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CRUACH CLENAMACRIE WIND FARM

CHAPTER 11:
ORNITHOLOGY

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RESPONSIBILITIES

	DATE	NAME	FUNCTION
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ABBREVIATIONS

ABBREVIATION	DESCRIPTION	ABBREVIATION	DESCRIPTION
ABC	Argyll and Bute Council	**NNR**	National Nature Reserve
ARSG	Argyl Raptor Study Group	**NPF3**	National Planning Framework 3
BGS	Black Grouse Surveys	**NPF4**	National Planning Framework 4
BoCC	Birds of Conservation Concern	**oHMP**	Outline Habitat Management Plan
BPP	Bird Protection Plan	**PAN**	Planning Advice Note
CIEEM	Chartered Institute of Ecology and Environmental Management	**PCH**	Potential Collision Height
CRM	Collision Risk Modelling	**RSPB**	Royal Society for the Protection of Birds
DS	Desk Study	**SBBS**	Scarce Breeding Bird Survey
EIA	Environmental Impact Assessment	**SBS**	Scottish Biodiversity Strategy
ECoW	Ecological Clerk of Works	**SINC**	Sites of Importance for Nature Conservation
ECU	Energy Consents Unit	**SNH**	Scottish Natural Heritage (now NatureScot)
EU	European Union	**SPA**	Special Protection Area
FAS	Flight Activity Survey	**SPI**	Standardised Preference Index
FLS	Forestry and Land Scotland	**SQO**	Suitable Qualified Ornithologist
GB	Great Britain	**SSSI**	Site of Special Scientific Interest
GPS	Global Position System	**SWT**	Scottish Wildlife Trust
GET	Golden Eagle Topographical model	**UK**	United Kingdom
HMU	Habitat Management Units	**VOR**	Valued Ornithological Receptors
HWRS	Harrier Winter Roost Surveys	**VP**	Vantage Point
IPCC	Intergovernmental Panel on Climate Change	**ha**	Hectare(s)
LBAP	Local Biodiversity Action Plans	**km**	Kilometre(s)
LNR	Local Nature Reserve	**m**	Metre(s)
NHZ	Natural Heritage Zone		

11 ORNITHOLOGY

11.1 Introduction

This chapter assesses effects from the Proposed Development on ornithological receptors (i.e. those bird species potentially impacted by the Proposed Development). In combination with **EIA Report Chapter 10: Ecology** this chapter completes the assessment of effects from the Proposed Development on ecology and biodiversity.

The assessment uses data collated from a commissioned programme of ornithology surveys undertaken during the period April 2020 to July 2024. In addition, a consultation and desk study exercise was undertaken to obtain information from ornithological interest groups with local knowledge and research organisations to ensure the baseline data gathered was as comprehensive as possible.

This chapter should be read in conjunction with the **Appendix 11.1: Ornithology Technical Report** of the Environmental Impact Assessment Report (EIA Report) and its associated figures, which comprise:

- **Figure 11.1** Argyll West and Islands Natural Heritage Zone (NHZ 14)
- **Figure 11.1.1** Vantage Point Location and Viewshed
- **Figure 11.1.2** Breeding Bird Survey Areas
- **Figure 11.1.3** Eagle Survey Area
- **Figure 11.1.4** Winter Hen Harrier Roost Survey Areas
- **Figure 11.1.5** Statutory Ornithological Designated Sites
- **Figure 11.1.6a** Scarce Raptor Flight Activity Survey Results (Year 1 2021/22)
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- **Figure 11.1.7a** Waterfowl Flight Activity Survey Results (Year 1 2021/22)
- **Figure 11.1.7b** Waterfowl Flight Activity Survey Results (Year 2 2022/23)
- **Figure 11.1.8a** Scarce Breeding Raptor Survey Data (Year 1 2021)
- **Figure 11.1.8b** Scarce Breeding Raptor Survey Data (Year 2 2022)
- **Figure 11.1.9a** Scarce Breeding Bird Eagle Survey Data (Year 1 2021)
- **Figure 11.1.9b** Scarce Breeding Bird Eagle Survey Data (Year 2 2022)
- **Figure 11.1.10** Scarce Breeding Wader Survey Results (2021 & 2022)
- **Figure 11.1.11** Hen Harrier Winter Roost Survey Results (2023/24)
- **Figure 11.1.12a** Black Grouse Survey Results (Year 1 2021)
- **Figure 11.1.12b** Black Grouse Survey Results (Year 2 2022)

Sensitive records such as nest and display sites of rare and vulnerable species of conservation concern are presented in **Appendix 11.2: Confidential Ornithological Information**. The distribution of this information is restricted to the immediate Project Team, NatureScot, the Royal Society for the Protection of Birds (RSPB) and the Energy Consents Unit (ECU). Additionally, **Appendix 11.3: Bird Protection Plan** sets out the proposed approach to avoid/minimise impacts on breeding and roosting birds during the construction and operation of the Proposed Development but is summarised herein.

11.2 Legislation, Policy and Guidance

11.2.1 International Legislation

11.2.1.1 The Habitats Directive

The Habitats Directive is the short name for European Union Council Directive 92/43/EEC[1] on the Conservation of Natural Habitats and of Wild Fauna and Flora. The Habitats Directive provides the legal framework and protection provided by the Habitats Regulations, which transpose requirements into domestic law for European Sites, including Special Protection Areas (SPAs) designated under the Birds Directive (see below).

11.2.1.2 The Birds Directive

The Birds Directive is the short name for Directive 2009/147/EC[2] of the European Parliament and of the Council on the Conservation of Wild Birds. The Birds Directive protects all wild birds, and their nests, eggs, and habitats, within the European Community and requires the classification of SPAs for species featured on its Annex I and regularly occurring migratory species. The Birds Directive is transposed into UK law through the Wildlife and Countryside Act (1981, as amended)[3] and the Habitats Regulations as described within the National legislation section below.

11.2.2 National Legislation

11.2.2.1 The Conservation of (Natural Habitats &c.) Regulations 1994 (as amended) (The Habitats Regulations)[4] and Conservation of Habitats and Species Regulations 2017[5]

In Scotland, the Habitats Directive is translated into specific legal obligations by the Conservation (Natural Habitats &c.) Regulations 1994. This piece of legislation is usually known as the Habitats Regulations.

The Habitats Regulations have been amended in Scotland, most recently in 2019 as a result of the UK leaving the EU. These amendments mean that we must continue to apply the requirements of the Habitats and Birds Directives to how European sites are designated and protected.

The Conservation of Habitats and Species Regulations 2017 apply in Scotland in relation to certain specific activities (reserved matters), including consents granted under Sections 36 and 37 of the Electricity Act 1989.

11.2.2.2 The Wildlife and Countryside Act 1981 (as amended)

The Wildlife and Countryside Act makes it an offence to intentionally or recklessly kill, injure or take any wild bird or to take, damage or destroy the nest of any wild bird while that nest is in use or being built, and intentionally or recklessly disturb birds and their dependent young listed on Schedule 1 (Part I) at, on or near an ‘active’ nest.

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[1] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A31992L0043 (Accessed August 10, 2024)
[2] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32009L0147 (Accessed August 10, 2024)
[3] https://www.legislation.gov.uk/ukpga/1981/69 (Accessed August 10, 2024)
[4] https://www.legislation.gov.uk/uksi/1994/2716/contents (Accessed August 10, 2024)
[5] https://www.legislation.gov.uk/uksi/2017/1012/introduction/made (Accessed November 07, 2024)

In Scotland, for any wild bird species listed on Schedule 1A, it's an offence to intentionally or recklessly harass any such bird. For any wild bird species listed on Schedule A1, it's an offence to intentionally or recklessly take, damage, destroy or interfere at any time with a nest habitually used by any such bird.

11.2.3 Policy

11.2.3.1 National Planning Framework 4

Scotland's fourth National Planning Framework (NPF4)[6] replaces the previous National Planning Framework 3 (NPF3) and Scottish Planning Policy (2014)[7]. It sets out new requirements for development, and in particular to ensure that positive effects are achieved for biodiversity. Development proposals for national, major or Environmental Impact Assessment (EIA) development will only be supported where it can be demonstrated that the proposal will conserve, restore and enhance biodiversity so they are in a demonstrably better state than without intervention.

NPF4 describes the role of the planning system in safeguarding statutory and non-statutory ecological sites of international, national and local importance and in protecting and enhancing degraded habitats and populations of priority species in order to safeguard these natural assets.

11.2.3.2 Scottish Biodiversity Strategy to 2045

Scottish Biodiversity Strategy (SBS) to 2045[8] sets out an ambition for Scotland to be Nature Positive by 2030 and to have restored and regenerated biodiversity by 2045. This builds upon Scotland's pre-existing biodiversity guidance (Biodiversity: It's in your hands)[9]; and the 2020 Challenge for Scotland's biodiversity[10], with reference to the Scottish biodiversity strategy post-2020[11]. The SBS is implemented locally through Local Biodiversity Action Plans (LBAP).

11.2.3.3 Argyll Local Biodiversity Action Plan (LBAP)

The Argyll and Bute LBAP, seeks to maintain and enhance the extensive variety of habitats and species found within the region. The latest version covered the period 2010-2015, but this is currently being refreshed to align with the Scottish Biodiversity Strategy. In the interim, Argyll and Bute Council (ABC) have provided a guidance note on biodiversity for planners and developers (ABC, 2017)[12] which sets out the considerations required to ensure that proposed developments adequately address and protect biodiversity. The guidance note also identified the habitat and species priorities for Argyll and Bute.

11.2.3.4 Argyll and Bute Council Local Development Plan 2 (LDP)

The LDP[13] is a "statutory planning document, which provides guidance about built development to residents, developers and investors. It promotes areas for development and is used in the determination of planning applications. Stakeholders, including communities, have been involved in the preparation of this

[6] Scottish Government (2023a). National Planning Framework 4. Scottish Government (Accessed 10 August, 2024)
[7] Scottish Government (2014). Scottish Planning Policy (Accessed 10 August, 2024)
[8] Scottish Government (2023b). Scottish Biodiversity Strategy to 2025 – Tackling the Nature Emergency in Scotland. Scottish Government. Available at: https://www.gov.scot/publications/scottish-biodiversity-strategy-2045-tackling-nature-emergency-scotland/ (Accessed 10 August, 2024)
[9] Scottish Executive (2004) Scotland's Biodiversity: it's in your hands – a strategy for conserving biodiversity in Scotland. Available at: (www.gov.scot). (Accessed 10 August, 2024)
[10] Scottish Government (2013). 2020 Challenge for Scotland's Biodiversity. Scottish Government. (Accessed 10 August, 2024)
[11] Scottish Government (2020a). Scottish Biodiversity Strategy Post-2020: A Statement of Intent. Scottish Government. Available at: Scottish Biodiversity Strategy Post-2020: A Statement of Intent (www.gov.scot). (Accessed 10 August, 2024)
[12] https://www.argyll-bute.gov.uk/environment/countryside/biodiversity (Accessed November 07, 2024).
[13] Argyll and Bute Council (2024). Argyll and Bute Local Development Plan 2.

document which shapes the future development of their area, helping create good places to live, invest, work and visit".

