

6. TERRESTRIAL BIODIVERSITY

6.1 Introduction

Ecology Ireland Wildlife Consultants Ltd. (Ecology Ireland) was commissioned by Orsted Onshore Ireland Midco Ltd. (Ørsted) to provide the Terrestrial Biodiversity chapter to the EIAR in relation to the Proposed Repowering of the Existing Kilgarvan Wind Farm, Co. Kerry. This chapter describes the terrestrial biodiversity features, with Aquatic Ecology dealt with separately in Chapter 7.

This chapter examines potential effects and impact significance during the construction, operation and decommissioning phases of the Proposed Development. The baseline ecological conditions are described through discussion of desktop and field studies carried out to inform this assessment. Cumulative impacts of the proposal in combination with other plans and projects are assessed. Appropriate mitigation measures to avoid, remediate or reduce potential significant negative direct, indirect and cumulative impacts on terrestrial biodiversity receptors are described and the overall residual impacts are assessed.

Details of the Proposed Development are provided in which is described in Chapter 4: Description of the Proposed Development of this EIAR. The Proposed Development will comprise the removal of 28 no. existing wind turbines, the erection of 11 No. wind turbines with a maximum blade tip height of 199.5-200 metres and all associated works. The Proposed Development will utilise the existing onsite 110kV Coomagearahy substation, which in turn connection to the existing Clonkeen 110kV substation via an existing 110kV overhead line. The planning application will be submitted to An Bord Pleanála as a Strategic Infrastructure Development (SID), as the 11 no. turbines meet the potential generation capacity of greater than 50MW.

The Existing Kilgarvan Wind Farm encompass a number of distinct wind farm projects, each with their own separate planning permissions, as detailed in Chapter 1, Section 1.1.2.

The Proposed Development involves the removal of 28 no. turbines and the erection of 11 no. wind turbines. The proposed turbines are located in close proximity to the existing turbines and other wind farm infrastructure.

6.2 Statement of Authority

The Ecology Ireland project team included specialist ecologists in a number of disciplines including a larger number of field ornithologists. Brief biographies of key team members are provided below. Details on the wider field team are provided in Appendix 6-1.

Dr Gavin Fennessy

Ecology Ireland Wildlife Consultants Ltd. were commissioned by the developer to conduct an ecological impact assessment in relation to terrestrial biodiversity for Proposed Repowering the Existing of Kilgarvan Wind Farm. The team was led by Dr Gavin Fennessy (BSc PhD MCIEEM) Director & Principal Ecologist of Ecology Ireland Wildlife Consultants, a consultant ecologist with almost 25 years' of experience in environmental consultancy. Dr Fennessy has contributed to and Project Managed numerous ecological impact assessment projects including EcIA, EIA, AA, SEA *etc.* Gavin is also an experienced Expert Witness having presented expert testimony at several An Bord Pleanála Oral Hearings. He is also an experienced lecturer and has regularly contributed to B.Sc. Env. Sc. courses at UCC. Gavin is the Dublin Airport Authority retained expert on wildlife hazard and bird strike risk. He sits on the national Wildlife & Bird Hazard Management Committee.

Dr John Conaghan

Dr. John Conaghan (BSc PhD MCIEEM) is one of Ireland's leading botanists. He has decades of experience as a professional independent consultant and is recognised for his expertise in habitat management and restoration. He has been a lead researcher on EU Life projects on peatland restoration and has project managed surveys of various Annex I habitats. He was an advisor to the National Vegetation Database Advisory Group. John is Vice County BSBI Recorder for West Galway. He carried out detailed vegetation and habitat surveys at the existing wind farm site.

John Deasy

John is an independent ecological consultant with experience across a range of ecological disciplines including botanical and habitat surveys, bird surveys, mammal surveys and protected invertebrate surveys. He has 10 years of experience as a professional ecologist and has undertaken a range of botanical and habitat surveys including baseline surveys for renewable energy projects, shared-use greenways and domestic and commercial properties. These surveys have included non-native invasive species surveys, rare species surveys and evaluations of habitats listed on Annex I of the EU Habitats Directive. John holds a MSc. in Ecological Assessment and BSc. in Earth and Environmental Science from University College Cork and is a member of the Botanical Society of Britain and Ireland. John carried out field surveys and contributed to the impact assessment in this chapter. He helped co-ordinate the field observers.

Tom O'Donnell

Tom O'Donnell is a Chartered Environmentalist and a full member of the Chartered Institute of Ecology and Environmental Management. He was awarded a BSc in Environmental and Earth System Science [Applied Ecology] from UCC in 2007 and an MSc in Ecological Assessment in 2009, both from UCC. He has gained significant experience in ecological assessment and environmental management over the last 15 years of professional employment. Tom has particular experience in bat survey, bat conservation and bat call sonogram analysis using Kaleidoscope Pro. Tom organised and carried out bat and non-volant mammal surveys at the site assisted by his colleagues in O'Donnell Environmental.

Athena Michaelides

Athena Michaelides (BSc Zoology & Animal Biology) has over five years of experience as a professional ecological consultant. She is a former secretary of the Irish Wildlife Trust with particular experience in field surveys and reporting as part of Ecological Impact Assessments. Athena formerly was employed by Ryan Hanley Consulting Engineers and now works as an independent ecologist. Athena assisted in the desktop review and report compilation process and produced GIS mapping for this chapter.

Ciaran Cronin/Abi Brewer (Wildeye)

Ciaran is a professional ecologist with over 30 years' experience identifying animals and plants in Ireland and the UK. Since 2008, he has operated as a freelance ecological consultant (Wildeye), conducting Ecological Assessments and Surveys. Ciaran and his partner Abi are trained expert dog handlers and have a wide range of ecological expertise. In recent years they have concentrated on developing a fatality monitoring practice, using highly trained dogs to detect bird and bat fatalities at wind farms. They use scavenger removal and blind detection trials to calibrate the results generated from regular searches around turbine bases. Wildeye carried out 14 months of fatality monitoring at the Existing Kilgarvan Wind Farm.

6.3 Methodology

The assessment involved undertaking field assessments and a desktop review, which are described in the relevant sections below, taking due regard of guidelines relating to ecological assessments (e.g. EPA 2022, CIEEM 2018). Detailed field surveys were carried out at the Proposed Development site between 2018 and 2022.

6.3.1 Relevant Guidelines

Guidelines relevant to the terrestrial biodiversity assessment (surveys and assessments) are outlined in the corresponding sections below.

6.3.2 Designated Sites

European (Natura 2000) sites include Special Areas of Conservation (SACs) and Special Protection Areas (SPAs) for birds, nationally designated sites include Natural Heritage Areas (NHAs) and proposed Natural Heritage Areas (pNHAs). Designated nature conservation sites in the vicinity of the Proposed Development were considered in detail as part of the terrestrial ecological assessment. Geographical Information Systems (GIS) software was used to map and measure the distance from the site boundary to nationally and European designated conservation sites. The boundary shapefiles were downloaded from NPWS in October 2023 (10/10/2023). The potential for likely significant effects on European designated Natura 2000 sites arising from the Proposed Development is considered as part of a Screening for Appropriate Assessment and consequently the potential for adverse effects of the Proposed Development (in combination with other plans or projects) on Special Areas of Conservation and Special Protection Areas is assessed in the Natura Impact Statement that accompanies the EIAR.

6.3.3 Habitat & Botanical

A desktop review of botanical data available for the study area was undertaken by consulting online databases to identify botanical species of interest (e.g. rare, protected) previously recorded within the relevant national grid squares that overlap the study area; in this case a review was undertaken of the R16 and R17 10km national grid squares from the National Biodiversity Data Centre (NBDC) online database. A review of the Flora Protection Order (FPO) Map Viewer – Bryophytes database as held by the NPWS was also reviewed (14th June 2023).

The habitat and flora site assessment was carried out in accordance with current Irish habitat survey guidelines (Smith *et al.* 2010). A preliminary botanical survey and habitat mapping exercise was carried out by Michelle O’Neill (BSc MSc) assisted by Claire Deasy (BSc MSc) on 8th & 9th September 2019, 12 February 2019 and 26th August 2019. Further specialist survey walkovers were carried out by Dr. John Conaghan and Claire Deasy (24th & 29th September 2021) with additional visits by Dr. Conaghan on 12th July 2022 and 10th November 2022.

The aim of the field surveys was to describe the habitat and vegetation composition throughout the survey area with particular attention to areas in which it is proposed to site new wind farm infrastructure. Habitats occurring within the survey area were classified according to the scheme outlined in “A Guide to Habitats in Ireland” (Fossitt 2000). During the surveys particular attention was paid to the possible occurrence of plant species listed in either the 2022 Flora Protection Order or the Irish Red Data Book (Curtis & McGough 1988). Where relevant, comparisons are drawn with EU Annex habitats of conservation importance listed in the EU Habitats Directive (European Commission, 2007). Vascular plant species nomenclature in this report follows (Stace 2010) while that of mosses follows Smith (2004).

The surveys were greatly aided by the availability of recent aerial photography of the survey area. In addition to surveying and describing the distribution of habitats and vegetation, a number of photographs were taken and a selection of these have been included in this report.

The conservation status of habitats and flora was considered in respect of the following: Irish Red Data Book for Vascular Plants (Wyse Jackson *et al.* 2016); Red List of Bryophytes (Lockhart *et al.* 2012); Flora Protection Order (2022); the EU Habitats Directive (92/43/EEC). Evaluation of the habitats present in terms of their ecological value was assessed using criteria amended from NRA (2009) and Nairn and Fossitt (2004).

6.3.4 Non-Volant Mammals

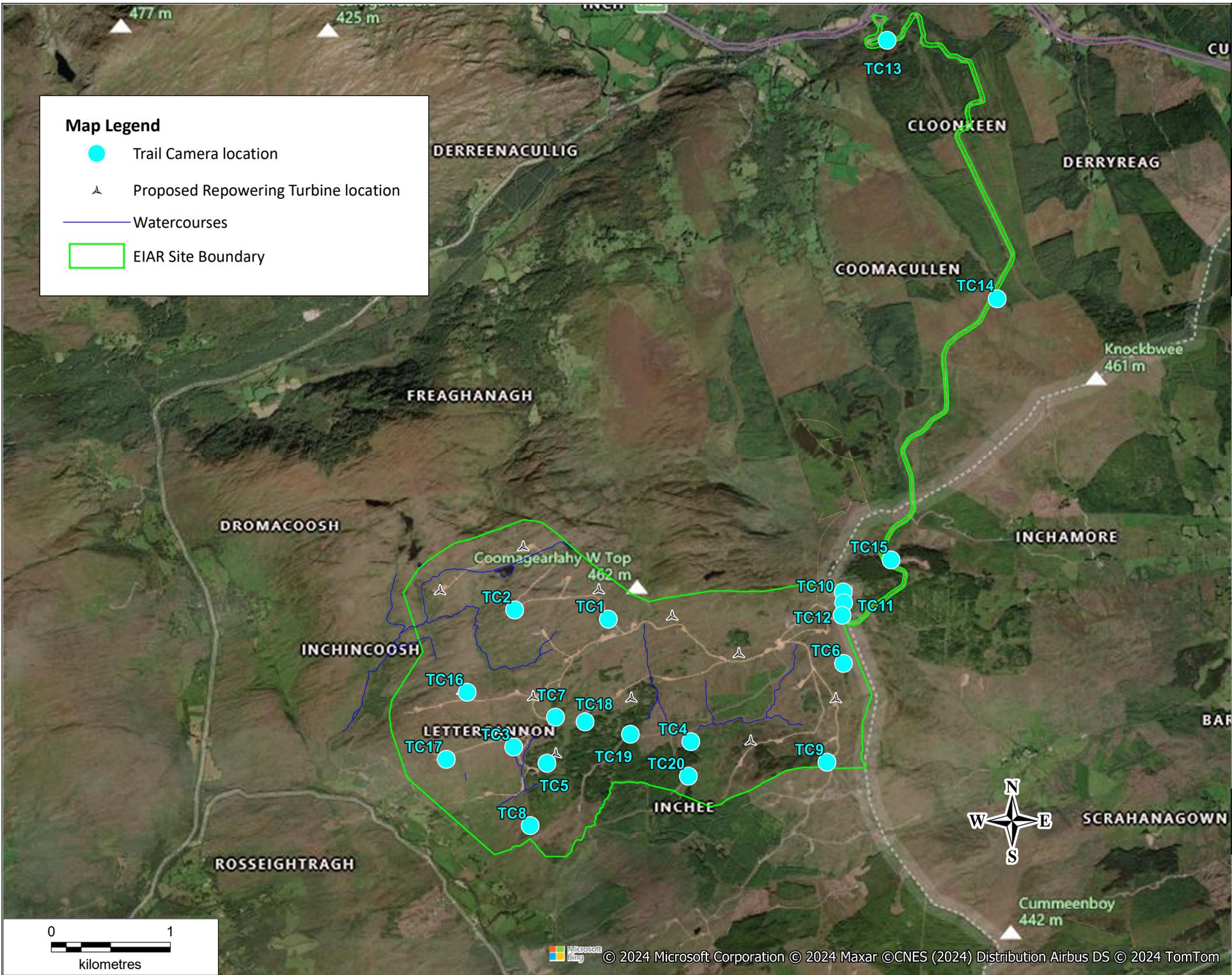
Non-volant mammal field surveys at the terrestrial biodiversity study area comprised of walkovers and long-term deployment of multiple wildlife trail cameras that were supplemented by casual records made in the course of other terrestrial field surveys (e.g. night-time active bat surveys, VP surveys). Details of the dedicated schedule and trail camera deployment dates are provided in Appendix 6-1, with trail camera deployment locations shown in Figure 6-1. Walkovers of the site to record signs of non-volant mammals were carried out over several days from 2018 to 2022 and these dates are provided in Appendix 6-1.

During the walkovers, all sightings and signs of mammal species or signs of mammal activity (e.g. droppings, tracks, burrows, setts, holts etc.) were recorded using field notes and/or hand-held GPS units. Techniques used to identify mammal activity followed recognised guidelines (e.g. Clark 1988, Sutherland 1996, Bang & Dahlstrom 2004 and JNCC 2004).

Trail cameras were deployed at a total of 20 locations from record mammal activity in the study area (Figure 6-1). These trail cameras ('camera traps') are small camera units that are left in situ to record mammals that pass close to the deployment locations. The trail camera deployments were for an average of 115 days (range: 7-374 days).

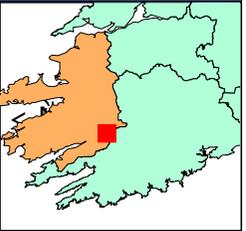
The fatality monitoring (for birds and bats) described in Section 6.3.1.4.3 below included a scavenger removal trail which also yielded some supplementary information on the non-volant mammal activity at the Proposed Development site.

A desktop study of non-volant mammal data was also undertaken by consulting the NBDC online mapping database to identify species historically recorded within the relevant 10km and 2km national grid squares overlapping the terrestrial biodiversity study area (data accessed July 2023). The conservation status of mammals was considered in respect of the following: EU Habitats Directive; Irish Wildlife Acts (1976 - 2012 as amended); Red List of Terrestrial Mammals (Marnell *et al.* 2019).



Map Legend

- Trail Camera location
- ▲ Proposed Repowering Turbine location
- Watercourses
- EIA Site Boundary



Client Name:
Orsted

Project Title:
Kilgarvan Wind Farm Repowering

Figure Name:
Trail Camera Deployment location

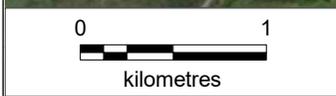
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6.3.5 Bats

Multi-year and multi-season bat field surveys at and in the vicinity of the study area were carried out. This included both active and passive detector surveys from 2018 to 2022 inclusive.

The only structures on site are the existing onsite 110kV Coomagearlahy substation building and pre-fabricated container office space. None of the structures present have any suitability for roosting bats. A request for information on historic bat roosts was submitted to Bat Conservation Ireland. In relation to potential for impacts on bat roosts, NatureScot (and the more recent NIEA 2022) guidelines, recommend a search area of at least 200m plus one rotor diameter, which in the current proposal represents a maximum distance of 363m from the proposed turbine locations. An examination of aerial mapping confirmed the absence of any structures attractive for roosting bats within 500m of the nearest proposed turbine location.

Prior to the publication of the SNH guidelines (2019; and as revised NatureScot 2021) a range of passive and active surveys were conducted. These 2018-2019 passive surveys sought to record activity in the range of habitats represented within the Proposed Development site (Figure 6-2). In 2021-2022 there were deployments in Spring, Summer and Autumn at proposed turbine locations. As the design of the wind farm evolved the location and number of proposed turbines also changed. However, sampling locations covered all parts of the site and have produced detailed information on the activity across all parts of the site and throughout the year. These passive detector deployment locations are shown in Figure 6-3. Ultrasonic microphones were deployed at height on the two existing met masts at the site with the mic secured at c. 55m above ground level. These were used to monitor bat activity at height during deployments in 2018-2022.

The 2021-2022 multi-season deployments were informed by guidance from SNH (2019; subsequently revised as NatureScot 2021). Survey methodologies are described below. The conservation status of bats was considered in respect of the following: Irish Wildlife Acts (1976 - 2012 as amended); Red List of Terrestrial Mammals (Marnell *et al.* 2019); EU Habitats Directive.

6.3.5.1 Passive Detector Surveys

Passive bat detectors (Wildlife Acoustics SM3BAT & SM4BAT) were deployed at various locations across the site (Figure 6-2 & Figure 6-3) between 2018 and 2022. In 2018 and 2019 the approach was to deploy the detectors across the range of habitats present to generate a picture of the species diversity and pattern of occurrence of bats in the area. In 2021 and 2022 passive detectors were deployed at a selection of the proposed turbines locations (Figure 6-2). A multi-season passive detector study was carried out in spring/summer 2022, summer 2022 and autumn/winter 2022 according to guidance from NatureScot (2021), with modifications applied for an Irish context (see below). Details of the survey periods is available in Appendix 6-1 with the passive detector deployment locations provided in Figure 6-3.

Passive bat detectors were deployed at a height of approximately 2m above ground level where possible. Microphones on long extension cables were placed at height on both of the existing met masts (ITM 506631 576054; ITM 507859 576579). Detectors were set to record bat calls (i.e. bat passes) from 30 minutes before sunset until 30 minutes after sunrise where GPS locations were set on each detector so that the units could automatically adjust their start and finish times based on sunrise/sunset times relative to the GPS locations. Bat calls were recorded onto SD cards within the passive detectors to allow post-hoc species identification of bat recordings through sonogram analysis. The recorded bat calls were processed and automatically identified using Kaleidoscope Pro software (V. 5.6) and the British Trust for Ornithology (BTO) 'Acoustic Pipeline' sound analysis tool. Automatic identifications were manually reviewed and verified following Russ (2012).

It is important to note that bat recordings are a measure of bat activity rather than a measure of abundance as recordings from the same species cannot be readily distinguished between individuals

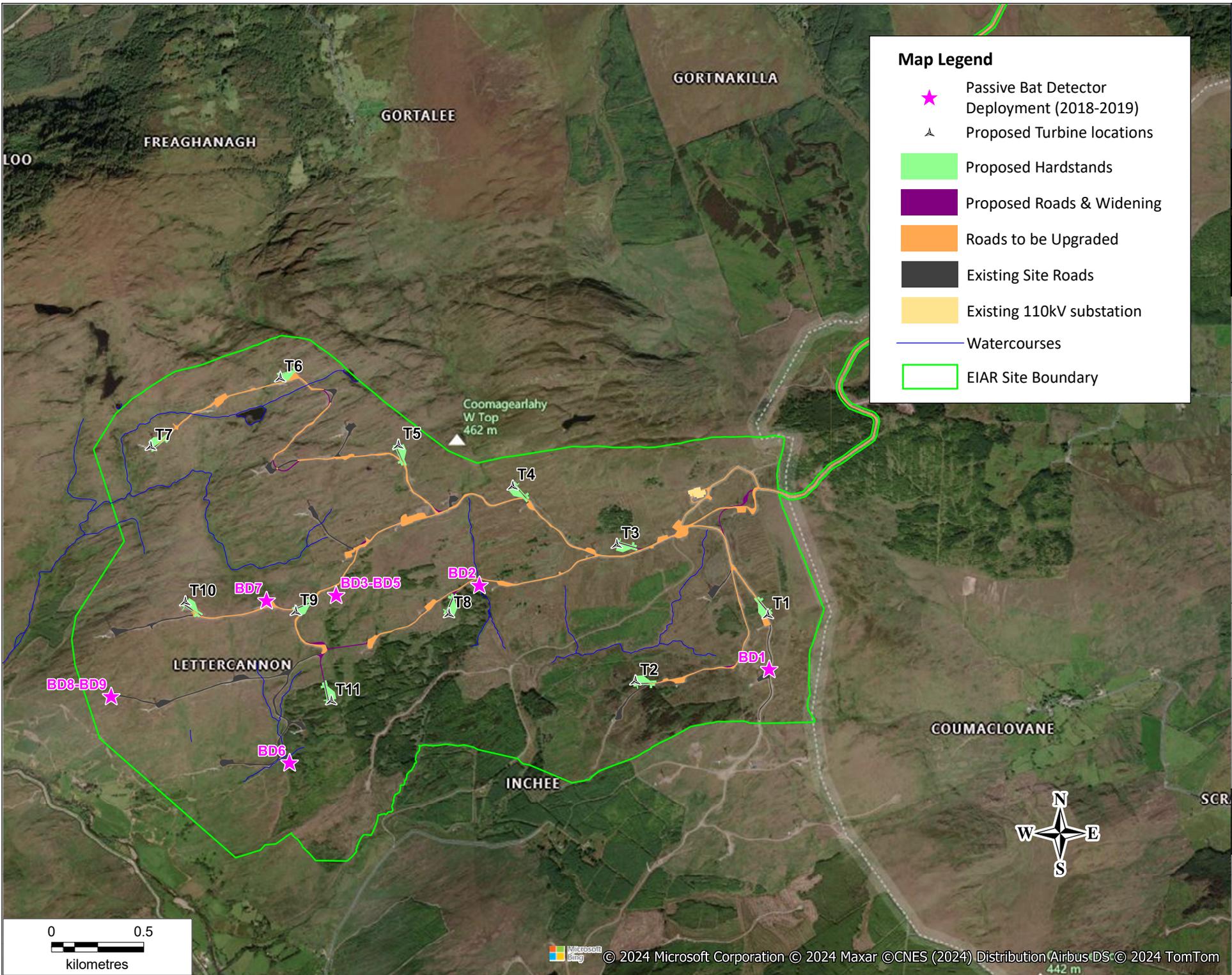
per se, especially in the absence of observations (see Collins 2016). In this case, a bat call or bat pass was defined as a recording of an individual species echolocation within a recording of up to 15 seconds duration (as prescribed in the settings for each Wildlife Acoustic SM3/SM4 full-spectrum unit), thereby allowing comparison of bat passes between passive monitoring units in this study. Sampling locations were chosen based on then current design iteration of the Proposed Development layout.

A minimum of 11 deployment locations were used in each survey season from 2021-2022 (Appendix 6-6; Figure 6-3). In five of the six seasonal deployments, passive detectors were deployed at 12-13 locations. However, in summer 2021 a bat detector went missing from one location and therefore data was only recovered from 11 sampling locations. In Autumn 2022 the sampling locations were adjusted to the current Proposed Development layout.

Due to the iterative design process, the final proposed turbine locations do not exactly match the deployment locations in all of the survey seasons. The deployment periods all exceeded the minimum recommended durations and it is considered that these deployments generated a good picture of the usage and pattern of occurrence of the area by bats. A summary of the prevailing weather conditions during the periods of deployment is provided in Appendix 6-6.

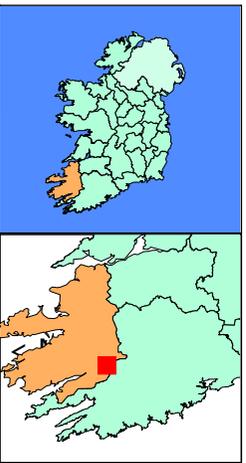
It is important to remember that the SNH (2019; NatureScot 2021) guidance was primarily written for a Scottish context. While survey effort and design here were carried out taking due regard of this guidance, the guidelines were adapted to an Irish context as follows:

- The timing of seasonal survey makes allowance for differences in seasonality between Scotland and Ireland in order to capture representative seasonal bat activity.
- SNH (2019) recommended the use of an online tool, 'Ecobat' to provide a measure of relative bat activity. The tool compares site specific inputted data to a comparator database to provide an interpretation of the level of bat activity compared to other regions across Britain. Therefore, this tool is not considered to be relevant in an Irish context (due to different range of species and differing ecology) and therefore interpretation of relative activity level at the proposed site versus other similar sites in Ireland relies on the expertise and experience of the authors. In addition, the tool has been unavailable online for almost a year at the time of writing and there is no indication if it will become available for use here or in the UK in the future.
- Assessment of vulnerability of bats to wind farms, including assessment of collision risk, generally follows the procedure outlined in SNH (2019) but with amendments to reflect the Irish species assemblage and the different relative abundance of individual species in an Irish context.



Map Legend

- ★ Passive Bat Detector Deployment (2018-2019)
- ▲ Proposed Turbine locations
- Proposed Hardstands
- Proposed Roads & Widening
- Roads to be Upgraded
- Existing Site Roads
- Existing 110kV substation
- Watercourses
- EIAR Site Boundary



Client Name:
Orsted

Project Title:
Kilgarvan Wind Farm Repowering

Figure Name:
Passive Bat Detector Deployment locations (2018-2019)

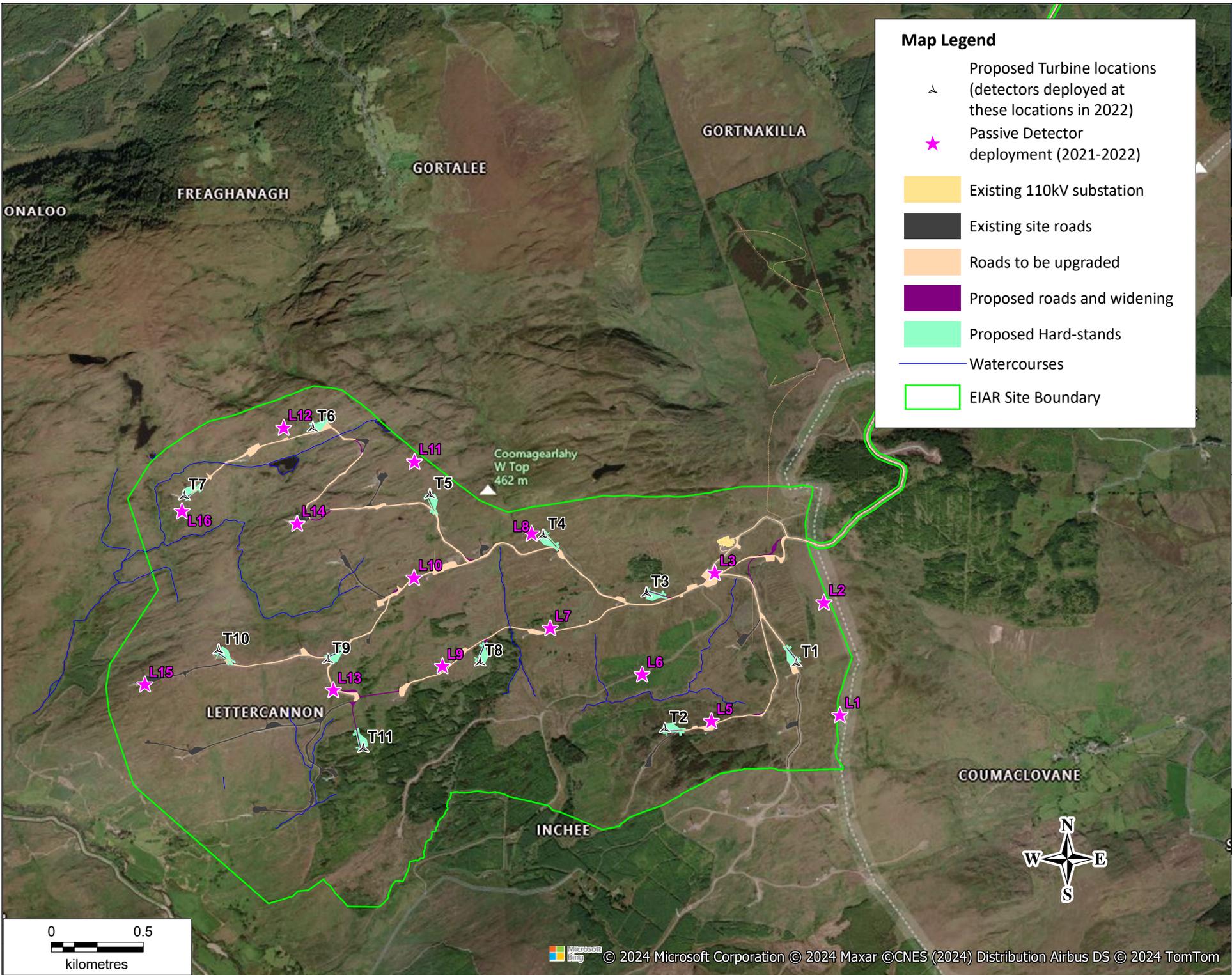
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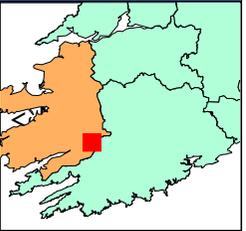


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Map Legend

- Proposed Turbine locations (detectors deployed at these locations in 2022)
- Passive Detector deployment (2021-2022)
- Existing 110kV substation
- Existing site roads
- Roads to be upgraded
- Proposed roads and widening
- Proposed Hard-stands
- Watercourses
- EIAR Site Boundary



Client Name:
Orsted

Project Title:
Kilgarvan Wind Farm Repowering

Figure Name:
Passive Bat Detector Deployment locations (2021-2022)

Date:
29/04/2024

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6.3.5.2 Active Bat Surveys

Car-based active transect surveys were carried out over a number of nights in 2018 (2), 2019 (2), 2021 (2) and 2022 (1) adopting the methodology used by Roche *et al.* (2004). In 2018 and 2019 the approach was to drive all internal roads within the Proposed Development site on two occasions after sunset during the most active months for bats (April-September).

Two summer season active surveys were carried out in 2018, 2019 and 2021 with an additional early season active survey in 2022. The active surveys in 2021 and 2022 included the existing road from the public road access at Cloonkeen. During these active surveys the internal wind farm roads were driven slowly (<15km/h) and a handheld bat detector (Wildlife Acoustic Touch Pro 2) was used to detect and record any bats active at the site. The dates and prevailing weather conditions during the active surveys are provided in Appendix 6-1. Any bat encounters were recorded for analysis with the locations of any 'triggers' also noted.

6.3.5.3 Fatality Monitoring - Bats

A detailed fatality monitoring survey was carried out around the turbines at the Existing Kilgarvan Wind Farm. The survey was designed by Ciaran Cronin of Wildeye, a professional ecologist with over 30 years experience identifying animals and plants in Ireland and the UK. He has received expert training in the design of fatality surveys and the handling and management of the highly trained carcass search dogs.

This survey used dogs to detect signs of carcasses of bats and birds. Specially trained dogs with expert handlers searched each turbine base and surrounding area out to approximately 50m from each of the turbines.

A core search radius of c. 50m radius from the turbine was decided upon following a review of the literature. Hull & Muir (2010) investigated the maximum distance at which an object striking a moving wind turbine blade could theoretically be thrown, using ballistic modelling. This can provide a core search area, beyond which carcasses cannot feasibly be thrown. The lightest object they modelled was approximately 11.5g, and for a small turbine (65m hub and 33m blade) the object could land a maximum distance of 59m from the turbine (up to 97m for large bird and 45m for 14g bat). There are confounding factors, but it could be expected that a Pipistrelle bat (weight c.5g) would thus fall significantly closer than 45m, and even a large bird was acknowledged to be likely to fall significantly closer than maximum modelled distances, due to effects of wind resistance on feathers etc. Kerns (2005) searched for bats at two sites under turbines with blade tip heights of 104.5m and 115m. At one site they found 93% of bat/bird fatalities within 40m of the turbine base with only 1.5% found at more than 50m. At the other, 84% of fatalities were within 40m (with 14% of bat carcasses within 10m). Between both sites combined, less than 3% of fatalities were found at more than 50m. Mathews *et al.* (2016) searched 46 turbine sites for bat carcasses between 2011-2013 using trained dogs and an average search interval of 2.5 days. 120 bat carcasses were found, with 80% within 30m and 93% within 40m of the turbine base. Mathews *et al.* (2016) references a paper by Brinkmann (2005) where the majority of bat carcasses were also found within 40m of the hub.

Searches commenced in September 2021 and searches were carried around each turbine base out on 14 occasions up to November 2022 (see schedule in Appendix 6-5). There was 7 no. searcher efficiency tests and three separate scavenger removal trials conducted over this period. In the scavenger removal trials, dead birds or mammals collected as roadkill were placed at locations near operational turbines and trail cameras were set to record the occasions where the carcasses were scavenged. Any signs of bat or bird fatalities were recorded in detail. Scans of fieldsheets, including observer efficiency trials and scavenger removal logs are provided in Appendix 6-3.

6.3.5.4 Desktop Study

A desktop study of bat data was also undertaken by consulting the NBDC online mapping database to identify bat species historically recorded within the relevant 2km and 10km national grid squares overlapping the terrestrial biodiversity study area. The NBDC online mapping database also hosts the Model of Bat Landscapes for Ireland, which has assessed the relative importance of landscape and habitat associations for bat species across Ireland (see Lundy *et al.* 2011); therefore, the landscape resource value for bats within the 10km national grid squares overlapping the study area here was also reviewed.

Data on historic bat roosts in the wider area was sourced from Bat Conservation Ireland and the approximate locations of roosts mapped using GIS. Exact locations of roosts are not revealed due to the sensitivity of this information.

6.3.6 Birds

Desktop and field surveys were conducted to record the avian usage of the site throughout the year. Field surveys were carried out between 2018 and 2022. Due to travel restrictions associated with the Covid-19 pandemic the surveys were interrupted in Spring 2020 and recommenced in winter 2021. Full breeding season surveys were completed in 2018, 2019 and 2022 (3 seasons) and full winter season surveys were completed over 2018/2019, 2019/2020 and 2021/2022 (3 seasons). This represents a considerable amount of field data, comfortably in excess of the minimum recommended coverage. Surveys carried out included detailed Vantage Point (VP) and hinterland surveys, breeding and winter transect and point count surveys, a tape-lure survey for Red Grouse, *Lagopus lagopus hibernicus* (under licence) and dog-based fatality monitoring around the existing turbines.

In addition to the field surveys, a desktop study was also undertaken by consulting the National Biodiversity Data Centre (NBDC) online mapping database¹ to identify additional avian species historically recorded within the relevant 2km and 10km national grid squares overlapping the wind farm site. The conservation status of bird species was considered in respect of the following: Irish Wildlife Acts (1976 – 2012 as amended); Birds of Conservation Concern in Ireland (BoCCI) Red, Amber and Green lists (see Gilbert *et al.* 2021); EU Birds Directive (2009/147/EC) Annex I list.

6.3.6.1 Vantage Point & Hinterland Surveys

Standard vantage point (VP) field surveys were undertaken with due regard to NPWS VP methodology recommendations and guidance by Scottish Natural Heritage (SNH 2017). SNH 2017 guidelines recommend that breeding/winter season surveys for target bird species be completed as part of assessments of proposed wind farm sites, with typically 6 hours of coverage per month from each VP location per season (SNH 2017). Winter surveys were undertaken between October and March with breeding season VP surveys carried out between April and August. Target species here included raptors, waterbirds and other high conservation value species, such as Hen Harrier, *Circus cyaneus* and any other Annex I species such as Peregrine Falcon *Falco peregrinus*, White-tailed Eagle, *Haliaeetus albicilla* and Golden Plover *Pluvialis apricaria*.

A study area encompassing the existing wind farm was provided in 2018 and was used as the core area for the focussed VP surveys (Figure 6-4). A total of seven vantage point locations were used for the VP surveys completed at the site, covering three breeding and three winter seasons. These VPs afforded views of the existing wind farm and surrounding area and allowed co-ordinated observations of flightlines of target species to be made of the wider area. The location of the VPs used is shown in

¹ <https://maps.biodiversityireland.ie/Map>

Figure 6-4. The schedule of the VP surveys completed during this period is provided in Appendix 6-1, along with the observers involved, the prevailing weather conditions on each survey visit etc.

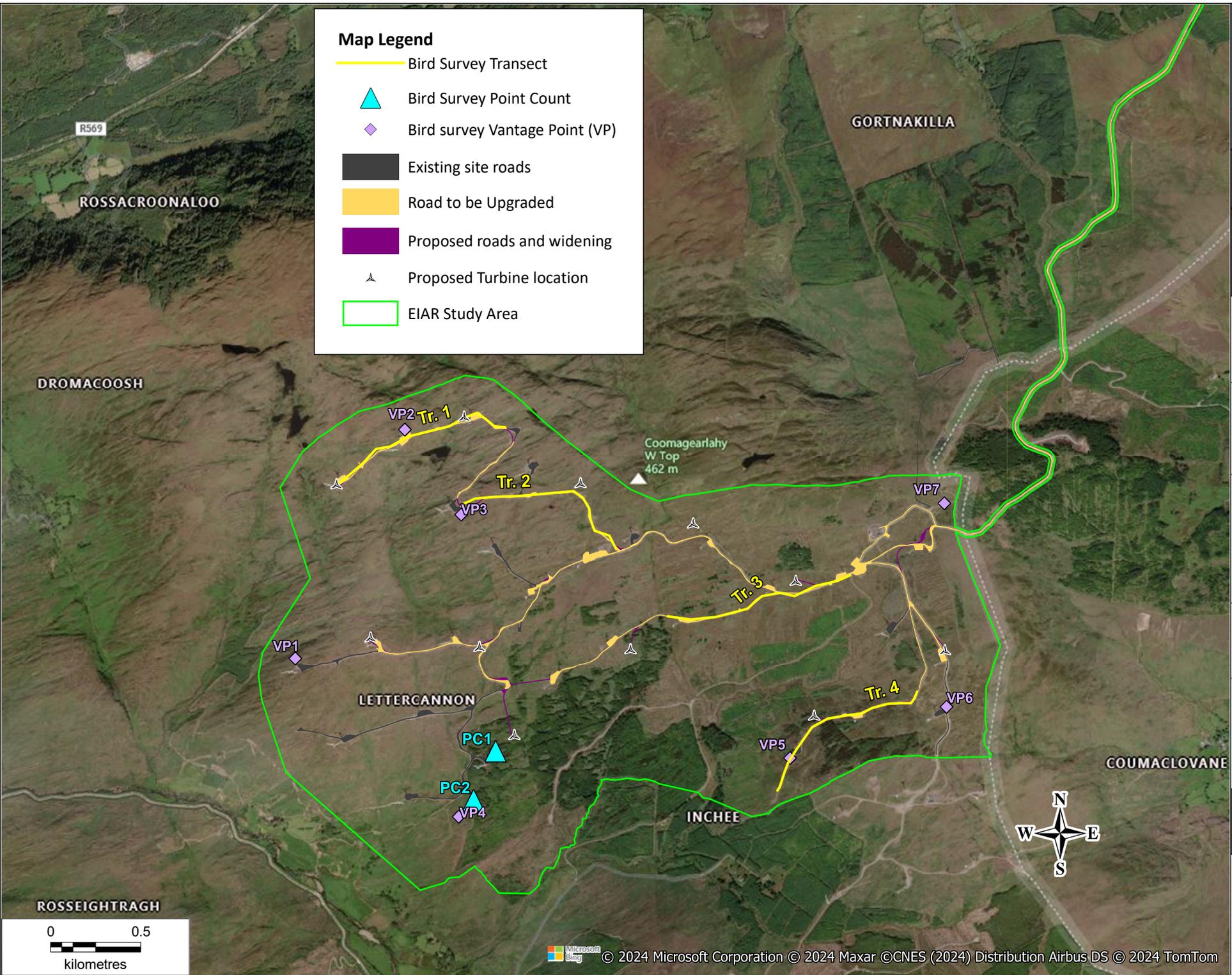
During each breeding season survey (2018, 2019 & 2022) four days of hinterland surveys were carried out, with two days observations in the early breeding season and two days in the late breeding season, concentrating on a 6km area around the original terrestrial ecology study area (Figure 6-5). These early and late season hinterland surveys (Hardey *et al.* 2013) were completed primarily to record any evidence of nesting birds of prey in the wider area. A 6km search area, focussing on suitable habitats for such species was used as recommended (*loc cit.*) given the known presence in the area of White-tailed Eagle. There is no suitable roost habitat for Hen Harrier within or in the vicinity of the EIAR Site Boundary.

