# Arklow Bank Wind Park 2

## Environmental Impact Assessment Report

Volume II, Chapter 13: Offshore Bats

sse Renewables

| Revision | Date | Status | Author | Reviewed by | Approved by |
|---|---|---|---|---|---|
| 1.0 | 30/05/2024 | Final (External) | GoBe Consultants | GoBe Consultants | Sure Partners Limited |

# Statement of Authority

| Name | Qualifications | Relevant Experience |
|---|---|---|
| Jason Guile | BSc (Joint Hons) Marine Biology and Oceanography | Jason is a Principal ecologist for Woodrow Sustainable Solutions Ltd trading as APEM Ireland, part of the APEM Group. He has over 12 years' relevant industry experience in ecological assessment and has worked in both Ireland and the UK. Jason has a B.Sc. in Marine Biology and Oceanography at University of Wales, Bangor. Jason holds a lead role on numerous projects undertaken by Apem Ireland and provides technical expertise and experience for significant others. Jason's specialism is bats, having worked in this area for over 10 years. He has experience in monitoring, capture, handling, bioacoustics and impact assessment.<br><br>Since moving to Ireland Jason's work has involved coordinating, surveying, analysing data, and writing technical bat reports for numerous projects including renewables, infrastructure, landfill remediation works, urban planning applications and commercial regeneration sites. Jason is currently lead author of the 'Offshore Bat' chapters for several Environmental Impact Assessments for offshore wind developments in Ireland and is considered the company technical lead for this subject. Jason is currently a committee member of Bat Conservation Ireland and Wind Energy Ireland and a representative with the Regional Wildlife Science Collaborative for Offshore Wind (RWSC) Science Plan addressing bat research and associated scientific needs in the context of offshore wind, on behalf of Apem. Jason holds licenses to survey bats from the Department of Culture Heritage and the Gaeltacht and Natural England. |
| Oisin O'Sullivan | BSc (Hons) Ecology and Environmental Biology | Oisín O'Sullivan is an Ecologist with Woodrow, he co-authored the 2023 technical report and undertook surveys for the project. Oisín has completed a B.Sc. in Ecology and Environmental Biology at University College Cork. His final year thesis involved bat surveys of urban habitats in Cork City. His work as a graduate ecologist with Woodrow was focused on bat data analysis including bat call identification and bat roost/habitat suitability surveys. Oisín has developed a high level of proficiency with Kaleidoscope, Ecobat and BatExplorer, all of which are analysis software used to assess bat calls and activity Since joining Woodrow, Oisín's current work involves coordinating, surveying, analysing data, and writing summary bat activity reports for all onshore wind developments that Woodrow has worked on in the 2021 and 2022 survey seasons. This also involves the use of R to provide data on bat activity relative to weather conditions with the goal of informing curtailment as a mitigation measure. During 2022 Woodrow began undertaking offshore bat surveys including Oisín as a technical lead on these projects. These surveys involve the long-term recording of activity on islands and headlands to record |

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|---|---|---|
| | | migration events. Oisín is a Qualifying member of CIEEM and holds a license to survey bat roosts from the Department of Culture Heritage and the Gaeltacht and a handling license issued by NPWS. |
| Patrick Power | BSc Forestry<br>BSc (Hons) in Land Management in Forestry<br>MSc Wildlife Biology and Conservation | Patrick Power is an Assistant Ecologist with Woodrow. He undertook surveys for the project, assisted with data analysis for this project, and co-authored the report. Patrick has completed a BSc in Forestry, BSc (Hons) in Land Management in Forestry with Waterford Institute of Technology. He is currently doing an MSc in Wildlife Biology and Conservation with Edinburgh Napier University.<br>His work as a graduate ecologist with Woodrow is focused on bat data analysis including bat call identification and bat roost/habitat suitability surveys. Patrick has developed a high level of proficiency with Kaleidoscope and BatExplorer, the analysis software used to assess bat calls and activity. Patrick also possesses Reptile, mammal, and habitat surveying skills. Patrick is a student member of CIEEM and currently has a training licence to survey bat roosts from the Department of Culture Heritage and the Gaeltacht. |

# Contents



## Figures



## Tables

# Glossary

| Term | Meaning |
|---|---|
| Arklow Bank Wind Park 1 (ABWP1) | Arklow Bank Wind Park 1 consists of seven wind turbines, offshore export cable and inter-array cables. Arklow Bank Wind Park 1 has a capacity of 25.2 MW. Arklow Bank Wind Park 1 was constructed in 2003/04 and is owned and operated by Arklow Energy Limited. It remains the first and only operational offshore wind farm in Ireland. |
| Arklow Bank Wind Park 2 – Offshore Infrastructure | "The Proposed Development", Arklow Bank Wind Park 2 Offshore Infrastructure: This includes all elements under the existing Maritime Area Consent (MAC). |
| Arklow Bank Wind Park 2 (ABWP2) (the Project) | Arklow Bank Wind Park 2 (ABWP2) (The Project) is the onshore and offshore infrastructure. This EIAR is being prepared for the Offshore Infrastructure. Consents for the Onshore Grid Infrastructure (Planning Reference 310090) and Operations Maintenance Facility (Planning Reference 211316) has been granted on 26th May 2022 and 20th July 2022, respectively.<br>• Arklow Bank Wind Park 2 Offshore Infrastructure: This includes all elements to be consented in accordance with the MAC. This is the subject of this EIAR and will be referred to as 'the Proposed Development' in the EIAR.<br>• Arklow Bank Wind Park 2 Onshore Grid Infrastructure: This relates to the onshore grid infrastructure for which planning permission has been granted.<br>• Arklow Bank Wind Park 2 Operations and Maintenance Facility (OMF): This includes the onshore and nearshore infrastructure at the OMF, for which planning permission has been granted.<br>• Arklow Bank Wind Park 2 EirGrid Upgrade Works: any non-contestable grid upgrade works, consent to be sought and works to be completed by EirGrid. |
| Array Area | The Array Area is the area within which the Wind Turbine Generators (WTGs), the Offshore Substation Platforms (OSPs), and associated cables (export, inter- array and interconnector cabling) and foundations will be installed. |
| Cable Corridor and Working Area | The Cable Corridor and Working Area is the area within which export, inter-array and interconnector cabling will be installed. This area will also facilitate vessel jacking operations associated with installation of WTG structures and associated foundations within the Array Area. |
| Competent Authority (CA) | The authority designated as responsible for performing the duties arising from the EIA Directive as amended. For this application, the Competent Authority is An Bord Pleanála (ABP). |
| Environmental Impact Assessment (EIA) | An Environmental Impact Assessment (EIA) is a statutory process by which certain planned projects must be assessed before a formal decision to proceed can be made. It involves the collection and consideration of environmental information, which fulfils the assessment requirements of the Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment as amended by Directive 2014/52/EU of the European Parliament and of the Council (EIA Directive). |
| EirGrid | State-owned electric power Transmission System Operator (TSO) in Ireland and Transmission Asset Owner (TAO) for the Project's transmission assets. |
| Landfall | The area in which the offshore export cables make landfall and is the transitional area between the offshore cabling and the onshore cabling. |

| Term | Meaning |
|---|---|
| Mitigation Measure | Measure which would avoid, reduce, or remediate an impact. |
| Permitted Maritime Usage | The construction and operation of an offshore wind farm and associated infrastructure (including decommissioning and other works required on foot of any permission for such offshore wind farm). |
| The Developer | Sure Partners Limited. |

# Acronyms

| Term | Meaning |
|---|---|
| AA | Appropriate Assessment |
| ABP | An Bord Pleanála |
| ABWP1 | Arklow Bank Wind Park 1 |
| ABWP2 | Arklow Bank Wind Park 2 |
| AGL | Above Ground Level |
| ALAN | Artificial Lighting at Night |
| BCI | Bat Conservation Ireland |
| BCT | Bat Conservation Trust |
| CA | Competent Authority |
| CBD | Convention on Biological Diversity |
| CIA | Cumulative Impact Assessment |
| CIEEM | Chartered Institute of Ecology and Environmental Management |
| CIL | Commissioners of Irish Lights |
| cSACs | candidate Special Areas of Conservation |
| cSPAs | candidate Special Protection Area |
| CSZ | Core Sustenance Zone |
| DECC | Department of the Environment, Climate and Communications |
| DHLGH | Department of Housing, Local Government and Heritage |
| DNA | Deoxyribonucleic Acid |
| DoD | Department of Defence |
| EcIA | Ecological Impact Assessment |
| ECMG | East Coast Monitoring Group |
| EIA | Environmental Impact Assessment |
| EIAR | Environmental Impact Assessment Report |
| EPA | Environmental Protection Agency |
| EU | European Union |
| HAT | Highest Astronomical Tide |
| HWM | High-Water Mark |
| IAA | Irish Aviation Authority |
| IEFs | Important Ecological Features |
| IPS | Intermediate Periphery Structures |

| | |
|---|---|
| IRCG | Irish Coast Guard |
| LAT | Lowest Astronomical Tide |
| LBAP | Local Biodiversity Action Plan |
| MAC | Maritime Area Consent |
| MPDM | Marine Planning and Development Management Bill |
| MSO | Marine Survey Office |
| NBAP | National Biodiversity Action Plan |
| NBDC | National Biodiversity Data Centre |
| NBN | National Biodiversity Network Trust |
| NED | Natural Environment Division |
| NHA | Natural Heritage Areas |
| NIEA | Northern Ireland Environment Agency |
| NIS | Natura Impact Statement |
| NISA | North Irish Sea Array |
| NMPF | National Marine Planning Framework |
| NNPP | National Nathusius' Pipistrelle Project |
| NPWS | National Parks and Wildlife Service |
| NREL | National Renewable Energy Laboratory |
| OESEA4 | Offshore Energy Strategic Environmental Assessment 4 |
| OGI | Onshore Grid Infrastructure |
| OMF | Operations and Maintenance Facility |
| OREDP (I/II) | Draft Offshore Renewable Energy Development Plan (I/II) |
| OSP | Offshore Substation Platform |
| QI | Qualifying Interest |
| R.O.I | Republic of Ireland |
| RPM | Revolutions per Minute |
| SAC | Special Area of Conservation |
| SAR | Search and Rescue |
| SCI | Site of Community Importance |
| SEA | Strategic Environmental Assessment |
| SEAI | Sustainability Energy Authority of Ireland |
| SPA | Special Protection Area |
| SPS | Significant Peripheral Structures |
| TAO | Transmission Asset Owner |

| | |
|---|---|
| TSO | Transmission System Operator |
| UV | Ultraviolet |
| WTG | Wind Turbine Generator |
| ZoI | Zone of Influence |

# Units

| Unit | Description |
|---|---|
| g | gram |
| km | kilometre |
| kts | knot |
| m | meter |
| MW | megawatt |
| m/s | meter per second |
| °C | degrees Celsius |

# 13 Offshore Bats

## 13.1 Introduction

13.1.1.1 This chapter of the Environmental Impact Assessment Report (EIAR) presents the assessment of the potential impacts of the Arklow Bank Wind Park 2 (ABWP2) Offshore Infrastructure (hereafter referred to as 'the Proposed Development') on offshore bats. Specifically, this chapter considers the potential impact of the Proposed Development below the High-Water Mark (HWM) during the construction, operational and maintenance, and decommissioning phases.

13.1.1.2 This chapter draws upon information contained within Volume III, Appendix 13.1, 13.2 and 13.3: Offshore Bats Technical Reports.

## 13.2 Regulatory background

13.2.1.1 Planning policy on renewable energy infrastructure is presented in Chapter 2: Policy and Legislation. Planning policy is contained in the National Marine Planning Framework (NMPF) (Department of Housing, Local Government and Heritage (DHLGH), 2021) and the Draft Offshore Renewable Energy Development Plan II (OREDP) (Department of the Environment, Climate and Communications (DECC), 2023). A summary of the policy provisions relevant to offshore bats is provided in Table 13.1.

13.2.1.2 The relative position of the Irish offshore wind industry compared with that of other European countries means that there is no specific statutory guidance in Ireland on offshore bat impact assessment for offshore wind farms. Countries that do not have formal guidance for the study of offshore bats and impact assessment, use an approach based on the EUROBATS publications 'Guidelines for consideration of bats in Wind Farm projects' (revised 2014) and 'A guide to the implementation of the Agreement on the Conservation of Populations of European Bats' (Hutson *et al.*, 2019).

13.2.1.3 In addition, a number of other guidance documents specific to the consideration of bats in the onshore environment are available and have been used to inform the assessment of the potential impacts. These include an adaptation of onshore bat surveying best practice guidelines produced by Bat Conservation Ireland (BCI, 2012), Sustainability Energy Authority of Ireland (SEAI) 2017, Scottish Natural Heritage 2021 (now referred to as NatureScot) and Northern Ireland Environment Agency (NIEA) 2021 along with adaptation methodologies from EUROBATS (2014), Natural England Technical Information Note TIN051 and recent literature.

**Table 13.1: Summary of regulatory background**

| Publisher | Name of document incl. reference | Key provisions |
|---|---|---|
| **Statutory** | | |
| **Legislation** | | |
| European Commission, 2011 | European Communities (Marine Strategy Framework) Regulations 2011 (S.I. No. 249 of 2011) (as amended); | Transposes EU Directive 2008/56/EC (Marine Strategy Framework Directive) into Irish law. |
| European Commission, 2011 | European Communities (Natural Habitats) Regulations 1997 (S.I. No 94 of 1997) (as amended), and European Union (EU) Directive 2009/147/EC (Birds Directive) European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No 477 of 2011) (as amended). | Transposes EU Directive 92/43/EEC (Habitats Directive) into Irish Law.<br>Refer to accompanying Natura Impact Statement (NIS).<br>The Habitats Directive also contains obligations in relation to the strict protection of Annex IV species wherever they occur, which are set out in Article 12 and Article 13 of the Directive. These obligations require each Member State to establish a system of Strict Protection for the species listed in Annex IV of the Directive. All bat species are Annex IV species within the directive. Of which only one species Lesser Horseshoe bat (Rhinolophus hipposideros), is designated under Annex II, in which a Special Area of Conservation (SAC) could be designated for it. There are 41 SACs designated for Lesser Horseshoe bat (NPWS, 2019), none of which are identified as within the ZoI of the Proposed Development. |
| Bern and Bonn Conventions, 1982 | Conserving European Biodiversity in a Changing Climate: The Bern Convention, the EU Birds and Habitats Directives and the Adaptation of Nature to Climate Change 2011. | The Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention 1979, enacted 1983) was instigated to protect migrant species across all European boundaries. It is an intergovernmental treaty of which Ireland is a member country. The main pieces of legislation to ensure that the provisions of the Bonn convention are applied include the Birds Directive and the Habitats Directive. |
| United Nations (UN) Convention on Biological Diversity (CBD), 1993 | Convention on Biological Diversity. | Parties to the CBD are required to submit a National Biodiversity Action Plan (NBAP) and report annually on the status of biodiversity and measures to address and reverse loss of biodiversity. |

| Publisher | Name of document incl. reference | Key provisions |
|---|---|---|
| The Wildlife Act (1976) and amendments | Wildlife Act (1976) (as amended). | The Wildlife Act 1976 is the principal national legislation in Ireland providing for the protection of wildlife and the control of some activities. It gives protection to a wide variety of birds, animals and plants and also provides a mechanism to give statutory protection to Natural Heritage Areas (NHAs). |
| Planning and Development Act 2000, as amended | Planning and Development Act 2000 (as amended). | For the purposes of an application for planning permission certain protections for, and assessments of biodiversity are additionally provided for in the 2000 Act, as amended, and the Planning and Development Regulations 2001, as amended, refer below. |
| Planning and Development Regulations 2001, as amended | Planning and Development Regulations 2001 (as amended). | Incorporates provisions of the Habitats and Birds Directives as well as the Wildlife Acts, the Water Framework Directive, and the biodiversity provisions of the County Development Plan. |
| Draft Planning and Development Bill 2023 | Planning and Development Bill 2023. | Obligation to prepare strategy for conservation, etc., of natural and built heritage. Including objectives for the conservation, protection, management and improvement of European sites and the Natura 2000 network in accordance with the Habitats Directive and the Birds Directive (including objectives to encourage the management of the features of the landscape that are of major importance for wild flora and fauna in accordance with Article 10 of the Habitats Directive), and biodiversity in accordance with the EU Biodiversity Strategy and the National Biodiversity Plan. |
| **Planning Policy and Development Control** | | |
| DECC, 2022 | Strategic Environmental Assessment (SEA) of the Offshore Renewable Energy Development Plan (OREDP I and OREDPII) in Ireland: Environmental Report: https://www.gov.ie/en/publication/e13f49-offshore-renewable-energy-development-plan/ | Contains the Appropriate Assessment (AA) screening process and Strategic Environmental Assessment (SEA) scoping report of the Maritime area associated with OREDP I and OREDPII. This resource has some important information on existing baseline conditions in the maritime area. |

| Publisher | Name of document incl. reference | Key provisions |
|---|---|---|
| | https://www.gov.ie/en/publication/71e36-offshore-renewable-energy-development-plan-ii-oredp-ii/#environmental-assessments | |
| **Non-Statutory** | | |
| **Planning Policy and Development Control** | | |
| Government of Ireland, 2023 | Ireland's 4th National Biodiversity Action Plan Ireland's 4th National Biodiversity Action Plan 2023–2030: d424b166-763b-4916-8eba-8afff955c5e5.pdf (assets.gov.ie) | Objective 1 - Adopt a Whole of Government, Whole of Society Approach to Biodiversity<br>Objective 2 - Meet Urgent Conservation and Restoration Needs<br>Objective 3 - Secure Nature's Contribution to People<br>Objective 4 - Enhance the Evidence Base for Action on Biodiversity<br>Objective 5 - Strengthen Ireland's Contribution to International Biodiversity Initiatives |
| National Marine Planning Framework, 2021 | National Marine Planning Framework (NMPF), 2021: https://www.gov.ie/en/publication/a4a9a-national-marine-planning-framework/ | Ireland's first comprehensive marine spatial planning framework. The NMPF brings together all marine-based human activities for the first time, outlining the Government's vision, objectives, and marine planning policies for each marine activity.<br><br>Biodiversity Policy 1<br>Proposals incorporating features that enhance or facilitate species adaptation or migration, or natural native habitat connectivity will be supported, subject to the outcome of statutory environmental assessment processes and subsequent decision by the competent authority (CA), and where they contribute to the policies and objectives of this NMPF. Proposals that may have significant adverse impacts on species adaptation or migration, or on natural native habitat connectivity must demonstrate that they will, in order of preference and in accordance with legal requirements:<br>a) avoid,<br>b) minimise, or<br>c) mitigate significant adverse impacts on species adaptation or migration, or on natural native habitat connectivity. |

| Publisher | Name of document incl. reference | Key provisions |
|---|---|---|
| | | Biodiversity Policy 4<br>Proposals must demonstrate that they will, in order of preference and in accordance with legal requirements:<br>a) avoid,<br>b) minimise, or<br>c) mitigate significant disturbance to, or displacement of, highly mobile species<br><br>The assessment currently shows significant effect from collision and barotrauma to foraging species within the Array Area during the operation and maintenance phase with no proposed mitigation. This is however, based on a highly precautionary assessment approach and the fact that the baseline will significantly change when construction of the wind turbine generators (WTGs) is complete.<br>While this is not in accordance with Policy 1(c), it is unlikely the population abundance of the species will be adversely affected due to the Proposed Development, such that the populations long-term viability is ensured. The Proposed Development is also committed to participating in the 'East Coast Monitoring Group' (ECMG), to discuss and agree potential strategic monitoring initiatives in relation to offshore bats (section 13.8.5). |
| DECC, 2017 | National Biodiversity Action Plan 2017-2021:<br>National Biodiversity Action Plan English.pdf (npws.ie) | Objective 1 - Mainstream biodiversity into decision-making across all sectors;<br>Objective 2 - Strengthen the knowledge base for conservation, management and sustainable use of biodiversity;<br>Objective 3 - Increase awareness and appreciation of biodiversity and ecosystems services;<br>Objective 4 - Conserve and restore biodiversity and ecosystem services in the wider countryside;<br>Objective 5 - Conserve and restore biodiversity and ecosystem services in the marine environment;<br>Objective 6 - Expand and improve management of protected areas and species; and |

| Publisher | Name of document incl. reference | Key provisions |
|---|---|---|
| | | Objective 7 - Strengthen international governance for biodiversity and ecosystem services. |
| Environment, Heritage and Local Government, 2008 | All-Ireland Species Action Plan – Bats: https://www.npws.ie/sites/default/files/publications/pdf/2008_Bat_SAP.pdf | Maintain the populations and present range of all bat species in Ireland. |
| **Guidelines and technical standards** | | |
| EPA, 2022 | Guidelines on the Information to be Contained in Environmental Impact Assessment Reports: https://www.epa.ie/publications/monitoring--assessment/assessment/EIAR_Guidelines_2022_Web.pdf | These Guidelines apply to the preparation of all EIARs undertaken in the State (Ireland) |
| Chartered Institute of Ecology and Environmental Management (CIEEM), 2018, updated 2022 | Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine. CIEEM: https://cieem.net/wp-content/uploads/2018/08/ECIA-Guidelines-2018-Terrestrial-Freshwater-Coastal-and-Marine-V1.2-April-22-Compressed.pdf | This presents the most relevant Environmental Impact Assessment (EIA) guidance for biodiversity assessment. |
| Sustainability Energy Authority of Ireland, 2017 | SEAI Community Energy Resource Toolkit: The Planning Process: https://www.seai.ie/publications/Community-Toolkit-Planning-Process.pdf | Bats and birds technical reports to inform EIAR/ AA |
| Scottish Natural Heritage, 2021 | Bats and onshore wind turbines - survey, assessment and mitigation: https://www.nature.scot/doc/bats-and-onshore-wind-turbines-survey-assessment-and-mitigation. | While not R.O.I guidance, these are the accepted guidelines for onshore wind developments within R.O.I along with the Northern Ireland guidelines.<br>Updates best practice information for developers and planners to ensure that onshore wind energy developments post minimal risk to bats. |

| Publisher | Name of document incl. reference | Key provisions |
|---|---|---|
| Northern Ireland Environment Agency (NIEA), 2021 | Guidance on Bat Surveys, Assessment and Mitigation for Onshore Wind Turbine Developments – Version 1.1<br>NIEA, Natural Environment Division, May 2022:<br>https://www.daera-ni.gov.uk/publications/niea-natural-environment-division-guidance-bat-surveys-assessment-and-mitigation-onshore-wind | While not R.O.I guidance, these are the accepted guidelines for onshore wind developments within R.O.I along with the Scottish guidelines.<br>Provides additional clarifications and outline the minimum standards which the Natural Environment Division (NED) of the NIEA expects for professional bat surveys carried out for onshore wind turbine development proposals in Northern Ireland. |
| EUROBATS, 2014 | Guidelines for consideration of bats in wind farm projects Revision 2014:<br>https://www.eurobats.org/sites/default/files/documents/publications/publication_series/pubseries_no6_english.pdf | While not R.O.I guidance, these are the accepted guidelines for onshore wind developments within Europe.<br>Survey and assessment guidance for both onshore and offshore developments. |
| EUROBATS, 2019 | A guide to the implementation of the Agreement on the Conservation of Populations of European Bats (EUROBATS). Version 2 :<br>https://www.informea.org/sites/default/files/imported-documents/ImplementationGuideFINAL%2029_5_19_hyperlinks.pdf | Intended to help Parties to implement the EUROBATS Agreement. It provides an overview of the Agreement and reviews each of the commitments undertaken by Parties to the Agreement. As well as providing guidance to Parties, this document summarises the fundamental obligations of the Agreement and will be of value to all Range States and other interested organizations and individuals. |
| Bat Conservation Ireland, 2012 | Wind Turbine/Wind Farm Development<br>Bat Survey Guidelines. Version No. 2.8. December 2012:<br>https://www.batconservationireland.org/wp-content/uploads/2013/09/BCIreland-Wind-Farm-Turbine-Survey-Guidelines-Version-2-8.pdf | Provide advice to the wind energy industry, ecologists, local planning authorities and other competent authorities on the survey work required to understand and assess the use by bats of an area proposed for a wind energy development |
| Natural England, 2014 | Bats and onshore wind turbines (Interim guidance) (TIN051):<br>Bats and onshore wind turbines (Interim guidance) - TIN051 (naturalengland.org.uk) | To help consider the potential adverse impacts to bats when assessing proposals for wind turbine development. It applies to bats and their activity in the wider countryside and does not specifically address turbines proposed near protected sites, particularly those designated due to important bat populations. |

| Publisher | Name of document incl. reference | Key provisions |
|---|---|---|
| Institute of lighting professional and Bat conservation trust, 2023 | Guidance Note GN08/23 Bats and Artificial Lighting at Night: https://theilp.org.uk/publication/guidance-note-8-bats-and-artificial-lighting/ | To raise awareness of the impacts of artificial lighting on bats but also the potential solutions to avoid and reduce this harm |

## 13.3 Consultation

**Table 13.2: Summary of consultation relating to Offshore Bats**

| Date | Consultation type | Consultation and key issue raised | Section where provision is addressed |
|---|---|---|---|
| 29/01/2019 | Introductory Meeting | National Parks and Wildlife Service (NPWS) queried if bats will be considered in the assessment and pointed out that although in Ireland most bats species do not migrate, it is thought that there may be species that do. NPWS drew attention to EUROBATS guidance and asked if there is potential to monitor bat activity using existing structures associated with Arklow Bank Wind Park 1 (ABWP1). | While surveys were not conducted within ABWP1, they were conducted offshore at a monopile location approximately 8km north of ABWP1 (within the Array Area of the Proposed Development). Refer to sections 13.4 and 13.5.2 and Figure 13.1. |

## 13.4 Study area

13.4.1.1 Based on the findings of the literature review (section 13.5.2) and the lack of data regarding bat species in the offshore environment between Ireland and the UK, a zone of influence (ZoI) has not been defined in strict distance terms but rather a species-specific basis, taking into account species core foraging ranges (and therefore the potential for different species to range from land to forage within the proposed development area) and potential movements between land masses. Therefore, due to the size of the proposed development being approximately 27km in length (north to south along the Array Area), the study area is greater than that defined within CIEEM and NatureScot (10km) and extends from Courtown Co. Wexford (southern extent) to Magheramore beach, Co. Wicklow (northern extent). Comprising approximately 40km of coastline that could be used as departing/ landing locations for migrating bat species traveling between Ireland and the UK that may cross the Cable Corridor and Working Area or Array Area, and by local individuals choosing to forage or commute offshore. The study area includes the Cable Corridor and Working Area, Array Area and the existing AWBP1 (Figure 13.1).