11.2.4 Guidance

The following guidance has been considered as part of this assessment:

- Planning Advice Note (PAN) 60[14];
- Scottish Government Online Renewables Advice on Onshore Wind Turbines[15];
- A Biodiversity Technical Note for Planners and Developers[16];
- Recommended Bird Survey Methods to Inform Impact Assessment of Onshore Windfarms[17];
- Assessing the Significance of Impacts from Onshore Wind Farms outwith Designated Sites[18];
- Assessing Connectivity with Special Protection Areas (SPAs)[19]; and
- Assessing the Cumulative Impacts of Onshore Wind Farms on Birds[20].

11.3 Consultation

Table 11.1 details the comments, guidance and advice received from relevant statutory and non-statutory nature conservation organisations in response to the EIA Scoping Report, and through additional consultation undertaken to ensure a comprehensive understanding of the ornithological issues associated with the Proposed Development.

[14] Scottish Government (2020b). Planning Advice Note (PAN) 60 Planning for Natural Heritage 2000. Scottish Government. Available at: Planning+Advice+Note+60+Planning+for+Natural+Heritage.pdf (www.gov.scot). (Accessed 10 August, 2024)
[15] Scottish Government (2014). Onshore Wind Turbines: Planning Advice. Scottish Government. Available at: Onshore wind turbines: planning advice: (www.gov.scot). (Accessed 10 August, 2024)
[16] Argyll and Bute Council (2017). A Biodiversity Technical Note for Planners and Developers. Argyll and Bute Planning Service. February 2017. (Accessed 10 August, 2024)
[17] SNH (2017). Recommended bird survey methods to inform impact assessment of onshore wind farms v2.
[18] SNH (2018a). Assessing the Significance of Impacts from Onshore Wind Farms Outwith Designated Sites. Version 2, February 2018. Available at: https://www.nature.scot/doc/guidance-assessing-significance-impacts-bird-populations-onshore-wind-farms-do-not-affect-protected. (Accessed 10 August, 2024)
[19] SNH (2016a). Assessing Connectivity with Special Protection Areas (SPAs). SNH (now NatureScot). Version 3, June 2016. Available at: Assessing connectivity with special protection areas.pdf (nature.scot). (Accessed 10 August, 2024)
[20] SNH (2018b). Assessing the Cumulative Impacts of Onshore Wind Farms on Birds. SNH (now NatureScot). August 2018. Available at: Guidance - Assessing the cumulative impacts of onshore wind farms on birds | NatureScot. (Accessed 10 August, 2024)

TABLE 11.1: CONSULTATION

CONSULTEE	TOPIC	RESPONSE	ACTION
NatureScot **Consolidated responses to EIA Scoping Report (dated 17 August 2023) and to initial consultation request[21] and subsequent follow up correspondence for opinion and advice on baseline ornithological studies, potential impacts and mitigation and enhancement opportunities received between 15 June and 15 December 2023.**	Scope and Adequacy of Ornithological Surveys and Assessment	NatureScot agreed that the consultation and range of ornithological surveys proposed or undertaken were sufficient and proportionate to inform the design and assessment of the Proposed Development, although it was recommended that hen harrier roost surveys should also be undertaken. It was also recognised that the ornithological receptors which were most likely to be relevant to this assessment were hen harrier, golden eagle, white-tailed eagle and black grouse.	Survey methods, including hen harrier roost surveys, and baseline information on the relevant ornithological receptors is set out in **Appendix 11.1: Ornithological Technical Report**, with results and any required assessment of potential impacts presented in **Sections 0** and **0** respectively.
		Queries were raised regarding the acceptability of the VP location (details of which are provided in **Appendix 11.1: Ornithological Technical Report**) regarding its proximity to sensitive ornithological features and that surveyors presence may potentially have influenced bird activity in its immediate vicinity.	In recognition of NatureScot's survey guidance[15] regarding Vantage Point (VP) locational considerations, the selected VP was positioned below the crest of the VP hill, as opposed to being conspicuously on the summit. Additionally, based on information subsequently provided, the VP was located over 2km from the nearest golden eagle or white-tailed eagle nesting or roosting sites which were not known at the commencement of surveys or suspected from activity observed during the survey programme.
	Ornithological Designated Sites	No comments were made regarding any relevant ornithological designated sites.	Baseline information regarding ornithological designated sites is provided in **Section 0** and **Appendix 11.1: Ornithological Technical Report**. In the absence of any comments on ornithological designated sites or associated qualifying features, it is assumed that NatureScot do not consider the Proposed Development to pose a risk to such receptors.

[21] Initial consultation request letter to NatureScot, dated 30 May 2023.

CONSULTEE	TOPIC	RESPONSE	ACTION
	Golden eagle	It was advised that the Proposed Development is located within a recently reoccupied golden eagle territory (referred to as territory G/LAW1) and that further information on its location and occupancy status should be sought from the Argyll Raptor Study Group (ARSG). Additionally, there are four other occupied golden eagle territories in the wider surrounding area all of which are already constrained by forestry plantations, other development and neighbouring eagle territories.	ARSG have been consulted as part of the desk study process for information on this golden eagle territory and any other relevant scarce raptor information (details of which are provided in **Appendix 11.2: Confidential Ornithological Information** with summarised details provided in **Appendix 11.1: Ornithological Technical Report**) which has been used to inform this impact assessment. Impacts on golden eagles in the wider Argyll region will be considered as part of the cumulative impact assessment (**Section 11.12**).
		It was recommended that Golden Eagle Topographical (GET) modelling data should be obtained to inform the assessment of range, use and potential impacts on locally occurring golden eagles.	GET model and satellite tag data has been obtained to inform the assessment of potential impacts on golden eagles, details of which are provided in **Appendix 11.2: Confidential Ornithological Information** with summarised details provided in **Appendix 11.1: Ornithological Technical Report**. This information has been used to inform the assessment of potential effects on golden eagles as presented in **Section 0**.
		Satellite tag data from the birds associated with the G/LAW1 territory may be available for informing the assessment. Such data could be obtained from Natural Research Ltd.	
	White-tailed eagle	The low recorded levels of white-tailed activity over and around the Site were a surprise to NatureScot given their knowledge of a breeding site in the nearby surrounding area.	Baseline information on white-tailed eagles relative to the Site is presented in **Section 0** and **Appendix 11.1: Ornithological Technical Report** with specific details provided in **Appendix 11.2: Confidential Ornithological Information**.

CONSULTEE	TOPIC	RESPONSE	ACTION
	Hen harrier	NatureScot acknowledged the sensitivity of the Site for hen harrier. They agreed that hen harriers are not necessarily dissuaded from nesting in close proximity to wind turbines but that collision mortality may consequently be a risk to this species. Although it was acknowledged that hen harrier nest site locations can change from year to year, it was recommended that turbines should be located over 500m from recorded nest sites. It was however, subsequently acknowledged that there are examples of hen harriers nesting close to turbines and there being some evidence of limited or apparently no displacement in Scotland, though this will not be applicable to all birds.	Baseline information on hen harriers relative to the Site is presented in **Section 0** and **Appendix 11.1: Ornithological Technical Report** with specific details provided in **Appendix 11.2: Confidential Ornithological Information**, while the assessment of potential impacts is presented in **Section 0**. The 500m stand-off distance between turbines and nest sites conflicted with literature on wind farm monitoring studies with accounts of hen harriers successfully nesting from over 300m from operational turbines, further details of which are provided in **Section 11.7**. Consequently, a 300m stand-off has been applied to the positioning of turbines relative to recorded nest sites.
	Black grouse	NatureScot acknowledged the sensitivity of the Site for black grouse and advised that turbines should be located over 750m from lek sites. However, this was reduced to 500m following further consultation and presentation of contrary examples.	Baseline information on black grouse relative to the Site is presented in **Section 0** and **Appendix 11.1: Ornithological Technical Report** with specific details provided in **Appendix 11.2: Confidential Ornithological Information**, while the assessment of potential impacts is presented in **Section 0**. The 750m stand-off distance between turbines and lek sites was contrary to the 500m distance provided by RSPB below, and by NatureScot on other wind farm projects, which is also supported by literature studies, further details of which are provided in **Section 11.7**. Following further consultation, a 500m stand-off was accepted and has been applied to the positioning of turbines relative to lek sites, informed by a review the observed lekking behaviour at the Site.

CONSULTEE	TOPIC	RESPONSE	ACTION
		Mitigation was also advised to avoid disturbance and potential displacement to lekking black grouse during construction and operation.	Mitigation measures designed to avoid disturbance to lekking black grouse during construction and operation are set out in **Section 0**.
	Ornithological Habitat Management	Extensive consultation was carried out regarding potential habitat enhancement opportunities for relevant ornithological receptors on and around the Site. The Site's small size and risks of encouraging birds into close proximity with the operational turbines as well as the fact that it is enclosed by Forestry and Land Scotland's (FLS) Fearnoch Forest Estate to the east, south and west, and by Clais Dhearg Site of Special Scientific Interest (SSSI) to the north were acknowledged as constraints to the identification and delivery of enhancement measures. It was recommended that FLS be consulted for potential land management agreement options immediately adjacent to the site, while advice was provided regarding the regulatory requirements and potential restrictions that any measures within the SSSI may entail. More widely, the management of deer population densities within the Site and wider surrounding area in order to suppress grazing pressure on habitats supporting relevant ornithological receptors (as well as for those for which Clais Dhearg SSSI is notified) was suggested as a possible course of more extensive habitat management.	FLS were consulted regarding the possibility of reaching a land management agreement within neighbouring parts of their estate. However, they were unwilling to relinquish further commercially viable timber producing land, and they had already identified their own biodiversity enhancement measures within both Fearnoch Forest and throughout Argyll. The implementation of direct habitat enhancement measures within Clais Dhearg SSSI were investigated but dropped due to potential conflicts with the habitat conditions and requirements of qualifying features. Instead, more extensive measures designed to enhance habitat conditions for relevant ornithological receptors have been proposed and these are set out in **Section 0** and **EIA Report Chapter 10: Ecology – Appendix 10.5: Outline Habitat Management Plan** (hereafter the "oHMP").