All bird species heard or seen during the VP and hinterland watches were noted. Detailed field records were taken of target species (heard or seen) with as much of the following information recorded as possible:

- > Species and estimated number
- > Time first observed; Duration of observation; Estimated time on-site; Estimated time off-site
- > Flight-line – drawn on a field map and numbered to link with associated field notes
- > Estimated flight height – initial height estimate and any marked change noted during period of observation.
- > Any other observations of note: behaviour, association or interaction with other species, turbines *etc.*

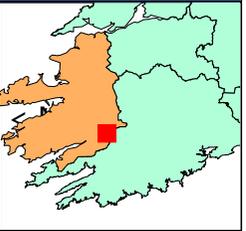
Field surveys were undertaken using appropriate survey equipment as required (*e.g.* GPS units, binoculars, scope, notebooks *etc.*) and during suitable weather conditions. All field observers communicated with two-way radios/mobile phones to allow co-ordination in the event that a Hen Harrier, or other noteworthy (i.e. Annex I) species, was observed at or close to the site.

A list of all birds seen or heard during each of the VP watches was recorded and these data collated to produce a taxa list of species present in each survey season.



Map Legend

- Bird Survey Transect
- ▲ Bird Survey Point Count
- ◆ Bird survey Vantage Point (VP)
- Existing site roads
- Road to be Upgraded
- Proposed roads and widening
- ▲ Proposed Turbine location
- EIAR Study Area



Client Name:
Orsted

Project Title:
Kilgarvan Wind Farm Repowering

Figure Name:
Bird Survey Transects, Point Counts & VP locations

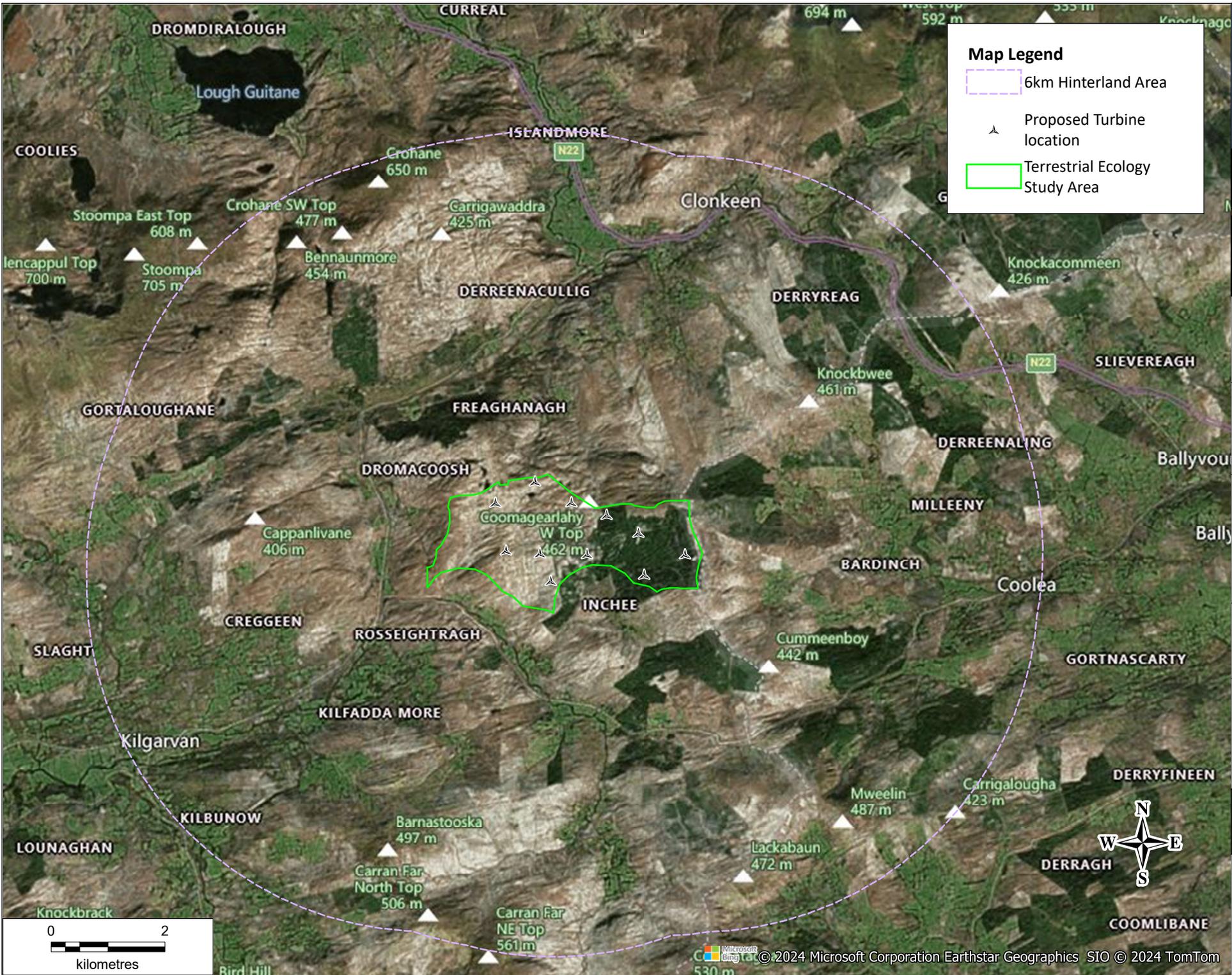
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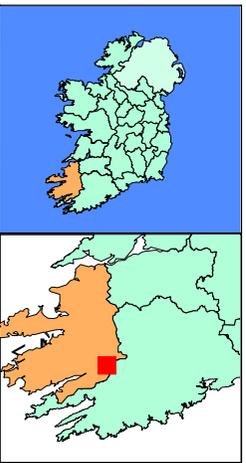


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Map Legend

- 6km Hinterland Area
- Proposed Turbine location
- Terrestrial Ecology Study Area



Client Name:
Orsted

Project Title:
Kilgarvan Wind Farm Repowering

Figure Name:
Hinterland survey area

Date:
29/04/2024

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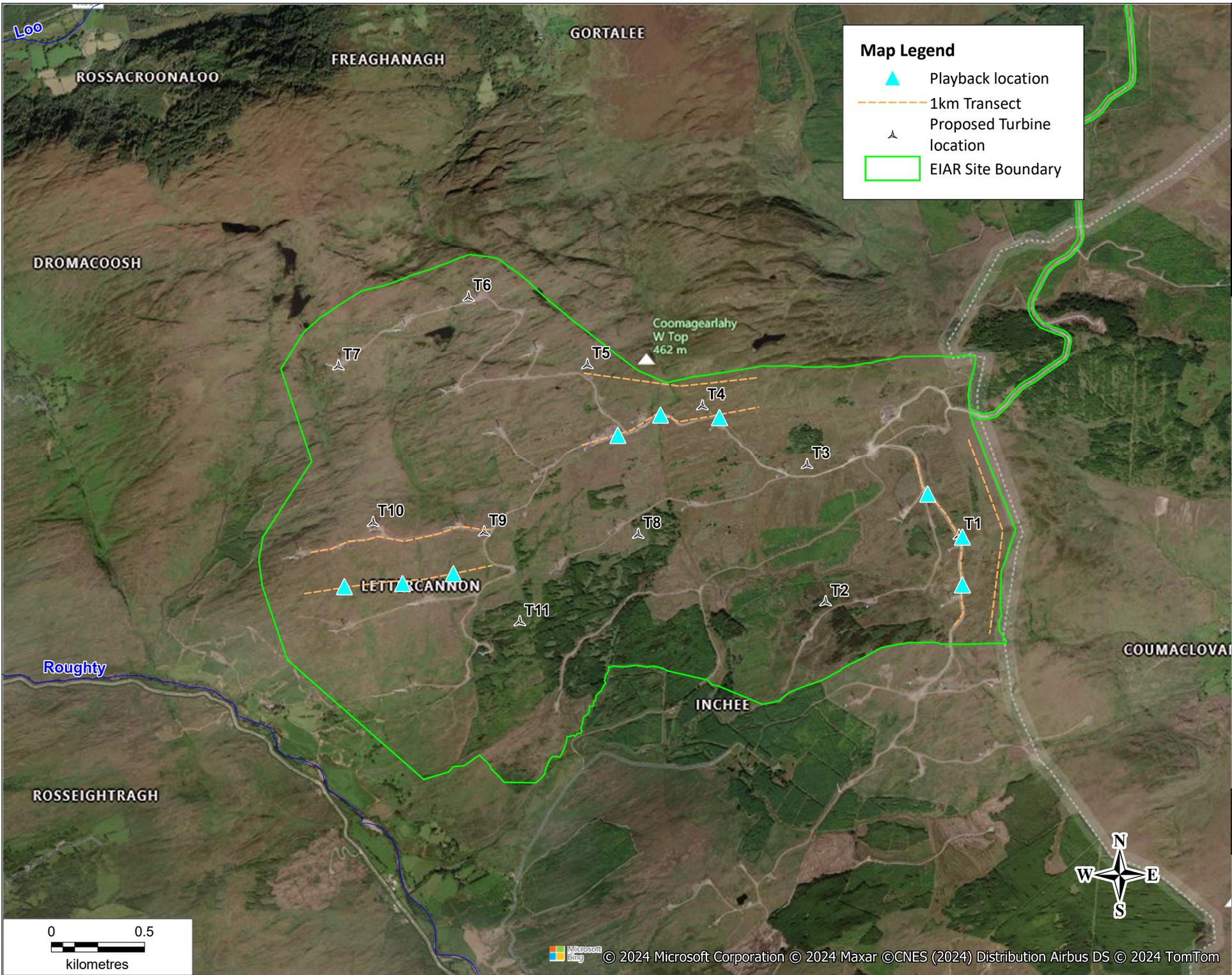
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6.3.6.2 Breeding & Winter Season Transects

Figure 6-4 shows the location of four transects and two point count locations used to assess the general breeding and wintering bird community present at and in the vicinity of the Proposed Development site. The transects were chosen to record the general bird community across the range of habitats present, using a standard approach (Bibby *et al.* 2000).

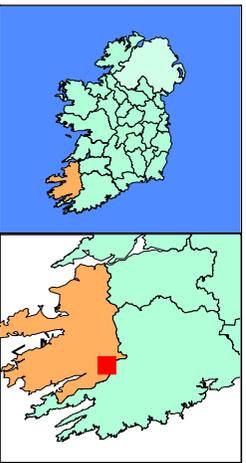
Transects were each *c.* 1km in length and were surveyed on two occasions in each of the breeding and winter seasons (Appendix 6-1). All birds seen or heard on transect were recorded in two distance bands from the observer (<100m, >100m). The species and their abundance along each of the walked transect was noted on each survey occasion. The point counts were located within conifer plantation and were also surveyed twice in each survey season. Birds seen or heard were recorded in two distance bands (<50m, >50m) over a ten-minute period.

On 26th March 2019, two 1km transects were surveyed for Red Grouse, using tape-lure playback under licence from NPWS (Licence 33/2019; Cummins *et al.* 2010). The surveys were undertaken by Aidan Duggan and Rory Dalton under the supervision of Dr. Gavin Fennessy. The transect routes and playback locations are shown in Figure 6-6. The methodology applied was adapted from Cummins *et al.* (2010). Three parallel 1-km transects were walked on areas of suitable open bog habitat within the proposed site with playback of a calling Male Red Grouse along each of the survey transects (Figure 6-6). Playback is initiated for 20-30 seconds with the calls amplified through a large portable megaphone. There is then a pause in playback and the observers scan the surrounding area with binoculars and record any response heard or seen. A second playback is conducted if there is no definite response to the first playback session. Playback takes place at approximate 250m, 500m & 750m points along each transect. Any additional signs of occupancy by Red Grouse – droppings, feathers etc. were also recorded.



Map Legend

- ▲ Playback location
- 1km Transect
- ▲ Proposed Turbine location
- EIAR Site Boundary



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Project Title:
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Figure Name:
Red Grouse survey transects



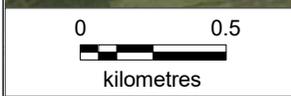
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6.3.6.3 Fatality Monitoring – Birds

As described in Section 6.3.5.3 an intensive dog-based fatality monitoring survey was carried out at the existing Kilgarvan Wind Farm turbines between September 2021 and November 2022. All records of probable or likely bird strike fatalities were recorded.

6.3.7 Other Protected Fauna

Observations of other terrestrial taxa casually noted during other terrestrial biodiversity surveys were also included as part of this assessment. A desktop study of other terrestrial taxa was also undertaken by consulting the NBDC online database² to identify additional other taxa species that are legally protected previously recorded within the relevant 2km and 10km national grid squares overlapping the terrestrial biodiversity study area.

Kerry Slug, *Geomalacus maculosus*, was known to occur at the site and was observed widely from areas of exposed siliceous rock on initial site visits in 2018. Trees were visually checked at night (under torchlight) during the active bat survey visits for any signs of occurrence of Kerry Slug in the conifer plantation at the wind farm site.

Lough Nabirria was visited regularly in parallel with bird VP visits and any insects and other taxa such as Common Frog, *Rana temporaria* were noted.

A limited amount of Marsh Fritillary, *Euphydryas aurinia* larval food plant, Devil's Bit Scabious, *Succisa pratensis*, was recorded within the wind farm during habitat and botanical assessment (Dry Heath area predominantly). The species has not been recorded in the W07 or W18 10km Grid Squares in recent decades (www.biodiversityireland.ie). However, there are several contemporary records of adult Marsh Fritillary from areas several kilometres to the east of the existing wind farm (NBDC). Areas with Devil's Bit Scabious were checked for signs of larval webs of Marsh Fritillary during site visits on August 21st 2019 and September 8th 2021. The timing of these surveys was in keeping with the guidance provided by the National Biodiversity Data Centre (<https://biodiversityireland.ie/app/uploads/2021/11/Marsh-Fritillary-Larval-Survey-Form.pdf>).

The conservation status of other taxa was considered in respect of the following: Irish Wildlife Acts (1976 - 2012 as amended); Irish Red List for Butterfly (Regan *et al.* 2010); Irish Red List for Damselflies & Dragonflies (Nelson *et al.* 2011); Irish Red List for Amphibians, Reptiles & Freshwater Fish (King *et al.* 2011); Regional Red List of Irish Bees (Fitzpatrick *et al.* 2006); EU Habitats Directive.

6.3.8 Aquatic Ecology

Aquatic ecology surveys and assessments are provided in Chapter 7 of this EIAR.

6.4 Results

6.4.1 Designated Nature Conservation Sites

The EIAR Site Boundary does not lie within any EU Natura 2000 site (Figure 6-7). The closest Natura 2000 site is Killarney National Park, Macgillycuddy's Reeks & Caragh River Catchment SAC (000365) is located within 0.1km of the entrance from the public road at Cloonkeen. The nearest of the proposed turbine locations is 1.6km from the SAC. There are two SPA sites located within 15km of the EIAR Site

Boundary, Mullaghanish to Musheramore Mts. SPA (004162) and Killarney National Park SPA (004038). There are a total of 9 no. SAC sites within 15km of the EIAR Site Boundary boundary. Only three Natura 2000 sites are located within 5km of the EIAR Site Boundary, Killarney National Park, Macgillicuddy's Reeks & Caragh River Catchment SAC, Old Domestic Building, Curraglass Wood SAC (002041; 2.8km) and Kilgarvan Ice House SAC (000364; 3.6km).

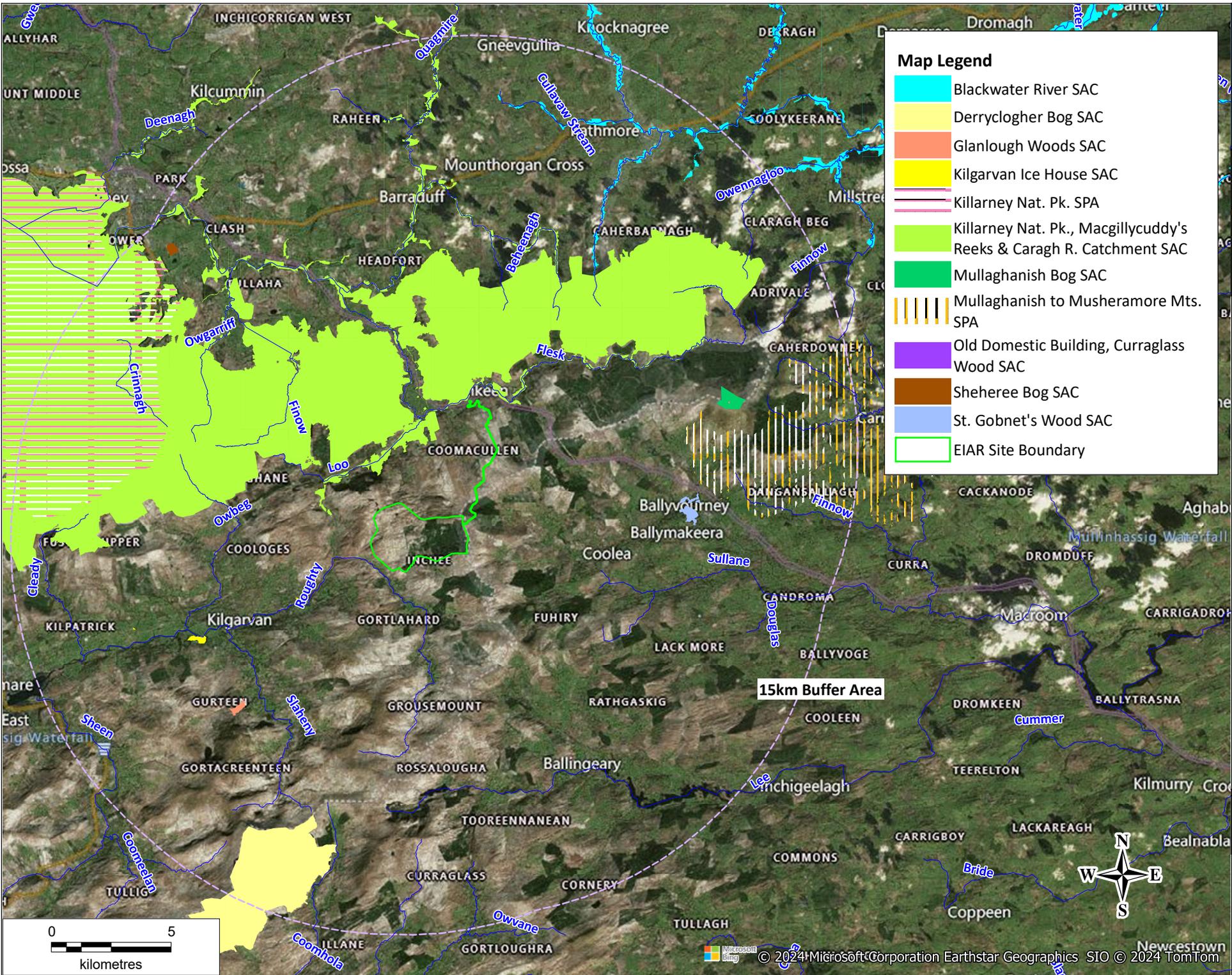
All potential pathways for impact on designated sites have been evaluated in the impact assessment both within and outside the nominal 15km buffer area around the site. This buffer area is an arbitrary distance used to display the sites most proximate to the Proposed Development. However, all sites within and outside of this 15km area are considered when assessing the potential for ecological impacts arising from the Proposed Development. The potential for ecological effects on sites at all distances from the Proposed Development are evaluated using the Source-Pathway-Receptor (S-P-R) model.

There are four NHA sites within 15km, with a further 15 pNHA sites located within 15km (Figure 6-8). There are 6 no. nationally designated sites located within 5km of the EIAR Site Boundary: Killarney National Park, Macgillicuddy's Reeks & Caragh River Catchment pNHA (000365; 0.1km), Roughty River pNHA (001376; 0.3km), Old Domestic Building, Curraglass Wood pNHA (002041; 2.8km), Sillahertane Bog NHA (001882; 3.0km), Kilgarvan Ice House pNHA (000364; 3.6km) and Kilgarvan Wood pNHA (4.7km).

Minimum distances to national and European designated sites are shown in Table 6-1. This table also presents the minimum distances from the nearest of the proposed turbine locations. A summary of the qualifying/special conservation interests of the Natura 2000 sites in the wider hinterland is provided in Table 6-2.

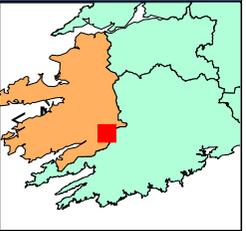
A detailed assessment of sensitive aquatic ecological receptors within catchments/sub-catchments with hydrological links to the Proposed Development site has been completed and is available in Chapter 7 of this EIAR.

The potential impacts of the Proposed Development on Natura 2000 sites in the surrounding area is considered in the Natura Impact Statement which accompanies the EIAR.



Map Legend

- Blackwater River SAC
- Derryclogher Bog SAC
- Glanlough Woods SAC
- Kilgarvan Ice House SAC
- Killarney Nat. Pk. SPA
- Reeks & Caragh R. Catchment SAC
- Mullaghanish Bog SAC
- Mullaghanish to Musheramore Mts. SPA
- Old Domestic Building, Curraglass Wood SAC
- Sheheree Bog SAC
- St. Gobnet's Wood SAC
- EIAR Site Boundary



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Figure Name:
Natura 2000 sites within 15km of EIAR Study Area

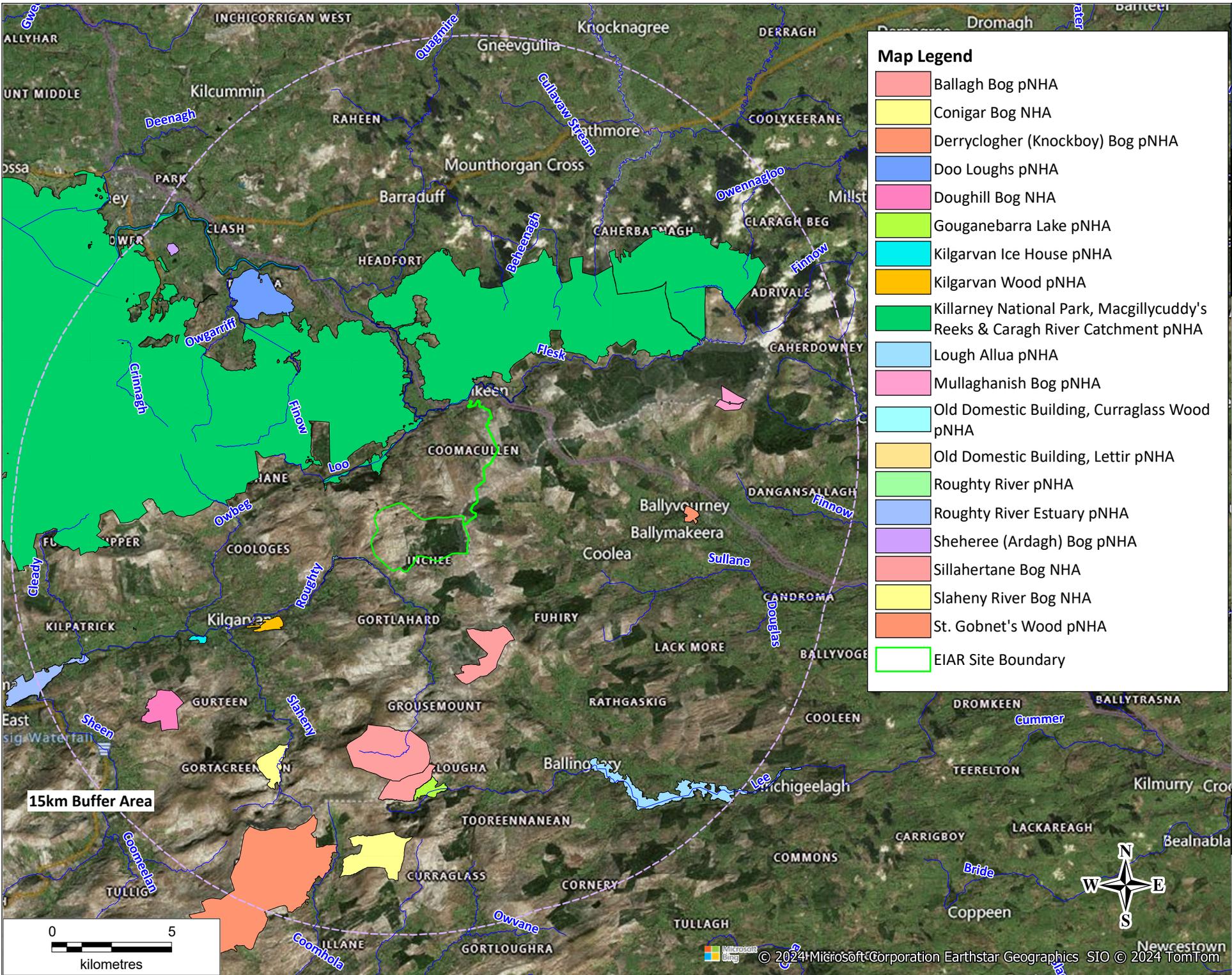
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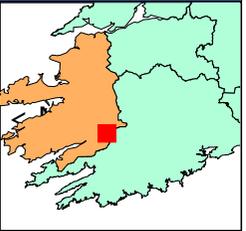
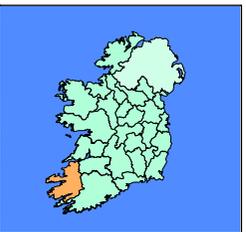
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Map Legend	
	Ballagh Bog pNHA
	Conigar Bog NHA
	Derryclogher (Knockboy) Bog pNHA
	Doo Loughs pNHA
	Doughill Bog NHA
	Gouganebarra Lake pNHA
	Kilgarvan Ice House pNHA
	Kilgarvan Wood pNHA
	Killarney National Park, Macgillycuddy's Reeks & Caragh River Catchment pNHA
	Lough Allua pNHA
	Mullaghanish Bog pNHA
	Old Domestic Building, Curraglass Wood pNHA
	Old Domestic Building, Lettir pNHA
	Roughly River pNHA
	Roughly River Estuary pNHA
	Sheheree (Ardagh) Bog pNHA
	Sillahertane Bog NHA
	Slaheny River Bog NHA
	St. Gobnet's Wood pNHA
	EIAR Site Boundary



Client Name:
Orsted

Project Title:
Kilgarvan Wind Farm Repowering

Figure Name:
Nationally designated sites within 15km of EIAR Site Boundary

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29/04/2024

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Table 6-1 National and European designated nature conservation sites.

Site Name	Site Code	Minimum distance to EIAR Site Boundary (km)	Minimum distance to proposed turbine location (km)
Natura 2000 sites			
Killarney National Park, Macgillycuddy's Reeks & Caragh River Catchment SAC	000365	0.1	1.6
Old domestic building, Curraglass Wood SAC	002041	2.8	3.1
Kilgarvan Ice House SAC	000364	3.6	4.4
Blackwater River SAC	002170	7.0	12.2
St. Gobnet's Wood SAC	000106	7.8	9.1
Mullaghanish to Musheramore Mts. SPA	004162	7.8	10.0
Glanlough Woods SAC	002315	8.0	8.9
Killarney National Park SPA	004038	9.2	9.5
Mullaghanish Bog SAC	001890	9.3	12.0
Derryclogher Bog SAC	001873	10.6	11.5
Sheheree Bog SAC	000382	13.5	13.8
Kenmare River SAC	002158	16.4	17.1
Castlemaine Harbour SAC	000343	18.9	20.9
Castlemaine Harbour SPA	004029	34.1	34.4
Nationally Designated Sites			
Killarney National Park, Macgillycuddy's Reeks & Caragh River Catchment pNHA	000365	0.1	1.6
Roughty River pNHA	001376	0.3	1.2
Old domestic building, Curraglass Wood pNHA	002041	2.8	3.1
Sillahertane Bog NHA	001882	3.0	3.5
Kilgarvan Ice House pNHA	000364	3.6	4.4
Kilgarvan Wood pNHA	001787	4.7	5.5
Ballagh Bog pNHA	001886	6.4	7.3

Site Name	Site Code	Minimum distance to EIAR Site Boundary (km)	Minimum distance to proposed turbine location (km)
St. Gobnet's Wood pNHA	000106	8.1	9.3
Old domestic building, Lettir pNHA	000350	8.2	8.9
Doo Loughs pNHA	002040	8.2	9.1
Slaheny River Bog NHA	000383	8.4	9.3
Gouganebarra Lake pNHA	001057	8.5	9.3
Mullaghanish Bog pNHA	001890	9.2	11.9
Lough Allua pNHA	001065	9.9	10.5
Doughill Bog NHA	001948	10.0	10.8
Derryclogher Bog pNHA	001873	10.6	11.5
Conigar Bog NHA	002386	10.7	11.6
Roughy River Estuary pNHA	002092	12.6	13.3
Sheheree Bog pNHA	000382	13.5	13.8

Table 6-2 Summary of qualifying/special conservation interests of the Natura 2000 sites in wider hinterland.

Site Name & Code	Conservation Summary	Minimum Distance from site (km)
<p>Killarney National Park, Macgillicuddy's Reeks and Caragh River Catchment SAC 000365</p>	<p>The conservation objectives of this site relate to maintaining and restoring the favourable conservation condition of the following qualifying interests;</p> <p>Oligotrophic waters containing very few minerals of sandy plains (<i>Littorelletalia uniflorae</i>) [3110] Oligotrophic to mesotrophic standing waters with vegetation of the <i>Littorelletea uniflorae</i> and/or <i>Isoeto-Nanojuncetea</i> [3130] Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation [3260] Northern Atlantic wet heaths with <i>Erica tetralix</i> [4010] European dry heaths [4030] Alpine and Boreal heaths [4060] Juniperus communis formations on heaths or calcareous grasslands [5130] Calaminarian grasslands of the <i>Violetalia calaminariae</i> [6130] Molinia meadows on calcareous, peaty or clayey-silt-laden soils (<i>Molinion caeruleae</i>) [6410] Blanket bogs (* if active bog) [7130] Depressions on peat substrates of the Rhynchosporion [7150] Old sessile oak woods with Ilex and Blechnum in the British Isles [91A0] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, Alnion incanae, Salicion albae) [91E0] <i>Taxus baccata</i> woods of the British Isles [91J0] <i>Geomalacus maculosus</i> (Kerry Slug) [1024] <i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029] <i>Euphydrias aurinia</i> (Marsh Fritillary) [1065] <i>Petromyzon marinus</i> (Sea Lamprey) [1095] <i>Lampetra planeri</i> (Brook Lamprey) [1096] <i>Lampetra fluviatilis</i> (River Lamprey) [1099] <i>Salmo salar</i> (Salmon) [1106] <i>Rhinolophus hipposideros</i> (Lesser Horseshoe Bat) [1303] <i>Lutra lutra</i> (Otter) [1355] <i>Trichomanes speciosum</i> (Killarney Fern) [1421] <i>Najas flexilis</i> (Slender Naiad) [1833] <i>Alosa fallax killarnensis</i> (Killarney Shad) [5046]</p> <p>(After NPWS 2017)</p>	<p>c. 0.1km land to EIAR Site Boundary</p> <p>c 1.6km Minimum distance to proposed turbine location (km)</p>
<p>Old domestic building, Curraglass Wood SAC 002041</p>	<p>The conservation objectives of this site relate to maintaining and restoring the favourable conservation condition of the following qualifying interests;</p>	<p>c. 2.8km over-land to EIAR Site Boundary</p>

Site Name & Code	Conservation Summary	Minimum Distance from site (km)
	<p><i>Rhinolophus hipposideros</i> (Lesser Horseshoe Bat) [1303]</p> <p>(After NPWS site synopsis 2018)</p>	<p>c 3.1km Minimum distance to proposed turbibe location (km)</p>
<p>Kilgarvan Ice House SAC 000364</p>	<p>The conservation objectives of this site relate to maintaining and restoring the favourable conservation condition of the following qualifying interests;</p> <p><i>Rhinolophus hipposideros</i> (Lesser Horseshoe Bat) [1303]</p> <p>(After NPWS site synopsis 2018)</p>	<p>c. 3.6km over-land to EIAR Site Boundary</p> <p>c 4.4km Minimum distance to proposed turbibe location (km)</p>
<p>Blackwater River SAC 002170</p>	<p>The conservation objectives of this site relate to maintaining and restoring the favourable conservation condition of the following qualifying interests;</p> <p>Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Perennial vegetation of stony banks [1220] Salicornia and other annuals colonising mud and sand [1310] Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>) [1330] Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410] Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation [3260] Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles [91A0] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i>, <i>Alnion incanae</i>, <i>Salicion albae</i>) [91E0] <i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029] <i>Austropotamobius pallipes</i> (White-clawed Crayfish) [1092] <i>Petromyzon marinus</i> (Sea Lamprey) [1095] <i>Lampetra planeri</i> (Brook Lamprey) [1096] <i>Lampetra fluviatilis</i> (River Lamprey) [1099] <i>Alosa fallax fallax</i> (Twaiite Shad) [1103] <i>Salmo salar</i> (Salmon) [1106] <i>Lutra lutra</i> (Otter) [1355] <i>Trichomanes speciosum</i> (Killarney Fern) [1421]</p> <p>(After NPWS site synopsis 2012)</p>	<p>c. 7.0km over-land to EIAR Site Boundary</p> <p>c 12.2km Minimum distance to proposed turbibe location (km)</p>

Site Name & Code	Conservation Summary	Minimum Distance from site (km)
St. Gobnet's Wood SAC 000106	<p>The conservation objectives of this site relate to maintaining and restoring the favourable conservation condition of the following qualifying interests;</p> <p>Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles [91A0]</p> <p>(After NPWS site synopsis 2021)</p>	<p>c. 7.8km over-land to EIAR Site Boundary</p> <p>c 9.1km Minimum distance to proposed turbine location (km)</p>
Mullaghanish to Musheramore Mts. SPA 004162	<p>The conservation objectives of this site relate to maintaining and restoring the favourable conservation condition of the following qualifying interests;</p> <p>Hen Harrier (<i>Circus cyaneus</i>) [A082]</p> <p>(After NPWS site synopsis 2022)</p>	<p>c. 7.8km over-land to EIAR Site Boundary</p> <p>c 10.0km Minimum distance to proposed turbine location (km)</p>
Glanlough Woods SAC 002315	<p>The conservation objectives of this site relate to maintaining and restoring the favourable conservation condition of the following qualifying interests;</p> <p><i>Rhinolophus hipposideros</i> (Lesser Horseshoe Bat) [1303]</p> <p>(After NPWS site synopsis 2018)</p>	<p>c. 8.0km over-land to EIAR Site Boundary</p> <p>c 8.9km Minimum distance to proposed turbine location (km)</p>
Killarney National Park SPA 004038	<p>The conservation objectives of this site relate to maintaining and restoring the favourable conservation condition of the following qualifying interests;</p> <p>Merlin (<i>Falco columbarius</i>) [A098] Greenland White-fronted Goose (<i>Anser albifrons flavirostris</i>) [A395]</p> <p>(After NPWS site synopsis 2022)</p>	<p>c. 9.2km over-land to EIAR Site Boundary</p> <p>c 9.5km Minimum distance to proposed turbine location (km)</p>
Mullaghanish Bog SAC 001890	<p>The conservation objectives of this site relate to maintaining and restoring the favourable conservation condition of the following qualifying interests;</p> <p>Blanket bogs (* if active bog) [7130]</p> <p>(After NPWS site synopsis 2017)</p>	<p>c. 9.3km over-land to EIAR Site Boundary</p> <p>c 12.0km Minimum distance to proposed turbine location (km)</p>
Derryclogher Bog SAC 001873	<p>The conservation objectives of this site relate to maintaining and restoring the favourable conservation condition of the following qualifying interests;</p> <p>Blanket bogs (* if active bog) [7130]</p> <p>(After NPWS site synopsis 2017)</p>	<p>c. 10.6km over-land to EIAR Site Boundary</p> <p>c 11.5km Minimum distance to proposed turbine location (km)</p>

Site Name & Code	Conservation Summary	Minimum Distance from site (km)
Sheheree Bog SAC 000382	<p>The conservation objectives of this site relate to maintaining and restoring the favourable conservation condition of the following qualifying interests;</p> <p>Active raised bogs [7110] Degraded raised bogs still capable of natural regeneration [7120]</p> <p>(After NPWS site synopsis 2015)</p>	<p>c. 13.5km over-land to EIAR Site Boundary</p> <p>c 13.8km Minimum distance to proposed turbine location (km)</p>

6.4.2 Habitat & Botanical

The map of habitat types present at the site is shown in Figure 6-9. The dominant habitat in the west of the survey area is wet heath (HH3), which occurs in mosaic with upland blanket bog (PB2), outcropping sandstone bedrock (ER1) and dry siliceous heath (HH1) while in the east of the survey area the main habitat comprises species-poor wet grassland (GS4) dominated by soft rush (*Juncus effusus*) which has regenerated following the felling of conifers. The access road from Cloonkeen to the east is adjoined by a variety of habitats including conifer plantation (WD4), scrub (WS1) and wet heath (HH3) dominated by Purple moor-grass (*Molinia caerulea*).

Some small areas of Poor Fen & Flush and Transition Mire habitat were recorded in the terrestrial study area. These were remote from any of the proposed infrastructure or construction compounds. Poor fen and flush (PF2) habitats are peat-forming communities that are fed by groundwater or flowing surface waters that are acid in nature. Generally, the substratum is acid peat which has a higher nutrient status than that of surrounding acid bogs. The vegetation of poor fens and flushes is typically dominated by sedges and extensive carpets of mosses, in particular, *Sphagnum* moss. Poor Fen & Flush habitat was found in association with Eroding Upland Stream (FW1) and with Dry Humid Acid Grassland habitats at the west of the study area. A small area of Annex I linked Poor fen and flush PF2-7230/Transition mire and quaking bog PF3-7140 mosaic was recorded at the south of the study area (>500m from proposed infrastructure). Transition mires and quaking bogs are also peat-forming communities which develop at the surface of waters with little or moderate amounts of nutrients, with characteristics intermediate between rich (alkaline) and poor (acidic) fen types. They are considered as a separate habitat but they may occur within, or on the fringes of other peat-forming systems.

In the following sections of this report the vegetation composition of the principal habitats in which the existing or Proposed Development infrastructure is to be located is described and the full list of the plant species recorded during the botanical surveys is provided in Appendix 6-7.

6.4.2.1 Wet heath (HH3)

Areas of wet heath habitat are well developed and widespread in the west of the site where the habitat occurs on relatively shallow peat soils, typically between 20 and 50cm in depth (Plate 6-1). The habitat occurs in an intimate mosaic with outcropping sandstone bedrock and blanket bog. Since wet heath and blanket bog share many of the main plant species it can often be difficult to distinguish these habitats in the field. The vegetation is generally dominated by *Molinia caerulea* which generally has a cover of greater than 50%, with frequent deer grass (*Trichophorum germanicum*), many-flowered cottongrass (*Eriophorum angustifolium*), cross-leaved heath (*Erica tetralix*), ling heather (*Calluna vulgaris*) and carnation sedge (*Carex panicea*). The cover of the heath species *Erica tetralix* and *Calluna vulgaris* is relatively low, i.e. <20%. Sphagnum cover is generally low, typically in the range of 10 to 30%, with *Sphagnum capillifolium* the main species evident. The low cover of Sphagnum is mainly due to the relatively shallow peat cover and the resultant high cover of *Molinia*.

The equivalent EU Annex 1 Habitat is Northern Atlantic wet heaths with *Erica tetralix* (4010).



Plate 6-1 General view of open habitats at Kilgarvan, dominated by *Molinia* wet heath with frequent rock outcrops.

6.4.2.2 Blanket bog (PB2/PB3)

Throughout the survey area there are occasional small areas of deeper peat dominated by upland blanket bog habitat. The peat depth in these areas generally exceeds two metres and this greater peat depth results in a locally wet peat surface. The main plant species growing in blanket bog habitat is *Molinia caerulea* and the cover of this species generally exceeds 50%. Other frequent species in the vegetation include varying proportions of deer grass (*Trichophorum germanicum*), bog asphodel (*Narthecium ossifragum*), ling heather (*Calluna vulgaris*), cross-leaved heath (*Erica tetralix*) and common bog-cotton (*Eriophorum angustifolium*). The moss layer can be well-developed with *Sphagnum capillifolium*, *Sphagnum papillosum*, *Racomitrium lanuginosum* and *Hypnum jutlandicum* dominating. The *Sphagnum* cover in these bog areas is generally greater than 30% and can exceed 50% in areas with deeper, wetter peat.

Equivalent EU Annex 1 Habitat – Blanket bog (7130)

6.4.2.3 Dry heath (HH1)

In areas close to outcropping bedrock, where the peat depth is less than 20 cm, small areas of dry heath habitat occur. The vegetation is generally dominated by *Calluna vulgaris* and western gorse (*Ulex gallii*) with frequent bell heather (*Erica cinerea*), tormentil (*Potentilla erecta*) and the moss *Hypnum jutlandicum*. In terms of overall cover this habitat occupies a relatively small proportion of the open peatland habitats within the site as it typically occurs a narrow zone fringing rock outcrops.

