or associated supporting habitat would help inform impact assessment and any subsequent mitigation for the development.

Triturus Environmental Ltd. made an application under Section 14 of the Fisheries (Consolidation) Act, 1959 as substituted by Section 4 of the Fisheries (Amendment) Act, 1962, to undertake a catchment-wide electro-fishing survey in the vicinity of the proposed Gathabawn Windfarm. The surveys were undertaken in July 2025.

1.2. Project description

A full description of the proposed Gathabawn Windfarm is provided in Chapter 5: Description of the Development of the Environmental Impact Assessment Report (EIAR).

1.3. Statements of Authority

This report has been prepared by:

Ross Macklin B.Sc. (Hons) MCIEEM., MIFM, HDip GIS, PDip IPM 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, EcIA, 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.

Bill Brazier B.Sc. (Hons) MIFM is an aquatic ecologist with over 10 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, EcIA and AA/NIS reporting, as well as biodiversity, invasive species and fisheries management. His diverse project list includes work on renewal energy developments, flood relief schemes, road schemes, blueways/greenways and biodiversity projects. He is currently completing his Ph.D. on the genetics, reproductive biology and invasive potential impact of Common Carp (Cyprinus carpio) in Irish waters. Additionally, Bill runs the highly respected Off the Scale magazine, Ireland's most-read recreational angling publication and is the national coordinator for the novel Anglers National Line Recycling Scheme (ANLRS).

This report was reviewed and amended for the submitted EIAR by INIS:

Ms Laura Stenson BSc ACIEEM is an Ecologist with Inis Environmental Consultants Ltd**.** who amended this report. Laura has an honours BSc in Earth and Ocean Sciences from University of Galway and has three years' experience working in consultancy. Laura has extensive report writing experience, which includes the production, review and editing of Appropriate Assessment Screening Reports (AA), Natura Impact Statements (NIS) and Ecological Impact Assessments (EcIA);

She has experience in multi-disciplinary surveys, including habitat classification, mammal surveys, various bird surveys (e.g. Wintering and Breeding birds, I-WeBS, Adapted Brown & Shepherd), invasive species surveys, pre-construction mammal surveys, and bat surveys.

Conor Daly MSc BSc ACIEEM is the Report Team Lead and Ecologist with Inis Environmental Consultants Ltd. who checked this report. Conor was awarded a MSc in Biodiversity and Conservation and an Honours BSc (Hons) in Zoology. Conor has conducted bird, mammal, habitat and entomological surveys for renewable energy projects, conservation monitoring projects and private developments. Over his three years as an ecologist, Conor has written Preliminary Environmental Assessments (PEA), Appropriate Assessment (AA) Screening, NIS and EIA reports. During his employment with Inis, Conor has been involved in conducting a range of reports, including Appropriate Assessment (AA) Screenings, Natura Impact Statements (NIS), and Environmental Impact Assessment (EIA) Screenings and reports.

2. METHODOLOGY

2.1. Selection of watercourses for assessment

All freshwater watercourses which could be affected directly or indirectly by the proposed development were considered as part of the current assessment. Thus, a total of 17 no. sites were selected for detailed aquatic assessment (see **Table 2.1, Figure 2.1**). The courses and nomenclature for the watercourses surveyed followed Environmental Protection Agency (EPA) mapping.

Riverine survey sites were present on the Coolnacrutta Stream (EPA code: 15C50), River Goul (15G02), Lismaine Stream (15L16), Gorteenahilla River (15G08), Nuenna River (15N02), Gorteennamuck Stream (15G39), Ballyring Upper Stream (15B73), Lisdowney (Stream) (15L02), Ballyconra Stream (15B86) and River Nore (15N01) in the Goul_SC_010 and Nore_SC_070 river sub-catchments (**Table 2.1**). A small pond adjoining the site boundary was also surveyed.

A total of 2 no. survey sites were located within the River Barrow and River Nore SAC (002162), with these also located within the River Nore SPA (004233). Numerous survey locations share downstream hydrological connectivity with these European sites. Please note this aquatic report should be read in conjunction with the Environmental Impact Assessment Report (EIAR) prepared for the Proposed Gathabawn Windfarm.

2.2. Aquatic site surveys

Aquatic surveys were conducted on the 29th, 30th and 31st July 2025. Survey effort focused on both instream and riparian habitats at each aquatic sampling location and included a fisheries assessment (electro-fishing and fisheries habitat appraisal), White-clawed Crayfish (*Austropotamobius pallipes*) survey, macrophyte and aquatic bryophyte survey and biological water quality sampling (Q-sampling). Environmental DNA (eDNA) samples were also collected from the River Goul and Nuenna River. This holistic approach informed the overall aquatic ecological evaluation of each site/watercourse in context of the proposed development and ensured that any habitats and species of high conservation value would be detected to best inform mitigation.

In addition to the ecological characteristics of the Whole Gathabawn Windfarm Project, a broad aquatic and riparian habitat assessment was conducted utilising elements of the methodology given in the Environment Agency's 'River Habitat Survey in Britain and Ireland Field Survey Guidance Manual 2003' (EA, 2003) and the Irish Heritage Council's 'A Guide to Habitats in Ireland' (Fossitt, 2000). This broad characterisation helped define the watercourses' conformity or departure from naturalness. All sites were assessed in terms of:

- Physical watercourse/waterbody characteristics (i.e. width, depth etc.) including associated evidence of historical drainage;
- Substrate type, listing substrate fractions in order of dominance (i.e. bedrock, boulder, cobble, gravel, sand, silt etc.);
- Flow type by proportion of riffle, glide and pool in the sampling area;
- An appraisal of the macrophyte and aquatic bryophyte community at each site; and
- Riparian vegetation composition

Table 2.1: *Location of 17 no. aquatic survey sites in vicinity of Gathabawn Windfarm, Co. Kilkenny.*

Site no.	Watercourse	EPA code	Location	X (ITM)	Y (ITM)
A1	Coolnacrutta Stream	15C50	Tobar na Súil	633751	669421
A2	Coolnacrutta Stream	15C50	R639 crossing	632395	670967
A3	River Goul	15G02	Ballinfrase	631492	673559
A4	River Goul	15G02	Ballyboodin	636296	677402
B1	Lismaine Stream	15L16	L1809 road crossing	639539	669606
B2	Lisaine Stream	15L16	R694 road crossing	642124	667563
B3	Lismaine Stream	15L16	L10003	643822	665914
B4	Gorteenahilla River	15G08	Tinnascarty	638182	667370
B5	Nuenna River	15N02	Millenium Park, Freshford	640442	664845
B6	Nuenna River	15N02	L10003 road crossing	644439	664231
P1*	Pond	n/a	Ballyring Upper	638684	668586
C1	Gorteennamuck Stream	15G39	Gorteennamuck	635335	670340
C2	Gorteenahilla River	15G08	Ballygowney	636074	669680
C3	Ballyring Upper Stream	15B73	Ballyring Upper	637540	669049
C4	Lisdowney Stream	15L02	L1807 road crossing	641405	671018
C5	Ballyconra Stream	15B86	L1807 road crossing	642618	670660
C6*	River Nore	15N01	Parksgrove	644038	671499

*fisheries appraisal only

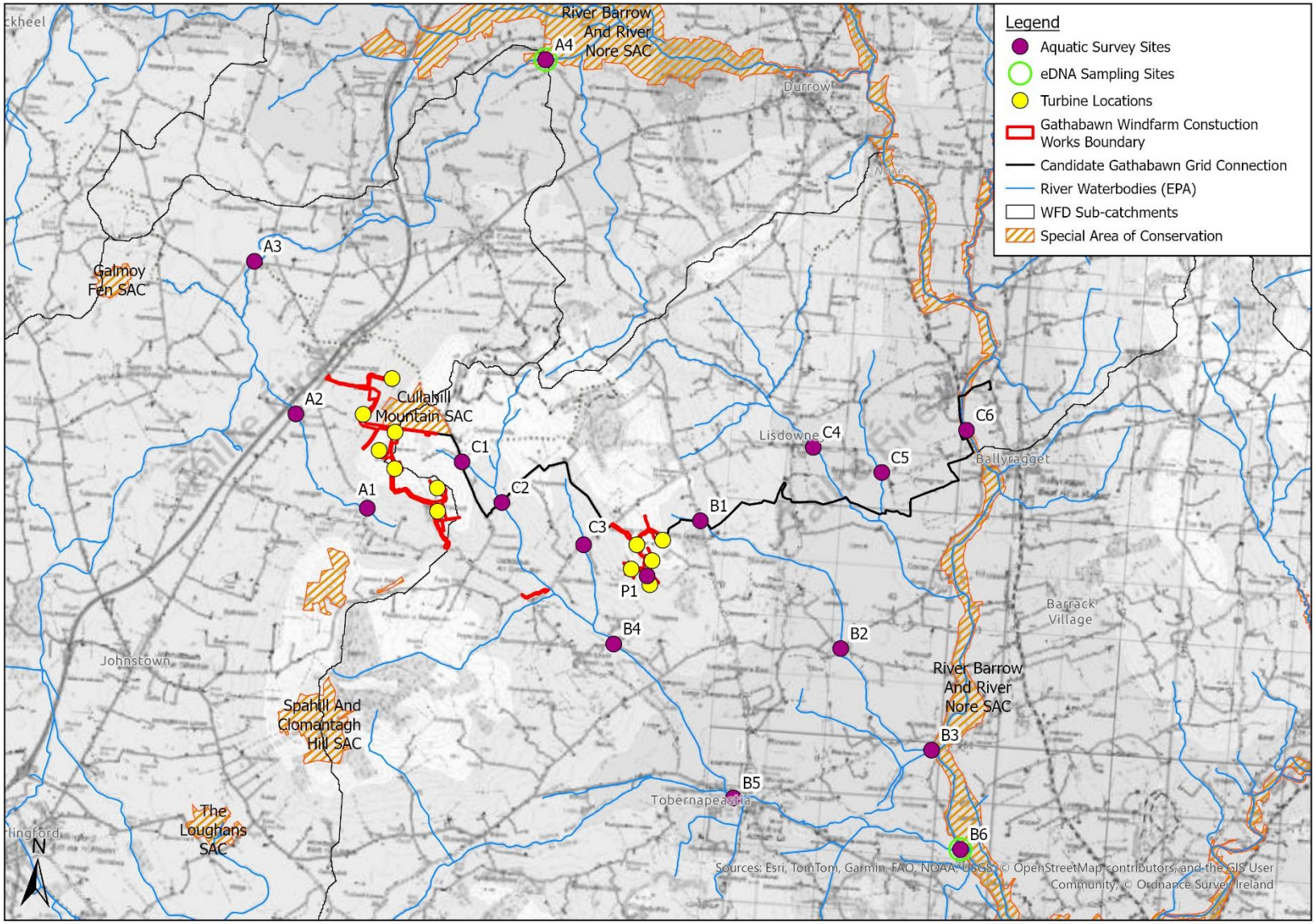


Figure 2.1: *Overview of the aquatic survey sites, July 2025.*

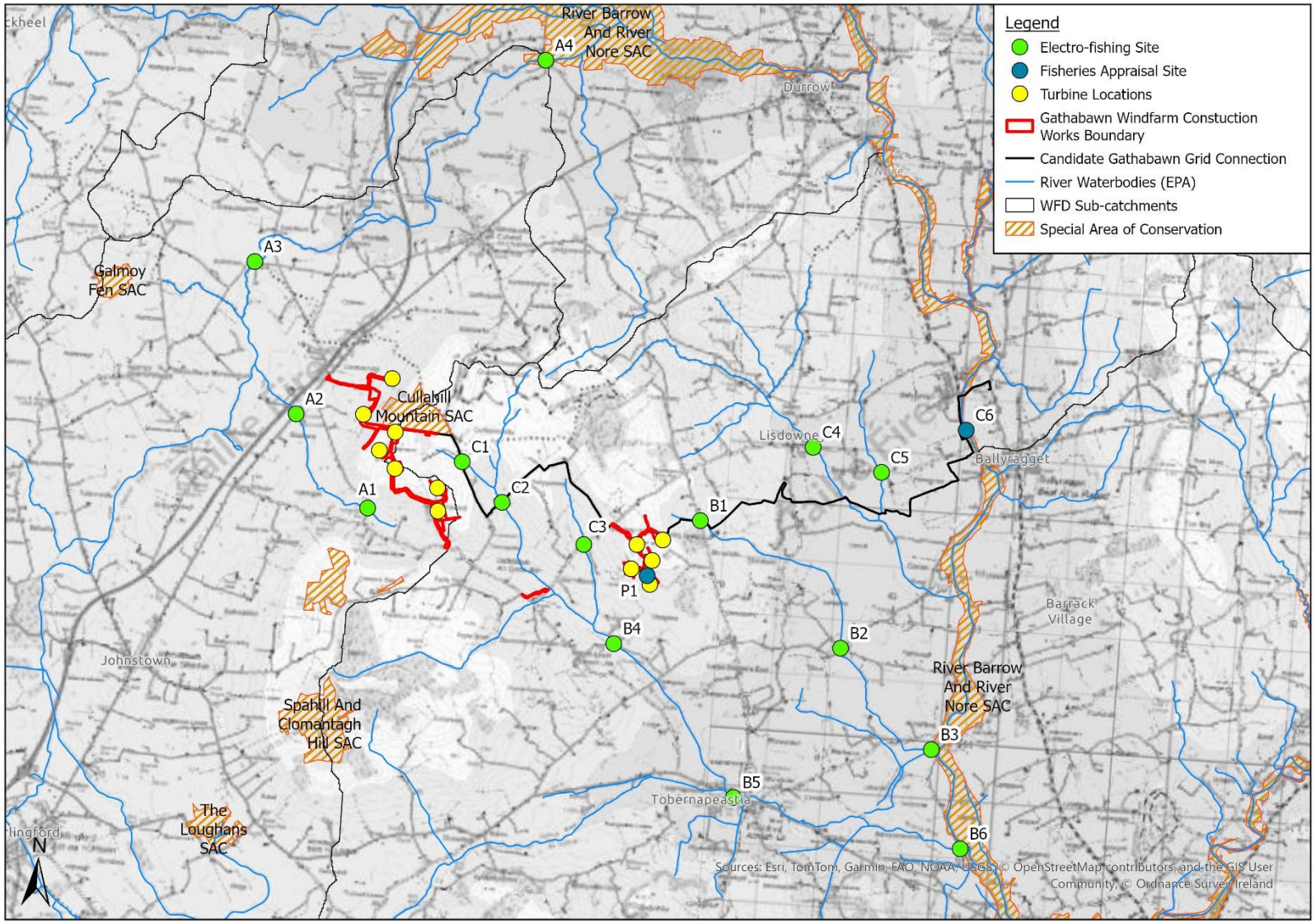


Figure 2.2: *Overview of the electro-fishing & fisheries appraisal survey site locations for the proposed Gathabawn Windfarm, Co. Kilkenny*

2.3. Fisheries assessment (electro-fishing)

To collate a more accurate baseline, a catchment-wide approach was adopted, and the electro-fishing survey was undertaken across 15 no. riverine sites (see **Table 2.1, Figure 2.1**). A single anode Smith-Root LR24 backpack (12V DC input; 300V, 100W DC output) was used to electro-fish riverine sites on the 29th, 30th and 31st July 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.

Both river and holding tank water temperature was monitored continually throughout the survey to ensure temperatures of 20°C were not exceeded, thus minimising stress to the captured fish due to low dissolved oxygen levels. A portable battery-powered aerator was also used to further reduce stress to any captured fish contained in the holding tank. Salmonids, European Eel and other captured fish species were transferred to a holding container with oxygenated fresh river water following capture. To reduce fish stress levels, anaesthesia was not applied to captured fish. All fish were measured to the nearest millimetre and released in-situ following a suitable recovery period.

As three primary species groups were targeted during the survey, i.e., salmonids, Lamprey, and Eel, the electro-fishing settings were tailored for each species. By undertaking electro-fishing using the rapid electro-fishing technique (see methodology below), the broad characterisation of the fish community at each sampling reach could be determined as a longer representative length of channel was surveyed. Electro-fishing methodology followed accepted European standards (CEN, 2003) and adhered to best practice (e.g., CFB, 2008).

Furthermore, a fisheries habitat appraisal of all aquatic survey sites (**Table 2.1**) was undertaken to establish their importance for Salmonid, Lamprey (*Lampetra* sp.), 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.

2.3.1. Salmonids and European Eel

For salmonid species and European Eel, as well as all other incidental species, electro-fishing was carried out in an upstream direction for a 10-minute CPUE, an increasingly common standard approach for wadable streams (Matson *et al.,* 2018a). A total of approximately 30-75m channel length was surveyed at each site, where feasible, in order to gain a better representation of fish stock assemblages.