13.4.1.2 Baseline data was collected from an existing monopile structure located approximately 8 km offshore and to the east of Arklow and within the Array Area (Position:52.88544136, -005.923436330), along with monitoring at two accessible terrestrial locations within the desktop study area including the dunes of Brittas Bay (c. 7km north of the approved Landfall location) and at the tip of a headland/small cliff (c. 2 km south of the approved Landfall location) (Figure 13.1).

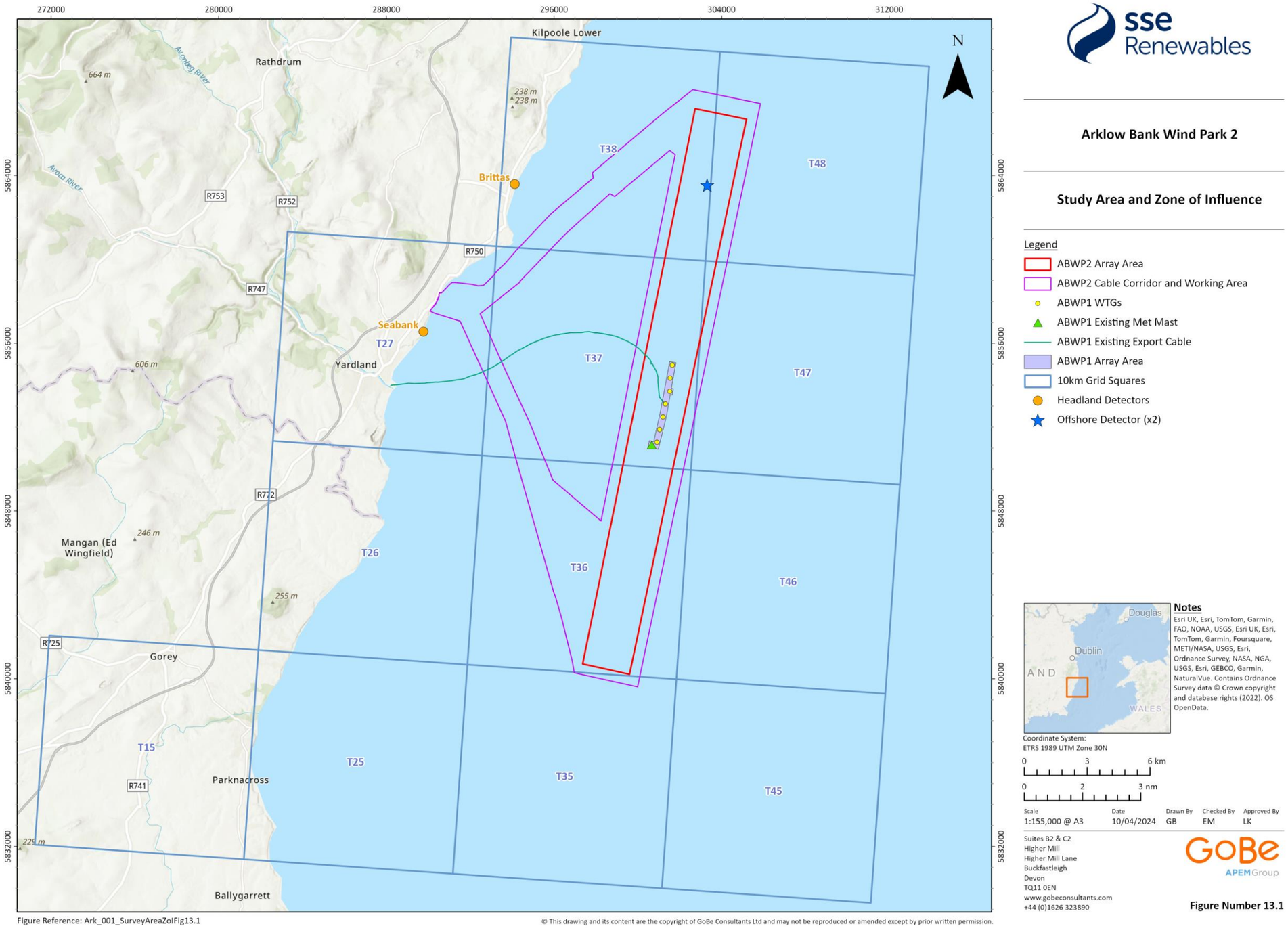


**Figure 13.1: Study area and survey locations**

# 13.5 Methodology

## 13.5.1 Methodology to inform the baseline

### Literature review

13.5.1.1 A desktop search was undertaken to identify any evidence/ studies or literature that would help determine if any of the nine resident bat species of Ireland could or do migrate or forage in the marine environment e.g., the Irish Sea Vagrant species have been considered with regards to their potential migration to Ireland from neighbouring countries. As there are very few studies that have been undertaken within Ireland on the subject of migration and offshore bats, the review was expanded to include all relevant evidence/ studies and literature from Europe, and North America where relevant to the resident Irish species. Refer to relevant species descriptions, in section 13.5.2.

13.5.1.2 European studies have the potential to include bat species relevant to Ireland, and observations on the behaviour of these species have the potential to be applied to the marine environment in Ireland.

13.5.1.3 Furthermore, as this is an emerging field of study, and in order to provide as wide and robust approach as possible to the assessment the literature review included the consideration of studies and papers published on the presence or absence of bats in the marine environment in North America. There is more limited overlap of bat species with those found in North America. However, there are similarities that can be drawn, considering the potential impacts of offshore wind developments on bats within the marine environment.

#### DESKTOP STUDIES

13.5.1.4 Information on bats within the offshore environment was collected through a detailed desktop review of existing studies and datasets. These are summarised in Table 13.3.

**Table 13.3: Summary of key desktop reports and data resources**

| Title | Source | Year | Author |
|---|---|---|---|
| National Nathusius' Pipistrelle Project (NNPP) | Bat Conservation Trust (BCT) | 2014-2023 Accessed February 2024 | BCT |
| Telemetry network for birds and bats (MOTUS Wildlife Tracking System) | Wageningen University and Research | Ongoing Accessed February 2024 | Wageningen University and Research |
| Irish Bat Monitoring Programme 2018-2021 | National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Ireland | 2022 Accessed February 2024 | Aughney, T., Roche, N. and Langton, S |
| Bat roost records | Bat Conservation Ireland | Received March 2024 | |
| Biodiversity Maps | National Biodiversity Data Centre (NBDC) | Updated regularly Accessed February 2024 | NBDC |

| Title | Source | Year | Author |
|---|---|---|---|
| NBN Atlas | National Biodiversity Network Trust (NBN) | Updated regularly Accessed February 2024 | |

## Site specific surveys

13.5.1.5 In order to inform the EIAR, site-specific surveys were undertaken. A summary of the surveys used to inform the offshore bats impact assessment is outlined in Table 13.4 below.

**Table 13.4: Site specific surveys**

| Data source | Date(s) of survey | Overview of survey | Survey contractor | Reference to further information |
|---|---|---|---|---|
| Offshore bat survey | May 2021 to November 2021 | Offshore static detector survey to determine bat activity in the vicinity of the offshore monopile. First year of monitoring. Two static detectors used to collect data. | Alpha Marine | Volume III, Appendix 13.3.: Offshore Bat Survey 2021 Technical Report |
| Offshore bat survey | March 2022 to October 2022 | Offshore static detector survey to determine bat activity in the vicinity of the offshore monopile. Second consecutive year of monitoring. Two static detectors used to collect data. | Alpha Marine | Volume III, Appendix 13.2: Offshore Bat Survey 2022 Technical Report |
| Offshore and headland bat survey | April 2023 to November 2023 | Offshore static detector survey to determine bat activity in the vicinity of the offshore monopile. Third consecutive year of monitoring. Two static detectors used to collect data. Headland survey of two locations to assess if bat activity events at the offshore monopile coincided with | Woodrow APEM Group | Volume III, Appendix 13.1: Offshore and Headland Bat Monitoring. |

| |
|---|
| activity changes on the mainland. |

### Identification of designated sites

13.5.1.6 All designated sites within the offshore bats study area and qualifying interests that could be affected by the construction, operational and maintenance, and decommissioning phases of the Proposed Development, were identified using the three-step process described below:

- Step 1: All designated sites of international, national and local importance within the offshore bats study area were identified using a number of sources. These included the Environmental Protection Agency (EPA) and NPWS websites.
- Step 2: Information was compiled on the relevant qualifying interest for each of these sites which may make them a sensitive receptor in terms of offshore bats. For example, risk of collisions with rotating turbine blades.
- Step 3: Using the above information and expert judgement, sites were included for further consideration if:
  - A designated site directly overlaps with the Proposed Development; or
  - Sites and associated qualifying interests were located within the potential Zone of Influence (ZoI) for impacts associated with the Proposed Development. Note that, as discussed above (section 13.4) the ZoI has not been defined in strict distance terms but rather a species specific basis taking into account potential movements between land masses.

13.5.1.7 There are no designated sites within the study area which have bat species as a Qualifying Interest (QI), or feature of interest to be affected by the Proposed Development.

## 13.5.2 Baseline environment

### Literature Review

13.5.2.1 The purpose of the literature review is to provide a focus on bats in relation to the offshore environment and the infrastructure proposed for the Proposed Development.

13.5.2.2 Since all European bat species are protected by international and national legislation (refer to section 13.2), any deliberate killing or disturbance of any European Protected Species is prohibited by law.

13.5.2.3 There are nine resident species of bat in Ireland and two vagrant species that have been identified as present at least once within Ireland. These are:

- Resident
  - Common pipistrelle (Pipistrellus pipistrellus)
  - Soprano pipistrelle (*Pipistrellus pygmaeus*)
  - Nathusius' pipistrelle (*Pipistrellus nathusii*)
  - Leisler's bat (*Nyctalus leisleri*)
  - Brown long-eared bat (*Plecotus auratus*)
  - Daubenton's bat (*Myotis daubentonii*)
  - Whiskered bat (Myotis mystacinus)
  - Natterer's bat (*Myotis nattereri*)
  - Lesser horseshoe bat (Rhinolophus hipposideros)
- Vagrant
  - Brandt's bat (*Myotis Brandtii*)
  - Greater Horseshoe bat (Rhinolophus ferrumequinum)

13.5.2.4 After undertaking the review, it was identified that although several of the species found in Ireland migrate within the country, only two species have been identified as having potential for migrating offshore to neighbouring countries. Furthermore, it has also been identified that several species may not migrate but can/will forage offshore. Therefore, for the purposes of this report the literature review focussed on the two Irish species; Nathusius' pipistrelle and Leisler's bat with regards to potential migration, and the remaining seven resident species with regards to potential foraging offshore. The vagrant species have been considered with regards to their potential migration to Ireland. It should be noted that the maximum migration for each species has been identified, to determine if the Proposed Development is within a commutable distance for each of the species beyond their identified core sustenance zone (CSZ) [1].

13.5.2.5 It should be noted that it is not known (at the time of writing this report) what proportion of the Irish and UK Nathusius' pipistrelle and Leisler's bat populations migrate across the Irish Sea as the majority of European-based literature available on the offshore migration of bats is centred around the North Sea, however as the species do migrate across large water bodies and seas it is inferred to occur from Ireland. Therefore using the precautionary principle, for the purposes of this report, it is assumed migratory species do cross the Irish Sea. It is also not known (at the time of writing this report) what proportion of the UK vagrant species Brandt's bat and greater horseshoe bat populations migrate across the Irish Sea.

13.5.2.6 Species recorded within this literature include Nathusius' pipistrelle, noctule (*Nyctalus noctula*), northern bat (*Eptesicus nilssonii*), serotine (*Eptesicus serotinus*) and parti-coloured bat (*Vespertilio murinus*) (Boshamer and Bekker, 2008; Jonge Poerink *et al.*, 2013; Lagerveld *et al.,* 2014a, 2014b, 2015; Leopold *et al.,* 2014; Bat Conservation Trust, 2014; Lagerveld *et al.,* 2019). Some European studies do show Nathusius' pipistrelle to be the more common migratory species, with common pipistrelles and members of Nyctalus genus being much scarcer (Lagerveld *et al.,* 2018 and 2019; UK Offshore Energy Strategic Environmental Assessment 4 (OESEA4) Appendix A1a.7, 2022.

### MIGRATORY AND VAGRANT SPECIES

13.5.2.7 As stated in Section 13.5.2.4 the outcome of the literature review on migratory species indicates that there are only two relevant species within the ZoI; Nathusius' pipistrelle and Leisler's bat.

### NATHUSIUS' PIPISTRELLE

13.5.2.8 The Nathusius' pipistrelle is a small migratory bat (weighing 6-10g) with a widespread distribution across Europe into western Asia. This species currently holds the world record for the longest migration distance of any bat, covering over 2,200km across Europe (Assembly, 2023) as well as movement over open waters (Alcade *et al.,* 2021). The study undertaken by Suba (2014) identified that Nathusius' pipistrelle (assuming bats are active for 7.3 hours per night) has a migration range of 30 to 120km per night which is in line with other studies including Pētersons (2004) and Hedenström (2009 and 2019) which also concluded that the species migrate on average 47km and 46km per night (range 32 to 77km per night) respectively. A recent study showed that Nathusius' exhibited high metabolic rates during migratory transit flights, even when flying at an energetically optimal speed (Troxell *et al.,* 2019). To cover the elevated energy demands of transit flights, they use a 'mixed-fuel strategy' based on oxidizing ingested insect proteins from insects caught *en route* ("aerial refuelling") and fatty acids from their body reserves

[1] A core sustenance zone (CSZ), as applied to bats, 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.

https://cdn.bats.org.uk/uploads/pdf/Bat-Species-Core-Sustenance-Zones-and-Habitats-for-Biodiversity-Net-Gain.pdf?v=1596874016

(Voigt *et al.,* 2012). Although they depend on insects as an oxidative fuel for migration, they rarely engage in foraging while flying in an actual migration corridor (Voigt *et al.,* 2018). Instead, they seem to forage first at nightfall and then launch into the sky to proceed with their migration route.

13.5.2.9 In Ireland, where the winters are relatively mild, Nathusius' pipistrelle may relinquish its migratory behaviour in favour of a more sedentary lifestyle. It is possible that Ireland, which lies in a transitional region, holds resident bats, with those resident bats being supplemented during winter by the migratory individuals returning from the north-east of the species range (Petersons, 2004 and Lagerveld *et al.,* 2023).

13.5.2.10 The first confirmed Irish breeding colony of this bat was identified in May 1997 near Lough Neagh, with smaller roosts located throughout the country (non-breeding). A recent assessment undertaken by Bat Conservation Ireland through the Car-Transect Monitoring Scheme (2003-2021) has found that Nathusius' pipistrelles are widely distributed, with individuals recorded in all counties across the country, albeit in low numbers. The study also showed that Northern Ireland (Lough Neagh) had a mean encounter rate of ten times that of all other survey squares combined (refer to Figure 13.2). According to the Article 17 (2013 - 2018) Assessment the estimated population of Nathusius' pipistrelle bat in the Republic of Ireland is estimated to be between 3,000 and 5,000 individuals. Figure 13.3 shows the distribution range of the species as of 2018.

13.5.2.11 Distribution and migration mapping for Nathusius' pipistrelle from EUROBATS in 2015 identified a possible migration route between the UK and Norway, with no known migration routes mapped between Ireland and the UK, nor the UK and France, Netherlands or Belgium. However, the NNPP undertaken in the UK, and the Motus tracking project, have identified the long-distance movement of individual Nathusius' bats (through ringing) between the south of England and mainland Europe, including the coast of the Netherlands, Latvia and Lithuania (Bat Conservation Trust, 2019). The Motus tracking program provides the most recently available mapped migration routes between the UK and Europe, for the migration seasons of spring and autumn. Refer to Figure 13.4 and Figure 13.5 showing routes undertaken by Nathusius' pipistrelles in 2022, during spring and autumn migration periods.

13.5.2.12 Despite evidence of these migratory routes in continental Europe, little is known about the seasonal movements of Nathusius' pipistrelle in Ireland and whether, or any extent to which, Irish Nathusius' pipistrelles are migratory.

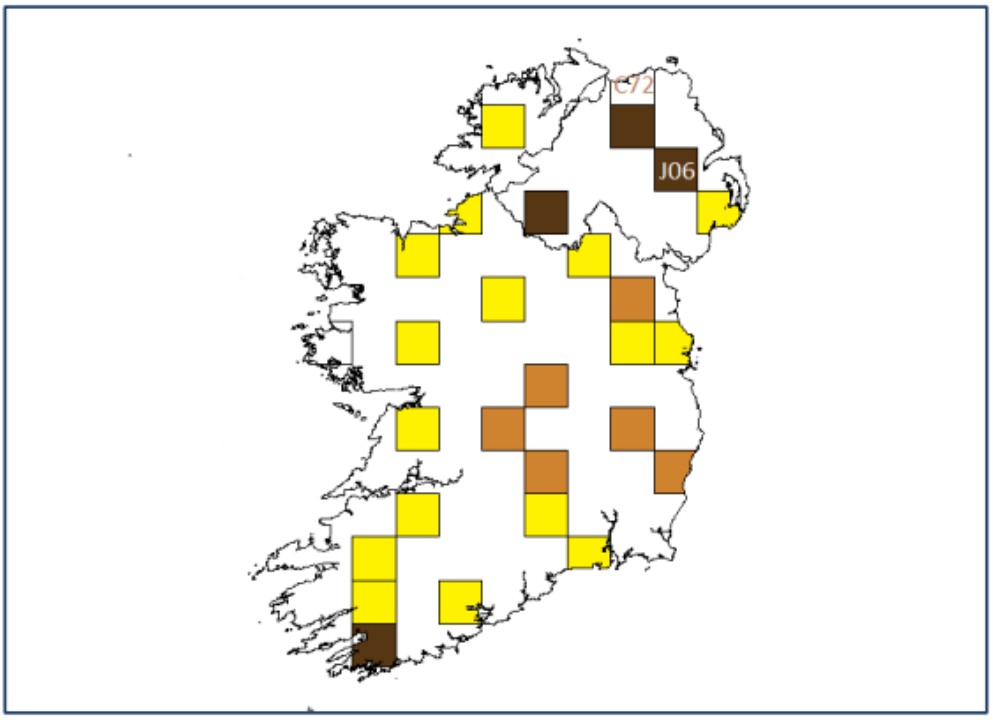


**Figure 2.10** Survey squares colour coded according to mean Nathusius' pipistrelle encounter rates from Batlogger detectors (per hour) from 2019-2021. The overall average rate of Nathusius' bat encounters for all squares from 2019-2021 was 2.2hr$^{-1}$.

Encounter rate >0≤1.5hr$^{-1}$
Encounter rate >1.5≤3hr$^{-1}$
Encounter rate >3hr$^{-1}$

**Figure 13.2: Nathusius' pipistrelle encounter rate**
*Source: Irish Bat Monitoring Programme 2018-2021. Irish Wildlife Manuals, No. 137*

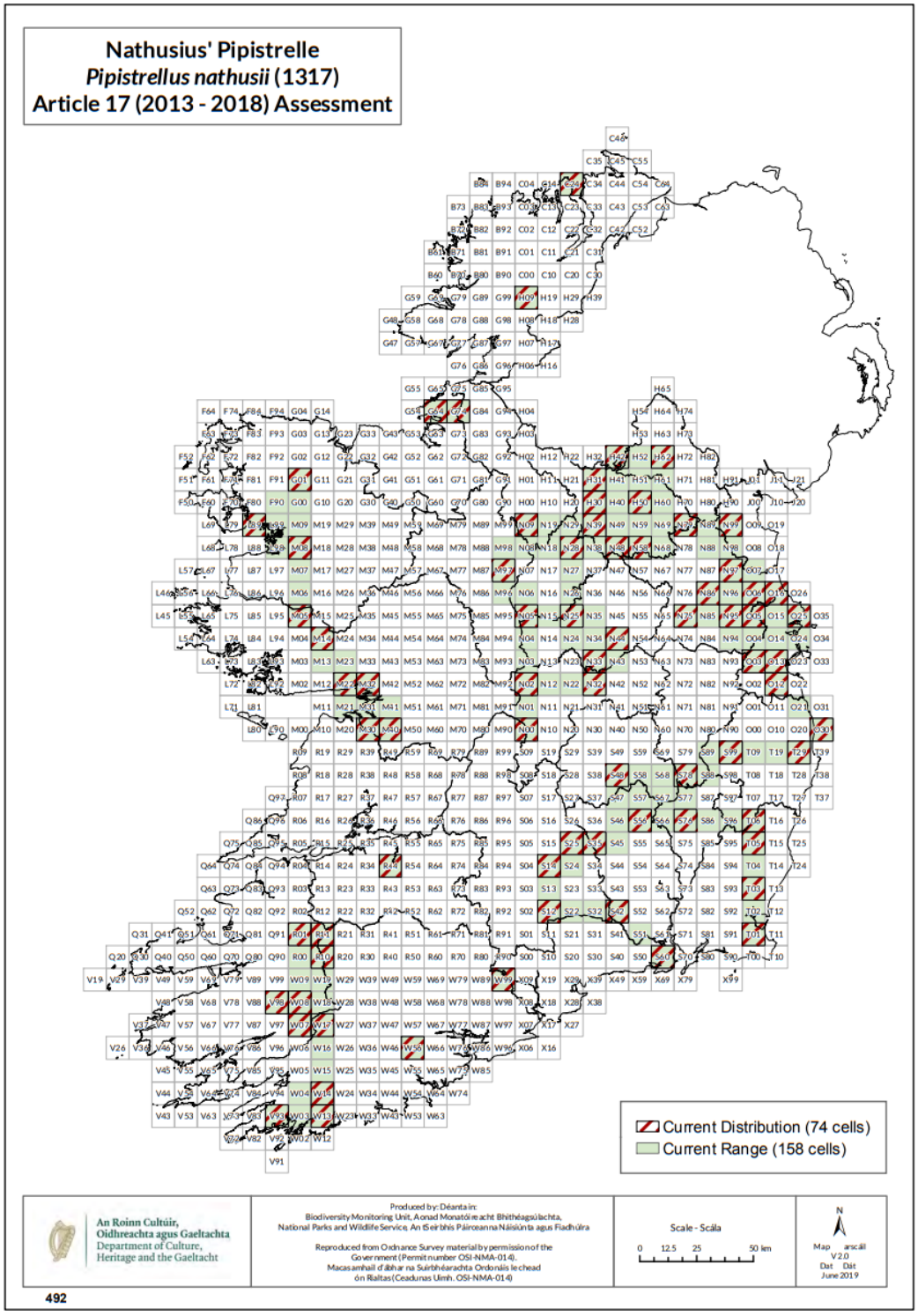


**Figure 13.3: Distribution range of Nathusius' pipistrelle bats 2007-2018**
Source: NPWS (2019). The Status of EU Protected Habitats and Species in Ireland. Volume 3: Species Assessments.