The equivalent EU Annex 1 Habitat is European dry heaths (4030).

6.4.2.4 Exposed siliceous rock (ER1)

Exposed bedrock is a prominent feature of much of the site which is best developed in the western half which was not previously afforested. In this area exposed Old Red Sandstone bedrock occurs in mosaic with areas of wet heath, dry heath and blanket bog. There are no extensive areas with tall cliff present and the crevice vegetation is very limited with the main species being carnation sedge (*Carex panicea*), hard fern (*Blechnum spicant*), *Erica cinerea* and *Calluna vulgaris*.

6.4.2.5 Poor fen and flush (PF2)

Throughout the site there are occasional areas of poor fen and flush habitat. These areas typically occur as small and narrow wet channels where there is intermittent flow of surface water. These channels are generally less than one metre in width. The main plant species occurring include star sedge (*Carex echinata*), short-stalked yellow sedge (*Carex viridula oedocarpa*), jointed rush (*Juncus articulatus*) and the moss *Sphagnum fallax*. The visually striking insectivorous plant species greater butterwort (*Pinguicula grandiflora*) also grows in these flush areas. This species is locally abundant in suitable habitats in west Cork and Kerry however it is otherwise absent from Ireland and Britain.

6.4.2.6 Wet grassland (GS4)

Species-poor wet grassland dominated by soft rush (*Juncus effusus*) dominates in areas of the site where conifers were felled within the last 20 years (Plate 6-2). This vegetation has developed mostly on shallow, sloping peats which have been disturbed and drained by forestry operations. Typically, the cover of *Juncus effusus* exceeds 50% and the vegetation is greater than 1 metre in height. The main species, in addition to *Juncus effusus*, include velvet bent (*Agrostis canina*), *Molinia caerulea*, heath rush (*Juncus squarrosus*), *Calluna vulgaris* and heath bedstraw (*Galium saxatile*). The main moss species occurring is *Polytrichum commune*, the cover of which can exceed 50% in places. Sphagnum cover is typically low and is largely confined to the old drains where there is some pooling of surface water.



Plate 6-2 Wet grassland dominated by *Juncus effusus* which has regenerated on previously afforested land.

6.4.2.7 Acid oligotrophic lakes (FL2)

Two acid oligotrophic lakes occur in the north of the survey area, namely Lough Nabirra and Lough Greana. These lakes have a peaty bottom with some limited stony sections along the margins and are surrounded by relatively intact wet heath and blanket bog habitat. The vegetation of these lakes is typically very sparse with only narrow bands of marginal vegetation developed. Typical plant species growing in the lake margins include *Equisetum fluviatile*, *Eriophorum angustifolium*, *Potamogeton polygonifolius* and *Sphagnum cuspidatum*. Equivalent EU Annex I habitat - Oligotrophic waters containing very few minerals of sandy plains (*Littorelletalia uniflorae* (3110)).

6.4.2.8 Eroding/upland rivers (FW1)

A number of narrow, First Order upland streams occur throughout the site. The stream margins are generally dominated by *Juncus effusus* and *Molinia caerulea* with bulbous rush (*Juncus bulbosus*) the main species growing in the water channels, however in channel vegetation is generally very sparse which is typical of upland streams

6.4.2.9 Scrub (WS1)

Scrub vegetation is best developed close to the existing wind farm entrance gate at Cloonkeen. This scrub vegetation is generally between 2 and 5 metres tall with common gorse (*Ulex europaeus*), grey willow (*Salix cinerea oleifolia*) and eared willow (*Salix aurita*) the main species evident. Other occasional species include rowan (*Sorbus aucuparia*), holly (*Ilex aquifolium*) and downy birch (*Betula pubescens*). Bracken (*Pteridium aquilinum*) and briar (*Rubus fruticosus* agg.) are also locally frequent components of the vegetation.

6.4.2.10 Coniferous plantation (WD4)

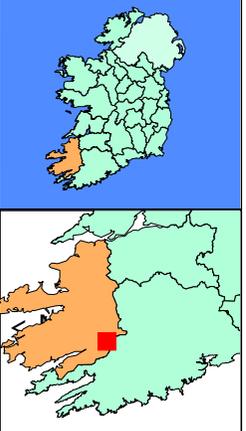
Areas of conifer plantation occur along the main wind farm entrance road and within the wind farm area. Most of these trees were planted between 1990 and 2000 and are generally between 6 and 10 metres tall. Sitka spruce (*Picea sitchensis*) and Lodgepole pine (*Pinus contorta*) are the main tree species planted and the species-poor ground layer is dominated by a thick layer of conifer needles along with occasional clumps of mosses such as *Hypnum jutlandicum*, *Rhytidiadelphus loreus* and *Plagiothecium undulatum*. *Molinia caerulea*, *Blechnum spicant* and *Dryopteris dilatata* are the main vascular plant species present however their cover is generally very low due to the shading effects of the woodland canopy.

6.4.2.11 Gravel tracks (BL3)

A network of gravel tracks occur within the site. Most of these were established within the past 25 years in order to service the wind farm and forest areas. The tracks generally have a low cover of vegetation however the track margins and the centre ridges can support a sparse grassland vegetation dominated by species such as *Molinia caerulea*, sweet vernal grass (*Anthoxanthum odoratum*), ribwort plantain (*Plantago lanceolata*), marsh thistle (*Cirsium palustre*), self-heal (*Prunella vulgaris*), daisy (*Bellis perennis*), mat grass (*Nardus stricta*), glaucous sedge (*Carex flacca*), lesser trefoil (*Trifolium dubium*) and the moss *Calliergonella cuspidata*. The invasive species piri-piri bur (*Acaena* sp.) grows frequently along track margins and is probably still spreading in the area due to spread via sheep movement/grazing. Slender cudweed (*Logfia minima*) was recorded growing in a number of locations along the track margins and on the existing wind turbine hard stand areas. This diminutive plant species was legally protected in the Republic of Ireland until 2022 (FPO species), however it is not currently protected as it now known to be much more common in the country having been recently recorded from additional sites in the south and south-east of Ireland.

Map Legend

- | | | |
|---|--|---|
|  Active blanket bog Priority Annex 1 |  Eroding upland stream FW1/Wet grassland GS4/Poor fen & flush PF2 |  Wet grassland GS4/Wet heath HH3 |
|  Conifer plantation WD4 |  Lowland Blanket Bog PB3 |  Wet heath HH3 |
|  Conifer plantation WD4/Conifer woodland WD3 |  Poor fen and flush PF2 |  Wet heath HH3- 4010/Upland blanket bog PB2 -7130 |
|  Conifer plantation WD4/Wet heath HH3 |  Poor fen and flush PF2-7230/Transition mire and quaking bog PF3-7140 |  Wet heath HH3-4010/Dry siliceous heath HH1-4030 |
|  Dry humid acid grassland GS3 |  Recently-felled woodland WS5 |  Wet heath HH3-4010/Dry siliceous heath HH1-4030/Upland blanket bog PB2-7130 |
|  Dry Siliceous heath HH1/ Exposed Rock ER1 |  Recently-felled woodland WS5/Dry siliceous heath HH1 |  Wet heath HH3-4010/Upland blanket bog PB2-7130/Dry siliceous heath HH1-4030 |
|  Dystrophic Lake FL1-3160 |  Upland blanket bog PB2 |  Wet Heath HH3/Dry humid acid grassland GS3/Wet grassland GS4 |
|  Eroding upland stream FW1/Dry humid acid grassland GS3/Poor fen & flush PF2 |  Wet grassland GS4 |  Wet Heath HH3/Wet Grassland GS4/Poor Fen & Flush PF2 |
|  Site Roads (ED2) |  Proposed Turbine location | |



Client Name:
Orsted

Project Title:
Kilgarvan Wind Farm Repowering

Figure Name:
Habitats within Terrestrial Study Area

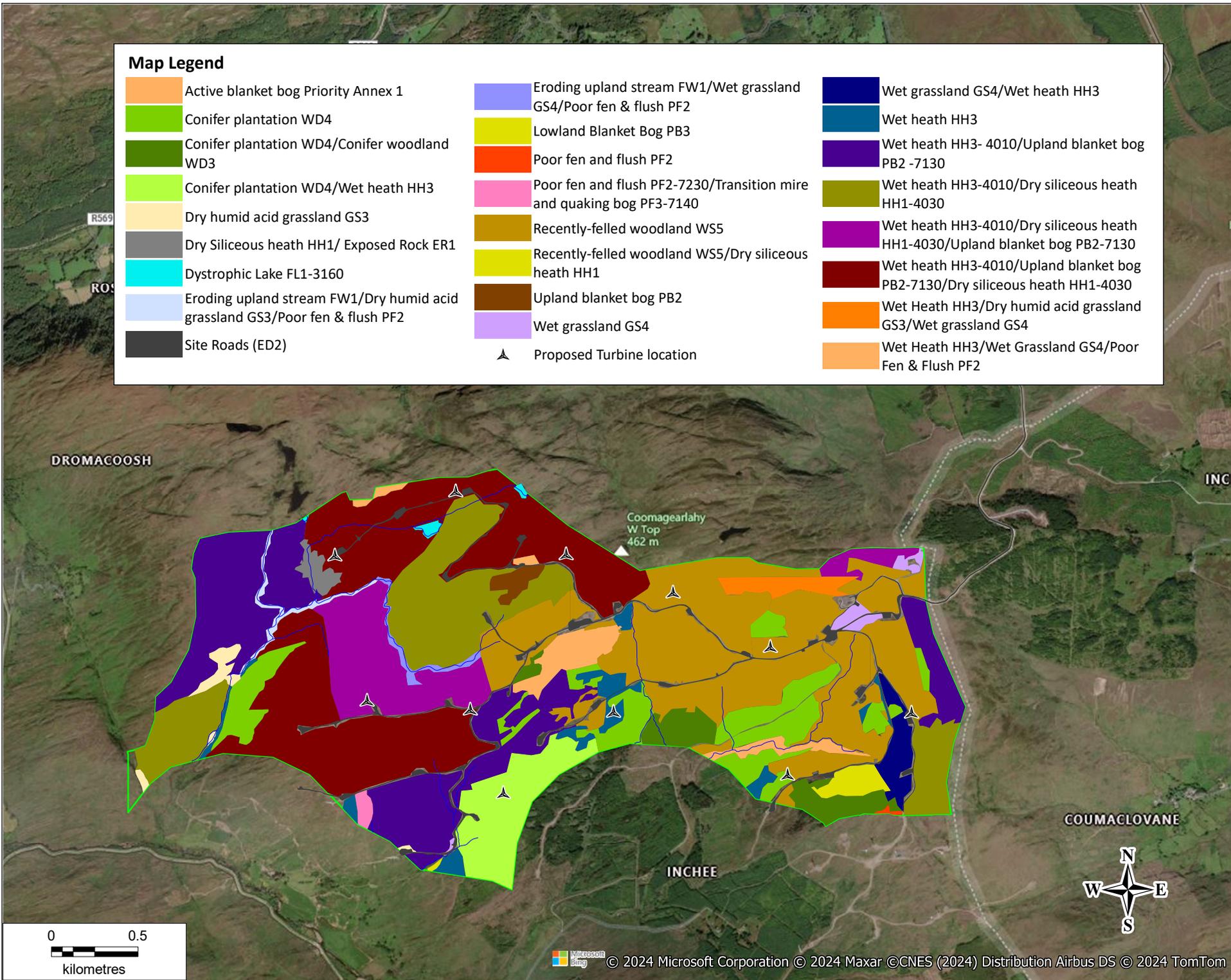
Date:
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Rev: A

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6.4.2.12 Rare Vascular Plants

In order to ascertain if any rare/legally protected plant species have been previously recorded from the site or adjoining areas, a search was made of the Botanical Society of Britain and Ireland (BSBI) online plant distribution Atlas (i.e. <https://bsbi.org/maps>). This search revealed recent records from hectads W07 and W17 for the following species which are listed in the 2022 Flora Protection Order (Table 6-3).

Table 6-3 Plant species listed in the 2022 Flora Protection Order which have been recently recorded within hectads W07 and W17.

Species	Main habitat	Comments
<i>Hieracium scullyi</i> (Scully's hawkweed)	Rock outcrops in wide river channels at low altitudes.	Suitable habitat for the species is not present within the wind farm site. The nearest known populations of the species are along the Roughty river which lie to the south-west.
<i>Hieracium sparsifrons</i> (Kerry hawkweed)	Rock outcrops in wide river channels at low altitudes.	Suitable habitat for the species is not present within the wind farm site. The nearest known populations of the species are along the Roughty river which lie to the south-west.
<i>Hieracium argentatum</i> (Killarney hawkweed)	Rock outcrops in wide river channels at low altitudes.	Suitable habitat for the species is not present within the wind farm site. The nearest known populations of the species are along the Roughty river which lie to the south-west.
<i>Trichomanes speciosum</i> (Killarney fern)	Dark and humid crevices in rock outcrops, often close to waterfalls.	There are previous records for both the sporophyte and gametophyte of this species from hectad W17 however the species was not noted from within the site area. Suitable habitat appears to be rare.

During the survey Slender cudweed (*Logfia minima*) was noted growing in a number of existing turbine hardstand areas and road margin areas in the north-west of the site. This species was listed on the 2015 Flora Protection Order, however it is not listed on the 2022 Order. The removal of the species from the 2022 Flora Protection Order is because the species is now known to be much more common in the south and east of the country, due to a combination of better recording and recent spread in range. It is thought likely that the species was introduced to the wind farm site recently during the importation of rock material from quarries in the local vicinity.

6.4.2.13 Habitat/vegetation assessment

The western section of the Proposed Development site comprises an extensive, open landscape dominated by a mosaic of wet heath, outcropping rock, blanket bog and dry heath habitats which is considered to be of high ecological value. The area is grazed by sheep with localized signs of grazing and poaching however it is clear from observations that sheep mainly graze and congregate along the wind farm road network. Damage due to peat cutting and drainage is absent and the condition of the peatland habitats is considered to be good.

The eastern section of the Proposed Development site is dominated by species-poor, rushy wet grassland vegetation which has regenerated on peat soils previously drained and afforested. Smaller areas of tall conifer plantation also occur throughout along with some small areas of open heath and blanket bog. The ecological value of this area is considered to be relatively low due to the afforestation of this area in the past.

No Third Schedule Invasive Plant species were recorded in the footprint of the proposed works. Japanese Knotweed, *Fallopia japonica* has been recorded historically from the public roadside between Glenflesk and Cloonkeen. *Rhododendron ponticum* has also been recorded from within commercial forestry to the south of the Existing Kilgarvan Wind Farm site outside of the study area and development footprint (www.biodiversityireland.ie).

Table 6-4 summarises the habitat types at each of the proposed turbine locations and proposed borrow pit area. Table 6-5 outlines the ecological value of the habitats present in relation to the scheme outlined in National Roads Authority (2009).

Table 6-4 Habitats affected at the proposed new turbine locations and borrow pit.

Proposed Turbine Number	Affected habitat(s)	Comments
1	Wet grassland (GS4)	Associated with recently cleared conifer plantation
2	Conifer plantation (WD4) and Wet grassland (GS4)	Conifer dominated
3	Wet grassland (GS4)	Associated with recently felled conifer plantation
4	Wet grassland (GS4)	Associated with recently cleared conifer plantation
5	Wet heath (HH3) and Exposed siliceous rock (ER1)	Area of Wet Heath and exposed rock within larger mosaic of wet/dry heath and blanket bog
6	Wet heath (HH3) and Exposed siliceous rock (ER1)	Area of Wet Heath and exposed rock within larger mosaic of wet/dry heath and blanket bog
7	Turbine hardstanding area (BL3) and Blanket bog (PB2)	Located close to existing wind turbine
8	Conifer plantation (WD4) and wet heath (HH1)	Wet heath in area of plantation
9	Blanket bog (PB2)	Location is between two roads. Some drying out of peat due to marginal drainage, within larger
10	Wet heath (HH3) and spoil and bare ground (ED2)	Located close to existing wind turbine and within larger mosaic of wet/dry heath and blanket bog
11	Conifer plantation (WD4) and wet heath (HH3)	In area of conifers planted on wet heath habitat.
Borrow pit area	Spoil and bare ground (ED2) and wet grassland (GS4)	Extension of existing borrow pit.

Table 6-5 Assessment of the ecological value of habitats occurring on site

Habitats	Ranking	Comments
Wet heath (HH3), Blanket bog (PB2), Exposed rock (ER1), Dry heath (HH1), Poor flush (PF2), Eroding upland river (FW1)	County importance	Extensive areas of wet heath and exposed rock occur. Habitats assessed together as they generally occur in an intimate mosaic.
Wet Grassland (GS4)	Local Importance (lower value):	These areas of wet grassland habitat are species-poor and have developed on peat soils disturbed by afforestation.
Conifer plantation (WD4)	Local Importance (lower value):	Much of the existing conifer plantation is of relatively poor commercial quality with windthrow
Scrub (WS1)	Local Importance (lower value):	Habitat confined to a relatively small area along the main access road at Cloonkeen.
Gravel tracks/turbine hardstands (BL3)	Local Importance (lower value):	The presence of the nationally rare plant species <i>Logfia minima</i> growing in gravel areas is notable.

6.4.3 Non-volant Mammals

6.4.3.1 Desktop Review

A desktop review of historical records of the non-volant mammals recorded in the 10km Grid Squares (W07, W17 & W18) that encompass the EIAR Site Boundary. Fifteen non-volant mammal species have been recorded in the 10km Grid Squares which encompass the application site. These are listed below in Table 6-6. The species assemblage is varied and includes Otter, *Lutra lutra*, Hedgehog, *Erinaceus europaeus* and Badger, *Meles meles*.

Two of the species American Mink, *Mustela vison* and Raccoon, *Procyon lotor* are introduced/invasive species. Table 6-6 also presents the Grid Squares in which each species has been recorded, as well as the latest national conservation status and legal protection of each of these species.

Table 6-6 Non volant Mammals recorded on corresponding 10km grid squares.

Species Name	Scientific Name	Irish Status	Legal Status	Grid Square (10km)
American Mink	<i>Mustela vison</i>		Not protected.	W07, W18
Badger	<i>Meles meles</i>	Least Concern	Wildlife Act, 1976; Wildlife (Amendment) Act, 2000; The Wildlife (Northern Ireland) Order 1985.	W07, W17, W18

Species Name	Scientific Name	Irish Status	Legal Status	Grid Square (10km)
Bank Vole	<i>Myodes glareolus</i>		Not protected.	W07, W17, W18
Hedgehog	<i>Erinaceus europaeus</i>	Least Concern	Wildlife Act, 1976; Wildlife (Amendment) Act, 2000; The Wildlife (Northern Ireland) Order 1985.	W07, W17, W18
Irish Hare	<i>Lepus timidus subsp. hibernicus</i>		EU Habitats Directive [92/43/EEC] Annex V; Wildlife Act, 1976; Wildlife (Amendment) Act, 2000; The Wildlife (Northern Ireland) Order 1985. Game Preservation Act (Northern Ireland), 1928 Open season, (NI) 12th Aug – 31st Jan (RoI): 26 Sept - 28 Feb	W07, W17, W18
Irish Stoat	<i>Mustela erminea subsp. hibernica</i>		Wildlife Act, 1976; Wildlife (Amendment) Act, 2000; The Wildlife (Northern Ireland) Order 1985.	W07
Otter	<i>Lutra lutra</i>	Least Concern	EU Habitats Directive [92/43/EEC] Annex II & IV. Nine SACs listed for otter in N.I., 47 listed in RoI. Wildlife Act, 1976; Wildlife (Amendment) Act, 2000; The Wildlife (Northern Ireland) Order 1985; CITES Appendix 1.	W07, W17, W18
Pine Marten	<i>Martes martes</i>	Least Concern	EU Habitats Directive [92/43/EEC] Annex V; Wildlife Act, 1976; Wildlife (Amendment) Act, 2000; The Wildlife (Northern Ireland.) Order 1985.	W07, W17, W18
Pygmy Shrew	<i>Sorex minutus</i>	Least Concern	Wildlife Act, 1976; Wildlife (Amendment) Act, 2000; and The Wildlife (Northern Ireland) Order 1985.	W17
Rabbit	<i>Oryctolagus cuniculus</i>	Least Concern	Not protected.	W07, W17, W18
Raccoon	<i>Procyon lotor</i>		Not protected.	W17
Red Deer	<i>Cervus elaphus</i>	Least Concern	Wildlife Act, 1976; Wildlife (Amendment) Act, 2000; The Wildlife (Northern Ireland.) Order 1985.	W07, W17, W18

Species Name	Scientific Name	Irish Status	Legal Status	Grid Square (10km)
Red Fox	<i>Vulpes vulpes</i>	Least Concern	Not protected.	W07, W17, W18
Red Squirrel	<i>Sciurus vulgaris</i>	Least Concern	Wildlife Act, 1976; Wildlife (Amendment) Act, 2000; The Wildlife (Northern Ireland) Order 1985.	W07, W17, W18
Sika Deer	<i>Cervus nippon</i>		Not protected.	W07, W17, W18

6.4.3.2 Non-Volant Mammal Surveys

The habitats present within the Existing Kilgarvan Wind Farm are relatively unattractive for most non-volant mammal species. The peatland and heath dominated habitats, particularly the open habitats in the western portion of the site, have very little potential for burrowing mammals. There are some foraging opportunities for grazing mammals, but the land is exposed in nature and lacks cover for larger mammals. Clearfell and conifer plantation dominate the eastern portion of the site. Walkover surveys (see schedule in Appendix 6-1), casual observations (e.g. during active bat surveys) and analysis of the trail cameras were used to identify the species present.

The walkover surveys recorded signs and occasional sightings of several non-volant mammal species in this area. No breeding or resting places of protected mammals were recorded within the Proposed Development site. There were regular and widespread records of several mammal species within the EIAR Site Boundary and along the access road from the public road at Cloonkeen.

Sika Deer, *Cervus nippon*, were observed on almost every site visit and their tracks and signs were noted throughout the area. Adults and young deer were recorded each year and Sika Deer appear to be relatively numerous in this area. A roadkilled Sika Deer was noted between Glenflesk and Cloonkeen in March 2019. Sika Deer was introduced into Ireland in the 1860's (<http://wdai.ie/sika-deer/>) and the species is now widespread and common (www.biodiversityireland.ie). They shelter and feed in woodland and graze throughout the site. Tracks, sightings and droppings of Sika Deer were extremely common at the site.

There were direct sightings of two further non-volant mammals from within the EIAR Site Boundary with both Fox and Irish Hare, *Lepus timidus hibernicus* observed on many occasions. No breeding den of Fox was recorded during the site walkovers, but a young cub was observed a short distance south of the site (ITM 508798 576148) on July 17th 2019. There is a considerable amount of conifer plantation to the south of the Proposed Development site, and it is likely that foxes breed locally.

The banks of the small watercourses were walked on several of the site visits to record any evidence of the presence of Otter. No spraints, resting places or feeding signs were recorded on-site. An adult Otter was recorded at Morley's Bridge on the Roughty River (ITM 504707 575315) during a breeding bird hinterland survey on 21st April 2022.

A Red Squirrel, *Sciurus vulgaris* was observed crossing the access road close to the Cloonkeen entrance on the 21st August 2019. Off-site, there were observations of Badger to the east of the site (ITM 513228 577566) in July 2021 and of a road-killed Pine Marten, *Martes martes*, at Curraglass North (ITM 504512 578960) in June 2018. A Pine Marten scat was recorded at the Cloonkeen entrance gate in August 2018 and an old scat was noted at the edge of the access road (ITM 510598 581876) on 15th April 2021.

Analysis of the trail cameras deployed in the area is summarised in Table 6-7. The relatively low species diversity noted during the dedicated site walkovers is mirrored in the trail camera record. Sika Deer was the most widely and easily most frequently recorded species (Plate 6-3). It is likely that they were the only deer species present although it was impossible to definitively identify a small number of photos of deer to species level. Irish Hare was recorded relatively frequently within the Proposed Development site (Plate 6-4). Foxes were recorded widely but not that frequently during the camera deployment (Plate 6-5). There were single recordings of Pine Marten and Badger, both from cameras deployed at the edge of the existing access road from Clonkeen. Neither species was recorded within the Proposed Development site.

The only Badger record was from the access road several kilometres from the wind farm. No active setts were recorded anywhere within the wind farm site.

Given the dominance of open heath and bog habitats and conifer plantation at the site along with the observed lack of breeding or resting sites for protected species, the Proposed Development site is rated as **low value, locally important** in terms of non-volant mammals

Table 6-7 Analysis of the trail cameras deployed in the area (2018-2022). Sheep are recorded as ‘P’ when present.

Species	TC1	TC2	TC3	TC4	TC5	TC6	TC7	TC8	TC9	TC10
Fox	1	1		1	5	1	1			8
Sika Deer		10	2	109	61	68	50			39
Sheep		P	P		P	P	P		P	P
Unidentified deer				4						
Irish Hare				6	10	7	11			15
Species	TC11	TC12	TC13	TC14	TC15	TC16	TC17	TC18	TC19	TC20
Fox		2	2	1	6		1			2
Sika Deer	2	60	15	8	21	4	9	11	5	7
Sheep	P	P		P	P	P	P	P	P	P
Irish Hare		5			1	1				2
Badger			2							
Pine Marten				1						
Small unidentified Mammal			1							



Plate 6-3 Sika Deer was the most commonly recorded species on the trail cameras.



Plate 6-4 Irish Hare was frequently seen and signs of the species were widely noted during site walkovers at the site.



Plate 6-5 An adult Fox carrying prey at the site in May 2019.

6.4.4 Bats

6.4.4.1 Desktop study

The landscape suitability index of the site for bats for the three 10km Grid Squares that overlap the wind farm site is summarised in Table 6-8. Overall, the area has low landscape suitability for bats. It is somewhat attractive for Brown Long-eared Bats, *Plecotus auritus*, Soprano Pipistrelle, *Pipistrellus pygmaeus* and Common Pipistrelle, *Pipistrellus pipistrellus*. Grid Square W18 has moderate landscape suitability for Lesser Horseshoe Bats, *Rhinolophus hipposideros*.

Table 6-8 Landscape suitability index for bats for the 10km Grid Squares that overlap the site.

Taxa	W07	W17	W18
All Bats	13.11	19.44	18.67
<i>Pipistrellus pygmaeus</i>	21	32	26
<i>Plecotus auritus</i>	21	25	26
<i>Pipistrellus pipistrellus</i>	19	28	26
<i>Rhinolophus hipposideros</i>	10	22	30
<i>Nyctalus leisleri</i>	15	22	21
<i>Myotis mystacinus</i>	12	9	8
<i>Myotis daubentonii</i>	11	18	18
<i>Pipistrellus nathusii</i>	0	0	0
<i>Myotis nattereri</i>	9	19	13

Bat species recorded historically (NBDC) in the relevant 10km grid squares are shown in Table 6-9 below. Daubenton's Bat (*Myotis daubentonii*) have been recorded historically in the wider area (10km grid squares, after NBDC database). Lesser Horseshoe Bat are of conservation concern and have been recorded in the wider area (Marnell *et al.* 2019).

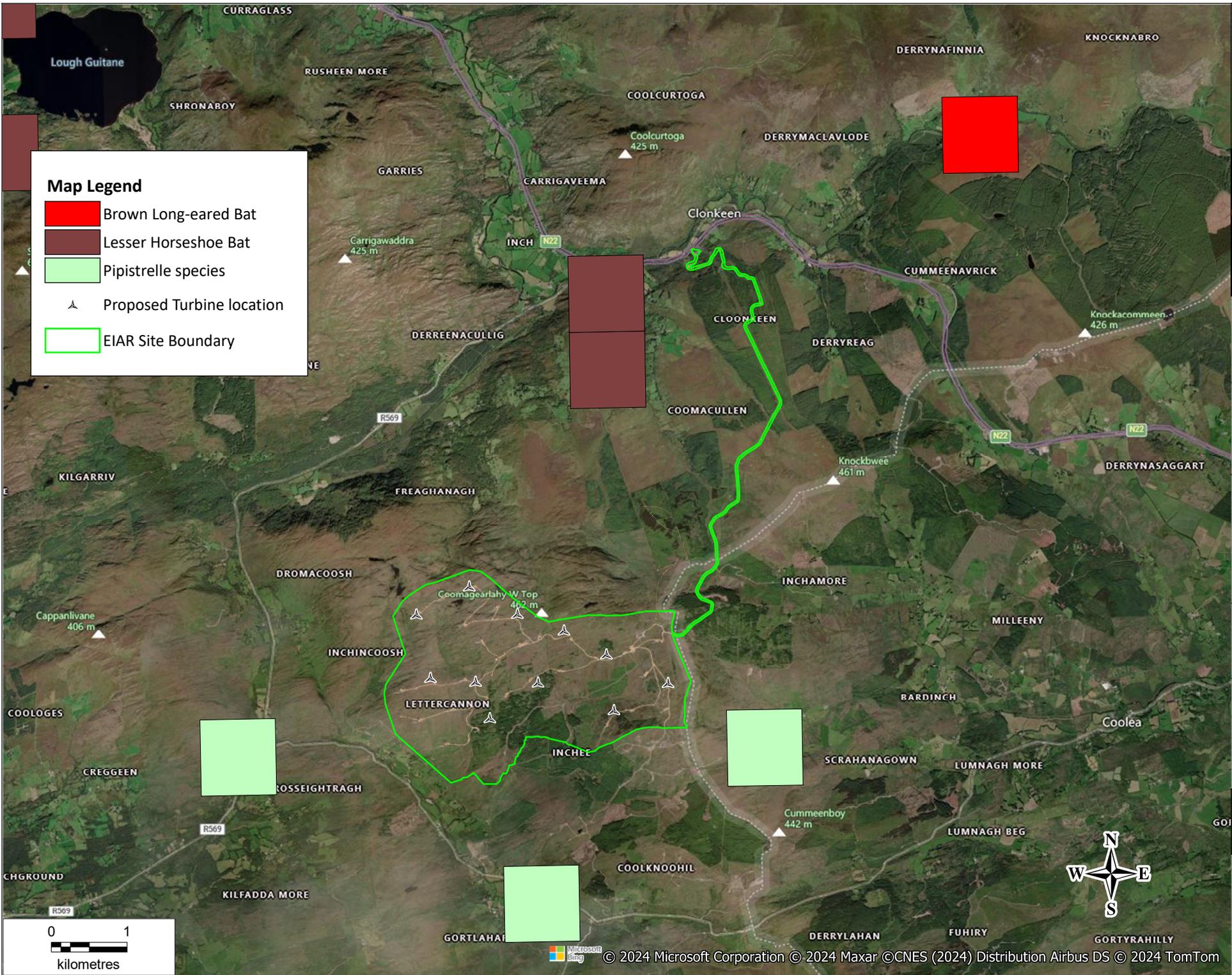
Table 6-9 Historical bat records from the 10km Grid Squares that encompass the Proposed Development site.

Species Name	Scientific Name	Irish Status	Legal Status	Grid Square (10km)
Brown Long-eared Bat	<i>Plecotus auritus</i>	Least Concern	EU Habitats Directive [92/43/EEC] Annex IV; Wildlife Act, 1976; Wildlife (Amendment) Act, 2000; The Wildlife (Northern Ireland) Order 1985.	W07, W17, W18
Daubenton's Bat	<i>Myotis daubentonii</i>	Least Concern	EU Habitats Directive [92/43/EEC] Annex IV; Wildlife Act, 1976; Wildlife (Amendment) Act, 2000; The Wildlife (Northern Ireland) Order 1985.	W07, W17
Lesser Horseshoe Bat	<i>Rhinolophus hipposideros</i>	Least Concern	EU Habitats Directive [92/43/EEC] Annex II & IV; 41 SACs listed. Wildlife Act, 1976; Wildlife (Amendment) Act, 2000	W07, W17, W18
Leisler's Bat	<i>Nyctalus leisleri</i>	Least Concern	EU Habitats Directive [92/43/EEC] Annex IV; Wildlife Act, 1976; Wildlife (Amendment) Act, 2000; The Wildlife (Northern Ireland.) Order 1985.	W07, W17, W18
Nathusius's Pipistrelle	<i>Pipistrellus nathusii</i>	Least Concern	EU Habitats Directive [92/43/EEC] Annex IV; Wildlife Act, 1976; Wildlife (Amendment) Act, 2000; The Wildlife	W07, W17

Species Name	Scientific Name	Irish Status	Legal Status	Grid Square (10km)
			(Northern Ireland) Order 1985.	
Pipistrelle	<i>Pipistrellus pipistrellus sensu lato</i>		EU Habitats Directive [92/43/EEC] Annex IV; Wildlife Act, 1976; Wildlife (Amendment) Act, 2000; The Wildlife (Northern Ireland) Order 1985.	W07, W17, W18
Soprano Pipistrelle	<i>Pipistrellus pygmaeus</i>	Least Concern	EU Habitats Directive [92/43/EEC] Annex IV; Wildlife Act, 1976; Wildlife (Amendment) Act, 2000; The Wildlife (Northern Ireland) Order 1985.	W07, W17, W18

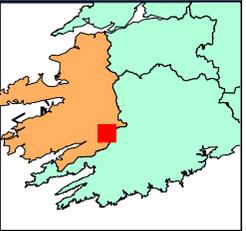
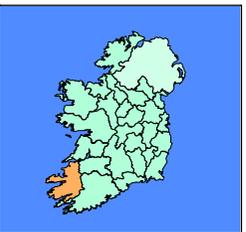
Bat Conservation Ireland provided data on the location of bat roosts in the vicinity of the EIAR Site Boundary. Figure 6-10 shows the approximate location of nearby historic roosts (the exact locations are not shown due to the sensitivity of these sites). No historic bat roosts are located within 500m of the EIAR Site Boundary. Only one of the Pipistrelle sp. historic roost sites is located within 1km of the nearest of the proposed turbine locations. The closest of the historic Lesser Horseshoe Bat roosts to the proposed turbines is 2.7km.

All bat species occurring in Ireland are legally protected under the Irish Wildlife Acts (1976 - 2012). Under this protection, it is an offence to hunt or interfere with or destroy their breeding or resting places (unless under statutory licence/permission). The species listed above are also listed on Annex IV of the EU Habitats Directive, with Lesser Horseshoe Bat also listed on Annex II of this Directive.



Map Legend

- Brown Long-eared Bat
- Lesser Horseshoe Bat
- Pipistrelle species
- Proposed Turbine location
- EIA Site Boundary



Client Name:
Orsted

Project Title:
Kilgarvan Wind Farm Repowering

Figure Name:
Historic Bat Roost Records (BCI)

Date:
29/04/2024

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6.4.4.2 Active surveys

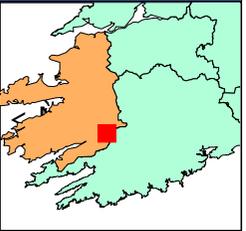
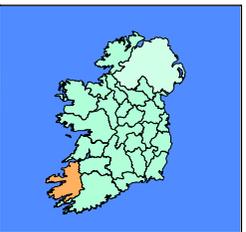
Active surveys carried out at the site in 2018, 2019, 2021 and 2022 did not record any bat activity within the Proposed Development site. This consistent result is unusual, although not entirely unexpected given the open and exposed nature of much of the site. Local roads were driven and surveyed in the August 2018 surveys and strong Daubenton's Bat and Soprano Pipistrelle activity was recorded on the Roughty River at Morley's Bridge on the 16th August 2018. Occasional records of Soprano and Common Pipistrelle were recorded along the R569 between Curraglass and Derrenacullig on the nights of 16th and 20th August. Overall, the levels of activity recorded in the wider area was relatively low, with a complete lack of registrations from within the Proposed Development site over 7 no. active surveys from 2018 to 2022.

Low levels of bat activity were recorded along the access road from Cloonkeen in the 2021-2022 active survey visits. Two species were identified, Common Pipistrelle and Leisler's Bat, *Nyctalus leisleri*. The distribution of these records is shown in Figure 6-11. Common Pipistrelle activity was greatest near the Cloonkeen entrance and this was consistently the case in 2021 and 2022. There was scattered activity Common Pipistrelle registrations along the access road with very few additional records of Leisler's Bat.



Map Legend

- ◆ Leisler's Bat
- ◆ Common Pipistrelle
- ▲ Proposed Turbine location
- EIA Site Boundary



Client Name:
Orsted

Project Title:
Kilgarvan Wind Farm Repowering

Figure Name:
Active Bat Records 2021-2022

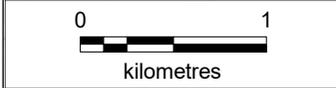
Date:
29/04/2024

Rev: A

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6.4.4.3 Passive Detector Survey (2018-2019)

The results of the passive detector deployments at the site in 2018-2019 confirmed the presence of a number of bat species, albeit the pattern of registrations confirmed a relatively low level of activity throughout the site. Details on the deployment locations and dates are provided in Figure 6-2 and Appendix 6-6. Table 6-10 summarises the results of the analysis of the 2018-2019 passive detector deployments.

The species identified as occurring at the Proposed Development site were: Common and Soprano Pipistrelle, Leisler's Bat, Daubenton's Bat, Natterer's Bat, *Myotis nattereri*, Brown Long-eared Bat and Lesser Horseshoe Bat.

Activity levels were low, particularly in the Autumn/Winter period. Four deployments did not register any bat activity. Three of these (BD2, BD4 & BD5) were winter period deployments, with BD4 & BD5 recording at the eastern met mast at ground level and at height. BD9 was recording at height at the western met mast for 10 nights in August 2019.

The only deployment at height that recorded any bat activity (BD8b) had a total of 6 registrations over a period of 9 nights in October 2018. Common Pipistrelle and Leisler's Bat were recorded with a small number of faint Pipistrelle sp. calls that could not be definitively identified to species. Interestingly, this detector was simultaneously recording activity at ground level and only detected a total of 15 registrations during this period. Brown Long-eared Bat and Daubenton's Bat were recorded on the ground-level microphone.

Leisler's Bat dominated the recordings from a deployment at the eastern met mast (BD3) but was infrequently registered at the other deployment locations. Soprano and Common Pipistrelle were the other two species most frequently registered with Common Pipistrelle identified at 5 no. of the 9 deployment locations. There was a single registration of Lesser Horseshoe Bat (BD6), at the edge of conifer plantation at the southwest of the EIAR Site Boundary (22:34 on 27th April 2019).

Table 6-10 Results of the analysis of passive bat detector deployments at the site in 2018-2019.

Species	BD1	BD2	BD3	BD4	BD5	BD6	BD7	BD8a	BD8b	BD9
Common Pipistrelle	77					3	52	5	2	
Soprano Pipistrelle			6				228			
Leisler's Bat			138					5	1	
Brown Long-eared Bat	3		1					2		
Daubenton's Bat	3							2		
Natterer's Bat	4									
Myotis sp.	3							1	1	
40/50 kHz Pipistrelle	1						19		2	
Lesser Horseshoe Bat						1				

6.4.4.4 Passive Bat Detector Deployment (2021-2022)

The locations of the passive deployments in 2021-2022 are shown in Figure 6-3. Two years of multi-season surveys were completed. The deployment locations used were based on a preliminary turbine layout, with the exception of Autumn 2022 when the detectors were deployed at each of the proposed turbine locations.

Details of the deployment coverage achieved in 2021-2022 is provided in Appendix 6-6 (see also Figure 6-3). The prevailing weather conditions during each period of deployment is summarised in Appendix 6-6.

The Spring 2021 deployment at 12 locations recorded very low rates of bat activity (Appendix 6-6). At most of the deployment locations there was no bat activity recorded on the majority of nights in this period. The analysis of registrations from each of the deployment locations is presented in Table 6-11. Seven taxa were identified: Common Pipistrelle, Soprano Pipistrelle, Leisler’s Bat, Brown Long-eared Bat, Daubenton’s Bat and Natterer’s Bat and *Myotis* sp. Leisler’s Bat was the most frequently detected species during this period, present at 10 of 12 deployment locations. The activity rate was very low. At L6 which had the most activity, the average rate of less than 2.8 registrations per night of deployment. The peak number of registrations per night was only 17 bat ‘triggers’.

Table 6-11 Registrations of bats at each deployment location in Spring 2021.