CONSULTEE	TOPIC	RESPONSE	ACTION
	Avian influenza	The potential impacts of avian influenza on white-tailed eagle breeding success was noted as a possible consideration in the longer-term stability of this species' populations.	In light of the limited presence of white-tailed eagle from both desk studies and field surveys, this species is not considered to be a key sensitivity and has been scoped out of the assessment and detailed in **Section 0**. Therefore the risks of avian influenza on this species is not considered further.
	Cumulative Impacts	Cumulative impacts on ornithological interests from other operational and consented wind farms should be based upon the relevant Natural Heritage Zone (NHZ) and ensure that correct NHZ populations are used in the assessment. Information was provided regarding populations and predicted collision risk for key receptor species in the wider NHZ.	The assessment of the Proposed Development and cumulative impact assessment (**Sections 0** and **11.12**) have been conducted in relation to the populations of relevant ornithological interests in relation to NHZ 14: Argyll West and Islands, the extent of which is shown in **Figure 11.1**.
		It was noted that there are other wind farm proposals in the nearby surrounding area and that ornithological survey data collected for those developments may be available to support the assessment of the Proposed Development.	Contact was made with neighbouring wind farm developers but offers of collaboration were rejected. The ornithological consultants for one of the neighbouring wind farm developments provided details of a golden eagle roost site in the vicinity of the Proposed Development (see **Appendix 11.2: Confidential Ornithological Information**).
Royal Society for the Protection of Birds (RSPB) **Response to EIA Scoping Report (02 August 2023).**	Suitability of the Site for Wind Farm Development	RSPB's overall view was that the open-ground setting of the Proposed Development was not an appropriate site for a wind farm, and that the adjacent commercial forestry plantation of Fearnoch Forest would represent a more appropriate location given its low biodiversity value.	Full details of off-site selection are provided in the assessment of alternatives (**EIA Report Chapter 4; Assessment of Alternatives**).

CONSULTEE	TOPIC	RESPONSE	ACTION
	Baseline Ornithological Studies	RSPB were unable to comment on the acceptability of the baseline ornithological surveys, as summarised in the Scoping report, without receipt of a more detailed report.	Full details of the baseline ornithological studies are provided in **Appendix 11.1: Ornithological Technical Report**.
	Ornithological Designated Sites	No comments were made regarding any relevant ornithological designated sites.	Baseline information regarding ornithological designated sites is provided in **Section 0** and **Appendix 11.1: Ornithological Technical Report**. In the absence of any comments on ornithological designated sites or associated qualifying features, it is assumed that RSPB do not consider the Proposed Development to pose a risk to such receptors.
	Hen harrier	RSPB acknowledged the sensitivity of the site for hen harrier and provided reference to NatureScot's guidance (SNH, 2016b[22]) regarding the sensitive placement of wind turbines relative to hen harrier foraging and nesting sites. The potential requirement to reduce the habitat suitability around the turbines to reduce hen harrier collision risk and the implications that this may have on black grouse (discussed below) was also noted.	Baseline information on hen harriers relative to the Site is presented in **Section 0** and **Appendix 11.1: Ornithological Technical Report** with specific details provided in **Appendix 11.2: Confidential Ornithological Information**, while the assessment of potential impacts is presented in **Section 0**. As discussed in response to NatureScot's response on hen harriers, a 300m stand-off has been applied to the positioning of turbines relative to recorded nest sites.

[22] SNH (2016b). Wind farm proposals on afforested sites – advice on reducing suitability for hen harrier, merlin and short-eared owl. January 2016. (Accessed 10 August, 2024)

CONSULTEE	TOPIC	RESPONSE	ACTION
	Black grouse	RSPB also acknowledged the sensitivity of the site for black grouse and provided details on the species' behaviour and national and regional conservation status. They also advised that they held historical records of black grouse leks from the Site and surrounding area. The following recommendations were made: - turbines are located over 500m from lek sites; - areas of high quality habitat suitable for chick rearing and shelter within 1.5km of lek sites should be maintained; - the adjacent commercial plantation forestry would represent a more suitable location of a wind farm development in regards to impacts to black grouse. It was concluded that the location of the black grouse population was at risk from individual and cumulative impacts from proposed wind farm developments in the area.	RSPB have been consulted as part of the desk study process for relevant records of black grouse and other species of conservation concern (see presented in **Section 11.4.1** and **Appendix 11.1: Ornithological Technical Report**) which has been used to inform the individual and cumulative assessment of impacts on black grouse. In line with RSPBs recommendations, a 500m stand-off has been applied to the positioning of turbines relative to lek sites, informed by a review the observed lekking behaviour at the Site
	Cumulative Impacts	Cumulative impacts from other wind farm development and forestry should be considered in the assessment, with reference being made to two nearby existing wind farm developments.	The cumulative impact assessment is presented in **Section 11.12**.

11.4 Methodology

11.4.1 Desk Study

11.4.1.1 Designated Sites

A desk study was undertaken to identify statutory ornithological designated sites of nature conservation interest located within, in proximity to, or potentially connected to the Site.

The extent of searches conducted for statutory European/International designated sites (i.e., SPAs and Wetlands of International Importance (Ramsar Sites)) was dependent on their proximity and/or potential connectivity to the Site. This included direct connectivity, such as via watercourses, or indirect connectivity, such as through the potential use of habitats within the Site by qualifying species based on those species' recognised foraging/commuting ranges (e.g., as detailed in SNH, 2016a[17]).

Based on the above, a baseline search area of 10km from the Application Boundary was applied, but this was extended to 20km for sites designated for pink-footed geese and greylag geese in order to reflect their upper-range foraging distance. Searches for all other designated sites with ornithological features of interest (including SSSIs, National Nature Reserves (NNRs) and Local Nature Reserves (LNRs)) extended to 2km from the Application Boundary. Searches were conducted using the NatureScot's Sitelink database website[23].

11.4.1.2 Protected and Notable Species of Conservation Concern

To help inform the ornithological survey programme and this assessment, a consultation exercise was also undertaken to request recent historical records of protected and notable species of conservation concern (i.e., records of target species from the past 10 years (2014-2023 inclusive)) within 2km of the Site. The following ornithological interest groups were consulted for any relevant data they may hold:

- ARSG;
- RSPB's Conservation Data Management Unit; and
- FLS.

Additionally, relevant information on golden eagle was provided by Natural Research Ltd., from surveys they had undertaken in relation to the proposed repowering of Beinn Ghlas Wind Farm, located approximately 4km south-east of the Site.

11.4.1.3 Golden Eagle Topographic (GET) Model and Satellite Tag Data

The GET model and satellite tag data was obtained to inform the assessment of potential impacts on golden eagles, summarised details of which are provided below with full details provided in **Appendix 11.2: Confidential Ornithological Information**.

The Golden Eagle Topography (GET) model data was developed using GPS telemetry data obtained from tagged juvenile eagles in Scotland to identify, and hence subsequently predict areas of air space used by golden eagles based on the underlying topographic features, as described in Fielding *et al* (2019[24]). The GPS telemetry data revealed that eagles preferred to use air space above slopes greater than 10° in gradient, at an altitude greater than 300m above sea level and within 300m of ridges. These topographic

[23] NatureScot Sitelink Website: https://sitelink.nature.scot/home. (Accessed 10 August, 2024)
[24] Fielding, A, H., Haworth, P, F., Anderson, D., Benn, S., Dennis, R., Weston, E and Whitfield, A, P (2019). A simple topographical model to predict Golden Eagle Aquila chrysaetos space use during dispersal. IBIS, 162(2), 400-415. (Accessed 10 August, 2024)

features create air currents which provide the lift which golden eagles, and other large raptors, rely on for energy-efficient flight.

Based on the Global Position System (GPS) telemetry data the GET model predicts air space use based on the underlying presence of the preferred topographic features and categorises those areas using a Standardised Preference Index (SPI) score ranging from the lowest predicted use, SPI 1, to the highest predicted use SPI 10. SPI scores of less than 6 (GET 5-) would mean that the corresponding area is likely to be unsuitable for, and therefore used rarely by golden eagles. Conversely, areas with SPI scores greater than 6 (GET 6+) are reasonably assumed as being likely to be used by eagles, at least in the regions where the species is known to occur, with areas with SPI scores of 8 and above being likely to experience high levels of use. The model does not however, account for habitat features which golden eagles would not typically use, such as extensive forestry or operational wind farm developments, which may nonetheless have suitable underlying topography. As such, these features require to be imported manually from land cover data, wind farm layout data or digitised from aerial imagery to represent these features within the landscape and against GET data. The GET model also does not predict territorial extents for eagle territories as an accurate prediction of territory extents is only possible by tracking territorial birds, not juvenile birds, upon which the GET model was developed.

Satellite tag data was obtained from Natural Research Ltd. who have conducted extensive studies on the range use of territorial golden eagles by trapping and tagging several territory-holding birds across Scotland and monitoring the spatial distribution of the received satellite tag transmissions. Coincidentally for the Proposed Development, this includes birds affiliated with the nearest golden eagle territory; G/LAW1. Two birds from the G/LAW1 territory have been tagged in recent years:

- **Bird 1 (Tag #996)**: a male golden eagle tagged over a nine-month period between 20 February 2021 until its death on 02 December 2021; and
- **Bird 2 (Tag #1157)**: a female golden eagle tagged on 07 February 2021. While this bird is still alive and the tag is still transmitting, data from this tag was provided for the 36-month period up until 31 January 2024 when the data was last processed.

Depending on the available power to connect with GPS satellites from the solar-charged batteries (and hence on available sunlight) daily transmissions of data can vary from tens of ‘fixes’ per day, to many hundreds of ‘fixes’ per day. The data recorded includes horizontal location, vertical height and speed.

The satellite tag data from these two birds from the G/LAW1 territory has been used to determine their distribution, frequency of flight activity and general occurrence in proximity to the Site relative to their wider territory. While only one bird from a territory holding pair is typically tagged, it is understood that the range use of the other untagged bird from the territorial pair would broadly be consistent with that of the tagged birds. Thus the distribution and range use of the tagged birds is confidently assumed to be reflective of the territorial pair.

The extent of the G/LAW1 golden eagle’s core range was determined based on a 95% kernal density analysis of the satellite tag fixes. This was then used to identify the extent to which their range overlapped with the Site, if at all. The satellite tag data was then used in combination with the GET model data to determine the extent to which the development of the Proposed Development may result in the effective loss of suitable habitat (displacement) from within the local golden eagle’s territory range.

The satellite tag data has also been used to represent the frequency with which the different parts of the core range are used by creating a heat map which ranks areas by their frequency of use, and hence their inferred importance to golden eagles, by the frequency of satellite tag fixes occurring across their core range. This is refined by applying a 100m x 100m square grid across the area over which the satellite tag fixes are distributed in order to provide a degree of spatial resolution to the ranking of land throughout.

The satellite tag data from both tagged birds was also used to identify roost site locations within the wider territory, and their frequency of use, by analysing the time-stamps of the tag data to identify locations where repeat registrations were returned from the same location between sunset and sunrise over the same night.