Relative conductivity of the water at each site was checked in-situ with a conductivity meter and the electro-fishing backpack was energised with the appropriate voltage and frequency to provide enough draw to attract salmonids and European Eel to the anode without harm. For the high conductivity waters of the sites a voltage of 200-240v, frequency of 35-40Hz and pulse duration of 3.5-4ms was utilised to draw fish to the anode without causing physical damage.

2.3.2. Lamprey

Electro-fishing for Lamprey ammocoetes was conducted using targeted quadrat-based electro-fishing (as per Harvey & Cowx, 2003) in objectively suitable areas of sand/silt, where encountered. As Lamprey take longer to emerge from silts and require a more persistent approach, they were targeted at a lower frequency (30Hz) burst DC pulse setting which also allowed detection of European Eelin sediment, if present. Settings for Lamprey followed those recommended and used by Harvey & Cowx (2003), APEM (2004) and Niven & McAuley (2013). Using this approach, the anode was placed under the water's surface, approximately 10-15cm above the sediment, to prevent immobilising Lamprey ammocoetes within the sediment. The anode was energised with 100V of pulsed DC for 15-20 seconds and then turned off for approximately five seconds to allow ammocoetes to emerge from their burrows. The anode was switched on and off in this way for approximately two minutes. Immobilised ammocoetes were collected by a second operator using a fine-mesh hand net as they emerged.

Lamprey species were identified to species level, where possible, with the assistance of a hand lens, through external pigmentation patterns and trunk myomere counts as described by Potter & Osborne (1975) and Gardiner (2003).

2.4. Fisheries Habitat

A fisheries habitat appraisal of 17 no. sites was undertaken to establish their importance for salmonid, Lamprey, European Eel and other fish species. The appraisals of salmonids and Lamprey were cognisant of species-specific habitat requirements and preferences as outlined in O'Grady (2006), Hendry *et al*. (2003), Armstrong *et al*. (2003), Harvey & Cowx (2003), Maitland (2003) and Hendry & Cragg-Hine (1997). River habitat surveys and fisheries assessments were also carried out utilising elements of the approaches in the River Habitat Survey Methodology (EA, 2003) and Fishery Assessment Methodology (O'Grady, 2006) to broadly characterise the riverine sites (i.e. channel profile, substrata etc.).

2.5. White-clawed Crayfish survey

White-clawed Crayfish surveys were undertaken at the aquatic survey sites in July 2025 under a National Parks and Wildlife (NPWS) open national licence (C164/2025) as prescribed by Sections 9, 23 and 34 of the Wildlife Act (1976-2023), to capture and release Crayfish to their site of capture. As per Inland Fisheries Ireland aquatic biosecurity recommendations, the Crayfish sampling started at the uppermost site(s) of each catchment or sub-catchment in the survey area to minimise the risk of transfer invasive propagules (including Crayfish plague (*Aphanomyces astaci*)) in an upstream direction.

Hand-searching of instream refugia and sweep netting was undertaken according to Reynolds *et al*. (2010). An appraisal of White-clawed Crayfish habitat at each site was conducted based on physical habitat attributes (Gammell *et al*., 2021; Peay, 2003), water chemistry and incidental records in mustelid spraint. Additionally, a desktop review of Crayfish records within the wider survey area was completed.

2.6. Environmental DNA

To further validate site surveys and to detect potentially cryptically low populations of high conservation value aquatic species within the survey area, composite water samples were collected from the River Goul (A4) and Nuenna River (B6) on the 31st of July 2025 (**Table 2.1; Figure 2.1**). These were analysed for Freshwater Pearl Mussel (*Margaritifera margaritifera*), White-clawed Crayfish and Crayfish plague eDNA. The sites were strategically chosen to maximise longitudinal (instream) coverage within the survey area/catchment (i.e. facilitating a greater likelihood of species detection).

In accordance with laboratory guidance, a composite (500ml) water sample was collected from the sampling point, maximising the geographic spread at the site (20 x 25ml samples at each site), thus increasing the chance of detecting the target species' DNA. The composite sample was filtered and fixed on site using a sterile proprietary eDNA sampling kit. The sample was stored at room temperature and sent to the laboratory for analysis with 48 hours of collection. A total of n=12 qPCR replicates were analysed for the site. Given the high sensitivity of eDNA analysis, a single positive qPCR replicate is considered as proof of the species' presence (termed qPCR No Threshold, or qPCR NT). Whilst an eDNA approach is not currently quantitative, the detection of the target species' DNA indicates the presence of the species at and or upstream of the sampling point. Please refer to **Appendix A** for full eDNA laboratory analysis methodology.

2.7. Biological water quality (Q-sampling)

The 14 no. riverine survey sites were assessed for biological water quality through Q-sampling in July 2025. All samples were taken with a standard kick sampling hand net (250mm width, 500µm mesh size) from areas of riffle/glide utilising a 2-minute kick sample, as per Environmental Protection Authority (EPA) methodology (Feeley *et al*., 2020). Large cobble was also washed at each site for 1-minute (where present) to collect attached macro-invertebrates (as per Feeley *et al*., 2020). Samples were elutriated and fixed in 70% ethanol for subsequent laboratory identification to species level. Samples were converted to Q-ratings as per Toner *et al*. (2005) and assigned to WFD status classes (**Table 2.2**). Any rare invertebrate species were identified from the NPWS Red List publications for beetles (Foster *et al*., 2009), mayflies (Kelly-Quinn & Regan, 2012), stoneflies (Feeley *et al*., 2020) and other relevant taxa (i.e. Byrne *et al*., 2009; Nelson *et al*., 2011).

Table 2.2: *Reference categories for EPA Q-ratings (Q1 to Q5) (Toner et al., 2005).*

Q value	WFD status	Pollution status	Condition
Q5 or Q4-5	High status	Unpolluted	Satisfactory
Q4	Good status	Unpolluted	Satisfactory
Q3-4	Moderate status	Slightly polluted	Unsatisfactory
Q3 or Q2-3	Poor status	Moderately polluted	Unsatisfactory
Q2, Q1-2 or Q1	Bad status	Seriously polluted	Unsatisfactory

2.8. Lacustrine macro-invertebrate communities

Pond site P1 was sampled for macro-invertebrates via sweep netting. A standard pond net (250mm width, mesh size 500µm) was used to sweep macrophytes to capture macro-invertebrates. The net was also moved along the pond bed 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 site to get a representative sample for sub-habitats.

2.9. Macrophytes and aquatic bryophytes

Surveys of the macrophyte and aquatic bryophyte community were conducted by instream wading at each of the survey sites, with specimens collected (by hand or via grapnel) for on-site identification. An assessment of the aquatic vegetation community helped to identify any rare macrophyte species listed under the FPO, 2022, Irish Red list for vascular plants (Wyse-Jackson *et al*., 2016) and or aquatic bryophytes (Lockhart *et al*., 2012), or habitats corresponding to Annex I aquatic habitats such as floating river vegetation (3260) or hydrophilous tall herb (6430).

2.10. Aquatic ecological evaluation

The evaluation of aquatic ecological receptors contained within this report uses the geographic scale and criteria defined in the 'Guidelines for Assessment of Ecological Impacts of National Road Schemes' (NRA, 2009).

2.11. Biosecurity

A strict biosecurity protocol following IFI (2010) and the Check-Clean-Dry approach was adhered to during surveys for all equipment and PPE used. Disinfection of all equipment and PPE before and after use with Virkon™ was conducted to prevent the transfer of pathogens or invasive propagules between survey sites. Surveys were undertaken at sites in a downstream order to minimise the risk of upstream propagule mobilisation. Particular cognisance was given towards preventing the spread or introduction of highly virulent Crayfish plague (*Aphanomyces astaci*). Any aquatic invasive species or pathogens recorded within or adjoining the survey areas were geo-referenced. All Triturus staff are certified in 'Good fieldwork practice: slowing the spread of invasive non-native species' by the University of Leeds.

3. DESKTOP REVIEW

3.1. Survey Area

The watercourses in the vicinity of proposed development (**Table 2.1; Figure 2.1**) were typically historically modified lowland depositing channels (FW2; Fossitt, 2000) and more natural upland eroding channels (FW1) within the Goul_SC_010 and Nore_SC_070 river sub-catchments. Land use practices in the wider survey area are dominated by pastures (CORINE 231). Predominantly, the watercourses flow over areas of Visean limestone & calcareous shale and Tournaisian limestone (Geological Survey of Ireland data).

3.2. Fisheries

The River Goul, a tributary of the River Erkina, is a low-energy limestone river fed from aquifer and ground-water sources (Sullivan, 2007) is known to support Atlantic Salmon (*Salmo salar*), Brown Trout (*Salmo trutta*), European Eel, Stone Loach (*Barbatula barbatula*) and Three-spined Stickleback (*Gasterosteus aculeatus*) (Triturus 2021-2024 data; IFI data). The Coolnacrutta Stream, a tributary of the River Goul, is known to support Atlantic Salmon, Brown Trout and European Eel (Triturus 2021-2024 data).

The River Nore in the vicinity of Ballyragget is known to support Atlantic Salmon, Brown Trout, *Lampetra* sp., European Eel, Stone Loach, Minnow (*Phoxinus phoxinus*) and Rudd (*Scardinius erythropthalmus)* (Triturus 2021-2024 data). Historical Sea Lamprey (*Petromyzon marinus*) records were available for the River Nore at Ballyragget (1968 and 1972).

The Nuenna River, a major tributary of the River Nore, is known to support Brown Trout, Three-spined Stickleback and low densities of *Lampetra* sp. (Gordon *et al*., 2021; Matson *et al*., 2018b). This species assemblage has been recorded over multiple years, with Brown Trout growth identified as 'slow' according to the criteria of Kennedy & Fitzmaurice (1971) (Kelly *et al*., 2014).

The Gorteenahilla River, a tributary of the Nuenna River, is known to support Atlantic Salmon, Brown Trout, European Eel and Three-spined Stickleback (Triturus 2021-2024 data; Matson *et al*., 2018).

The Lismaine Stream, a heavily modified Nore tributary that suffers from frequent low flows, is known to support Three-spined Stickleback (Triturus 2021-2024 data).

The Lisdowney Stream, a small alkaline tributary of the River Nore, is known to support Atlantic Salmon, Brown Trout, European Eel and Three-spined Stickleback (Triturus 2023 data; IFI data[1]).

Fisheries data for the other watercourses of interest was not available prior to these survey efforts.

3.3. Protected and rare aquatic species

A comprehensive desktop review of available data from the National Parks and Wildlife Service (NPWS), National Biodiversity Data Centre (NBDC), Inland Fisheries Ireland (IFI), Botanical Society of Britain and Ireland (BSBI), National Crayfish Plague Surveillance Programme (NCPSP), Environmental Protection Agency (EPA) and Triturus databases for the 10km grid squares containing and adjoining the Proposed Gathabawn Windfarm and Candidate Gathabawn Grid Connection (i.e. S36, S37, S46 &

[1] *Inland Fisheries Ireland data available at https://opendata-ifigis.hub.arcgis.com/datasets/IFIgis::water-framework-directive-fish-ecological-status-2008-2021/*

S47) identified records for a low number of rare and or protected aquatic species within the vicinity of the proposed development.

A low number of records for Annex II White-clawed Crayfish were available in the wider survey area, with more contemporary records for the River Goul and River Nore (2005-2023 data; **Figure 3.1**). Crayfish remains have previously been identified in Otter (*Lutra lutra*) spraint on the lower reaches of the Coolnacrutta Stream (current survey site A2) (Triturus 2022 data).

Contemporary Annex II Otter records were widespread throughout the respective grid squares, with contemporary records available for the Coolnacrutta Stream, River Goul, Gorteenahilla River, Nuenna River, Lisdowney Stream and River Nore (2005-2023 data; **Figure 3.1**).

Smooth Newt (*Lissotriton vulgaris*), protected under the Wildlife Acts 1976-2023, were known from several locations in the 2013-2016 period (NBDC data) but none of these directly overlapped with the survey area (data not shown). A small former quarry pond c. 3km southwest of the proposed site boundary is known to support a newt population (Triturus 2023 data).

Multiple records for the critically endangered hard-water form of the Freshwater Pearl Mussel were available for the River Nore. This species has declined significantly in recent years and is now confined to areas in the River Nore upstream of the Nore and Erkina confluence, Durrow (NPWS & Triturus data). It has recently been concluded that pearl mussel is no longer present in the River Nore downstream of the Erkina confluence (Sweeney, 2022).

A low number of historical records for opposite-leaved pondweed (*Groenlandia densa*), a macrophyte protected under the Flora Protection Order (FPO), 2022, were available for the River Goul in the 1975-1991 period (data not shown). No other contemporary NPWS records for macrophytes or aquatic bryophytes protected under the FPO, 2022 were available for the respective grid squares.

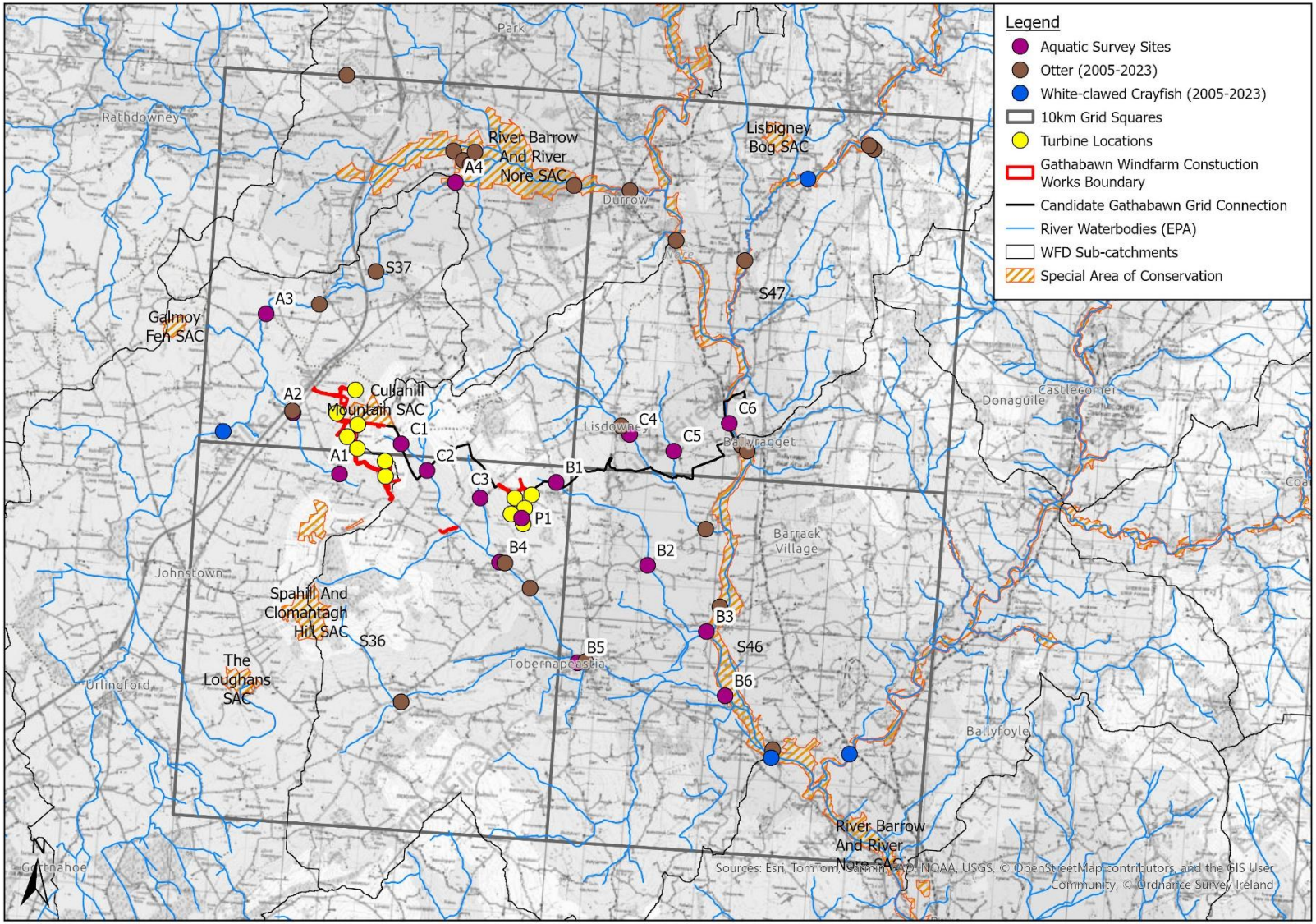


Figure 3.1: *Selected rare/protected aquatic species records in vicinity of the proposed development (source: NPWS, NBDC, EPA & Triturus data).*

4. RESULTS OF AQUATIC SURVEYS

The following section summarises each of the 17 no. survey sites in terms of aquatic habitats, physical characteristics and overall value for fish and macrophyte/aquatic bryophyte communities. Biological water quality (Q-sample) results are summarised for each riverine sampling site and presented in full in **Appendix B**. A summary of the fish species recorded at each survey site is provided in **Table 4.2** and **Table 4.3**. A summary of the aquatic species and habitats of high conservation concern recorded during the surveys is provided in **Table 4.4**. An evaluation of the aquatic ecological importance of each survey site based on these aquatic surveys is provided and summarised in **Table 4.5**. Habitat codes are according to Fossitt (2000). Scientific names are provided at first mention only. Sites were surveyed in July 2025.