Species	L1	L3	L5	L6	L7	L9	L10	L11	L13	L14	L15	L16
Myotis sp.	1		7	15			7		4		15	
Common Pipistrelle	1	2	1		2	2	2		5			2
Leisler's Bat	1	3	13	36	9	1	4	8			6	1
Soprano Pipistrelle	2			2		2			1	1	2	7
Brown Long-eared Bat		1	1				1	1				
Daubenton's Bat			4	5		1	1	1	3			
Natterer's Bat								1				

The Summer 2021 deployment at 12 locations recorded relatively low rates of bat activity (Appendix 6-6). The analysis of registrations from each of the deployment locations is presented in Table 6-12. Nine taxa were identified: Common Pipistrelle, Soprano Pipistrelle, Leisler’s Bat, Brown Long-eared Bat, Daubenton’s Bat and Natterer’s Bat and *Myotis* sp, 40/50kHz Pipistrelle species and Lesser Horseshoe Bat. The activity rate was relatively low for this time of year. Average number of registrations per night ranged from 3.6 at L10 to 23.6 registrations per night at L6. The lowest rate of nightly activity was recorded at L5, L7 and L12 with an average of less than 5 bat ‘triggers’ per night during the summer deployment. The deployment period was extended (up to 41 nights) to ensure that any peaks in activity across this period could be detected. The activity rates varied considerably from night to night, even in the absence of clear differences in prevailing weather conditions. The peak nightly activity was also recorded at L3 (255 registrations) which represents over 30% of the registrations at this location on a single night of a 36 no. night deployment.

Four taxa were recorded at all 12 of the deployment locations, Common and Soprano Pipistrelle, *Myotis* sp, and Leisler’s Bat. There were two Lesser Horseshoe Bat registrations at deployment locations L13 (25th July) and L15 (3rd August). Both Natterer’s and Daubenton’s Bat were recorded widely across the site at low levels of activity.

Table 6-12 Registrations of bats at each deployment location in Summer 2021.

Species	L2	L3	L6	L7	L8	L9	L10	L12	L13	L14	L15	L16
Myotis sp.	4	6	3	6	2	6	2	1	5	3	2	5
Common Pipistrelle	39	204	177	94	7	93	75	166	115	99	314	8
Leisler's Bat	216	410	69	353	22	185	3	241	151	309	232	18
Soprano Pipistrelle	9	134	32	28	2	49	17	24	112	36	111	15
Brown Long-eared Bat	2	8	1	6	4	7	1	21	5	6	4	
Daubenton's Bat	2	30		9	7	20	4	8	9		8	7
Natterer's Bat		8		7	5	1		1			2	2
40/50kHz Pipistrelle	2	2	1					1	1	2	3	
Lesser Horseshoe Bat									1		1	

The Autumn 2021 deployment at 11 locations (one additional detector was stolen) and recorded low-moderate rates of bat activity (Appendix 6-6). Autumn 2021 had a somewhat higher rate of bat activity than the other deployment periods in 2021. The analysis of registrations from each of the deployment locations is presented in Table 6-13. Nine taxa were identified: Common Pipistrelle, Soprano Pipistrelle, Leisler's Bat, Brown Long-eared Bat, Daubenton's Bat and Natterer's Bat and *Myotis* sp, 40/50kHz Pipistrelle species and Lesser Horseshoe Bat. Five taxa were recorded at all of the deployment locations: Common and Soprano Pipistrelle, Leisler's Bat, Brown Long-eared Bat and *Myotis* sp. Daubenton's Bat (10 of 11 locations) and Natterer's Bat (9 of 11 locations) were also widely recorded in the Autumn 2021 period. As in the previous deployments, the location with highest level of activity was at L3, just south out the existing onsite 110kV Coomagearahy substation and east of the proposed turbine T3. The activity at this location was dominated by Common Pipistrelle in Autumn 2021. There was an average of 66.2 bat 'triggers' per night at L3, although activity was extremely variable from night to night. The peak activity (450 triggers) occurred on 5th September with Common Pipistrelle foraging at this location for much of the night. L3 is located near a large area of hardstanding area (turning circle) and is at the junction of internal roads. The activity at L14 was dominated by Leisler's Bat. L14 is south of turbine T6 and Lough Nabirria in a relatively open part of the site. Similarly, at L15 near

turbine T10, there was 298 registrations of Leisler’s Bat during the Autumn 2021 deployment. This area is open in nature and the rate of activity was highly variable across the period of deployment. Of 991 registrations recorded at L15, 602 of these (60.8%) occurred on a single night (26th August).

While activity levels were higher than recorded in Spring and Summer 2021, the activity was still low-moderate with six of the eleven deployment location registering an average number of bat triggers of less than 20 per night. There was a total of 4 Lesser Horseshoe Bat registrations (1 no. at L3, 2 no. at L9 and 1 no. at L15).

Table 6-13 Registrations of bats at each deployment location in Autumn 2021.

Species	L1	L3	L7	L8	L9	L10	L12	L13	L14	L15	L16
Myotis sp.	6	26	4	18	3	3	19	3	5	4	22
Common Pipistrelle	70	836	73	132	121	84	159	194	153	471	251
Leisler's Bat	110	99	109	51	55	2	89	80	234	358	109
Soprano Pipistrelle	26	255	36	53	65	29	80	123	124	136	174
Brown Long-eared Bat	17	115	16	58	17	2	13	15	27	9	27
Daubenton's Bat	14	109	18	31	15		38	19	6	10	31
Natterer's Bat	2	12	2	7	5		12	9	4		19
40/50kHz Pipistrelle		4		3				1	2	2	
Lesser Horseshoe Bat		1			2					1	

In Spring 2022, passive detectors were deployed at 13 locations, as well as at both met masts present at the Proposed Development site. The detectors at the met masts were connected to the microphones at height. As in the previous Spring, there was very low rates of bat activity recorded (Appendix 6-6). No activity was recorded at L2 and similarly there were no bat triggers from height on either of the met masts. The species recorded on site were the same as in 2021. The location with the greatest activity was L5 near the proposed turbine location T2 in an area of clearfell. A total of 148 Leisler’s Bat registrations were logged at this location. However, 106 of these triggers occurred on a single night (22nd April).

As in Spring 2021, most of the deployment locations there was no bat activity recorded on the majority of nights in this period. The analysis of registrations from each of the deployment locations is presented in Table 6-14. Apart from L5, the average number of nightly registrations was less than three at all of the deployment locations across the Spring 2022 period.

There were 4 no. Lesser Horseshoe Bat registrations, all from L9 and all from the night of the 25th April 2022. L9 is located just west of the proposed turbine location T8.

Table 6-14 Registrations of bats at each deployment location in Spring 2022. Note there was no activity recorded at the met masts.

Species	L1	L2	L3	L5	L6	L7	L8	L9	L10	L12	L13	L14	L16
Myotis sp.	4	0			4	2	2		2	2	1	2	2
Common Pipistrelle	5	0		1		2				4	3	4	2
Leisler's Bat	1	0	1	148	23		2	31					
Soprano Pipistrelle	1	0					2				3		1
Brown Long-eared Bat		0		3			2			3	2	3	1
Daubenton's Bat		0	1		10	4			1		2		1
Natterer's Bat		0			1								
40/50kHz Pipistrelle			1					1					
Lesser Horseshoe Bat								4					

The Summer 2022 deployment at 13 locations as well as at both met masts present at the Proposed Development site (Appendix 6-6). The detectors at the met masts were connected to the microphones at height. The analysis of registrations from each of the deployment locations is presented in Table 6-15. The activity levels were low across the site with no bat ‘triggers’ at the met masts and at L13 (south of proposed location T9). The greatest amount of bat activity was recorded at L6 (north of turbine location T2 and south of T3) during this period with an average number of registrations of 20.9 per night. At L5, the activity was dominated by Leisler’s Bat and much of the activity (>62%) occurred on a single night (19th June). A total of 72 Daubenton’s Bat registrations was recorded at L8 (turbine location T4), many of the calls fairly faint and with 23 additional triggers only identifiable to *Myotis* sp. There was a single Lesser Horseshoe Bat registration, from L7 (south of proposed location T4) during the summer 2022 deployment.

Table 6-15 Registrations of bats at each deployment location in Summer 2022. Note there was no activity recorded at the met masts.

Species	L1	L2	L3	L5	L6	L7	L8	L9	L10	L12	L13	L14	L16
Myotis sp.					4	6	23	4	3	2	0	2	3
Common Pipistrelle	38	8	10	24	407	26	14	37	9	18	0	9	6
Leisler's Bat	1	11		223	6	12	113	1	1	4	0	1	3
Soprano Pipistrelle	1	1	5	6	16	12		6	5	14	0	19	3
Brown Long-eared Bat	2			1	4	1	4	1	2		0		

Species	L1	L2	L3	L5	L6	L7	L8	L9	L10	L12	L13	L14	L16
Daubenton's Bat		4		3		4	72		3	2	0	3	
Natterer's Bat						1	8		2		0	1	2
40/50kHz Pipistrelle	3				1					2	0		
Lesser Horseshoe Bat						1					0		

In Autumn 2022, 11 no. passive detectors were deployed at the proposed turbine locations. The deployment was later in the season than the deployment in 2021 and this may explain the lower levels of activity recorded during the Autumn 2022 period (Appendix 6-6). The number of bat registrations over the 22 night period ranged from 1 no. trigger (T6) to 92 no. triggers (T3). The proposed turbine location T3 is close to L3, a deployment location that had most bat activity in several previous survey seasons. The activity levels recorded was relatively low with average nightly triggers of less than one at 8 no. of 11 no. proposed turbine locations.

Table 6-16 presents the results of the Autumn 2022 deployment of passive detectors. The species diversity was consistent with previous seasons at this site. There was a cluster of Natterer's Bat records at T3 and T4. On 12th October 2022 there were 20 Natterer's Bat triggers at T3 on a single night. The other notable aspect of the Autumn 2022 deployment was a greater number of Lesser Horseshoe Bat records than in previous survey seasons (19 registrations overall). Ten of these registrations occurred on the night of 16th October at proposed turbine locations at the west of the site (T7, T9, T10 & T11). Lesser Horseshoe Bats were also recorded at T4 (12th October) and on a second occasion during the deployment period at T9, T10 & T11.

Table 6-16 Registrations of bats at each deployment location in Autumn 2022. Note there was no activity recorded at the met masts.

Species	L1	L2	L3	L4	L5	L6	L7	L8	L9	L10	L11
Myotis sp.		1	21	9	4	1	4		2		1
Common Pipistrelle	1	3	2	1			4	4			3
Leisler's Bat	2	2	2	1	4		3	4	8	3	7
Soprano Pipistrelle	1	1					2		4		
Brown Long-eared Bat	1		1	4					1		1
Daubenton's Bat	8		11	15				2	2		
Natterer's Bat	3		55	14	1			2	1		
40/50kHz Pipistrelle							1				

Species	L1	L2	L3	L4	L5	L6	L7	L8	L9	L10	L11
Lesser Horseshoe Bat				1			1		7	6	4

The field assessments included an evaluation of the potential for roosting bats within and closely adjacent to the wind farm site. There is a lack of built features with potential for roosting bats located within the site. The conifer plantation within the eastern portion of the Proposed Development site has limited potential for roosting bats. The upland and relatively exposed nature of the site means that the site is relatively unattractive for bats.

Overall, the nature of the habitats present, combined with the lack of attractive roost features within the wind farm, contributes to the consistently low levels of activity recorded in the area across the survey seasons. This is consistent with the results of previous surveys carried out in 2018-2019 and the results of the active surveys at this site. The field surveys did record a good diversity of bat species in the area, including occasional registrations of Lesser Horseshoe Bat. Given the lack of evidence of roost sites and the consistently low levels of activity recorded the site is evaluated of **local importance (higher value)**.

6.4.4.5 Fatality Monitoring

The results of the dedicated dog-based carcass searches recorded very little evidence of significant levels of bat mortality at the existing wind farm. The searcher efficiency trials confirmed that the recovery rate of even small carcasses such as bats are accomplished with a very high success rate (>90%) using trained dogs and expert handlers. The carcass removal trials showed that bats can remain unscavenged for relatively long-periods, although they can be substantially decomposed by invertebrates and on occasion removed by scavenging species (Table 6-17). The field data from the 14 months of searches as well as the searcher efficiency and scavenger removal trials are presented in Appendix 6-5.

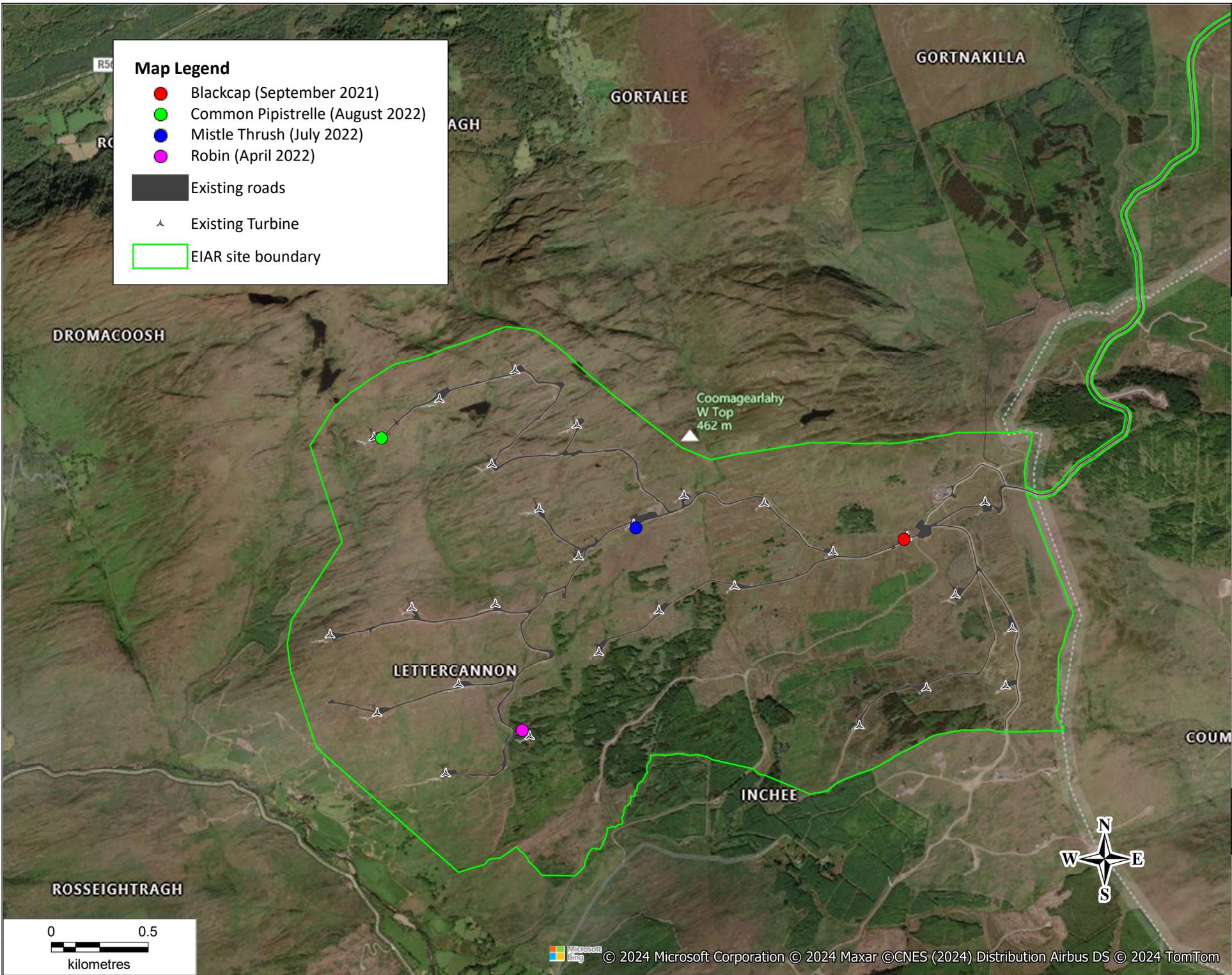
Table 6-17 Results of Scavenger removal trials at Kilgarvan Wind Farm 2022.

Date set	End trial	Carcass type	Scavenged/Removed	Scavenger	Days before removal
06/09/2022	04/10/2022	Herring Gull	Yes	Raven	3
06/09/2022	04/10/2022	Bat species	Yes	unknown	15
06/09/2022	04/10/2022	Kestrel	No	n/a	28
06/09/2022	04/10/2022	Linnet	Yes	Fox	14
04/10/2022	07/11/2022	Lesser Horseshoe Bat	No	n/a	34
04/10/2022	07/11/2022	Barn Owl	Yes	unknown	3
07/11/2022	10/12/2022	Pipistrelle species	No	n/a	33
07/11/2022	10/12/2022	Common Pipistrelle	No	n/a	33
07/11/2022	10/12/2022	Dunnock	Yes	Fox	8
07/11/2022	10/12/2022	Feral Pigeon	Yes	unknown	<33

Date set	End trial	Carcass type	Scavenged/Removed	Scavenger	Days before removal
07/11/2022	10/12/2022	Magpie	Yes	Raven	11

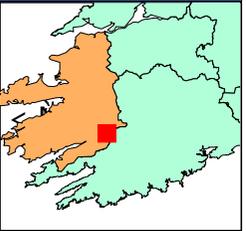
From September 2021 to November 2022, only one bat carcass was recovered from Kilgarvan Wind Farm. A decomposing Common Pipistrelle was recovered 46m from a turbine base (N5 at Kilgarvan, close to turbine location T7) on August 5th 2022 (Figure 6-12).

As would be predicted, there is some evidence that the risks of mortality events at wind farms are species specific (e.g. Guest *et al.* 2022). There is a growing body of evidence that bats, at least certain species, including Common and Soprano Pipistrelle, are attracted to operating turbines (e.g. Richardson *et al.* 2021). This research also suggests that operational mitigation (minimising blade rotation in periods of higher collision risk) is likely to be the most effective way to reduce collisions because the presence of turbines alters bat activity.



Map Legend

- Blackcap (September 2021)
- Common Pipistrelle (August 2022)
- Mistle Thrush (July 2022)
- Robin (April 2022)
- Existing roads
- Existing Turbine
- EIAR site boundary



Client Name:
Orsted

Project Title:
Kilgarvan Wind Farm Repowering

Figure Name:
Carcass Recovery locations

Date:
29/04/2024

Rev: A

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6.4.5 Birds

6.4.5.1 Desktop study

The bird species recorded historically in the 2km and 10km Grid Squares that overlap the EIAR Site Boundary were collated from the NBDC on July 26th, 2023. The conservation status of the species recorded locally (BoCCI status; Gilbert *et al.* 2021) is highlighted. Appendix 6-3 presents the bird species recorded historically within the overlapping 10km Grid Squares (W07, W17 & W18). A total of 87 no. bird species have been recorded historically in these 10km grid squares (NBDC) and 14 no. of these are currently Red-listed and 18 no. are Amber-listed (Gilbert *et al.* 2021).

The Red-listed species recorded in the wider area historically include Barn Owl, *Tyto alba*, Corncrake, *Crex crex*, Curlew, *Numenius arquata*, Golden Plover, *Pluvialis apricaria*, Grey Wagtail, *Motacilla cinerea*, Kestrel, *Falco tinnunculus*, Meadow Pipit, *Anthus pratensis*, Redwing, *Turdus iliacus*, Snipe, *Gallinago gallinago*, Stock Dove, *Columba oenas*, Swift, *Apus apus*, Tundra Swan, *Cygnus columbianus*, White-tailed Eagle, Woodcock, *Scolopax rusticola* and Yellowhammer, *Emberiza schoeniclus*. Appendix 6-3 also presents the bird species recorded within the 2km Grid Squares that encompass the wind farm. A total of 17 bird species have been recorded in these 2km grid squares (NBDC database) two of these are currently Red-listed and 5 are Amber-listed (Gilbert *et al.* 2021). The two Red-listed species recorded in this area are Meadow Pipit and Snipe.

6.4.5.2 Transects & Point Counts

General breeding and winter season transects and point counts were carried out at the site from 2018 to 2022. Detail on these surveys is provided in the following sections.

6.4.5.2.1 Breeding Season Transects & Point Counts

The results of the breeding season transect and point count surveys carried out in 2018, 2019 and 2022 are presented in Appendix 6-3. Peak counts of each species from the transects and point counts undertaken are presented for each transect and point count. There were no observations of any breeding waders made in the vicinity of the Proposed Development.

Overall, 26 bird species were recorded during the 2018 breeding season survey (Appendix 6-3). The most abundant species recorded on site was Meadow Pipit. These were most common in the more open western parts of the Proposed Development site. Raven, *Corvus corax* was also quite common in the western parts of the site. In general, low numbers of birds were recorded during the 2018 breeding season. No raptors or waders were recorded during the 2018 survey. A male Mallard, *Anas platyrhynchos* was recorded on Transect 2.

A similar level of species diversity (23 species) and a similar range of birds was recorded in the 2019 breeding season transects and point count surveys (Appendix 6-3). Crossbill, *Loxia curvirostra*, a conifer plantation specialist was recorded at Point Count 1. No wading birds were recorded.

In 2022, a total of 27 bird species were recorded during the breeding season transects and point count surveys (Appendix 6-3). Additional species recorded during this season included Pheasant, *Phasianus colchicus*, Kestrel, *Falco tinnunculus* and Sand Martin, *Riparia riparia*. Meadow Pipit was as in the two previous breeding season surveys, the most abundant species recorded at the site.

Most of the species recorded are common birds at a local and national level. Grey Wagtail, *Motacilla cinerea* and Meadow Pipit are both Red-listed (Gilbert *et al.* 2021). There was a single record of Grey Wagtail on Transect 3 (in 2018). Meadow Pipit is one of the most common and widespread resident passerines in Ireland. The species experienced a significant decline in population believed to have been associated with poor survival rates over the two severe winters in 2009/2010 and 2010/2011 (Gilbert *et al.* 2021). The Countryside Bird Census (CBS) has recorded a substantial recovery in the population of

breeding Meadow Pipit over the past decade (www.birdwatchireland.ie). It is likely that given the substantial recovery of Meadow Pipit populations that the future iteration of the BoCCI list will see an improvement in the conservation status of the species. Grey Wagtail is a passerine species closely associated with rivers and streams. They are Red-listed due to observed declines in breeding population and range in Ireland in recent decades (Gilbert *et al.* 2021). They are rarely recorded far from the river corridor.

Kestrel was recorded on-site during the 2022 breeding season transect surveys. Kestrel is not listed on Annex I of the Bird's Directive and the species was a new addition to the Birds of Conservation Concern in Ireland (BoCCI) Red-list in 2021 (Gilbert *et al.* 2021). The reason for the change in the conservation status of Kestrel is partly due to an increase in the time span of the short-term breeding decline criteria and to more recent severe declines recorded in their breeding populations. Causes for the decline of Kestrel in Ireland in recent years are not well understood, but it has been speculated that this has been due to changes in prey availability, agricultural changes and reduced feeding opportunities, as well as secondary rodenticide poisoning (Gilbert *et al.* 2021). However overall, Kestrel remains one of the most abundant and widespread birds of prey in Ireland.

6.4.5.2.2 Winter Season Transects & Point Counts

The results of the winter season transect and point count surveys carried out in the three winter periods of 2018/2019, 2019/2020 and 2021/2022 are presented in Appendix 6-3. Peak counts of each species from the transects and point counts undertaken are presented for each transect and point count.

In winter 2018/2019 a total of 24 bird species were recorded during the transect and point count surveys. Meadow Pipit, Raven and Hooded Crow, *Corvus cornix* were again prominent, particularly in the western parts of the Proposed Development.

There was one sighting of a flock of 60 Golden Plover over 100m from Transect 1 just to the north of the terrestrial study area (21st November 2018). No other wading bird species were recorded. Golden Plover is listed on Annex 1 of the Birds Directive. However, they are classified as being of Least Concern internationally (Birdlife, 2023). Wintering Golden Plover in Ireland are primarily Icelandic bred individuals (Wernham *et al.* 2002) and recent evidence confirms that the wintering numbers of Golden Plover in Ireland are relatively stable with some minor increases in the wintering distribution throughout the country (Balmer *et al.* 2013). Across their range, the population is showing slight increase overall (BirdLife International 2023).

There are two populations of Golden Plover that occur in Ireland. During the breeding season, small numbers of the nominate race breed at a number of upland areas, largely restricted to northwest Ireland. This breeding population winters in northwest Europe, although numbers wintering in Ireland are believed to be small (www.birdwatchireland.ie). Ringing recoveries have shown that most Irish wintering Golden Plover are from the *altifrons* population, which breeds in Iceland and the Faeroe Islands. Wintering Golden Plover are highly dispersed and total wintering numbers are difficult to quantify exactly (Balmer *et al.* 2013). However, recent evidence confirms that the wintering numbers of Golden Plover in Ireland are in excess of 150,000 and are relatively stable (Balmer *et al.* 2013, Boland & Crowe, 2012). The ELAR Site Boundary is not within the known breeding range of Golden Plover, as the breeding population is largely restricted to northwest Ireland (and where significant population decline and range contraction has occurred; Balmer *et al.* 2013). Golden Plover was not recorded displaying or breeding at or in the vicinity of the Proposed Development site and was absent from the site across the summer months.

A male Red Grouse was heard calling from cover (>100m) from Transect 2 on 21st November 2018, west of the proposed T5 location. Droppings of Red Grouse had been recorded on site during mammal survey walkovers and there were occasional sightings of the species during the VP surveys. A dedicated breeding (tape lure playback) survey for the species was carried out in March 2019 (see Section 6.4.5.3).

Redwing were recorded on Transect 3 and from Point Count 1 during the winter surveys in 2018/2019. Redwing is a BoCCI Red-listed winter migrant thrush species which was moved from Green-listed to Red-listed on the most recent BoCCI list due to declines across the international range of the species (Gilbert *et al.* 2021). Within its European range it has experienced moderate declines, and although the majority of the population occurs outside Europe, it is suspected that at least some declines are occurring elsewhere in its range and Redwing has therefore precautionarily uplisted to Near Threatened (BirdLife International 2023). Redwing is a relatively numerous winter visitor to Ireland and it forms large feeding flocks that are widespread throughout the country and across a range of habitat types. Feeding flocks typically exploit berry crops and also feed in grassland.

The results of the winter transect and point count survey in 2019/2020 is presented in Appendix 6-3. A total of 25 bird species were recorded. It is a similar species assemblage as was recorded in 2018/2019. A Grey Wagtail was recorded on Transect 3. Two Snipe were flushed from the roadside on Transect 2 on January 17th 2020. Snipe is a resident wading bird species that is included on the BoCCI Red list. Snipe were not recorded as a breeding species (no display flights observed etc.) during the three breeding season surveys (and VPs). Snipe were previously Amber-listed but are now included on the Red-list due to observed declines in both the breeding and wintering populations in Ireland in recent decades (Gilbert *et al.* 2021). The Irish population is supplemented to by an influx of winter migrants from northern Europe and Iceland. The species has a preference for areas of wetland, wet grassland and upland heath and bog. Observed declines have been attributed to increased drainage of wetland habitats, afforestation and exploitation of peatland habitats. The species does not appear to be common anywhere within the Proposed Development site and no significant numbers were present at any time of year.

Appendix 6-3 also presents the results of the transect and points count surveys from the winter of 2021/2022. In total 24 bird species were recorded a very similar level of species diversity to that recorded at the site in previous winter seasons. No wading birds were observed. Kestrel was recorded on Transect 4 on both of the survey occasions.

6.4.5.3 Breeding Red Grouse Survey

There were a number of observations of droppings of Red Grouse recorded at the Proposed Development site during the course of surveys in 2018. There are some areas of Heather (*Calluna vulgaris*) cover at the site but much of the open areas within the study area have limited cover and would be considered sub-optimal for breeding Red Grouse. However, as there was evidence of at least occasional occurrence of the species in the area a dedicated tape-lure playback survey was carried out under licence (Licence 33/2019) on 26th March 2019 (Figure 6-6).

There was no response to the playback at any of the locations on the three survey transects. Neither was there any Red Grouse sighted during the survey. There were occasional sightings and signs of Red Grouse noted at the site over the course of other field surveys, with droppings recorded near VP3 in December 2021 and a Red Grouse recorded crossing the internal wind farm road near VP1 at the west of the Proposed Development site in March 2020. Red Grouse were not heard calling on-site and it is likely the Proposed Development site is used occasionally by non-breeding birds.

6.4.5.4 Vantage Point & Hinterland Surveys

Three breeding season and three winter season Vantage Point surveys were conducted at the site. Seven Vantage Points were used to record flightlines of target species (Raptors, Wading Birds, Waterbirds). A record was maintained of all species seen or heard during the VP watches and this information is provided in Appendix 6-2. The schedule of visits, prevailing weather conditions and personnel are presented in Appendix 6-1.

6.4.5.4.1 Breeding Season Vantage Point & Hinterland Surveys

Flightline maps and associated descriptions of each of the flightlines are provided in Appendix 6-2. These data have been collated and the flightlines of target species are summarised, recording the number of flightlines of each species recorded in a particular season, the overall duration of observations, the cumulative time a species was seen within, or outside of the study area and the number of the recorded flightlines of each species that occurred at estimated flight heights within the potential Rotor Swept Height (RSH; 36.5-200m). In addition, the number and duration of the flightlines that occurred at RSH within the study area for each species during the season is presented.

Table 6-18 summarises the results of the 2018 breeding season VP surveys. Flightlines for a total of 7 no. target species were recorded. Of these, Kestrel was by far the most frequently recorded species (17 flightlines), followed by Lesser Black-backed Gull, *Larus fuscus* (5 flightlines) and Peregrine Falcon, *Falco peregrinus* (4 flightlines). There were single flightline observations of Buzzard, *Buteo buteo*, Mallard, Sparrowhawk, *Accipiter nisus* and White-tailed Eagle.

Kestrel flightlines were cumulatively observed for 58 minutes and 31 seconds, with just over 29 minutes of observations from within the Proposed Development site. In total 8 no. of the 17 no. flightlines occurred at RSH, 5 no. of these within the EIAR Site Boundary.

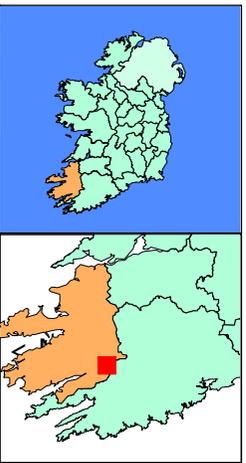
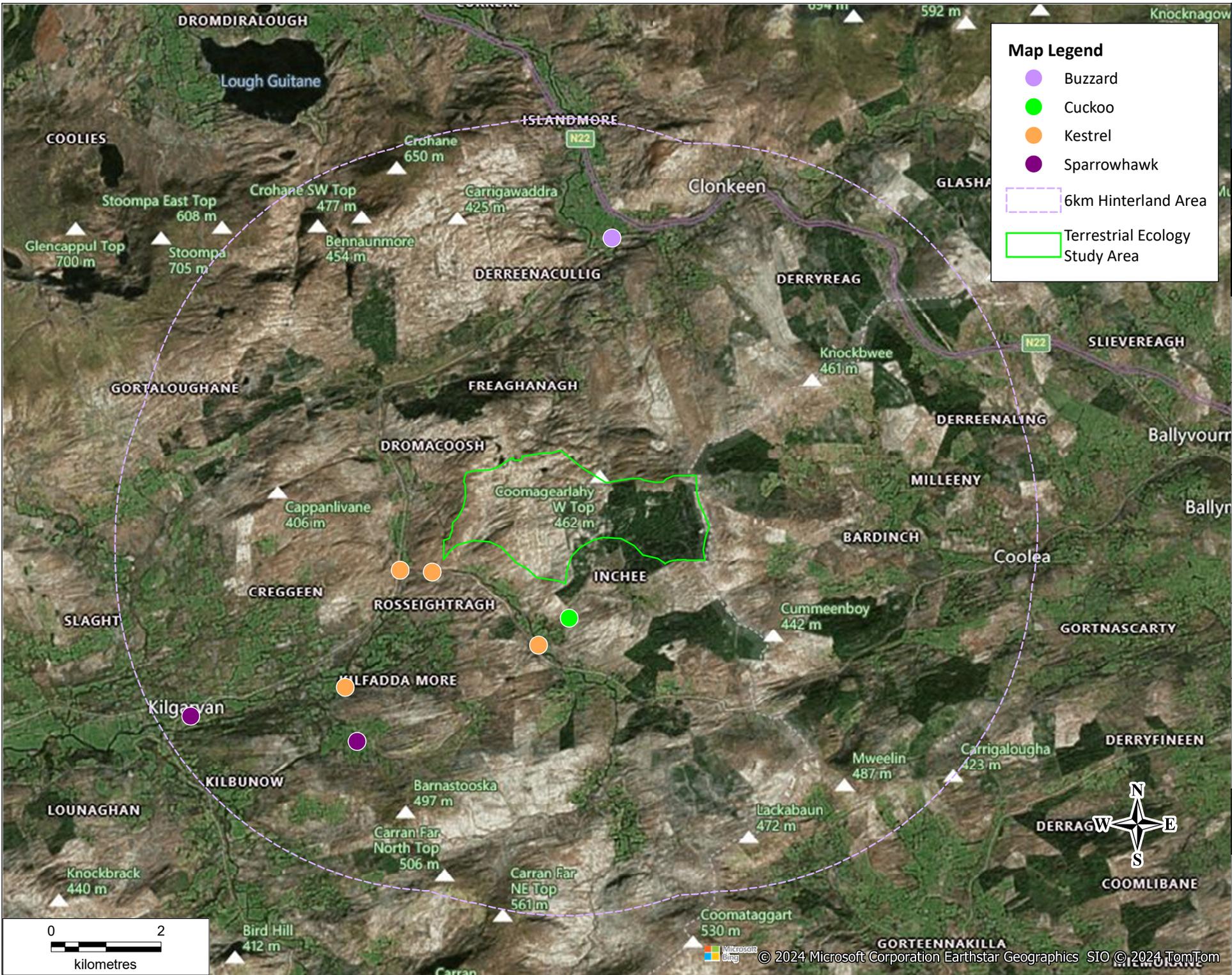
Neither Sparrowhawk nor White-tailed Eagle flightlines were observed within the terrestrial ecology study area. Of the 4 no. flightlines of Peregrine Falcon, two of the flightlines were outside of the RSH and there was only one flightline at RSH (1m 41s) within the Proposed Development site.

Table 6-18 Summary of flightline observations of key target species, 2018 breeding season.

Species	Max no.	No of Flightlines	Duration On (s)	Duration Off (s)	Overall time (s)	No. of flightlines at RSH	No. of fl. on-site at RSH	Duration on site at RSH (s)
Buzzard	1	1	30 (0m 30s)	90 (1m 30s)	120 (2m 00s)	1	1	30 (0m 30s)
Kestrel	1	17	1773 (29m 33s)	1738 (28m 58s)	3511 (58m 31s)	8	5	733 (12m 13s)
Lesser Black-backed Gull	2	5	119 (1m 59s)	192 (3m 12s)	311 (5m 11s)	3	1	119 (1m 59s)
Mallard	3	1	30 (0m 30s)	0	30 (0m 30s)	1	1	30 (0m 30s)
Peregrine Falcon	1	4	111 (1m 51s)	432 (7m 12)	543 (9m 03s)	2	1	101 (1m 41s)
Sparrowhawk	1	1	0	323 (5m 23s)	323 (5m 23s)	1	0	0

Species	Max no.	No of Flightlines	Duration On (s)	Duration Off (s)	Overall time (s)	No. of flightlines at RSH	No. of fl. on-site at RSH	Duration on site at RSH (s)
White-tailed Eagle	1	1	0	300 (5m 00s)	300 (5m 00s)	1	0	0

Figure 6-13 shows the observations of target species recorded during the 2018 early/late season hinterland surveys. There were several sightings of Kestrel to the south/southwest of the EIAR Site Boundary. A soaring Buzzard was recorded just southwest of the Cloonkeen entrance on the R569. There were two sightings of Sparrowhawk, including a perched female Sparrowhawk near Kilgarvan village in July 2018.



Client Name:
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Project Title:
Kilgarvan Wind Farm Repowering

Figure Name:
2018 - Hinterland sightings

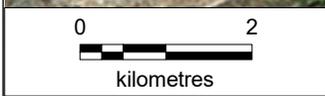
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There were 10 no. target species recorded during the 2019 breeding season VP surveys (Table 6-19). Three waterbird species were observed, Cormorant, *Phalacrocorax carbo* (2 flightlines), Grey Heron, *Ardea cinerea* (2 flightlines) and Lesser Black-backed Gull (6 flightlines). There was one sighting of a male Hen Harrier, *Circus cyaneus*, on 26th August 2019. The observation was of a foraging male bird below 25m above ground level. The timing of the observation would be in the post-breeding period when Hen Harriers may be dispersing away from breeding grounds.

There were two very brief observations of Goshawk, *Accipiter gentilis* recorded. The species is an occasional visitor to Ireland and has bred in Ireland in small numbers in recent decades. There is no known breeding pair in this part of Ireland.

As in the previous breeding season the species for which there was most observations was Kestrel (31 flightlines). Birds were observed in flight for a little under 90 minutes during the 2019 breeding season watches. Most of the flightlines observed were of birds at less than 25m above ground level and only 10 no. of the flightlines were within the RSH, 7 no. of these within the Proposed Development site. Overall, Kestrels were observed in flight at RSH within the Proposed Development site for just under 30 minutes within the 2019 VP survey season.

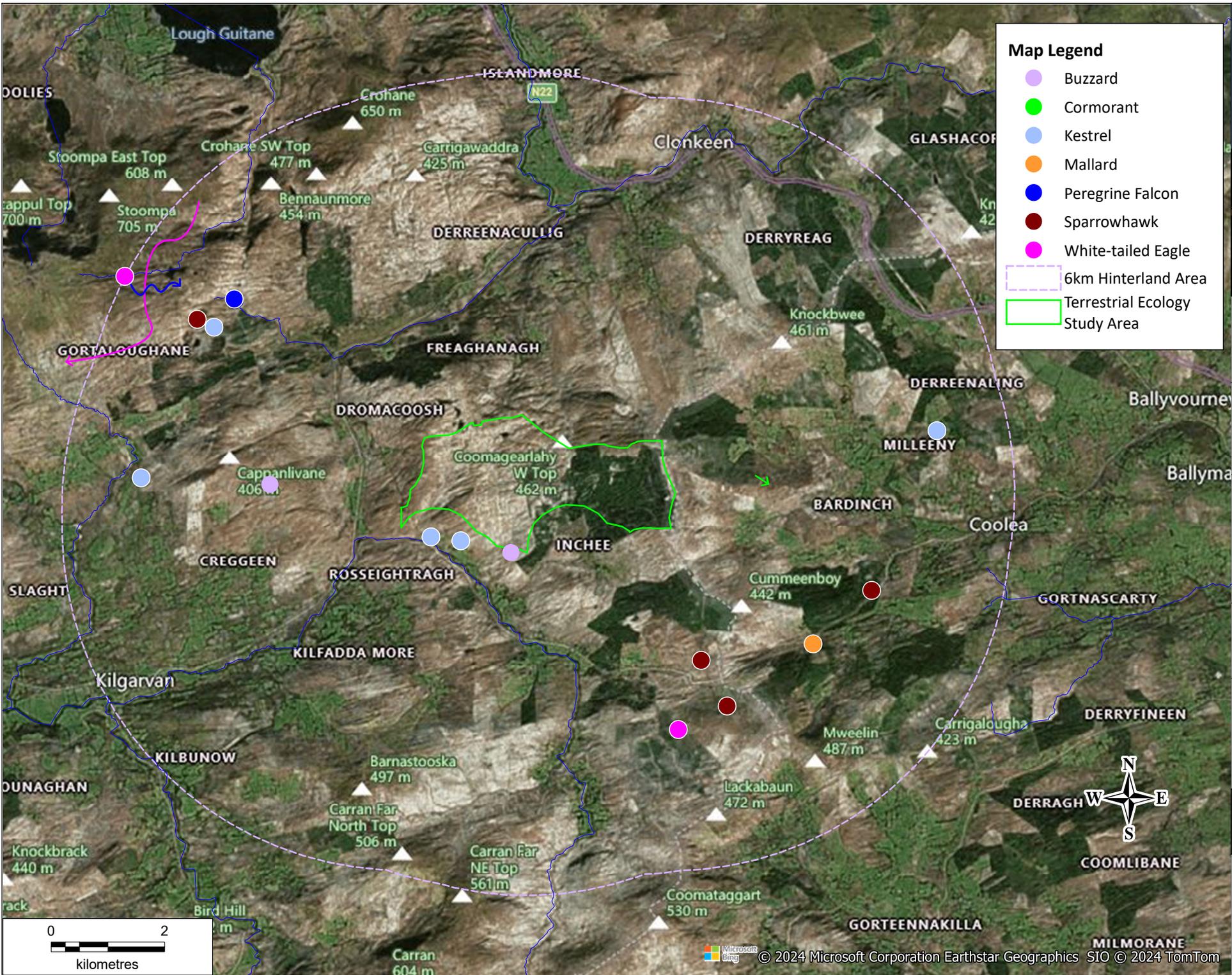
There were a small number of flightlines of other birds of prey recorded during the 2019 breeding VP surveys. Buzzard (maximum of two birds) and White-tailed Eagle were only recorded outside of the study area (see mapping in Appendix 6-2). Peregrine Falcon was recorded within the EIAR Site Boundary for a total of 45 seconds, only 25 seconds of which was at RSH. Sparrowhawk (4 flightlines) was recorded within the study area for 5 minutes and 40 seconds of the observation period. However, none of the flights observed on site were of birds flying within the potential rotor swept envelope.