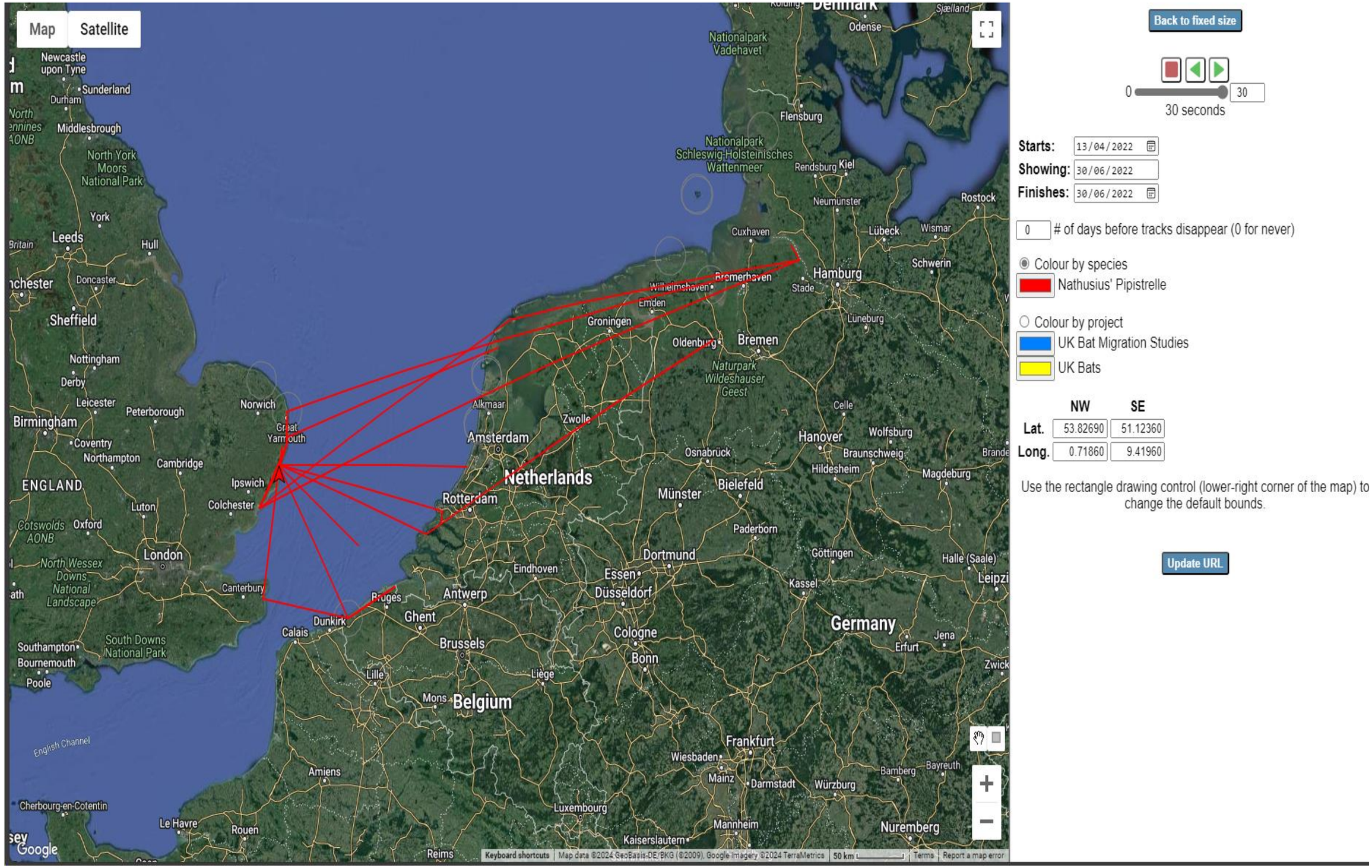


**Figure 13.4: Nathusius' pipistrelle track map showing migration movements between the UK and Northern Europe between 13 April and 30 June 2022 (spring migration period)**
*Source: Motus Tracking Wildlife System https://motus.org/data/tracksSearch. Note the actual migratory route taken is unknown, lines are indicative based on software parameters identified in Motus.*

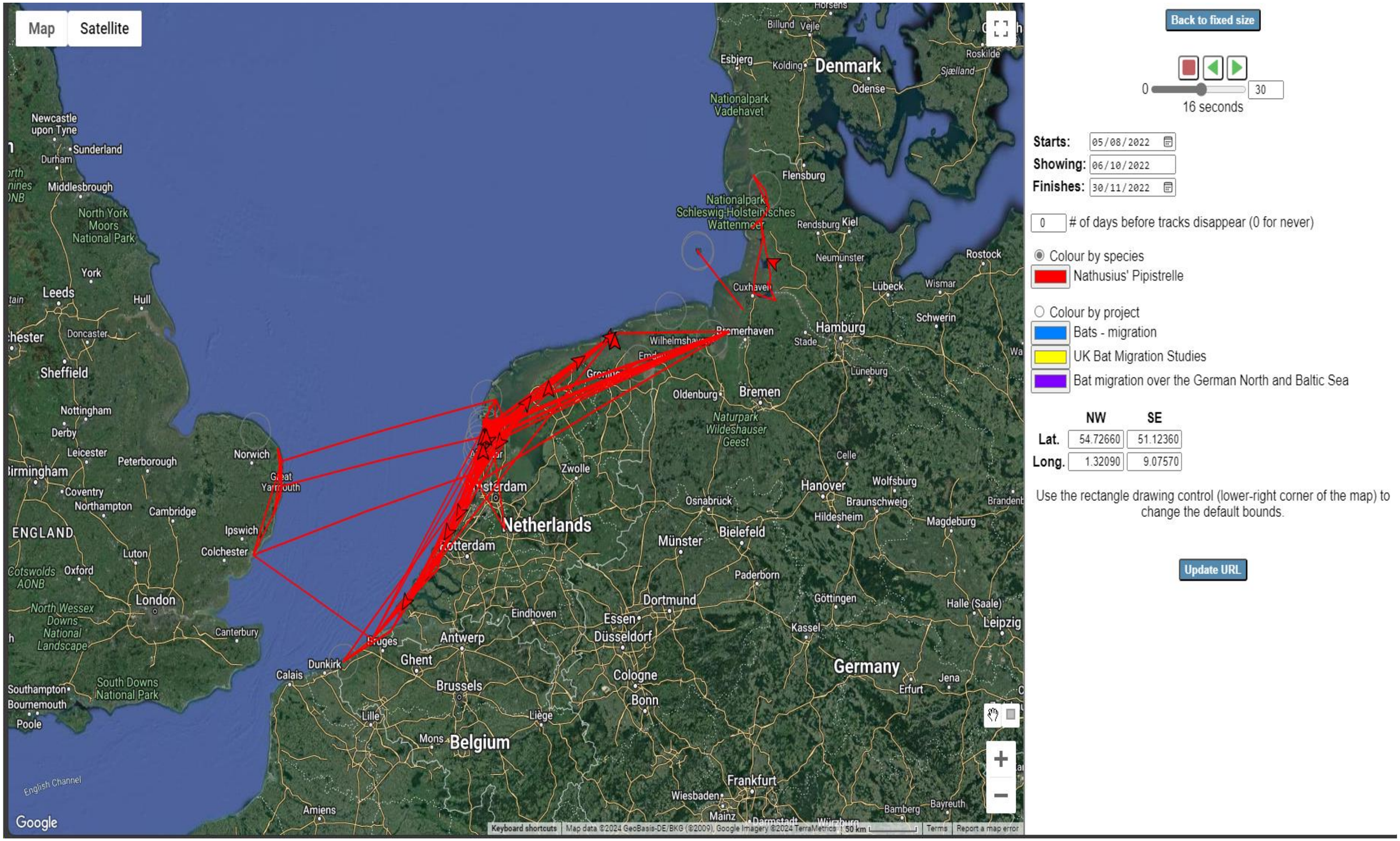


**Figure 13.5: Nathusius' pipistrelle track map showing migration movements between the UK and Northern Europe between 5 August and 30 November 2022 (autumn migration period)**
*Source: Motus Tracking Wildlife System https://motus.org/data/tracksSearch. Note the actual migratory route taken is unknown, lines are indicative based on software parameters identified in Motus.*

### LEISLER'S BAT

13.5.2.13 Leisler's bat is the biggest of the nine resident species of bats found in Ireland (12-20g) with a widespread but rare distribution in Europe, including the British Isles and Isle of Man. With Ireland being considered a European stronghold, where the species is the third most common bat (Bat Conservation Ireland). A recent assessment undertaken by Bat Conservation Ireland through the Car-Transect Monitoring Scheme (2003-2021) has found Leisler's bats to be the third most frequently encountered species during the monitoring scheme in most survey years to-date and that there is a southern bias in species distribution (refer to Figure 13.6). According to the Article 17 (2013 - 2018) Assessment the estimated population of Leisler's bat in the Republic of Ireland is estimated to be between 63,000 and 113,000 individuals. Figure 13.7 shows the distribution range of the species as of 2018.

13.5.2.14 There is much less data and literature available about the offshore migratory habits of Leisler's bat (Ahlen *et al.,* 2009, Motus tracking program accessed February 2024). While in continental Europe Leisler's bat is one of the long-distance seasonally migratory species (Giavi *et al.,* 2014), with six records of flights over 1,000km (EUROBATS, Dondini, 2012) including three over 1500km (Wohlgemuth *et al.,* 2004 and Dondini, 2012, Dechmann Lab, 2023). There are currently no available public records of this species in an Irish marine environment. However, they have been recorded offshore in Europe.

13.5.2.15 It is not known whether the Irish population migrates within or from Ireland to another country. However, it should be noted that some agencies submit that, 'Leisler's bat does not migrate from Ireland' (Vincent Wildlife trust). This is an argument further strengthened by Shiel (1999), which states, 'in Ireland, it seems Leisler remain within their summer range to hibernate', and Boston *et al.,* (2015) which compares phylogeographic relationships of Irish populations in relation to those across Europe. In contrast, Pinder (2020) highlights that Leisler's bats have colonised/re-colonised the Isle of Man since the 1990's, with population levels increasing since, demonstrating that there is a level of movement of this species in the Irish sea. Pinder (2020) does not however, state whether the assumption is that the species have re-colonised from the UK or Ireland.

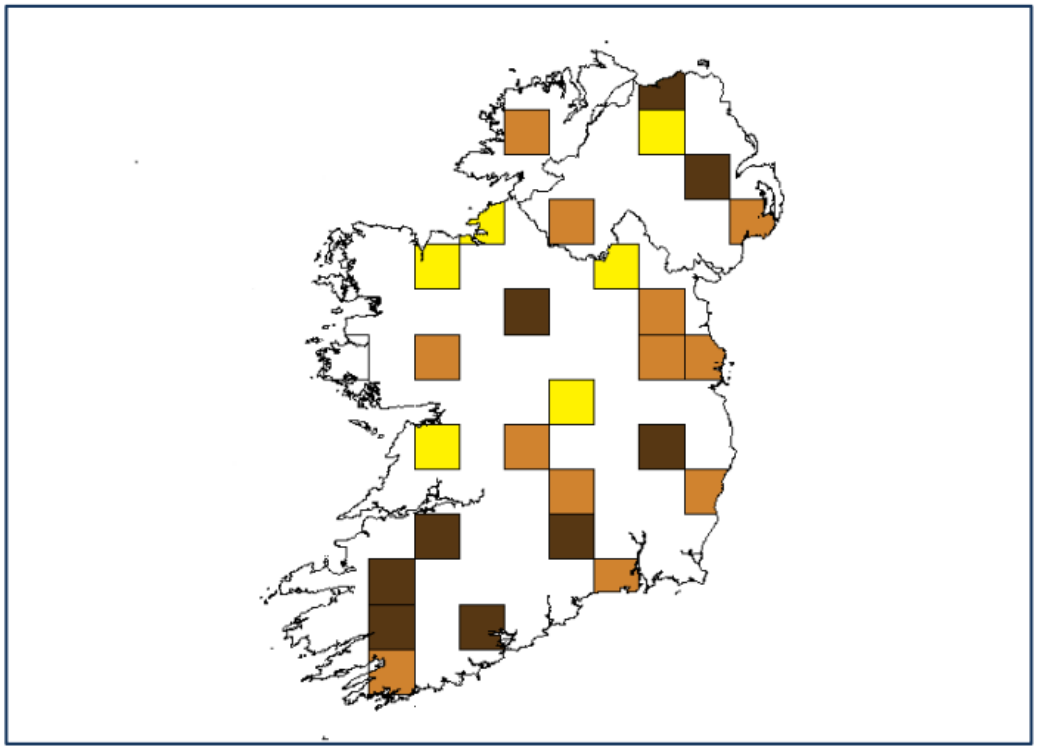

**Figure 2.8** Survey squares colour coded according to mean Leisler's bat encounter rates from Batlogger detectors (per hour) from 2019-2021. The overall average rate of Leisler's bat encounters for all squares from 2019-2021 was 22.3hr$^{-1}$.

Encounter rate >0≤12hr$^{-1}$

Encounter rate >12≤24hr$^{-1}$

Encounter rate >24hr$^{-1}$

**Figure 13.6: Leisler's Bat encounter rate**

*Source: Irish Bat Monitoring Programme 2018-2021. Irish Wildlife Manuals, No. 137*

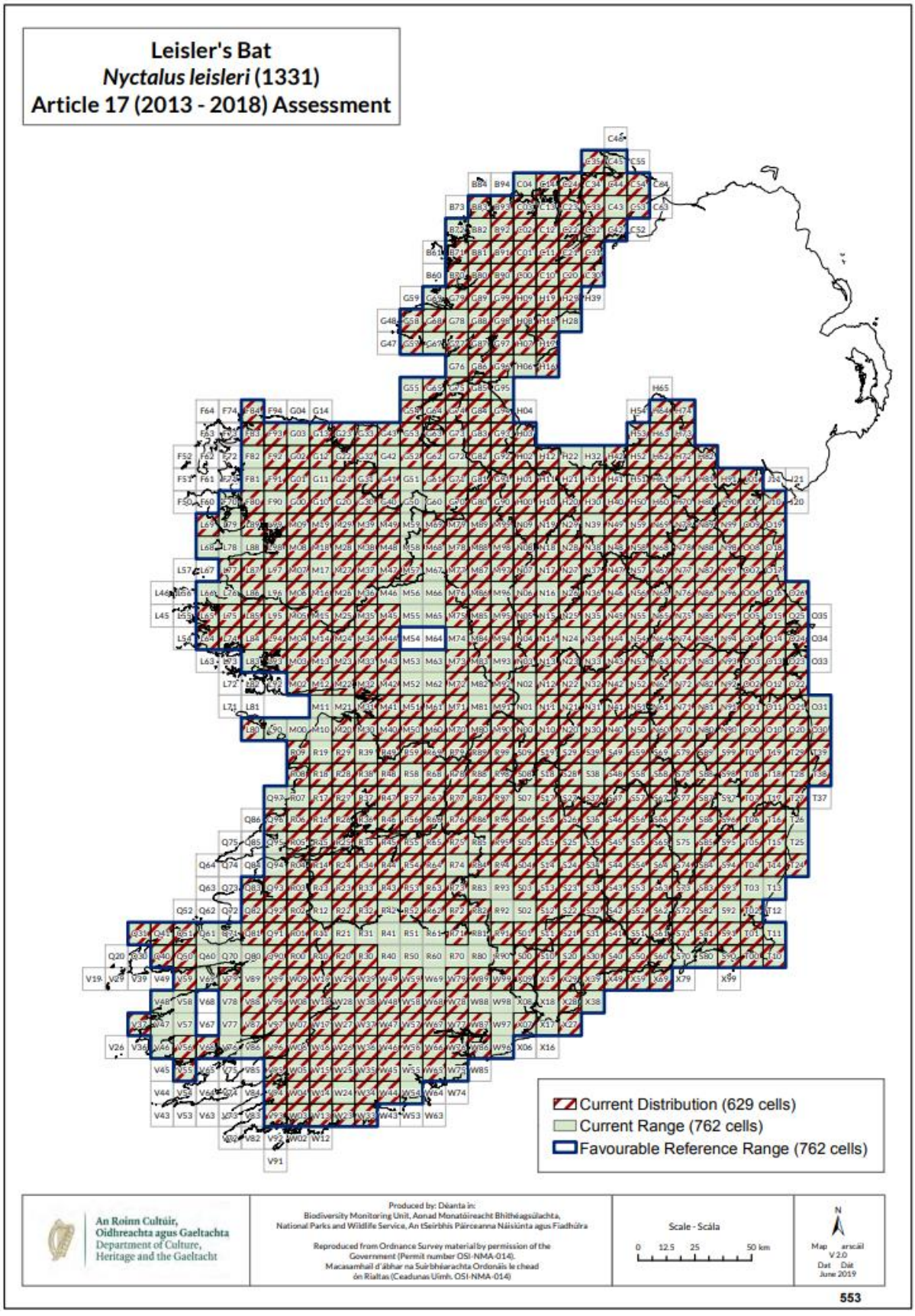


**Figure 13.7: Distribution range of Leisler's bats 2007-2018**
Source: NPWS (2019). The Status of EU Protected Habitats and Species in Ireland. Volume 3: Species Assessments.

## VAGRANT SPECIES

### BRANDT'S BAT

13.5.2.16 A specimen of Brandt's Bat was first recorded in Ireland in 2003 when one was discovered in County Wicklow. The bat subsequently died, and its identification was determined by Deoxyribonucleic acid (DNA) analysis. This bat is known from only five specimens found to date in Co. Cavan, Clare, Kerry, Tipperary and Wicklow. However, these animals were identified by physical characteristics while being held and not genetically. As no resident population has yet been identified on the island of Ireland, the species' status remains unknown. This species is known as a regional migrant (seasonal migration of a few hundred km but also disperse or facultatively migrate over distances up to 800 km[2]) Jones *et al.,* (2009). The longest recorded migrations of this species have been up to 300 km.

### GREATER HORSESHOE BAT

13.5.2.17 The greater horseshoe bat is the largest species that has been found in Ireland. In winter 2013 a single male was found hibernating in an underground site in Co. Wexford. The same individual was ringed and found in the same location the following summer. It is assumed that this individual is a vagrant from the Welsh population. The species are known as sedentary (travel short ranges between roosts (tens of km), barely disperse or migrate less than 100km). The longest recorded migrations of this species have been up to 180 km.

## MIGRATION ACTIVITY

13.5.2.18 Activity at offshore locations is most frequently documented during the migration periods spring (April–May) and autumn (August–October) (Boshamer and Bekker, 2008, Motus tracking program accessed February 2024). During the autumn period there are favourable weather conditions identified for offshore migration towards the UK (Nathusius' pipistrelle only) to occur including temperature >13°C, wind speed <5 m/s, and wind direction originating from the E, NE and SE. As shown in Figure 13.4 and Figure 13.5, there is a lot of movement along the coast before moving out to sea. It is assumed that along with gathering food stores, the bats are awaiting the favourable weather conditions to travel.

13.5.2.19 It is also highlighted within the studies that the presence of tailwinds is likely to be an important determinant of offshore migration events (Hüppop and Hill, 2016; Brabant *et al.,* 2019; Brabant *et al.,* 2021, Lagerveld *et al.,* 2021). There is very little data available to identify favourable weather conditions for the spring migratory period. However, Hüppop and Hill (2016) identify presumed direction of migration as (WSW in autumn and ENE in spring (it should be noted that the platform used for the study is to the west of Heligoland, within the eastern section of the southern North Sea). There is currently no published information on the favourable weather conditions of offshore Leisler's bat migrations. Most recorded recoveries of long-distance flights lie in SW to NE directions (Rydell *et al.,* 2014).

13.5.2.20 Studies demonstrate that bats did not avoid WTGs. On the contrary, they stayed for periods hunting close to the WTGs because of the accumulation of flying insects (Ahlen *et al.,* 2007, Lagerveld *et al.,* 2017, Boshamer and Bekker /Lutra 2008, Guest *et al.,* 2022). The studies also indicate that more active flying insects were caught in low wind-speeds. With increasing winds, passively transported aeroplankton (such as drifting ballooning small spiders) were observed. This also coincides with weather conditions known to trigger insect migration in August-September (Chapman *et al.,* 2004, Drake and Reynolds, 2012), along with insect migration over

[2] For the purposes of the study, regional, seasonal & facultative migration are the same thing (facultative = optional migration due to weather (seasonal) conditions / food availability)

sea being associated with lunar phasing, and late summer/ early autumn migrations (Lagerveld, 2023).

13.5.2.21 The literature is currently inconclusive on the flight height at which bats migrate in the offshore environment. Some literature suggests that bats migrate at higher altitudes in favourable tailwinds (Hüppop and Hill, 2016), while others suggest much lower migration heights of <10m, assuming the use of echolocation against the surface of the water (Ahlén *et al.,* 2009; Troxell *et al.*, 2019; Brabant *et al.,* 2020). Another North Sea based study in the Thornton bank, 27km from the Belgian coast, examined the height of Nathusius' pipistrelle offshore activity. This study recorded an approximate 90% to 10% split in data between a detector mounted at 16m on a wind turbine and another at 93m. This suggests that migratory behaviour may be primarily low altitude for Nathusius' pipistrelle (Brabant *et al.,* 2019). This study does highlight the need for surveys to be undertaken at heights between the two used as this area needs further study. There is currently no published information on the potential heights of offshore Leisler's bat migrations. However, there are studies involving common noctule (close relative) identifying flight heights of 50 m (+/- 45 m above ground level (AGL)) to 295 (+/- 84 m AGL) with 1 no. individual ascending to 800 m AGL (O'Mara *et al.,* 2019). Note this study identifies that bats of the same species showed individual migratory behaviour (both within and among individuals). Therefore, a precautionary approach is taken as to whether the two species will show similarities in migration altitudes.

### POTENTIAL INTERACTIONS OF WIND DEVELOPMENTS WITH MIGRATING BAT SPECIES

13.5.2.22 The presence of wind turbines in a terrestrial environment is a well-established source of bat mortality with estimates of mainland European fatalities ranging between 0.6–11 bat mortalities per megawatt (MW) of energy generated, depending on the habitat present near the wind turbine (Rydell *et al.,* 2010; Korner-Nievergelt *et al.,* 2013; Arnett *et al.,* 2016). This is also shown worldwide (e.g. Barclay *et al.,* 2007, Arnett *et al.,* 2008), with mortality most commonly associated with species migrating long distances in terrestrial environments (Kunz *et al.,* 2007).

13.5.2.23 While this is the case for onshore bats, information on interactions between bats and offshore wind turbines is almost completely lacking. Although studies have been carried out at offshore turbine locations including Ahlén *et al.,* (2007) which involved monitoring of bat behaviour around offshore wind farms in the Baltic and Kattegat, where bats were observed foraging near the turbines, no mention is made of observed collisions between bats and turbines.

13.5.2.24 Nathusius' pipistrelle are considered to be at high risk of collisions from onshore wind farms due to their occurrence in open habitats and migratory behaviour (NatureScot 2021, NIEA 2021, Brabant *et al.,* 2021, Lagerveld *et al.,* 2021, Lagerveld *et al.,* 2023), and the species has been reported among the most commonly observed fatalities under turbines at onshore wind farms in mainland Europe (Rodrigues *et al.,* 2015). Whilst the previous studies are of onshore wind farms, due to the migratory behaviour of Nathusius' pipistrelle and their known presence in the offshore environment, potential for collision must be considered during this assessment.

13.5.2.25 Leisler's bats are also considered to be at high risk of collisions from onshore wind farms due to their occurrence in open habitats and migratory behaviour (BCI accessed 2023, NatureScot 2021, NIEA 2021) along with their known foraging height of c. 40m above ground level. Whilst the previous studies are of onshore wind farms, due to the migratory behaviour of Leisler's bats, and the short flight distance between the UK and Ireland, potential for collision must be considered during this assessment.

### FORAGING SPECIES

13.5.2.26 The foraging behaviours of Nathusius' pipistrelle and Leisler's bat are described with their migratory behaviour above.

### COMMON AND SOPRANO PIPISTRELLE

13.5.2.27 Common and soprano pipistrelle are Ireland's two smallest bat species and also the commonest, weighing no more than 5-6g, the weight of a 1 euro piece (BCI accessed 2023). While the two species are not known to migrate offshore, both are known as regional migrants (Jones *et al.*, 2009) and have been recorded at wind farms and coastal islands up to 10 km from the coast (Ahlén *et al.,* 2007; Boshamer and Bekker, 2008). The longest recorded migrations for common pipistrelle have been up to approximately 1,100 km, while the longest recorded migrations for soprano pipistrelle are unknown. The CSZ for common pipistrelle is 2 km while for soprano pipistrelle is 3 km (BCT 2020). According to the Article 17 (2013 - 2018) Assessment the estimated population of common pipistrelles in the Republic of Ireland is estimated to be between 1,070,000 and 2,400,000 individuals. The estimated population of soprano pipistrelles is between 500,000 and 1,200,000.

### DAUBENTON'S BAT

13.5.2.28 Daubenton's Bat has a widespread distribution throughout Western Europe, including Ireland and the UK (NBDC accessed 2024, EUROBATS). This species primarily occurs close to freshwater rivers and lakes and can forage up to 10 km from roosts. While not a species known to migrate offshore, the species are known as a regional migrant (Jones *et al.,* 2009) covering a distance of up to 150 km between roosts and have been recorded at wind farms and coastal islands hunting over the sea surface up to 10 km from the coast (Ahlén *et al.,* 2007; Boshamer and Bekker, 2008). The species has also been recorded along coastlines (Lagerveld *et al.,* 2017). The longest recorded migrations of this species have been up to 300 km. The CSZ for this species is 2 km (BCT 2020). According to the Article 17 (2013 - 2018) Assessment the estimated population of Daubenton's bats in the Republic of Ireland is estimated to be 1,580.

### BROWN LONG-EARED BAT

13.5.2.29 The brown long-eared bat is one of the most common of Ireland's nine resident bat species and is found all over the country (BCI accessed 2023). The species are known as sedentary with the longest recorded migrations of this species being up to 90 km. There has only been one reported sighting of the species from North Sea platforms, while anecdotal sightings have been reported at lighthouses and light-ships in the North Sea (Boshamer and Bekker, 2008; Racey *et al.,* 2004). The species has also been recorded at Lambay Island, approximately 4km off the coast of Portraine. The CSZ for this species is 3 km (BCT 2020). According to the Article 17 (2013 - 2018) Assessment the estimated population of brown long-eared bats in the Republic of Ireland is estimated to be between 62,000 and 97,000.

### WHISKERED BAT / NATTERER'S BAT

13.5.2.30 While these species are thought to be present throughout Ireland, they are two of the rarer bat species for the country. Due to the difficulty to definitively identify them to species level without capture techniques, little is known about the flight or foraging behaviour of the two species. While whiskered are known as a regional migrant, Natterer's are sedentary (Jones *et al.,* 2009), with the longest recorded migrations for Natterer's bat up to 300 km and for Whiskered bats up to 600 km. While these species have not been recorded offshore in Europe, relatives in the *Myotis* family have been recorded as far out as 7 km in the mid-Atlantic (Biodiversity Research Institute. 2022). The CSZ for whiskered is 1 km and for Natterer's is 4 km (BCT 2020). According to the Article 17 (2013 - 2018) Assessment the estimated population of whiskered bats in the Republic of Ireland is estimated to be 270. The estimated population of Natterer's bats is 464.