4.1. Aquatic survey sites

4.1.1. Site A1 – Coolnacrutta Stream, Tobar na Súil

Site A1 was located on the uppermost reaches of the Coolnacrutta Stream (15C50) at a local road crossing, c. 50m downstream of Tobar na Súil (source of the stream). The small lowland stream (FW2) was 1.5-2m wide and 0.05-0.1m deep at the time of survey, suffering from low summer flows (a known occurrence at this location; Triturus data). An over-widened ponding area upstream of the road crossing was 0.2m deep. The profile was exclusively of shallow glide. The substrata were dominated by grossly silted mixed gravels and small cobble, with occasional boulder. Soft sediment deposits were up to 0.3m deep. The site was heavily vegetated with frequent Fool's Watercress (*Helosciadium nodiflorum)* and Watercress (*Nasturtium officinale*) with occasional marginal brooklime (*Veronica beccabunga*), Blue Water Speedwell (*Veronica anagallis-aquatica*), Common Water Starwort (*Callitriche stagnalis*) and Water Mint (*Mentha aquatica*). Filamentous algae cover was high, indicating significant eutrophication. Aquatic bryophytes were limited to *Leptodictyum riparium* on larger cobble and boulder. The riparian areas had been cleared historically, with no remaining tree cover and sparse herbaceous vegetation present. The site was bordered by low-intensity semi-improved grassland (GA1) with mosaics of wet grassland (GS4).

No fish were recorded via electro-fishing at site A1. Despite the occasional presence of fish, including Brown Trout, Lamprey and European Eel (Triturus data), the site was unsuitable for resident fish at the time of survey given low summer flows in addition to gross siltation pressures. Despite some low suitability, no White-clawed Crayfish were recorded. No Otter signs were recorded in vicinity of the site.

Biological water quality, based on Q-sampling, was calculated as **Q2-3** (**poor status**) (Appendix B). No macro-invertebrate species of conservation value greater than 'least concern', according to national red lists, were recorded via Q-sampling.

Given the absence of aquatic species or habitats of high conservation value, the aquatic ecological evaluation of site A1 was of **Local Importance (Lower Value)** (Table 4.5).



Plate 4.1: Representative image of site A1 on the upper reaches of the Coolnacrutta Stream, July 2025.

4.1.2. Site A2 – Coolnacrutta Stream, R639 crossing.

Site A2 was located on the lower reaches of the Coolnacrutta Stream, 1.2km upstream of the River Goul confluence. The site was representative of an upland eroding stream (FW1) of lower energy. The channel was 2-2.5m wide and 0.1m deep at the time of survey, with low summer flows. The stream had been straightened historically, with boulder revetments along both banks in the vicinity of the single masonry arch bridge. The profile comprised shallow riffle and glide with frequent small pools. The substrata were dominated by boulder and cobble with heavily silted mixed gravels locally. Given heavy shading, macrophytes were restricted to more open areas with locally frequent Watercress, Fool's Watercress, Lesser Water Parsnip (*Berula erecta*) and Water Mint downstream of the bridge. Coverage of aquatic bryophytes was high, with abundant *Rhynchostegium riparoides* on boulder and large cobble. The stream was heavily shaded by mature treelines of Sycamore (*Acer psuedoplatanus*), Elder (*Sambucus nigra*) and Ash (*Fraxinus excelsior*) with Hazel (*Corylus avellana*) and Bramble (*Rubus fruticosus agg.*) scrub. The site was bordered by heavily improved pasture (GA1).

Atlantic Salmon (n=2), Brown Trout (n=3), Lamprey (n=1) and European Eel (n=1) were recorded via electro-fishing at site A2 (Table 4.3). The quality of Salmonid spawning and nursery habitat was compromised by poor flows, shallow water and evident eutrophication, with only very low densities recorded. Fish were largely confined to deeper pool areas underneath the road bridge. Furthermore, a significant barrier (debris dam at a livestock gate) was located at the upstream side of the bridge, which impaired fish migration and potentially blocked access to better-quality spawning habitat present upstream (finer gravels). European Eel habitat was poor overall but locally good underneath the road bridge (abundant boulder refugia). The site was of poor quality for Lamprey given the limited pockets of superficial silt downstream of the bridge with only a single ammocoete recorded. Despite some low suitability and previous records for the species at this site (Triturus 2022 data), no White-clawed Crayfish were recorded. A single Otter spraint was recorded on boulders immediately upstream of the bridge.

Biological water quality, based on Q-sampling, was calculated as **Q3** (**poor status**) (Appendix B). No macro-invertebrate species of conservation value greater than 'least concern', according to national red lists, were recorded via Q-sampling.

Given the presence of Salmonids (including Atlantic Salmon), Lamprey and Red-listed European Eel, the aquatic ecological evaluation of site A2 was of **Local Importance (Higher Value)** (Table 4.5).



Plate 4.2: Representative image of site A2 on the Coolnacrutta Stream, July 2025.

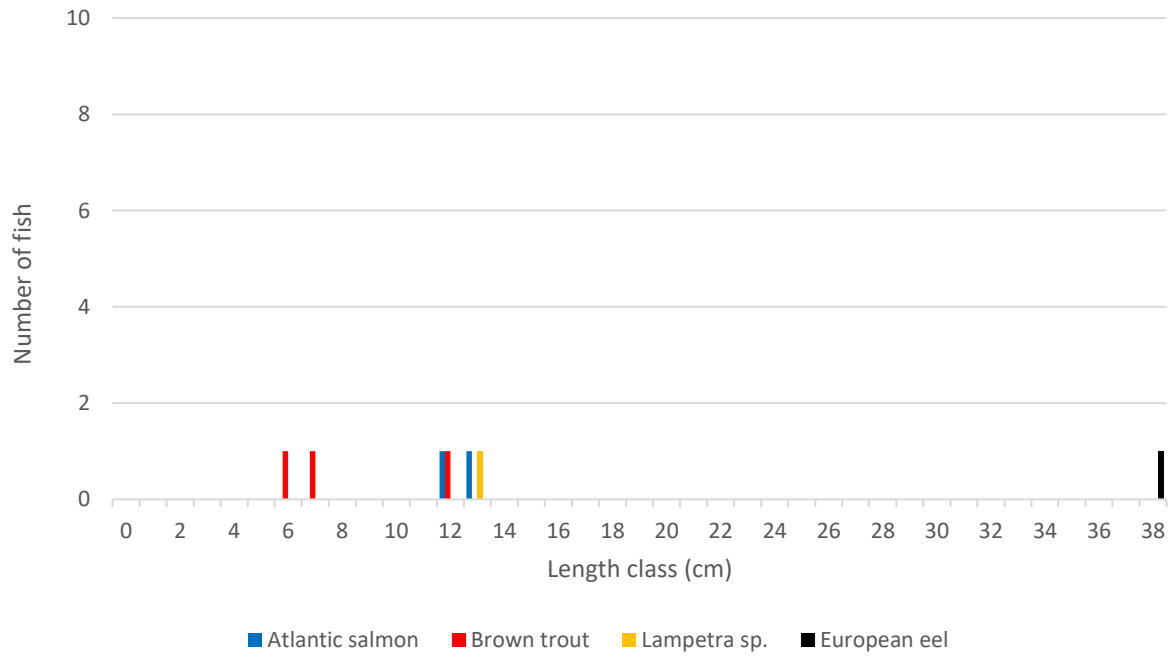


Figure 4.1: *Length frequency distribution recorded via electro-fishing at site A2, July 2025.*



Plate 4.3: Juvenile Brown Trout recorded at site A2 on the Coolnacrutta Stream, July 2025.

4.1.3. Site A3 – River Goul, Ballinfrase

Site A3 was located on the River Goul (15G02) at a local road (L5572) road crossing. The semi-natural lowland depositing watercourse (FW2) was 7-8m wide and 0.3m to 0.6m deep. The profile comprised riffle, glide and pool sequences with a bed of compacted boulder, cobble and gravels that were moderately silted. Eutrophication pressures were also evident given the high cover of filamentous algae (c. 20%) and floc. The site supported frequent Lesser Water Parsnip, Watercress and Water Mint with occasional Branched Bur-reed (*Sparganium erectum*), Water Forget-me-not (*Myosotis scorpioides*) and Common Water Starwort. The instream boulders supported occasional *Fontinalis antipyretica* with the liverwort *Pellia endiviifolia* locally frequent. The riparian areas supported scattered mature Ash, Alder, Hawthorn and Grey Willow (*Salix cinerea*) with frequent Reed Canary Grass (*Phalaris arundinacea*), Great Willowherb (*Epilobium hirsutum*), Nettle (*Urtica dioica*), Thistles (*Cirsium* sp.) and Bramble. The site was bordered by improved pasture (GA1).

Atlantic Salmon (n=6), Brown Trout (n=18), Minnow (n=7) and Stone Loach (n=1) were recorded via electro-fishing at site A3 (Table 4.3). The site supported good densities of adult (1+ & 2+) trout with a lower density of juvenile Salmonids (both trout and salmon). The nursery conditions were of moderate quality given mixed riffle and glide with a rocky bed. However, the bed condition was compromised by siltation and enrichment pressures consequential of bordering heavily improved pastures. The poorer bed condition also resulted in poorer quality spawning habitat, despite locally pockets being present where swifter flows cleaned the bed. Good quality Salmonid holding habitat was present in deeper pool and glide between stands of macrophyte and in bank scours. Lamprey nursery habitat was of poor quality as soft organic rich silts were very limited due to higher flows and poor rates of accretion. Lamprey spawning habitat was however of moderate quality given the presence of fine gravels adjoining riffle. The site was of good quality for European Eel given ample refugia and food resources albeit none were recorded. Despite good suitability for White-clawed Crayfish, with ample refugia, none were recorded. No Otter signs were recorded in vicinity of the site.

Biological water quality, based on Q-sampling, was calculated as **Q3** (**poor status**) (Appendix B). No macro-invertebrate species of conservation value greater than 'least concern', according to national red lists, were recorded via Q-sampling.

Given the presence of Salmonids (including Atlantic Salmon) and Red-listed European Eel, the aquatic ecological evaluation of site A3 was of **Local Importance (Higher Value)** (Table 4.5).



Plate 4.4: Representative image of site A3 on the River Goul, July 2025.

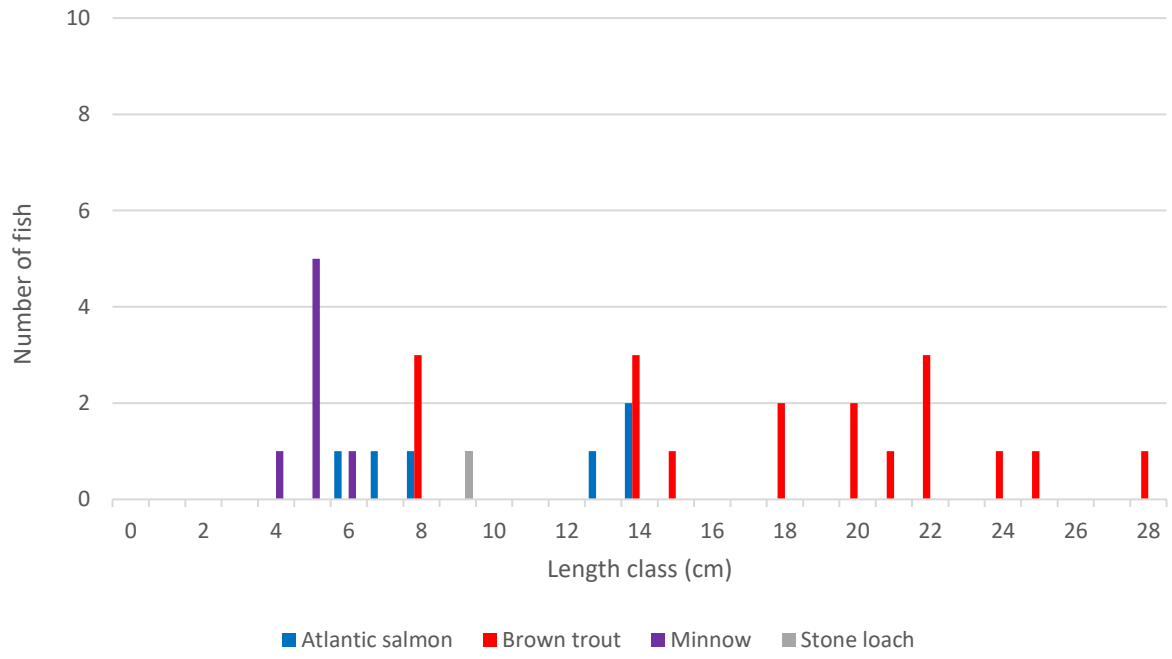


Figure 4.2: *Length frequency distribution recorded via electro-fishing at site A3, July 2025.*



Plate 4.5: Well conditioned adult Brown Trout recorded at site A3 on the River Goul, July 2025.

4.1.4. Site A4 – River Goul, Ballyboodin

Site A4 was located on the River Goul (15G02) at a local road crossing. The lowland depositing watercourse had been historically deepened and locally straightened resulting in a site with poor hydromorphology. The river was 7-8m wide and 0.3-0.8m deep. The profile was dominated by deep, very slow flowing glide with occasional pool (no riffle). The bed comprised compacted boulder, cobble and gravels that were heavily bedded with gross siltation. Very high enrichment pressures were also evident with high cover of filamentous algae (c. 40%) and floc. The site supported profuse growth of Common Clubrush (*Schoenoplectus lacustris*), Lesser Water Parsnip, Watercress, Branched Bur-reed and Water Mint. Water-forget-me-not and Common Water Starwort were occasional. Instream boulders supported locally frequent *Fontinalis antipyretica* with *Cinclidotus fontinaloides* on the bridge apron. The liverwort (*Pellia endiviifolia*) was present locally on the riverbed. The riparian areas supported scattered mature Crack Willow (*Salix fragilis*), Grey Willow and White Willow (*Salix alba*) with understories of Reed Canary Grass, Great Willowherb and Bramble. The site was bordered by improved pasture (GA1).

Atlantic Salmon (n=4), Brown Trout (n=18), Lamprey (n=3), European Eel (n=1), Minnow (n=4), Stone Loach (n=2) and Three-spined Stickleback (n=3) were recorded via electro-fishing at site A4 (Table 4.3). Despite hydromorphological impacts the site supported moderate densities of adult 1+ and 2+ trout with a low density of juvenile Salmonids (both trout and salmon). The nursery conditions were evidently of poor quality given the absence of riffle habitat and the slow flowing, heavily enriched and silted nature of the river at this location. The poor bed condition also resulted in poor quality spawning habitat. Holding habitat, however, was of good quality given the presence of deeper pool and glide between stands of macrophytes and overhanging willow trees. Lamprey nursery habitat sub-optimal with compacted silts supporting only low densities of ammocoetes. Furthermore, Lamprey spawning habitat was of very poor quality given high siltation, bed compaction and enrichment pressures. Good quality eel habitat was present given ample refugia and food resources albeit only a single adult was

recorded. The site had some moderate suitability for White-clawed Crayfish albeit high sedimentation, bed compaction and enrichment pressures impacted the quality of habitat. None were recorded during the survey. No Otter signs were recorded in vicinity of the site.

Biological water quality, based on Q-sampling, was calculated as **Q3-4 (moderate status)** (Appendix B). However, this rating was tentative given the absence of suitable riffle areas for sampling (as per Toner *et al*., 2005). No macro-invertebrate species of conservation value greater than 'least concern', according to national red lists, were recorded via Q-sampling.

Given the presence of Salmonids (including Atlantic Salmon), Lamprey and Red-listed European Eel, the aquatic ecological evaluation of site A4 was of **Local Importance (Higher Value)** (Table 4.5)**.**



Plate 4.6: Representative image of site A4 on the River Goul, July 2025.