Table 6-19 Summary of flightline observations of key target species, 2019 breeding season.

Species	Max no.	No of Flightlines	Duration On (s)	Duration Off (s)	Overall time (s)	No. of fl. at RSH	No. of fl. on-site at RSH	Duration on site at RSH (s)
Buzzard	2	2	0	236 (3m 56s)	236 (3m 56s)	1	0	0
Cormorant	1	2	0	470 (7m 50s)	470 (7m 50s)	2	0	0
Goshawk	1	1	10 (0m 10s)	0	10 (0m 10s)	1	1	10 (0m 10s)
Grey Heron	1	2	0	170 (2m 50s)	170 (2m 50s)	0	0	0
Hen Harrier	1	1	300 (5m 00s)	40 (0m 40s)	340 (5m 40s)	0	0	0
Kestrel	2	31	4357	853	5210	10	7	1789

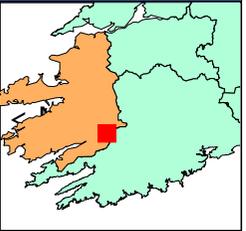
Species	Max no.	No of Flightlines	Duration On (s)	Duration Off (s)	Overall time (s)	No. of fl. at RSH	No. of fl. on-site at RSH	Duration on site at RSH (s)
			(1hr 12m 37s)	(14m 13s)	(1hr 26m 50s)			(29m 49s)
Lesser Black-backed Gull	3	6	90 (1m 30s)	683 (11m 23s)	773 (12m 53s)	5	2	90 (1m 30s)
Peregrine Falcon	1	3	45 (0m 45s)	0	45 (0m 45s)	1	1	25 (0m 25s)
Sparrowhawk	1	4	340 (5m 40s)	82 (1m 22s)	422 (7m 02s)	2	1	280 (4m 40s)
White-tailed Eagle	1	1	0	240 (4m 00s)	240 (4m 00s)	1	0	0

Figure 6-14 shows the distribution of sightings of target species made during early/late season survey hinterland surveys. There were several sightings of White-tailed Eagle, including a flightline where a bird interacted with a Peregrine Falcon at Gortaloughane (>5km) northwest of the EIAR Site Boundary on 11th April 2019. On the same survey occasion, two White-tailed Eagles (an adult and an immature bird) were observed at roost in conifers near the entrance to Grousemount Wind Farm. There were sightings of Kestrel and Buzzard a short distance to the south of the EIAR Site Boundary. An active Sparrowhawk nest was recorded in woodland southeast of the Proposed Development site in July 2019. There was also sightings of Cormorant and Mallard in flight, to the east of the Proposed Development.



Map Legend

- Buzzard
- Cormorant
- Kestrel
- Mallard
- Peregrine Falcon
- Sparrowhawk
- White-tailed Eagle
- 6km Hinterland Area
- Terrestrial Ecology Study Area



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Flightlines of a total of 9 target species were observed in the 2022 breeding season (Table 6-20). The activity was dominated by Kestrel (66 flightlines), with frequent observations of Buzzard (20 flightlines) and Sparrowhawk (10 flightlines). Kestrel flightlines were recorded for over 4.5 hours during the 2022 VP breeding season surveys. An estimated 29 of the 66 flightlines occurred at RSH, 23 of these within the Proposed Development site (51 minutes 38 seconds). Flightlines of two other raptor species were recorded within the Proposed Development site: Buzzard (15 minutes 10 seconds) and Sparrowhawk (20 minutes 20 seconds). Only three of the Buzzard flightlines on-site occurred at RSH. However, most of the Sparrowhawk time on site was of birds observed at RSH (19 minutes 44 seconds). There were single flightline observations of White-tailed Eagle and Peregrine Falcon, although neither intersected with the Proposed Development site.

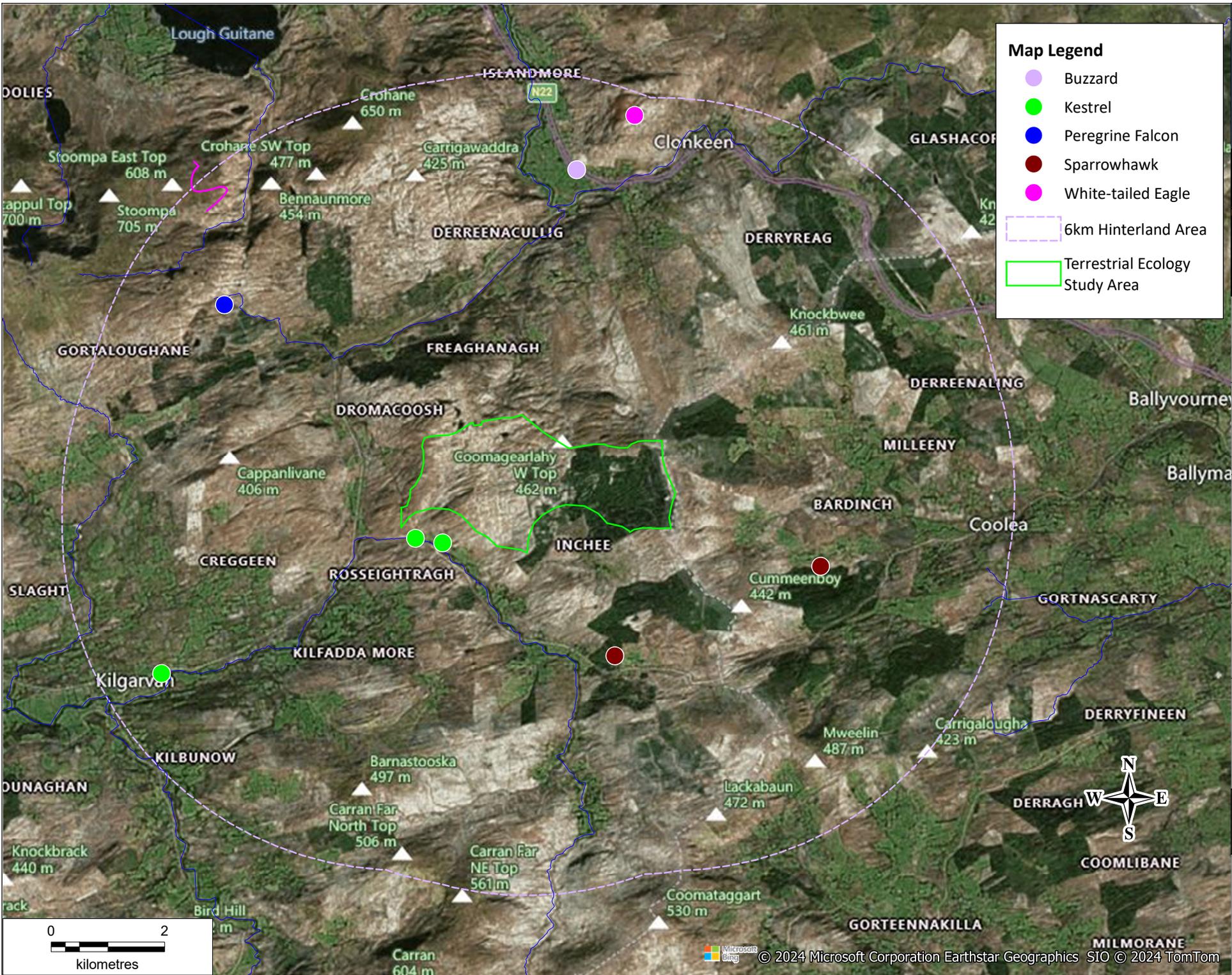
There were flightlines observed of Grey Heron (1 flightline), unidentified Gull species (2 flightlines), Mallard (1 flightline) and Lesser Black-backed Gull (8 flightlines).

Table 6-20 Summary of flightline observations of key target species, 2022 breeding season.

Species	Max no.	No of Flightlines	Duration On (s)	Duration Off (s)	Overall time (s)	No. of fl. at RSH	No. of fl. on-site at RSH	Duration on site at RSH (s)
Buzzard	1	20	910 (15m 10s)	834 (13m 54s)	1744 (29m 04s)	10	3	445 (7m 25s)
Grey Heron	1	1	160 (2m 40s)	0	160 (2m 40s)	0	0	0
Gull species	1	2	0	38	38	1	0	0
Kestrel	3	66	12346 (3hr 25m 46s)	4048 (1hr 7m 28s)	16394 (4hr 33m 14s)	29	23	3098 (51m 38s)
Lesser Black-backed Gull	15	8	120 (2m 00s)	1657 (27m 37s)	1777 (29m 37s)	6	1	60 (1m 00s)
Mallard	2	1	0	10 (0m 10s)	10 (0m 10s)	0	0	0
Peregrine Falcon	1	1	0	60 (1m 00s)	60 (1m 00s)	1	0	0
Sparrowhawk	2	10	1220 (20m 20s)	555 (9m 15s)	1775 (29m 35s)	8	7	1184 (19m 44s)

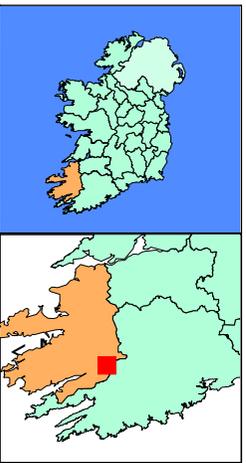
Species	Max no.	No of Flightlines	Duration On (s)	Duration Off (s)	Overall time (s)	No. of fl. at RSH	No. of fl. on-site at RSH	Duration on site at RSH (s)
White-tailed Eagle	1	2	0	58 (0m 58s)	58 (0m 58s)	2	0	0

Hinterland observations from the 2022 breeding season are shown in Figure 6-15. A soaring White-tailed Eagle was recorded north of Cloonkeen on July 9th 2022 and an adult White-tailed Eagle was recorded in flight south of Lough Guitane c. 6km from the Proposed Development site on the same survey occasion. A pair of Sparrowhawks were observed provisioning young at a nest site close to the nest location observed in 2019 (Bardinchy) on 30th July 2022. As in previous years there were several observations of Kestrels in areas to the south/southwest of the Proposed Development. There was one observation of a Peregrine Falcon (21st April) at Gortaloughane, northwest of the EIAR Site Boundary.



Map Legend

- Buzzard
- Kestrel
- Peregrine Falcon
- Sparrowhawk
- White-tailed Eagle
- 6km Hinterland Area
- Terrestrial Ecology Study Area



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6.4.5.4.2 Winter Season Vantage Point Surveys

Three seasons of winter vantage point surveys were completed. The same number and location of VPs were used as during the breeding season.

Table 6-21 summarises the results of the 2018/2019 winter period. Flightlines of a total of 10 no. target species were recorded during this season (Appendix 6-2). These included species that are present locally year-round such as Kestrel (25 flightlines), Buzzard (9 flightlines) and Sparrowhawk (4 flightlines). There were also observations of species not recorded locally during the breeding season VP surveys including Golden Plover (19 flightlines), Red Grouse (2 flightlines) and Merlin, *Falco columbarius* (1 flightline).

Although there were relatively frequent observations of Golden Plover, the flock size recorded was generally low. A peak flock size of 80 birds was observed during the winter of 2018/2019. Golden Plovers were observed within the EIAR Site Boundary for a total of over 32 minutes, and for much of this time birds were at RSH (>30 minutes).

White-tailed Eagle (maximum two birds) were recorded on-site for a total of 53 minutes 28 seconds. Much of this time was spent circling and soaring and the birds did not appear to be actively foraging on-site within the Proposed Development site. There were four of the flightlines within the Proposed Development site that occurred at RSH and these flights totalled over 52 minutes during the winter of 2018/2019.

Goshawk, which was recorded locally on two occasions during the 2019 breeding season was also recorded on two occasions in the preceding winter period. Buzzard (up to 3 birds) were observed over the EIAR Site Boundary for 16 minutes with almost all of this time (15 minutes 32 seconds) as RSH. Kestrel was present on-site for over 22 minutes, with a little over 9 minutes spent at RSH. There was a single observation of Merlin and this was of a low-flying bird. Similarly, the observations of Red Grouse were of birds flying near ground level.

Table 6-21 Summary of flightline observations of key target species, 2018/2019 winter season.

Species	Max no.	No of Flightlines	Duration On (s)	Duration Off (s)	Overall time (s)	No. of fl. at RSH	No. of fl. on-site at RSH	Duration on site at RSH (s)
Buzzard	3	9	960 (16m 00s)	665 (11m 05s)	1625 (27m 05s)	7	5	932 (15m 32s)
Golden Plover	80	19	1943 (32m 23s)	2494 (41m 34s)	4437 (1h 13m 57s)	14	10	1716 (28m 36s)
Goshawk	1	2	60 (1m 00s)	70 (1m 10s)/	130 (2m 10s)	1	1	10 (0m 10s)
Kestrel	2	25	1338 (22m 18s)	920 (15m 20s)	2258 (37m 38s)	10	9	566 (9m 26s)

Species	Max no.	No of Flightlines	Duration On (s)	Duration Off (s)	Overall time (s)	No. of fl. at RSH	No. of fl. on-site at RSH	Duration on site at RSH (s)
Merlin	1	1	10 (0m 10s)	0	10 (0m 10s)	0	0	0
Peregrine Falcon	1	4	167 (1m 47s)	50 (0m 50s)	217 (3m 37s)	2	1	127 (2m 07s)
Red Grouse	2	2	12 (0m 12s)	3 (0m 03s)	15 (0m 15s)	0	0	0
Sparrowhawk	2	4	85 (1m 25s)	40 (0m 40s)	125 (2m 05s)	3	3	65 (1m 05s)
Unknown Raptor	1	1	4 (0m 04s)	0	4 (0m 04s)	1	1	4 (0m 04s)
White-tailed Eagle	2	7	3208 (53m 28s)	2150 (35m 50s)	5358 (1h 29m 18s)	6	4	3163 (52m 43s)

The results of the 2019/2020 VP watches are summarised in Table 6-22. Flightlines were recorded for 6 no. target species. Two wading bird species were recorded, Golden Plover (16 flightlines) and Snipe (1 flightline). A flock of up to 100 Golden Plovers was recorded locally. However, Golden Plovers were observed for far shorter duration in the winter of 2019/2020, with a combined time within the Proposed Development site of just 7 minutes.

Flightlines were recorded of 4 no. raptor species, Kestrel (27 flightlines), Merlin (2 flightlines), Sparrowhawk (3 flightlines) and White-tailed Eagle (3 flightlines). In contrast to the previous winter season, White-tailed Eagle spent a relatively small amount of time over the Proposed Development site. The duration of the flightlines of White-tailed Eagle on-site at RSH was only 70 seconds across this winter period.

Kestrels were observed in flight over the Proposed Development site for just over 42 minutes. A total of 13 of the Kestrel flightlines occurred within the Proposed Development site at RSH (32 minutes 8 seconds). Merlin was only recorded off-site during the winter of 2019/2020. Sparrowhawk was seen briefly within the Proposed Development site (20s) but this flightline was below RSH.

Table 6-22 Summary of flightline observations of key target species, 2019/2020 winter season.

Species	Max no.	No of Flightlines	Duration On (s)	Duration Off (s)	Overall time (s)	No. of fl. at RSH	No. of fl. on-site at RSH	Duration on site at RSH (s)
Golden Plover	100	16	445	769	1214	13	6	420

Species	Max no.	No of Flightlines	Duration On (s)	Duration Off (s)	Overall time (s)	No. of fl. at RSH	No. of fl. on-site at RSH	Duration on site at RSH (s)
			(7m 25s)	(12m 49s)	(20m 14s)			(7m 00s)
Kestrel	1	27	2526 (42m 06s)	708 (11m 48s)	3234 (53m 54s)	16	13	1928 (32m 8s)
Merlin	1	2	10 (0m 00s)	35 (0m 35s)	45 (0m 45s)	1	0	0
Snipe	1	1	10 (0m 10s)	0	10 (0m 10s)	0	0	0
Sparrowhawk	1	3	20 (0m 20s)	66 (1m 06s)	86 (1m 26s)	2	0	0
White-tailed Eagle	1	3	610 (10m 10s)	854 (14m 14s)	1464 (24m 24s)	2	2	70 (1m 10s)

Table 6-23 summarises the results of the 2021/2022 winter period. Flightlines of a total of 14 no. target species were recorded during this season. This was by some margin the greatest diversity of target species recorded during the winter VP surveys. However, it was also notable in that there were relatively few flightlines observed of certain species including Golden Plover (3 flightlines; maximum 34 birds). One species seen that was not previously recorded at the site in any previous season's survey was Chough, *Pyrrhocorax pyrrhocorax* (5 birds). Although largely coastal in distribution Chough will occur inland, especially in winter. They have previously been recorded near Ballyvourney at Gortarahilly (<https://gortarahillyplanning.ie/wp-content/uploads/2022/09/Chapter-7-Ornithology.pdf>). The Chough was recorded commuting through the Proposed Development site in late November 2021 and mid-December 2022. The birds were observed feeding in wet fields along the Roughty River to the south of the Proposed Development site.

Three waterbird species were only recorded outside of the Proposed Development site; Cormorant, Lesser Black-backed Gull and Grey Heron. Two Mallard were seen very briefly overflying the wind farm stud area.

There were a number of raptor species observed during the winter 2021/2022 VP surveys. The most frequently observed was Kestrel (24 flightlines), followed by White-tailed Eagle (11 flightlines), Sparrowhawk (10 flightlines) and Buzzard (9 flightlines). Kestrel was also recorded on-site for the most time of these raptor species (32 minutes 40 seconds) although the majority of observations were of low flying birds (<25m). Only 6 no. of the Kestrel flightlines occurred at RSH, accounting for 10 minutes 42 seconds. Of the 11 flightlines of White-tailed Eagle (up to 3 birds present) only two occurred over the Proposed Development site during the winter VP watches in 2021/2022. These flights were both largely at RSH and the birds were present within the Proposed Development site for a total of 28 minutes. There were three sightings of Hen Harrier recorded during this winter period. All were of single male birds, two of these sightings occurring on the morning of 16th December 2022 and almost certainly involving the same individual. None of the Hen Harrier flightlines were of birds flying at RSH.

There were a number of brief sightings of a Merlin, totalling only 54 seconds within the Proposed Development site. There were also two sightings of Peregrine Falcon during the winter 2021/2022 VPs and the bird spent a total of 5 minutes 34 seconds over the Proposed Development site. However, only one flightline totalling 34 seconds on-site was spent at RSH.

Table 6-23 Summary of flightline observations of key target species, 2021/2022 winter season.

Species	Max no.	No of Flightlines	Duration On (s)	Duration Off (s)	Overall time (s)	No. of fl. at RSH	No. of fl. on-site at RSH	Duration on site at RSH (s)
Buzzard	1	9	656 (10m 56s)	865 (14m 25s)	1521 (25m 21s)	8	5	656 (10m 56s)
Chough	5	4	288 (4m 48s)	95 (1m 35s)	383 (6m 23s)	1	1	155 (2m 35s)
Cormorant	1	3	0	224 (3m 44s)	224 (3m 44s)	3	1	90 (1m 30s)
Golden Plover	34	3	175 (2m 55s)	329 (5m 29s)	504 (8m 24s)	2	1	135 (2m 15s)
Grey Heron	1	1	0	15 (0m 15s)	15 (0m 15s)	0	0	0
Hen Harrier	1	3	366 (6m 06s)	0	366 (6m 06s)	0	0	0
Kestrel	1	24	1960 (32m 40s)	1727 (28m 47s)	3687 (1hr 1m 27s)	6	6	642 (10m 42s)
Lesser Black-backed Gull	2	1	0	31 (0m 31s)	31 (0m 31s)	1	0	0
Mallard	2	1	13 (0m 13s)	13 (0m 13s)	26 (0m 26s)	1	1	13 (0m 13s)
Merlin	1	6	54 (0m 54s)	38 (0m 38s)	92 (1m 32s)	1	1	21 (0m 21s)
Peregrine Falcon	1	2	334 (5m 34s)	57 (0m 57s)	391 (6m 34s)	1	1	34 (0m 34s)

Species	Max no.	No of Flightlines	Duration On (s)	Duration Off (s)	Overall time (s)	No. of fl. at RSH	No. of fl. on-site at RSH	Duration on site at RSH (s)
Red Grouse	1	1	15 (0m 15s)	0	15 (0m 15s)	0	0	0
Sparrowhawk	2	10	50 (0m 50s)	626 (10m 26s)	676 (11m 16s)	6	2	30 (0m 30s)
White-tailed Eagle	3	11	1680 (28m 00s)	2045 (34m 05s)	3725 (1hr 2m 05s)	9	2	1680 (28m 00s)

Due to the occurrence of resident Red-listed species and the occasional occurrence of Annex I bird species and taking into account the overall usage of the habitats at the site by birds, the EIAR Site Boundary is ascribed a **local higher to county** value for bird species.

6.4.5.4.3 **Fatality Monitoring**

Dog-based carcass searches were carried out around the Existing Kilgarvan Wind Farm 28 no. turbines to record evidence of bird fatalities. The searcher efficiency trials confirmed that the recovery rate of even small carcasses are accomplished with a very high success rate (>90%) using trained dogs and expert handlers. The carcass removal trials showed that birds can remain unscavenged for relatively long-periods (Table 6-17). The data collected in the carcass searches as well as the scavenger removal and searcher efficiency trials is presented in Appendix 6-5.

As summarised in Figure 6-12 only three bird carcasses were recovered during the 14-months of surveys. A Blackcap was recovered in September 2021, a Robin in April 2022 and a Mistle Thrush in July 2022. All showed evidence of being strike casualties.

6.4.6 **Other taxa**

6.4.6.1 **Desktop study**

The NBDC database for the 10km Grid Squares which overlap EIAR Site Boundary was consulted (20th July 2023) to collate the records of other taxa of note that have been recorded in this area historically.

Common Frog has been recorded in each of the overlapping 10km Grid Squares. There are no historic records of Smooth Newt, *Lissotriton vulgaris* or Common Lizard, *Zootoca vivipara* from these overlapping Grid Squares.

Marsh Fritillary has been recorded in W07 and W17 10km Grid Squares, although the records from W07 are aged. Kerry Slug has been recorded in each of the overlapping 10km Grid Squares.

6.4.6.2 **Field surveys**

No adult Marsh Fritillaries were recorded on the wing locally during any of the field surveys carried out in this area. There were limited amounts of Devil's Bit Scabious recorded in the area, mostly confined

to areas of Dry Heath. No larval webs of Marsh Fritillary were recorded on these plants during checks of areas with the larval food plant in August 2019 and September 2021.

Table 6-24 summarises the other taxa observed at the site. The majority of these were casual observations with some species records the result of dedicated visits to patches of attractive habitat e.g. Lough Nabirria.

Common Lizard was recorded at the site on two occasions, in June 2019 and again in March 2022.

Kerry Slug was common and widespread at the site. They were recorded at several of the bird Vantage Point locations on the very first site visit. Hand searching or metric trapping was deemed unnecessary as the species is so widespread at the site. They were recorded widely on almost every site visit. Their distribution appeared to be limited to areas with exposed rock and are particularly common along the edges of roads within the site and elsewhere where there are exposed boulders. Spot checks along the conifer edge carried out during active bat survey visits failed to record the species in the conifer plantation. Dr. Fennessy previously designed and carried out surveys for the Galway population of Kerry Slug in the Cloosh Valley, including surveys in woodland.

Table 6-24 Records of other taxa recorded at the Proposed Development site.

Species	Scientific Name	Notes
Bumblebee Hoverfly	<i>Volucella bombylans</i>	Observed June 2022
Click-beetle	<i>Ctenicera cuprea</i>	Observed May 2022
Common Blue Damselfly	<i>Enallagma cyathigerum</i>	Recorded annually
Common Frog	<i>Rana temporaria</i>	Adult frogs, spawn and tadpoles recorded
Common Hawker	<i>Aeshna juncea</i>	Observed August 2022
Common Heath Moth	<i>Ematurga atomaria</i>	Recorded May 2022
Common Lizard	<i>Zootoca vivipara</i>	Recorded on site in June 2019 and March 2022
Emperor Dragonfly	<i>Anax imperator</i>	Recorded in 2018 at Lough Nabirria
Emperor Moth	<i>Saturnia pavonia</i>	Recorded annually (May/June)
Four-spotted Chaser	<i>Libellula quadrimaculata</i>	Recorded annually
Grayling	<i>Hipparchia semele</i>	July 2019 & 2022
Green Hair-streak	<i>Callophrys rubi</i>	June 2021 & May 2022
Green-veined White	<i>Pieris napi</i>	Seen annually
Keeled Skimmer	<i>Orthetrum coerulescens</i>	Recorded annually
Kerry Slug	<i>Geomalacus maculosus</i>	Widespread in open areas of the site
Large Red Damselfly	<i>Pyrhosoma nymphula</i>	Recorded annually

Species	Scientific Name	Notes
Large White	<i>Pieris brassicae</i>	Widespread and common
Meadow Brown	<i>Maniola jurtina</i>	Widespread and common
Musk beetle	<i>Aromia moschata</i>	Observed May 2022
Orange Tip	<i>Anthocharis cardamines</i>	Seen annually
Painted Lady	<i>Vanessa cardui</i>	Annual, regularly recorded
Red Admiral	<i>Vanessa atalanta</i>	Recorded in June 2018 and July 2021
Small Heath	<i>Coenonympha pamphilus</i>	Recorded in 2018 and 2021
Small Tortoiseshell	<i>Aglais urticae</i>	Seen annually
White-barred Peat Hoverfly	<i>Sericomyia lappona</i>	Observed May 2022

Small Heath, *Coenonympha pamphilus* a Near Threatened butterfly species was recorded locally on two occasions in 2018 and 2021.

The conifer plantation and clearfell and existing buildings and artificial surfaces within the wind farm site are evaluated of **higher local importance** for other taxa with the exception of Kerry Slug. Kerry Slug were regularly recorded on the rocky roadside verges within the Proposed Development and around the hard standing areas of the existing turbines and the site is considered of **County Importance** for the species.

The open areas of open peatland habitats and eroding upland streams are of **local importance (higher)** value for other taxa.

6.4.7 Constraints & Limitations

Due to travel restrictions associated with the Covid-19 pandemic the field surveys were interrupted in Spring 2020 and recommenced in winter 2021. Full breeding season surveys were completed in 2018, 2019 and 2022 (3 seasons) and full winter season surveys were completed over 2018/2019, 2019/2020 and 2021/2022 (3 seasons). No other significant site-specific difficulties were encountered in the completion of the field surveys for the terrestrial biodiversity assessment. We are satisfied that the information collected is sufficiently detailed and extensive to allow for a comprehensive ecological impact assessment.

6.5 Ecological Impact Assessment

This section of the chapter describes the potential impacts of the project on the terrestrial ecology in the receiving environment. A full description of the Proposed Development is included in Chapter 4 of this EIAR.

The timeline for the proposed works is presented in Chapter 4 of the EIAR. Removal of the existing turbines will occur in parallel with the construction phase. The potential effects of the removal of the existing turbines are therefore considered as part of the appraisal of construction phase impacts.

A detailed assessment of sensitive aquatic ecological receptors within catchments/sub-catchments with hydrological links to the development site has been completed and is provided in Chapter 7 of this EIAR. The potential impacts of the Proposed Development on Natura 2000 sites in the surrounding area is considered in the Natura Impact Statement which accompanies the EIAR and summarised herein.

6.5.1 Constraints-led Design Approach

A constraints-led design approach was taken to siting the principal features of the development to avoid areas of high sensitivity for key habitats and species occurring or likely to occur at the development site. The potential impacts on the Natura 2000 sites and their qualifying interests are considered in detail in the NIS that accompanies the planning application. The assessment concludes that with the implementation of the environmental controls including reinstatement plans in the construction phase, that there will be no significant adverse impacts upon any of the Natura 2000 sites, or their qualifying interests, arising from the Proposed Development.

6.5.2 Do -Nothing Scenario

If the Proposed Development was not developed, the site will continue to function as it does at present, with no changes made to the current land-use of a wind farm combined with areas of commercial forestry. If the Proposed Development were not to proceed, the Existing Kilgarvan Wind Farm turbines would eventually be decommissioned as per their existing permissions. The opportunity to capture an even greater part of County Kerry's valuable renewable energy resource would be lost, as would the opportunity to further contribute to meeting Government and EU targets for the production and consumption of electricity from renewable resources and the reduction of greenhouse gas emissions. The opportunity to generate local employment and investment and to diversify the local economy would also be lost.

6.5.3 Source-Pathway-Receptor

To assess the potential effects of the construction, operation and eventual decommissioning of the Proposed Development the Source-Pathway-Receptor (SPR) model was used. The detailed desktop and field studies provided a good understanding of the habitats and species of importance present at and in the wider receiving environment of the Proposed Development. For many habitat types the potential zone of influence (ZoI) for effects arising from the construction, operation and decommissioning of a wind farm are closely aligned with the footprint of the Proposed Development. However, in the case of mobile species, or those particularly sensitive to (for instance) construction-related disturbance, the zone of influence may extend several kilometres beyond the EIAR Site Boundary. This is discussed in detail in relation to the potential effects on aquatic habitats and species in Chapter 7 of the EIAR. The potential effects are assessed in the absence of "mitigation measures".

6.5.4 Potential Construction Phase Effects

6.5.4.1 Potential Construction Phase Effects on European Designated Sites

The Proposed Development site is not located within the bounds of any Natura 2000 sites; i.e. Special Areas of Conservation or Special Protection Areas. However, the EIAR Site Boundary is located proximate to Killarney National Park, Macgillycuddy's Reeks & Caragh River Catchment SAC (0.1km) with a minimum distance to the proposed turbines of 1.6km. This SAC is a large site designated for the conservation of a wide range of qualifying interests, including peatland habitats and species such as Kerry Slug and Lesser Horseshoe Bat. The next closest European sites, Old Domestic Building Curraglass Wood SAC (located c. 2.8km to the EIAR Site Boundary and over 3km from the nearest of the proposed turbines) and Kilgarvan Ice House SAC (located c. 3.6km to the EIAR Site Boundary and over 4.4km from the nearest of the proposed turbines) are both protected roost sites of Lesser Horseshoe Bats.

The hydrological linkages were considered when evaluating the likelihood of any more distant effects on European sites. The Proposed Development area is drained by three sub-catchments:

- **The Roughty sub-catchment:** The Proposed Development site is drained by 3 no. tributaries of the Roughty River, hereafter referred to as Glanlee, Lettercannon and Thurehouma. These mountain streams each confluence with the Roughty main channel between 6.5km and 8.3km upstream of Kilgarvan. The Roughty then flows westwards for c. 15km, discharging to the Atlantic Ocean at Kenmare Bay.
- **Flesk sub-catchment:** The site access road travels up from the N22, crossing the mountains high above the Flesk River, intersecting 1 no. small tributary (Cloonkeen) near the site entrance and 3 no. small headwater streams of the Owgarriv Tributary of the Flesk River. The tributaries confluence 23.5km and 27.5km, respectively, upstream of Killarney, upstream of Lough Leane which before discharges via the Killorglin (Laune River) to the Atlantic Ocean at Dingle Bay.
- **Sullane sub-catchment:** A very small proportion of the existing access road drainage connects, mainly via existing forestry drains to a small headwater of the "Barr Duinse" tributary of the upper Sullane River. A single existing watercourse intersection is 11km upstream of Baile Bhuirne, Co. Cork and connects to the River Lee via Macroom and Cork City, discharging to Cork Harbour >65km away.

The Blackwater River SAC is located c. 7km over-land from the EIAR Site Boundary and is not hydrologically connected to the Proposed Development site. There will be no likely effects on this SAC as a result of the Proposed Development. Given the distance from the Proposed Development and lack of hydrological pathways there is also no likelihood of significant effects on St. Gobnet's Wood SAC, Mullaghanish Bog SAC, Derryclogher Bog SAC and Sheheree Bog SAC arising in relation to the Proposed Development.

In agreement with the conclusions presented in Chapter 7 and Chapter 9 of the EIAR, there is no likelihood of significant construction phase effects on designated European sites arising from run-off of contaminants to the watercourses that drain the Proposed Development site. The potential for hydrologically mediated effects on habitats and species in the draining sub-catchments along the Roughty, Sullane and Flesk rivers are described in detail in Chapter 7 and Chapter 9. The Roughty River Estuary discharges to Kenmare Bay SAC and potential effects on water quality identified are only likely to be localised to the headwaters and areas well upstream of the European site. Similarly, while the Flesk is hydrologically connected to Killarney Park SPA it is not predicted that there is any likelihood of significant effects on the water quality within this downstream European site (due to distance and dilution/settlement effect). The Sullane joins the River Lee at Carrigadrohid Reservoir before discharging to Cork Harbour >65km downstream. Given the distance involved there is no likelihood of significant hydrologically mediated effects on the downstream European sites.

Most of the construction works will occur in the Roughty River subcatchment and while there is potential for effects on local water quality associated with the construction phase, there are no hydrologically connected European sites located within the ZoI.

Without appropriate mitigation there is some likelihood of significant effects on Killarney National Park, Macgillycuddy's Reeks & Caragh River Catchment SAC. This is based on the close proximity of the site to the Proposed Development site as well as the hydrological linkage through the Flesk sub-catchment. The two local SACs designated for the protection of Lesser Horseshoe Bat roost sites, Old Domestic Building Curraglass Wood SAC and Kilgarvan Ice House SAC, are outside of the Core Sustainment Zone (CSZ) for the species (>2.5km; NPWS & VWT 2022). CSZ refers to the area surrounding a communal bat roost within which habitat availability and quality will have a significant influence on the resilience and conservation status of the colony using the roost (NPWS 2018). However, on occasion bats will commute and forage beyond their CSZ and given that both of these roosts are located <4km from the EIAR Site Boundary they have been taken forward for further consideration as part of the NIS. Glanlough Woods SAC, also designated for the protection of Lesser Horseshoe Bat, is located over 8km from the EIAR Site Boundary. Given the distance involved there is no likelihood of any significant effects arising in relation to the Proposed Development with respect to this SAC.

There are two SPA sites located within 10km of the EIAR Site Boundary. However, the distance from Killarney National Park SPA (>9km) is greater than the published foraging ranges for the associated SCI species, Merlin and Greater White-fronted Goose (SNH, 2016) and well beyond the core foraging range at which potential connectivity with the SPA network is considered relevant as part of the AA screening process (*loc cit*). Therefore, it was concluded that potential effects on Killarney Park SPA need not be considered further as part of the NIS. Mullaghanish to Musheramore Mountains SPA is designated for the conservation of Hen Harrier and is located c. 7.8km from EIAR Site Boundary and c. 10km from the nearest of the proposed turbines. This is well outside of the core foraging range of Hen Harrier (e.g. SNH 2016) but given that foraging distances of over 10km have been recorded on occasion in Ireland (e.g. Irwin *et al.* 2012) the potential effects of the Proposed Development on Hen Harriers associated with the SPA are considered further as part of the NIS.

The following European sites were 'screened in' for further consideration in the accompanying NIS:

- Killarney National Park, Macgillycuddy's Reeks & Caragh River Catchment SAC
- Old Domestic Building Curraglass Wood SAC
- Kilgarvan Ice House SAC
- Mullaghanish to Musheramore Mountains SPA

During the construction phase, in the absence of adequate and appropriate mitigation there is some likelihood of significant effects upon the sites QIs/SCIs as a result of clearance and/or damage to habitat, disturbance associated with construction, negative effects on water quality (e.g. through run-off of contaminants).

The detailed field assessments showed that while Lesser Horseshoe Bats do occur within the Proposed Development site on occasion, that they do so very infrequently. The Proposed Development site does not appear to be used with any regularity by commuting or foraging Lesser Horseshoe Bats. The extent of open upland habitat at and in the vicinity of the site makes significant connectivity with the SACs located outside the CSZ of the species very unlikely. The fatality monitoring at the site did not record any fatalities of Lesser Horseshoe Bat at the Proposed Development site over the course of 14-months of intensive dog-based carcass searches.

Hen Harriers were very infrequently recorded in the vicinity of the Proposed Development site. There were four sightings overall, all of single male birds. Three of these occurred in the winter months and there was a single sighting of an adult male in late summer (August 2019). None of these were associated with a time of year when male birds would be actively provisioning young and the observations appeared to be of birds passing through outside of the breeding season. None of these

sightings involved a bird flying at RSH. During the construction phase, the existing 28 turbines will be removed and 11 no proposed turbines will be erected. The activity will see a localised and temporary increase in the movement of plant and personnel and associated disturbance to habitats associated with vegetation clearance, digging of turbine foundations etc. There will be associated noise and visual disturbance and a change in the size and location of above ground obstacles. Without mitigation there is some likelihood of temporary disturbance and displacement effects of Hen Harrier during construction.

Killarney National Park, Macgillycuddy's Reeks & Caragh River Catchment SAC is designated for a wide range of habitats and species:

- Oligotrophic waters containing very few minerals of sandy plains (*Littorelletalia uniflorae*) [3110]
- Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or *Isoeto-Nanojuncetea* [3130]
- Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260]
- Northern Atlantic wet heaths with *Erica tetralix* [4010]
- European dry heaths [4030]
- Alpine and Boreal heaths [4060]
- *Juniperus communis* formations on heaths or calcareous grasslands [5130]
- Calaminarian grasslands of the *Violetalia calaminariae* [6130]
- *Molinia* meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*) [6410]
- Blanket bogs (* if active bog) [7130]
- Depressions on peat substrates of the Rhynchosporion [7150]
- Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0]
- Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae) [91E0]
- *Taxus baccata* woods of the British Isles [91J0]
- *Geomalacus maculosus* (Kerry Slug) [1024]
- *Margaritifera margaritifera* (Freshwater Pearl Mussel) [1029]
- *Euphydrias aurinia* (Marsh Fritillary) [1065]
- *Petromyzon marinus* (Sea Lamprey) [1095]
- *Lampetra planeri* (Brook Lamprey) [1096]
- *Lampetra fluviatilis* (River Lamprey) [1099]
- *Salmo salar* (Salmon) [1106]
- *Rhinolophus hipposideros* (Lesser Horseshoe Bat) [1303]
- *Lutra lutra* (Otter) [1355]
- *Trichomanes speciosum* (Killarney Fern) [1421]
- *Najas flexilis* (Slender Naiad) [1833]
- *Alosa fallax killarnensis* (Killarney Shad) [5046]

The QI species Kerry Slug is listed under Annex II/IV of the Habitats Directive as such is strictly protected from injury, or disturbance/damage to their breeding or resting place wherever it occurs. Kerry Slug is abundant at the Proposed Development site. It was recorded widely, particularly in open areas of the site and along the margins of the existing access roads. It was not recorded in the conifer plantation at the site. The overall conservation status of the species has been reported as 'favourable and improving' and it is not currently considered threatened within its range (NPWS 2019). The construction activity has the potential to cause fragmentation of habitats and direct mortality of individuals. In the absence of appropriate mitigation measures such effects are considered to have the potential to be moderate to significant negative for the species at a local level. It is noted that the area of suitable habitat that will be directly impacted by construction is relatively small and that a considerable amount of suitable habitat for Kerry Slug exists at the site. It is also noted that the population of Kerry Slug at the Proposed Development appears to be in robust state and that this has persisted at a site where a considerably larger amount of construction was required to facilitate the Existing Kilgarvan

Wind Farm. The potential effects on Kerry Slug are likely to be highly localised and would result in the creation of some suitable habitat for the species e.g. along the margins of roads.

The Conservation Objective document prepared for this SAC presents a series of maps showing the known primary distribution of the QI habitats and species. As the Proposed Development is located outside of the SAC boundary there is no likelihood of direct effect on the terrestrial habitats. The closest part of the SAC to the proposed turbines is c. 1.6km. In the absence of appropriate mitigation there could be hydrologically mediated effects on aquatic habitats and species associated with deterioration of water quality in the Flesk sub-catchment. Such effects are not likely to extend very far downstream given the nature and extent of the works proposed in this sub-catchment. However, mobile and widely occurring species e.g. Atlantic Salmon, *Salmo salar*, could potentially experience localised temporary morbidity/mortality effects associated with uncontrolled run-off to this catchment. While species such as Otter were not recorded on-site during the surveys for the Proposed Development, they are widespread throughout the area and could also be affected indirectly through deteriorating feeding conditions associated with local deterioration in water quality.

High impact invasive plant species Japanese Knotweed and Rhododendron have been recorded off-site in the wider local area. Both species represent a risk that machinery associated with tree felling and construction could act as a vector for introducing or dispersing non-native invasive species within the Proposed Development working areas (including intersecting watercourses) and to adjacent lands/watercourses.