### LESSER HORSESHOE

13.5.2.31 The range of the lesser horseshoe bat in Ireland is, for the most part, limited to six western counties – Mayo, Galway, Clare, Limerick, Kerry and Cork, with strongholds in Kerry/west Cork and in Clare (Augney *et al.* 2022). This species considered to be largely sedentary and one that does not undertake extensive migrations (Jones *et al.,* 2009). The longest recorded migrations of this species have been up to 153 km. (Schober and Grimmberger, 1997). According to the Article 17 (2013 - 2018) Assessment the estimated population of lesser horseshoe bats in the Republic of Ireland is estimated to be between 5,000 and 7,000.

### POTENTIAL INTERACTIONS OF WIND DEVELOPMENTS WITH BAT SPECIES

13.5.2.32 Bat species may be at risk from wind developments due to several 'Attraction Hypotheses (Cryan and Barclay, 2009)'. Theories include bats perceiving the WTGs as potential roosts (Cryan and Barclay, 2009), potentially increased prey base (Ahlén *et al.*, 2007, Lagerveld *et al.*, 2017, Boshamer and Bekker / Lutra 2008, Guest *et al.*, 2022), visual attraction (Guest *et al.*, 2022), disorientation due to electro-magnetic fields (EMFs) or decompression (Nicholls and Racey, 2009), or attraction due to mating strategies (Arnett *et al.*, 2008; Cryan and Brown, 2007; Kunz *et al.* 2007, Cryan and Barclay 2009; Foo *et al.*, 2017; Richardson *et al.*, 2021; Guest *et al.*, 2022, SEER 2022). Studies examining this hypothesis suggest that bats are attracted to insect populations surrounding turbines which are themselves attracted to turbines (Kunz *et al.*, 2007; Rydell *et al.*, 2010). Given the general peak in activity and migratory behaviour in autumn within mainland Europe, there is also a trend for fatalities to increase at onshore wind farms during this period (Arnett *et al.*, 2008; Lagerveld *et al.*, 2020). Whilst the previous studies are of onshore wind farms, due to the offshore development area being within a commutable distance from the mainland for all residential species, potential for attraction has been considered during the assessment.

## Desk Study

### EXISTING ECOLOGICAL RECORDS

13.5.2.33 Table 13.5 identifies the bat species records from the National Biodiversity Data Centre (NBDC) (accessed February 2024) for the 10 km grid squares T15, T25, T26, T27, T35, T36, T37, T38, T45, T46, T47 and T48. The records show that species have only been recorded on land and nothing recorded offshore to date. The onshore locations T15, T26, T27 and T38 all have records of Leisler's bat, while there are no records of Nathusius' pipistrelle for the study area. It should be noted that T25 (coastal grid square) has no records of bats.

13.5.2.34 Figure 13.8 shows bat species records from BCI (received March 2024) for a 10 km radius from the Seabank monitoring location (refer to Figure 13.1).

**Table 13.5: Bat species records from NBDC for the 10km grid squares T15, T25, T26, T27, T35, T36, T37, T38, T45, T46, T47 and T48 (shaded rows refer to offshore only grid square)**

| | Common Pipistrelle (Pipistrellus pipistrellus) | Soprano pipistrelle (*Pipistrellus pygmaeus*) | Nathusius' pipistrelle (*Pipistrellus nathusii*) | Leisler's bat (Nyctalus leisleri) | Brown long-eared bat (*Plecotus auritus*) | Daubenton's bat (*Myotis daubentonii*) | Whiskered bat (Myotis mystacinus) | Natterer's Bat (*Myotis nattereri*) |
|---|---|---|---|---|---|---|---|---|
| T15 | ✓ | ✓ | | ✓ | ✓ | ✓ | | ✓ |
| T25 | | | | | | | | |
| T26 | ✓ | ✓ | | ✓ | | ✓ | | |
| T27 | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | |
| T35 | | | | | | | | |
| T36 | | | | | | | | |
| T37 | | | | | | | | |
| T38 | ✓ | ✓ | | ✓ | ✓ | ✓ | | |
| T45 | | | | | | | | |
| T46 | | | | | | | | |
| T47 | | | | | | | | |
| T48 | | | | | | | | |

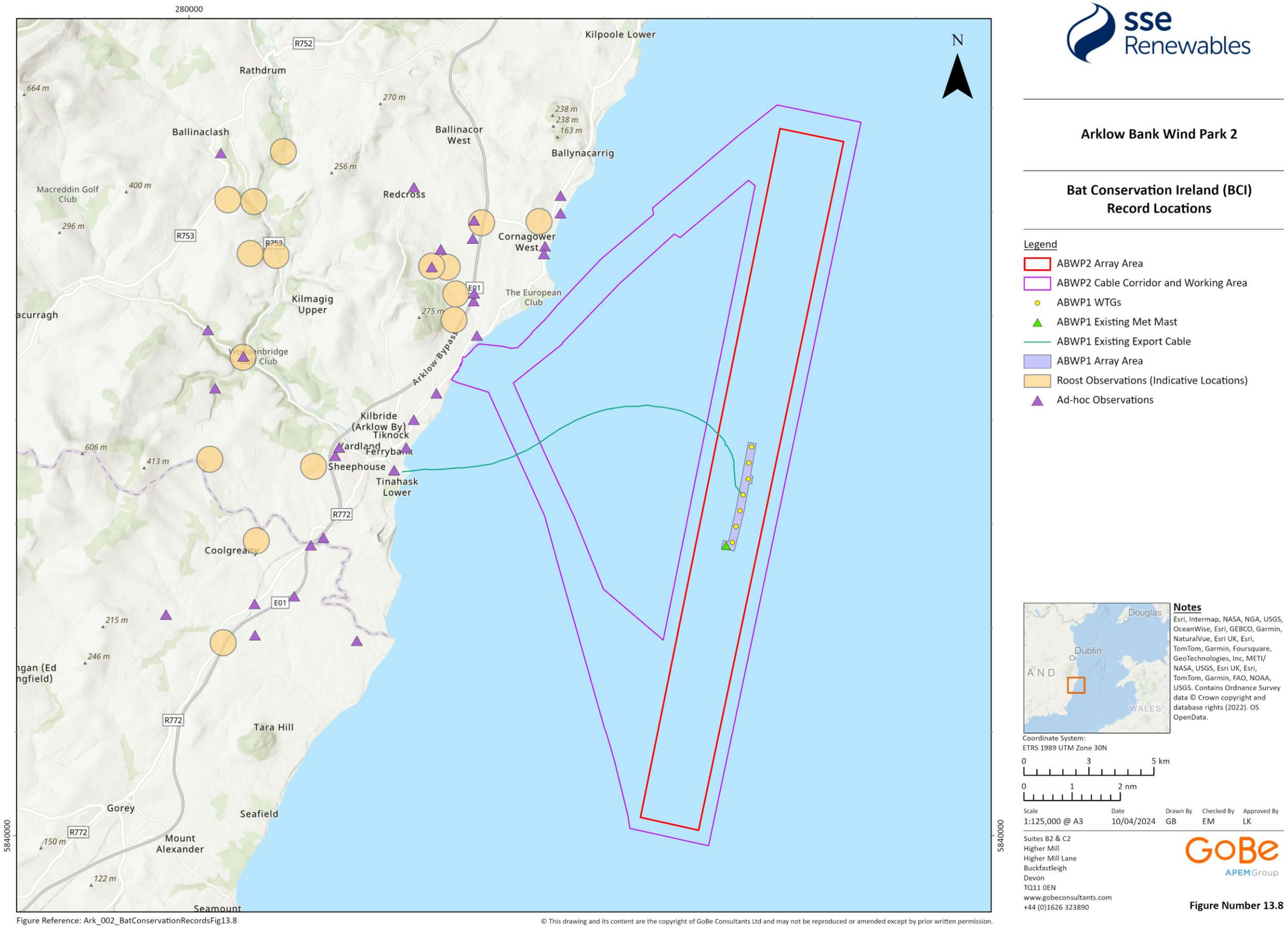


**Figure 13.8: Bat Conservation Ireland roost location records**

## Field Survey Results 2021

### OFFSHORE RESULTS

13.5.2.35 Two bat species were recorded at the offshore monopile location (a marine platform approximately 8 km offshore of Arklow, Co. Wicklow at coordinates: 52.88544136, -5.923436330) (Figure 13.1) during the 2021 survey period; three Leisler's bat passes recorded in July and August and two common pipistrelle passes recorded in August. Commuting and feeding behaviours were noted from the data collected. Refer to Appendix 13.1 for the full survey data.

## Field Survey Results 2022

### OFFSHORE RESULTS

13.5.2.36 Two bat species were recorded at the same offshore monopile location as used in 2021(refer to (Figure 13.1) during the 2022 survey period; two Leisler's bat passes recorded in August and three common pipistrelle passes recorded in October. Commuting and feeding behaviours were noted from the data collected. Refer to Appendix 13.2 for the full survey data.

13.5.2.37 For the duration of the survey period, the wind direction was predominantly in a SSW to WSW direction with an average wind speed of 22.4 kts with the gusts frequently exceeding 40 kts. The first detection of a Leisler's bat (6 August 2022) occurred during a high-pressure system, with no rain, a steady WSW breeze F2-3 (-9 kts), and full cloud coverage. A further single Leisler's call was recorded (15 August 2022) in similar conditions, with lighter winds (F3-4, 10-17 kts), though the prevailing wind had veered to a NNW direction. During the surveys, the majority of bat detections were within a fresh to strong breeze F4-F6 (5.6 - 15.15 m/s) windspeed and an average temperature of 12.06 °C.

## Field Survey Results 2023

### OFFSHORE RESULTS

13.5.2.38 Two bat species were recorded at the same offshore monopile location as used in 2021 (Figure 13.1) during the 2023 survey period; four Leisler's bat passes recorded in June and two common pipistrelle passes recorded in July. There was no foraging or social behaviour associated with the passes. Refer to Volume III, Appendix 13.1 for the full survey data.

13.5.2.39 The prevailing nightly winds were southerly winds between 4 – 10 m/s consisting of 14% of the conditions during the survey. Overall, 21% of the recorded nightly wind conditions were S winds. The bat passes, were however, recorded during N, NE, and SW winds.

13.5.2.40 While both bat species were grouped together to assess any correlation between wind speed and direction to bat passes, due to the low sample size, the results do not provide enough data to show a significant influence on bat activity. However, it is notable that passes did occur in conditions contrasting the overall prevailing nightly winds.

13.5.2.41 The results highlight that bat species are active offshore within the Proposed Development area.

### HEADLAND RESULTS

13.5.2.42 Nathusius' pipistrelle activity was recorded between April and October 2023 with the higher activity levels occurring in August. Levels peaked at the Seabank location (Figure 13.9) on 28 August with 11 passes and in September at the Brittas location (Figure 13.9) with 4 passes. Activity was more frequent at the Seabank location compared to the Brittas location. However, the activity levels were low overall, with most recordings being of a single or two passes per night (Figure 13.9). Of the 216 days of deployment, only 25 days recorded a pass. Ninety five percent of passes occurred in wind speeds below 5 m/s and temperatures above 7.5 °C.

13.5.2.43 It should be noted that while the higher levels of activity were recorded in August and September (autumn migration period), the absence of recorded activity offshore and limited data to date for this species prevent conclusive evidence of migratory behaviour.

13.5.2.44 Leisler's bat activity occurred between April and October with higher levels of activity occurring at the Seabank location in May, July, August and October and the higher levels of activity occurring at the Brittas location in April, June and September. Activity peaked at the Seabank location on 18 May with 157 passes and 09 October with 116 passes, while at the Brittas location on 22 April with 118 passes and 05 September with 96 passes. While the data shows there is a lot of overlap in activity between the two locations from July to October, during April and June the activity was predominantly at the Brittas location and in May at the Seabank location, with little to no overlap in activity (Figure 13.10). Ninety five percent of the passes occurred during wind speeds below approximately 5.5 m/s and also at temperatures above 7.5 $^{o}$C.

13.5.2.45 Overall the headland data shows that there is significantly more activity on the coast (38,126 passes) to that identified at the offshore location (six passes).

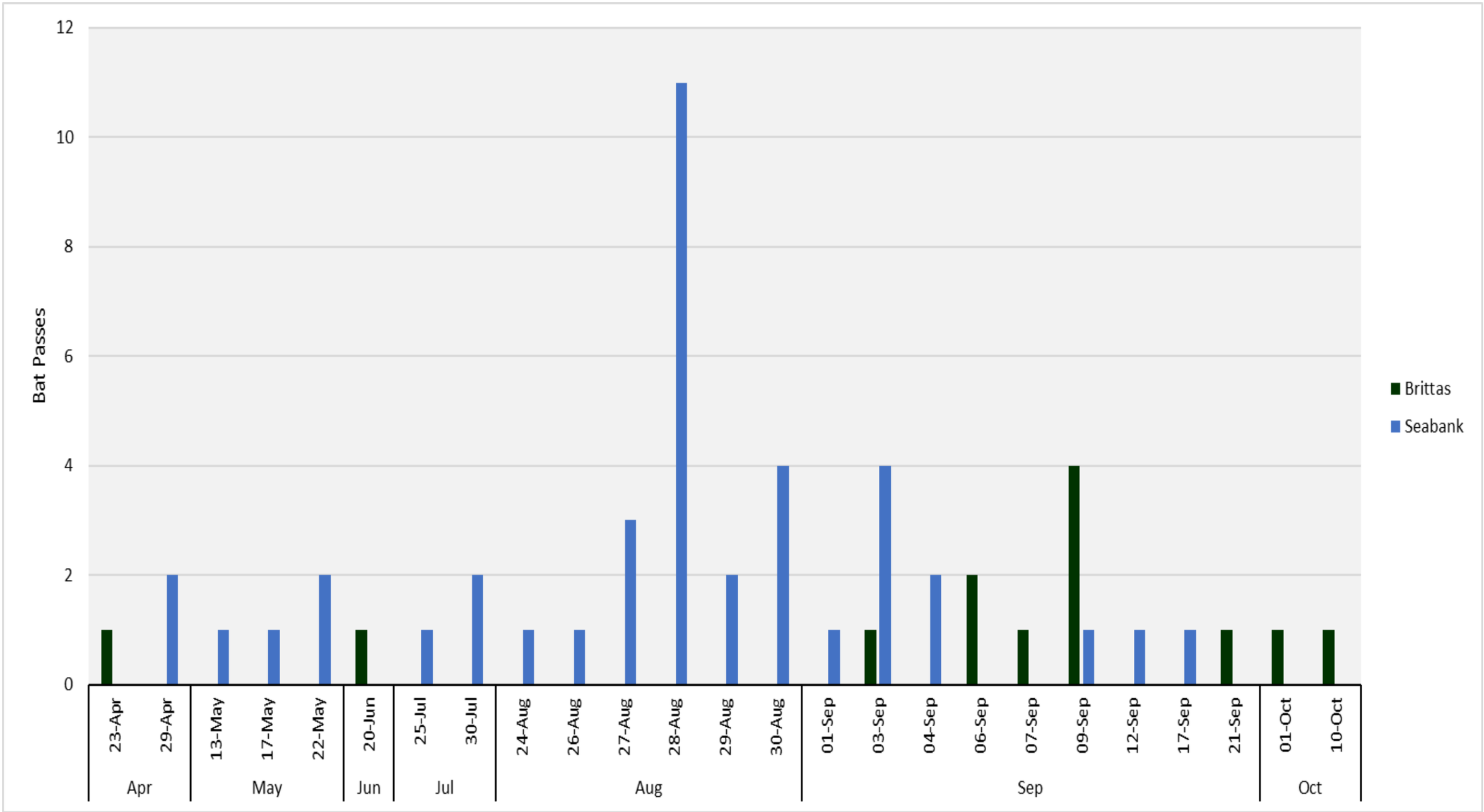


**Figure 13.9: Temporal spread of Nathusius' pipistrelle activity during headland deployment dates at both locations**

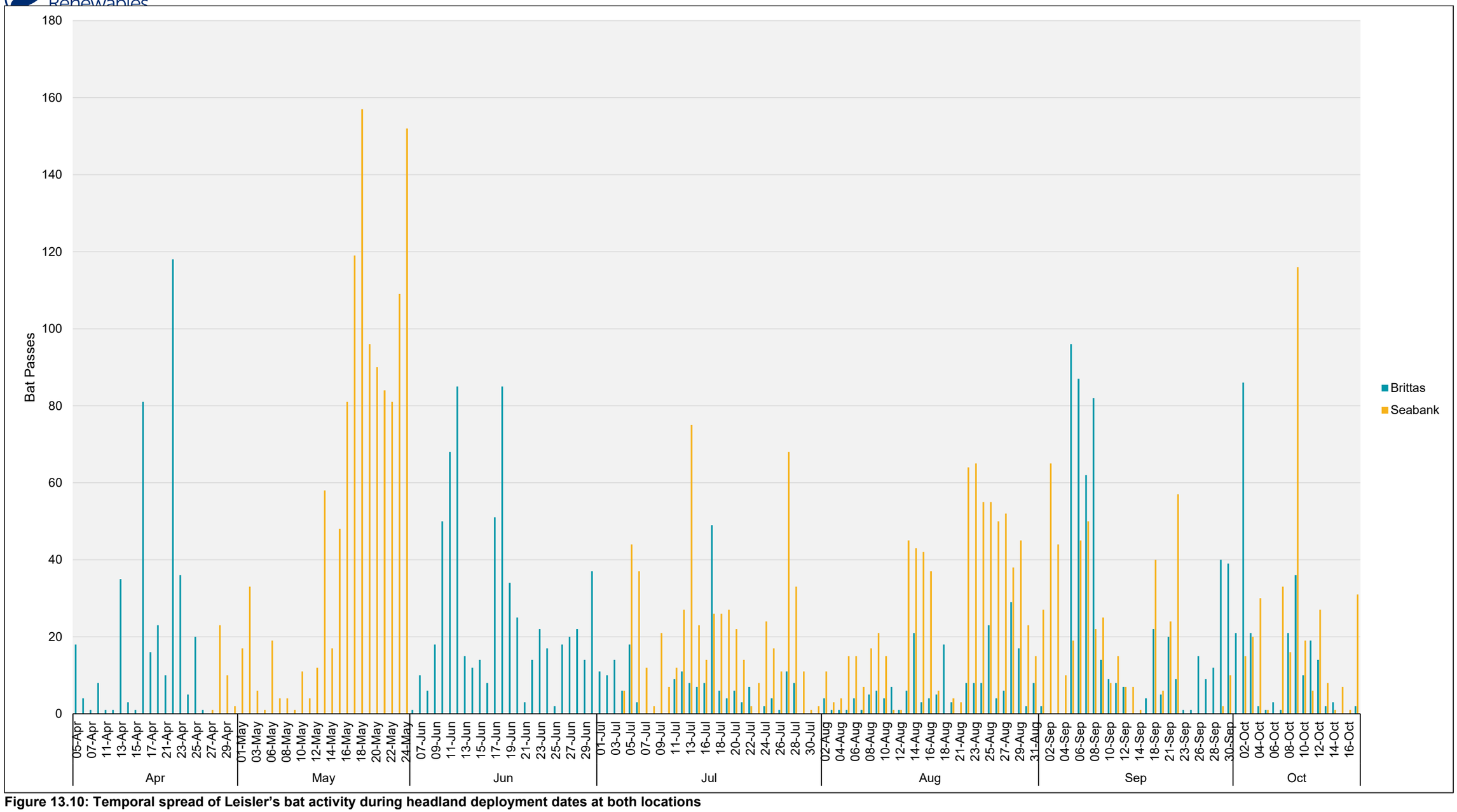


**Figure 13.10: Temporal spread of Leisler's bat activity during headland deployment dates at both locations**

### 13.5.3 Data Limitations

13.5.3.1 The following data limitations are acknowledged in relation to the desk-based review and the site-specific surveys.

13.5.3.2 Overall, the limitations detailed below are not considered to affect the validity or robustness of the impact assessment within this chapter. In all cases, a precautionary approach has been taken at an appropriate scale, and where appropriate mitigation measures have been included to reduce the risk of impacts on bat species to an acceptable level.

#### Literature review

13.5.3.3 Despite evidence of migratory routes in continental Europe, little is known about the seasonal movements of Nathusius' pipistrelle and Leisler's bats in Ireland and if Irish Nathusius' pipistrelles and/or Leisler's are migratory or travel over the marine environment for commuting, feeding or other behavioural activities.

13.5.3.4 While there are records of Nathusius' pipistrelle in an Irish/Northern Europe marine environment, there are currently no available public records of Leisler's bat in an Irish/Northern Europe marine environment.

13.5.3.5 To provide a full picture of the potential for migrating bats occurring in the offshore environment of the Proposed Development an extensive literature review of potential migrating species has been undertaken. The literature review provided insight into known aspects of migration and potential attraction and fills any potential gaps in data.

#### Offshore surveys

13.5.3.6 Loss of data between 11 August 2021 and 20 September 2021 for the north facing detector.

13.5.3.7 Data capture reductions were also evident for both detectors from 20 September 2021 until the collection of the equipment on the 17 November 2021.

13.5.3.8 Despite the failures it is considered that the data recorded provides an accurate representation of the bat activity for the offshore location. Furthermore, the data collected shows certain bat species are present in the offshore environment.

#### Headland surveys

13.5.3.9 During the surveys, a detector at the Brittas location (refer to Figure 13.1) experienced interference in April 2023, which resulted in 21 nights of data loss at this location. Additionally, a card writing error affected the second detector at the Brittas location in May, causing a data loss of 40 nights.

13.5.3.10 A microphone failure occurred on the detector at the Seabank headland location, leading to a further loss of 41 nights of data in May and June 2023.

13.5.3.11 Despite the failures it is considered that the data recorded provides an accurate representation of the bat activity for the headland locations during the recording period. Furthermore, there was no time during the recording period that both detectors failed and no data was recorded for the headland area, other than 12 days between 24 May and 06 June 2023. Refer to Figure 2 in Appendix 13.1 for the periods of data recording for each location.

### 13.5.4 'Do nothing' scenario

13.5.4.1 Under the 'do-nothing scenario', it is likely that the baseline conditions of the Proposed Development would continue to exist as they are and carry on to providing suitable offshore foraging locations and migration corridors for bat species until the decommissioning of the

monopile, where conditions would likely revert back to migration corridors only as there would be no foraging location.

## 13.6 Impact assessment methodology

### 13.6.1 Key parameters for assessment

13.6.1.1 The assessment of significance of effects has been carried out on both of the two discrete Project Design Options detailed in Volume II, Chapter 4: Description of Development. This approach has allowed for a robust and full assessment of the Proposed Development.

13.6.1.2 The two Project Design Options and parameters relevant to each potential impact are detailed in Table 13.6 and Table 13.7.

13.6.1.3 The Project Design Options identified in Table 13.6 and Table 13.7 have been assessed for their potential effects on identified receptors or receptor groups (a receptor group is defined as all bat species as they share ecological features that put them at similar risk of impacts). These scenarios are a summary of the full project parameters provided in Volume II, Chapter 4: Description of Development.