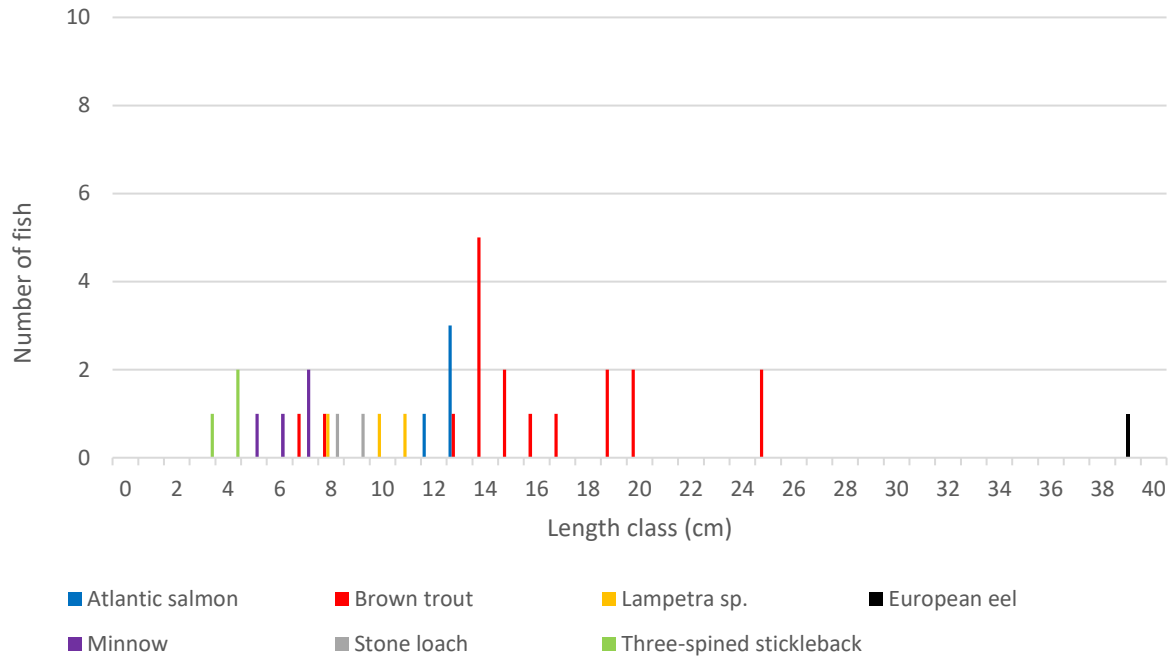


Figure 4.3: *Length frequency distribution recorded via electro-fishing at site A4, July 2025.*



Plate 4.7: European Eel recorded at site A4 on the River Goul, July 2025.

4.1.5. Site B1 – Lismaine Stream, L1809 road crossing

Site B1 was located on the upper reaches of the Lismaine Stream (15L16) at a local road crossing. The upland eroding stream (FW1) flowed over a high gradient in a meandering incised valley and was 4-6m wide with 2m high banks. The stream was semi-dry at this location with water restricted to isolated stagnant pools of 0.05-0.2m depth. The bed comprised of mixed rounded boulder, cobble and gravels that were predominantly exposed and dry. Due to the heavily compacted bed and high shading,

macrophytes were absent. Instream boulders supported occasional *Rhynchostegium riparioides* with the liverwort (*Chiloscyphus polyanthos*) being rare. Stable shaded riverbanks supported abundant *Thamnobryum alopercum*. The riparian zone supported scrubby treelines of mature Ash, Sycamore and Holly (*Ilex aquilinum*). The site was bordered by extensive pastures (GA1).

No fish were recorded via electro-fishing at site B1. The stream was semi-dry at this location with water restricted to isolated stagnant pools of 0.05-0.2m depth. The site was unsuitable for resident fish given the seasonality of flows in the uppermost reaches of the watercourse. However, the fisheries value improved moving downstream. The site was unsuitable for White-clawed Crayfish (none recorded). No Otter signs were recorded in vicinity of the site.

Biological water quality, based on Q-sampling, was calculated as **Q3 (poor status)** (Appendix B). However, this rating was tentative given poor flows and the absence of suitable riffle areas for sampling (as per Toner *et al*., 2005). No macro-invertebrate species of conservation value greater than 'least concern', according to national red lists, were recorded via Q-sampling.

Given the absence of aquatic species or habitats of high conservation value, the aquatic ecological evaluation of site B1 was of **Local Importance (Lower Value)** (Table 4.5).



Plate 4.8: Representative image of the upper reaches of the Lismaine Stream, July 2025 (semi-dry channel).

4.1.6. Site B2 – Lismaine Stream, R694 road crossing

Site B2 was located on the upper reaches of the Lismaine Stream (15L16) at the R694 road crossing c. 3.8km downstream of site B1. The River Nore tributary (FW1) was semi-dry at the time of survey with stagnant impounded pools of 0.1m deep water downstream of the bridge and under the box culvert. The stream had been historically straightened and deepened was 2-3m wide in a steep, trapezoidal channel with 2.5-3m high banks. The mostly exposed bed was dominated by small boulder, bedded cobble and sand, with abundant mud (silt). Macrophytes were not recorded with localised *Pellia endiviifolia* along the banks and on littoral substrata. The site was heavily shaded by mature Sycamore,

Wych Elm (*Ulmus glabra*), Hawthorn, Ash and Willow (*Salix* spp.) with Bramble, Ivy (*Hedera* sp.) and non-native Snowberry (*Symphoricarpos albus*) scrub. The site was bordered by improved grassland (GA1).

Three-spined Stickleback (n=6) was the only fish species recorded via electro-fishing at site B2. With the exception of low densities of stickleback in stagnant pools, the site was not of significant fisheries value given extensive modifications and poor/absent summer flows. There was no suitability for White-clawed Crayfish. No Otter signs were recorded in vicinity of the site.

Biological water quality, based on Q-sampling, was calculated as **Q2-3 (poor status)** (Appendix B). However, this rating was tentative given poor flows and the absence of suitable riffle areas for sampling (as per Toner *et al*., 2005). No macro-invertebrate species of conservation value greater than 'least concern', according to national red lists, were recorded via Q-sampling.

Given the absence of aquatic species or habitats of high conservation value, the aquatic ecological evaluation of site B2 was of **Local Importance (Lower Value)** (Table 4.4).



Plate 4.9: Representative image of site B2 on the Lismaine Stream, July 2025 (semi-dry channel).

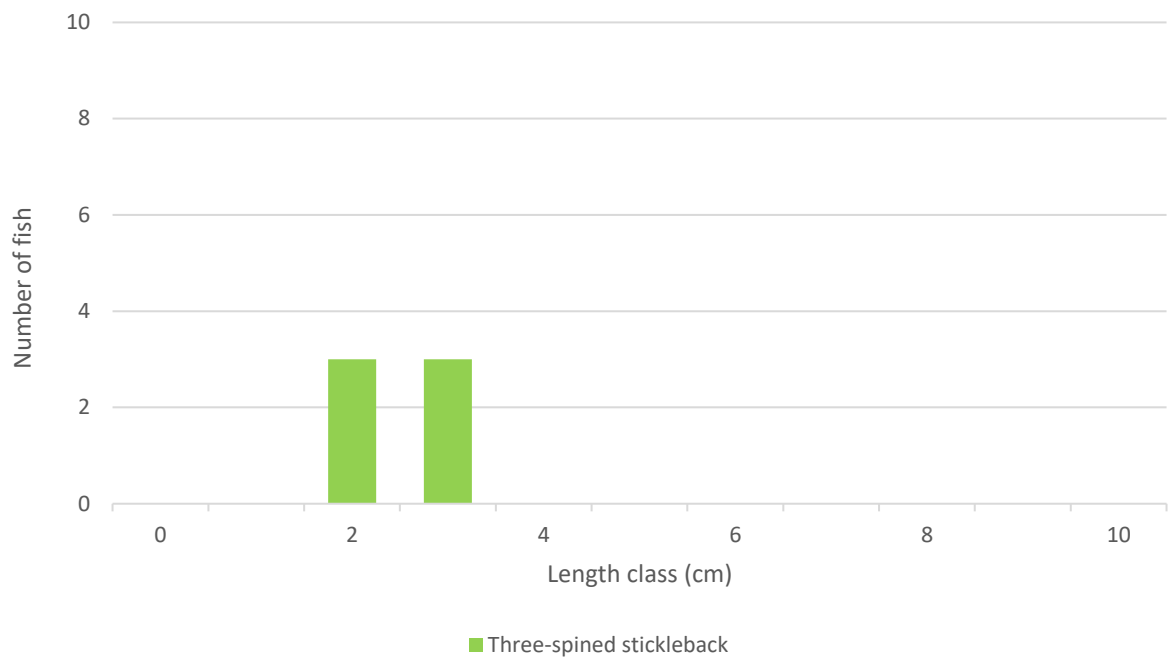


Figure 4.4: *Length frequency distribution recorded via electro-fishing at site B2, July 2025.*

4.1.7. Site B3 – Lismaine Stream, L10003 road crossing

Site B3 was located on the Lismaine Stream (15L16) at a livestock ford c. 2.6km downstream of site B2. Here, the lowland depositing stream (FW2) featured much improved water flows and was 2m wide and 0.1-0.3m deep with low lying banks. The stream had been historically deepened with widespread bank clearance works and often poor recovery. The profile comprised localised riffle and pool with frequent deeper glide. The substrata were dominated by cobble and mixed gravels although much of the bed was covered by silt. Scattered boulders and bricks were present near the ford. Calcification of the bed was evident. The site supported frequent Fool's Watercress with occasional water-forget-me not. Aquatic bryophytes were limited to rare *Leptodictyum riparium*. The cleared banks supported only scattered grey Willow, Ash and Alder with a typical nitrophilous ruderal community dominated by Cleavers (*Galium aparine*), Hedge Bindweed (*Calystegia sepium*), Nettle and rank grasses. The site was bordered by heavily improved pasture (GA1) with very narrow buffers.

Atlantic Salmon (n=1), Brown Trout (n=5), Lamprey (n=6), Stone Loach (n=4), Minnow (n=4) and Three-spined Stickleback (n=2) were recorded via electro-fishing at site B3. Despite evident hydromorphological and siltation impacts, the site was of some value as a Salmonid nursery although supported only low densities of juvenile salmon and trout. Significant siltation as well as bed calcification reduced the availability of spawning habitat for Salmonids and Lamprey. The survey reach was not of high value for adult Salmonids given low summer flows and the generally shallow depths (poor holding opportunities). The site had moderate suitability as a Lamprey nursery given abundant flocculent beds of organic rich silt. However, these were often encrusted with cyanobacterial films (reducing quality) and only a low density of ammocoetes was recorded. The heavily silted site was of poor suitability for European Eel or White-clawed Crayfish (limited refugia), and none were recorded. No Otter signs were recorded in vicinity of the site.

Biological water quality, based on Q-sampling, was calculated as **Q3 (poor status)** (Appendix B). No macro-invertebrate species of conservation value greater than 'least concern', according to national red lists, were recorded via Q-sampling.

Given the presence of Salmonids (including Atlantic Salmon) and Lamprey, the aquatic ecological evaluation of site B3 was of **Local Importance (Higher Value)** (Table 4.4).



Plate 4.10: Representative image of site B3 on the Lismaine Stream, July 2025.

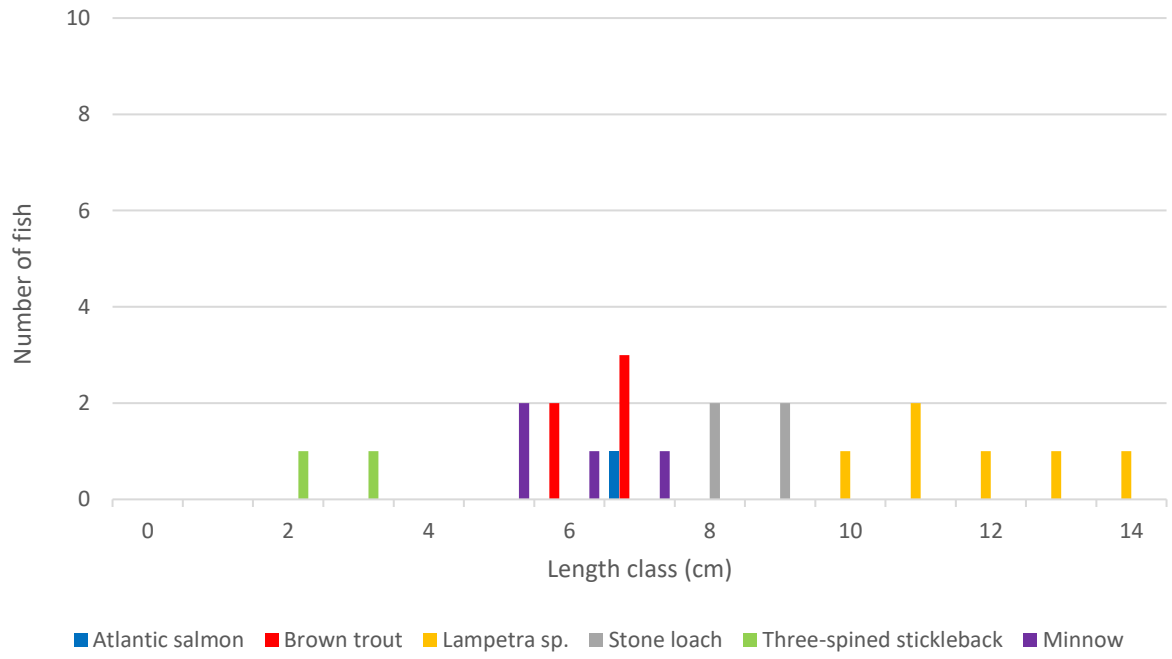


Figure 4.5: *Length frequency distribution recorded via electro-fishing at site B3, July 2025.*



Plate 4.11: *Lampetra* sp. ammocoete and Stone Loach recorded at site B3 on the Lismaine Stream, July 2025.

4.1.8. Site B4 – Gorteenahilla River, Tinnascarty

Site B4 was located on the Gorteenahilla River (15G08). The higher energy lowland river (FW2) had been historically deepened but demonstrated good instream recovery with a varied flow profile of riffle, glide and pool. The river as 3-4m wide and 0.1-0.3m deep with 1.5-2m high banks. The substrata comprised mixed boulder, cobble and gravels. However, these were heavily silted with high floc and filamentous algal cover indicating eutrophication pressures. A significant point source of pollution was identified immediately upstream of the bridge with sewage fungus on the bed. The site supported limited macrophytes due to the higher energy of the channel with localised Fool's Watercress, Watercress, Branched Bur-reed, Water Mint and Whorled Mint (*Mentha x verticillata*). Cover of aquatic bryophytes was low with *Leptodictyum riparium* dominating. *Rhynchostegium riparioides* was also present locally. The riparian areas were predominantly open (previously cleared) but supported a dense nitrophilous herbaceous community with maturing Willows. The site was bordered by improved pasture (GA1).

Atlantic Salmon (n=16), Brown Trout (n=7), Lamprey (n=14) and Three-spined Stickleback (n=2) were recorded via electro-fishing at site B4. The site was of moderate value as a Salmonid nursery, despite evident impacts. Holding opportunities for adults were limited. The quality of spawning habitat for both Salmonids and Lamprey was significantly reduced due to siltation. The site had relatively high suitability as a Lamprey nursery given abundant organic rich flocculent beds of silt, especially near the bridge. These areas supported a moderate density of ammocoetes. Suitability for European Eel and White-clawed Crayfish was poor (limited refugia), and neither were recorded. No Otter signs were recorded in vicinity of the site.

Biological water quality, based on Q-sampling, was calculated as **Q3-4 (moderate status)** (Appendix B). No macro-invertebrate species of conservation value greater than 'least concern', according to national red lists, were recorded via Q-sampling.

Given the presence of Salmonids (including Atlantic Salmon) and Lamprey, the aquatic ecological evaluation of site B4 was of **Local Importance (Higher Value)** (Table 4.4).



Plate 4.12: Representative image of site B4 on the Gorteenahilla River, July 2025.

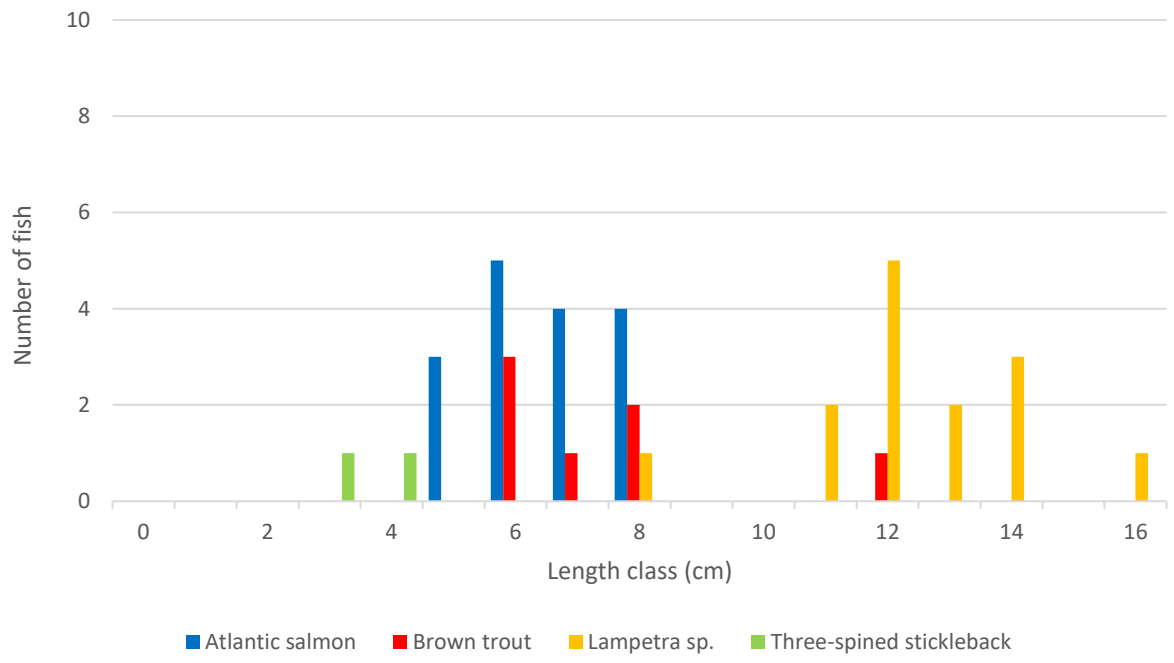


Figure 4.6: *Length frequency distribution recorded via electro-fishing at site B4, July 2025.*



Plate 4.13: 0+ Atlantic Salmon parr recorded at site B4 on the Gorteenahilla River, July 2025.