6.5.4.2 Potential Construction Phase Effects on Nationally Designated Sites

There are four NHA sites within 15km, with a further 15 pNHA sites located within 15km (Figure 6-8). There are 6 no. nationally designated sites located within 5km of the EIAR Site Boundary: Killarney National Park, Macgillycuddy's Reeks & Caragh River Catchment pNHA (000365; 0.1km), Roughty River pNHA (001376; 0.3km), Old Domestic Building, Currageglass Wood pNHA (002041; 2.8km), Sillahertane Bog NHA (001882; 3.0km), Kilgarvan Ice House pNHA (000364; 3.6km) and Kilgarvan Wood pNHA (4.7km).

Many of these designations overlap with the Natura 2000 sites already discussed and are designated for the protection of the same range of habitats and species.

The Roughty River pNHA is designated due to the historic record of Scully's Hawkweed, a FPO species. As described in Section 6.4.2.11, there are a number of rare Hawkweed species that have been recorded on outcrops along the Roughty River pNHA. These would not be especially vulnerable to changes in water quality in the river but might well be more vulnerable to changes in the discharge rate into the Roughty River and spate events. This could occur if the drainage design did not manage the run-off from the site during the construction phase.

No other of the nationally designated sites, not also covered by Natura 2000 designation, are considered to be within the ZoI of the Proposed Development.

6.5.4.3 Potential Construction Phase Effects on Habitats and Flora

The habitats present within the Proposed Development site differ from east to west with the western section of the site characterised by an open landscape dominated by a mosaic of wet heath, outcropping rock, blanket bog and dry heath habitats which is considered to be of high ecological value. This area is grazed by sheep with localized signs of grazing and poaching, however it is clear from observations that sheep mainly graze and congregate along the wind farm road network. Damage due to peat cutting and drainage is absent and the condition of the peatland habitats is considered to be good. The eastern section of the Proposed Development site is dominated by species-poor, rushy wet grassland vegetation which has regenerated on peat soils previously drained and afforested. Smaller

areas of tall conifer plantation also occur throughout, along with some small areas of open heath and blanket bog. The ecological value of this area is considered to be relatively low due to the afforestation of this area in the past. There are a variety of habitats present that are linked to habitats listed on Annex I of the EU Habitats Directive. Extensive areas of Annex I North Atlantic Wet heaths with *Erica tetralix* (4010) in mosaic with active Blanket Bog (7130) are present in the western portion of the site in particular.

The erection of new turbines and associated infrastructure will result in the loss of habitat within the site. In addition, there will be small areas of wet heath, scrub and conifer plantation lost through the development/widening of roads within the Proposed Development site and along the access road. Throughout the design process an effort was made to minimise the direct impacts associated with construction in areas of higher value habitat. Care was taken in siting the turbines and new access roads to ensure that insofar as possible areas of higher value habitat were avoided. This included setback and offset from watercourses and flush areas within the Proposed Development site.

No rare or protected flora were recorded within the study area. While there are documented records for a number of rare and protected plant species for the relevant 10km Grid Squares that overlaps the Proposed Development site there is a lack of suitable habitat for these species within the EIAR Site Boundary itself. No Bryophytes protected under the Flora (Protection) Order 2022 are documented for the study area (Flora Protection Order Map Viewer NPWS).

The process will involve the removal of the 28 no. turbines and natural regeneration of hard-standing areas and roads (see Chapter 4 of the EIAR). The areas around 11 no. turbines and hard-stands have been identified as suitable for peat and spoil placement taking into account peat stability and the objective of promoting natural revegetation of these areas.

It is noted that the turbine components are reused and recycled and not disposed of as waste. Sections of the existing road network and hardstanding will remain in use by local landowners to access livestock or will be left to naturally regenerate. The existing site roads (17.9km) will be upgraded as described in Chapter 4 of the EIAR with a finished road width of 5m with some localised widening at bends. There will be c. 1.5km of new access roads constructed. The construction period is estimated to take 18-24 months to complete.

Most of the new areas of construction will occur in areas dominated by local lower importance habitat value e.g. Wet Grassland (GS4) and Conifer plantations (WD4). The permanent loss of sections of such habitats, which are of Local importance (Lower value), as a result of the Proposed Development will lead to a neutral - imperceptible effect at the local scale. The Proposed Development will also require the removal of smaller sections of intact and partially degraded natural and semi-natural habitats considered to be of County Importance e.g. Wet Heath (HH3) and Upland Blanket Bog (PB2).

The area of these habitats to be removed has been minimised through an iterative design process and is much smaller in area (approximately 2.84 hectares) than the lower value habitats that will be directly affected. A short section of new access road between T9, T8 and T11 crosses an area of intact Wet Heath (HH3) and Upland Blanket Bog (PB2) before crossing into Conifer Plantation (WD4) at the new turbine location. Small areas of intact heath and peatland habitat will be directly impacted to facilitate new road and road upgrades, but this is limited in extent and occurs in areas where there are opportunities for restoration of existing roads and hard standing areas. The removal of these higher value habitats will have a localised long-term significant negative impact.

The direct construction phase impacts on low local importance value habitats will see the felling of 8.9ha of commercial forestry plantation (WD4) and the localised loss of small areas of Wet Grassland (GS4). The bulk of the conifer felling (5.75ha) will occur around T11 with other smaller areas at other proposed turbines. The remaining 3.15ha of tree clearance will occur along the margins of the access road.

Overall, it is predicted that the direct impact on these habitats due to construction phase will be long-term slight negative and highly localised effect.

Where proposed access roads (new and upgraded) and new turbine bases adjoin or are located in proximity to peatland and heathland habitats, there is the risk of indirect impacts to these habitats during the construction phase. Excavations, infilling of excavated areas and the construction of new and upgraded roads could impact drainage patterns and the hydrological functionality of adjacent peatland and heathland habitats, leading to drying out of peat soils with consequent reduction in species diversity and the deterioration of habitat quality and potential indirect habitat loss. Uncontrolled broadcast of dust and run-off to adjoining terrestrial habitats and could also impact indirectly on areas close to the working footprint. Such impacts are considered to be indirect and could potentially affect habitats of County Importance, contributing to a significant negative effect at the Local Scale. In the absence of mitigation there is some potential for dust arising from the construction activities to damage botanical species and habitats. However, it is likely that any such impacts would be highly localised and temporary in nature.

High impact invasive plant species were recorded in the wider area outside of the construction footprint. Construction works, can potentially disturb stands of invasive plants and/or soils contaminated with invasive plant material and cause them to spread onsite. Construction plant can also potentially carry seeds or viable plant material from other works sites if not adequately cleaned. In addition to lands within the proposed works areas, there is an identified risk of invasive plant species being spread onto neighbouring lands and onto public roads and other locations. Construction works could therefore result in the spread of invasive plant species both in-situ and ex-situ. The most common ways that these species can be spread are:

- Site and vegetation clearance, mowing, or other landscaping activities;
- Spread of seeds or plant fragments during the movement or transport of soil/spoil;
- Spread of seeds or plant fragments through the local surface water and drainage network;
- Contamination of vehicles or equipment with seeds or plant fragments which are then transported to other areas;
- Importation of soil from off-site sources contaminated with invasive species plant material.

The potential effect from the spread of invasive alien plant species during the project construction phase is considered to be long term significant negative at the Local Scale and could impact in-situ and adjacent habitats including high quality and degraded peatland and heathland habitats.

A watercourse can act as a potential impact-receptor pathway allowing the transit of invasive species resulting in the indirect habitat loss/damage to downstream habitats in the wider area including designated nature conservation sites that are present. There are historical records of a number of rare and protected species from the Roughty River and run-off from traffic, deposition of spoil from the wheels of vehicles or accidental spillage of soil from the trailers may result in a deterioration in the water quality downstream of the site. Inadequate site biosecurity during the construction phase can also lead to the inadvertent spread of invasive plant species to nearby aquatic habitats downstream. Machinery, equipment and material (including soil) which may be transported onto the site for construction could lead to the introduction of further invasive species to the site with potential to displace local natural biodiversity.

There is hydrological connection and proximity to Killarney National Park, Macgillicuddy's Reeks and Caragh River Catchment SAC. The works on the access road in the Flesk sub-catchment are localised and limited in extent. The terrestrial habitats and plant species for which the site is designated are unlikely to be affected by the proposed works. The potential for impacts on aquatic ecology are considered in detail in Chapter 7 of the EIAR and the potential impacts upon designated Natura 2000 sites and their conservation objectives arising from the development are assessed in the NIS which accompanies this application for planning permission.

6.5.4.4 Potential Construction Phase Effects on Non-volant Mammals

The EIAR Site Boundary was found to have relatively low non-volant mammal abundance and diversity. The non-volant mammal assemblage is dominated by common and widespread species such as Fox and Irish Hare and no breeding sites of any protected non-volant mammal species was found within 50m of the proposed turbine locations. A number of species were only recorded outside of the Proposed Development site (e.g. along the access road) such as Badger, Pine Marten and Red Squirrel. There were no Badger setts, or Red Squirrel dreys located within the Proposed Development site and indeed sightings and signs from this area tended to be restricted to a relatively small number of species including Sika Deer, Irish Hare and Fox. The only recording of Otter was from downstream of the site at Morley's Bridge on the Roughty River. No Otter signs were recorded from within the EIAR Site Boundary. Otters are also known to occur in the other two sub-catchments that drain the Proposed Development footprint (Flesk and Sullane) but the watercourses within the application site are relatively small and unattractive for Otter.

6.5.4.4.1 Habitat loss or degradation

Direct habitat loss due to the development of wind farms tends to be relatively small and this is certainly the case for the Proposed Development site with a network of existing access roads. The permanent land take is largely limited to the area of the turbine bases, crane hard standing, the new and widened access roads, borrow pit, met-mast etc. There will be clearfelling of 8.9ha of conifer plantation, the majority of which is located around T11 and along the access road. Tree clearance will locally decrease the extent of suitable habitat for species including Red Squirrel and Pine Marten and cover for species including Sika Deer. However, there is a considerable amount of plantation forestry in the wider area and the extent of clearance required is not considered to be significant in relation to the availability of similar habitat in the wider area.

As described in Section 6.5.4.3 the design of the Proposed Development layout has sought to minimise direct and indirect impacts through construction on higher value habitats present. There will be approximately 1.5km of new access roads constructed at the site along with the upgrading of access tracks to facilitate the development. The construction phase is estimated to span 18-24 months and during this period there is the potential for localised disturbance and displacement of non-volant mammals as a result of movement and activity of plant and personnel. However, no burrows or permanent resting places of protected non-volant mammal species were recorded within 50m of any of the working footprint. The construction activity will result in temporary and localised loss of small areas of grazing land and cover for deer and Irish Hare. In parallel with the new construction, where existing roads and hardstaings are not required for the Proposed Development, these will remain in use by local landowners to access livestock or will be left to naturally regenerate.

The remaining habitats affected by the Proposed Development include areas of Wet Grassland (GS4) and small areas of heath and peatland habitats. These relatively open habitats are not of high ecological value to most protected non-volant mammal species. It is considered that the small permanent loss of such habitats is unlikely to impact negatively on the local non-volant mammal community.

Mammals associated with aquatic habitats (e.g. Otter) in the wider area could potentially be subject to indirect negative effect through activities associated with the project, such as siltation, run-off and fuel spills. The design of the project (e.g. setback buffers from watercourses) has through iterative design minimised the risks of significant downstream effects on the local environment. Environmental controls and measures which minimise the occurrence of such impacts downstream of the site are outlined in Chapter 7, Aquatic Ecology.

6.5.4.4.2 Disturbance/Displacement effects

During the construction phase of the development, there is likely to be a certain amount of disturbance to fauna occurring on/near the site, however this will be temporary to short-term in duration.

No breeding sites of protected non-volant mammal species were found within 50m of proposed turbine locations or other infrastructure and as such, no disturbance/displacement or mortality of breeding individuals is expected to occur during the construction of the Proposed Development (where a pre-construction survey will also be carried out immediately prior to construction to confirm that this is still the case).

It is possible that the increase in site traffic might lead to an increase risk of road casualties of Sika Deer and other non-mammals occurring in the area. However, given the bulk of construction traffic and movement of machinery and personnel will occur during daylight hours and the relatively low site speed limits which will be imposed the risk of any significant increase in fatalities of Badger and other predominantly nocturnal mammals is considered insignificant.

In the event that some mammals are displaced through disturbance or direct loss of habitat, there are extensive areas of conifer plantation and similar suitable habitat in the vicinity of the site and affected or disturbed individuals may move into the surrounding area. Given the relatively small footprint of the development, any displacement or disturbance that may occur is likely to be highly localised, both temporally and spatially. Considering the low abundance of non-volant mammals at the study area, the widespread availability of similar habitat in the wider area and the small scale of the construction works areas, potential construction phase disturbance/displacement and mortality impacts are considered to have an imperceptible effect on the local non-volant mammal population.

Considering all of the above, potential effects on non-volant mammals from the construction-phase of the Proposed Development are considered imperceptible, neutral overall.

6.5.4.5 Potential Construction Phase Effects on Bats

Wind energy developments present four potential risks to bats (SNH, 2019):

- Collision mortality (vehicles and above ground infrastructure)
- Loss or damage to commuting and foraging habitat
- Loss of, or damage to, roosts
- Displacement of individuals or populations

For each of these four risks, the detailed knowledge of bat distribution and activity within the study area gained during the current assessment is used to predict the potential effects of the wind farm on bats. Several bat species were noted in the vicinity of the EIAR Site Boundary all of which are legally protected under the Irish Wildlife Acts (1976-2012 as amended) and listed on the EU Habitats Directive.

The registrations of bat species recorded at the site were dominated by three species, Common Pipistrelle, Soprano Pipistrelle and Leisler's Bat. The other taxa present were relatively infrequently recorded, Brown Long-eared Bat, Daubenton's Bat, Natterer's Bat, *Myotis* sp., 40/50kHz Pipistrelle sp. and Lesser Horseshoe Bat. Expansive open (heathland and peatland) habitats and clearfell/wet grassland within the EIAR Site Boundary are considered to be of low value, local importance for bats, given their elevated terrain and the relative shortage of suitable foraging, commuting and roosting habitats. The conifer plantation has somewhat greater potential to support bats, particularly as foraging and commuting habitats. These areas are considered to be of moderate to high value, local importance for bats, particularly in their capacity to provide large, contiguous foraging and commuting habitat.

Construction phase activities will result in the loss of c. 8.9ha of commercial conifer plantation, to facilitate turbine footprint, hard standing and access roads and associated infrastructure. The impact of this loss will be to marginally reduce foraging and commuting habitat for bats locally. This has the

potential to locally disturb or displace bats that forage at the site or commute through the site. While extensive commercial conifer plantations are common in the wider landscape, the loss of commuting habitats could potentially displace some bats in the immediate locality of works and marginally reduce local habitat connectivity. Felling is also carried out to reduce the likelihood of occurrence of bats in the immediate proximity of operational turbines.

The construction phase will involve the removal of the existing 28 no. turbines. The 28 no. turbines will be removed and 11 no. proposed turbines will be erected. There will be cranes and other vehicles in use at the site and an evolving set of potential obstacles for bats to navigate while traversing the wind farm. The works will result in fewer turbines present and many of these turbines present in relatively open habitat with relatively low suitability for foraging and commuting bats. The potential for collision and barotrauma related mortality is discussed in more detail in Section 6.5.5.4 dealing with Operational Phase Effects on Bats. However, the evidence from the Existing Kilgarvan Wind Farm, both in relation to the pattern of activity of bats (including at height) and the recovery of only a single bat carcass over the course of 14-months of dog-based carcass searches, indicates that there is low likelihood of significant mortality of bats through collisions/barotrauma during the construction phase.

While bats can and will roost in trees, these tend to be mature trees that have acquired 'features' that provide bats with a suitable microclimate for roosting (e.g. cracks, hollows, ivy cover). These tend to be far less common in commercial forestry plantation due to the nature of the standing crop. No evidence of roosting bats was recorded within or in the immediate vicinity of the EIAR Site Boundary. The nature of the habitats present, combined with the lack of attractive roost features within the wind farm, explains the consistently low levels of bat activity recorded in the area across the survey seasons. The field surveys did record a relatively good diversity of bat species in the area, including occasional registrations of Lesser Horseshoe Bat.

The BCI roost records confirms that there are a number of Lesser Horseshoe Bat roosts between 2.5 and 4km of the nearest of the proposed turbine locations. A Common Pipistrelle roost is located approximately 1km from the EIAR Site Boundary (to the southeast). The relatively open and upland nature of much of the surrounding area, with interrupted commercial forestry cover, means that there is sub-optimal connectivity and commuting routes preferred by bats at local landscape level. This explains the relatively low levels of bat activity recorded at the site during the multiple survey years. In Winter and Spring the activity levels recorded were exceptionally low and even in Summer and Autumn, the bat activity was low-moderate with little to no activity recorded from the microphones deployed at height (c. 55m) on the met masts at the site. Records of Lesser Horseshoe Bat were infrequent with only two registrations in Summer 2021, 4 registrations in Autumn 2021, 1 registration in Summer 2022 and 19 registrations in Autumn 2022 (10 of these in a single night). The occasional occurrence of Lesser Horseshoe Bat in the area is not unexpected given the known distribution of the species and the extent of the passive surveys carried out at this site. Nothing in this pattern of occurrence was suggestive of a regular usage of the EIAR Site Boundary by foraging or commuting Lesser Horseshoe Bats.

Construction phase lighting has the potential to attract certain bat species and displace others and floodlighting can be a significant source of disturbance for all nocturnal mammal species. However, this impact will be temporary in nature and localised to areas around the site compound. Night-time lighting will be limited in extent (both static lighting, and vehicle headlights) as standard construction works will be carried out mostly during daylight hours.

Construction related run-off or degradation of aquatic habitats through hydrological links could potentially lead to a deterioration of the feeding resource for bats associated with aquatic habitats in the wider area. However, the design of the wind farm has ensured that construction activity will be minimised in the vicinity of watercourses (excluding stream crossing points, works associated with the improvement to the access road etc.).

Considering the above, potential effects on bats, in the absence of mitigation during construction of the Proposed Development are considered slight to moderate negative short-term effect at the local scale.

6.5.4.6 Potential Construction Phase Impacts on Avifauna

There are a number of potential construction phase impacts of wind farms on birds, including habitat loss or degradation and disturbance. The likely significance of each of these impacts at the Proposed Development site and associated elements is discussed below. An overall assessment of the likely effect of the Proposed Development as a whole on the local avian community is also presented.

There are two SPA sites located within 15km of the EIAR Site Boundary, Killarney National Park SPA and Mullaghanish to Musheramore Mountains SPA. The potential effects of the construction phase on the special conservation interest species of these sites are considered in detail in the accompanying NIS. The distance from Killarney National Park SPA (>9km) is greater than the published foraging ranges for the associated SCI species, Merlin and Greater White-fronted Goose (SNH, 2016) and well beyond the core foraging range at which potential connectivity with the SPA network is considered relevant as part of the AA screening process (*loc cit.*). Mullaghanish to Musheramore Mountains SPA is designated for the conservation of Hen Harrier and is located c. 7.8km from EIAR Site Boundary and c. 10km from the nearest of the proposed turbines. This is well outside of the core foraging range of Hen Harrier (e.g. SNH 2016) but given that foraging distances of over 10km have been recorded on occasion in Ireland (e.g. Irwin *et al.* 2012) the potential effects of the Proposed Development on Hen Harriers associated with the SPA are considered further as part of the NIS and described in this assessment.

The desktop and field surveys have described the avian usage of the Proposed Development site and surrounding areas. The breeding and winter season bird surveys recorded a relatively low species diversity and abundance in the EIAR Site Boundary. Most of the species recorded are common locally and nationally and of no particular conservation concern.

Of key consideration in terms of the impact assessment are effects on the target Annex I species observed to occur in the vicinity of the EIAR Site Boundary: Golden Plover, Peregrine Falcon, Merlin, Hen Harrier, White-tailed Sea Eagle and Chough. In addition, the potential effects on additional Red-listed species (not included on Annex I of the Bird's Directive) that occur at or in the vicinity of the Proposed Development are important to this assessment. These birds include passerines such as Meadow Pipit, Redwing and Grey Wagtail as well as Kestrel, Red Grouse and Snipe. The most common bird species at the site is Meadow Pipit, which is currently a Red-listed species. Another Red-listed species regularly recorded during the field surveys was Kestrel, which was observed during each of the Vantage Point survey seasons. Kestrel was by far the most frequently recorded target species during the VP surveys with foraging and commuting birds observed across the terrestrial study area.

In the following sections the potential effects of habitat loss and change, as well as construction phase disturbance and displacement on the bird species that occur in the area will be assessed. This assessment is made in the absence of mitigation measures designed to minimise such effects on birds during the construction phase.

6.5.4.6.1 Habitat Loss or Change Effects

Direct habitat loss or change is inevitable in the development of any wind farm, especially when the development of access roads, turbines, substation buildings and other associated construction is considered. However, the Proposed Development is somewhat different given that the development will occur at an existing operational wind farm site. Much of the infrastructure is already in place or can be upgraded or repurposed to facilitate the new wind farm infrastructure. The development will see the removal of 28 no. turbines and associated restoration of lands currently under hard-standing areas. Access roads will be upgraded and that has the potential to directly affect marginal areas of habitat at the edge of the existing roads. There will be areas of construction involving new access tracks, turbine foundations, crane hard-stands, extension to the existing borrow pit etc. An existing borrow pit will be enlarged to provide stone used in the construction phase. Post extraction of rock the borrow pit will be infilled with surplus soil material.

The direct effects associated with vegetation clearance (including tree-felling), excavation, movement and spreading of soil and rock all have the potential to result in reduced feeding, nesting and roosting opportunities for birds. However, direct habitat loss due to the development of wind farms tends to be relatively small (Drewitt & Langston 2006). The wind farm cables will be undergrounded via access roads and will involve relatively little habitat disturbance or permanent habitat loss.

The habitat types directly affected by the construction phase are mostly 'open' upland habitats with limited suitability for most bird species. Meadow Pipits do breed and winter in these habitats and it is the species most likely to be directly affected by loss and disturbance of habitats during the construction phase. However, these effects are likely to be temporary and highly localised and there is a considerable amount of suitable nesting and foraging habitat for ground nesting passerines in the wider area. The felling of 8.9ha of conifer plantation to facilitate the development will marginally reduce the amount of nesting, roosting and foraging habitat for specialist woodland species e.g. Crossbill. Given the availability of plantation habitat in the wider landscape the loss of a relatively small amount of coniferous woodland is unlikely to significantly affect the diversity or abundance of bird species present in the area.

The results of the field studies confirmed that there is no breeding, roosting or regular feeding area present in the EIAR Site Boundary for Hen Harrier, Merlin, Peregrine Falcon or Chough. It is unlikely that the habitat loss or change associated with the construction phase will have any significant effects on the potential resource value of the site for these species. The potential for disturbance, displacement and mortality effects on such species are discussed in following sections. The clearfelling of 8.9ha of conifer plantation marginally reduces the amount of suitable nesting habitat available locally for species such as Merlin. However, there was no evidence that the species breeds locally and all of the flightlines recorded for this species involved sightings in the winter period.

White-tailed Eagle is a recently re-introduced Annex I species. The original release site was located near Mangerton Mountain. The occurrence of White-tailed Eagle in the EIAR Site Boundary varied substantially from year to year and season to season. The species was very infrequently observed locally during the breeding season (total of 4 flightlines over 3 seasons). However, in the winter period White-tailed Eagle sightings were more common (total of 21 flightlines over 3 seasons). The sightings were typically of 1-3 individuals commuting or soaring through the Proposed Development site. White-tailed Eagles were not observed actively foraging or at rest within the wind farm site. Birds were seen at rest in trees near the entrance to Grousemount Wind Farm and White-tailed Eagles often roost within conifer plantation. The loss of 8.9ha of conifer plantation to facilitate the Proposed Development marginally decreases the amount of suitable roosting habitat for the species within the EIAR Site Boundary. There was no evidence that White-tailed Eagles roosted in this area and there seemed to be very limited evidence of the species foraging within the Proposed Development site. It is unlikely that the scale and nature of habitat loss/change involved in the construction phase will significantly affect the local resource value of the site for the species.

Golden Plover was recorded in the EIAR Site Boundary in each of the winter seasons although there was no evidence that there was any feeding or roosting site present. Birds were generally recorded in flight and the flock size recorded was typically low. Construction phase-related habitat loss or change is unlikely to significantly affect the usage of the site by Golden Plover. It should be noted that the potential impacts relate to the large and stable wintering Golden Plover population and not to the declining and range-contracting Irish breeding population. The loss/fragmentation of sections of bog/heath/wet grassland within the study area as a result of the Proposed Development will potentially have a slight negative effect on the highly mobile wintering population of this species, where large areas of alternative suitable habitat are present in the wider area.

Red Grouse are ground-nesting birds and were recorded locally in the winter period. The loss or degradation of open habitats could potentially decrease the amount of foraging and nesting habitat for Red Grouse within the EIAR Site Boundary. The site does not appear to support a breeding population of Red Grouse with occasional and infrequent sightings and evidence of occurrence of the species

locally, particularly in the winter period. The loss and change of habitat during the construction phase is unlikely to significantly affect the usage of the study area by Red Grouse.

Snipe was not recorded in the EIAR Site Boundary during the breeding season. There were very infrequent records of Snipe in the area in winter (1 flightline over 3 winter seasons). The construction related effects on habitats are not likely to have significant effects on Snipe.

Kestrel was recorded regularly and widely across the EIAR Site Boundary. Kestrels were observed commuting through and foraging within the EIAR Site Boundary. They were most commonly observed foraging in the open habitats at the Proposed Development site. The number of flightline observations of Kestrel recorded in each season ranged from 17 (2018 breeding season) to 66 (2022 breeding season). The clearance of trees associated with the Proposed Development will marginally decrease the amount of suitable nesting habitat for the species within the EIAR Site Boundary. While it is likely that the species breeds locally, no confirmed nest site was observed within the EIAR Site Boundary. The construction related habitat loss and change could potentially have localised slight negative effects on the local resource value of the site for the species.

Redwing is a Red-listed migratory thrush species that was only recorded in the area in one of the three winter season surveys. There is very limited habitat suitability for the species within the EIAR Site Boundary and the habitat loss and change associated with the construction phase is unlikely to have any significant effects on the species.

In the event that water quality in the watercourses that drain the site was negatively impacted during the construction phase (e.g. through run-off of contaminants), that could potentially have negative effects on Grey Wagtails that occur in the sub-catchment. They feed on invertebrates that are sensitive to changes in water quality.

General bird surveys have established that the study area is used by a range of breeding and wintering species typical of the range of habitats present within the EIAR Site Boundary (i.e. conifer plantation, bog/heath, rough grassland). Common raptor species such as Buzzard, Kestrel and Sparrowhawk are present and forage within and over the site and are likely to nest in the wider local area. Existing roads and access roads will be upgraded where possible and this will minimise the habitat loss within the development site. It is not expected that there will be any significant reduction of breeding species diversity within the Proposed Development site as a result of the clearance and construction activities within the conifer plantation. The introduction of open spaces or 'edge-effect' into a previously closed canopy can in fact increase the abundance of some species and could benefit the overall species diversity of the plantation (Fuller 2003).

Indirect habitat loss can occur where construction activities in areas of peat result in changes in hydrology and or geomorphological processes or cause a peat slippage event. The design of the wind farm has sought to minimise the amount of peat excavated at the site. Any new access roads in areas of deep peat will be constructed as floating roads. The turbine foundations shall be constructed using standard reinforced concrete construction techniques. No impacts on avifauna as a result of indirect habitat loss resulting from changes in hydrology and or geomorphological processes or a peat slippage event are therefore deemed likely in this case.

The construction phase of a wind farm can also lead to indirect habitat loss for the local bird community through displacement of the birds from the wind farm site as a result of disturbance effects (Langston & Pullan 2004, Drewitt & Langston 2006, Percival 2003). This is dealt with in the following section.

6.5.4.6.2 **Disturbance Effects (Construction Phase)**

Wind farm construction can cause disturbance to the bird community through displacement related to increased human presence and construction activity. As mentioned previously, the literature on bird displacement due to wind farm disturbance has provided somewhat inconsistent and inconclusive

results (Langston & Pullan 2003 & 2004, Drewitt & Langston 2006, Kingsley & Whittam 2005, Goodship & Furness, 2022). These studies have indicated that the scale of disturbance varies greatly between and within species (*loc. cit.*). Disturbance impacts depend on a range of issues including seasonal bird use, diurnal bird use, location, availability of alternative habitats, bird life cycle, flock size, habituation and turbine and wind farm specifications (*loc. cit.*). There is an existing wind farm at this site and there may be a level of habituation of locally occurring birds with the presence of operational turbines. Post-removal of the existing 28 no. turbines, there will be many fewer, albeit larger, turbines (11 no.) in operation.

NatureScot (2022) published an updated review of disturbance distances for a range of bird species. Based on the research the sensitivity to disturbance of a range of species was evaluated. Table 6-25 summarises the sensitivity of various bird species recorded at the site to disturbance based on NatureScot (2022) research. Sensitivity to disturbance is dependent on the type of activity and also the usage of a site by a particular species. For instance, birds may be more prone to disturbance at a nest site and considerably less so when commuting through an area.

Table 6-25 Sensitivity of various bird species to disturbance effects.

Species Name	Sensitivity to Disturbance
Hen Harrier	Medium
Buzzard	Low/Medium
Kestrel	Low/Medium
Goshawk	Medium
Peregrine Falcon	Medium
White-tailed Eagle	High
Merlin	Medium
Golden Plover	Medium
Crossbill	Low

The distance at which the disturbance response is likely to be initiated depends on the nature of the disturbance and the species involved. Even for species considered to have a high sensitivity to disturbance e.g. White-tailed Eagle the distance at which human activity will elicit a response varies considerably (NatureScot 2022). A buffer zone of 250-500m is suggested to protect roosting and foraging birds during the nonbreeding season from pedestrian disturbance (*loc cit.*).

Kestrel is recorded locally throughout the year and is likely to breed in areas proximate to the development site. Kestrel has an estimated disturbance distance of 100-200m in the breeding season and c. 50m in the non-breeding season (NatureScot 2022). There is some potential for disturbance of Kestrel during the construction phase of the Proposed Development. None of the other raptor species breed within or proximate to the Proposed Development site and no nest-sites of these species are likely to be impacted upon by construction relation disturbance.

The number of erected and operational turbines will change throughout the construction phase. The potential for collision fatalities is discussed in the section on operational phase effects.

As the site is currently in use as an operational wind farm there is a background level of potential sources of disturbance for birds (visual, noise, site traffic). The construction activity will see a marginal

increase in potential sources of disturbance. The activity will be concentrated in different parts of the Proposed Development site as the construction programme progresses. It will mean that sources of disturbance are not going to be felt uniformly across the EIAR Site Boundary and that construction related activities with the potential to disturb and displace birds are likely to be localised and ranging from brief to short-term in duration.

While a number of sections of open bog/heath/wet grassland habitats will be impacted by the Proposed Development, the scale of the proposed works in these areas is relatively small and the construction works will be temporary. The avian surveys carried out to inform the assessment of potential effects revealed that while a range of bird species occur in the EIAR Site Boundary, the site does not support a very diverse bird population. The open habitats are attractive for some high conservation value species such as Meadow Pipit. There is potential for localised displacement and disturbance of such species during the construction phase. While Red Grouse do occur locally, they did not breed at the site and appeared to be present in low numbers, especially in winter. The construction activity has some limited potential for some disturbance and displacement of Red Grouse during construction, although such impacts if they were to occur would likely to be highly localised.

The open habitats present were not observed to be preferred by roosting or feeding Golden Plover. The conifer plantation is unattractive for Golden Plover. There are no breeding Golden Plover pairs present in this area. The wintering birds are highly mobile and were not observed feeding or at rest within the wind farm. They may be commuting to other feeding or roosting sites elsewhere in the wider area. Construction works taking place at the site have the potential to cause disturbance/displacement impacts on this wintering/migrating species. There is a significant amount of similar open upland habitat in the hinterland of the Proposed Development site. Construction related activity has the potential to cause some localised temporary displacement of the highly-mobile flocks of Golden Plover during the winter months. It should be noted that the potential impacts relate to the large and stable wintering Golden Plover population which occurs at the study area and not to the declining and range-contracting Irish breeding population (which is restricted in range to northwest Ireland). Given the presence of suitable alternative habitat in the wider area, the construction phase of the Proposed Development will have a temporary slight negative disturbance/displacement effect on the local wintering population of this species.

Species that were recorded very infrequently at the site (e.g. Hen Harrier and Chough) are unlikely to be exposed to significant levels of disturbance/displacement stimuli associated with the construction phase of the project. They do not appear to occur in the area with any regularity and localised increases in disturbance at the site are unlikely to change the pattern of very occasional occurrence of such species.

As highlighted above, Kestrel could potentially be disturbed or displaced from areas of the EIAR Site Boundary. There was no breeding site confirmed from within the Proposed Development site. However, it is likely that the species breeds and roosts in the local area from time to time. The construction activity, including the habitat clearance, has the potential to cause localised disturbance and displacement effects on Kestrel. Kestrel will also potentially exploit newly cleared areas to forage.

The movement of plant and personnel and the associated sources of disturbance could potentially change the pattern of occurrence of bird species at the site during the construction phase. For species that typically occur only to commute through the area (e.g. Cormorant, Lesser Black-backed Gull) the effects are likely to be minimal. Localised changes in pattern of movement of birds may occur but are unlikely to have any significant effects on the species in question. Species such as White-tailed Eagle may avoid areas with high levels of anthropogenic activity. White-tailed Eagle is highly mobile and ranges widely and is likely to continue to be recorded locally with any changes in occurrence during construction likely to be temporary and localised in extent.

Disturbance to the local breeding and wintering bird community will largely occur at the construction stage of the wind farm. The clearfelling of conifer plantation will potentially disturb, displace or cause mortality of breeding or roosting birds. It will also reduce the locally available woodland habitat for

these species on a permanent basis. Displacement and disturbance will tend to have a lesser impact on the local bird population if alternative habitats with sufficient carrying capacity are widely available in the surrounding landscape (Kingsley & Whittam 2005). There is a significant amount of similar conifer plantation and open upland habitats in the hinterland of the Proposed Development and the surrounding areas and this is considered adequate to accommodate any localised displacement of the general breeding and wintering birds that commonly occur at the EIAR Site Boundary.

6.5.4.7 Potential Construction Phase Effects on Other Protected Fauna

As described in Section 6.5.4.1 Kerry Slug is abundant at the Proposed Development site. It was recorded widely, particularly in open areas of the site and along the margins of the existing access roads. It was not recorded in the conifer plantation at the site. The construction activity has the potential to cause fragmentation of habitats and direct mortality of individuals. In the absence of appropriate mitigation measures such effects are considered to have the potential to be moderate to significant negative for the species at a local level. It is noted that the area of suitable habitat that will be directly impacted by construction is relatively small and that a considerable amount of suitable habitat for Kerry Slug exists at the site. It is also noted that the population of Kerry Slug at the Proposed Development site appears to be in robust state and that this has persisted at a site where a considerably larger amount of construction was required to facilitate the existing development. The potential effects on Kerry Slug are likely to be highly localised and would result in the creation of some suitable habitat for the species e.g. along the margins of roads.

The construction phase could lead to habitat loss or disturbance of other taxa present such as Common Frog and Common Lizard. Common Frog is listed on Annex V of the EU Habitats Directive and is also legally protected by the Irish Wildlife Acts (1976 – 2012 as amended) along with Common Lizard. There is some potential for direct mortality of such species through movement of construction traffic.

Indirect habitat loss or degradation during the construction phase could also potentially have negative effects on the local population of Common Frog, Common Lizard and Kerry Slug, as well as a range of other taxa recorded locally (e.g. in association with Lough Nabirria).

Road widening and construction of hard-standing areas and turbine bases could potentially reduce the amount of suitable breeding habitat for Frogs, Common Lizard and Kerry Slug at the site. The footprint of the Proposed Development is relatively small however and much of the habitat present is not of high ecological value for Frogs and other taxa in general. The design of the wind farm has avoided, insofar as possible, areas close to watercourses, flushes, etc.

In summary, the construction phase could potentially lead to the disturbance of, or losses to other taxa including Kerry Slug. While such impacts would be temporary in duration and localised to the development footprint, the abundance of Kerry Slug (in particular) at the site increases the potential for locally significant effects during the construction phase.

Construction activities have the potential to impact upon aquatic habitats at and downstream of the site and access route through hydrological links from the works areas. Potential impacts on aquatic habitats and species are considered in detail in Chapter 7 (Aquatic Ecology).

6.5.5 Potential Operational Phase Impacts

In this section of the assessment the potential operational stage effects on designated sites and local biodiversity is considered. This is assuming the completion of the construction phase with the removal of the existing turbines and the erection and commissioning of the new 11 no. turbines and associated infrastructure.

6.5.5.1 Potential Operational Phase Effects on Designated Sites

The European sites 'screened in' for further consideration are:

- Killarney National Park, Macgillycuddy's Reeks & Caragh River Catchment SAC
- Old Domestic Building Curraglass Wood SAC
- Kilgarvan Ice House SAC
- Mullaghanish to Musheramore Mountains SPA

The reasons for the inclusion of these sites are outlined in Section 6.5.4.1 of this Chapter and in the accompanying NIS. In agreement with the conclusions made in Chapter 7 of the EIAR we conclude that there is very limited potential for hydrologically mediated effects on Killarney National Park, Macgillycuddy's Reeks & Caragh River Catchment SAC during the operational phase. Such effects would even in the absence of mitigation be likely to impact upon water quality in the upper headwaters and not result in any significant negative effects on the qualifying interests of Killarney National Park, Macgillycuddy's Reeks & Caragh River Catchment SAC.

The qualifying interest of all three SAC sites which could potentially be affected by the operation of the wind farm is Lesser Horseshoe Bat. During the operational phase the 11 no. turbines could present a fatality risk (through collision or baro-trauma) for the species should it occur on-site. The known roost sites of the species are located beyond the CSZ for the species and the evidence of the field studies confirms that Lesser Horseshoe Bats are present infrequently within the EIAR Site Boundary. It is unlikely given the nature of the landscape that the pattern of usage of the site will change in the operational phase of the project. In the absence of mitigation there is some potential for bat fatalities at the operational wind farm. However, the findings of dog-based carcass searches carried out at the existing wind farm site suggested that bat fatalities are not regularly occurring. The proposed turbines will be larger but far fewer than are currently in operation. No increase in the baseline fatality risk is predicted during the operational phase of the Proposed Development and that baseline risk is considered to be extremely low for Lesser Horseshoe Bat. The potential for operational phase bat fatalities is discussed further in Section 6.5.5.4.

Individual Kerry Slugs, (QI of Killarney National Park, Macgillycuddy's Reeks & Caragh River Catchment SAC) could be killed by site traffic using the access roads and hard stands during the operational phase. While individual slugs were recorded on the margins of the existing roads they were largely absent from the trafficked areas and any such losses would not have the potential to have significant effects on the SAC population.

Mullaghanish to Musheramore Mts. SPA is located 10km from the nearest of the proposed turbines. This is beyond the core foraging distance of Hen Harrier. Sightings of Hen Harrier in the EIAR Site Boundary were very infrequent with only one observation of a Hen Harrier made during the breeding season surveys – that of an adult male in August, probably a bird dispersing post-breeding. There were three flightline observations of Hen Harrier made over the course of three winter seasons and these were concentrated over two days in winter 2021/2022. None of the flightlines were of birds at RSH within the EIAR Site Boundary. While the Proposed Development site is located within the extremes of the potential foraging distance for Hen Harriers breeding in the Mullaghanish to Musheramore Mts. SPA there is no evidence that the site is within any regular foraging or commuting route. It is likely that, as was recorded in the surveys undertaken to inform the current assessment, that Hen Harriers will continue to occasionally occur in the area but that this is far more likely to be associated with non-breeding birds. While the proposed turbines will be larger than those currently present there will be fewer in operation and they will be situated in an area where there was no flightline of Hen Harriers at RSH across any of the six survey seasons. Hen Harriers may avoid areas close to the operational turbines altogether but given that the site does not appear to be important for the species this effect is likely to be insignificant.

No additional operational phase effects were identified in relation to the nationally designated conservation sites in the wider area.

6.5.5.2 Potential Operational Phase Effects on Habitats and Flora

There will be no additional removal of habitat during the operational phase of the Proposed Development. As a result, there is no potential for direct negative impacts to habitats and flora arising from the operational phase of the Proposed Development.

There is the potential for ongoing degradation of adjacent peatland or heathland habitats during the project operational phase. Such degradation may arise as a result of ongoing drainage patterns associated with the hard standing areas, especially the access roads. Drainage patterns that redirect or deflect water from down gradient peatland or heathland habitats could contribute to indirect impacts, resulting in the desiccation of the underlying organic substrates and consequent reduction of plant species diversity and habitat quality. Due to the design led constraints approach the likelihood of such impacts has been minimised and any deterioration of adjoining peatland is likely to be slight, permanent, negative and highly localised.