11.4.2 Field Surveys

A programme of ornithological surveys was conducted between September 2020 and February 2024 using standard industry guidance informed by the results of the desk study and consultation. A list of target species was determined based on species falling within at least one of the following categories; this did not include passerines (songbirds) as it is accepted that they are not significantly impacted by wind farm developments:

- Birds listed on Annex I of the EU Birds Directive;
- Birds listed on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended);
- Birds that are qualifying features of European designated sites of nature conservation importance for birds (i.e. SPAs and Ramsar Sites) in proximity or potentially connected to the Site;
- Red-listed Birds of Conservation Concern (BoCC) (Stanbury et al., 2021[25]); and
- Other species which are not represented by any of the above lists but which may be vulnerable to the effects of wind farm developments based on their large size, low manoeuvrability and/or flight characteristics (e.g. mute swan, snipe, oystercatcher).

Full details of the survey methods used to inform this assessment are presented in **Appendix 11.1: Ornithology Technical Report** with an overview of survey methods provided below:

- **Flight activity surveys** conducted between April 2021 and February 2023 following the methods described by SNH (2017). The data from the flight activity surveys was used to undertake Collision Risk Modelling (CRM) using the Band *et al*. (2007)[26] method to predict turbine collision mortality rates.
- **Scarce breeding bird surveys**, a combination of breeding raptor surveys and moorland breeding bird, conducted over the wind farm site and surrounding buffer of up to 2km during the 2021 and 2022 breeding season (March to August inclusive) and overlooking the forest access track and surrounding buffer of up to 750m during the 2024 breeding season, based on the methods described in Hardey *et al*. (2013)[27] and Gilbert *et al.* (1998)[28]. Additionally, as part of the scarce breeding raptor survey element, dedicated golden eagle surveys were conducted during the 2021 breeding season and spring of 2022. These involved long-range watches undertaken from a vantage point located just south of the Site looking due south across to the opposite side of Glen Lonan towards areas of habitat with the highest suitability for golden eagle associated with Beinn Ghlas, using a telescope to scan for the presence of birds up to 6km from the Site.
- **Lekking black grouse surveys** conducted over the wind farm site and surrounding buffer of up to 1.5km during the spring of 2021 and 2022 (late March to mid-May) and suitable habitats within 750m of the forest access track during the 2024 breeding season following the methods described in Gilbert *et al*. (1998)[26].
- **Hen harrier winter roost surveys** conducted over the wind farm site and surrounding buffer of up to 2km during the 2023/24 non-breeding season (October to March inclusive) following the methods described in Gilbert *et al.* (1998)[26].

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[25] Stanbury, A.J., Eaton, M.A., Aebischer, N.J., Balmer, D., Brown, A.F., Douse, A., Lindley, P., McCulloch, N., Noble, D.G. & Win, I. (2021). The status of our bird populations: the fifth Birds of Conservation Concern in the United Kingdom, Channel Islands and Isle of Man and second IUCN Red List assessment of extinction risk for Great Britain. British Birds Volume: 114. Available at: The status of our bird populations: the fifth Birds of Conservation Concern in the United Kingdom, Channel Islands and Isle of Man and second IUCN Red List assessment of extinction risk for Great Britain | BTO - British Trust for Ornithology. (Accessed 10 August, 2024)

[26] Band, W., Madders, M. & Whitfield, D.P. (2007) Developing field and analytical methods to assess avian collision risk at wind farms. In: de Lucas, M., Janss, G.F.E. & Ferrer, M. (Eds.) Birds and Wind Farms: Risk Assessment and Mitigation, pp 259-275. Quercus, Madrid. (Accessed 10 August, 2024)

[27] Hardey, J.; Crick, H.; Wernham, C.; Riley, H.: Ethridge, B. and Thompson, D. (2013). Raptors. A Field Guide for Surveys and Monitoring. SNH, Inverness. (Accessed 10 August, 2024)

[28] Gilbert G., Gibbons DW, and Evans J. (1998). Bird Monitoring Methods. RSPB, Sandy. (Accessed 10 August, 2024)

11.4.3 Methods for the Assessment of Significant Effects

Assessment of the significance of effects on ornithological receptors is based on the staged process outlined in the ecological impact assessment guidelines from the Chartered Institute of Ecology and Environmental Management (CIEEM, 2018)[29]. The stages in the assessment are as follows:

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

11.4.3.1 Significance Criteria

Evaluation of the ornithological features identified by the baseline studies as 'Valued Ornithological Receptors' (VORs) has been guided by the CIEEM (2018)[27] guidelines. In accordance with these guidelines, the importance of each VOR has been assessed in relation to the conservation status of the species over the full range of geographical scales as listed below in **Table 11.2**.

TABLE 11.2: APPROACH TO CLASSIFYING VALUED ORNITHOLOGICAL RECEPTORS

CONSERVATION IMPORTANCE (SENSITIVITY)	CONSERVATION VALUE	EXAMPLES
High	International	An internationally designated site (e.g., SPA) as designated under the EU Birds Directive or Ramsar Convention, candidate sites, qualifying features connected to a nearby SPA, or an area meeting the criteria for an international designation. A regularly occurring, nationally important population of any species listed under Annex I of the EU Birds Directive, or regularly occurring migratory species connected to an SPA designated for this species under the EU Birds Directive.
	National	A nationally designated site, or area meeting the criteria for national level designations (e.g., SSSI or NNR). A regularly occurring, regionally important population of any species listed under Schedule 1 of the Wildlife and Countryside Act or Annex I of the EU Birds Directive, or species represented on the red list of Birds Conservation Concern or Scottish Biodiversity List. A nationally rare species (<300 breeding pairs in the UK).
Medium	Regional	A regularly occurring, locally important population of any species listed under Schedule 1 of the Wildlife and Countryside Act or Annex I of the EU Birds Directive, or species represented on the Scottish Biodiversity List. Sites which exceed the local authority-level designations but fall short of SSSI selection guidelines. A species for which a significant proportion (>1 %) of the regional population is found within the site.

[29] CIEEM (2018). Guidelines for Ecological Impact Assessment in the UK. Chartered Institute of Ecology and Environmental Management, Winchester. Available at: ECIA-Guidelines-2018-Terrestrial-Freshwater-Coastal-and-Marine-V1.2-April-22-Compressed.pdf (cieem.net). (Accessed 10 August, 2024)

CONSERVATION IMPORTANCE (SENSITIVITY)	CONSERVATION VALUE	EXAMPLES
Low	Local	LNRs, Sites of Importance for Nature Conservation (SINCs) or equivalent sites selected on local authority criteria (e.g., Scottish Wildlife Trust (SWT) Wildlife Sites or Reserves). Other species of conservation concern, including species represented on the amber-list of Birds Conservation Concern or listed under the Local BAP (LBAP).
Negligible	Negligible	All other species that are widespread and common and which are not present in regionally or nationally important numbers and/or are considered to be of limited conservation importance (e.g., green-listed Birds of Conservation Concern).

These criteria are intended as a guide and are not definitive. Attributing a value to a receptor is straightforward in the case of designated sites, as the designations themselves are normally indicative of a value level. For example, qualifying species of SPAs designated under the EU Birds Directive are implicitly of European (i.e., International) importance. Professional judgement is therefore important when attributing a level of value to species or individual habitat in non-designated areas. In these cases, reference has also been made to respective national and regional populations and population trends.

The EIA Regulations require consideration of the types of effect in terms of how they arise, whether they are beneficial or adverse, and their duration. The nature of each of these effects is defined in **Table 11.3**. The potential effects are determined through understanding how each VOR is likely to be affected by the Proposed Development. The elements used to define the scale of the effect of include determining:

- The potential types of effect (as detailed in **Table 11.3**);
- The scale/magnitude of the predicted effect (as detailed in **Table 11.4**); and
- Whether there are any cumulative effects that may affect the long-term integrity of the ecosystem(s) at the Site.

TABLE 11.3: TYPES OF EFFECT

EFFECT	DESCRIPTION
Direct	Effects arising immediately as part of the Proposed Development.
Indirect	Effects not caused immediately by the Proposed Development but arising because of it (e.g., habitat change which may not directly affect a top-level predator, but which causes a reduction in the presence of their prey species).
Secondary	Additional effects resulting as a consequence of one or more direct effects (e.g. the combined effects of habitat loss and displacement).
Temporary	Effects which cause a change to the baseline for a limited period.
Permanent	Effects causing an irreversible change to the baseline.
Cumulative	Effects which arise from multiple types of effect on a particular receptor. These may overlap spatially or temporarily.
Beneficial	Effects having a beneficial influence on the environment.
Adverse	Effects having an adverse influence on the environment.
Short-term	Effects with a duration of 0-5 years
Medium-term	Effects with a duration of 5-15 years

EFFECT	DESCRIPTION
Long-term	Effects with a duration of >15 years

TABLE 11.4: CRITERIA FOR DESCRIBING SPATIAL MAGNITUDE

MAGNITUDE	DESCRIPTION
Large	Total loss or major / substantial alteration to a key element(s) or features of the baseline conditions to the extent that post-development the character or composition of baseline conditions will be fundamentally changed.
Medium	Loss or alteration to one or more key elements or features of the baseline conditions to an extent that post-development character represents a material change from baseline conditions.
Small	Minor shift away from baseline conditions. Changes arising will be detectable / discernible but not material; the underlying character or composition of the baseline conditions will be like the pre-development situation.
Negligible	Very little change from baseline conditions. Change is barely distinguishable, approximating to a 'no change' situation.

The level of potential effects on each VOR were determined by considering the type and magnitude of the effect (**Table 11.3** and **Table 11.4**) in relation to the conservation importance (sensitivity) of the VOR (**Table 11.2**). Sensitivity is reported on a scale of high, medium, low and negligible and magnitude of change on a scale of large, medium, small and negligible as illustrated in The overall magnitude of change is assessed a matter of professional judgement, having regard to the type, scale and duration of the effect outlined in **Table 11.3: Types of Effect.** Explanations of the levels of effect are provided below in **Table 11.5**

The overall magnitude of change is assessed a matter of professional judgement, having regard to the type, scale and duration of the effect outlined in **Table 11.3**: Types of Effect. Explanations of the levels of effect are provided below in **Table 11.6.**

TABLE 11.5: ASSESSMENT MATRIX

MAGNITUDE OF CHANGE	SENSITIVITY (IMPORTANCE)				
	High	Medium	Low	Negligible
Large	Major	Moderate to Major	Minor to Moderate	Negligible
Medium	Moderate to Major	Moderate	Minor	Negligible
Small	Minor to Moderate	Minor	Negligible to Minor	Negligible
Negligible	Negligible	Negligible	Negligible	Negligible

TABLE 11.6: LEVELS OF EFFECT CRITERIA

MAGNITUDE	DESCRIPTION
Major	Only adverse effects are assigned this level of effect as they represent key factors in the decision-making process. These effects are generally, but not exclusively, associated with sites and features of international, national or regional importance that are likely to suffer a most damaging effect and loss of resource integrity. A major change at a regional or district scale site or feature may also enter this category.
Moderate	These beneficial or adverse effects are likely to be very important considerations at a local or district scale and, if adverse, are potential concerns to the scheme and may become material in the decision-making process.
Minor	These beneficial or adverse effects while important at a local scale are not likely to be key decision-making issues. Nevertheless, the cumulative effect of such issues may influence decision making if they lead to an increase in the overall adverse effects on a particular area or on a particular resource.
Negligible	No effect or an effect which is beneath the level of perception, within normal bounds of variation or within the margin of forecasting error. Such effects are not normally considered by the decision maker.