4.1.9. Site B5 – Nuenna River, Millenium Park, Freshford

Site B5 was located on the Nuenna River (15N02) at Millenium Park in Freshford, upstream of Old Bridge. The river (FW1) had been heavily modified in the park with historical retaining walls present. The typically high energy river suffered from low summer water levels at the time of survey and was 6-8m wider and 0.1-0.8m deep, with occasional deeper pool to 1.4m. The alkaline river substrata were heavily calcified with boulder, cobble and mixed gravels dominating. Siltation was high with significant eutrophication pressures evident given a relatively high cover of filamentous algae. Due to the high energy characteristics and high shading, macrophytes were limited to Fool's Watercress. Instream boulder and cobble supported abundant calcified *Rhynchostegium riparioides* with occasional *Fissidens* sp. in the margins. The riparian areas supported mature Beech (*Fagus sylvatica*), Ash, Oak (*Quercus* sp.), Hawthorn, Ash, Grey Willow, Weeping Willow (*Salix babylonica*), Elder and Horse Chestnut (*Aesculus hippocastanum*) and Grey Alder (*Alnus incana*) with Ivy understories. The site was bordered by mixed broadleaved woodland (WD1) on the west bank and scattered trees and parkland (WD5) on the east bank.

Atlantic Salmon (n=11) and Brown Trout (n=42) were the only fish species recorded via electro-fishing at site B5. The site was a good quality Salmonid nursery given ample water flows and good flow heterogeneity with healthy mixed cohort populations present. However, high siltation and bed calcification reduced the value of the site considerably both as a nursery and spawning habitat. Deeper pool and bank scours offered excellent quality holding areas for adult Salmonids. The river had no suitability for Lamprey in the survey area given the high calcification of the bed and none were recorded. While the channel had some suitability for eel, given deeper water with high shading, downstream barriers and high bed calcification limited its potential to support eel (none recorded but known from site: Triturus data). Despite some suitability for White-clawed Crayfish in the highly

alkaline river, none were recorded with bed calcification reducing accessibility of instream refugia. No Otter signs were recorded in vicinity of the site albeit very high foraging suitability existed.

Biological water quality, based on Q-sampling, was calculated as **Q3 (poor status)** (Appendix B). No macro-invertebrate species of conservation value greater than 'least concern', according to national red lists, were recorded via Q-sampling.

Given the presence of Salmonids (including Atlantic Salmon), the aquatic ecological evaluation of site B5 was of **Local Importance (Higher Value)** (Table 4.4).



Plate 4.14: Representative image of site B5 on the Nuenna River, July 2025.

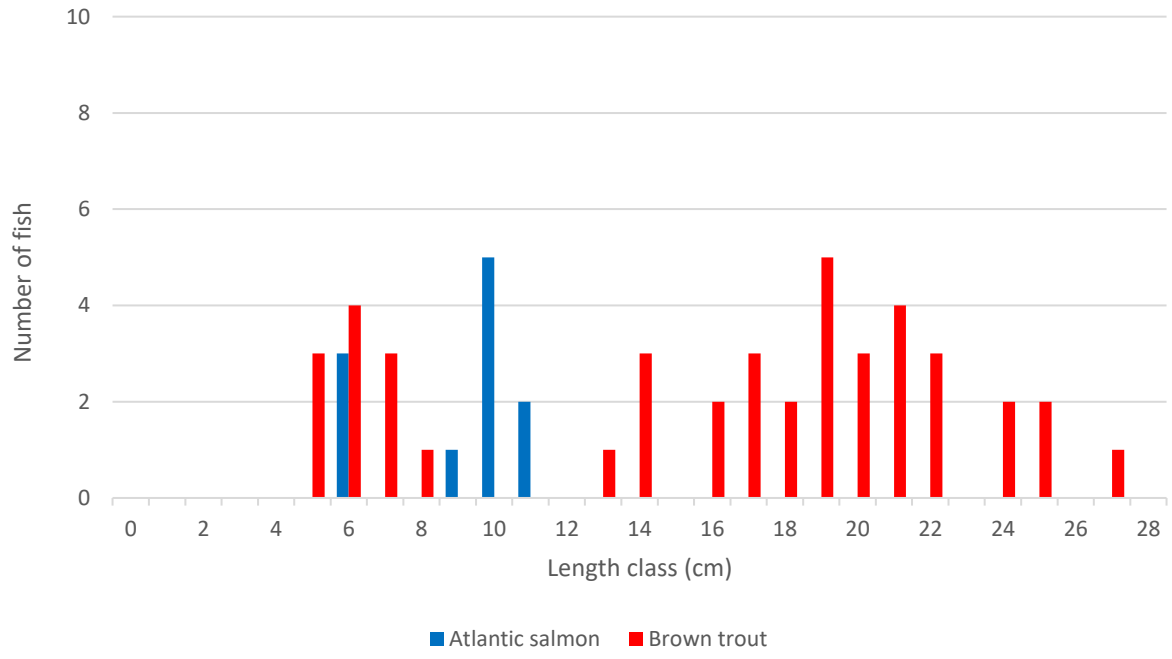


Figure 4.7: *Length frequency distribution recorded via electro-fishing at site B5, July 2025.*



Plate 4.15: Adult Brown Trout recorded at site B5 on the Nuenna River, July 2025.

4.1.10. Site B6 – Nuenna River, L10003 road crossing

Site B6 was located on the lower reaches of the Nuenna River (15N02) at a local road crossing just upstream of the River Nore confluence. The high energy lowland river at this location had been historically deepened but demonstrated good instream recovery. The river was 5-6m wide and 0.2-0.5m deep with steep loamy banks of 2-2.5m in height. Natural bank scouring was frequent. The site had equal proportions of riffle, glide and pool. The substrata were dominated by abundant cobble and gravels with banks of sand and silt in the depositing margins. The gravels were moderately compacted but heavily silted. Given high shading macrophytes were restricted to occasional Fool's Watercress and Common Water Starwort. The exposed muddy banks of the channel supported the calcicolous liverwort *Pellia endiviifolia*. The well-developed riparian zones supported abundant Grey Willow and Osier (*Salix viminalis*), with frequent Crack Willow, Hazel, Hawthorn, Blackthorn (*Prunus spinosa*) and occasional Ash. The understories featured Reed Canary Grass, Nettle, Hedge Bindweed and Bramble. The site was bordered by intensive pasture (GA1).

Atlantic Salmon (n=27), Brown Trout (n=19) and European Eel (n=1) were recorded via electro-fishing at site B6. The site was of high value for Salmonids with good flow heterogeneity and abundant spawning substrata providing good quality nursery and spawning habitat. However, the quality of the habitat was compromised by siltation pressures and historical hydromorphological impacts (despite good recovery). Mature riparian buffers protected the river from thermal stress. Valuable holding areas for adult Salmonids were frequent in deep glide and pool in bank undercuts and behind woody debris dams. Eel habitat was locally good between boulders under the masonry bridge crossing where a single large adult eel was recorded. The site had good potential to support Crayfish given the presence of swift flowing water, muddy banks for burrowing and good cover from overhanging trees. However, none were recorded. The channel also had high suitability for Otter given high cover and abundant food resources. An Otter latrine site was recorded on exposed gravels immediately downstream of the bridge.

Biological water quality, based on Q-sampling, was calculated as **Q3 (poor status)** (Appendix B). No macro-invertebrate species of conservation value greater than 'least concern', according to national red lists, were recorded via Q-sampling.

Given the location of the site within the River Barrow and River Nore SAC (002162) and the River Nore SPA (004233), the aquatic ecological evaluation of site B6 was of **International Importance** (Table 4.4).



Plate 4.16: Representative image of site B6 on the lowermost reaches of the Nuenna River, July 2025.

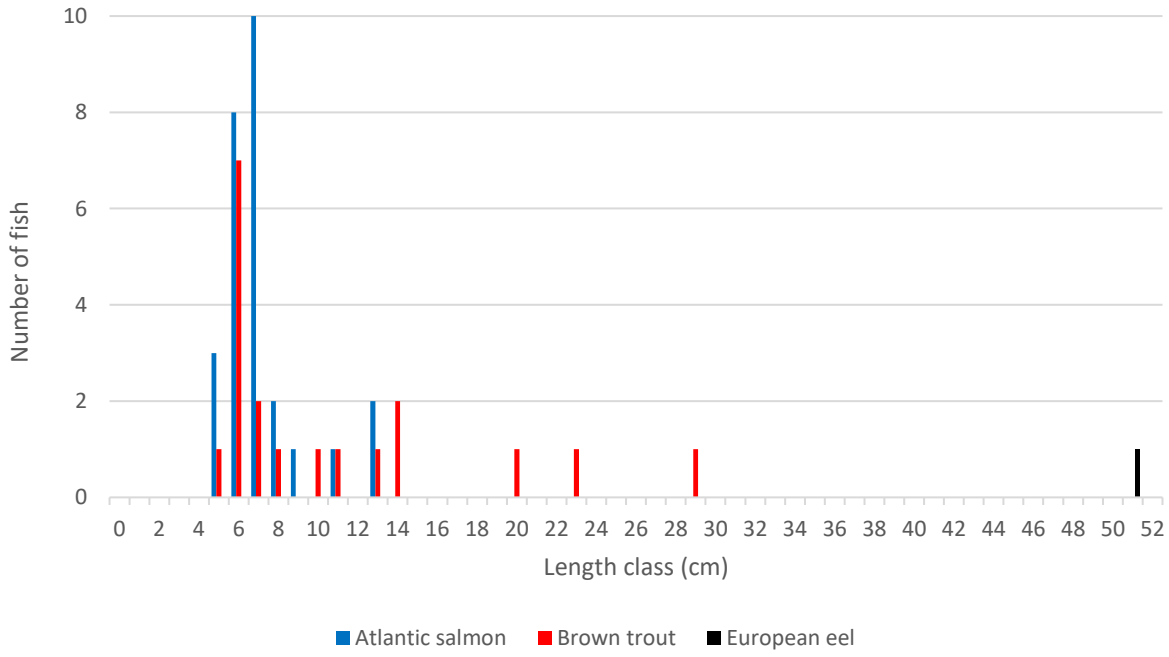


Figure 4.8: *Length frequency distribution recorded via electro-fishing at site B6, July 2025.*



Plate 4.17: 1+ Atlantic Salmon parr recorded at site B6 on the lowermost reaches of the Nuenna River, July 2025.

4.1.11. Site P1 – Pond, Ballyring Upper

Site P1 was a small pond located adjacent to proposed site boundary and turbine array. The former quarry pond was 0.05ha in size with depths of 0.1-0.5m. While the pond had gently sloping margins and a wide inundation zone it evidently retained water during dry summer periods. The bed supported compacted limestone gravels and silt. These were strewn with frequent Tolypella species, Curled Pondweed (*Potamogeton crispus*) and Pond Water Crowfoot (*Ranunculus peltatus*). The pond also supported occasional Common Water Starwort, Watercress and Fennel Pondweed (*Stuckenia pectinata*) with frequent emergent Common Spikerush (*Eleocharis palustris*) and Bulrush (*Typha latifoli*a) in the littorals at the base of step quarry escarpments. The pond borders supported abundant Sharp Flowered Rush (*Juncus acutiflorus*), Black Medick (*Medicago lupulina*) and Great Willowherb with occasional Water Figwort (*Scrophularia auriculata*) in the wet margins.

Site P1 was not of fisheries value given its shallow, artificial nature and isolation from other fisheries habitats. However, the pond had very high suitability for amphibians with Smooth Newt efts recorded via sweep sampling. The ample depth, high macrophyte cover, gently sloping margins and nearby refugia for winter torpor created optimal conditions for amphibians. There was poor habitat suitability for White-clawed Crayfish, and none were recorded. No Otter signs were recorded in vicinity of the site.

No macro-invertebrate species of conservation value greater than 'least concern', according to national red lists, were recorded via sweep sampling (Appendix B).

Given the presence of Smooth Newt, the aquatic ecological evaluation of site P1 was of **Local Importance (Higher Value)** (Table 4.4).



Plate 4.18: Representative image of site P1, July 2025.



Plate 4.19: Smooth Newt efts recorded at site P1, July 2025.

4.1.12. Site C1 – Gorteennamuck Stream, Gorteennamuck

Site C1 was located on the upper reaches of the Gorteennamuck Stream (15G39) at a local road and crossing of the Ballylehaun-Ballyring Underground Cabling. The stream had been historically straightened and realigned through a private garden into a small ornamental pond (FL8) which supported some standing water. However, the stream was dry at the time of survey with an absence of aquatic habitats or species. The pond supported some Water Lily (*Nuphar* sp.) and ornamental Rushes, which had also colonised the dry stream channel bed.

Site C1 was dry at the time of survey and was not of fisheries value given the ephemeral nature of the channel at this location. The stream had been diverted through a private garden pond, which featured some standing water and had some value for ornamental fish species (not observed).

Given the dry nature of the stream at this location, it was not possible to collect a biological water quality sample.

Given the absence of aquatic species or habitats of high conservation value, the aquatic ecological evaluation of site C1 was of **Local Importance (Lower Value)** (Table 4.4).



Plate 4.20: Representative image of site C1 on the Gorteennamuck Stream, July 2025 (dry, ephemeral channel).

4.1.13. Site C2 – Gorteenahilla River, Ballygowney

Site C2 was located on the upper reaches of the Gorteenahilla River (15G08) at a local road and crossing of the Ballylehaun-Ballyring Underground Cabling. The upland eroding channel (FW1) flowed over moderate gradient and had been historically straightened along field boundaries but retained some good semi-natural characteristics and localised sinuosity near meanders. The river was 2m wide and 0.05-0.15m deep with a profile of slow flowing shallow riffle and glide. Pool was localised and shallow under tree roots at meanders. The small river evidently suffered from low summer flows. The substrata comprised mixed angular boulder, cobble and gravels that were moderately bedded and silted. Siltation increased in shallow pools were settlement of fines increased. The site did not support macrophytes. Larger substrata did support some *Rhynchostegium riparioides.* Filamentous algae cover was high (c. 30%) in open areas indicating eutrophication pressures. The riparian zone supported scrubby mature blackthorn, Hawthorn and Ash with Bramble. The site was bordered by extensive pastures (GA1).

Brown trout (n=11) was the only fish species recorded via electro-fishing at site C2. The site was a moderate quality nursery for Brown Trout. The presence of mixed riffle, glide and localised pool sequences with invertebrate prey resources and good riparian cover supported a low density of

juveniles. Spawning habitat was localised in deeper glide and pool tailings where mixed finer gravels persisted. Holding habitat was poor as supported by the dominance of 0+ fish. The site had limited suitability for European Eel given the upland characteristics with limited deeper pool habitat (none recorded). There was no suitability for Lamprey. There was poor suitability for White-clawed Crayfish given low summer flows and upland characteristics (none recorded). No Otter signs were recorded in vicinity of the site.

Biological water quality, based on Q-sampling, was calculated as **Q3 (poor status)** (Appendix B). No macro-invertebrate species of conservation value greater than 'least concern', according to national red lists, were recorded via Q-sampling.

Given the presence of Salmonids, the aquatic ecological evaluation of site C2 was of **Local Importance (Higher Value)** (Table 4.4).



Plate 4.21: Representative image of site C2 on the Gorteenahilla River, July 2025.