**Table 13.6: Project design parameters and impacts assessed – Project Design Option 1**

| Potential impact | Phase | | | Project Design Option 1 |
|---|---|---|---|---|
| | C | O | D | |
| 1. Disturbance and displacement due to anthropogenic noise | ✓ | ✓ | ✓ | **Construction phase**<br>• Installation of 56 Wind Turbine Generators (WTGs) and two Offshore Substation Platforms (OSPs) within the Array Area;<br>• Maximum of one foundation installed at any one time (within any 24 hour period);<br>• Maximum of 69 installation vessels in the Cable Corridor and Working Area at any one time (including 12 installation vessels along the offshore Cable Corridor at any one time and maximum of seven installation vessels in the vicinity of the Landfall at any one time);<br>• Maximum of three helicopters in the Array Area at any one time; and<br>• Maximum construction schedule of 24 hours a day, seven days a week for a maximum construction period of five years. Within this period, OSP and WTG installation will take place over a period of 15 and 18 months respectively.<br>**Operational and maintenance phase**<br>• Presence of 58 (i.e. 56 x WTG + two x OSP) monopile foundations with base diameter between 7 – 11 m for WTGs and 7-14 m for OSPs and associated scour protection;<br>• Minimum spacing of 500 m between turbine blade tips;<br>• A maximum of 30 vessels on site at any one time providing a maximum of 1,359 vessel return trips per annum for supporting wind farm operations comprised of crew transfer vessels, jack-up vessels, cable repair vessels and other vessels;<br>• A maximum of 485 helicopter movements making return trips per annum for supporting wind farm operations; and<br>• Operational phase of 36.5 years.<br>Decommissioning phase<br>• Disturbance and displacement are anticipated to be similar in nature but of lower magnitude than during the construction phase with limited noise disturbance as no piling during decommissioning. |
| 2. Disturbance and displacement due to increased vessel activity and | ✓ | ✓ | ✓ | **Construction phase**<br>• Installation of 56 Wind Turbine Generators (WTGs) and two Offshore Substation Platforms (OSPs) within the Array Area;<br>• Maximum of one foundation installed at any one time (within any 24 hour period); |

| Potential impact | Phase | | | Project Design Option 1 |
|---|---|---|---|---|
| | C | O | D | |
| infrastructure presence | | | | • Maximum of 69 installation vessels in the Cable Corridor and Working Area at any one time (including 12 installation vessels along the offshore Cable Corridor at any one time and maximum of seven installation vessels in the vicinity of the Landfall at any one time);<br>• Maximum of three helicopters in the Array Area at any one time; and<br>• Maximum construction schedule of 24 hours a day, seven days a week for a maximum construction period of five years. Within this period, OSP and WTG installation will take place over a period of 15 and 18 months respectively.<br>**Operational and maintenance phase**<br>• Presence of 58 (i.e. 56 x WTG + two x OSP) monopile foundations with base diameter between 7 – 11 m for WTGs and 7-14 m for OSPs and associated scour protection;<br>• Minimum spacing of 500 m between turbine blade tips;<br>• A maximum of 30 vessels on site at any one time providing a maximum of 1,359 vessel return trips per annum for supporting wind farm operations comprised of crew transfer vessels, jack-up vessels, cable repair vessels and other vessels;<br>• A maximum of 485 helicopter movements making return trips per annum for supporting wind farm operations; and<br>• Operational phase of 36.5 years.<br>**Decommissioning phase**<br>• Disturbance and displacement are anticipated to be similar in nature but of lower magnitude than during the construction phase with limited noise disturbance as no piling during decommissioning. |
| 3. Disturbance and displacement due to Artificial Lighting at Night (ALAN) | ✓ | ✓ | ✓ | The lighting and marking of WTG and OSP structures will be defined in consultation with the Commissioners of Irish Lights (CIL), Irish Coast Guard (IRCG), the Marine Survey Office (MSO), the Irish Aviation Authority (IAA) and the Department of Defence (DoD). Aviation lighting requirements will be defined in consultation with the IAA, DoD and IRCG, including in relation to Search and Rescue (SAR) lighting requirements. Refer to Volume III, Appendix 25.6: Lighting and Marking Plan.<br>**Construction phase**<br>• Working areas will be marked by a buoyed construction area to alert mariners to the presence of construction activities. Temporary lighting of all structures will be applied, up until the commissioning of the operational lighting and marking scheme;<br>• Installation of 56 Wind Turbine Generators (WTGs) and two OSPs within the Array Area; |

| Potential impact | Phase C | Phase O | Phase D | Project Design Option 1 |
|---|---|---|---|---|
| | | | | • Maximum of 69 installation vessels in the Cable Corridor and Working Area at any one time (including 12 installation vessels along the offshore Cable Corridor at any one time and maximum of seven installation vessels in the vicinity of the Landfall at any one time);<br>• Maximum construction schedule of 24 hours a day, seven days a week for a maximum construction period of five years. Within this period, OSP and WTG installation will take place over a period of 15 and 18 months respectively.<br>**Operational and maintenance phase**<br>• Significant Peripheral Structures (SPS) will exhibit synchronised flashing yellow lights of at least 5 nm nominal range;<br>• Intermediate Periphery Structures (IPS) will exhibit synchronised flashing yellow lights of at least 2 nm nominal range; and<br>• All lights will be exhibited at least at night and when the visibility is reduced to 2 nm or less.<br>**Decommissioning phase**<br>• As above for construction phase. Indirect disturbance and displacement resulting from ALAN are anticipated to be similar in nature but of lower magnitude than during the construction phase. |
| 4. Indirect disturbance and displacement resulting from changes to prey | ✓ | ✓ | ✓ | **Construction phase**<br>• Installation of 56 Wind Turbine Generators (WTGs) and two OSPs within the Array Area;<br>• Maximum of 69 installation vessels in the Cable Corridor and Working Area at any one time (including 12 installation vessels along the offshore Cable Corridor at any one time and maximum of seven installation vessels in the vicinity of the Landfall at any one time);<br>• Maximum construction schedule of 24 hours a day, seven days a week for a maximum construction period of five years. Within this period, OSP and WTG installation will take place over a period of 15 and 18 months respectively.<br>**Operational and maintenance phase**<br>• SPSs will exhibit synchronised flashing yellow lights of at least 5 nm nominal range;<br>• Intermediate Periphery Structures (IPS) will exhibit synchronised flashing yellow lights of at least 2 nm nominal range;<br>• All lights will be exhibited at least at night and when the visibility is reduced to 2 nm or less;<br>**Decommissioning phase**<br>• As above for construction phase. Indirect disturbance and displacement resulting from changes to prey are anticipated to be similar in nature but of lower magnitude than during the construction phase. |

| Potential impact | Phase | | | Project Design Option 1 |
|---|---|---|---|---|
| | C | O | D | |
| 5. Collision and Barotrauma | × | ✓ | × | **Operational and maintenance phase**<br>• Presence of 56 wind turbines within the Array Area;<br>• Hub height of 155 m above Lowest Astronomical Tide (LAT);<br>• Lower blade tip height of 37 m above LAT;<br>• Upper blade tip height of 273 m above LAT; and<br>• Rotor diameter of 236 m.<br>• Average rotation speed (Revolutions per minute (RPM)) 6.34 (WTG model 1a) and 5.73 (WTG model 1b) |

**Table 13.7: Project design parameters and impacts assessed - Project Design Option 2**

| Potential impact | Phase | | | Project Design Option 2 |
|---|---|---|---|---|
| | C | O | D | |
| 1. Disturbance and displacement due to anthropogenic noise | ✓ | ✓ | ✓ | **Construction phase**<br>Disturbance and displacement from construction activity, including increased vessel and helicopter activity:<br>• Installation of 47 Wind Turbine Generators (WTGs) and two OSPs within the Array Area;<br>• Maximum of one foundation installed at Cable Corridor and Working Area at any one time (including 12 installation vessels along the offshore Cable Corridor at any one time and maximum of seven installation vessels in the vicinity of the Landfall at any one time);<br>• Maximum of three helicopters in the Array Area at any one time; and<br>• Maximum construction schedule of 24 hours a day, seven days a week for a maximum construction period of five years. Within this period, OSP and WTG installation will take place over a period of 15 and 18 months respectively.<br>**Operational and maintenance phase**<br>Disturbance and displacement from operational and maintenance activity, including increased vessel and helicopter activity:<br>• Presence of 49 (i.e. 47 x WTG + two x OSP) monopile foundations with base diameter between 7 – 11 m for WTGs and 7-14 m for OSPs and associated scour protection;<br>• Minimum spacing of 500 m between turbine blade tips;<br>• A maximum of 30 vessels on site at any one time providing a maximum of 1,359 vessel return trips per annum for supporting wind farm operations comprised of crew transfer vessels, jack-up vessels, cable repair vessels and other vessels;<br>• A maximum of 485 helicopter movements making return trips per annum for supporting wind farm operations; and<br>• Operational phase of 36.5 years.<br>**Decommissioning phase**<br>• Disturbance and displacement are anticipated to be similar in nature but of lower magnitude than during the construction phase with limited noise disturbance as no piling during decommissioning. |
| 2. Disturbance and displacement due to increased vessel activity | ✓ | ✓ | ✓ | **Construction phase**<br>Disturbance and displacement from construction activity, including increased vessel and helicopter activity:<br>• Installation of 47 Wind Turbine Generators (WTGs) and two OSPs within the Array Area;<br>• Maximum of one foundation installed at any one time (within any 24 hour period); |

| Potential impact | Phase | | | Project Design Option 2 |
|---|---|---|---|---|
| | C | O | D | |
| and infrastructure presence | | | | • Maximum of 69 installation vessels in the Cable Corridor and Working Area at any one time (including 12 installation vessels along the offshore Cable Corridor at any one time and maximum of seven installation vessels in the vicinity of the Landfall at any one time);<br>• Maximum of three helicopters in the Array Area at any one time; and<br>• Maximum construction schedule of 24 hours a day, seven days a week for a maximum construction period of five years. Within this period, OSP and WTG installation will take place over a period of 15 and 18 months respectively.<br>**Operational and maintenance phase**<br>Disturbance and displacement from operational and maintenance activity, including increased vessel and helicopter activity:<br>• Presence of 49 (i.e. 47 x WTG + two x OSP) monopile foundations with base diameter between 7 – 11 m for WTGs and 7-14 m for OSPs and associated scour protection;<br>• Minimum spacing of 500 m between turbine blade tips;<br>• A maximum of 30 vessels on site at any one time providing a maximum of 1,359 vessel return trips per annum for supporting wind farm operations comprised of crew transfer vessels, jack-up vessels, cable repair vessels and other vessels;<br>• A maximum of 485 helicopter movements making return trips per annum for supporting wind farm operations; and<br>• Operational phase of 36.5 years.<br>**Decommissioning phase**<br>• Disturbance and displacement are anticipated to be similar in nature but of lower magnitude than during the construction phase with limited noise disturbance as no piling during decommissioning. |
| 3. Disturbance and displacement due to ALAN | ✓ | ✓ | ✓ | The lighting and marking of WTG and OSP structures will be defined in consultation with the Commissioners of Irish Lights (CIL), Irish Coast Guard (IRCG), the Marine Survey Office (MSO), the Irish Aviation Authority (IAA) and the Department of Defence (DoD). Aviation lighting requirements will be defined in consultation with the IAA, DoD and IRCG, including in relation to Search and Rescue (SAR) lighting requirements.<br>**Construction phase**<br>• Working areas will be marked by a buoyed construction area to alert mariners to the presence of construction activities. Temporary lighting of all structures will be applied, up until the commissioning of the operational lighting and marking scheme; |

| Potential impact | Phase C | Phase O | Phase D | Project Design Option 2 |
|---|---|---|---|---|
| | | | | • Installation of 47 Wind Turbine Generators (WTGs) and two OSPs within the Array Area;<br>• Maximum of 69 installation vessels in the Cable Corridor and Working Area at any one time (including 12 installation vessels along the offshore Cable Corridor at any one time and maximum of seven installation vessels in the vicinity of the Landfall at any one time);<br>• Maximum construction schedule of 24 hours a day, seven days a week for a maximum construction period of five years. Within this period, OSP and WTG installation will take place over a period of 15 and 18 months respectively.<br>**Operational and maintenance phase**<br>• SPSs will exhibit synchronised flashing yellow lights of at least 5 nm nominal range;<br>• Intermediate Periphery Structures (IPS) will exhibit synchronised flashing yellow lights of at least 2 nm nominal range;<br>• All lights will be exhibited at least at night and when the visibility is reduced to 2 nm or less;<br>**Decommissioning phase**<br>• As above for construction phase. Indirect disturbance and displacement resulting from ALAN are anticipated to be similar in nature but of lower magnitude than during the construction phase. |
| 4. Indirect disturbance and displacement resulting from changes to prey | ✓ | ✓ | ✓ | **Construction phase**<br>• Installation of 47 Wind Turbine Generators (WTGs) and two OSPs within the Array Area;<br>• Maximum of 69 installation vessels in the Cable Corridor and Working Area at any one time (including 12 installation vessels along the offshore Cable Corridor at any one time and maximum of seven installation vessels in the vicinity of the Landfall at any one time);<br>• Maximum construction schedule of 24 hours a day, seven days a week for a maximum construction period of five years. Within this period, OSP and WTG installation will take place over a period of 15 and 18 months respectively.<br>**Operational and maintenance phase**<br>• SPSs will exhibit synchronised flashing yellow lights of at least 5 nm nominal range;<br>• Intermediate Periphery Structures (IPS) will exhibit synchronised flashing yellow lights of at least 2 nm nominal range;<br>• All lights will be exhibited at least at night and when the visibility is reduced to 2 nm or less;<br>**Decommissioning phase** |

| Potential impact | Phase | | | Project Design Option 2 |
|---|---|---|---|---|
| | C | O | D | |
| | | | | • As above for construction phase. Indirect disturbance and displacement resulting from changes to prey are anticipated to be similar in nature but of lower magnitude than during the construction phase. |
| 5. Collision and Barotrauma | × | ✓ | × | **Operational and maintenance phase**<br>• Presence of 47 wind turbines within the Array Area;<br>• Hub height of 162 m above Lowest Astronomical Tide (LAT);<br>• Lower blade tip height of 37 m above LAT;<br>• Upper blade tip height of 287 m above LAT; and<br>• Rotor diameter of 250 m.<br>• Average RPM 6.19 |

## 13.6.2 Impacts scoped out of the assessment

13.6.2.1 On the basis of the baseline environment and the description of development outlined in Volume II, Chapter 4: Description of Development, a number of impacts are proposed to be scoped out of the assessment for Offshore bats. These impacts are outlined, together with a justification for scoping them out, in Table 13.8.

**Table 13.8: Impacts scoped out of the assessment for Offshore Bats**

| Potential impact | Justification |
|---|---|
| Lesser horseshoe bats | Due to their limited range within Ireland, no SAC designated for the species and no records of the species within the NBDC or BCI records, it is extremely unlikely that lesser horseshoe bats will be present along the eastern coastline or offshore within the Array Area. It is therefore proposed that this species is scoped out of the EIAR. |
| ALAN disturbance on resident Myotis and long-eared bats and vagrant Brandt's and greater horseshoe bats | All resident Myotis and long-eared bats along with the vagrant species Brandt's and greater horseshoe are light-sensitive (light-averse) species that have shown to significantly reduce in activity levels and avoid areas that are illuminated with white and amber lighting (Guidance Note GN08/23). While Myotis and long-eared bats have been recorded roosting within the study area (within 5 km of the coastline), the roosts are outside of the potential light spill area of the ALAN from the Array Area, Cable Corridor and Working Area. The results of the offshore survey also do not indicate that the Myotis and long-eared species forage offshore. There are also no records of the vagrant species within the study area.<br>While the lighting is visible from the coastline during all phases of the Proposed Development, the aversion to light for each of the species is stronger than the potential draw from the Proposed Development, therefore, the lighting is acting more like a deterrent (section 13.8.3, Impact 3) than an attractor.<br><br>It is therefore proposed that resident Myotis and long-eared species and the vagrant species Brandt's and greater horseshoe are scoped out of the assessment for this impact. |
| Indirect disturbance and displacement resulting from changes to prey on resident Myotis and long-eared bats and vagrant Brandt's and greater horseshoe bats | As stated above, all resident Myotis and long-eared and the vagrant species Brandt's and greater horseshoe are light-averse and have shown to significantly reduce in activity levels when areas are illuminated with white and amber lighting (Guidance Note GN08/23). As the disturbance and displacement resulting from changes to prey is likely an indirect impact associated with ALAN (section 13.8.4, Impact 4) and Myotis and long-eared species and vagrant species have been scoped out of the assessment for ALAN (see above). It can also be assumed that the deterrent from the lighting of the Proposed Development outweighs the attraction of any potential prey concentration; therefore, it is unlikely these species will be in the Array Area, Cable Corridor and Working Area during the lifetime of the Proposed Development.<br>It is therefore proposed that resident Myotis and long-eared species and the vagrant species Brandt's and greater horseshoe are scoped out of the assessment for this impact. |

| Potential impact | Justification |
|---|---|
| Collision and Barotrauma | As stated above, all resident Myotis and long-eared and the vagrant species Brandt's and greater horseshoe are light-averse and have shown to significantly reduce in activity levels when areas are illuminated with white and amber lighting (Guidance Note GN08/23). As the Proposed Development will be lit for the hours of darkness, it is assumed the deterrent from the lighting of the Proposed Development outweighs the any attraction and therefore, it is unlikely these species will be in the Array Area, Cable Corridor and Working Area during the lifetime of the Proposed Development. Therefore, there is no potential for impacts from collision and barotrauma to these species.<br>It is proposed that resident Myotis and long-eared species and the vagrant species Brandt's and greater horseshoe are scoped out of the assessment for this impact. |

## 13.6.3 Methodology for assessing the significance of effects

### Overview

13.6.3.1 The general approach for the EIAR methodology is set out in Volume II, Chapter 5. As the subject is new to Environmental Impact Assessments in Ireland, and there are many unknowns with regards to sensitivity and magnitude of effects on bat species in the offshore environment, it is determined that the CIEEM approach to impact assessment be used to establish significance of effects on offshore bats (Table 13.1). The following list provides a summary of the process for undertaking an ecological impact assessment (EcIA), as detailed in the CIEEM guidance document:

- Scoping: Determining the matters to be addressed in the EcIA, including consultation to ensure the most effective input to defining the scope;
- Establishing the baseline: Collecting information and describing the ecological conditions in the absence of the proposed project, to inform the assessment of impacts;
- Important Ecological Features: Identifying Important Ecological Features (habitats and species) that may be affected, with reference to a geographical context in which they are considered important;
- Impact assessment: An assessment of whether Important Ecological Features may be subject to potential impacts and characterisation of these impacts and their effects. Assessment of potential residual ecological impacts of the project remaining after mitigation and the significance of their effects, including cumulative effects;
- Avoidance, mitigation, compensation and enhancement: Incorporating measures to avoid, reduce and/or compensate potential ecological impacts, and the provision of ecological enhancements; and
- Monitoring: Monitoring impacts of the development and evaluation of the success of proposed mitigation, compensation, and enhancement measures.

#### IDENTIFYING ECOLOGICAL FEATURES WITHIN THE ZONE OF INFLUENCE (ZOI)

13.6.3.2 Information obtained during the field surveys identified ecological features which have the potential to be affected by the Proposed Development and as such, occur within the Zone of Influence (ZoI) of the Proposed Development.

13.6.3.3 The ZoI depends on the type of development taking place, its likely impacts and the presence of ecological connections which enable such impacts to affect sensitive ecological features. The ZoI may extend a great distance (several kilometres) beyond the boundaries of the Proposed

Development site, due to the presence of ecological connections with an ecological feature of interest. Similarly, ecological features that have no ecological connection with the Proposed Development are not within its ZoI, regardless of their proximity to the Proposed Development, as no pathway for impacts exists.

13.6.3.4 The ZoI has been determined as the study area for the Proposed Development (section 13.4). This is due to the potential ecological connectivity of the ecological features (in this case the bat species) and the Proposed Development.

### EVALUATING ECOLOGICAL FEATURES WITHIN THE ZOI

13.6.3.5 Those ecological features which occur within the ZoI such as nature conservation sites, habitats, or species of fauna, are then evaluated in geographic hierarchy of importance. The categories and criteria used for this evaluation with regards to bats species are listed in Table 13.9.

**Table 13.9: Geographic frame of reference used to determine ecological value. Source: Adapted from CIEEM (2018, updated 2022) for bats only**

| Importance | Criteria |
|---|---|
| International Importance | 'European Sites' including Special Areas of Conservation (SACs), Sites of Community Importance (SCIs), or Special Protection Areas (SPAs), candidate Special Areas of Conservation (cSACs) or candidate Special Protection Area (cSPAs).<br>Resident or regularly occurring populations (assessed to be important at the national level) of the following:<br>Species of animal and plants listed in Annex II and/or IV of the Habitats Directive.<br>World Heritage Site (Convention for the Protection of World Cultural and Natural Heritage, 1972).<br>Site hosting significant species populations under the Bonn Convention (Convention on the Conservation of Migratory Species of Wild Animals, 1979).<br>Site hosting significant populations under the Berne Convention (Convention on the Conservation of European Wildlife and Natural Habitats, 1979). |
| National Importance | Sites, habitats, and species populations of importance in a national context.<br>Undesignated site fulfilling the criteria for designation as an NHA, Statutory Nature Reserve, Refuge for Fauna and Flora protected under the Wildlife Act, and/or a National Park.<br>Refuge for Fauna and Flora protected under the Wildlife Acts.<br>Resident or regularly occurring populations (assessed to be important at the national level in Ireland) of the following:<br>Species protected under the Wildlife Acts; and/or<br>Species listed on the relevant Red Data list. |
| County / Regional Importance | Resident or regularly occurring populations (assessed to be important at the County level) of the following:<br>• Species of animal and plants listed in Annex II and/or IV of the Habitats Directive<br>• Species protected under the Wildlife Acts Ireland); and/or<br>• Species listed on the relevant Red Data list.<br>• County important populations of species, or viable areas of semi-natural habitats, or natural heritage features identified in the National or Local Biodiversity Action Plan (LBAP), if this has been prepared.<br>• 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.<br>• Sites containing habitats and species that are rare or are undergoing a decline in quality or extent at a national level. |

| Importance | Criteria |
|---|---|
| Local Importance (Higher Value) | Locally important populations of priority species or habitats or natural heritage features identified in the LBAP, if this has been prepared.<br>Resident or regularly occurring populations (assessed to be important at the Local level) of the following:<br>• Species of animal and plants listed in Annex II and/or IV of the Habitats Directive<br>• Species protected under the Wildlife Acts; and/or<br>• Species listed on the relevant Red Data list.<br>• 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.<br>• 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. |

13.6.3.6 The status of a species requiring protection at an international level does not necessarily impose an international conservation value on any single example of that species found at the site. Approaches to attributing nature conservation value to species have been previously developed for some species groups such as birds and bats. The approach to attributing nature conservation value to bat populations and foraging habitats is drawn from Wray *et al.* (2010).

### SUMMARY OF IMPORTANT ECOLOGICAL FEATURES

13.6.3.7 Table 13.10 summarises Important Ecological Features (IEFs) that have been identified as at risk of potentially likely significant impacts via a source-pathway-receptor link. For the purposes of this chapter the IEFs are all bat species. Important Ecological Features are valued as local importance (higher) or above per the criteria set out in Table 13.9.

**Table 13.10: Valuation of IEFs**

| Feature | Highest Evaluation / Importance | Important Ecological Feature? |
|---|---|---|
| Common pipistrelle | National | Yes |
| Soprano pipistrelle | National | Yes |
| Nathusius' pipistrelle | National | Yes |
| Leisler's bat | National | Yes |
| Brown long-eared bat | National | Yes |
| Daubenton's bat | National | Yes |
| Whiskered bat | National | Yes |
| Natterer's bat | National | Yes |
| Brandt's bat | International | Yes |
| Greater Horseshoe bat | International | Yes |

13.6.3.8 Based on bat behaviour as outlined in the literature review, their reported occurrence offshore, and also taking into account species' sensitivity to onshore wind farms (NatureScot, 2021), species identified as being at possible risk of impact from the Proposed Development are identified in Table 13.11.

**Table 13.11: Bat species identified as being at possible risk of impact from the Proposed Development, based on species ecology and distribution (adapted from Wray *et al.* (2010) using data from the Irish Bat Monitoring Programme 2018-2021)**

| Feature | Migration | Collision Risk from onshore wind farm | Recorded offshore in the North Sea/ Irish Sea | Risk from offshore wind farm |
|---|---|---|---|---|
| Common pipistrelle | Regional | High | Yes | Yes |
| Soprano pipistrelle | Potential Regional (Lindecke *et al.*, 2019) | High | No | Yes |
| Nathusius' pipistrelle | Long distance | High | Yes | Yes |
| Leisler's bat | Long distance | High | Yes | Yes |
| Brown long-eared bat | Sedentary | Low | No | No |
| Daubenton's bat | Regional | Low | Yes | No |
| Whiskered bat | Regional | Low | No | No |
| Natterer's bat | Sedentary | Low | No | No |
| Brandt's bat | Regional | Low | No | No |
| Greater Horseshoe bat | Sedentary | Low | No | No |

## 13.6.4 Impact assessment criteria

13.6.4.1 When describing ecological impacts, reference is made to the following characteristics:

- Positive or negative;
- Extent
  - The extent is the spatial or geographical area over which the impact/effect may occur under a suitably representative range of conditions (e.g. noise transmission under water).
- Magnitude
  - Magnitude refers to size, amount, intensity and volume. It should be quantified if possible and expressed in absolute or relative terms e.g. the amount of habitat lost, percentage change to habitat area, percentage decline in a species population.
- Duration
  - Duration should be defined in relation to ecological characteristics (such as the lifecycle of a species) as well as human timeframes. For example, five years, which might seem short-term in the human context or that of other long-lived species, would span at least five generations of some invertebrate species.

- Timing
  - The timing of an activity or change may result in an impact if it coincides with critical life-stages or seasons e.g. bat breeding season.
- Frequency
  - The number of times an activity occurs will influence the resulting effect. For example, a single person walking a dog will have very limited impact on nearby waders using wetland habitat, but numerous walkers will subject the waders to frequent disturbance and could affect feeding success, leading to displacement of the birds and knock-on effects on their ability to survive.
- Reversibility
  - An irreversible effect is one from which recovery is not possible within a reasonable timescale or there is no reasonable chance of action being taken to reverse it. A reversible effect is one from which spontaneous recovery is possible or which may be counteracted by mitigation. In some cases, the same activity can cause both reversible and irreversible effects.

13.6.4.2 However, the assessment only needs to describe those characteristics relevant to understanding the ecological effect and determining the significance; and as such does not need to incorporate all stated characteristics (CIEEM, 2018; updated 2022).

#### SIGNIFICANCE OF EFFECT

13.6.4.3 For the purpose of EcIA, a significant effect is an effect that either supports or undermines biodiversity conservation objectives for those ecological features which have been identified as being an important feature of the site i.e., IEFs. Conservation objectives may be specific (e.g., for a designated site) or broader at a plan level (e.g., national/local nature conservation policy). As such effects can be considered significant in a wide range of geographic scales from international to local. Consequently, significant effects are qualified with reference to the appropriate geographic scale (CIEEM, 2018; updated 2022).

### 13.6.5 Factored-in measures

13.6.5.1 The Project Design Options set out in Volume II, Chapter 4: Description of Development includes a number of designed-in measures and management measures (or controls) which have been factored into the Proposed Development and are committed to be delivered by the Developer as part of the Proposed Development.

13.6.5.2 These factored-in measures are standard measures applied to offshore wind development, including lighting and marking of the Proposed Development, use of ‘soft-starts’ for piling operations etc, to reduce the potential for impacts.

13.6.5.3 There are a number of factored-in measures that have been implemented through the design development process to reduce impacts on birds (refer to Chapter 12: Offshore Ornithology) which may potentially benefit bats and are presented in Table 13.12. This includes specific number of WTGs and the increase in the minimum lower blade tip height.