Operational stage maintenance works have the potential to introduce silt, hydrocarbons and other chemicals into watercourses. The potential for impacts on aquatic ecology are considered in detail in Chapter 7 of the EIAR and the potential impacts upon designated Natura 2000 sites and their conservation objectives arising from the development are assessed in the NIS which accompanies this application for planning permission.

Considering the above, potential effects on habitats during the operational phase of the Proposed Development are considered imperceptible neutral overall.

6.5.5.3 Potential Operational Phase Effects on Non-Volant Mammals

There is very limited potential for operational phase effects on the local non-volant mammal community. The maintenance requirement of wind farms is relatively low and there will be low and localised site traffic and activity expected during the operational phase. Internal speed limits will apply on all of the site access roads and this minimises the risks of significant traffic fatalities of non-volant mammals during the operational phase. It should also be noted that the majority of the non-volant mammals that occur at the site are nocturnal or crepuscular and as such will be active at times when human activity at the site will be absent or very low.

No breeding or resting sites of any protected non-volant mammal species are known to occur within 50m of the proposed turbine locations and new site infrastructure and as such no loss of breeding sites is expected and no significant disturbance of breeding individuals is expected. Irish Hare, Sika Deer, Fox and other mammals will continue to utilise the access roads to traverse the site and the Proposed Development (once operational) will not present any barrier to movement of the locally occurring mammals.

Any edible or putrescible wastes generated by visitors to the site (e.g. at the existing onsite 110kV Coomagearlahy substation or along walking trails) could potentially attract mammalian scavengers. Such impacts are amenable to mitigation as described in the mitigation measures outlined below.

With the exception of aviation warning lights, required by the Irish Aviation Authority, the wind farm will not be lit at night (apart from emergency maintenance works) and switchable lighting around the existing onsite 110kV Coomagearlahy substation building and there will be no impacts on nocturnal non-volant mammal species as a result of light pollution from the operational wind farm.

Taking the above into consideration, the potential impacts on non-volant mammals as a result of the operation of the Proposed Development are considered imperceptible neutral overall.

6.5.5.4 Potential Operational Effects on Bats

The operation of the wind farm at this site has the potential to result in disturbance to commuting and foraging bats. It is known that bats are vulnerable to fatalities due to collision with turbines and potentially through effects such as barotrauma. Collision risk is discussed further below.

Bat activity at the site was low-moderate overall, with low levels of activity for much of the year. Bats will continue to forage and commute through the site and it is considered that connectivity throughout the afforested areas of the site may be marginally enhanced through the provision of some additional roads through forestry.

The proposed turbines are larger (Hub height range of 118m-125m and Rotor Diameter range of 149m-163m) with a maximum blade tip height of 200m. Depending on the configuration chosen, the ground clearance of the blade will be from 36.5m up to 50.5m. The existing turbines have a hub height of 80m with a rotor diameter of 90m, meaning a rotor swept area of 35m-125m. The nature of the wind farm site is that it is upland and relatively exposed in nature. The recording of bats at height (microphone at c. 55m above ground level) recorded little to no activity. It is considered unlikely, given the landscape and ecology of the bat species that were present in the area that the increase in the hub-height and blade-tip would substantially increase the fatality risk for commuting bats when compared with the existing turbines. It is unlikely that there are frequent movement of bats at above 125m across this site. Indeed, in most conditions it is highly likely that the vast majority of bat movements are well below 25m above ground level. That assumption is also supported by the recording of bat activity near ground level during periods when the microphones deployed at height detected few or any bats present.

6.5.5.4.1 Collision Risk

There is little or no published evidence available on prevalence of bat fatalities at wind farms in an Irish context. Where fatalities have been monitored at wind farms in the USA, most losses have been related to periods of migration (www.nationalwind.org).

Both direct collision with turbine blades and barotrauma resulting from close contact with blades have been reported as an issue for bats at wind farms (e.g. Cryan & Barclay, 2009). The susceptibility of bat species likely to be at risk of impacts from wind turbines is partly associated with the likelihood of different species flying at rotor blade height. In an Irish context, Leisler's Bat is considered to have a somewhat greater mortality risk at wind farms than the other species recorded on (or adjacent to) the site, as this species is a relatively large and high-flying species. Leisler's Bats typically do not follow landscape features such as treelines or woodland edges when foraging.

6.5.5.4.2 Assessment of Collision Risk

A general assessment of vulnerability of bat populations to collision with wind turbines, based on best available scientific information, is provided in Table 6-26 below. This adapts for use in an Irish context a collision risk scheme provided in NatureScot (2021). SNH (2019; and as revised NatureScot 2021) provides a generic assessment of bat collision risk for UK species, based on species behaviour and flight categorisation as well as evidence of casualty rates in the UK and Europe. This bat species collision risk assessment is considered to represent best available information for use in an Irish context.

This species collision risk categorisation is used in combination with relative abundance to indicate the potential vulnerability of bat populations. Relative abundance for Irish species was determined in accordance with a scheme for rarity of bat species provided in Wray *et al.* (2010) in combination with best available population data provided in recent Article 17 reports (NPWS, 2019; www.npws.ie). The limitations in terms of Irish bat population data are acknowledged in the latter report.

Table 6-26 Scheme for estimation of Irish bat species' population vulnerability to wind energy development.

Relative Abundance	Collision-Risk		
	Low	Medium	High
Common (100,000 plus)			Common Pipistrelle Soprano Pipistrelle
Rarer (10,000 – 100,000)	Daubenton's Bat Brown Long-eared Bat Lesser Horseshoe Bat		Leisler's Bat
Rarest (under 10,000)	Natterer's Bat Whiskered Bat		Nathusius' Pipistrelle

In determining the project specific potential risk to bats, NatureScot (2021) recommends a two-stage process as follows:

- Stage 1: Indicatively assess potential site risk based on consideration of habitat present and development related features (i.e. number of turbines, size of turbines and proximity to other wind farms).
- Stage 2: Overall assessment of risk for high collision-risk species, considering bat activity site survey results and the relative vulnerability of species.

Initially an assessment of the general site risk based on habitats present was carried out following the scheme presented in NatureScot (2021). The Proposed Development site generally lacks potential roosting features (PRFs), and the quality of the foraging habitat is variable. The open landscape and upland nature of much of the site is considered relatively unattractive for bats. As there is some wider habitat connectivity afforded by the presence of watercourses and conifer plantation a habitat risk of 'Moderate' is conservatively applied. The Proposed Development is 'Medium' (i.e. between 10 and 40 turbines, although with relatively large turbines, and several other wind energy developments within 5km). Based on the above initial site risk assessment, the Proposed Development is considered to be 'Medium Risk' to bats and a 'Site Risk Level' of 3 is applicable.

The next stage of the process is applicable to 'high collision-risk' species only and utilises information on the activity level recorded on site in each monitoring period. This assessment is intended to identify projects which are of greatest concern in terms of bat collision risk. The following high collision-risk species have been recorded at the current site:

- Leisler's Bat
- Common Pipistrelle
- Soprano Pipistrelle

A species-specific indication of risk is provided below for each of these species. The collision risk assessment draws upon two years of multi-season deployment of passive detectors at the Proposed Development site.

Leisler's bats are considered to be a high-collision risk species due to their foraging ecology and flight characteristics. While Leisler's Bat is rare in a European context, Ireland is a stronghold for the species. The minimum population range for the species in Ireland is estimated at 60,000 to 110,000 (NPWS, 2019; www.npws.ie) and therefore the species is conservatively considered here to be 'Rarer'. The

Mammal Red List for Ireland (Marnell *et al.* 2019) categorises the status of the species in Ireland as ‘least concern’ due to its improving European status, widespread distribution in Ireland and recent data showing continuing population increase here. Leisler’s Bats were recorded during activity surveys across the site.

Overall collision risk for Leisler’s Bat in the context of the Proposed Development is considered to be ‘Low’ up to ‘Low to Moderate’ in Spring, ‘Low to Moderate’ in Summer and ‘Low’ up to ‘Moderate’ in Autumn (Table 6-27).

Collision risk may be influenced during the operational lifetime of the Proposed Development in certain areas by the rotational cycles of the surrounding forestry. Where turbines are ‘key-holed’ into mature forestry edge effects can occur attracting greater levels of bat activity locally. This additional risk may apply particularly to species which fly above the forest canopy, such as Leisler’s Bat.

Common Pipistrelle are a common and widespread species in Ireland which are considered to be a high-collision risk species due to their foraging ecology and flight characteristics. The minimum population estimate for the species in Ireland is 1m to 2m individuals (NPWS, 2019) and therefore the species is considered here to be ‘Common’. The Mammal Red List for Ireland (Marnell *et al.* 2019) categorises the status of the species in Ireland as ‘least concern’ due to its widespread range across Ireland, no evidence of decline and the European status of ‘least concern’.

Common Pipistrelles were generally the most frequently recorded bat species at the site. Overall collision risk for Common Pipistrelles in the context of the Proposed Development is considered to be ‘Low’ up to ‘Low to Moderate’ in Spring, ‘Low to Moderate’ in Summer and from ‘Low’ up to ‘Moderate to High’ in Autumn (Table 6-27).

Soprano Pipistrelle are a common and widespread species in Ireland which are considered to be a high-collision risk species due to their foraging ecology and flight characteristics. The minimum population estimate for the species in Ireland is 500,000 to 1.2m individuals (NPWS, 2019) and therefore the species is considered here to be ‘Common’. The Mammal Red List for Ireland (Marnell *et al.* 2019) categorises the status of the species in Ireland as ‘least concern’ due to its widespread range across Ireland, no evidence of decline and the European status of ‘least concern’.

Overall collision risk for Soprano Pipistrelles in the context of the Proposed Development is considered to be ‘Low’ for all three seasons of bat activity (i.e. Spring, Summer and Autumn; Table 6-27).

Table 6-27 Overall collision risk assessment of relevant (high-risk) species. Note: Overall collision risk assessment: Low (green), medium (amber), high (red).

	Species	Site Risk Level	Activity Category	Overall Assessment
Spring 2021	Leisler's Bat	3	Low (1)	3
	Common Pipistrelle	3	Low (1)	3
	Soprano Pipistrelle	3	Low (1)	3
Summer 2021	Leisler's Bat	3	Low to Moderate (2)	6

	Species	Site Risk Level	Activity Category	Overall Assessment
	Common Pipistrelle	3	Low to Moderate (2)	6
	Soprano Pipistrelle	3	Low (1)	3
Autumn 2021	Leisler's Bat	3	Moderate (3)	9
	Common Pipistrelle	3	Moderate to High (4)	12
	Soprano Pipistrelle	3	Low (1)	3
Spring 2022	Leisler's Bat	3	Low to Moderate (2)	6
	Common Pipistrelle	3	Low (1)	3
	Soprano Pipistrelle	3	Low (1)	3
Summer 2022	Leisler's Bat	3	Low to Moderate (2)	6
	Common Pipistrelle	3	Low to Moderate (2)	6
	Soprano Pipistrelle	3	Low (1)	3
Autumn 2022	Leisler's Bat	3	Low (1)	3
	Common Pipistrelle	3	Low (1)	3
	Soprano Pipistrelle	3	Low (1)	3

While activity levels of the above species varied between survey locations it is not possible to determine with any accuracy the different levels of collision risk presented by individual turbines. Changes made to landscape locally as a result of the Proposed Development may alter flight patterns and foraging opportunities (positively and negatively) post-construction compared with pre-construction. This is particularly the case in the context of a repowering project where the existing turbines will be removed

as part of the development. Nevertheless, based on the multi-season data collected at the site and a precautionary approach to the overall risk assessment of the site for species believed to be more vulnerable to fatality at wind farms, the conclusion is that the risk of collision for bats during the operational phase will be low to medium (at worst).

As per NatureScot (2021) guidance there is no requirement to complete an Overall Risk Assessment for low-risk species. The low-risk species that were recorded were Brown Long-eared Bat, Natterer's Bat, Daubenton's Bat and Lesser Horseshoe Bat. Overall activity levels varied for these above species but by virtue of their low potential vulnerability to wind energy developments, no significant collision related risk is likely. No other significant impacts are likely to occur on bats during the operations phase of the Proposed Development.

The assessment of collision risk is also informed by the dedicated dog-based carcass searches that were carried out around the existing turbines. Over the course of 14 months, only one carcass was recovered, that of a Common Pipistrelle in August 2022. August 2022 was the warmest month nationally since 1995. It is unknown if the unusual weather conditions contributed to the observed mortality event. In Europe the United States and Australia, bat fatalities at land-based wind farms are associated with certain conditions. In European studies they have been found to occur only at night, predominately over a 3-month period from mid-July to mid-October, and primarily during relatively low wind speeds (e.g., less than 5 meters per second [m/s]).

In the absence of mitigation there is some risk of bat fatalities through collision with operational turbines. However, there is no likelihood that significant losses would occur as a result of collision fatalities at this site.

6.5.5.5 Potential Operational Phase Effects on Avifauna

Operational phase impacts on birds can be related to disturbance, displacement or collision impacts.

6.5.5.5.1 Disturbance/Displacement Effects

The bird species that regularly occur within the EIAR Site Boundary include resident passerines such as Meadow Pipit, raptors including Kestrel and wintering waders such as Golden Plover. As all of these species have been recorded using the site when it is in active use as a wind farm it is reasonable to assume that they will continue to occur in the area post construction. Subtle effects could of course occur in relation to localised distribution and abundance of certain species in the post-construction phase.

Wind farms can cause disturbance to the bird community through displacement related to increased human presence (e.g. post construction maintenance), turbine presence and turbine noise. There is an existing wind farm at this site and there may be a level of habituation of locally occurring birds with the presence of operational turbines. Post-removal of the existing 28 no. turbines, there will be many fewer, albeit larger, turbines (11 no.) in operation.

Wind farms may also cause displacement of birds by creating a barrier effect to migration or local flight paths, which could result in disruption of ecological links between feeding, breeding and roosting areas (e.g. Drewitt & Langston 2006, Kingsley & Whittam 2005). In Ireland, this potential problem is more likely to occur with migrating wildfowl populations (Percival, 2003), however, no such species were recorded at the study area during the six-season VP survey. There will also be 17 no. fewer turbines in operation at the site post-construction.

Published research on disturbance and displacement impacts of wind farms on birds (e.g. Pearce-Higgins *et al.* 2012) has reported significant declines in the population densities of certain species at wind-farm sites from pre- to post-construction and there are indications from other research that the presence of turbines may result in lower nest success for species such as Hen Harrier (Fernández-Bellón *et al.* 2015). More recently a meta-analysis of studies of post-construction displacement found that there

was evidence for a displacement effect in just over 39% of studies at onshore wind farms (Marques *et al.* 2021). Irish research has recorded a gradient effect on bird densities at wind farms, with total bird densities lower at wind farms than at control sites, and the greatest differences occurring close to turbines (Fernández-Bellón *et al.* 2019). Densities of forest species were significantly lower within 100m of turbines than at greater distances, and this difference was mediated by habitat modifications associated with wind-farm development (e.g. clear-felling). It is worth noting that the amount of clear-felling involved in the Proposed Development is relatively minor with a total of 8.9ha being removed to facilitate the project.

Potential disturbance and displacement effects on various bird species at operational wind farms have been reported (Marques *et al.* 2021) although estimates have varied considerably. Pearce-Higgins *et al.* (2012) found little evidence that the displacement effects recorded during construction consistently persist into the operational phase. Dohm *et al.* (2019) suggested that some observed displacement effects on raptor species were temporary in nature and reversed during the operational phase of a wind farm. Some species of raptor are believed to be less likely to show avoidance of the areas around operational turbines than other species due to their general ecology and behaviour. For instance, large soaring raptors such as White-tailed Eagle, are likely to continue to occur within the operational site from time to time.

While a number of sections of open bog/heath/wet grassland habitats will be impacted by the Proposed Development, the scale of the proposed land-take in these areas is relatively small. There may be some highly localised disturbance/displacement effects on the locally occurring birds. Conversely, the operation of fewer turbines within the EIAR Site Boundary could potentially see localised increases in the abundance or occurrence of certain bird species in the operational phase.

Kestrels may choose not to nest or roost in areas of woodland close to the active turbines. Many of the proposed turbines are located in open areas of habitat where this effect is unlikely to occur. Displacement of nesting or roosting Kestrels is likely to be very localised if it were to occur. There are substantial areas of suitable nesting and roosting habitat distant from the proposed turbine layout and any displacement effects are unlikely to significantly affect the number of Kestrels present in the active wind farm. For most of the other target bird species, there is low likelihood of any significant change in the pattern of usage of the site post-construction. This is based on the absence of local nest and roost sites (e.g. Peregrine Falcon, Hen Harrier and Merlin) or the low level of usage of the Proposed Development site (e.g. Red Grouse).

Golden Plovers were recorded in flight over and in the vicinity of the EIAR Site Boundary in each of the three winter seasons. No feeding or roosting area was observed within the EIAR Site Boundary. It is likely that Golden Plover will continue to occur in the area post construction. As described previously, the wintering population which occurs at the study area is large and stable as compared to the breeding population, which is declining and is restricted in range to northwest Ireland. While there is some evidence that Golden Plover can initially be displaced from the area immediately around an active turbine (Pearce Higgins *et al.* 2009), a subsequent study by the same author has reported that, following the construction period, populations may become habituated to operational wind farms (Pearce Higgins *et al.* 2012). Many of these studies have concentrated on breeding birds. For instance, post construction monitoring at 15 upland wind farms showed no significant decline in Golden Plover numbers (Pearce Higgins *et al.* 2012). Similarly, there was no decline in Golden Plover populations recorded during 3-years of post-construction surveys at one UK wind farm site (Douglas *et al.* 2011). It is therefore considered likely that Golden Plover will continue to use the wind farm site post construction and no significant disturbance/displacement impacts on the local wintering Golden Plover population are therefore considered likely as a result of the operation of the Proposed Development.

All other bird species recorded at the site are not regarded as being particularly sensitive to disturbance displacement and/or barrier to movement arising from wind farm development (Langston & Pullan 2003 & 2004, Percival, 2003 and Stewart *et al.* 2004).

6.5.5.5.2 Collision Effects

Bird mortality or injury at wind farms can occur through collision with rotors, towers, nacelles, cables, power lines and meteorological masts (Drewitt & Langston, 2006, Kingsley & Whittam, 2005). While most wind farm collision studies indicate low levels of bird mortality per turbine, these levels could still be significant for some bird species populations such as those with a low annual productivity, slow maturity and in cases of very large wind farms with tens of turbines (Langston & Pullan 2003, Drewitt & Langston, 2006). This scenario has occurred on a number of inappropriately located wind farms such as those at Altamount Pass in California and Tarifa in Spain (loc cit., Percival, 2003). It should be noted that the Altamount Pass wind turbines were only of c. 30m in height and the rotor envelope is therefore not comparable to the current wind farm layout. In contrast the proposed turbines will have a blade tip height of up to 200m (Hub height range of 118m-125m and Rotor Diameter range of 149m-163m). Depending on the configuration chosen, the ground clearance of the blade will be from 36.5m to 50.5m.

Collisions with wind turbines are most likely to occur where birds fly regularly at turbine blade height and do not demonstrate an effective avoidance response. In general, large/heavy species such as swans/geese are more susceptible to collision mortality as they are less manoeuvrable than raptors such as Hen Harrier. No flightlines of protected wildfowl species such as Whooper Swan or Greenland White-fronted Goose were recorded in the EIAR Site Boundary during the VP surveys and there is no evidence that the site is located on regular commuting or migration route for any such bird species.

The fatality monitoring carried out at the Existing Kilgarvan Wind Farm indicated that there were few bird strike casualties. Only three birds in total were recovered during the dog-based searches. Even allowing for scavenger removal, decomposition and detectability of remains, this represents an apparently low rate of bird collision mortality at this site. Fewer, albeit larger turbines, in operation are unlikely to represent a greater cumulative collision risk in the post-construction phase.

To assess the individual species risk of collision mortality at the site we consider the field data collected from the EIAR Site Boundary. Collision Risk Modelling (CRM) which is prevalent in the UK typically adopts the 'Band' model and variants thereof, is widely used in avian collision risk assessments for wind farms. A criticism of the adoption of CRM is that it is not evidence based and the driver of the model ('avoidance rate') is generally derived with little if any observational data (Band *et al.* 2007). The weaknesses inherent on a reliance on CRM are recognised (e.g. Cook *et al.* 2014; Masden & Cook 2016) but the methodology is still widely used, albeit less so in Ireland than in the UK. There is a lack of studies measuring the accuracy of the outputs of such models, even after the widespread adoption of the method in the UK for the past 15 years. As recognised by Band *et al.* (2007) in their original paper there are significant difficulties in collecting accurate data and the assumptions that underpin the model are considerable. CRMs are not generally recommended for sites where existing turbines are present. For example, SNH (2014) recommends that flight activity surveys should not be carried out at operational wind farms for the purposes of quantifying collision risk. We assess the potential for collision risk by preferring to rely on the detailed field observations that describe the occurrence and flight behaviour of the birds in the vicinity of the Proposed Development and with an understanding of the ecology and behaviour of the species. Data are presented in this report as flightline observation tables with corresponding flightline maps. In addition, the time spent by target bird species on and off the site and at potential rotor swept height (on and off-site) during the survey is calculated.

The pattern of usage of the site of the target species recorded at the site is described below.

Kestrel is a Red-listed raptor species present in each survey season and was the most frequently recorded target species overall. Kestrels are considered vulnerable to collision (Whitfield & Madders, 2006). In the breeding season there were 17, 31 and 66 flightlines of the species respectively in the three survey seasons. Kestrels were under observation for c. 7% of the total observation period across the three breeding seasons and for c. 4.5% of the total observation time Kestrels were present within the EIAR Site Boundary. The number of Kestrel flightlines observed at Rotor Swept Height (RSH) on each breeding season was 5, 9 and 24 respectively. Kestrels were estimated to be flying at RSH within the

EIAR Site Boundary for a total of 1 hour 42 minutes and 15 seconds (c. 1.6% of the total observation period). In the winter period there were 25, 27 and 24 flightlines recorded of Kestrel over the three winter seasons. They were recorded for c. 2.4% of the total period of observation in the winter season (c. 1.5% within the EIAR Site Boundary). The number of flightlines observed of Kestrel at RSH in the winter seasons was 10, 15 and 8 respectively. The time spent each winter at RSH within the EIAR Site Boundary ranged from 11 minutes 18 seconds to 32 minutes 23 seconds. Overall, Kestrels were observed for a cumulative total of just over 55 minutes (c. 0.9% of observation period). Kestrel was recorded consistently and widely at the Proposed Development. The species did not appear to avoid any part of the active wind farm and appeared adept at foraging and commuting through the EIAR Site Boundary. The maximum number of Kestrels under observation was 3 birds (during the breeding season) and there appeared to be a consistent presence of one or more Kestrels in the area. Kestrels in this area are likely to be habituated to the presence and operation of turbines. While the fatality surveys did not record any evidence of raptor mortality at the site, there is some potential for collisions to occur with Kestrels at the Proposed Development. This is unlikely to result in significant losses of Kestrels at the wider population level, but there is a possibility of occasional collision mortalities with the species.

White-tailed Eagle is an Annex I and Red-listed raptor species. It was reintroduced into Ireland in 2007 with releases of chicks from Norway in the Kilgarvan area between 2007 and 2011. The second phase of the reintroduction commenced in 2020 with the release of additional young eagles. There is an estimated national breeding population of 12 pairs (O'Donoghue *et al.* 2020). White-tailed Eagle is known to be vulnerable to collision with turbines. Studies in Norway have shown that the species does not show any clear avoidance flight responses to the wind turbines (Dahl *et al.* 2013). From 2007 to 2019, 6 birds were recovered in Ireland that are believed to have collided with turbines, with three of these fatalities occurring in Co. Kerry (loc cit.). For context, a further 12 White-tailed Eagles were recovered nationally that were victim to poisoning or shooting. The species takes several years to reach breeding maturity and during this time the juvenile eagles tend to roam widely across the country. They are a large and highly mobile species that are often observed circling and soaring and riding thermals. Birds were observed at roost near the entrance to Grousemount Wind Farm and there were occasional observations of birds in the hinterland area during the summer months. The breeding season VP surveys only recorded a total of 4 flightlines with none of these birds within the EIAR Site Boundary. In total individual White-tailed Eagles were observed for a total of almost 10 minutes (off-site) over the course of three breeding seasons. In winter there were more frequent observations of the species, sometimes of up to three individuals at once. The number of flightlines recorded in the winter seasons was 7, 3 and 11 respectively. Birds were under observation for a cumulative total of 2 hours 55 minutes and 44 seconds (c. 2.7% of the total observation period) during the winter season. A total of 8 of the flightlines recorded were of White-tailed Eagles flying at RSH within the EIAR Site Boundary, for a cumulative total of 1 hour 21 minutes and 53 seconds (1.3% of the total observation period). The observations of White-tailed Eagle on-site were exclusively of birds in flight and while some may have been opportunistically foraging, no incidence of prey capture or scavenging was observed within the EIAR Site Boundary. While the fatality surveys did not record any evidence of raptor mortality at the site and the species was not recorded within the EIAR Site Boundary during the breeding season period, it is concluded that there is some potential for collisions to occur with White-tailed Eagle at the Proposed Development.

Peregrine Falcon is an Annex I listed raptor. The species was occasionally recorded during the breeding seasons (7 flightlines total) and winter periods (6 flightlines total). In all cases the observations were of single birds. There is no breeding or roosting site for Peregrine Falcon on or adjacent to the Proposed Development site. In the breeding season Peregrine Falcon were observed cumulatively within the EIAR Site Boundary for a total of 2 minutes 36 seconds. Only two flightlines were recorded of birds in flight at RSH within the EIAR Site Boundary across the three breeding seasons (total of 126 seconds). Peregrines were recorded in two of the three winter seasons, observed within the Site Boundary for c. 0.1% of the total observation period. There were two flightlines recorded of birds occurring at RSH within the EIAR Site Boundary during this period. Given the infrequent occurrence of Peregrine Falcon within the EIAR Site Boundary, the lack of nesting and roosting sites proximate to the wind farm and the recorded low fatality rate at the development site, there is no concern in relation to collision mortality and Peregrine Falcon at this site.

Sparrowhawk is a Green-listed raptor species and is therefore not of elevated conservation concern in Ireland. Sparrowhawk were recorded in each of the survey seasons with a total of 15 breeding season flightlines and 17 winter season flightlines. Most observations were of a single individual, with a maximum number of two birds under observation at any time. There was no evidence of the presence of a breeding or regular roosting site within or in the immediate vicinity of the EIAR Site Boundary. Over three breeding seasons Sparrowhawks were observed within the EIAR Site Boundary for a cumulative total of 26 minutes (c. 0.4% of the total observation period) and 24 minutes 24 seconds at RSH. Sparrowhawk spent less time within the EIAR Site Boundary during the winter seasons (total of 2 minutes 35 seconds) with most observations made related to birds present outside of the study area. There were brief observations of Sparrowhawk within the EIAR Site Boundary at RSH during the winter period, cumulatively totalling only 95 seconds across the three seasons. Given the infrequent occurrence of Sparrowhawk within the EIAR Site Boundary, the absence of nesting sites proximate to the wind farm and the recorded low fatality rate at the development site, there is no concern in relation to collision mortality and Sparrowhawk at this site.

Hen Harrier is an Amber listed raptor species that is also listed on Annex I of the Birds Directive. Hen Harrier was a key target species given the known breeding population associated with Mullaghanish to Musheramore Mts. SPA located c. 10km from the nearest of the proposed turbine locations. There were very infrequent observations of Hen Harrier during the six seasons of VP surveys. There was a single observation of an adult male Hen Harrier recorded in the breeding season, this late in the season in August when birds are typically post-breeding. This male bird was observed flying across the Proposed Development site at below RSH. There was a further 3 flightlines of Hen Harrier recorded, all of these in a single winter season. These totalled a cumulative 6 minutes and 6 seconds within the EIAR Site Boundary and during none of this time were birds observed at RSH. Given the infrequent occurrence of Hen Harrier within the EIAR Site Boundary, the absence of nesting sites proximate to the wind farm and the recorded low fatality rate at the development site, there is no concern in relation to collision mortality and Hen Harrier at this site.

Merlin is an Annex I and Amber-listed raptor species. Merlin was very infrequently recorded during the survey seasons and was not recorded at all during the breeding season. There is no known breeding site for the species within or proximate to the Proposed Development site. A total of 9 flightlines were recorded over the 3 winter periods, much of the observation time involving sightings of birds outside the EIAR Site Boundary. In total, Merlin was recorded within the EIAR Site Boundary for a cumulative total of 1 minute 14 seconds over three winter periods. Only one of these flightlines involved a bird observed at RSH for 21 seconds in total. Given the infrequent occurrence of Merlin within the EIAR Site Boundary, the absence of nesting sites proximate to the wind farm and the recorded low fatality rate at the development site, there is no concern in relation to collision mortality and Merlin at this site.

Buzzard is a Green-listed raptor species that is common locally and nationally which has increased in abundance and range in Ireland in recent decades. It was not observed to nest or roost within the EIAR Site Boundary. It was recorded on 5 of the 6 VP survey seasons, with a maximum of three birds present. The number of breeding season flightlines observed varied considerably interannually, with 1, 2 and 20 flightlines recorded across the three survey periods. Cumulatively Buzzards were observed within the EIAR Site Boundary for 15 minutes and 40 seconds. Only 5 of the flightlines recorded during the breeding season surveys involved observations of birds at RSH within the EIAR Site Boundary. These flightlines totalled 9 minutes 26 seconds (c. 0.1% of the total observation period). Buzzards were recorded during two of three winter survey seasons. There was a total of 18 flightlines, accounting for a cumulative total of just under 27 minutes within the EIAR Site Boundary, most of which occurred at RSH (11 flightlines; 26 minutes 41 seconds). Cumulatively Buzzard flightlines were observed for c. 0.4% of the total observation period at RSH within the EIAR Site Boundary during the winter season. While the fatality surveys did not record any evidence of raptor mortality at the site, there is some potential for collisions to occur with Buzzards at the Proposed Development. This is however unlikely to cause any significant losses to the local or national population which is increasing and of no elevated conservation concern.

Goshawk is an Amber-listed raptor that is uncommon in Ireland. There is no known breeding or roosting site for this species in proximity to the EIAR Site Boundary. There was a total of three sightings of Goshawk locally over the course of six seasons of VP surveys. Given, the very low rate of occurrence of Goshawk at this site and limited time spent at RSH within the EIAR Site Boundary there is no concern in relation to collision mortality and Goshawk at this site.

Lesser Black-backed Gull is an Amber-listed bird species that was recorded in all three breeding seasons and one of the winter seasons. The observations ranged from 1 to 15 birds. In the three breeding seasons there were 5, 6 and 8 flightlines respectively. Most of the observation period was of birds commuting outside of the EIAR Site Boundary. Birds were cumulatively observed within the EIAR study area for a total of 329 seconds over the three breeding seasons. The observations of Lesser Black-backed Gulls on-site at RSH totalled 269 seconds (c. 0.1% of the total observation period) over the course of the three breeding seasons. There was a single observation of Lesser Black-backed Gulls made during the three winter seasons and these two birds were not recorded within the EIAR Site Boundary. Based on the very low occurrence of the species within the EIAR Site Boundary at RSH there is no concern in relation to collision mortality and Lesser Black-backed Gull at this site.

Mallard is an Amber-listed species that was recorded on a handful occasions across the breeding (2 flightlines) and winter season surveys (1 flightline). Given, the very low rate of occurrence of Mallard at this site and limited time spent at RSH within the EIAR Site Boundary there is no concern in relation to collision mortality and Mallard at this site.

Red Grouse is a Red-listed species. Signs and irregular sightings were recorded of this species in the area. A dedicated breeding tape lure survey did not find evidence of any breeding pairs in the EIAR Site Boundary. There were no records of Red Grouse made during the breeding season VP surveys and only a total of 3 flightlines observed of the species during the three winter seasons. All of these sightings were of birds flying locally near ground level. There is no concern in relation to collision mortality and Red Grouse at this site.

Cormorant is an Amber-listed piscivore that was recorded on just one breeding and one winter season. None of the sightings involved birds overflying the EIAR Site Boundary. Given, the low rate of occurrence of Cormorant locally and lack of presence within the EIAR Site Boundary there is no concern in relation to collision mortality and Cormorant at this site.

Grey Heron is a Green-listed species recorded in two of the breeding seasons and in one winter season. There was a total of 3 flightlines recorded during the breeding season surveys, accounting cumulatively for a total of 2 minutes and 40 seconds within the EIAR Site Boundary, none of which was spent at RSH. The only Grey Heron flightline observation made during the winter period was of a bird flying outside the EIAR Site Boundary. Based on the very low occurrence of the species within the EIAR Site Boundary and absence of flightlines at RSH, there is no concern in relation to collision mortality and Grey Heron at this site.

Golden Plover is an Annex I species that is currently Red-listed. The species was only recorded in the area during the winter survey seasons. There are no known breeding pairs in the local area. A total of 31 flightlines were recorded, with the peak flock size recorded varying from 34 to 100 individual across the three winter periods. Golden Plover flightlines were observed for 1 hour 27 minutes and 55 seconds of which 38 minutes and 33 seconds were spent within the EIAR Site Boundary. A total of 16 flightlines were recorded of Golden Plover at RSH within the EIAR Site Boundary over the three winter seasons, totalling a cumulative time of 36 minutes 11 seconds (c. 0.6% of the total observation period). Given the regular occurrence of Golden Plover within the EIAR Site Boundary and the potential for flocks of this species to fly within the RSH there is some potential for turbine collision to occur at the Proposed Development site. The available research shows that Golden Plover are relatively adept at navigating around operational turbines and collision fatalities are unlikely to have any measurable impact on the local wintering Golden Plover population (Pearce Higgins *et al.* 2012). This supposition is supported by post construction monitoring at 15 upland wind farms where no significant decline in Golden Plover numbers occurred (Pearce Higgins *et al.* 2012) and also during 3-years of post-construction surveys at

one UK wind farm site (Douglas *et al.* 2011) where no decline in Golden Plover populations were recorded. While the fatality surveys did not record any evidence of wintering wading bird mortality at the site and it is concluded that there is some potential for collisions to occur with Golden Plover at the Proposed Development. It is highly unlikely that any such losses would lead to significant losses to the local wintering population. Wintering flocks of Golden Plover are highly mobile and are considered to have a generic avoidance rate of 98% (SNH 2018), making them less susceptible to turbine collision. There is some evidence that the actual avoidance rate of wintering Golden Plover is considerably higher with calculated rates of 99.6% or higher (Gittings 2022).

Snipe is a Red-listed species. There was no evidence of any breeding pairs of the species in the EIAR Site Boundary and few observations of Snipe within the site at any time of year. There was a single flightline recorded during the 6 survey seasons of a single individual flying below RSH. Given, the very low rate of occurrence of Snipe at this site and absence of flightlines at RSH observed within the EIAR Site Boundary there is no concern in relation to collision mortality and Snipe at this site.

Chough is an Annex I and Amber-listed species. There were 4 observations of Chough recorded during the winter of 2021/2022. Up to five birds were present and two of the flightlines were of Choughs commuting through the EIAR Site Boundary at RSH for a total of 4 minutes 13 seconds. The birds appeared to be attracted to flooded fields along the Roughty River to feed. Choughs are sometimes recorded at inland sites and non-breeding flocks can be particularly mobile. There is no breeding site of Chough in the local area. It is possible that Chough will occur at the Proposed Development site from time to time, particularly in the winter period, but it is not anticipated that this will be a regular occurrence. There is no concern in relation to collision mortality and Chough at this site.

Based on the detailed analysis of the survey data and knowledge of the ecology of the target bird species it is concluded that in the absence of mitigation there is appreciable potential for fatalities of White-tailed Eagle, Kestrel, Buzzard and Golden Plover to occur at the Proposed Development site. Buzzard are Green-listed and there is no likelihood that any collision losses that might occur would have any significant effects on the local or national population of the species. It is also unlikely given the numbers of Golden Plover recorded within the EIAR Site Boundary that any potential collision fatalities would significantly diminish the local or national wintering population of the species. Kestrel is not listed on Annex I of the Bird's Directive and the species was a new addition to the Birds of Conservation Concern in Ireland (BoCCI) Red-list in 2021 (Gilbert *et al.* 2021). The reason for the change in conservation status of Kestrel is partly due to an increase in the time span of the short-term breeding decline criteria and to more recent severe declines recorded in their breeding populations. Causes for the decline of Kestrel in Ireland in recent years are not well understood, but it has been speculated that this has been due to changes in prey availability, agricultural changes and reduced feeding opportunities, as well as secondary rodenticide poisoning (Gilbert *et al.* 2021). However overall, Kestrel remains one of the most abundant and widespread birds of prey in Ireland. Kestrel is a species believed to be more vulnerable than other raptor species to collision with turbines due to their foraging behaviour. Kestrels hover while hunting and spend their time focussing on the ground, trying to spot signs of movement of small prey items on the ground below. Collision related fatalities of Kestrels are not cited as the likely reasons for the inclusion of the species on the most recent Red-list and it is unlikely that this development directly, indirectly or cumulatively with other wind energy projects will be a significant driver of the population demographics of the species during the operational phase. There was no evidence recorded of fatalities of raptor species at the Proposed Development site and the birds present are likely to be habituated to the presence of operational turbines. Some collision related fatalities are possible of course, but as the Proposed Development will result in the reduction in the number of operational turbines present, it is unlikely to result in a diminished conservation outlook for locally occurring Kestrels.

White-tailed Eagles are uncommon and take several years to reach breeding age. They have low breeding output and therefore losses of individuals are more significant in relation to population demographics. Historically, there have been several fatalities of White-tailed Eagle with wind farms in the local area (including at Sillahertane and Lettercannon). In this context, and with the observation of birds spending considerable time at RSH within the EIAR Site Boundary during the winter period, it is

concluded that in the absence of mitigation that there is potential for significant losses of White-tailed Eagle to occur through collision with the proposed turbines. In Chapter 12 of the Kerry CDP (2022-2028) they state that energy projects in this area must be accompanied by ornithological assessments based on at least two years of survey data and taking into account the results of ongoing monitoring of existing renewable energy infrastructure in the area and should include mitigation to prevent eagle mortality as agreed for the existing Grousemount Wind Farm. These measures to address the identified collision risk with White-tailed Eagles are described in the Mitigation section of this Chapter.

6.5.5.6 Potential Operational Phase Effects on Other Protected Fauna

The operational phase is not likely to lead to any significant impacts on other taxa (e.g. Lepidoptera, amphibians and reptiles) that occur at or in the immediate vicinity of the site. As already discussed in relation to operational effects on designated sites, individual Kerry Slugs could potentially be killed by site traffic using the access roads and hard stands during the operational phase. While individual slugs were recorded on the margins of the existing roads they were largely absent from the trafficked areas and any such losses would not have the potential to have significant effects on the local or SAC population. Potential operational phase effects on other taxa are considered to be imperceptible neutral overall.

6.5.6 Potential Effects during Decommissioning

A Decommissioning Plan has been prepared and included as Appendix 4-5 of this EIAR, which will be agreed with the local authority prior to any decommissioning. The plan provides details of the methodologies that will be adopted, throughout decommissioning, the environmental controls that will be implemented, the Emergency Response Procedure to be adopted, methods for reviewing compliance and an indicative programme of decommissioning works. The Decommissioning Plan will be updated prior to the end of the operational period in line with decommissioning methodologies that may exist at the time and will be agreed with the competent authority at that time.

No other potential effects other than those already discussed above for the construction and operational phases are likely to occur during decommissioning. Turbine design renders the decommissioning process as a straightforward process. In the decommissioning phase, cranes disassemble each turbine section which is then removed from the site. Underground cables will be cut back at the turbine termination and either be recycled or left buried in situ (de-energised). Site materials will be recycled where practicable, or disposed of in accordance with current waste legislation and best practice guidelines. Based on current commodity prices, principally steel and copper, material costs achieved through recycling will exceed current financial costs associated with site decommissioning. Decommissioning activities are assumed to be similar to construction activities, having similar type risks and sensitive receptors associated with them. However, they are considerably less intrusive. No additional measures other than those outlined for the construction or operational phase will be required.

The environmental control, monitoring and mitigation measures applied during the construction phase detailed in the sections below will also be applied as appropriate for the decommissioning of the Proposed Development.