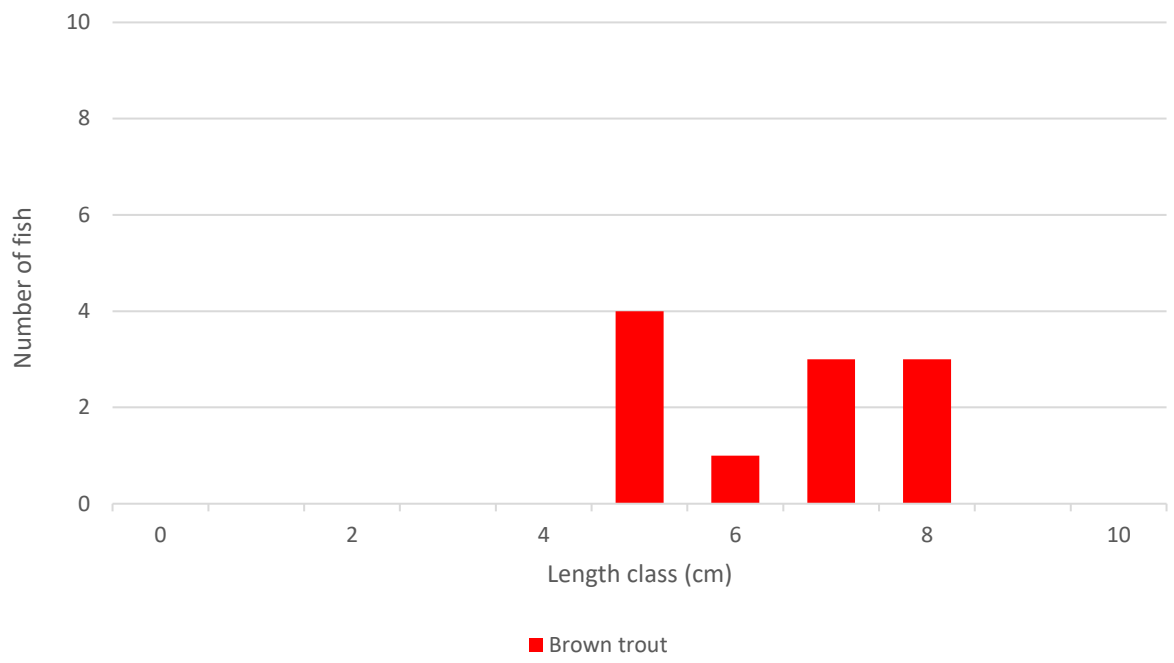


Figure 4.9: *Length frequency distribution recorded via electro-fishing at site C2, July 2025.*



Plate 4.22: Juvenile Brown Trout recorded at site C2 on the Gorteenahilla River, July 2025.

4.1.14. Site C3 – Ballyring Upper Stream, Ballyring Upper

Site C3 was located on the Ballyring Upper Stream (15B73) downstream of the Ballylehaun-Ballyring Underground Cabling. The small upland eroding stream (FW1) flowed over a steep gradient and had been historically realigned with bank reinforcement works upstream and downstream of the bridge crossing. The stream suffered from low summer flows at the time of survey with stagnant pools of water only (a regular feature of the watercourse; Triturus data). The stream was 1-1.5m wide was 0.05-0.15m deep with locally deeper pools. The substrata comprised mixed boulder, cobble and

gravels that were moderately bedded and heavily silted. Filamentous algae cover was high in open areas indicating eutrophication pressures with abundant floc in pools. The site supported some localised Watercress, brooklime and Fool's Watercress in open pool margins. Aquatic bryophytes were not recorded. The riparian zone supported mature, scrubby Blackthorn, Hawthorn, Hazel and Ash treelines with abundant Bramble. The site was bordered by sloping improved pasture (GA1).

Three-spined Stickleback (n=10) was the only fish species recorded via electro-fishing at site C3. With the exception of low densities of stickleback in stagnant pools, the site was not of significant fisheries value given poor/absent summer flows. There was no suitability for White-clawed Crayfish. No Otter signs were recorded in vicinity of the site.

Biological water quality, based on Q-sampling, was calculated as **Q3 (poor status)** (Appendix B). However, this rating was tentative given poor flows and the absence of suitable riffle areas for sampling (as per Toner *et al*., 2005). No macro-invertebrate species of conservation value greater than 'least concern', according to national red lists, were recorded via Q-sampling.

Given the absence of aquatic species or habitats of high conservation value, the aquatic ecological evaluation of site C3 was of **Local Importance (Lower Value)** (Table 4.4).



Plate 4.23: Representative image of site C3 on the Ballyring Upper Stream, July 2025.

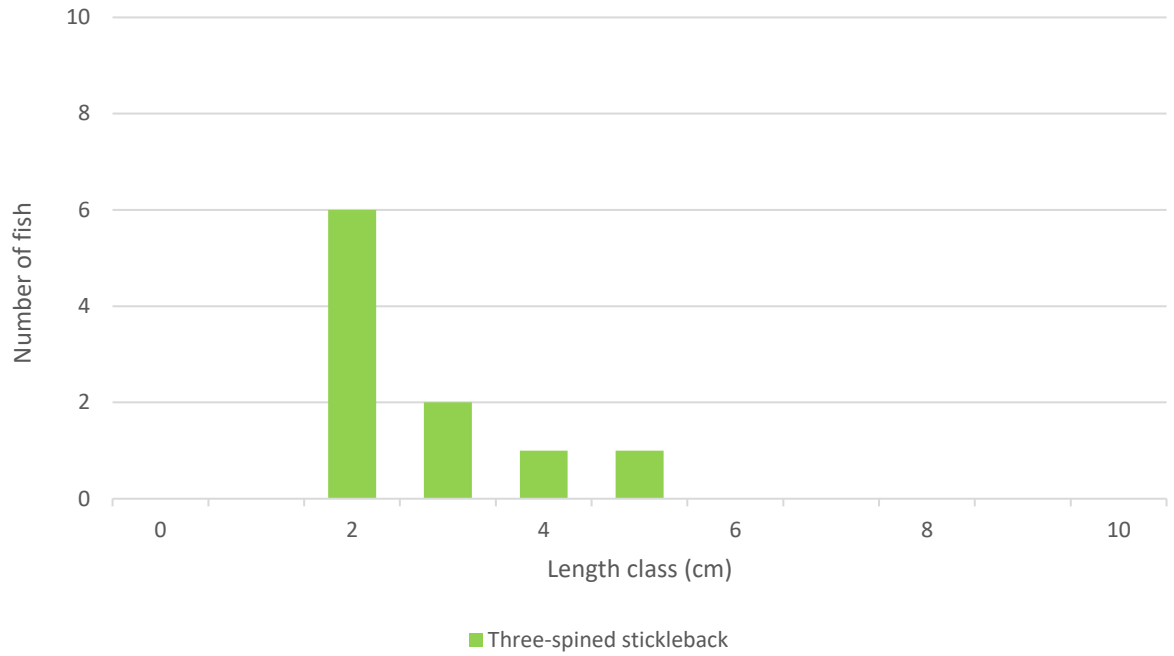


Figure 4.10: *Length frequency distribution recorded via electro-fishing at site C3, July 2025.*



Plate 4.24: Mixed cohort Three-spined Stickleback recorded at site C3 on the Ballyring Upper Stream, July 2025.

4.1.15. Site C4 – Lisdowney Stream, L1807 road crossing

Site C4 was located on the Lisdowney Stream (15L02) at the L1807 road. The upland eroding spate stream (FW1) flowed over a low to moderate gradient and was 2-4m wide (1.5m water width) with 2m high banks. The water was 0.1-0.3m deep. The channel had been historically deepened but demonstrated good instream recovery with riffle, glide and pool sequences despite low summer flows. The substrata comprised mixed boulder, cobble and gravels that suffered significant siltation and

enrichment (abundant floc). Bed calcification was evident. The site did not support macrophytes due to the heavily compacted bed and high shading, although instream calcified boulders supported occasional *Rhynchostegium riparioides*. The riparian zone supported mature Ash, Sycamore and Oak with dense Bramble and Ivy in open areas. The site was bordered by extensive pastures (GA1).

Brown trout (n=26) were the only fish species recorded via electro-fishing at site C4. Atlantic Salmon are known from the site (Triturus 2021 data) but were not recorded in the current survey. In spite of low summer flows, the site was a valuable Salmonid nursery with good densities of 0+ fish present. Good quality spawning habitat was present locally, although calcification and siltation reduced the capacity of the site. Holding opportunities were rare, reflecting the absence of resident adult Salmonids. The upland site was unsuitable for Lamprey, with no soft sediment nursery areas present. Despite some suitability for both European Eel (known from the watercourse) and White-clawed Crayfish (no records), neither was recorded, with limited refugia due to bed calcification. A regular Otter spraint site was recorded underneath the masonry arch bridge crossing and also on a large boulder immediately downstream of the bridge.

Biological water quality, based on Q-sampling, was calculated as **Q3 (poor status)** (Appendix B). No macro-invertebrate species of conservation value greater than 'least concern', according to national red lists, were recorded via Q-sampling.

Given the presence of Salmonids and utilisation by Otter, the aquatic ecological evaluation of site C4 was of **Local Importance (Higher Value)** (Table 4.4).



Plate 4.25: Representative image of site C4 on the Lisdowney Stream, July 2025.

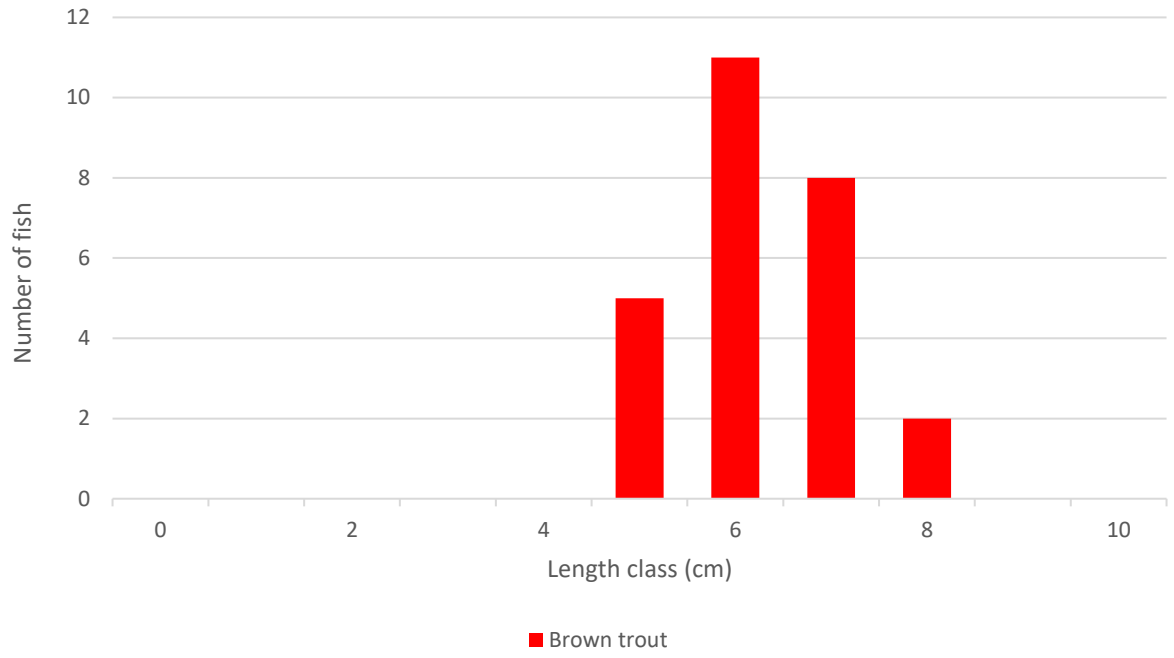


Figure 4.11: *Length frequency distribution recorded via electro-fishing at site C4, July 2025.*



Plate 4.26: Juvenile Brown Trout recorded at site C4 on the Lisdowney Stream, July 2025.

4.1.16. Site C5 – Ballyconra Stream, L1807 road crossing

Site C5 was located on the Ballyconra Stream (15B86) at the L1807 road.

The stream had been historically straightened and deepened and was 100% dry at the time of survey. The heavily modified U-shaped channel was 1.5m wide with a damp mud and stone base. In open areas, the channel supported occasional Fool's Watercress with encroachment from great Willowherb. Aquatic bryophytes were absent. The riparian areas supported mature treelines of Ash,

Crack Willow, grey Willow, Elder, Hawthorn and blackthorn with dense Bramble scrub. The site was bordered by heavily improved pasture (GA1) and a residential property (BL3, GA2).

Site C5 was not of fisheries value given the ephemeral and typically dry nature of the channel at this location.

Given the dry nature of the stream at this location, it was not possible to collect a biological water quality sample.

Given the absence of aquatic species or habitats of high conservation value, the aquatic ecological evaluation of site C5 was of **Local Importance (Lower Value)** (Table 4.4).



Plate 4.27: Representative image of site C5 on the Ballyconra Stream, July 2025 (dry, ephemeral channel).

4.1.17. Site C6 – River Nore, Parksgrove

Site C6 was located on the River Nore (15N01) upstream of Ballyragget. The large lowland river (FW2) had been historically deepened and was 1.2-1.4m deep with 3m high banks. The flow profile was composed exclusively of deep depositional glide. The substrata comprised compacted boulder and cobble with localised areas of sands and silt. Significant eutrophication and siltation were evident. The site supported frequent linear stands of branched bur reed and Water Mint with rare river water dropwort (*Oenanthe fluviatilis*) and Common Clubrush. Larger boulders and cobble were heavily strewn with abundant *Fontinalis antipyretica*. The riparian areas supported intermittent and narrow treelines of mature Crack Willow, Grey Willow and Alder with herbaceous and scrubby herbaceous understories. The site was bordered by heavily improved pasture (GA1) and dry meadow areas (GS2).

Electro-fishing was not undertaken at site C6 given prohibitive depths and water volumes. The deep glide survey reach was of some moderate value to Salmonids with nursery and spawning areas present. However, the quality was impacted by siltation. Much improved Salmonid and Lamprey

nursery habitat was present c. 500m upstream near an island (pers. obs.). The deep section was of good value as a holding area for adult Salmonids, particularly given overhanging tree cover. The bed was too compacted to support good quality Lamprey nursery habitat albeit localised pockets of shallow silt existed in the margins near beds of Branched Bur-reed and likely supported low ammocoete densities. The Nore is also known to support European Eel in addition to a range of coarse fish species near the survey reach. There was moderate potential for White-clawed Crayfish although bed compaction and poorer hydromorphology reduced suitability. Furthermore, known historical outbreaks of plague have decimated much of the historical populations within the main channel. The survey area had good suitability for Otter albeit no signs were recorded.

Biological water quality, based on Q-sampling, was calculated as **Q3 (poor status)** (Appendix B). However, this rating was tentative given the absence of suitable riffle areas for sampling (as per Toner *et al*., 2005). No macro-invertebrate species of conservation value greater than 'least concern', according to national red lists, were recorded via Q-sampling.

Given the location of the site within the River Barrow and River Nore SAC (002162) and the River Nore SPA (004233), the aquatic ecological evaluation of site C6 was of **International Importance** (Table 4.4).



Plate 4.28: Representative image of site C6 on the River Nore, July 2025.

4.2. White-clawed Crayfish survey

No White-clawed Crayfish were recorded via hand-searching or sweep netting of instream refugia at any of the aquatic survey sites in July 2025. Furthermore, inspection of Otter spraint/latrines at sites on the Coolnacrutta Stream, Nuenna River and Lisdowney Stream did not reveal the presence of Crayfish remains.

However, environmental DNA sampling of the River Goul and Nuenna River detected the species (**Table 4.1**).

4.3. eDNA sampling

Although not recorded through traditional methodologies, White-clawed Crayfish eDNA was detected at site A4 on the River Goul and site B6 on the Nuenna River (5 & 3 positive replicates out of 12, respectively; **Table 4.1; Appendix A**). These results were considered as evidence of the species' presence at and or upstream of the sampling locations.

In keeping with an absence of records for the respective watercourses, Freshwater Pearl Mussel were not detected in the samples from the River Goul or Nuenna River (0 positive replicates out of 12, respectively). No eDNA of Crayfish plague (an obligate pathogen of Crayfish) was detected in the samples.

Table 4.1: eDNA results in the vicinity of the proposed development, July 2025 (positive qPCR replicates out of 12 in parentheses).

Site	Watercourse	Freshwater pearl mussel	White-clawed Crayfish	Crayfish plague
A4	River Goul	Negative (0/12)	Positive (5/12)	Negative (0/12)
B6	Nuenna River	Negative (0/12)	Positive (3/12)	Negative (0/12)

4.3.1. Biological water quality (macro-invertebrates) & lacustrine macro-invertebrates

No rare or protected macro-invertebrate species (according to national red lists) were recorded in the biological water quality samples taken from a total of 14 no. wetted riverine sites or sweep samples from 1 no. pond site in July 2025 (**Appendix B**).

Sites A4 on the River Goul and B4 on the Gorteenahilla River achieved Q3-4 (moderate status) water quality (**Figure 4.12**). Despite the presence of the EPA group A Mayfly species *Ephemera danica* (A4) or *Rhithrogena semicolorata* (B4) these were only recorded in low numbers (<5% of total sample) and thus did not meet the qualifying criteria for good status as set out by Toner *et al*. (2005).