The level of effect generated from **Table 11.5** for each impact was then assessed against the likelihood of such predictions occurring, and the confidence level of the effect on a population, based on expert judgement and evidence from the existing literature. A scale of confidence, as recommended by IPCC (2010)[30] can then be used:

- Virtually certain: >99 % probability of occurrence;
- Very likely: >90 % probability;
- Likely: >66 % probability;
- About as likely as not: 33-66 % probability;
- Unlikely: <33 % probability;
- Very unlikely: <10 % probability; and
- Exceptionally unlikely: <1 % probability.

Where the assessment criteria arrive at an effect of variable level (e.g. Major or Moderate, see **Table 11.5**), then the outcome is defined either by taking a precautionary, worst-case scenario approach or where possible by applying professional judgement taking into consideration specialist knowledge of the receptor in question and confidence in the prediction.

Based on the EIA Regulations, those effects defined as being of 'Moderate' or greater are considered to have the potential to result in a significant effect, defined against the relevant geographical scale (**Table 11.2**) and duration. In the case of 'Moderate' adverse effects, further evidence needs to be provided to show whether an identified effect is likely to be 'tolerable' - if it is, then a significant effect will not result.

The issue of what is a 'tolerable' level of effect has not been specifically defined here, although it is generally accepted that populations or habitats usually have a threshold for absorbing deterioration and a certain capacity for self-regeneration. Therefore, to be tolerable (and thus avoiding a significant effect), it should be demonstrated that any loss is within the regenerative capacity of the reference population or habitat and will result in the population or habitat extent remaining viable over the long-term.

[30] IPCC (2010). Guidance Notes for Lead Authors of the IPCC Fifth Assessment Report on Addressing Uncertainties. Intergovernmental Panel on Climate Change, July 2010. (Accessed 10 August, 2024)

Effects arising from the development that are 'Minor' or 'Negligible' are not considered to be significant (in terms of the EIA Regulations).

The effects on a species may be assessed at several scales, ranging from local or regional to national or even international. Where an identified effect is not considered significant at a national level, for instance, it may be so at a regional level. The focus of the impact assessment will however be at the wider spatial levels (i.e., regional, national, or international). Indeed, NatureScot typically consider Natural Heritage Zones (NHZs) to be the most appropriate regional biogeographic level against which to assess impacts on breeding bird populations, while for non-breeding migratory species effects at the national level are more appropriate (SNH, 2018a[16]). This corresponds with SNH policy (2018a) which states that: "*We will not normally object to a wind farm proposal on account of purely local or regional impacts, provided these do not affect populations protected within a protected area*." These conditions highlighted by NatureScot have been considered in the impact assessment process so that no potentially significant effects are omitted. As identified in **Table 11.1**, the relevant NHZ to the Proposed Development is NHZ 14: Argyll West and Islands, the extent of which is shown in **Figure 11.1**.

11.4.4 Cumulative Effects

As well as considering the impacts of the Proposed Development on VORs on its own, the EIA Regulations also require the consideration of potential for cumulative effects from other projects and activities to be assessed.

In line with NatureScot's latest guidance on the assessment of cumulative effects (SNH, 2018b[18]), developments at the following stages should be factored in when considering cumulative impacts:

- Developments that are already operational and those that are under construction or consented and likely to be built, should be considered first, as the impacts arising from these, once mitigation has been factored in, are unavoidable; and
- Applications that have been formally submitted to a planning authority or Scottish Government but have yet to be determined, consented and constructed, should then be factored in.

Confidential data (e.g., on Schedule I species) from such assessments are often not in the public domain.

Proposed wind farms that have been rejected by the planning authority or withdrawn by a developer (but not understood to be at appeal) are not included in the cumulative assessment as any future amended layout would have different ornithological effects. Similarly, projects at the pre-application scoping stage of the EIA process were also excluded from the cumulative assessment in this chapter since baseline ornithological surveys are either ongoing or the data are not publicly available and so potential effects of such developments are as yet unknown.

The same principles apply to other developments though they may not have the same range of impacts identified for wind farms. For example, a new overhead powerline may increase collision risk, unless birds avoid the powerline altogether, but may present little additional disturbance or habitat loss.

The assessment of cumulative effects is also conducted at the regional, NHZ scale (i.e. NHZ 14). The significance of cumulative effects has been assessed following the same criteria detailed in **Section 11.4.3**.

11.5 Baseline

11.5.1 Desk Study

11.5.1.1 Designated Sites

The Site does not physically overlap with any internationally or nationally designated sites of ornithological interest. One internationally designated site of ornithological interest was identified within 10km of the Application Boundary, Glen Etive and Glen Fyne SPA, which is designated for its important population of breeding golden eagle. There are no designated sites for pink-footed and/or greylag geese within 20km of the Site and no other designated sites with ornithological interests within 2km of the Site. Details of the SPA are presented in **Table 11.7** while its location and distribution in relation to the Site is shown in **Figure 11.1.5**.

TABLE 11.7: DESIGNATED SITES WITH ORNITHOLOGICAL INTEREST WITHIN 20KM OF THE SITE

SITE NAME	QUALIFYING FEATURES	DISTANCE TO NEAREST POINT OF THE SITE
Glen Etive and Glen Fyne SPA	This SPA is designated for regularly supporting a population of European importance of the Annex 1 species golden eagle Aquila chrysaetos (19 active territories in 2003, more than 4.2% of the GB population).	~8.5km east of the windfarm Site, ~6.6km east of the access track.

11.5.1.2 Protected and Notable Species of Conservation Concern

A summary of records derived from data sources using the methodology described in **Section 11.4** is provided in **Table 11.8**. Details concerning the nest and lek site locations of rare and vulnerable species of conservation concern are presented in **Appendix 11.2: Confidential Ornithological Information**.

TABLE 11.8: SUMMARY OF RECENT HISTORICAL RECORDS OF SPECIES OF CONSERVATION CONCERN

SPECIES	SUMMARY OF DATA PROVIDED	DATE(S)	PROVIDER(S)
Golden eagle	One nest site located within 6km but over 2km from the Site, which corresponded with the G/LAW1 territory referred to in consultation with NatureScot (see **Table 11.1**). Nest site locations for a further two territories located over 6km from the Site were also provided.	2020-2022	ARSG
	A recorded roost site located to the west of the Site during surveys for the proposed Beinn Ghlas Wind Farm Repowering Project.	2022	Natural Research
White-tailed eagle	One nest site located within 6km but over 2km from the Site, and a further five nest sites located over 6km from the Site.	2017-2022	ARSG, FLS
Osprey	One nest site located within 2km of the Site.	2020-2021	ARSG, FLS
Black grouse	One lek site comprising two males from 2018 located within the Site, and a further two lek sites located within 2km of the Proposed Development Site, one from 2014 comprising an undefined number of males and the other from 2017 comprising two males. Sightings records were also provided from within and immediately to the east of the Site.	2014-2022	RSPB, FLS

In addition to the recent historical records presented in **Table 11.8**, the following notable (older) historical recorded were also provided:

- **Hen harrier**: two nest site records from 2010; one located within the Site and the other located over 2km from the Site.
- **Black grouse**: a lek site comprising seven males located within the Site from 2012.

11.5.1.3 Golden Eagle Topographic and Satellite Tag Data

Results and interpretation of the GET model and satellite tag data is summarised below with full details provided in **Appendix 11.2: Confidential Ornithological Information**.

In summary, the GET model data demonstrate that the Site and immediately surrounding area (i.e. up to 1km) represents moderately suitable habitat for golden eagle with a reasonable proportion of land corresponding to GET 6+ suitability. This is interspersed with smaller pockets of unsuitable (GET 5-) habitat such as lower lying ground as well as being partially surrounded to the south, east and west by closed canopy forestry. More extensive suitable (GET 6+) land exists in the wider surrounding area, particularly over 2km to the south of the Site associated with Beinn Ghlas hill and the affiliated higher ground. Much more extensive and consistently suitable habitat exists over 6km to the east of the Proposed Development, either side of Loch Etive where the land is predominantly classed as GET 8+. This land corresponds with Glen Etive and Glen Fyne SPA, which is designated for golden eagles.

Meanwhile the satellite tag data from the birds associated the G/LAW1 territory shows that their distribution is concentrated around the higher ground associated with Beinn Ghlas located over 3km to the south of the Site, stretching from Glen Feochan in the west to the Pass of Brander and the southern slopes of Ben Cruachan in the east. Southerly distribution extends across the open hills towards Loch Scammadale and Glen Nant, while to the north the birds range across Glen Lonan to use higher ground associated with the Site, including in particular Deadh Choimhead immediately to the south. Using kernel density analysis to identify the area within which 95% of the satellite tag fixes occur, the core range of the G/LAW1 territory encompasses an area of 111.15ha centred around the higher ground associated with Beinn Ghlas extending to the named locations to the north, south, east and west as referenced above (i.e. Glen Feochan and the southern slopes of Ben Cruachan etc).

When compared with the GET model data, the core range of the G/LAW1 golden eagles shows a very strong correlation with the areas where GET 6+ land predominates, as is associated with Beinn Ghlas and the affiliated higher ground. In total there is 58.56ha of suitable (GET 6+) golden eagle habitat within the core G/LAW1 golden eagle range, which represents 52.68% of the core range.

Additionally, the heat mapping exercise which the satellite tag data has also been used to represent the frequency with which the different parts of the core range are used, and hence their inferred importance to golden eagles, clearly shows that the higher ground located to the south of the Site, on the opposite side of Glen Lonan and associated with Beinn Ghlas, is occupied most frequently and represents the most intensively utilised part of the range. Meanwhile, the peripheral areas of the core range, which include land within which the Site is located, are occupied much less frequently.

Meanwhile, with regards to interpretation of the satellite tag data to identify overnight roost sites, analysis of the data revealed there to be over 100 locations where G/LAW1 golden eagles roost throughout their core territory. Some of these are clustered into broader roosting areas presumably with multiple roosting crags or trees. Further analysis into the frequency with which each location/area is used, identified two regularly used, traditional roost sites and one frequently used site as well as over 100 occasional or infrequently used roost sites. The three regular and frequently used roost sites were all over 2km from the Site and distributed throughout the golden eagles' wider core territory. Of the remaining occasional to infrequently used roost sites/areas, five are located within 1km of the Site, all but one of which are located over 500m from the development footprint. Notably there are several roost sites located within 500m of the existing Beinn Ghlas Wind Farm site.