6.5.7 Potential Cumulative Effects

Projects in the wider hinterland were identified using various online resources including:

- Kerry County Council planning viewer
<https://kerry.maps.arcgis.com/apps/webappviewer/index.html?id=33565bc13600476c8c4bae1eadb8c22d>

- Cork County Council planning viewer <https://www.corkcoco.ie/en/planning/planning-enquiry-online-submissions>
- An Bord Pleanála (Strategic infrastructure development (SID) applications, Strategic Housing Development (SHD) applications and major project applications including wind farms) <https://www.pleanala.ie/en-ie/home>;
- [Wind Energy Ireland \(WEI\)](https://windenergyireland.com/) <https://windenergyireland.com/>
- Department of Department of Housing, Local Government and Heritage's EIA Portal <https://www.gov.ie/en/publication/9f9e7-eia-portal/>.

A list of projects and plans was reviewed and the potential for cumulative impacts on terrestrial biodiversity was considered. The majority of consent applications in the wider local area pertain to one-off residential dwelling or farm buildings/structures along the regional roads. The scale of these applications is such that there is no potential for significant in-combination/cumulative effects with the Proposed Development arising from such developments. There are some agricultural projects e.g. intensive pig rearing facilities that are subject to EPA licensing and other project involving waste transfer. None of these projects are considered likely to result in cumulative or in-combination effects in relation to the Proposed Development due to the location, scale or nature of these projects, or the licensing and planning conditions that apply.

The potential cumulative and in-combination impacts on designated Natura 2000 sites arising from the Proposed Development is discussed in detail in the NIS which accompanies this planning application.

The main projects that require consideration in relation to potential for cumulative and in combination effects are other wind energy projects.

There are five other operational wind farms in the Roughty River catchment where the proposed turbines will be constructed as set out in Table 6-28. The largest is Grousemount Wind Farm, with 38 turbines. It is the most recent wind development in the catchment, largely completed and commissioned by 2020. The other wind farms in the catchment were constructed prior to the 2007 and 2009 periods.

Table 6-29 presents details of other constructed, permitted or in planning wind farm projects in the wider hinterland. There are a number of wind farm projects currently seeking planning permission in this area. These include Inchamore Wind Farm which is a proposed 5-turbine development located directly to the east of the Proposed Development. The EIAR for this project also recorded the presence of Kerry Slug on site and the occasional occurrence of White-tailed Eagle. The mitigation strategy proposed was reviewed and considered as part of this assessment.

The ecological impact assessments and reports (where available) in support of the AA process for the wind farms in the wider area were reviewed. This included the permitted and proposed projects. Particular attention was given to the mitigation strategy developed and agreed with Kerry County Council as part of the Grousemount Planning Application for the purpose of minimising the risk to White-tailed Eagles. The strategy to prevent Eagle mortality is also referenced in Chapter 12 of the Kerry County Development Plan (Section 12.5.4.1.4). Each of the more recent projects (permitted and proposed) were accompanied by detailed ecological impact assessments and NIS. Detailed mitigation strategy is provided in order to minimise the risk of significant effects on sensitive habitats and species, due to the Proposed Development and in combination with other developments in the receiving environment.

Table 6-28 Other Wind Farms in the Roughty River Sub-catchment

Wind Farm	Status	Year Commissioned	No. Turbines	Relationship to Proposed Development
Inchee / Coolknoohil	Constructed	2007	6	Drains to the Inchee branch of the Glanlee tributary of the Roughty
Midas / Coolknoohil (Everwind)	Constructed	2007	11	Drains via tributary to Roughty River (c.2.3km upstream of site)
Foilgreana / Coolknoohil	Constructed	2007	6	Drains overland to Roughty River (c.1.4km upstream of site)
Sillahertane / Coomagearlachy II	Constructed	2009	10	Drains via tributary to Roughty River (c.2.3km upstream of site)
Grousemount	Constructed	2020+	38	Drains to Roughty River (c3.7km upstream of site at nearest)

Table 6-29 Other permitted, constructed or Wind Farms in wider hinterland of EIAR Site Boundary.

Wind Farm	Status	Year Commissioned	No. Turbines	Notes
Curraglass	In Planning	n/a	7	Application for 7 wind turbines currently with An Bord Pleanála
Derragh	Constructed	2019	6	Granted permission in 2016 but not constructed.
Cleanrath	Constructed/under appeal	2019+	9-11	Site was under construction when permission was quashed. Substitute consent application under consideration by ABP.
Gneeves	Constructed	2006	11	Now in operation for 17 years.
Clydaghroe	Constructed	2012	2	Located to northwest of Ballyvourney.
Knocknamork	Permitted	n/a	7	Located north of Ballyvourney on the Cork/Kerry border. Project also includes photovoltaic array.
Gortyrachilly	In Planning	n/a	14	SID application at further consideration stage.
Ballinagree	In Planning	n/a	24	SID application at further consideration stage.
Inchamore	In Planning	n/a	5	Application to Cork County Council at Further Information stage.

Each of the individual wind farms in the wider area operates and will be decommissioned on their own schedule in accordance with their planning permissions. It is noted that within the Roughty sub-catchment in which the proposed turbines will be constructed that (with the exception of Grousemount) many of the wind farms are in an advanced portion of their anticipated lifetime. Just as at Kilgarvan, even in the absence of a conditioned lifetime, the existing turbines will predictably become more costly to maintain and eventually fall out of service and be decommissioned. In the absence of extension of life permissions, or new repowering projects, the number of functional turbines within these wind farms will predictably decline in the coming years.

The Proposed Development would see a net reduction of 17 in the number of operational turbines at the site. As technology has advanced in recent years the size of turbines has tended to increase and this means that new and repowering projects are likely to result in an overall reduction in the number of operational turbines into the future. Larger turbines may have a different collision risk profile for birds and bats, but this also needs to be considered in relation to a reduction in number of turbines present at a given site.

Existing or proposed wind energy projects in the hinterland of this project have the potential to cumulatively impact on the local ecology, particularly through increased fragmentation of the landscape, increased habitat disturbance, barrier effects, and through intensification of collision or displacement impacts on sensitive bird species. Each additional turbine erected in the landscape can potentially increase the cumulative risk of collision for birds and bats foraging and commuting through a landscape. For most species their ecology and in particular their pattern of movement means that they will not experience an incremental increase in collision risk for each turbine erected (e.g. territorial passerines). For bird species with large home ranges, or those commuting long distances, there is a potential for individuals to experience a cumulative collision risk. Information from recovery of ringed and tagged birds indicates that losses associated with collision with road traffic and buildings, along with hunting and predation fatalities, are the most significant source of bird mortality (Wernham *et al.* 2002).

No wind farm projects were identified which are considered likely to result in significant cumulative effects upon the local terrestrial ecology (habitats and species) in the EIAR Site Boundary. There are several wind farm projects that, like the Existing Kilgarvan Wind Farm, are well established and deep into their scheduled lifetime. The more recent permitted and proposed projects have presented detailed mitigation strategies to minimise the risk of impact upon sensitive habitats and species (e.g. White-tailed Eagle, Golden Plover and Kerry Slug) and thereby minimise the risk of cumulative and in-combination effects.

6.6 Mitigation Measures

From the outset an iterative process of constraints led design was employed for the Proposed Development whereby independent ecological expertise was utilised at an early design stage in identifying the constraints and designing the site layout to take account of these constraints. The siting of the turbines and associated infrastructure was informed by the environmental constraints.

The mitigation measures described below are designed to address and minimize the risk of impact arising from each phase of the Proposed Development. A Construction and Environmental Management Plan (CEMP) has been prepared which describes the general mitigation strategy that will apply during the removal of the existing turbines and erection of the proposed 11 turbine development (Appendix 4-3). The CEMP captures the mitigation commitments provided in specialist chapters including measures to protect water quality in the sub-catchments that drain the wind farm and access road. The following mitigation measures are related to minimising the potential for negative effects on the receiving terrestrial ecology throughout each phase of the development.

6.6.1 Mitigation Measures During Construction

6.6.1.1 Construction Phase Mitigation Measures – Designated Sites

All of the mitigation to protect water quality as outlined in Chapter 7, 9 and in the CEMP (Appendix 4-3) will be fully implemented. Specific measures to protect the European sites screened in for assessment in the NIS are summarised below.

- A suitably qualified ECoW will be appointed and will ensure the implementation and delivery of the mitigation strategy.
- A pre-construction survey will be carried out to confirm the presence/absence of Third Schedule Invasive plant species in or directly adjacent to the works footprint. In the event that any Third Schedule Invasive species are recorded in this area an Invasive Species Management Plan will be prepared by a suitably qualified ecologist. A suitably qualified specialist will be appointed if necessary to deliver any recommended control or eradication plans. The plan, if required, will be integrated into the contractor's CEMP.
- Due to the unavoidable disturbance to Kerry Slug habitat, a derogation license will be sought from the NPWS prior to the commencement of construction. Works will be carried out in compliance with any conditions set by such the license. To minimise effects on Kerry Slug areas of suitable habitat that occur outside of the footprint of the Proposed Development shall be avoided during the course of construction thereby minimising the loss and disturbance of Kerry Slug habitat. Immediately prior to undertaking works in areas of suitable habitat, the ECoW, or nominated specialist, will check for the presence of Kerry Slug. The preferred method shall be hand-searching. Should slugs be discovered then they will be transferred to suitable habitat identified outside of the works footprint. Throughout construction, monitoring of suitable habitat within works areas will continue using a combination of metric traps and regular hand-searching. Hand-searching will be undertaken during periods of wet weather when slugs are most active and feeding on the surface and therefore at greater risk of impacts e.g. from site traffic.
- Bird Vantage Point surveys will be commenced ahead of the construction phase and continue throughout the construction phase. No clearance of vegetation will be carried out in the bird breeding season (March to August inclusive). In the unlikely event that any nesting/roosting Hen Harrier are recorded within, or in the immediate vicinity of the works footprint works will only proceed in this area on the advice of the ECoW and in consultation with NPWS.

- A passive bat monitoring programme will be carried out at the site throughout the construction phase. Artificial lighting will be minimised throughout in order to minimise disruption of foraging and commuting routes for bats.

6.6.1.2 Construction Phase Mitigation Measures – Habitats and Botanical Species

The below best practice and mitigation measures will be undertaken during the project construction phase:

- No removal/clearance of habitats or movement of construction machinery will occur outside of the development works area/footprint during the construction phase, where the works area/footprint will be clearly marked for associated site staff.
- The construction of the Proposed Development will be implemented in accordance with the CEMP for the Proposed Development to ensure environmental protection of the site in accordance with best practice controls (e.g. CIRIA 2015; see Appendix 4.3). This will be effective in addressing potential indirect impacts on habitats and species such as those associated with dust emissions. All of the mitigation to protect water quality as outlined in Chapter 7, 9 and in the CEMP (Appendix 4-3) will be fully implemented.
- Prior to the development works, a survey by an appropriately experienced ecologist will be carried out to confirm the presence/absence and extent of Third Schedule Invasive plant species within or directly adjacent to the proposed works footprint. In the event that any Third Schedule Invasive species are recorded in this area an Invasive Management Plan will be prepared by a suitably qualified ecologist. A suitably qualified specialist will be appointed if necessary to deliver any recommended control or eradication plans. The plan, if required, will be integrated into the contractor's CEMP.
 - The contractor will refer to and implement the following, which provides detailed recommendations for the control of invasive species and noxious weeds: Chapter 7 and Appendix 3 of the TII Publication The Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads (NRA, 2008).
 - Maintaining site hygiene at all times in an area where invasive non-native species are present is essential to prevent further spread. The following site hygiene measures will be implemented onsite during the construction and/or for maintenance works during the operational stage where applicable:
 - Fence off the infested areas prior to and during construction works where possible in order to avoid spreading seeds or plant fragments around or off the construction site.
 - Clearly identify and mark out infested areas. Erect signs to inform Contractors of the risk.
 - Avoid if possible using machinery with roads in infested areas.
 - Clearly identify and mark out areas where contaminated soil is to be stockpiled on site and cannot be within 75m of any watercourse or within a flood zone.
 - If soil/stone is imported to the site for landscaping, infilling or embankments, the contractor will gain documentation from suppliers stating that it is free from invasive species.
 - Ensure all site users are aware of measures to be taken and alert them to the presence of the Invasive Species Management Plan.
 - Erection of adequate site hygiene signage in relation to the management of non-native invasive material as appropriate.
- A peatland restoration plan has been developed and will be applied at a suitable location identified by Dr. John Conaghan, the botanical specialist (Appendix 6-8).

The restoration area (measuring approximately 5.5 hectares in size), comprises a mix of open blanket bog areas with forest drains and small areas dominated by low-yielding/stunted conifers. The present ecological value of the plot is relatively low at present due to drainage, however there is good potential to increase the cover of bog vegetation, and especially *Sphagnum* mosses, by blocking the drains and felling conifers. These works will be carried out in parallel with the construction phase and under the supervision of ECoW (or nominated specialist). The blanket bog rehabilitation plan for the Proposed Development will restore an area of former lowland blanket bog that has been damaged by drainage and afforestation. This will provide mitigation for the loss of blanket bog and heath habitat as a result of wind farm construction. The methodology described in the plan is based on similar bog projects which have been carried out successfully at various Coillte owned properties in Ireland (Coillte 2008, Mackin *et al.* 2017). The restoration area will be monitored for the lifetime of the wind project in accordance with the plan.

6.6.1.3 Construction Phase Mitigation Measures – Mammals

Regard was given to current guidance in relation to mitigation of effects on protected mammal species in Ireland (e.g. Marnell *et al.* 2022). The following mitigation measures are designed to minimise construction phase risks of impact upon mammals.

- A pre-construction mammal survey (including checks for non-volant mammals and passive/active bat surveys) will be carried out immediately before the commencement of vegetation clearance to ensure that there is no evidence of resting/breeding sites of protected mammal species in or directly adjacent to the works footprint. There are no known mammal resting/roosting or breeding sites which will be directly impacted by the Proposed Development. In the event that resting places of any protected mammal species are present the ECoW (or nominated specialist) will advise on the appropriate course of action. The ecologist will have ‘Stop Work’ authority and works will only proceed in the vicinity of the identified constraint in accordance with the advice of the ecologist and the relevant environmental legislation.
 - The ECoW will supervise/check areas where tree-felling and vegetation removal will occur prior to and during construction. This will ensure that any site-specific issues in relation to wildlife will be highlighted and appropriate mitigation measures (e.g., TII guidelines) are applied.
- Construction operations will largely take place during the hours of daylight to minimise disturbances to nocturnal mammal species. Night-time lighting will be kept to a minimum.
 - All lighting systems will be designed to minimise nuisance through light spillage. Shielded, downward directed lighting will be used wherever possible and all non-essential lighting will be switched off during the hours of darkness.
- All edible and putrescible wastes will be stored and disposed of in an appropriate manner. Similarly, all construction materials will be stored and stockpiled according to the CEMP (Appendix 4-3)
- Any sightings of mammals on-site will be logged on the wildlife register. This includes any fatalities recorded during construction phase.
- Bat activity will be monitored at the site in the year(s) of construction with two active detector night-time surveys between May and October. Passive bat detectors will be deployed at several locations close to the construction footprint for the duration of the construction period to monitor the pattern of bat activity in the area throughout the tree felling and construction period. The locations chosen for the deployment of the passive detector(s) will include a number of locations at or adjacent to turbine locations and a number of other locations remote from turbines. These locations will be used for pre-, during- and post-construction bat activity monitoring.

- A fatality monitoring programme for birds and bats (using dog-based searches) will be implemented during the construction phase when the existing turbines are being removed and the new turbines and associated infrastructure installed. Monthly searches of turbine bases (where a turbine is present) and around met masts will be carried out throughout the construction phase with associated searcher efficiency and scavenger removal trials will also be included in the programme. A report will be prepared at the end of the construction phase and circulated for the information of the Planning Authority, Kerry County Council and NPWS.

6.6.1.4 Construction Phase Mitigation Measures - Avifauna

During the construction phase there will be vegetation clearance and disturbance associated with movement of plant, materials and personnel. The mitigation as described below and in the accompanying CEMP (Appendix 4-3) will be implemented in full.

- An appropriately qualified and experienced Ecological/Environmental Clerk of Works (ECoW) will be appointed to monitor the day-to-day construction activity and implementation of the environmental and ecological mitigation measures.
 - A Toolbox Talk will be prepared and incorporated as part of the construction phase site induction. A wildlife register will be maintained by the environmental site staff during the construction phase. Site staff will be encouraged to report any bird sightings of note made during the construction phase and this information will be logged by the environmental site staff. The site manager will continue to maintain a wildlife register throughout the operational phase.
- Construction operations will largely take place during the hours of daylight to minimise disturbances to roosting birds or any active crepuscular/nocturnal bird species.
- All lighting systems will be designed to minimise nuisance through light spillage. Shielded, downward directed lighting will be used wherever possible and all non-essential lighting will be switched off during the hours of darkness.
- All edible and putrescible wastes will be stored and disposed of in an appropriate manner. Similarly, all construction materials will be stored and stockpiled at prescribed locations and all waste materials will be disposed of to licensed facilities.
- Tree-felling and removal of mature vegetation will be undertaken outside of the bird breeding season (March 1st – August 31st). To avoid impacts on nesting birds and potentially small mammals all undisturbed works areas will be first checked by a suitably qualified ecologist to ensure that no protected species are present.
- Standard Vantage Point Monitoring in accordance with the Survey Methods for Use in Assessing the Impacts of Onshore Wind farms on Bird Communities (Scottish Natural Heritage, 2018) will be carried out during the construction year by competent experienced ornithologists. The survey shall cover the development footprint and all areas within 500m of the works.
- During the construction phase and in advance of the operation phase of the new turbines, a detailed White-tailed Eagle mitigation strategy will be implemented in accordance with that agreed with Kerry County Council as part of the Grousemount Planning Application, for the purpose of minimising the risk to White-tailed Eagles. The requirement to adhere to this strategy to prevent Eagle mortality is also referenced in Chapter 12 of the Kerry County Development Plan 2022 - 2028 (Section 12.5.4.1.4). An outline plan to minimise risk to White-tailed Eagles is presented in Appendix 6-9. A suitably qualified ornithologist will be appointed to develop and oversee the implementation of the plan which will include the following:
 - Meet with the key stakeholders including the White-tailed Eagle Reintroduction group, and NPWS.
 - Implement an annual monitoring and reporting approach in accordance with the agreed programme for Grousemount Wind Farm.

- Instigate regular checks, to ensure that no carrion is present within the wind farm site that could possibly serve as an attractant for feeding White-tailed Sea Eagles. Because dead sheep are likely to be the main source of carrion, effort will be concentrated during times when such death is most likely, i.e. seasonally and climatically. The final approach will be informed by the experience of the Grousemount strategy.
- The birds most likely to access the wind farm site are young birds that have dispersed from the release, or nest sites. Funds for 10 GSM/GPS ‘satellite’ tags, including download costs (assuming each tag will last four years), will be transferred to the Reintroduction Programme prior to commencement of the wind farm’s operation in accordance with the agreed approach implemented for Grousemount Wind Farm. Responsibility for the tagging of birds will be handed to the Reintroduction Programme as was the case for Grousemount.
- A fatality monitoring programme for birds and bats (using dog-based searches) will be implemented during the construction phase when the old turbines are being removed and the new turbines and associated infrastructure installed. Monthly searches of turbine bases (where a turbine is present) and around met masts will be carried out throughout the construction phase with associated searcher efficiency and scavenger removal trials will also be included in the programme. A report will be prepared at the end of the construction phase and circulated for the information of the Planning Authority, Kerry County Council and NPWS.

6.6.1.5 Construction Phase Mitigation Measures - Other Protected Taxa

The following mitigation measures are designed to minimise construction phase risks of impact upon other taxa e.g. Frogs. The measures described for the protection of watercourses and water quality described in Chapters 7, 9 and the CEMP (Appendix 4-3) will be effective in minimising potential negative construction-phase effects on other taxa that occur locally. The particular mitigation measures that will be implemented to minimise construction phase effects on Kerry Slug are described in Section 6.6.1.1 above.

- Areas where spoil is to be stored temporarily, or permanently, will be checked in advance for the presence of Frogs (and spawn). If protected species are present, the environmental staff will translocate these, if possible (under licence if applicable). The same measure will be applied for any drains or areas of standing water worked on, or forded by construction machinery. These areas will be checked on an ongoing basis by the ECoW and any areas with breeding frogs, spawn or tadpoles will be mapped and if possible fenced off temporarily to allow Frogs to metamorphose. If such areas cannot be avoided by site traffic the environmental staff will translocate the frogs (adults/young) under licence if applicable.
- An updated survey for adult Marsh Fritillary, *Euphydras aurinia*, will be carried out in the year of construction (May/June) ideally before construction commences. Locations with Devil’s Bit Scabious within the site and along the turbine delivery and grid access route will be checked in September/October for the presence of larval webs. Marsh Fritillary butterfly is the only Irish insect listed under Annex II of the EU Habitats Directive. In the event that larval webs are recorded within the proposed works area, mitigation measures will follow best practice guidelines as outlined in the ‘Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes’ (NRA, 2008). This could include (for instance) the implementation and monitoring of exclusion areas.
- If other taxa such as other species of Lepidoptera, Common Lizard etc. are recorded within or adjacent to the works footprint, these sightings will be logged on the wildlife register.

6.6.2 Mitigation Measures during Operation

6.6.2.1 Operational Phase Mitigation Measures – Designated Sites

Mitigation measures to minimise the potential operational phase effects on the sites identified at the Appropriate Assessment Screening Stage are outlined in the accompanying NIS and described below.

- Bat activity will be monitored at the site for the first three years of operation using passive detector deployment at the same locations used to monitor activity in the construction phase. Annual reports on the occurrence and activity of Lesser Horseshoe Bat and other bats species detected will be prepared and submitted for the information of the Planning Authority, Kerry County Council and NPWS.
- As a precautionary mitigation measure, in addition to the creation of buffers between the proposed turbines and surrounding vegetation reduced rotation speed will be implemented when turbines are idling. Automatic ‘feathering’ of idling blades will be implemented (through SCADA) to reduce rotation speed of blades to below 2 RPM while idling. Feathering blades has been shown to be effective in reducing fatality rates of bats by up to 50% and does not result in a significant loss of energy output (SNH, 2019).
- Vantage Point surveys (breeding and winter) will be carried out at the operational site in years 1, 2, 3, 5, 10 and 15 in accordance with guidance (e.g. SNH, 2009). Reports will be prepared and submitted for the information of the Planning Authority, Kerry County Council and NPWS.
- The fatality monitoring programme for birds and bats (using dog-based searches) instigated in the construction phase will be continued for the first three years of operation. Monthly searches of turbine bases and met mast will be carried out along with associated searcher efficiency and scavenger removal trials. An annual report will be prepared detailing the results of the fatality monitoring and circulated for the information of the Planning Authority, Kerry County Council and NPWS.

6.6.2.2 Operational Phase Mitigation Measures – Habitats and Botanical Species

There will be no additional removal of habitat during the operational phase of the Proposed Development. As a result, there is no potential for direct negative impacts on habitat and flora arising from the operational phase of the development. All operational-phase monitoring and mitigation commitments provided herein and elsewhere in the EIAR and NIS in relation to the Proposed Development will be fully implemented to ensure environmental protection of the site and receiving environment throughout the operation phase and onto decommissioning and reinstatement.

- The peatland restoration plan (Appendix 6-8) will be monitored annually in years 1, 2 and 3 and at five-year intervals thereafter for the lifetime of the wind farm. Status reports will be prepared and any recommendations for additional management presented in these reports will be implemented according to the advice of the habitat specialist. The reports will be provided for the information of the Planning Authority, Kerry County Council and NPWS.
 - The restoration plan will also include monitoring of the restored borrow pit and decommissioned turbine bases, hard stands and access roads.
 - The presence of any Third Schedule Invasive plant species in the development area will be noted and advice provided on appropriate control/eradication options.

6.6.2.3 Operational Phase Mitigation Measures – Mammals

The mitigation measures to minimise impacts on mammals during the operational phase of the wind farm are detailed below. Several of these measures are also detailed in Section 6.6.2.1 above.

- Bat activity will be monitored at the site for the first three years of operation using passive detector deployment at the same locations used to monitor activity in the construction phase. Annual reports on the occurrence and activity of Lesser Horseshoe Bat and other bats species detected will be prepared and submitted for the information of the Planning Authority, Kerry County Council and NPWS.
 - As a precautionary mitigation measure, in addition to the creation of buffers between the proposed turbines and surrounding vegetation reduced rotation speed will be implemented when turbines are idling. Automatic ‘feathering’ of idling blades will be implemented (through SCADA) to reduce rotation speed of blades to below 2 RPM while idling. Feathering blades has been shown to be effective in reducing fatality rates of bats by up to 50% and does not result in a significant loss of energy output (SNH, 2019).
- The fatality monitoring programme for birds and bats (using dog-based searches) instigated in the construction phase will be continued for the first three years of operation. Monthly searches of turbine bases and met mast will be carried out along with associated searcher efficiency and scavenger removal trials. An annual report will be prepared detailing the results of the fatality monitoring and circulated for the information of the Planning Authority, Kerry County Council and NPWS.
- All lighting systems at the site, including at the entrance and around the substation will be designed to minimise nuisance through light spillage. Shielded, downward directed lighting will be used wherever possible and all non-essential lighting will be switched off during the hours of darkness.
- All edible and putrescible wastes will be stored and disposed of in an appropriate manner.
- Any sightings of mammals on-site will be logged on the wildlife register – these logs will be maintained by the site manager and available for inspection at the site office/substation. Any records of mammal fatalities within the wind farm site and along the access road from Clonkeen will be logged and photographed.

6.6.2.4 Operational Phase Mitigation Measures – Avifauna

The mitigation measures to minimise impacts on birds during the operational phase of the wind farm are detailed below. Several of these measures are also detailed in Section 6.6.2.1 above.

- Vantage Point surveys (breeding and winter) will be carried out at the operational site in years 1, 2, 3, 5, 10 and 15 in accordance with guidance (e.g. SNH, 2009). Reports will be prepared and submitted for the information of the Planning Authority, Kerry County Council and NPWS.
- The fatality monitoring programme for birds and bats (using dog-based searches) instigated in the construction phase will be continued for the first three years of operation. Monthly searches of turbine bases and met mast will be carried out along with associated searcher efficiency and scavenger removal trials. An annual report will be prepared detailing the results of the fatality monitoring and circulated for the information of the Planning Authority, Kerry County Council and NPWS.
- The White-tailed Eagle mitigation strategy will continue to be implemented as described in Section 6.6.1.4 and Appendix 6-9. A suitably qualified ornithologist will be appointed to oversee the implementation of the plan and prepare annual reports.
 - The ‘tags’ will provide accurate data on numerous locations per day, providing rapid detection of any regular use of the wind farm site by White-tailed Eagle(s) and enable the Site Manager to focus visual observational

efforts (and to investigate any possible cause of regular use e.g. presence of a carcass) before any activity builds to a level where collision risk becomes unacceptable. The Site Manager will be responsible for managing and implementing a potential turbine shut-down system, which will be informed by the following:

- Any sightings and information from third parties, notably the Reintroduction Programme and information on tagged individuals
 - Based on these information sources, thresholds and a protocol for instigating a shut-down (turbine numbers, locations and stop duration) will be agreed with NPWS and/or the White-tailed Eagle Reintroduction Programme in accordance with the measures agreed at Grousemount Wind Farm prior to the operation of the new turbines.
 - The proposed mitigation strategy measures for White-tailed Eagle will be applied initially for the first five years of operation. A review will be conducted after five years, including consultation with stakeholders, to consider if these, or other additional measures should continue to be applied for the remainder of the lifetime of the wind farm. A review report with recommendations will be prepared by a suitably qualified ornithologist with actionable recommendations fully implemented.
- The installation of warning lights on turbines can help to increase their visibility, and thereby reduce the risk of bird collision. A number of the turbines will be fitted with aviation warning lights in accordance with the requirements of the Irish Aviation Authority in advance of project construction.

6.6.2.5 Operational Phase Mitigation Measures - Other Protected Taxa

The following mitigation measures will be applied for the protection of other taxa throughout the operational phase.

- A Kerry Slug survey will be carried out in the first year of operation including in areas which have been translocated and a report of the survey results will be prepared for the information of the Planning Authority, Kerry County Council and NPWS.
- Casual sightings of rare or protected invertebrates, amphibians etc. made in the course of operational phase ecological monitoring will be recorded and if appropriate this information will be submitted to the National Biodiversity Data Centre.

6.6.3 Mitigation Measures during Decommissioning

The final decommissioning of the Proposed Development will be carried out according to a decommissioning plan (Appendix 4-5).

- The potential for impacts during decommissioning are similar in nature, if not in scope, to those assessed for the initial decommissioning and construction phase. All decommissioning works will be governed by the same requirements to control run-off or potential pollution to watercourses as have been implemented during the construction phase.
- The site compound will need to conform to the construction phase mitigation measures including those related to lighting design and proper treatment of edible and putrescible wastes. All plant removed during decommissioning of the site will be re-used at other wind farm sites whenever possible. All remaining materials which cannot be re-used will be recycled. This is likely to include scrap metal, plastic and other waste materials. Any materials which cannot be re-used or recycled will be disposed of by an appropriately licenced contractor in the most environmentally

appropriate manner available at the time of the decommissioning by an appropriately licenced contractor.

- Following reinstatement, the site will be monitored to determine the progress of revegetation and if necessary to examine the need for supplementary planting with native species. A full site survey by a habitat specialist will be carried out at the end of Year 1 to assess the progression of the restoration and revegetation of the decommissioned areas and to capture photographic evidence of the site vegetation status, drainage management and general site appearance at the end of Year 1.

6.7 Residual Impacts

The mitigation measures described for the Proposed Repowering of the Existing Kilgarvan Wind Farm have been designed to minimise the impact of the development, from the construction of the wind farm infrastructure, through the operational phase and onto decommissioning. The constraints led design approach followed has been effective in identifying and insofar as possible avoiding potential risks of impacts to the receiving environment. The mitigation measures set out in the EIAR are comprehensive and backed by a detailed planning phase CEMP.

With the implementation of mitigation measures the Proposed Development will not contribute to the potential in-combination impacts of agriculture and silviculture on the hydrologically connected European sites. The accompanying NIS contains information which the competent authority, may consider in making its own complete, precise and definitive findings and conclusions and upon which it is capable of determining that all reasonable scientific doubt has been removed as to the effects of the Proposed Development on the integrity of the relevant European sites. In the light of the conclusions of the assessment which it shall conduct on the implications for the European sites concerned, the competent authority is enabled to ascertain that the Proposed Development will not adversely affect the integrity of any European site.

The monitoring and mitigation commitments will be effective in ensuring that the residual impacts will likely be slight negative (local) in the temporary to short-term upon the terrestrial habitats and species that occur in the receiving environment.

6.8 Conclusion

The Terrestrial Biodiversity Chapter examines potential effects and impact significance during the operation and decommissioning of the Proposed Development. The baseline ecological conditions are described through a combination of desktop and field studies which were carried out to inform this assessment. The Proposed Development will involve removal of 28 no. turbines and the erection of 11 no. wind turbines.

The field surveys were carried out by a team of experienced specialist ecologists that recorded the flora, habitats and fauna present in the receiving environment. The conservation value of the species and habitats present was assessed. Dedicated surveys were conducted to map the habitats present and to record botanical species of interest. The presence of non-volant mammals was recorded from sightings, field signs and deployment of wildlife trail cameras. Active and passive surveys for bats were conducted over several years and included deployment of passive detectors at height using the existing meteorological masts. Multi-season bird surveys were also conducted over several years, including specialist surveys for Red Grouse, Vantage Point (VP) and Hinterland surveys and general breeding and winter bird surveys. Evidence of collision fatalities (birds and bats) at the existing turbines was assessed by intensive dog-based carcass searches. Surveys to record the presence of other taxa including Kerry Slug and Marsh Fritillary were also undertaken.

The results of the detailed field surveys along with information gathered from desktop studies generated a comprehensive dataset to describe the terrestrial biodiversity present.

The potential effects of the Proposed Development on designated nature conservation sites was assessed. The potential for ecological effects on sites at all distances from the Proposed Development are evaluated using the Source-Pathway-Receptor (S-P-R) model. The Kilgarvan Wind Farm EIAR Site Boundary does not lie within any EU Natura 2000. The closest Natura 2000 site is Killarney National Park, Macgillicuddy's Reeks & Caragh River Catchment SAC (000365) is located within 0.1km of the entrance from the public road at Cloonkeen. The nearest of the proposed turbines is 1.6km from this SAC. There are two SPA sites located within 15km of the EIAR study area, Mullaghanish to Musheramore Mts. SPA (004162) and Killarney National Park SPA (004038).

There are six nationally designated sites located within 5km of the EIAR Site Boundary: Killarney National Park, Macgillicuddy's Reeks & Caragh River Catchment pNHA (000365; 0.1km), Roughty River pNHA (001376; 0.3km), Old Domestic Building, Curraglass Wood pNHA (002041; 2.8km), Sillahertane Bog NHA (001882; 3.0km), Kilgarvan Ice House pNHA (000364; 3.6km) and Kilgarvan Wood pNHA (4.7km).

The potential impacts of the Proposed Development on Natura 2000 sites in the surrounding area is considered in the Natura Impact Statement which accompanies the EIAR.

The western section of the Existing Kilgarvan Wind Farm comprises an extensive, open landscape dominated by a mosaic of wet heath, outcropping rock, blanket bog and dry heath habitats which is considered to be of high ecological value. The area is grazed by sheep with localized signs of grazing and poaching however it is clear from observations that sheep mainly graze and congregate along the wind farm road network. Damage due to peat cutting and drainage is absent and the condition of the peatland habitats is considered to be good. The eastern section of the Proposed Development site is dominated by species-poor, rushy wet grassland vegetation which has regenerated on peat soils previously drained and afforested. Smaller areas of tall conifer plantation also occur throughout along with some small areas of open heath and blanket bog. The ecological value of this area is considered to be relatively low due to the afforestation of this area in the past. No Third Schedule Invasive Plant species were recorded in the footprint of the proposed works. There are a variety of habitats present that are linked to habitats listed on Annex I of the EU Habitats Directive. Extensive areas of Annex I North Atlantic Wet heaths with *Erica tetralix* (4010) in mosaic with active Blanket Bog (7130) are present in the western portion of the site in particular.

The habitats present within the Existing Kilgarvan Wind Farm are relatively unattractive for most non-volant mammal species. The peatland and heath dominated habitats, particularly the open habitats in the western portion of the site, have very little potential for burrowing mammals. There are some foraging opportunities for grazing mammals, but the land is exposed in nature and lacks cover for larger mammals. Clearfell and conifer plantation dominate the eastern portion of the site. The walkover surveys recorded signs and occasional sightings of several non-volant mammal species in this area. No breeding or resting places of protected mammals were recorded within the Proposed Development site. Tracks, sightings and droppings of Sika Deer were extremely common at the site. There were direct sightings of two further non-volant mammals from within the existing wind farm study area with both Fox and Irish Hare, *Lepus timidus hibernicus* observed on many occasions. No Badger setts or Otter holts are present within the existing wind farm. Evidence of several other species was recorded locally, including Red Squirrel and Pine Marten.

Active bat surveys recorded very low levels of bat activity at the site and along the access road from Cloonkeen. Long-term deployments of passive bat detectors confirmed generally low levels of bat activity across the site and throughout the year. The species identified as occurring at the Proposed Development site were: Common and Soprano Pipistrelle, Leisler's Bat, Daubenton's Bat, Natterer's Bat, Brown Long-eared Bat and Lesser Horseshoe Bat. The field assessments included an evaluation of the potential for roosting bats within and closely adjacent to the wind farm site. There is a lack of built features with potential for roosting bats located within the site. The conifer plantation within the eastern portion of the existing wind farm has limited potential for roosting bats. The upland and relatively exposed nature of the site means that the site is relatively unattractive for bats. The results of the dedicated dog-based carcass searches recorded very little evidence of significant levels of bat mortality

at the Existing Kilgarvan Wind Farm. The searcher efficiency trials confirmed that the recovery rate of even small carcasses such as bats are accomplished with a very high success rate (>90%) using trained dogs and expert handlers. From September 2021 to November 2022, only one bat carcass was recovered from the Existing Kilgarvan Wind Farm. A decomposing Common Pipistrelle was recovered 46m from a turbine base on August 5th 2022.

Most of the bird species recorded during breeding and winter bird walkovers were common birds at a local and national level. Species of higher conservation importance including Kestrel, White-tailed Eagle, Redwing, Golden Plover, Grey Wagtail and Meadow Pipit were recorded. As there was evidence of at least occasional occurrence of Red Grouse in the area a dedicated tape-lure playback survey was carried out, but there was no response to the playback at any of the locations on the three survey transects. It is likely the Proposed Development site is used occasionally by non-breeding birds.

Three breeding season and three winter season Vantage Point surveys were conducted at the site using seven VPs to record flightlines of target species (e.g. Raptors, Wading Birds, Waterbirds). Hinterland surveys were carried out to record the presence of target species in the wider receiving environment. Species recorded in flight during the VP surveys included raptors such as White-tailed Eagle and Kestrel, waterbirds such as Lesser Black-backed Gull and Grey Heron and wading birds including Golden Plover. Due to the occurrence of a number of resident Red-listed species and the occasional occurrence of Annex I bird species in the area and taking into account the overall usage of the habitats at the site by birds, the EIAR Site Boundary was ascribed a local higher to county value for bird species. Only three bird carcasses were recovered during the 14-months of fatality searches. A Blackcap was recovered in September 2021, a Robin in April 2022 and a Mistle Thrush in July 2022.

No adult Marsh Fritillaries were recorded on the wing locally during any of the field surveys carried out in this area. There were limited amounts of Devil's Bit Scabious recorded in the area, mostly confined to areas of Dry Heath. No larval webs of Marsh Fritillary were recorded on these plants during checks of areas with the larval food plant. Common Lizard was recorded at the site on two occasions, in June 2019 and again in March 2022. Kerry Slug was common and widespread at the site. Their distribution appeared to be limited to areas with exposed rock and are particularly common along the edges of roads within the site and elsewhere where there are exposed boulders. Spot checks along the conifer edge carried out during active bat survey visits failed to record the species in the conifer plantation.

A constraints-led design approach was taken to siting the principal features of the Proposed Development to avoid areas of high sensitivity for key habitats and species occurring or likely to occur at the site. The potential impacts on the Natura 2000 sites and their qualifying interests are considered in detail in the NIS that accompanies the planning application. The assessment concludes that with the implementation of the environmental controls including reinstatement plans in the construction phase, that there will be no significant adverse impacts upon any of the Natura 2000 sites, or their qualifying interests, arising from the Proposed Development.

The potential effects of the construction, operational and decommissioning phases of the Proposed Development on designated sites, habitats and species is assessed in detail. The assessment also considers the potential cumulative and in-combination effects that could occur arising from other projects and plans in the area. These assessments informed the Proposed Development of a mitigation strategy. Mitigation measures were designed to address and minimize the risk of impact arising from each phase of the Proposed Development. A Construction and Environmental Management Plan (CEMP) has been prepared which describes the general mitigation strategy that will apply during the removal of the existing turbines and construction of the Proposed Development. The CEMP captures the mitigation commitments provided in other specialist chapters including measures to protect water quality in the sub-catchments that drain the Proposed Development. Detailed mitigation and monitoring commitments are presented which have been informed by measures implemented at other wind farms in the area. For instance, during the construction phase and in advance of the operational phase of the new turbines, a detailed White-tailed Eagle mitigation strategy will be implemented in accordance with that agreed with Kerry County Council as part of the planning application for the Grousemount Wind Farm, for the purpose of minimising the risk to White-tailed Eagles. The requirement to adhere to this

strategy to prevent Eagle mortality is also referenced in Chapter 12 of the Kerry County Development Plan. A suitably qualified ornithologist will be appointed to develop and oversee the implementation of the plan. Measures to minimise the impacts on bats include commitments to monitor bat activity at the site during the construction phase and for the first three years of operation. As a precautionary mitigation measure, in addition to the creation of buffers between the proposed turbines and surrounding vegetation reduced rotation speed will be implemented when turbines are idling. Automatic 'feathering' of idling blades will be implemented to reduce rotation speed of blades to below 2 RPM while idling. Feathering blades has been shown to be effective in reducing fatality rates of bats. The fatality monitoring programme for birds and bats (using dog-based searches) will recommence during the construction phase and will be continued for the first three years of operation. Monthly searches of turbine bases and met mast will be carried out along with associated searcher efficiency and scavenger removal trials. All of the monitoring reports will be made available to the planning authority and to National Parks & Wildlife Service.

The mitigation measures described for the Proposed Repowering of the Existing Kilgarvan Wind Farm have been designed to minimise the impact of the Proposed Development, from the construction of the wind farm infrastructure, through the operational phase and onto decommissioning. With the implementation of mitigation measures the Proposed Development will not contribute to the potential in-combination impacts of agriculture and silviculture on the hydrologically connected European sites. The residual impacts are likely to be slight negative (local) in the temporary to short-term upon the terrestrial habitats and species that occur in the receiving environment.