The remaining 12 no. sites on the Coolnacrutta Stream (A1, A2), River Goul (A3), Lismaine Stream (B1, B2, B3), Nuenna River (B5, B6), Gorteenahilla River (C2), Ballyring Upper Stream (C3), Lisdowney Stream (C4) and River Nore (C6) achieved **Q2-3 or Q3 (poor status**) based on an absence of group A species, low numbers of group B species and a dominance of group C species such as the Mayflies *Baetis rhodani* and *Seratella ignita* and Freshwater Shrimp (*Gammarus duebeni*) (**Appendix B**).

The pond site P1 sample was dominated by the Lake Olive (*Cloeon simile*), a low diversity of gastropod molluscs such as New Zealand Mud Snail (*Potamopyrgus antipodarum*), Water Beetles and Dragonflies (e.g. *Anax imperator*) (**Appendix B**).

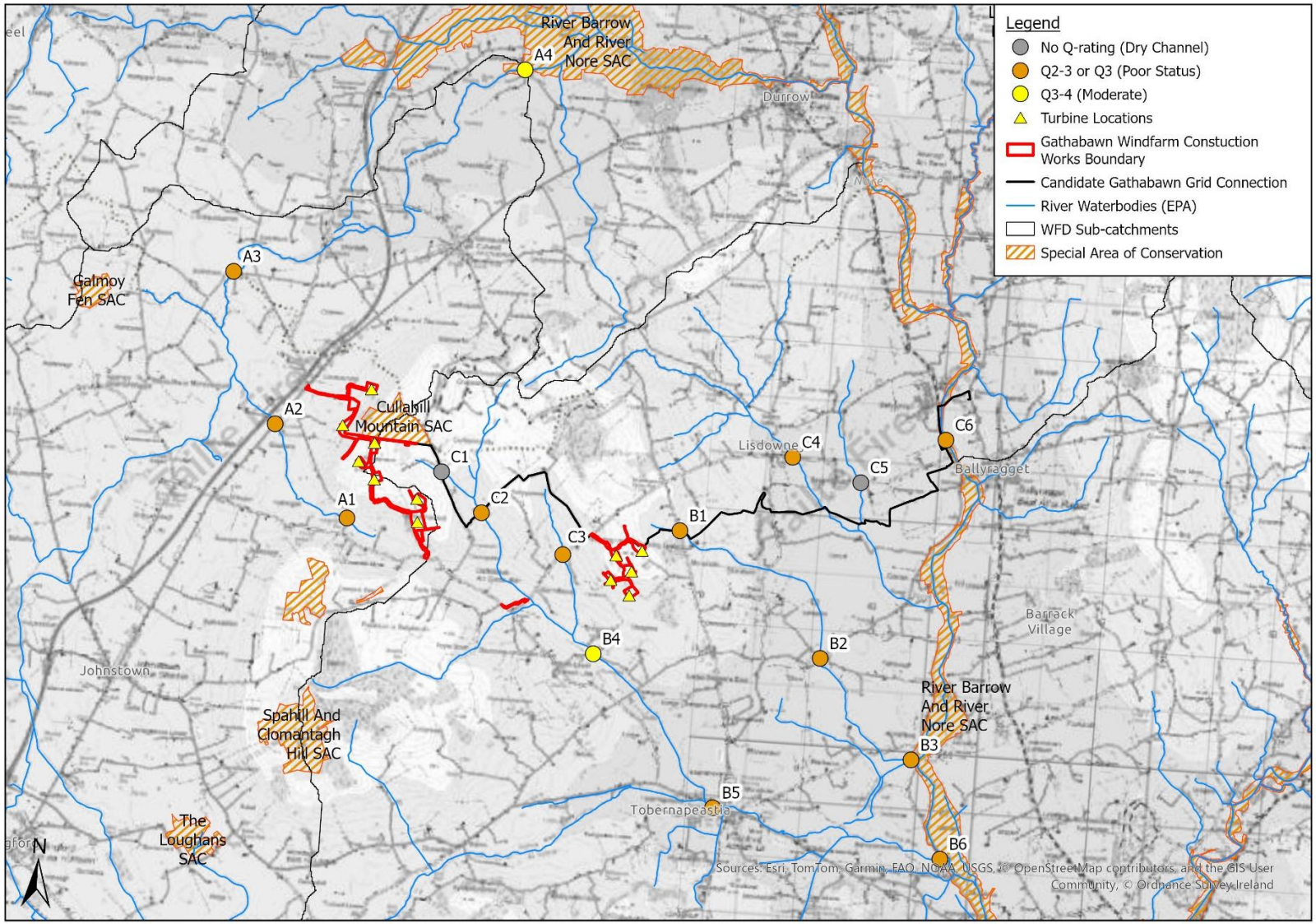


Figure 4.12: *Overview of the biological water quality status in the vicinity of the proposed development, July 2025.*

Table 4.2: *Relative abundance of fish species of higher conservation value recorded via electro-fishing in the vicinity of the proposed development, July 2025 (blank cell = none recorded).*

Site	Watercourse	Atlantic Salmon	Brown trout	Lamprey	European Eel	Other species
A1	Coolnacrutta Stream	No fish recorded				
A2	Coolnacrutta Stream	Low	Low	Low	Low	
A3	River Goul	Low	Medium			Minnow, Stone Loach
A4	River Goul	Low	Medium	Low	Low	Minnow, Stone Loach, three-spined stickleback
B1	Lismaine Stream	No fish recorded				
B2	Lismaine Stream					Three-spined Stickleback
B3	Lismaine Stream	Low	Low	Low		Minnow, Stone Loach, three-spined stickleback
B4	Gorteenahilla River	Medium	Low	Medium		Three-spined Stickleback
B5	Nuenna River	Medium	High			
B6	Nuenna River	Medium	Medium		Low	
P1	Pond	Fisheries appraisal only (not of fisheries value)				
C1	Gorteennamuck Stream	No fish recorded (dry channel)				
C2	Gorteenahilla River		Low			
C3	Ballyring Upper Stream					Three-spined Stickleback
C4	Lisdowney Stream		Medium			
C5	Ballyconra Stream	No fish recorded (dry channel)				
C6	River Nore	Fisheries appraisal only				

Table 4.3 *Fish species densities per m2 recorded at sites in the vicinity of the proposed development via electro-fishing in July 2025 (values in bold represent the highest densities recorded for each species, respectively)*

Site no.	Watercourse	CPUE (elapsed time)	Approx. area fished (m^2)	Atlantic Salmon	Brown trout	*Lampetra* sp.	European Eel	Stone loach	Three-spined stickleback	Minnow
A1	Coolnacrutta Stream	5	50	0.000	0.000	0.000	0.000	0.000	0.000	0.000
A2	Coolnacrutta Stream	10	120	0.017	0.025	0.67 per m2	0.008	0.000	0.000	0.000
A3	River Goul	10	180	0.033	0.100	0.000	0.000	0.006	0.000	0.039
A4	River Goul	10	200	0.020	0.090	2 per m2	0.005	0.010	0.015	0.020
B1	Lismaine Stream	5	30	0.000	0.000	0.000	0.000	0.000	0.000	0.000
B2	Lismaine Stream	5	50	0.000	0.000	0.000	0.000	0.000	0.120	0.000
B3	Lismaine Stream	10	150	0.007	0.033	4 per m2	0.000	0.027	0.013	0.027
B4	Gorteenahilla River	10	140	0.114	0.050	7 per m2	0.000	0.000	0.014	0.000
B5	Nuenna River	10	220	0.050	0.191	0.000	0.000	0.000	0.000	0.000
B6	Nuenna River	10	210	0.129	0.090	0.000	0.005	0.000	0.000	0.000
P1*	Pond	n/a	Fisheries appraisal only	n/a	n/a	n/a	n/a	n/a	n/a	n/a
C1	Gorteennamuck Stream	5	50	0.000	0.000	0.000	0.000	0.000	0.000	0.000
C2	Gorteenahilla River	10	150	0.000	0.073	0.000	0.000	0.000	0.000	0.000
C3	Ballyring Upper Stream	5	100	0.000	0.000	0.000	0.000	0.000	0.100	0.000
C4	Lisdowney Stream	10	200	0.000	0.130	0.000	0.000	0.000	0.000	0.000
C5	Ballyconra Stream	n/a	n/a - dry channel	n/a	n/a	n/a	n/a	n/a	n/a	n/a
C6*	River Nore	n/a	n/a - too deep	n/a	n/a	n/a	n/a	n/a	n/a	n/a

Table 4.4 Summary of aquatic species and habitats of higher conservation value recorded in the vicinity of the proposed developments, July 2025.

Site	Watercourse	White-clawed Crayfish	Otter signs[2]	Annex I aquatic habitats	Rare or protected macrophytes/ aquatic bryophytes	Rare or protected macro-invertebrates	Other species/habitats of high conservation value
A1	Coolnacrutta Stream	None recorded	None recorded	Not present	None recorded	None recorded	None recorded
A2	Coolnacrutta Stream	None recorded	1 no. spraint site	Not present	None recorded	None recorded	Atlantic Salmon, *Lampetra* sp., European Eel
A3	River Goul	None recorded	None recorded	Not present	None recorded	None recorded	Atlantic Salmon
A4	River Goul	Detected via eDNA	None recorded	Not present	None recorded	None recorded	Atlantic Salmon, *Lampetra* sp., European Eel
B1	Lismaine Stream	None recorded	None recorded	Not present	None recorded	None recorded	None recorded
B2	Lismaine Stream	None recorded	None recorded	Not present	None recorded	None recorded	None recorded
B3	Lismaine Stream	None recorded	None recorded	Not present	None recorded	None recorded	Atlantic Salmon, *Lampetra* sp.
B4	Gorteenahilla River	None recorded	None recorded	Not present	None recorded	None recorded	Atlantic Salmon, *Lampetra* sp.
B5	Nuenna River	None recorded	None recorded	Not present	None recorded	None recorded	Atlantic Salmon
B6	Nuenna River	Detected via eDNA	Latrine recorded	Not present	None recorded	None recorded	Atlantic Salmon, European Eel
P1	Pond	None recorded	None recorded	Not present	None recorded	None recorded	Smooth Newt
C1	Gorteennamuck Stream	None recorded	None recorded	Not present	None recorded	None recorded	None recorded

[2] *Otter signs within 150m of the survey site*

Site	Watercourse	White-clawed Crayfish	Otter signs[2]	Annex I aquatic habitats	Rare or protected macrophytes/ aquatic bryophytes	Rare or protected macro-invertebrates	Other species/habitats of high conservation value
C2	Gorteenahilla River	None recorded	None recorded	Not present	None recorded	None recorded	None recorded
C3	Ballyring Upper Stream	None recorded	None recorded	Not present	None recorded	None recorded	None recorded
C4	Lisdowney Stream	None recorded	2 no. spraint sites	None recorded	None recorded	None recorded	None recorded
C5	Ballyconra Stream	None recorded	None recorded	Not present	None recorded	None recorded	None recorded
C6	River Nore	None recorded	None recorded	Not present	None recorded	None recorded	Atlantic Salmon, *Lampetra* sp., European Eel & Otter all known from area

Conservation value: White-clawed Crayfish, Eurasian Otter, Atlantic Salmon & Lamprey are listed under Annex II and Annex V of the Directive on the Conservation of Natural Habitats of Wild Fauna and Flora (92/43/EEC) ('EU Habitats Directive'). White-clawed Crayfish, Otter and Smooth Newt are protected under the Irish Wildlife Acts 1976-2023. Atlantic Salmon are also protected under the Wild Salmon and Sea Trout Tagging Scheme (Amendment) Regulations. European Eel is 'critically endangered' according to most recent ICUN red list (Pike *et al*., 2020) and listed as 'critically engendered' in Ireland (King *et al*., 2011).

Table 4.5 Aquatic ecological evaluation summary of the survey sites according to NRA (2009) criteria.

Site	Watercourse	EPA code	Evaluation of importance	Rationale summary
A1	Coolnacrutta Stream	15C50	Local importance (lower value)	No aquatic species or habitats of high conservation value
A2	Coolnacrutta Stream	15C50	Local importance (higher value)	Atlantic Salmon, Brown Trout, Lamprey & European Eel recorded; site utilised by Otter
A3	River Goul	15G02	Local importance (higher value)	Atlantic Salmon & Brown Trout recorded
A4	River Goul	15G02	Local importance (higher value)	Atlantic Salmon, Brown Trout, Lamprey & European Eel recorded
B1	Lismaine Stream	15L16	Local importance (lower value)	No aquatic species or habitats of high conservation value
B2	Lismaine Stream	15L16	Local importance (lower value)	No aquatic species or habitats of high conservation value
B3	Lismaine Stream	15L16	Local importance (higher value)	Atlantic Salmon, Brown Trout & Lamprey recorded
B4	Gorteenahilla River	15G08	Local importance (higher value)	Atlantic Salmon, Brown Trout & Lamprey recorded
B5	Nuenna River	15N02	Local importance (higher value)	Atlantic Salmon & Brown Trout recorded
B6	Nuenna River	15N02	International importance	Located within the River Barrow and River Nore SAC (002162) and the River Nore SPA (004233)
P1	Pond	n/a	Local importance (higher value)	Smooth Newt recorded
C1	Gorteennamuck Stream	15G39	Local importance (lower value)	No aquatic species or habitats of high conservation value (dry, ephemeral channel)
C2	Gorteenahilla River	15G08	Local importance (higher value)	Brown trout recorded
C3	Ballyring Upper Stream	15B73	Local importance (lower value)	No aquatic species or habitats of high conservation value
C4	Lisdowney Stream	15L02	Local importance (higher value)	Brown trout recorded, site utilised by Otter
C5	Ballyconra Stream	15B86	Local importance (lower value)	No aquatic species or habitats of high conservation value (dry, ephemeral channel)
C6	River Nore	15N01	International importance	Located within the River Barrow and River Nore SAC (002162) and the River Nore SPA (004233)

5. DISCUSSION

The watercourses surveyed in the vicinity of the proposed Gathabawn Windfarm development were typically small upland and lowland channels which had been historically straightened and or deepened. Whilst good instream recovery was evident across most modified survey sites, siltation and eutrophication pressures were significant and had impacted aquatic habitats and resulted in a reduction of biological water quality. Low summer flows, very much characteristic of this region, further affected the quality of aquatic habitats and were evidently an issue for fish populations on several watercourses in the vicinity of the development with a total of 4 no. sites not supporting resident fish at the time of survey. Intermittent flows result in degradated fisheries habitat, particularly due to high thermal stress (O'Briain *et al*., 2020, 2019, 2017) and agricultural (siltation and eutrophication) pressures (Kelly-Quinn *et al*., 2020; O'Callaghan *et al*., 2019; Davis *et al*., 2018; Conroy *et al*., 2016). The Nore catchment features a relatively high number of instream barriers (Atkinson *et al*., 2018; Sullivan, 2007), particularly for non-salmonid species (Gargan *et al*., 2011; IFI National Barriers dataset) and this also influenced fish distributions. Pond site P1 was not of fisheries value given its shallow, isolated nature. Nearly half of the riverine survey sites were of low fisheries and aquatic value and were evaluated as **Local Importance (Lower Value)** given an absence of aquatic species or habitats of high conservation value (**Table 4.4**). A number of sites were dry, ephemeral channels namely the Gorteennamuck Stream (C1) and Ballyconra Stream (C5).

Nevertheless, a range of high conservation value species were recorded during the surveys including Annex II Atlantic Salmon, Lamprey and Otter in addition to Red-listed European Eel. The presence of one or more of these fish species resulted in most sites being evaluated **as Local Importance (Higher Value)** in terms of their aquatic ecology (**Table 4.4**). Site B6 on the Nuenna River and C6 on the River Nore were of **International Importance** given their locations within the River Barrow and River Nore SAC (002162) and the River Nore SPA (004233) sites. Pond site P1 supported a Smooth Newt population, a species protected under the Wildlife Acts 1976-2023. White-clawed Crayfish were detected via eDNA sampling both the River Goul and Nuenna River.

No rare or protected macrophytes/aquatic bryophytes, rare or protected macro-invertebrates, Otter breeding/resting areas or aquatic invasive species were recorded during the current survey. Broadly speaking, the highest value watercourses in terms of aquatic ecology within vicinity of the proposed development were the Coolnacrutta Stream, River Goul, Gorteenahilla River, Nuenna River and River Nore.

5.1. Fisheries

A typical diversity of fish for the surveyed sub-catchments (Triturus 2021-2024 data; Gordon *et al*., 2021; Matson *et al*., 2018; Kelly *et al*., 2014) was recorded, with Atlantic Salmon, Brown Trout, Lamprey, European Eel, Minnow, Stone Loach and Three-spined Stickleback captured in July 2025 (**Table 4.2**). A total of 4 no. sites did not support resident fish at the time of survey, primarily given low summer flows and or an absence of aquatic habitats.