It is worth noting that none of the roost sites identified by the satellite tag data corresponded with the roost location provided by Natural Research to the west of the Site. This suggests that that observation will have been of a non-tagged bird, either a non-territorial bird or the un-tagged bird from the territorial pair.

11.5.2 Field Survey Results

11.5.2.1 Flight Activity Surveys

A total of 76 flights by ten target species were recorded over and around the Site between April 2021 and February 2023. Full details of the flight activity results are provided in **Appendix 11.1: Ornithology Technical Report** and illustrated on **Figure 11.1.6a-b** for raptors and **Figure 11.1.7a-b** for waterfowl for survey years 1 and 2, respectively. A summary of the flight activity results is provided below. The number of flights at Potential Collision Height (PCH) is included[31], i.e., the number of flights at risk of collision with turbines based on the proposed turbine layout and design parameters.

- **Hen harrier**: 53 flights comprising 58 individuals, of which 18 flights comprising 20 individuals occurred in Year 1, and 35 flights comprising 38 individuals occurred in Year 2. Of these, 29 flights involving 31 birds were at PCH (nine flights comprising nine birds, totalling 11 seconds at PCH in Year 1; and 20 flights comprising 22 birds, totalling 1,231 seconds at PCH in Year 2). All but two flights (one in each survey year) occurred during the breeding season, with flights in Year 1 being widely distributed across the Site with a concentration in the south-central part of the Site, while flight activity in Year 2 was concentrated towards the north-eastern part of the Site.
- **Golden eagle**: nine flights comprising 11 individuals, of which three flights comprising three individuals occurred in Year 1, with six flights comprising eight individuals occurred in Year 2, although four of the Year 2 flights involved repeat sightings of the same two birds over a 30-minute period on the same day. Of these, only five flights involving six birds occurred at PCH (totalling 192 seconds of flight time), all of which were in Year 2. Flights were predominantly distributed over the higher ground within the west and south of the Site.
- **White-tailed eagle**: three flights comprising three individuals (two of which were immature birds), two of which occurred in Year 1, with the third flight occurring in Year 2. Of these, only the two flights in Year 1, which involved single birds, were at PCH (totalling 469 seconds of flight time).
- **Osprey**: only one flight of a single bird above PCH was recorded during the breeding season of Year 1.
- **Peregrine**: only one flight of a single bird above PCH was recorded during the breeding season of Year 1.
- **Merlin**: only one flight of a single bird below PCH was recorded during the breeding season of Year 1.
- **Red-throated diver**: one flight by a single bird which was at PCH but outside of the turbine envelope, recorded during the breeding season of Year 1.
- **Pink-footed goose**: four flights comprising 451 individuals, all of which were above PCH. Of these, one flight comprising 180 individuals occurred in Year 1, three flights comprising 271 individuals (peak 193) occurring in Year 2 with all flights occurring during either the spring or autumn migration periods.
- **Greylag goose**: two flights comprising 21 individuals, of which one flight involving a single bird was at PCH. Both flights occurred during the breeding season of Year 1 and were probably birds on spring migration.
- **Whooper swan**: one flight by a flock of 11 birds which were above PCH, recorded during the non-breeding season of Year 1 and were probably birds on autumn migration.

[31] This includes all flights recorded during the flight activity surveys rather than just those within the Site.

11.5.2.1.1 Collision Risk Modelling Output

As detailed in the methods section of **Appendix 11.1: Ornithology Technical Report**, in order for CRM results to be meaningful, a minimum of three "at risk" flights are required. The flight activity survey results therefore meant that there were only sufficient at-risk flights to undertake CRM for two species; golden eagle and hen harrier. A summary of the output from the CRM based on the recorded flight activity by these species in each year is presented in **Table 11.9** below.

TABLE 11.9: COLLISION RISK MODELLING OUTPUT

SPECIES	RECOMMENDED AVOIDANCE RATE	YEAR	NUMBER OF PREDICTED COLLISIONS/YEAR	TIME PREDICTED FOR ONE COLLISION TO OCCUR (YRS)
Hen harrier	99%	Yr 1 (2021/22)	0.01	170
	99%	Yr 2 (2022/23)	0.06	15.5
Golden eagle	99%	Yr 1 (2021/22)	Insufficient number of 'at risk' flights.	
	99%	Yr 2 (2022/23)	0.02	66.5

11.5.2.2 Scarce Breeding Bird Surveys

Details of the scarce breeding bird survey results are provided in **Appendix 11.1: Ornithology Technical Report** and illustrated on **Figures 11.8a-b** for survey years 1 and 2, respectively. Sensitive information concerning nest sites of rare and vulnerable species is restricted to **Appendix 11.2: Confidential Ornithological Information** and its associated figures. A summary of the scarce breeding bird survey results is provided below.

- **Hen harrier**: Due to its sensitivity, details relating to hen harrier are restricted to **Appendix 11.2 Confidential Ornithological Information**.
- **Golden eagle**: Limited observations during Year 1, with those which were recorded being located over 3km south of the Site in the vicinity of Beinn Ghlas during the dedicated eagle watches. Higher levels of activity were recorded in 2022 although flights were again predominantly over 3km and around Beinn Ghlas. Only two flights were recorded in or around the Site: one involving a single adult passing around the southern and eastern peripheries and the other of a single bird seen perched in the western half of the Site before taking flight.
- **White-tailed eagle**: Four flights were recorded during the Year 1 surveys. Two of these involved single birds observed at least 4km south-east of the Site in the vicinity of Beinn Ghlas Wind Farm, while the other two flights, one involving an adult pair, the other of a single adult, were observed passing due north high over the eastern part of the Site. During the Year 2 surveys, six flights were recorded. Two of these were located just to the south of the Site circling over Glen Lonan, while a third was observed over Fearnoch Forest before drifting north-east towards Loch Etive. The remaining three flights were located over 3km south of the Site, to the west of Beinn Ghlas.
- **Osprey**: Details relating to osprey are restricted to **Appendix 11.2 Confidential Ornithological Information**.
- **Red kite**: Two flights by what were presumed to be the same single red kite were observed over 3km due south of the Site in the vicinity of Beinn Ghlas Wind Farm during the eagle surveys of Year 1. There were no observations of this species over or around the Site itself.
- **Merlin**: There were two observations of a male bird along the Site's southern boundary in Year 1 but there was no evidence of breeding by this species.
- **Peregrine**: A single peregrine was observed over the forestry to the south of the Site in Year 1. However, there were no other sightings of this species to indicate that there was a breeding site in close proximity to the Site.

- **Greenshank**: A single bird was observed briefly at the edge of Lochan na Creige Deirge to the north of the Application Boundary in Year 1, before taking flight and departing the Site. There were no further observations of this species, and no suggestion of breeding by this species.

No scarce breeding birds were recorded during the surveys undertaken for the Proposed Forest Access Track.

11.5.2.3 Lekking Black Grouse Surveys

Details of the black grouse survey results are provided in **Appendix 11.1: Ornithology Technical Report** and illustrated on **Figures 11.1.12a-b** for survey years 1 and 2, respectively. Sensitive information concerning lek sites is restricted to **Appendix 11.2: Confidential Ornithological Information** and its associated figures. A summary of the black grouse survey results is provided below.

Black grouse were recorded lekking at four locations during the surveys of 2021 and 2022 (referred to as Leks A, B, C and D), the locations and observations dates of which are provided in **Appendix 11.2: Confidential Ornithological Information** and illustrated on associated figures. No black grouse were recorded during surveys in 2024 associated with the Forest Access Track.

Lek A is the only location at which lekking males were repeatedly observed both within and between survey years, with two males being recorded there in 2021 and the peak count of three males being recorded in 2022. Three males and a single female were observed at Lek B, but these birds were only observed on a single occasion in 2022, despite multiple visits to that part of the Site during dedicated black grouse surveys in both years. Furthermore, those birds were only observed to fly in and lek for short periods (e.g. 15-20 minutes) before flying away again, to/from the general direction of Lek A. Meanwhile, only single birds were observed at Leks C and D both on only single occasions in 2021 and 2022 respectively, with the bird at Lek D only lekking at that location for no more than five minutes.

Further consideration and interpretation of the observations at these lek sites is discussed in further detail in **Appendix 11.1: Ornithology Technical Report**. In conclusion only Lek A is considered to be a core lek site having consistently been attended in both years. Although birds were observed lekking at the other three locations they are not considered to be traditional/core lek sites and are simply concluded as having been a chance observation of competing males chasing a female (Lek B) and ad-hoc observations of an opportunistic subordinate male (Leks C and D).

11.5.2.4 Hen Harrier Winter Roost Surveys

The only hen harrier sighting made during the winter roost watches was of an adult male bird flying due north-east over Cruach Clenamacrie in December. However, there was no indication that the bird went into roost anywhere within the survey area.

Other birds observed during the hen harrier winter roost surveys included a pair of black grouse and a single female black grouse over the northern end of Cruach Clenamacrie during the October and January surveys respectively, a short-eared owl observed hunting to the north of the Site in November and a pair of golden eagles flying due south-east over Deadh Choimhead to the south of the Site in January.

Full details of the hen harrier winter roost survey results are provided in **Appendix 11.1: Ornithology Technical Report** and illustrated on **Figure 11.1.11**.

11.5.3 Future Baseline

As recommended by CIEEM (2018)[27], consideration must be given to the likely baseline situation at the time of the Proposed Development's construction, as it may not be the same as the conditions at the time of the data collection and impact assessment. To determine this, it is necessary to try to predict any changes that will alter conditions prior to the start of the proposed construction.

The proposed wind farm site lies within an area of open moorland surrounded to the south, east and west by the commercial forestry plantation of FLS's Fearnoch Forest Estate and to the north by Clais Dhearg SSSI.

There is currently no management of the Site, nor is there anticipated to be in the short- to medium-term. Similarly, it is not expected that conditions associated with the adjacent SSSI would substantially change. Therefore, habitat conditions associated with the Site and the SSSI to the north, and the species they support can reasonably be expected to remain the same as those upon which this assessment is based.

With regards to the adjacent forestry plantation, FLS's Taynuilt Land Management Plan (FLS, 2024[32]) identifies that many coupes are scheduled to be felled throughout Fearnoch Forest between 2020 and 2029, although the woodland immediately surrounding the Site is to remain intact. FLS also aspires to return a large part of Fearnoch Forest to the east of the Site to native broadleaved woodland as part of its biodiversity policy commitments. The ongoing management of the forest is likely to create new habitats (open clear fell, young plantation and broadleaved (compared to coniferous) woodland) for the same, or a slightly different suite of species to those which currently exist there. Therefore, the baseline conditions of the adjacent forest may be slightly different to those which currently exist. However, this is not expected to significantly increase the occurrence of any particularly rare or vulnerable species which may be attracted into the Site from the surrounding area. Subsequent felling phases may coincide with the construction and operational activities of the Proposed Development, resulting in potential cumulative disturbance or displacement events.