13.6.5.4 These measures are integrated into the description of development and have therefore been considered in the impact assessment. These measures are considered standard industry practice for this type of development. This approach is in line with EPA guidance which states that ‘in an EIAR it may be useful to describe avoidance measures that have been integrated into the proposed proposal’ (EPA, 2022).

**Table 13.12: Factored in measures**

| Factored in measures | Justification |
|---|---|
| Number of wind turbines of 56 for Project Design Option 1 and 47 for Project Design Option 2. | The number of wind turbines has been refined to minimise the potential collision risk impacts (see Chapter 3: Consideration of Alternatives). |
| Lower blade tip height of 37 m above LAT for Project Design Option 1 and Project Design Option 2. | Minimises potential bat collision risks since most activity occurs below 40m. |
| Rehabilitation Schedule | Sets out the proposed rehabilitation activities. This includes the dismantling of the WTGs and removal of artificial lighting, which removes all potential for impacts to bats. |
| The Developer confirms and commits that it will not carry out any works in respect of the Proposed Development under the planning permission (if granted) at the same time as any activities the subject of the Foreshore Licence for Site Investigations (FS007339). | The Developer was granted a Foreshore Licence (FS007339) for Site Investigations (associated with the Proposed Development) from the Minister for Housing, Local Government and Heritage in May 2022.<br><br>The Developer confirms and commits that it will not carry out any works in respect of the Proposed Development under the planning permission (if granted) at the same time as any activities the subject of the Foreshore Licence for Site Investigations (FS007339) being carried out.<br><br>As such there is no temporal overlap between the activities consented in this Foreshore Licence and the Proposed Development and there will be no potential for cumulative effects. |
| The Developer confirms and commits that it will not carry out any works in respect of the Proposed Development under the planning permission (if granted) at the same time as any activities the subject of the Foreshore Licence Application for Site Surveys FS007555 (should a licence be granted) are being carried out. | The Developer submitted a Foreshore Licence Application for Site Surveys to the Minister for Housing, Local Government and Heritage in April 2023 (FS007555) and this application is pending determination.<br><br>The Developer confirms and commits that it will not carry out any works in respect of the Proposed Development under the planning permission (if granted) at the same time as any activities the subject of the Foreshore Licence Application for Site Surveys FS007555 (should a licence be granted) are being carried out.<br><br>As such there is no temporal overlap between the activities proposed in the Foreshore Licence Application and the Proposed Development. |

## 13.7 Assessment of the significance of effects

13.7.1.1 The impacts of the construction, operational and maintenance and decommissioning phases of both Project Design Options forming the Proposed Development have been assessed on Offshore bats. The potential impacts arising from the construction, operational and maintenance and decommissioning phases of the Proposed Development are listed in Table 13.6 and Table 13.7, along with the project parameters against which each impact has been assessed.

13.7.1.2 A description of the potential effect on Offshore bats caused by each identified impact is provided below in section 13.8. Where an individual species (refer to Table 13.11) is not assessed the bat group e.g. migrating or foraging, as per the literature review are assessed.

# 13.8 Assessment of Project Design Options 1 and 2

## 13.8.1 Impact 1 – Direct disturbance and displacement due to anthropogenic noise

### Construction phase

13.8.1.1 Anthropogenic noise associated with offshore wind construction, including noise from pile-driving and other construction activities such as vessel and helicopter use, has the potential to disturb or displace offshore bats present within the Array Area due to:

- auditory impacts; and/or
- habitat-related impacts.

13.8.1.2 Auditory impacts to offshore bats are most likely to be caused by pile-driving activities, vessel movements (in the Array Area, Cable Corridor and Working Area, and the Landfall) and helicopter movements during construction. Noise from pile driving for Project Design Option 1 would occur during the installation of 58 foundations (for WTGs and OSPs) and for Project Design Option 2 during the installation of 49 foundations (for WTGs and OSPs) at a frequency of three hours per day (average) over 75 days for Project Design Option 1 and 63 days for Project Design Option 2 and 4 days for both OSPs. The activity would be temporary and highly localised.

13.8.1.3 Noise from vessel movements will be for a total of 4,150 trips (including return) across the construction period. Noise from helicopter movements will be for a total of 294 trips (including return) across the construction period. Helicopters will be used for crew and equipment transfer during daytime hours and only used at night for emergencies. Therefore, the activity would be temporary and highly localised.

13.8.1.4 Auditory impacts to offshore bats are not expected to occur, as recent research has shown that bats may be less sensitive to temporary threshold shifts than other terrestrial mammals (Simmons *et al.,* 2016). Furthermore, due the low numbers of bats anticipated to be within the cable corridor and array area, it is unlikely that bats will be disturbed or displaced.

13.8.1.5 Habitat-related impacts (i.e., displacement from potential migration routes and foraging areas) could occur in response to noise from construction activities which could cause avoidance behaviour in individual migrating and foraging bats (Schaub *et al.,* 2008, Luo *et al.,* 2015). Behavioural avoidance is more likely to occur during times of pile-driving and construction activities between the Array Area and land.

13.8.1.6 These impacts are unlikely to occur or be significant to migrating species or foraging species due to the low numbers of bats anticipated to be within the Cable Corridor and Working Area during migration periods, spring (April–May) and autumn (August–October). Refer to Appendix 13.2 and 13.1, identifying low bat activity within the offshore surveys. Five bat calls recorded within the autumn migration season during the 2022 offshore surveys and six bat calls recorded outside the migration season during the 2023 offshore surveys.

13.8.1.7 The potential for disturbance and displacement impact on offshore bats during construction due to noise has been assessed as temporary and localised in extent. Therefore, **no significant effects** would be expected to occur as a result of disturbance and displacement due to anthropogenic noise associated with Project Design Option 1. The same conclusion has been reached for Project Design Option 2 of the Proposed Development.

## Operational and maintenance phase

13.8.1.8 The operational and maintenance activities will require a variety of different vessels including crew transfer vessels, jack-up vessels, cable repair vessels and other vessels. The maximum number of vessel return trips per annum, for supporting operation and maintenance activities, will be 1,359. Helicopters will also be used for operational and maintenance activities with a maximum of 485 return trips per annum. Helicopters will be used for crew and equipment transfer during daytime hours and only used at night for emergencies. Therefore, the activity would be temporary and highly localised.

13.8.1.9 Habitat-related impacts (i.e., displacement from potential migration routes and foraging area) could occur in response to noise from operational and maintenance activities which could cause avoidance behaviour in individual migrating and foraging bats (Schaub *et al.,* 2008, Luo *et al.,* 2015). Behavioural avoidance is more likely to occur during the times of operation and maintenance activities such as vessel movements between the Array Area and land.

13.8.1.10 These impacts are unlikely to occur or be significant as operation and maintenance activities and helicopter movements will be restricted to daylight hours with helicopter movements only being required during darkness in emergencies. Therefore, activity would be temporary and highly localised. Furthermore, recent research has shown that bats may be less sensitive to temporary noise shifts than other terrestrial mammals (Simmons *et al.,* 2016).

13.8.1.11 Therefore, **no significant effects** would be expected to occur as a result of disturbance and displacement due to anthropogenic noise associated with Project Design Option 1.The same conclusion has been reached for Project Design Option 2 of the Proposed Development.

## Decommissioning Phase

13.8.1.12 The decommissioning phase will give rise to similar impacts regarding anthropogenic noise as that of the construction phase with the exception of piling activities. However, the impacts from infrastructure presence will be a complete reverse to that of the construction phase as WTGs and OSPs will be removed as part of the decommissioning phase. As these potential impacts have been ruled out for significant effects during the construction phase and with the implementation of the Rehabilitation Schedule (Volume III, Appendix 4.1), no significant effects would be expected to occur as a result of direct disturbance and displacement due to anthropogenic noise during decommissioning associated with Project Design Option 1. The same conclusion has been reached for Project Design Option 2 of the Proposed Development.

### PROPOSED MITIGATION

13.8.1.13 **No significant effect** has been identified, therefore no mitigation measures are required or proposed.

### RESIDUAL EFFECT ASSESSMENT

13.8.1.14 No mitigation is proposed for this potential impact; therefore, the residual effect remains as **no significant effects** would be expected to occur as a result of disturbance and displacement due to anthropogenic noise associated with Project Design Option 1. The same conclusion has been reached for Project Design Option 2 of the Proposed Development.

### MONITORING

13.8.1.15 The Proposed Development is committed to participating in the ECMG, to discuss and agree potential strategic monitoring initiatives in relation to offshore bats. The need for strategic monitoring, and the level of participation by individual projects, will be determined by the conclusions of the EIAR process, in consultation with statutory and technical stakeholders, and with a focus on validation and evidence gathering.

### 13.8.2 Impact 2 – Direct disturbance and displacement due to increased vessel activity and infrastructure presence

#### Construction phase

13.8.2.1 The construction activities will require a total of 4,150 vessel trips (including return) across the construction period for each Project Design Option. This will include vessels during the foundation (WTG/OSP) installations, and cable installation phases, along with movement of personnel. There will be a maximum of 69 installation vessels in the Array Area at any one time (including 12 installation vessels along the Cable Corridor and Working Area at any one time, and maximum of seven installation vessels in the vicinity of the Landfall at any one time) for each Option. Refer to the Chapter 4: Description of Development for full list of vessel requirements.

13.8.2.2 Increased vessel activity and infrastructure presence during construction has the potential to disturb or displace offshore bats present due to obstruction or change in flightpaths impacts. The presence of large infrastructure in areas where none had been previously could cause migrating or foraging bats to potentially change course and expend more energy in doing so. This could lead to expenditure of food reserves and incomplete migration of individual bats.

13.8.2.3 It is also possible that some bats may encounter, or perhaps be attracted to, the working area during construction, due to the presence of vessels and non-operational WTG towers to opportunistically roost or forage (Brabant *et al.*, 2019) as they have been observed doing on offshore oil rigs (Russ, 2001; Boshamer and Bekker, 2008; Peterson *et al.,* 2014; BSG ,2015). Refer also to Impacts 4 and 5 below.

13.8.2.4 While some potential exists for migrating bats, and opportunistic bats for roosting and foraging, to encounter large infrastructure including non-operating WTGs and the vessels used for installing the WTGs, unlike with terrestrial infrastructure, there are no landscape features that would concentrate bats in a particular direction (Baerwald and Barclay, 2009; Cryan and Barclay, 2009; Smith and McWilliams, 2016; Kirkpatrick *et al.,* 2017; Fitch *et al.,* 2020) and thereby increase exposure to the large infrastructure. Furthermore, with the proposed spacing between structures of up to 1km, individual bats migrating over the Array Area would likely pass between large infrastructure (WTGs and installation vessels) with only slight course alterations, if any, to avoid the infrastructure or vessels (stationary or moving).

13.8.2.5 The potential for disturbance and displacement impact on offshore bats during construction due to increased vessel activity and infrastructure presence has been assessed as temporary, restricted in duration and localised in extent. It is also expected that for the very low number of bats that may be present within the Cable Corridor and Working Area and Array Area, there will be insignificant responses to impacts from increased vessel activity and infrastructure presence by the bats.

13.8.2.6 Therefore, **no significant effects** would be expected to occur as a result of disturbance and displacement due to increased vessel activity and infrastructure presence associated with Project Design Option 1. The same conclusion has been reached for Project Design Option 2 of the Proposed Development.

#### Operational and maintenance phase

13.8.2.7 Project Design Option 1 will have a presence of 58 structures (56 WTGs and two OSPs) and Project Design Option 2 will have a presence of 49 structures (47 WTGs and two OSPs) for a duration of 36.5 years. For each Project Design Option, the WTGs will have a minimum spacing of 500m between turbine blade tips.

13.8.2.8 While some potential exists for migrating bats and opportunistic bats for roosting and foraging, to encounter operating WTGs during migration, unlike with terrestrial migration routes, there are no landscape features that would concentrate bats in a particular direction and thereby increase exposure to the operational WTGs. Furthermore, with the proposed spacing of structures within

the Array Area (for Project Design Option 1 and Project Design Option 2), individual bats migrating over the Array Area would likely pass between WTGs with only slight course alterations, if any, to avoid WTGs.

13.8.2.9 Given the localised stature of the WTGs, the slower rotation speeds during optimal migration conditions compared to onshore developments, the distance between WTGs, the low numbers of bats anticipated to be migrating within the Array Area, and the bats' echolocation abilities and agility, it is unlikely that the WTGs would displace migrating individuals.

13.8.2.10 Therefore, **no significant effects** would be expected to occur as a result of disturbance and displacement due to increased vessel activity and infrastructure presence associated with Project Design Option 1. The same conclusion has been reached for Project Design Option 2 of the Proposed Development.

### Decommissioning Phase

13.8.2.11 The decommissioning phase will give rise to similar impacts regarding vessel presence as that of the construction phase with the exception of piling activities. However, the impacts from infrastructure presence will be a complete reverse to that of the construction phase as WTGs and OSPs will be removed as part of the decommissioning phase. As these potential impacts have been ruled out for significant effects during the construction phase and with the implementation of the Rehabilitation Schedule (Volume III, Appendix 4.1), **no significant effects** would be expected to occur as a result of direct disturbance and displacement due to increased vessel activity and infrastructure presence during decommissioning associated with Project Design Option 1. The same conclusion has been reached for Project Design Option 2 of the Proposed Development.

#### PROPOSED MITIGATION

13.8.2.12 **No significant effect** has been identified, therefore no mitigation measures are required or proposed.

#### RESIDUAL EFFECT ASSESSMENT

13.8.2.13 No mitigation is proposed for this potential impact. Therefore, the residual effect remains as **no significant effects** would be expected to occur as a result of disturbance and displacement due to increased vessel activity and infrastructure presence associated with Project Design Option 1. The same conclusion has been reached for Project Design Option 2 of the Proposed Development.

#### MONITORING

13.8.2.14 The Proposed Development is committed to participating in the ECMG, to discuss and agree potential strategic monitoring initiatives in relation to offshore bats. The need for strategic monitoring, and the level of participation by individual projects, will be determined by the conclusions of the EIAR process, in consultation with statutory and technical stakeholders, and with a focus on validation and evidence gathering.

## 13.8.3 Impact 3 – Disturbance and displacement due to Artificial Lighting at Night (ALAN)

### Construction phase

13.8.3.1 Lights on WTG or associated infrastructure and vessels during construction may directly or indirectly contribute to increased bat activity. For example, bats may orient towards or away from light of certain wavelengths during migration (Guidance Note GN08/23) or be attracted by insect

concentrations near illuminated areas. Indirect disturbance and displacement resulting from changes to prey is covered in Impact 4 – Indirect disturbance and displacement resulting from changes to prey and not repeated here. Displacement of bats from natural communities or habitats onshore, due to attraction to the Array Area, Cable Corridor and Working Area from ALAN, could therefore lead to physical deterioration and potential death of relevant bat species due to energy expenditure in undertaking the displacement activity.

13.8.3.2 For bats, artificial lighting is also thought to increase the chances of predation by avian predators, therefore, in lit areas bats modify their behaviour, potentially in response to this threat. Predators of Nathusius' pipistrelle and other insectivorous bats include several species of owls, diurnal raptors, gulls, and crows (Speakman, 1991; Sieradzki and Mikkola, 2020). Predation risk is likely to increase with more lit areas at sea including the WTGs and OSPs and lit areas on the coast including the Landfall location (temporary for up to 3 months) since bats become more visible. It should be noted however that the risk is much smaller within the offshore environment than onshore.

13.8.3.3 For several years, studies have recorded that faster-flying species can congregate around white light sources (Guidance Note GN08/23), species such as: noctule; Leisler's; and pipistrelle. This is particularly true for light sources with ultra-violet spectrum light. This is a problem especially if it is a single light source in a dark area, as would be the case within the Array Area, Cable Corridor and Working Area, as it creates a 'vacuum effect', denuding the surrounding area of invertebrate prey and pulling the bats from their natural foraging locations.

13.8.3.4 While vessel lighting is not as bright as offshore platform lighting apart from the spotlights needed for WTG installation (if required during night-time hours), there will be a maximum of 69 installation vessels in the Array Area, Cable Corridor and Working Area at any one time, with a maximum construction schedule of 24 hours a day, seven days a week for the duration of the construction phase of five years. Furthermore, all structures will be illuminated with temporary lighting up until the commissioning of the operational lighting.

13.8.3.5 During the 2021, 2022 and 2023 offshore surveys, common pipistrelle and Leisler's bats were recorded within the Array Area (refer to Appendix 13.1, 13.2, and 13.3). The presence of common pipistrelle (albeit in low numbers – three passes in 2022 and two passes in 2023) would indicate that the species does commute/ forage to an approximate distance of 8 km (shortest distance between the offshore survey area/Array Area and shore). This could also be said of the Leisler passes, as they occurred outside the known migration periods.

13.8.3.6 While the potential for displacement of bats to the Cable Corridor and Working Area and Array Area during construction due to the presence of artificial lighting is low, there is little evidence to suggest that bats are attracted to artificial lighting alone (refer to Impact 4 – Indirect disturbance and displacement resulting from changes to prey) on vessels in the offshore environment. Furthermore, if lighting is needed for emergency repairs/maintenance during the hours of darkness, the temporary use would not be expected to attract significant numbers for offshore foraging or migrating species.

13.8.3.7 It is also recognised that alternative attraction locations exist within the study area, including works at the Landfall site (although temporary for maximum of nine months) and other existing infrastructure with lighting (such as lighthouses), further reducing the likelihood of bats travelling to the Cable Corridor and Working Area and the Array Area. Also, should the bats encounter offshore vessels and infrastructure, it is assumed that bat echolocation abilities and agility will ensure they avoid the infrastructure or vessels (stationary or moving).

13.8.3.8 Therefore, in the unlikely scenario that large numbers of bats from the mainland coast attempt foraging within the Cable Corridor and Working Area during construction (2023 results show 0.0016% of passes identified during the survey were offshore), unless they are moving from WTG to WTG or vessel to WTG, etc, to investigate the lighting with no return to a roosting location, the

distance is commutable and they will be able to return to their roosts without the energy expenditure from the displacement activity significantly compromising individuals.

13.8.3.9 Therefore, **no significant effects** would be expected to occur from displacement of foraging bat species from the mainland because of ALAN within the Cable Corridor and Working Area and Array Area during the construction phase associated with Project Option 1. The same conclusion has been reached for Project Option 2 of the Proposed Development.

13.8.3.10 While a precautionary approach is taken, assuming migrating species are within the area of the Proposed Development, it should be noted that migrating Nathusius' pipistrelle are more likely to show avoidance behaviour, that could be a result of optimization strategies, when performing long-distance migratory flights, reducing the potential for impacts from the Proposed Development (Marggraf *et al.,* 2023). Also, Leisler's bat can fly faster than Nathusius' pipistrelle, often exceeding 40 km per hour (Shiel *et al.,* 2006), meaning they are more likely to reach Landfall quicker, and forage in familiar habitats including pasture, drainage canals, lake and conifer forest, estuary, stream, beach and dunes, which are located within the study area The distance between the Brittas survey location and Aberdaron, Pwllheli, UK is approximately 90 km.

13.8.3.11 Therefore, **no significant effects** would be expected to occur from displacement of migrating species, as a result of ALAN within the Array Area, Cable Corridor and Working Area during the construction phase associated with Project Design Option 1. The same conclusion has been reached for Project Design Option 2 of the Proposed Development.

### Operational and maintenance phase

13.8.3.12 As detailed above, lights on WTGs and vessels during operation may directly or indirectly contribute to increased bat activity within the Array Area. For example, bats may orient towards light of certain wavelengths during migration which could lead to physical deterioration and potential death of bat species due to energy expenditure in undertaking the displacement activity.

13.8.3.13 During the operational and maintenance phase the SPS and IPS will exhibit synchronised flashing yellow lights of at least 5 nm and 2 nm nominal range respectively. All lights will be visible from all directions and exhibited at the same height (i.e. between 6 and 30 m above highest astronomical tide (HAT) and below the arc of the lowest WTG blades) and at least at night. Aviation lighting requirements will be defined in consultation with the IAA, DoD and IRCG, including in relation to Search and Rescue (SAR) lighting requirements.

13.8.3.14 Although a 2014 study by Bennett and Hale states that bats are not attracted to aviation lighting, further studies have shown bat attraction to red light for migratory species including Nathusius' pipistrelle (Voigt 2018, ILP-GN 08/23). Conversely, several studies, most of which were conducted at wind energy facilities, reported no relationship between bat activity or mortality with the presence or absence of red light for some bat species (Guest *et al.,* 2022).

13.8.3.15 During the 2021, 2022 and 2023 surveys, common pipistrelle and Leisler's bats were recorded at the monopile location within the Array Area (refer to Appendix 13.1, 13.2, and 13.3). The presence of common pipistrelle would indicate that the species does commute/ forage to an approximate distance of 8 km (shortest distance between the monopile and shore). This could also be said of the Leisler passes, as they occurred outside the known migration periods in 2023 and foraging buzzes were recorded during the 2021 survey for both species.

13.8.3.16 While the overall effect of ALAN on bats has demonstrated variable responses across numerous species, regarding research conducted at both onshore and offshore wind farms, artificial lights do not appear to be the primary cause of bat attraction to WTG (Voigt 2018, ILP-GN 08/23). However, it cannot be distinguished, at this stage, as to whether the bats were attracted to the monopile due to artificial lighting or prey distribution (refer to Impact 4 – Indirect disturbance and displacement resulting from changes to prey). According to 2022 and 2023 monitoring records Leisler's bat and common pipistrelle are present within the Array Area.

13.8.3.17 The potential for displacement of bats from the mainland to the Array Area during the operation of the Proposed Development due to the presence of ALAN would be permanent during the operational life of the Proposed Development. SPS structures will be visible from the mainland (refer to Volume III, Appendix 17.3 and 17.4: Seascape and Landscape Visual Impact Assessment Viewpoint Visualisations) and bats have been identified present within the Array Area (refer to Appendix 13.1, 13.2, and 13.3). However, artificial lighting on vessels are unlikely to attract bat species as these will be significantly less visible from the mainland.

13.8.3.18 Furthermore, it is recognised that alternative attraction locations exist within the study area including lighthouses, further reducing the likelihood of bats travelling to the Array Area and that, should bats encounter offshore vessels and stationary infrastructure with lighting (i.e., the OSPs), it is assumed that bat echolocation abilities and agility will ensure they avoid stationary infrastructure and moving vessels.,

13.8.3.19 While attraction cannot be ruled out and therefore the displacement of individuals to the Array Area, unless they are moving from WTG to WTG to investigate the lighting with no return to a roosting location, leading to further physical deterioration and potential death of bat species due to energy expenditure in undertaking the displacement activity, there will be **no significant effect** on the individuals. Furthermore, the distance to the array area is commutable, as discussed in the Literature review and shown in the survey results, for the species assumed to be drawn to forage within the array area.

13.8.3.20 Therefore, **no significant effects** would be expected to occur to foraging bat species as a result of ALAN within the Array Area during the operational and maintenance phase associated with Project Design Option 1. The same conclusion has been reached for Project Design Option 2 of the Proposed Development.

13.8.3.21 During the 2022 and 2023 surveys, there are no records of migratory species Nathusius' pipistrelle or Leisler's bat at the offshore survey location, during the recognised migration periods. The species have however, been recorded present at the headland locations. As stated in the literature review, the migratory species will travel along the coast foraging and waiting favourable weather conditions before embarking on migration, therefore the absence of data for these species during the offshore surveys does not mean absence of species within the rest of the Array Area. It may just mean that the migrating bats were not within detection range.

13.8.3.22 While a precautionary approach is taken, assuming migrating species are within the Array Area, it should be noted that migrating Nathusius pipistrelle are more likely to show avoidance behaviour due to optimisation strategies when performing long-distance migratory flights, and Leisler's bat can fly longer distances faster than Nathusius' pipistrelle, meaning they are more likely to reach landfall quicker and forage in familiar habitats (Marggraf *et al.,* 2023 and Shiel, 2006).

13.8.3.23 Therefore, **no significant effects** would be expected to occur from displacement of migrating species as a result of ALAN within the Array Area during the operational and maintenance phase associated with Project Design Option 1. The same conclusion has been reached for Project Design Option 2 of the Proposed Development.

### Decommissioning Phase

13.8.3.24 The decommissioning phase will give rise to similar impacts regarding ALAN as that of the construction phase. However, the impacts from infrastructure presence will be a complete reverse to that of the construction phase as WTGs and OSPs will be removed as part of the decommissioning phase. As these potential impacts have been ruled out for significant effects during the construction phase and with the implementation of the Rehabilitation Schedule (Volume III, Appendix 4.1) including the removal of artificial lighting upon completion of decommissioning, **no significant effects** would be expected to occur from displacement as a

result of ALAN during the decommissioning phase associated with Project Design Option 1. The same conclusion has been reached for Project Design Option 2 of the Proposed Development.

#### PROPOSED MITIGATION

13.8.3.25 Due to the specific requirements for offshore vessels and infrastructure with regards to health and safety (H&S), aviation and navigation, all structures and vessels must be lit within the hours of darkness and be visible to a minimum distance (as per organisation) no existing measures to reduce ALAN are applicable in the offshore environment, therefore no mitigation is proposed for ALAN.

#### RESIDUAL EFFECT ASSESSMENT

13.8.3.26 No mitigation is proposed for this potential impact, therefore the residual effect remains as **no significant effects** would be expected to occur as a result of ALAN associated with Project Design Option 1. The same conclusion has been reached for Project Design Option 2 of the Proposed Development.

#### MONITORING

13.8.3.27 The Proposed Development is committed to participating in the ECMG, to discuss and agree potential strategic monitoring initiatives in relation to offshore bats. The need for strategic monitoring, and the level of participation by individual projects, will be determined by the conclusions of the EIAR process, in consultation with statutory and technical stakeholders, and with a focus on validation and evidence gathering.