Salmonid populations were widespread in the survey area although were absent from the upper reaches of several watercourses such as the Coolnacrutta and Lismaine Streams (which supported salmonids further downstream). Atlantic Salmon were recorded from 7 no. sites on the Coolnacrutta Stream (A2), River Goul (A3, A4), Lismaine Stream (B3), Gorteenahilla River (B4) and the Nuenna River

(B5, B6). Brown trout were also present at these sites as well as sites C2 on the Gorteenahilla River and C4 on the Lisdowney Stream, but are also known from the River Nore in the vicinity of the candidate grid connection route crossing (Site C6 too deep for electro-fishing) and the upper reaches of the Lisdowney Stream (Triturus data). Densities were typically low to medium, reflecting the significant water quality and hydromorphological impacts throughout the survey area. Brown Trout had a similar distribution being recorded from these above sites in addition to sites C2 on the Gorteenahilla River and C4 on the Lisdowney Stream. Salmon parr were typically present only in low densities although moderate numbers were recorded from sites on the Nuenna River and its tributary the Gorteenahilla River (superior nurseries). The Nuenna River (sites B5, B6) also supported the highest numbers of Brown Trout recorded during the survey. Siltation of spawning habitat was especially noticeable throughout the survey area, with Hydromorphological impacts reducing habitat heterogeneity and the quality of available nursery areas.

Lamprey habitat was restricted in the survey area given the higher energy conditions at many sites which discourages the settlement of organic rich fines required for larval burial (Aronsuu & Virkkala, 2014; Goodwin *et al*., 2008; Gardiner, 2003) plus siltation, eutrophication and hydromorphological pressures. Given that *Lampetra* spp. require fine, clean gravels for spawning (Dawson *et al*., 2015; Rooney *et al*., 2013; Lasne *et al*., 2010; Kelly & King, 2001), siltation significantly impacted spawning opportunities in the survey area, with bed calcification and eutrophication also additional pressures. Channel gradients and instream barriers (both natural and anthropogenic) further restricted Lamprey populations given their poor ability to navigate even low head obstacles and higher flow velocities. However, *Lampetra* sp. ammocoetes were recorded in low to medium densities (0.67 to 7 per m^2) from a total of 4 no. sites on the Coolnacrutta Stream (A2), River Goul (A4), Lismaine Stream (B3) and Gorteenahilla River (B4). Sites B3 and B4 supported higher ammocoete densities given the abundance of suitable soft sediment accumulations not typically encountered elsewhere (invariably flocculent and too shallow for larval burial).

European Eel is Red-listed in Ireland (King *et al*., 2011) and are classed as 'critically endangered' on a global scale (Pike *et al*., 2020). Despite widespread suitability, European Eel were only recorded in low numbers at 3 no. sites on the Coolnacrutta Stream (A1), River Goul (A4) and Nuenna River (B6) (**Table 3.1, 3.2**). Sites beyond the scope of electro-fishing on the River Nore (C6) also provided good quality eel habitat and likely supported the species. The low eel numbers and absence from many physically suitable sites likely reflects the high number of barriers to fish passage present in the Nore catchments, as well as widespread low summer flow conditions which influence and restrict fish distribution. Eel penetration into many Nore tributaries is low (Gargan *et al*., 2011), primarily due to the high number of aforementioned instream barriers within the catchment. As eel occurrence decreases significantly with increasing distance from the sea (Degerman *et al*., 2019), the paucity of eel observed in the survey sub-catchments can be further explained by the distance between the survey area and marine habitats (Matondo *et al*., 2021; Chadwick *et al*., 2007) (c. 90km nearest instream distance).

5.2. Water quality & macro-invertebrates

Whilst no live White-clawed Crayfish were recorded during the targeted surveys, the species was detected via eDNA sampling at site A4 on the River Goul and site B6 on the Nuenna River (**Table 4.1; Appendix A**). Although both historical and contemporary Crayfish records are available for the River Goul, a tributary of the River Erkina (**Figure 3.1**), none are available for the Nuenna River. Our results indicate a previously unrecorded Crayfish population within this highly alkaline river system that may be of considerable conservation value given the decline of the species in the downstream connecting River Nore.

An outbreak of the highly infectious Crayfish plague- a pathogen which causes mass mortality in White-clawed Crayfish populations - was confirmed on the River Nore in Kilkenny in 2019 and the pathogen has likely impacted populations throughout the Nore catchment. Environmental DNA monitoring as part of the National Crayfish Plague Surveillance Programme has since detected and confirmed the spread of Crayfish plague in the wider Nore catchment (Swords *et al*., 2022) although none was recorded in the current survey (**Table 4.1; Appendix A**). Crayfish plague is listed at one of the world's 100 worst invasive species (GISD, 2025).

5.3. Macro-invertebrates & biological water quality

No rare or protected macro-invertebrate species (according to national red lists) were recorded in the samples taken from a total of 14 no. wetted riverine sites or 1 no. pond site in July 2025 (**Appendix B**). The samples were typically dominated by pollution-tolerant taxa common to Irish rivers impacted by siltation, eutrophication and hydromorphological pressures. Only two sites (A4 & B4) were found to support any EPA group A macro-invertebrate species (i.e. most pollution sensitive).

Although not protected, the nationally uncommon lesser water boatman species *Corixa iberica* was recorded in low numbers from pond site P1. This species is highly localised in Scotland and Ireland as well as the Iberian Peninsula (Huxley, 2003) but its close similarity to (and possible hybridisation with) the widespread *Corixa punctata* (Angus, 2006) may have led to misidentification and under recording.

All riverine sites sampled failed to meet the target good status (≥Q4) requirements of the European Union Environmental Objectives (Surface Waters) (Amendment) Regulations 2019 and the Water Framework Directive (2000/60/EC) (**Figure 4.12**). The biological water quality of the survey area was unsatisfactory (i.e. ≤Q3-4) and typically of poor status (Q2-3 or Q3) with significant siltation and hydromorphological impacts evidently contributing to a reduction in water quality, in addition to eutrophication pressures. Agriculture is known to be the major water quality pressure within the wider survey area (EPA, 2024 & other EPA data) and this was supported by observations made during the aquatic surveys.

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APPENDIX A – EDNA LAB REPORT

Folio No:	3960-2025
Purchase Order:	eDNA_Gathabaun_25
Contact:	Triturus Environmental Ltd
Issue Date:	26.08.2025
Received Date:	11.08.2025

eDNA Report

Technical Report

SureScreen Scientifics

Folio No:	3960-2025
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SureScreen Scientifics

eDNA Analysis

Summary

When aquatic organisms inhabit a waterbody such as a pond, lake or river they continuously release small amounts of their DNA into the environment. By collecting and analysing water samples, we can detect these small traces of environmental DNA (eDNA) to confirm the presence or absence of the target species within the waterbody.

Results

Lab ID	Site Name	OS Reference	Target Species	Sample Integrity Check	Result	Positive Replicates
FK2900	B6		White-clawed crayfish (Austropotamobius pallipes)	Pass	Positive	3
			Crayfish plague (Aphanomyces astaci)	Pass	Negative	0
			Freshwater pearl mussel (Margaritifera margaritifera)	Pass	Negative	0
FK2904	A4		White-clawed crayfish (Austropotamobius pallipes)	Pass	Positive	5
			Crayfish plague (Aphanomyces astaci)	Pass	Negative	0
			Freshwater pearl mussel (Margaritifera margaritifera)	Pass	Negative	0

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SureScreen Scientifics

Matters affecting result: none

Reported by:Consuela Sopronyi

Approved by: Lauryn Jewkes

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SureScreen Scientifics

Methodology

Samples have been analyzed for the presence of target species eDNA following readily available and scientifically published eDNA assays and protocols.

The analysis is conducted in two phases. The sample first goes through an extraction process where the filter is incubated in order to obtain any DNA within the sample. The extracted sample is then tested via real-time PCR (also called q-PCR) for each of the selected target species. This process uses species-specific molecular markers (known as primers) to amplify a select part of the DNA, allowing it to be detected and measured in 'real time' as the analytical process develops. qPCR combines amplification and detection of target DNA into a single step. With qPCR, fluorescent dyes specific to the target sequence are used to label targeted PCR products during thermal cycling. The accumulation of fluorescent signals during this reaction is measured for fast and objective data analysis. The primers used in this process are specific to a part of mitochondrial DNA only found in each individual species. Separate primers are used for each of the species, ensuring no DNA from any other species present in the water is amplified. If target species DNA is present, the DNA is amplified up to a detectable level, resulting in positive species detection. If target DNA is not present then amplification does not occur, and a negative result is recorded.

Analysis of eDNA requires scrupulous attention to detail to prevent the risk of false positive and false negative results. True positive controls, negative controls, and spiked synthetic DNA are included in every analysis and these have to be correct before any result is declared. Stages of the analysis are also conducted in different buildings at our premises for added security. SureScreen Scientifics Ltd is ISO9001 accredited and participates in Natural England's proficiency testing scheme for GCN eDNA testing.

Interpretation of Results

Sample Integrity Check:

Laboratory Arrival:

When samples are received in the laboratory, they are inspected for any tube leakage, suitability of sample (not too much mud or weed etc.) and absence of any factors that could potentially lead to inconclusive results. Any samples which fail this test are rejected and eliminated before analysis.

Degradation and Inhibition check:

Analysis of the spiked DNA marker to see if there has been degradation or inhibition of the kit or sample, between the date it was made to the date of analysis. Degradation of the spiked DNA marker may indicate a risk of false negative results. If inhibition is detected, samples are purified and re-analyzed. Inhibitors cannot always be removed, if the inhibition check fails, the sample should be re-collected.

Result:

Presence of eDNA (Positive/Negative/Inconclusive)

Positive: DNA was identified within the sample, indicative of species presence within the sampling location at the time the sample was taken or within the recent past.

Positive Replicates: Number of positive qPCR replicates out of a series of 12. If one or more of these are found to be positive the pond is declared positive for species presence. It may be assumed that small fractions of positive analyses suggest low level presence, but this cannot currently be used for population studies. Even a score as low as 1/12 is declared positive. 0/12 indicates negative species presence.

Negative: eDNA was not detected or is below the threshold detection level and the test result should be considered as evidence of species absence, however, does not exclude the potential for species presence below the limit of detection.

Inconclusive: Controls indicate inhibition or degradation of the sample, resulting in the inability to provide conclusive evidence for species presence or absence.

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APPENDIX B – MACRO-INVERTEBRATES & BIOLOGICAL WATER QUALITY

Table 1: *Macro-invertebrate Q-sampling results, July 2025*

Group	Family	Species	A1	A2	A3	A4	B1	B2	B3	B4	B5	B6	C2	C3	C4	C6	EPA group
Ephemeroptera	Ephemeridae	*Ephemera danica*				1											**A**
Ephemeroptera	Heptageniidae	*Rhithrogena semicolorata*								2							**A**
Ephemeroptera	Baetidae	*Alainites muticus*			3					1	5		2		1	5	**B**
Plecoptera	Leuctridae	*Leuctra fusca*			3	4				4	1		2		2	2	**B**
Trichoptera	Cased caddis pupa	sp. indet.		2		1											**B**
Trichoptera	Glossosomatidae	*Agapetus fuscipes*		1													**B**
Trichoptera	Hydroptilidae	*Hydroptila* sp.			1	2											**B**
Trichoptera	Lepidostomatidae	*Lepidostoma hirtum*			3	1										6	**B**
Trichoptera	Leptoceridae	*Athripsodes aterrimus*			3	1											**B**
Trichoptera	Limnephilidae	*Drusus annulatus*												1			**B**
Trichoptera	Limnephilidae	*Limnephilus lunatus*	4														**B**
Trichoptera	Limnephilidae	*Potamophylax cingulatus*		2			3			3	1	1	7	2	3		**B**
Trichoptera	Sericostomatidae	*Sericostoma personatum*		3		4			3	1			1	1	1	1	**B**
Odonata	Calopterygidae	*Calopteryx splendens*															**B**
Ephemeroptera	Baetidae	*Baetis rhodani*		4	8	1			5	34	3	4	7			4	**C**
Ephemeroptera	Caenidae	*Caenis luctuosa*															**C**
Ephemeroptera	Ephemerellidae	*Serratella ignita*	2	2	58	10			2	35	8	76	17			72	**C**
Trichoptera	Hydropsychidae	*Hydropsyche instabilis*							1	1		7	1			1	**C**
Trichoptera	Hydropsychidae	*Hydropsyche siltalai*			3	1						1	1			1	**C**
Trichoptera	Philopotamidae	*Philopotamus montanus*											2				**C**
Trichoptera	Polycentropodidae	*Plectrocnemia conspersa*				1							1				**C**
Trichoptera	Polycentropodidae	*Polycentropus kingi*			3	2				1	1					4	**C**
Trichoptera	Rhyacophilidae	*Rhyacophila dorsalis*								1		1	2				**C**

Group	Family	Species	A1	A2	A3	A4	B1	B2	B3	B4	B5	B6	C2	C3	C4	C6	EPA group
Arachnida	Hydrachnidiae	sp. indet.			2												C
Coleoptera	Dytiscidae	*Ilybius ater*					1										C
Coleoptera	Dytiscidae	*Stictotarsus duodecimpustulatus*				1								2			C
Coleoptera	Elmidae	*Elmis aenea*		3	4	2				2	12	6	4	1	4		C
Coleoptera	Elmidae	*Limnius volckmari*		2						2	1	2	1			1	C
Coleoptera	Haliplidae	*Brychius elevatus*		2	6	4			2							5	C
Coleoptera	Haliplidae	Haliplidae larva														1	C
Coleoptera	Haliplidae	sp. indet.															C
Coleoptera	Hydraenidae	*Hydraena gracilis*											1				C
Coleoptera	Hydrophilidae	*Helophorus brevipalpis*												1			C
Coleoptera	Hydrophilidae	*Helophorus grandis*												5			C
Crustacea	Gammaridae	*Gammarus duebeni*	4	2	11	4	4	21	4	8	85	26	6	1	2	6	C
Diptera	Chironomidae	Non-*Chironomus* spp.			2	2	1	1	2	6	1			5	1		C
Diptera	Culicidae	sp. indet.								1							C
Diptera	Dixidae	sp. indet.							1				1				C
Diptera	Pediciidae	*Dicranota* sp.							6			1	1				C
Diptera	Simuliidae	sp. indet.									2						C
Gastropoda	Tateidae	*Potamopyrgus antipodarum*		3	2	4											C
Gastropoda	Bithnyiidae	*Bithynia tentaculata*														4	C
Gastropoda	Planorbidae	*Planorbis planorbis*														4	C
Gastropoda	Valvatidae	*Valvata piscinalis*				4											C
Hemiptera	Gerridae	Gerridae nymph						1							1		C
Hemiptera	Veliidae	*Velia caprai*		1			2	3	1					1			C
Hirudinidae	Erpobdellidae	sp. indet.								1		1					C
Crustacea	Asellidae	*Asellus aquaticus*	2	4			1	32	2			1		4		2	D
Gastropoda	Lymnaeidae	*Ampullacaena balthica*				1			1	1							D

Group	Family	Species	A1	A2	A3	A4	B1	B2	B3	B4	B5	B6	C2	C3	C4	C6	EPA group
Gastropoda	Physidae	*Physa fontinalis*															**D**
Hirudinidae	Glossiphoniidae	sp. indet.				2	1										**D**
Megaloptera	Sialidae	*Sialis lutaria*															**D**
Mollusca	Sphaeriidae	sp. indet.														1	**D**
Diptera	Chironomidae	*Chironomus* spp.	5	2		2		2					2	9		1	**E**
Abundance			**17**	**33**	**112**	**55**	**13**	**60**	**30**	**104**	**120**	**127**	**59**	**33**	**15**	**121**	**17**
Q-rating			Q2-3*	Q3	Q3	Q3-4	Q3*	Q2-3*	Q3	Q3-4	Q3	Q3	Q3	Q3*	Q3	Q3*	
WFD status			Poor	Poor	Poor	Mod	Poor	Poor	Poor	Mod	Poor	Poor	Poor	Poor	Poor	Poor	

* Tentative Q-rating given the absence of suitable riffle areas for sampling (Toner et al., 2005)

Table 2: *Lacustrine macro-invertebrate community recorded at pond site P1, July 2025*

Group	Family	Species	P1
Ephemeroptera	Baetidae	*Cloeon simile*	15
Gastropoda	Tateidae	*Potamopyrgus antipodarum*	10
Coleoptera	Halipliidae	*Haliplus* sp.	9
Hemiptera	Corixidae	*Corixa iberica*	5
Coleoptera	Noteridae	*Noterus clavicornis*	4
Odonata	Aeshnidae	*Anax imperator*	3
Gastropoda	Lymnaeidae	*Ampullacaena balthica*	3
Hemiptera	Pleidae	*Plea leachii*	3
Crustacea	Asellidae	*Asellus aquaticus*	2
Odonata	Coenagrionidae	sp. indet.	2
Odonata	Libellulidae	*Libellula quadrimaculata*	2
Hemiptera	Notonectidae	*Notonecta viridis*	1
Abundance			**59**
Taxon richness			**12**