Overall, however, the baseline situation within the Site and surrounding area is expected to be similar in nature to that which exists at present with little to no management over the open ground and SSSI, and parts of the adjacent forestry being cleared and replaced on a rotational basis.

11.6 Receptor Sensitivity

11.6.1 Designated Sites and Connectivity to the Proposed Development

All designated sites with ornithological interests within a ZoI of the Proposed Development are **scoped out**. The rationale for scoping out the designated sites is presented in **Table 11.10** below.

TABLE 11.10: RATIONALE FOR SCOPING OUT DESIGNATED SITES

DESIGNATED SITE	RATIONALE
Glen Etive and Glen Fyne SPA	The Site does not overlap with this designated site which is located over 8km from the Proposed Development turbine locations and over 6km from the proposed Access Track (see **EIA Report Chapter 5: Project Description).** Additionally, based on these distances, the Proposed Development is located well beyond the recognised 6km core foraging range for golden eagles (SNH, 2016a[17]). Therefore, there is negligible to no risk of connectivity for golden eagles associated with Glen Etive and Glen Fyne SPA occurring in proximity to the Site.

11.6.2 Protected and Notable Species of Conservation Concern

These are species meeting at least one of the target species criteria identified in **Section 11.4.2** and form the preliminary list of VORs associated with the Site. A summary of their presence, conservation value, and a rationale for scoping them in or out of further assessment is given in **Table 11.11** and represents an initial screening of VORs recorded at the Site. Following this preliminary assessment three VORs remain scoped

[32] FLS (2024). Forestry and Land Scotland Taynuilt Land Management Plan website. Available at: Taynuilt land management plan | Forestry and Land Scotland. (Accessed 10 August, 2024)

in for further assessment: golden eagle, hen harrier and black grouse. Further information on the population status and conservation value of these scoped in VORs is provided in the following section.

TABLE 11.11: PRELIMINARY ASSESSMENT OF VALUED ORNITHOLOGICAL RECEPTORS

SPECIES	RECORDED PRESENCE* [* DS: DESK STUDY, FAS: FLIGHT ACTIVITY SURVEY, SBBS: SCARCE BREEDING BIRD SURVEY, BGS: BLACK GROUSE SURVEYS, HWRS: HARRIER WINTER ROOST SURVEYS]	CONSERVATION VALUE IN CONTEXT OF THE SITE	SCOPED IN/OUT OF ASSESSMENT	RATIONALE
Golden eagle	DS: one occupied territory (G/LAW1) located within 6km, but over 4km, from the Site. Satellite tag data demonstrates that the core range of the G/LAW1 territory encompasses the Site but that the most frequently and intensively used area is centred around Beinn Ghlas and associated higher ground located over 3km south of the Site, where suitable (GET) habitat is more prevalent. The satellite tag data also identified over 100 roost sites within the G/LAW1 core territory, of which five roosts (used infrequently or occasionally) are located within 1km of the Site. One of these is located within the Site (and was only infrequently used). FAS: nine flights by 11 birds over two years, five of which were 'at risk' in Year 2 only. SBBS: occasional flight activity over/around the Site, with more frequent, concentrated activity observed over more extensive suitable habitat over 3km to the south. No evidence of nesting or roosting on or around the Site. HWRS: single observation of a pair flying south of the Site.	Local	In	Recorded infrequently over or around the Site with the majority of observations located over 3km south of the Site in the vicinity of Beinn Ghlas. However, satellite tag data for the birds associated with the G/LAW1 territory confirms that their range does extend as far at the Site, although the Site lies within the outer extent of their range and forms only a peripheral part of their range. GET modelling data indicates that the Site does provide suitable habitat for golden eagles, although is largely suboptimal habitat (e.g. GET 5-). Satellite tag data also identified one infrequently used roost site located within the Site. The Proposed Development may therefore potentially pose a risk of disturbance, displacement, indirect habitat loss and collision risk to this species.

SPECIES	RECORDED PRESENCE* [* DS: DESK STUDY, FAS: FLIGHT ACTIVITY SURVEY, SBBS: SCARCE BREEDING BIRD SURVEY, BGS: BLACK GROUSE SURVEYS, HWRS: HARRIER WINTER ROOST SURVEYS]	CONSERVATION VALUE IN CONTEXT OF THE SITE	SCOPED IN/OUT OF ASSESSMENT	RATIONALE
White-tailed eagle	DS: one known nest site located within 6km, but over 2.5km from the Site. FAS: three flights by three birds over two years, two of which were 'at risk' in Year 1. SBBS: infrequent flight activity over/around the Site, with more frequent, concentrated activity observed over more extensive suitable habitat to the south. No evidence of nesting or roosting on or around the Site.	Negligible	Out	Rarely recorded passing over/around the Site with no evidence of breeding nearby, hence negligible theoretical risk of collision mortality or disturbance/ displacement of breeding birds.
Osprey	DS: one known nest site located within 2km of the Site. FAS: one flight by one individual in Year 1 only, which was not 'at risk'. SBBS: the same nest site identified through desk study, active in 2021 and 2022. However, this was subsequently blown down in 2023/24.	Negligible	Out	Despite the recorded presence in 2021 and 2022, the natural destruction of this nest site and no apparent replacement in the vicinity of the Site means that this species is not thought to pose a constraint to the Proposed Development.
Red kite	DS: No records. SBBS: two flights over 4km south-east of the Proposed Development but no evidence of breeding nearby.	Negligible	Out	No evidence of breeding nearby and only recorded rarely in the wider surrounding areas beyond the influence of the Proposed Development, hence no theoretical risk of collision mortality or disturbance/displacement of breeding birds.

SPECIES	RECORDED PRESENCE* [* DS: DESK STUDY, FAS: FLIGHT ACTIVITY SURVEY, SBBS: SCARCE BREEDING BIRD SURVEY, BGS: BLACK GROUSE SURVEYS, HWRS: HARRIER WINTER ROOST SURVEYS]	CONSERVATION VALUE IN CONTEXT OF THE SITE	SCOPED IN/OUT OF ASSESSMENT	RATIONALE
Hen harrier	DS: a historic nest site located within the Site. FAS: 53 flights by 58 individuals over two years, nine flights by nine individuals which were 'at risk' in Year 1, 20 flights by 22 individuals which were 'at risk' in Year 2. SBBS: confirmed breeding on/around the Site in 2021 (one nest) and 2022 (two nests) with high levels of associated flight activity. HWRS: a single observation of a male bird, no evidence of roosting.	Regional	In	Regularly recorded over and around the Site with confirmed breeding in 2021 and 2022. The Proposed Development poses a risk of disturbance/displacement and collision risk to this species.
Peregrine	DS: No records. FAS: one flight by one individual in Year 1 only, which was not 'at risk'. SBBS: sighting of a single bird to the south of the Site in spring 2021, but no evidence of nesting.	Negligible	Out	Recorded rarely over/around the Site with no evidence of breeding nearby, hence negligible theoretical risk of collision mortality or disturbance/ displacement of breeding birds.

SPECIES	RECORDED PRESENCE* [* DS: DESK STUDY, FAS: FLIGHT ACTIVITY SURVEY, SBBS: SCARCE BREEDING BIRD SURVEY, BGS: BLACK GROUSE SURVEYS, HWRS: HARRIER WINTER ROOST SURVEYS]	CONSERVATION VALUE IN CONTEXT OF THE SITE	SCOPED IN/OUT OF ASSESSMENT	RATIONALE
Merlin	DS: No records. FAS: one flight by one individual in Year 1 only, which was not 'at risk'. SBBS: two sightings of a single male along the Site's southern boundary in spring 2021, but no evidence of nesting.	Negligible	Out	Recorded rarely over/around the Site with no evidence of breeding nearby, hence negligible theoretical risk of collision mortality or disturbance/ displacement of breeding birds.
Short-eared owl	DS: No records. HWRS: a single flight over the Site.	Negligible	Out	Recorded rarely over/around the Site with no evidence of breeding nearby, hence negligible theoretical risk of collision mortality or disturbance/ displacement of breeding birds.
Red-throated diver	DS: No records. FAS: one flight involving one individual in Year 1 only, which was not 'at risk'.	Negligible	Out	Recorded rarely over/around the Site with no evidence of breeding nearby, hence negligible theoretical risk of collision mortality or disturbance/ displacement of breeding birds.
Pink-footed goose	DS: No records. FAS: four flights comprising 451 birds over the two-year survey programme, none of which were 'at risk'.	Negligible	Out	Recorded rarely over/around the Site (all four flocks recorded over the two year period were recorded outside of the collision risk zone) with no evidence of foraging nearby, hence negligible theoretical risk of collision mortality or disturbance/ displacement of winter foraging birds.

SPECIES	RECORDED PRESENCE* [* DS: DESK STUDY, FAS: FLIGHT ACTIVITY SURVEY, SBBS: SCARCE BREEDING BIRD SURVEY, BGS: BLACK GROUSE SURVEYS, HWRS: HARRIER WINTER ROOST SURVEYS]	CONSERVATION VALUE IN CONTEXT OF THE SITE	SCOPED IN/OUT OF ASSESSMENT	RATIONALE
Greylag goose	DS: No records. FAS: two flights by 21 birds over the two-year survey programme, one flight of one bird was 'at risk'.	Negligible	Out	Recorded rarely over/around the Site with no evidence of foraging or breeding nearby, hence negligible theoretical risk of collision mortality or disturbance/ displacement of breeding or winter foraging birds.
Whooper swan	DS: No records. FAS: one flight comprising six birds in Year 1 only, which was not 'at risk'.	Negligible	Out	Recorded rarely over/around the Site with no evidence of foraging nearby, hence negligible theoretical risk of collision mortality or disturbance/ displacement of winter foraging birds.
Greenshank	DS: No records. SBBS: a single observation of a single bird during the 2022 breeding season - no evidence of breeding.	Negligible	Out	Recorded rarely over/around the Site with no evidence of breeding nearby, hence negligible theoretical risk of collision mortality or disturbance/ displacement of breeding birds.

SPECIES	RECORDED PRESENCE* [* DS: DESK STUDY, FAS: FLIGHT ACTIVITY SURVEY, SBBS: SCARCE BREEDING BIRD SURVEY, BGS: BLACK GROUSE SURVEYS, HWRS: HARRIER WINTER ROOST SURVEYS]	CONSERVATION VALUE IN CONTEXT OF THE SITE	SCOPED IN/OUT OF ASSESSMENT	RATIONALE
Black grouse	DS: one lek site (2 males) located within the Site, with a further two lek sites within 2km). SBBS/BGS: one core lek site, with birds also observed lekking more opportunistically in three other locations within and immediately surrounding the Site. Birds also occasionally observed within and immediately surrounding the Site during SBBS walkover surveys. HWRS: sightings of pair, and a single female around Cruach Clenamacrie.	Regional	In	Recorded on and around the Site throughout the year with one core lek and three other lower status, peripheral leks located in and around the Site.