### 13.8.4 Impact 4 – Indirect disturbance and displacement resulting from changes to prey

#### Construction phase

13.8.4.1 During studies undertaken at offshore locations (wind farms and platforms) in Europe and the US, (Kunz *et al.,* 2007; Rydell *et al.,* 2010, Ahlén *et al.,* 2007, Lagerveld *et al.,* 2017, Boshamer and Bekker, 2008, Guest *et al.,* 2022), it was noticed that not only were migratory bats present, but also resident species were traveling to the sites to partake in the abundance of insects. This is likely due to the ALAN causing a 'vacuum effect', denuding the surrounding area of invertebrate prey. Displacement of bats from natural communities or habitats due to attraction to the Array Area or the Cable Corridor and Working Area due to changes to prey distribution could lead to physical deterioration and potential death of bat species due to energy expenditure in undertaking the displacement activity.

13.8.4.2 The same studies also demonstrate that bats did not avoid the WTGs but stayed for periods hunting close to the WTGs because of the accumulation of flying insects. Furthermore, WTGs and OSPs are typically white or light grey in colour, which has been demonstrated to be significantly more attractive to insects during the day and one hour after sunset, compared to other colours, furthering the potential for bats to be attracted to wind turbines because of increased prey availability (Guest *et al.,* 2022). The WTG towers and OSP for the Proposed Development will be coloured grey (refer to Chapter 4: Description of Development).

13.8.4.3 Furthermore, during the 2021, 2022 and 2023 offshore surveys, common pipistrelle and Leisler's bats were recorded within the Array Area (refer to Appendix 13.1 and 13.2). Foraging and commuting behaviour are associated with the passes recorded and their presence would indicate that bat species do commute/ forage within the Array Area. Refer to Appendix 13.1, 13.2, and 13.3.

13.8.4.4 The presence of vessels and infrastructure within the Cable Corridor, Working Area and Array Area during construction has the potential to cause attraction by bats via a change in prey distribution (an indirect impact from the presence of lighting from the vessels and infrastructure along with the WTG tower/ and OSP colour). It is also recognised that alternative attraction locations (indirect disturbance due to ALAN) exist within the study area, including lighthouses, further reducing the likelihood of bats travelling to the offshore development area.

13.8.4.5 Consequently, in the unlikely scenario that large numbers of bats from the mainland attempt foraging within the Cable Corridor and Working Area during construction (2023 results show 0.0016% of passes identified during the survey were offshore), unless they are moving from WTG to WTG or vessel to WTG, etc, to investigate prey distribution with no return to a roosting location, the distance is commutable and they will be able to return to their roosts without the energy expenditure from the displacement activity significantly compromising individuals.

13.8.4.6 Therefore, while attraction cannot be ruled out, **no significant effects** would be expected to occur to foraging species because of indirect disturbance and displacement resulting from changes to prey distribution associated with Project Option 1. The same conclusion has been reached for Project Option 2 of the Proposed Development.

13.8.4.7 During the 2021, 2022 and 2023 surveys, there are no records of migratory species Nathusius' pipistrelle at the offshore survey location during the recognised migration periods. Leislers's bat have been recorded during the 2021 autumn migration period with calls identified on 18 August 2021 and during the 2022 migration period with calls identified on 01 and 02 October 2022. Both species have also been recorded present at the headland locations during the 2023 surveys. As stated in the literature review, the migratory species will travel along the coast foraging and waiting for favourable weather conditions before embarking on migration, therefore the absence of data for Nathusius' pipistrelle at the offshore location does not mean absence of species within the rest of the Array Area or the Cable Corridor and Working Area. It may just mean that the migrating bats were not within detection range.

13.8.4.8 Also, migrating Nathusius' pipistrelle are more likely to show avoidance behaviour to mating and feeding that could be a result of optimisation strategies when performing long-distance migratory flights, reducing the potential for impacts from the Proposed Development (Marggraf *et al.,* 2023). Leisler's are also known to fly at speeds often exceeding 40 km per hour (Shiel 2006), meaning they are more likely to reach landfall quicker and forage in familiar habitats, and unlikely to be distracted by prey while migrating.

13.8.4.9 Therefore, **no significant effects** would be expected to occur to migrating bats as a result of displacement of bat species via a change in prey distribution within the Array Area or the Cable Corridor and Working Area during the construction phase associated with Project Design Option 1. The same conclusion has been reached for Project Design Option 2 of the Proposed Development.

### Operational and maintenance phase

13.8.4.10 As described in section 13.5.2 and above in construction phase impacts, not only are migratory bats observed at offshore locations, so too are foraging bats, likely due to a vacuum effect caused by ALAN. Displacement due to changes to prey distribution could lead to physical deterioration and potential death of bat species due to energy expenditure in undertaking the displacement activity.

13.8.4.11 The same studies also demonstrate that bats did not avoid the WTGs but stayed for periods hunting close to the WTGs because of the accumulation of flying insects.

13.8.4.12 Furthermore, during the 2021, 2022 and 2023 surveys, common pipistrelle and Leisler's bats were recorded at the offshore survey location within the Array Area (refer to Appendix 13.1, 13.2, and 13.3). Although there are no foraging or social behaviour associated with the passes recorded

in 2022 and 2023, calls identified within the 2021 offshore survey (Appendix 13.1) do show foraging behaviour for the two species. Their presence would indicate that bat species do commute/ forage within the Array Area.

13.8.4.13 The presence of WTGs and OSPs has the potential to cause attraction by bats via a change in prey distribution (an indirect impact from the presence of lighting from the infrastructure). Indirect attraction by bats via a change in prey distribution at vessels is less likely to occur as artificial lighting on vessels will be significantly less visible from the mainland. While attraction cannot be ruled out and therefore the displacement of individuals to the Array Area, unless they are moving from WTG to WTG to investigate the prey with no return to a roosting location, leading to further physical deterioration and potential death of bat species due to energy expenditure in undertaking the displacement activity, there will be **no significant effect** on the individuals. Furthermore, the distance to the Array Area is commutable for the species drawn to forage within the Array Area.

13.8.4.14 Therefore, **no significant effects** would be expected to occur to foraging bats because of disturbance and displacement resulting from changes to prey within the Array Area during the operational and maintenance phase associated with Project Design Option 1. The same conclusion has been reached for Project Design Option 2 of the Proposed Development.

13.8.4.15 While foraging species may be present within the Array Area for prey, the migrating species are more likely to pass through the area and not be distracted by the presence of prey (Marggraf *et al.,* 2023, Shiel 2006) using optimisation strategies.

13.8.4.16 Therefore, **no significant effects** would be expected to occur to migrating bats because of displacement resulting from changes to prey within the Array Area during the operational and maintenance phase associated with Project Design Option 1. The same conclusion has been reached for Project Design Option 2 of the Proposed Development.

## Decommissioning Phase

13.8.4.17 As the decommissioning phase will give rise to similar impacts regarding ALAN as that of the construction phase but in reverse, so too will the indirect impact disturbance and displacement resulting from changes to the prey distribution.

13.8.4.18 The impacts from infrastructure presence will be a complete reverse to that of the construction phase as WTGs and OSPs will be removed as part of the decommissioning phase. As these potential impacts have been ruled out for significant effects during the construction phase and with the implementation of the Rehabilitation Schedule (Volume III, Appendix 4.1) including the removal of artificial lighting upon completion of decommissioning, **no significant effects** would be expected to occur because of indirect disturbance and displacement resulting from changes to prey during the decommissioning phase associated with Project Design Option 1. The same conclusion has been reached for Project Design Option 2 of the Proposed Development.

### PROPOSED MITIGATION

13.8.4.19 As there are no known mitigation measures to avoid or reduce impacts from indirect disturbance and displacement resulting from changes to prey other than the potential to change the turbines colour which is still in the infancy study stage (Long *et al.*, 2011) or controlling the Ultraviolet (UV) component of artificial lighting (Barghini & de Medeiros 2012 and Deichmann *et al.* 2021) which has not been tested at offshore wind farms to date, along with there being no proposed mitigation for ALAN, no mitigation is proposed for this impact.

### RESIDUAL EFFECT ASSESSMENT

13.8.4.20 No mitigation is proposed for this potential impact, therefore the residual effect remains as **no significant effects** would be expected to occur as a result of indirect disturbance and

displacement resulting from changes to prey associated with Project Design Option 1. The same conclusion has been reached for Project Design Option 2 of the Proposed Development.

#### MONITORING

13.8.4.21 The Proposed Development is committed to participating in the ECMG, to discuss and agree potential strategic monitoring initiatives in relation to offshore bats. The need for strategic monitoring, and the level of participation by individual projects, will be determined by the conclusions of the EIAR process, in consultation with statutory and technical stakeholders, and with a focus on validation and evidence gathering.

## 13.8.5 Impact 5 – Collision and Barotrauma

### Operation and maintenance phase

13.8.5.1 Bat mortality due to collision has been reported around terrestrial WTGs worldwide for years. This had led to the potential for collision to be assumed as an impact with regards to the offshore wind industry also (SEER, 2022, Thaxter *et al.,* 2017, Huos *et al.,* 2016, Lagerveld, 2020 etc).

13.8.5.2 Although mortality of bats at terrestrial wind farms include barotrauma (results from exposure to the pressure variations caused by rotating turbine blades) as first presented by Baerwald *et al.,* (2008) a number of studies since, including the National Renewable Energy Laboratory (NREL) (2012) and Lawson *et al.,* (2020), dispute the hypothesis that barotrauma is responsible for a significant number of WTG related bat fatalities. However, it should be noted, the more recent studies have been undertaken on several mammal species (representative of bat species) as there is no data available on pressure change levels that cause barotrauma in bats. As the area is still in being studied and although it is not clear if barotrauma impact bat species, it is clear that should a bat be close enough to a blade for barotrauma to effect it, the likelihood of collision is high. Therefore, this section assesses the potential for impacts from collision to include barotrauma as they are closely related with regards to the proximity to the blades in which a bat has to be for an impact to occur.

13.8.5.3 While there are no significant landscape features that would concentrate migrating bats in a particular direction as would occur at terrestrial wind farms, it has been identified that Impact 3 – Disturbance and displacement due to Artificial Lighting at Night (ALAN) and Impact 4 – Indirect disturbance and displacement resulting from changes to prey could attract foraging bats to the Array Area (WTGs and OSPs) during the operational and maintenance phase. Furthermore, while beyond their identified core foraging range, common pipistrelle and Leisler's bats have been recorded within the Array Area, 2023 results show six (0.0016% of all passes recorded) passes identified during the survey were from these two species at the offshore location (refer to Appendix 13.1 and 13.2). The remaining potential foraging species in an offshore environment, soprano and Nathusius' pipistrelle were not recorded at the offshore location (Refer to Table 13.6).

13.8.5.4 However, studies monitoring behaviour around offshore wind farms (Ahlén *et al.,* 2007, ESGS surveillance footage, 2014) where bats were observed foraging near the offshore WTGs, feeding on accumulations of flying insects, there is no mention of observed collisions between bats and WTGs.

13.8.5.5 As highlighted in Lintott *et al*, 2016, the ecological conditions within the Array Area after the WTGs are constructed, will change significantly to what is being assessed as the baseline and bat activity recorded during pre-construction surveys may not reflect activity levels post-construction, notably with respect to disturbance and displacement due to ALAN and indirect disturbance and displacement resulting from changes to prey. The potential for significant effect on bats as a result of collision, although likely to be low (six bat passes recorded offshore from a total of 38,132 bat passes recorded during the 2023 surveys), cannot therefore be definitively determined.

Furthermore, given the localised stature of the WTGs, the distance between WTGs, the low numbers of bats anticipated to be within the Array Area, and the bats' echolocation abilities and agility, it is unlikely that collisions would occur.

13.8.5.6 However, it is assumed the activity levels within the Array Area will be slightly higher during the operation and maintenance phase than recorded during the surveys therefore, without monitoring during operation, according to the precautionary principle, potential for impact cannot be excluded at this stage.

13.8.5.7 Therefore, **significant effects** to foraging bats cannot be ruled out, and must, in line with the precautionary principle, be assumed to occur because of collision and barotrauma during the operational and maintenance phase associated with Project Option 1. The same conclusion has been reached for Project Option 2 of the Proposed Development based on the current baseline data.

13.8.5.8 As identified in Table 13.6 and Table 13.7, the lowest blade tip height for both Options will be 37 m above LAT, with an average rotation speed of 6 rotations per minute (average rotation speed between WTG models, 1a, 1b and 2, refer to Chapter 4: Description of Development for individual rotation speeds). The rotation speed is less than that identified for onshore turbines as 10-25rpm (IWEA accessed February 2024) for which bat collision studies and modelling have been established. Furthermore, with regards to Nathusius' pipistrelle migratory flight is anticipated to be below the swept path of the WTGs as identified by Brabant *et al.,* (2019). The study recorded only 10% of calls within nacelle height as opposed to 90% of calls at 16m above mean sea level. It should be noted that the detection range for this study was approximately 25m (as assumed for small bat species including Nathusius' pipistrelle; Barataud, 2015; Hüppop and Hill, 2016; Lagerveld *et al.,* 2017).

13.8.5.9 There are no studies available on the migration altitude for Leisler's bats, however, there are studies available for noctule, identifying a migration altitude of 50 to 300 m AGL. Refer to literature review.

13.8.5.10 While a precautionary approach is taken, assuming migrating species are within the Array Area, it is also assumed that migrating species are more likely to pass through the array area using optimisation strategies (refer to Impacts 2, 3 and 4). Furthermore, given the localised stature of the WTGs, the slower rotation speeds during optimal migration conditions, the low numbers of bats anticipated to be migrating within the Array Area (six bats recorded at the offshore location during the 2023 survey), the bats' echolocation abilities and agility, and the distance between rotating WTG (minimum 500m between blade tips) it is unlikely that the WTGs would pose a collision risk to migrating individuals.

13.8.5.11 Therefore, **no significant effects** would be expected to occur on migrating species as a result of collision and barotrauma associated with Project Design Option 1. The same conclusion has been reached for Project Design Option 2 of the Proposed Development.

### PROPOSED MITIGATION

13.8.5.12 **Significant effects** to foraging bats cannot be ruled out, however further specific mitigation is not proposed at this stage. However, collecting data about baseline activity and movement patterns help assess potential risk (refer to impact assessment above), but understanding bat activity around operational WTGs and quantifying mortality is essential in determining whether the Proposed Development gives rise to a significant effect to foraging bats and whether mitigation is required, refer to 13.8.5.15 below. This will be discussed as part of further consultation with NPWS and a derogation license application will be submitted should one be required.

13.8.5.13 Therefore, in the absence of mitigation, the residual effect remains as **significant effects** would be expected to occur as a result of collision and barotrauma for foraging species (common and

Leisler's bat) associated with Project Design Option 1. The same conclusion has been reached for Project Design Option 2 of the Proposed Development.

13.8.5.14 No mitigation is proposed for this potential impact on migrating bats, therefore the residual effect remains as **no significant effects** would be expected to occur as a result of collision and barotrauma associated with Project Design Option 1. The same conclusion has been reached for Project Design Option 2 of the Proposed Development.

#### RESIDUAL EFFECT ASSESSMENT

13.8.5.15 No mitigation is proposed for this potential impact, therefore the residual effect remains as stated above.

#### MONITORING

13.8.5.16 The Proposed Development is committed to participating in the 'ECMG, to discuss and agree potential strategic monitoring initiatives in relation to offshore bats. The need for strategic monitoring, and the level of participation by individual projects, will be determined by the conclusions of the EIAR process, in consultation with statutory and technical stakeholders, and with a focus on validation and evidence gathering.

## 13.9 Cumulative impacts assessment methodology

### 13.9.1 Methodology

13.9.1.1 The Cumulative Impact Assessment (CIA) takes into account the impacts associated with the Proposed Development together with other proposed and reasonably foreseeable projects, plans and existing and permitted projects. The projects and plans selected as relevant to the CIA presented within this chapter are based upon the results of a screening exercise (see Volume III, Appendix 3.2: Cumulative Impact Assessment Screening). Each project and plan has been considered on a case-by-case basis for screening in or out of this chapter's assessment based upon, effect-receptor pathways and the spatial/temporal scales involved.

13.9.1.2 A tiered approach to assessment has been adopted, the tiers and relevant stages of development are set out in Volume III, Appendix 3.2: Cumulative Impact Assessment Screening. This tiered approach is adopted to provide an assessment of the Proposed Development as a whole.

13.9.1.3 Although marine projects require the use of vessels, and therefore present the potential for impacts from increased presence, noise and ALAN, as identified in Impacts 1,2,3 and 4, the impacts from vessels are localised, short term and unlikely to affect bat species that are migrating or foraging. Therefore, there are no cumulative pathways with the Proposed Development and other projects including cable laying, dredging operations and coastal developments which have been screened out. Refer to Volume III, Appendix 3.2: Cumulative Impact Assessment Screening for the long list for those projects scoped out of cumulative effects with the Proposed Development.

13.9.1.4 There are also several offshore wind projects within the UK that are operational and in the planning stages, however, due to their positioning north and south of Wales and not to the west (between Wales and the Proposed Development), there is no predicted impacts from the projects to bats traveling east of the Proposed Development to Wales (shortest direct route) or vice versa. The distance to the UK offshore wind projects is also beyond the foraging distance for the resident bat species. Therefore, there are no cumulative pathways with the Proposed Development and UK offshore wind projects.

13.9.1.5 Due to the commitments made by the Developer in respect of the Foreshore Licence FS007339 and Foreshore Licence Application FS007555 (Table 13.12), FS007339 and FS007555 have been screened out of the cumulative impact assessment.

**Table 13.13: List of other projects and plans considered within the cumulative impact assessment**

| Project/Plan | Status | Distance from Array Area (km) | Distance from Export Cable Corridors | Description of Project/Plan | Dates of Construction | Dates of Operation | Justification for screening in |
|---|---|---|---|---|---|---|---|
| **Tier 1** | | | | | | | |
| Arklow Bank Wind Park 2 Onshore Grid Infrastructure (OGI) (ABWP2 OGI) | Consented | 10.2 | 0.0 | Development of the onshore grid infrastructure. | 2026 to 2030 | 2030 to 2066 | Screened in due to pathway with offshore receptors |
| Arklow Bank Wind Park 2 Operations and Maintenance Facility (OMF) Onshore and offshore Infrastructure (ABWP2 OMF) | Consented | 11.3 | 4.5 | Development of an OMF to support the Proposed Development, located at Arklow Port. | 2026 to 2030 | 2030 to 2066 | Screened in due to pathway with offshore receptors |
| Arklow Bank Wind Park 1 | Operational | 0 | 0.5 | Arklow Bank Wind Park 1, consisting of seven wind turbines at a capacity of 25.2 MW. | 2003 to 2004 | 2004 to ongoing | Screened in due to ongoing impact. Surrounded by the Array Area. |
| **Phase 1 Projects** | | | | | | | |
| Codling Wind Park (formerly known as Codling I and Codling II) | Proposed | 10.2 | 15.2 | 'Relevant Project'. Application expected to be made under the Maritime Area | 2027 to 2028 | 2029 | Potential for temporal overlap with Proposed Development construction and operational and |

| Project/Plan | Status | Distance from Array Area (km) | Distance from Export Cable Corridors | Description of Project/Plan | Dates of Construction | Dates of Operation | Justification for screening in |
|---|---|---|---|---|---|---|---|
| | | | | Planning Act 2021. | | | maintenance phases. |
| Dublin Array (formerly known as Bray and Kish Offshore Wind Farms) | Proposed | 25.8 | 30.5 | 'Relevant Project'. Application expected to be made under the Maritime Area Planning Act 2021 | 2028 to 2032 | 2033 | Potential for temporal overlap with Proposed Development construction and operational and maintenance phases. |
| North Irish Sea Array (NISA) | Proposed | 65 | 69.7 | 'Relevant Project'. Application expected to be made under the Maritime Area Planning Act 2021 | 2027 to 2029 | 2030 | Potential for overlap with Proposed Development construction and operational and maintenance phases. |
| Oriel Wind Park | Proposed | 108.1 | 112.8 | 'Relevant Project'. Application expected to be made under the Maritime Area Planning Act 2021 | 2026 to 2028 | 2029 | Potential for overlap with Proposed Development construction and operational and maintenance phases. |
| **Tier 3** | | | | | | | |
| Arklow Bank Wind Park 1 | Decommissioning | 0 | 0.5 | Arklow Bank Wind Park 1, consisting of | 2003 to 2004 | 2004 to ongoing | Potential for overlap with Proposed Development |

| Project/Plan | Status | Distance from Array Area (km) | Distance from Export Cable Corridors | Description of Project/Plan | Dates of Construction | Dates of Operation | Justification for screening in |
|---|---|---|---|---|---|---|---|
| | | | | seven wind turbines at a capacity of 25.2 MW. | | | construction and operational and maintenance phases. |

13.9.1.6 Table 13.14 presents the potential impacts, development phase, and the list of projects / plans with which the two Project Design Options have been cumulatively assessed.

**Table 13.14: Cumulative assessment impacts, phases, scenarios, and projects to be considered cumulatively**

| Potential cumulative impact | Phase | | | Projects considered cumulatively | Justification for projects considered cumulatively |
|---|---|---|---|---|---|
| | C | O | D | | |
| Disturbance and displacement due to anthropogenic noise | ✓ | ✓ | ✓ | Project parameters associated with Project Design Option 1 or 2 plus the following projects:<br>**Tier 1**<br>• ABWP2 OGI;<br>• ABWP2 OMF; and<br>• ABWP1.<br>**Phase 1 Projects**<br>• Codling Wind Park;<br>• Dublin Array;<br>• NISA; and<br>• Oriel Wind Park.<br>**Tier 3**<br>• ABWP1 decommissioning. | Noise associated with the construction of other ABWP2 infrastructure (including the OGI and OMF), offshore wind farms (other Phase 1 projects including Codling Wind Park, Dublin Array, NISA and Oriel Wind Park), and the decommissioning of ABWP1. |
| Disturbance and displacement due to increased vessel activity and infrastructure presence | ✓ | ✓ | ✓ | Project parameters associated with Project Design Option 1 or 2 plus the following projects:<br>**Tier 1**<br>• ABWP2 OGI;<br>• ABWP2 OMF; and<br>• ABWP1.<br>**Phae 1 Projects**<br>• Codling Wind Park;<br>• Dublin Array;<br>• NISA; and<br>• Oriel Wind Park.<br>**Tier 3**<br>• ABWP1 decommissioning. | Vessel and helicopter movements associated with the construction of other ABWP2 infrastructure (including the OGI and OMF), offshore wind farms (other Phase 1 projects including Codling Wind Park, Dublin Array, NISA and Oriel Wind Park), and the decommissioning of ABWP1. |
| Disturbance and displacement due to ALAN | ✓ | ✓ | ✓ | Project parameters associated with Project Design Option 1 or 2 plus the following projects:<br>**Tier 1**<br>• ABWP2 OGI;<br>• ABWP2 OMF; and<br>• ABWP1.<br>**Phase 1 Projects**<br>• Codling Wind Park;<br>• Dublin Array; | ALAN associated with the construction of other ABWP2 infrastructure (including the OGI and OMF), offshore wind farms (other Phase 1 projects |

| Potential cumulative impact | Phase C | Phase O | Phase D | Projects considered cumulatively | Justification for projects considered cumulatively |
|---|---|---|---|---|---|
| | | | | • NISA; and<br>• Oriel Wind Park.<br>**Tier 3**<br>• ABWP1 decommissioning. | including Codling Wind Park, Dublin Array, NISA and Oriel Wind Park), and the decommissioning of ABWP1. |
| Indirect disturbance and displacement resulting from changes to prey | ✓ | ✓ | ✓ | Project parameters associated with Project Design Option 1 or 2 plus the following projects:<br>**Tier 1**<br>• ABWP2 OGI;<br>• ABWP2 OMF; and<br>• ABWP1.<br>**Phase 1 Projects**<br>• Codling Wind Park;<br>• Dublin Array;<br>• NISA; and<br>• Oriel Wind Park.<br>**Tier 3**<br>• ABWP1 decommissioning. | Changes to prey associated with the construction of ABWP2 infrastructure (including the OGI and OMF), offshore wind farms (other Phase 1 projects including Codling Wind Park, Dublin Array, NISA and Oriel Wind Park), and the decommissioning of ABWP1. |
| Collision and Barotrauma | × | ✓ | × | Project parameters associated with Project Design Option 1 or 2 plus the following projects:<br>**Tier 1**<br>• ABWP1.<br>**Phase 1 Projects**<br>• Codling Wind Park;<br>• Dublin Array;<br>• NISA; and<br>• Oriel Wind Park. | Operational and maintenance phases of different offshore wind projects overlap. |

# 13.10 Cumulative impact assessment

13.10.1.1 A description of the significance of cumulative effects upon offshore bats arising from each identified impact is given below.

## 13.10.2 Impact 1 – Cumulative disturbance and displacement due to anthropogenic noise

### Construction phase

13.10.2.1 Anthropogenic noise associated with construction of the Proposed Development, together with anthropogenic noise associated with the construction of Tier 1 projects (ABWP2 OGI and OMF) and ABWP1 operation, Phase 1 projects (Codling Wind Park, Dublin Array, NISA and Oriel Wind Park), and Tier 3 project (decommissioning of ABWP1), may contribute to cumulative disturbance

and displacement due to anthropogenic noise if the periods of construction, operation or decommissioning of the different projects overlap.

13.10.2.2 While the impact is highly dependent on the extent of temporal overlap across projects, the levels of disturbance will be localised to the Cable Corridors and Working Areas for each project. As ABWP1 is in operation and is surrounded by the Proposed Development the operational stage is considered within the baseline. Furthermore, as the ABWP1 array only comprises seven WTGs, there will be no significant increase in vessel activity for Tier 3 decommissioning stage above that described in sections 13.6 and 13.8. Vessel movements associated with Proposed Development are precautionary and therefore any associated vessel movements for the Tier 3 decommissioning stage of ABWP1 are considered to be captured within the vessel movements already assessed for the Proposed Development.

13.10.2.3 There is a significant distance between the Proposed Development and the remaining Tier 1 projects (ABWP2 OGI approximately 10km east) and Phase 1 projects (closest project is Codling Wind Park approximately 15km north), to allow for any localised disturbance to migration routes. Furthermore, recent research has shown that bats may be less sensitive to temporary noise shifts than other terrestrial mammals (Simmons *et al.,* 2016) and those foraging within the Cable Corridors and Working Areas of the individual projects will not be significantly affected.

13.10.2.4 Therefore, even if there is a complete overlap in construction of Tier 1 and Phase 1 project, operation of Tier 1 projects and decommissioning of Tier 3 projects for the duration of construction of the Proposed Development, due to the distance between projects, it is unlikely that a significant effect will occur. The more likely scenario would be that any overlap that may occur will be during only comparatively short periods at each project location.

13.10.2.5 Furthermore, the Proposed Development alone was not predicted to have a significant effect based on both Project Design Options due to construction phase disturbance and displacement due to anthropogenic noise (section 13.8.1).

13.10.2.6 Therefore, **no significant cumulative effects** would be expected to occur as a result of disturbance and displacement due to anthropogenic noise associated with both Project Design Options and other projects.

### Operational and maintenance phase

13.10.2.7 Anthropogenic noise associated with the operational and maintenance of the Proposed Development, together with anthropogenic noise associated with the construction or operation and maintenance or decommissioning phase of other Phase 1 projects in the Irish Sea, may contribute to cumulative disturbance and displacement due to anthropogenic noise if the periods of construction or operation and maintenance or decommissioning of different projects overlap with operation and maintenance phase activities carried out as part of the Proposed Development.

13.10.2.8 While the impact is highly dependent on the extent of temporal overlap across projects, the levels of disturbance will be localised to vessel movements for each project. Furthermore, vessel movements will usually be restricted to daylight hours unless in emergencies, therefore, operational and maintenance activities of the Proposed Development at night would be temporary and highly localised. Although ABWP1 is surrounded by the Proposed Development the array only comprises seven WTGs. Vessel movements associated with Proposed Development are precautionary and therefore any associated vessel movements for the Tier 3 decommissioning stage of ABWP1 are considered to be captured within the vessel movements already assessed for the Proposed Development.

There is also a significant distance between the Proposed Development and the other Phase 1 projects (closest project is Codling Wind Park approximately 15km north), and no project will be using the same operation and maintenance facility as the Proposed Development, therefore, it is

unlikely that vessels will be traveling between the Proposed Development and other Phase 1 projects. Also recent research has shown that bats may be less sensitive to temporary noise shifts than other terrestrial mammals (Simmons *et al.,* 2016) and those foraging within the Works Areas will not be significantly affected.

13.10.2.9 The Proposed Development alone was not predicted to have a significant effect based on both Project Design Options due to operational and maintenance phase disturbance and displacement due to anthropogenic noise (section 13.8.1).

13.10.2.10 Therefore, **no significant cumulative effects** would be expected to occur as a result of disturbance and displacement due to anthropogenic noise associated with both Project Design Options and other projects.

### Decommissioning phase

13.10.2.11 Any effects generated from the cumulative impact of disturbance and displacement due to anthropogenic noise during the decommissioning phase of the Proposed Development are expected to be similar, or reduced, to those generated during the construction phase, as certain activities such as piling would not be required. This is because it would generally involve a reverse of the construction phase through the removal of structures and materials installed.

13.10.2.12 Such activities have already been assessed in the cumulative construction section above and have been found to have no significant effect as a result of disturbance and displacement due to anthropogenic noise associated with both Project Design Options and other projects.

13.10.2.13 Therefore, **no significant cumulative effects** would be expected to occur as a result of disturbance and displacement and displacement due to anthropogenic noise associated with both Project Design Options and other projects during the decommissioning phase of the Proposed Development.

## 13.10.3 Impact 2 – Cumulative disturbance and displacement due to increased vessel activity and infrastructure presence

### Construction phase

13.10.3.1 Vessel and helicopter movements associated with construction of the Proposed Development, together with vessel and helicopter movements associated with the construction of Tier 1 projects (ABWP2 OGI and OMF) and ABWP1 operation, Phase 1 projects (Codling Wind Park, Dublin Array, NISA and Oriel Wind Park), and Tier 3 project (decommissioning of ABWP1), may contribute to cumulative disturbance and displacement if the periods of construction or operation and maintenance or decommissioning of different projects overlap.

13.10.3.2 While this impact is highly dependent on the extent of temporal overlap across projects, the levels of disturbance will be localised to the Cable Corridors and Working Area for each project, unless there is a complete overlap in construction for all projects for the duration of construction of the Proposed Development or vessels / helicopters are traveling between projects, it is unlikely that a significant cumulative effect will occur.

13.10.3.3 As ABWP1 is in operation and is surrounded by the Proposed Development the operational stage is considered within the baseline. Furthermore, as the ABWP1 array only comprises seven WTGs, there will be no significant increase in vessel activity for Tier 3 decommissioning stage above that described in sections 13.6 and 13.8. Vessel movements associated with Proposed Development are precautionary and therefore any associated vessel movements for the Tier 3 decommissioning stage of ABWP1 are considered to be captured within the vessel movements already assessed for the Proposed Development. Also as there is a significant distance between the Proposed Development and the other Tier 1 projects (ABWP2 OGI approximately 10km east) and Phase 1 projects (closest project is Codling Wind Park approximately 15km north), to allow for any localised disturbance to migration routes.

13.10.3.4 Furthermore, the Proposed Development alone was not predicted to have a significant effect based on both Project Design Options due to construction phase disturbance and displacement due to increased vessel activity and infrastructure presence (Section 13.8.2)

13.10.3.5 Therefore, **no significant cumulative effects** would be expected to occur as a result of disturbance and displacement due to increased vessel activity and infrastructure associated with both Project Design Options and other projects during the construction phase.

### Operational and maintenance phase

13.10.3.6 Vessel and helicopter movements associated with operation and maintenance of the Proposed Development, together with vessel and helicopter movements associated with the construction and or operation and maintenance or decommissioning phase of the other Tier 1, 2 and 3 projects in the Irish Sea, may contribute to cumulative disturbance and displacement if the periods of construction and or operation and maintenance or decommissioning of different projects overlap.

13.10.3.7 While the impact is highly dependent on the extent of temporal overlap across projects, the levels of disturbance will be localised to vessel movements for each project. Furthermore, vessel movements will usually be restricted to daylight hours unless in emergencies, therefore, operational and maintenance activities of the Proposed Development at night would be temporary and highly localised. Although ABWP1 is surrounded by the Proposed Development the array only comprises seven WTGs and there will be no significant increase in vessel activity for Tier 3 decommissioning stage above that described in sections 13.6 and 13.8. Vessel movements associated with Proposed Development are precautionary and therefore any associated vessel movements for the Tier 3 decommissioning stage of ABWP1 are considered to be captured within the vessel movements already assessed for the Proposed Development. There is also a significant distance between the Proposed Development and the other Tier 1 projects (ABWP2 OGI approximately 10km east) and Phase 1 projects (closest project is Codling Wind Park approximately 15km north), and no project will be using the same operation and maintenance facility as the Proposed Development, therefore, it is unlikely that vessels will be traveling between the Proposed Development and other Phase 1 projects.

13.10.3.8 Also, the Proposed Development alone was not predicted to have a significant effect based on both Project Design Options due to operational and maintenance phase disturbance and displacement due to increased vessel activity and infrastructure presence (section 13.8.2).

13.10.3.9 Therefore, **no significant cumulative effects** would be expected to occur as a result of disturbance and displacement due to increased vessel activity and infrastructure associated with both Project Design Options and other projects during the operational and maintenance phase of the Proposed Development.

### Decommissioning phase

13.10.3.10 Any effects generated from the cumulative impact of disturbance and displacement due to increased vessel activity and infrastructure presence during the decommissioning phase of the Proposed Development are expected to be similar, or reduced, to those generated during the construction phase, as certain activities such as piling would not be required. This is because it would generally involve a reverse of the construction phase through the removal of structures and materials installed.

13.10.3.11 Such activities have already been assessed in the cumulative construction section above and have been found to have no significant effect as a result of disturbance and displacement due to increased vessel activity and infrastructure presence associated with both Project Design Options and other projects.

13.10.3.12 Therefore, **no significant cumulative effects** would be expected to occur as a result of disturbance and displacement due to increased vessel activity and infrastructure presence

associated with both Project Design Options and other projects during the decommissioning phase of the Proposed Development.

### 13.10.4 Impact 3 – Cumulative disturbance and displacement due to Artificial Lighting at Night (ALAN)

#### Construction phase

13.10.4.1 Lights on WTG or associated infrastructure and vessels during construction may directly or indirectly contribute to increased bat activity. Displacement of bats from natural communities or habitats onshore due to attraction to the Cable Corridor and Working Area or Array Area from ALAN could therefore lead to physical deterioration and potential death of relevant bat species due to energy expenditure in undertaking the displacement activity.

13.10.4.2 ALAN associated with construction of the Proposed Development, together with ALAN associated with the construction of Tier 1 projects (ABWP2 OGI and OMF) and ABWP1 operation, Phase 1 projects (Codling Wind Park, Dublin Array, NISA and Oriel Wind Park), and Tier 3 project (decommissioning of ABWP1), may contribute to cumulative disturbance and displacement if the periods of construction or operation and maintenance or decommissioning of different projects overlap.

13.10.4.3 While this impact is highly dependent on the extent of temporal overlap across projects the levels of disturbance will be localised to the construction and working areas for each project. Even if there is a complete overlap in construction of the Proposed Development and the construction or operation of Tier 1 projects, Phase 1 projects or decommissioning of Tier 3 projects for the duration of construction or vessels / helicopters are traveling between projects, it is unlikely that a significant cumulative effect will occur.

13.10.4.4 As ABWP1 is surrounded by the Proposed Development and the array only comprises seven WTGs, ALAN from the Proposed Development will exceed any ALAN associated with ABWP1 during operation or decommissioning activities, therefore there will be no in-combination effects and therefore ALAN above that described in sections 13.6 and 13.8. The other Tier 1 projects (ABWP2 OGI and OMF) will provide alternative attraction locations along the coast, further reducing the likelihood of bats travelling to the Cable Corridor and Working Area or Array Area of the Proposed Development.

13.10.4.5 Furthermore, while it is recognised the presence of vessels, WTGs and OSPs have the potential to cause attraction by bats via ALAN, unless bats are commuting from vessel to vessel or project to project to investigate the lighting and not roosting, leading to further physical deterioration and potential death of bat species due to energy expenditure in undertaking the displacement activity, there will be no cumulative effect on foraging bat species. Migrating species are also more likely to pass through the area and not be distracted by the presence of ALAN using optimisation strategies.

13.10.4.6 Therefore, **no significant cumulative effects** would be expected to occur as a result of disturbance and displacement of bat species via a change in prey associated with both Project Design Options and other projects during the construction phase of the Proposed Development.

#### Operational and maintenance phase

13.10.4.7 During the operational and maintenance phase of the Proposed Development the SPS and IPS will exhibit synchronised flashing yellow lights of at least 5 nm and 2 nm nominal range respectively. As this is a requirement with regards to H&S and navigation at sea, it is assumed that the other Phase 1 projects will adhere to similar lighting regimes.

13.10.4.8 ALAN associated with operational and maintenance of the Proposed Development, together with ALAN associated with the construction and or operation and maintenance or decommissioning

phase of other Tier 1, 2 and 3projects in the Irish Sea, may contribute to cumulative disturbance and displacement if the periods of operation and maintenance of different projects overlap.

13.10.4.9 While it is recognised the presence of vessels, WTGs and OSPs has the potential to displace bats via an increase in ALAN. Even if large numbers of bats are commuting offshore to investigate the lighting, unless bats are commuting from project to project and not roosting, leading to further physical deterioration and potential death of bat species due to energy expenditure in undertaking the displacement activity, there will be no cumulative effect on the foraging bat species. Furthermore, migrating species are more likely to pass through the area and not be distracted by the presence of ALAN using optimization strategies.

13.10.4.10 Therefore, **no significant cumulative effects** would be expected to occur as a result of disturbance and displacement of bat species via a change in prey associated with both Project Design Options and other projects during the operational and maintenance phase of the Proposed Development.

### Decommissioning phase

13.10.4.11 Any effects generated from the cumulative impact of disturbance and displacement due to ALAN during the decommissioning phase of the Proposed Development are expected to be similar, or reduced, to those generated during the construction phase. This is because it would generally involve a reverse of the construction phase through the removal of structures and materials installed.

13.10.4.12 Such activities have already been assessed in the cumulative construction section above and have been found to have no significant cumulative effects as a result of disturbance and displacement due to ALAN associated with both Project Design Options and other projects.

13.10.4.13 Therefore, **no significant cumulative effects** would be expected to occur as a result of disturbance and displacement due to ALAN associated with both Project Design Options and other projects during the decommissioning phase of the Proposed Development.

## 13.10.5 Impact 4 – Indirect disturbance and displacement resulting from changes to prey

### Construction phase

13.10.5.1 WTG or associated infrastructure and vessels during construction may directly or indirectly contribute to increased bat activity. This is likely due to the ALAN causing a ‘vacuum effect’, denuding the surrounding area of invertebrate prey. Displacement of bats from natural communities or habitats due to attraction to the Cable Corridor and Working Area and Array Area due to changes to prey distribution could lead to physical deterioration and potential death of bat species due to energy expenditure in undertaking the displacement activity.

13.10.5.2 Indirect disturbance and displacement resulting from changes to prey associated with construction of the Proposed Development, together with indirect disturbance and displacement resulting from changes to prey associated with the construction of Tier 1 projects (ABWP2 OGI and OMF) and ABWP1 operation, Phase 1 projects (Codling Wind Park, Dublin Array, NISA and Oriel Wind Park), and Tier 3 project (decommissioning of ABWP1), may contribute to cumulative disturbance and displacement if periods of construction or operation and maintenance or decommissioning of different projects overlap.

13.10.5.3 While this impact is highly dependent on the extent of temporal overlap across projects the levels of disturbance will be localised to the construction and working areas for each project. Even if there is a complete overlap in construction of the Proposed Development and the construction or operation of Tier 1 projects, Phase 1 projects or decommissioning of Tier 3 projects for the duration of construction; or vessels / helicopters are traveling between projects, it is unlikely that a cumulative effect will occur.

13.10.5.4 As ABWP1 is surrounded by the Proposed Development and the array only comprises seven WTGs, ALAN from the Proposed Development will exceed any ALAN associated with ABWP1 during operation or decommissioning activities, there will be no significant increase above that described in sections 13.6 and 13.8. The other Tier 1 projects (ABWP2 OGI and OMF) will provide alternative ALAN locations and indirectly prey locations along the coast, further reducing the likelihood of bats travelling to the Cable Corridor and Working Area or Array Area of the Proposed Development.

13.10.5.5 It is also recognised the presence of vessels, WTGs and OSPs has the potential to displace bats via a change in prey distribution. Unless bats are commuting from vessel to vessel and project to project and not roosting, leading to further physical deterioration and potential death of bat species due to energy expenditure in undertaking the displacement activity, there will be no cumulative effect. on the foraging bat species. Migrating species are also more likely to pass through the area and not be distracted by the presence of prey using optimisation strategies.

13.10.5.6 Therefore, **no significant cumulative effects** would be expected to occur as a result of disturbance and displacement of bat species via a change in prey associated with both Project Design Options and other projects during the construction phase of the Proposed Development.

### Operational and maintenance phase

13.10.5.7 WTG or associated infrastructure and vessels during operational and maintenance may directly or indirectly contribute to increased bat activity. This is likely due to the ALAN causing a 'vacuum effect', denuding the surrounding area of invertebrate prey. Displacement of bats from natural communities or habitats due to attraction to the Array Area due to changes to prey distribution could lead to physical deterioration and potential death of bat species due to energy expenditure in undertaking the displacement activity.

13.10.5.8 The baseline assessment has identified bats present within the Array Area of the Proposed Development, thereby taking a precautionary approach the same bat species are assumed to be present within the array areas of other Phase 1 projects.

13.10.5.9 Indirect disturbance and displacement resulting from changes to prey associated with operation and maintenance of the Proposed Development, together with indirect disturbance and displacement resulting from changes to prey associated with the construction and or operation and maintenance or decommissioning phase of other Phase 1 projects in the Irish Sea, may contribute to cumulative disturbance and displacement if the periods of operation and maintenance of different projects overlap.

13.10.5.10 While the presence of WTGs and OSPs has the potential to cause attraction by bats via a change in prey distribution. Even if large numbers of bats are commuting offshore to investigate the changes in prey distribution (refer to Impact 3 – Cumulative disturbance and displacement due to Artificial Lighting at Night (ALAN)), unless bats are commuting from project to project and not roosting, leading to further physical deterioration and potential death of bat species due to energy expenditure in undertaking the displacement activity, there will be no cumulative effect on the bat species. Furthermore, migrating species are more likely to pass through the area and not be distracted by the presence of prey using optimization strategies.

13.10.5.11 Therefore, **no significant cumulative effects** would be expected to occur as a result of disturbance and displacement of bat species via a change in prey associated with both Project Design Options and other projects during the operational and maintenance phase of the Proposed Development.

### Decommissioning phase

13.10.5.12 Any effects generated from the cumulative impact of disturbance and displacement due to change in prey during the decommissioning phase are expected to be similar, or reduced, to

those generated during the construction phase. This is because it would generally involve a reverse of the construction phase through the removal of structures and materials installed.

13.10.5.13 Such activities have already been assessed in the cumulative construction section above and have been found to have no significant effect as a result of disturbance and displacement due to change in prey associated with both Project Design Options and other projects.

13.10.5.14 Therefore, **no significant cumulative effects** would be expected to occur as a result of disturbance and displacement due to change in prey associated with both Project Design Options and other projects during the decommissioning phase of the Proposed Development.

### 13.10.6 Impact 5 – Collision and Barotrauma

#### Operational and maintenance phase

13.10.6.1 The Proposed Development, together with other Phase 1 projects in the Irish Sea may contribute to cumulative impact collision and barotrauma, in the event the operational and maintenance phases of different projects overlap. Bats are highly mobile, therefore they can encounter offshore wind farms, and be at risk of collisions, across large areas.

13.10.6.2 While a precautionary approach is taken, assuming migrating species are within the Proposed Development Array Area and therefore also within the array area of Phase 1 projects, it should be noted that given the localised stature of the WTGs, the slower rotation speeds during optimal migration conditions, the low numbers of bats anticipated to be migrating within the Array Area of the Proposed Development and therefore within the array area of other Phase 1 projects, the bats' echolocation abilities and agility, the distance between rotating WTG (minimum 500m between blade tips of the Proposed Development) and the distance between Phase 1 projects (closest project is Codling Wind Park approximately 15km north) it is unlikely that the projects would pose a cumulative collision risk to migrating individuals.

13.10.6.3 Therefore, **no significant cumulative effects** would be expected to occur as a result of collision and barotrauma associated with both Project Design Options and other projects.

13.10.6.4 While significant effects from collision and barotrauma impacts cannot be ruled out for foraging bats for the Proposed Development alone, the distance between the Tier 2 projects (closest project is Codling Wind Park approximately 15km north) would indicate they are beyond the foraging range of the species recorded offshore during the 2023 surveys (common pipistrelle and Leisler's bat) and they would not be visible from the Array Area (refer to Impact 3). It is therefore unlikely that the other projects would pose a cumulative collision risk to the foraging bat populations.

13.10.6.5 The Proposed Development alone assessment takes into account the fact that bats may already be habituated to ABWP1 and therefore are considered part of the baseline conditions, however there is the recognition of the potential for on-going impacts from collision and barotrauma during the operation and maintenance phase. As the project is surrounded by the Proposed Development, no effects of greater significance than that assessed in this chapter are predicted to occur.

13.10.6.6 Therefore, **no significant cumulative effects** would be expected to occur as a result of collision and barotrauma associated with both Project Design Options and other projects.

## 13.11 Transboundary effects

13.11.1.1 A screening of transboundary impacts has been carried out and has identified that there was no potential for significant transboundary effects with regard to migrating offshore bats from the Proposed Development upon the interests of other states. Foraging bat species have been ruled out for transboundary effects due to the distance between Ireland and the UK being beyond the foraging distance for the resident bat species.

13.11.1.2 The potential transboundary impacts assessed within section 13.7 are summarised below:

- Direct disturbance and displacement due to anthropogenic noise during the construction, operational and maintenance and decommissioning phases. Overall bat species are less sensitive to temporary threshold shifts than other terrestrial mammals. Therefore, no significant transboundary effects would be expected to occur as a result of offshore noise associated with the Proposed Development.
- Direct disturbance and displacement due to increased vessel activity and infrastructure presence during the construction, operational and maintenance and decommissioning phases. Overall bats' echolocation abilities and agility make it unlikely that the stationary objects or moving vessels would pose a collision risk to individuals in flight. Therefore, no significant transboundary effects would be expected to occur as a result of disturbance and displacement due to increased vessel activity and infrastructure presence associated with the Proposed Development.
- Disturbance and displacement due to Artificial Lighting at Night (ALAN) during the construction, operational and maintenance and decommissioning phases. Overall, the two migratory species are likely to avoid the Proposed Development due to optimisation strategies. Therefore, no significant transboundary effects would be expected to occur as a result of disturbance and displacement due to ALAN.
- Indirect disturbance and displacement resulting from changes to prey during the construction, operational and maintenance and decommissioning phases. Overall, the two migratory species are likely to avoid the Proposed Development due to optimisation strategies. Therefore, no significant transboundary effects would be expected to occur as a result of disturbance and displacement resulting from changes to prey.
- Collision and Barotrauma during the operational and maintenance phase. Overall, no significant transboundary effects would be expected to occur as a result of collision and barotrauma on migrating species.

## 13.12 Summary of effects

13.12.1.1 Information on offshore bats within the Offshore Bats study area was collected through review of available literature, other offshore wind farm assessments, European guidance, detailed analysis of the data collected during the field surveys and consultation with relevant stakeholders.

13.12.1.2 Table 13.15 presents a summary of the potential impacts for both Project Design Options, mitigation measures and residual effects in respect to offshore bats. The impacts assessed include direct disturbance and displacement due to anthropogenic noise, increased vessel activity and infrastructure presence and ALAN, along with indirect disturbance and displacement resulting from changes to prey and impacts from collision and barotrauma.

**Table 13.15: Summary of potential environmental impacts, mitigation and monitoring for Project Design Option 1 and 2**

| Description of impact | Phase | | | Factored-in measures | Significance of effect | Additional measures | Residual effect | Proposed monitoring |
|---|---|---|---|---|---|---|---|---|
| | C | O | D | | | | | |
| 1. Direct disturbance and displacement due to anthropogenic noise | ✓ | ✓ | ✓ | N/A | No significant effects | None | No significant effects | The Proposed Development is committed to participating in the ECMG, to discuss and agree potential strategic monitoring initiatives in relation to offshore bats. The need for strategic monitoring and the level of participation by individual projects will be determined by the conclusions of the EIAR process, in consultation with statutory and technical stakeholders, and with a focus on validation and. evidence gathering. |
| 2. Direct disturbance and displacement due to increased vessel activity and infrastructure presence | ✓ | ✓ | ✓ | N/A | No significant effects | None | No significant effects | The Proposed Development is committed to participating in the ECMG, to discuss and agree potential strategic monitoring initiatives in relation to offshore bats. The need for strategic monitoring and the level of participation by individual projects will be determined by the conclusions of the EIAR process, in consultation with statutory and technical stakeholders, and with a focus on validation and. evidence gathering. |
| 3. Disturbance and displacement due to ALAN | ✓ | ✓ | ✓ | N/A | No significant effects | None | No significant effects | The Proposed Development is committed to participating in the ECMG, to discuss and agree potential strategic monitoring initiatives in relation to offshore bats. The need for strategic monitoring and the level of participation by individual projects will be determined by the conclusions of the EIAR process, in consultation with statutory and technical stakeholders, and |

| Description of impact | Phase | | | Factored-in measures | Significance of effect | Additional measures | Residual effect | Proposed monitoring |
|---|---|---|---|---|---|---|---|---|
| | C | O | D | | | | | |
| | | | | | | | | with a focus on validation and. evidence gathering. |
| 4. Indirect disturbance and displacement resulting from changes to prey | ✓ | ✓ | ✓ | N/A | No significant effects | None | No significant effects | The Proposed Development is committed to participating in the ECMG, to discuss and agree potential strategic monitoring initiatives in relation to offshore bats. The need for strategic monitoring and the level of participation by individual projects will be determined by the conclusions of the EIAR process, in consultation with statutory and technical stakeholders, and with a focus on validation and. evidence gathering. |
| 5. Collision and Barotrauma | × | ✓ | × | Lower blade tip height of 37m from LAT. Number of turbines. Rehabilitation Schedule | Significant effects | None | Significant effects | The Proposed Development is committed to participating in the ECMG, to discuss and agree potential strategic monitoring initiatives in relation to offshore bats. The need for strategic monitoring and the level of participation by individual projects will be determined by the conclusions of the EIAR process, in consultation with statutory and technical stakeholders, and with a focus on validation and. evidence gathering. |

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