11.6.3 Conservation Status of Scoped in VORs

The level of a potential effect on the scoped in VORs was determined by considering the magnitude, extent, and duration of **potential impacts** in relation to the conservation value of the Site for each VOR within the context of their corresponding reference population (see **Table 11.11**).

SNH (2018a[16]) recommends that, "*the concept of favourable conservation status of a species should be applied at the level of its Scottish population, to determine whether an impact is sufficiently significant to be of concern. An adverse impact on a species at a regional scale (within Scotland) may adversely affect its national conservation status. This is a test which makes good ecological sense and maintains compatibility with the aims of European legislation and Government policy. An impact should therefore be judged as of concern where it would adversely affect the existing favourable conservation status of a species or prevent a species from recovering to favourable conservation status, in Scotland.*"

This is likely to be the case where a moderate adverse effect, or higher, which is unlikely to be tolerable, is predicted using the impact assessment matrix procedure discussed in **Section 11.4**, although expert judgement is applied in all cases.

The term 'favourable conservation status' (as articulated within the Habitats Directive) is defined by SNH (2018a[16]) as "*the sum of influences acting on a species which may affect its long-term distribution and abundance, within the geographical area of interest (which for the purposes of the Directive is the EU)*". This interpretation has become increasingly common in court within the context of the Birds Directive. Conservation status is favourable when:

- Population dynamics indicate that the species is maintaining itself on a long-term basis and is therefore likely to persist in the habitat(s) it occupies.
- The natural range of the species is not being reduced, nor is likely to be reduced for the foreseeable future.
- There is (and will probably continue to be) a sufficiently large habitat to maintain its populations on a long-term basis.

The conservation status of each VOR is therefore considered at the international, national and/or regional scale, depending on whether the population is breeding, migratory or overwintering. For non-breeding or migratory species, consideration at a national scale is more appropriate than at regional level or lower (SNH, 2018a[16]).

For breeding birds, the regional scale equates to their respective NHZ, as advised by in their consultation responses (see **Table 11.1**), where there is high biogeographical coherence within each zone. The Proposed Development lies within NHZ 14 (see **Figure 11.1**), which covers Mid-Argyll, the Cowal Peninsula, Kintyre and the southern Inner Hebrides including Arran, Islay, Jura and Colonsay.

11.6.3.1 Golden Eagle

Golden eagle is an Annex 1 listed species. It is also listed on Schedule 1 of the Wildlife and Countryside Act which means that as well as the standard protection applied to all wild birds in the UK, it is also an offence to disturb them whilst building or using their nests and to disturb their dependent young. They are also listed on Schedule 1A and A1 of the Wildlife and Countryside Act 1981 (as amended). Schedule 1A makes it an offence to intentionally or recklessly harass a golden eagle at any time, whilst Schedule A1 makes it an offence to intentionally or recklessly damage, destroy or interfere with their habitually used nest sites.

Golden eagles are largely restricted to the Scottish Highlands and islands. In Argyll, they are a scarce but widespread resident breeding species while immature birds often wandering throughout the region resulting in them bring recorded in areas where breeding does not occur (Jardine et al (eds), 2023[33]).

Despite their relative scarcity, they are recognised as a green-listed Bird of Conservation Concern (BoCC) (Stanbury et al, 2021[23]). This reflects their broadly stable national population which, despite ongoing persecution, is estimated to be approximately 508 breeding pairs (Challis et al, 2023[34] (from Hayhow et al, 2017[35])). The last published golden eagle population for NHZ 14 was estimated at approximately 44 pairs (SNH, 2012[36] and Wilson et al, 2015[37]) and was considered to be in a favourable conservation status (Whitfield et al, 2008[38]). However, following the 2015 national golden eagle survey the population is thought to have increased to 52 pairs (Challis et al, 2023[32]), which corresponds to the figure provided through consultation with NatureScot.

Based on the above information, golden eagle is considered to have a favourable conservation status at a national and regional/NHZ level. However, based on the limited frequency of golden eagle occurrence over and around the Site as reflected through field survey evidence, GET modelling data (showing that the site is largely sub-optimal habitat) and satellite tag data, the Site is considered to be of no more than **local** importance (see **Table 11.11**) in its contribution to supporting locally occurring birds.

11.6.3.2 Hen Harrier

Hen harrier is an Annex 1 listed species. It is also listed on Schedule 1 of the Wildlife and Countryside Act which means that as well as the standard protection applied to all wild birds in the UK, it is also an offence to disturb them whilst building or using their nests and to disturb their dependent young. They are also listed on Schedule 1A of the Wildlife and Countryside Act, which makes it an offence to intentionally or recklessly harass them at any time (including at both nest and roost sites).

Hen harrier is a scarce but widespread resident breeding species in Scotland whose range is largely restricted to highlands and islands. They are scarce but widespread in Argyll too, although the region holds around one quarter of the Scottish breeding population (Jardine et al (eds), 2023[28]). Outside of the breeding season birds can also be regularly seen throughout the region (Jardine et al (eds), 2023[28]).

They are recognised as a red-listed BoCC (Stanbury et al, 2021[23]) due to the substantial historical decline in their breeding population, which is largely attributed to illegal persecution. The national population continues to suffer declines and is estimated to be approximately 460 breeding pairs based on the 2016 national hen harrier survey (Challis *et al*, 2023[32] (from Wotton *et al*, 2018[39])). The last published hen harrier population for NHZ 14 was estimated at approximately 125 pairs with a range of up to 150 pairs (SNH, 2012[34] and Wilson *et al*, 2015[35]), which corresponds to the figure provided through consultation with NatureScot. However, SNH (2012)[34] considered the population to be towards the upper end of that range.

Despite the recent national decline, the regional population is considered to be relatively stable and remain at a favourable conservation status. Based on the field surveys results, the Site has been shown to support up to two breeding pairs of hen harrier, which represents between 1.3-1.6% of the NHZ population (based

[33] Jardine, D.C., Dickson, J. and Chattwood, M. (eds) (2023). Argyll Bird Report 2022. The Thirty Fourth Argyll Bird Report with Systematic List for the Year 2022. Published by Argyll Bird Club. (Accessed 10 August, 2024)
[34] Challis, A., Beckmann, B.C., Wilson, M.W., Eaton, M.A., Stevenson, A., Stirling-Aird, P., Thornton, M. & Wilkinson, N.I. (2023). Scottish Raptor Monitoring Scheme Report 2021 & 2022. BTO Scotland, Stirling. (Accessed 10 August, 2024)
[35] Hayhow, D.B., Benn, S., Stevenson, A., Stirling-Aird, P.K. & Eaton, M.A. (2017). Status of Golden Eagle Aquila chrysaetos in Britain in 2015. Bird Study 64: 281-294. (Accessed 10 August, 2024)
[36] SNH (2012). Regional Population Estimates of Selected Scottish Breeding Birds. April 2012. (Accessed 10 August, 2024)
[37] Wilson, M.W., Austin, G.E., Gillings, S. & Wernham, C.V. (2015). Natural Heritage Zone Bird Population Estimates. SWBSG Commissioned report number SWBSG_1504. pp72. Available from: www.swbsg.org. (Accessed 10 August, 2024)
[38] Whitfield, D P, Fielding, A H, McLeod, D R A and Haworth, P F (2008). A conservation framework for golden eagles: implications for their conservation and management in Scotland. Scottish Natural Heritage Commissioned Report No.193. (Accessed 10 August, 2024)
[39] Wotton, S.R., Bladwell, S., Mattingley, W., Morris, N.G., Raw, D., Ruddock, M., Stevenson A. & Eaton, M.A. (2018). Status of the Hen Harrier Circus cyaneus in the UK and Isle of Man in 2016. Bird Study 65: 145–160. (Accessed 10 August, 2024)

on the NHZ population range of between 125-150 pairs). Consequently, the Site is considered to support a population of **regional** importance.

11.6.3.3 Black Grouse

Black grouse is protected under the standard legislation of the Wildlife and Countryside Act which applies to all wild birds in the UK.

Black grouse is widespread resident breeding bird in the uplands of Scotland, although its distribution is more concentrated towards northern and eastern parts of its range (Forrester et al, (eds), 2007[40]). In Argyll, it is a more scarce, localised, resident breeder whose abundance is still likely to be declining but at a slower rate, after an initial steep decline (Jardine et al (eds), 2023[31]).

Black grouse is a red-listed BoCC (Stanbury et al, 2021[23]) due to the substantial historical decline in both their breeding population and range, which is largely attributed to habitat loss and unfavourable management. The national population, taken from the last national survey in 2005 and which was based on the number of lekking makes, is estimated to be in the region of 3,350 males (Wilson et al, 2015[35] (from Sim et al, 2008)[41]). The last published population for NHZ 14 was estimated at approximately 67 males, but with a range a range of up to 99 males (Wilson et al, 2015[35]). Indeed, the figure provided through consultation with NatureScot was 101 males, which was taken from Dickson (2019)[42].

Despite an ongoing declining trend in the national population, Argyll is considered to be a key area for black grouse with the regional population considered to be relatively stable where they remain at a favourable conservation status. Based on the field survey results, the black grouse population associated with the Site is estimated to comprise three lekking males, plus at least one female, which represents 3% of the NHZ population (based on the number of lekking males). Consequently, the Site is considered to support a population of **regional** importance.

11.7 Embedded Mitigation

Primary mitigation includes modifications to the location or design of the Proposed Development made during the pre-application phase that are an inherent part of the project, and do not require additional action to be taken. Detailed constraints advice was provided during the iterative layout design process for the turbines and associated infrastructure features. At various stages during the design stage, desk study and field survey data, as well as consultation advice from NatureScot (e.g. see **Table 11.1**) were used to inform the Proposed Development's design.

With regards to ornithological features of interest, the design of the Proposed Development has taken account of the recorded locations of hen harrier nest sites and the most consistently used, core black grouse lek site located within the Site. Turbines have been positioned at least 300m away from hen harrier nest sites and 500m from the core black grouse lek, the justification for which is provided below. Although black grouse were observed lekking at other locations within the Site, including in some cases within 500m of the proposed turbine locations, these were not considered to be traditional/core lek sites. Birds recorded lekking at those other locations were limited to brief, one-off observations of individual (most likely sub-ordinate) birds and a competitive exchange between three males chasing a female, all of which are considered to be co-incidental encounters reflective of less conventional behaviour of black grouse when birds exist at a low population density. Consequently, turbine standoff distance have not been applied to these ad-hoc, peripheral lek sites.

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[40] Forrester, R. W., Andrews, I. J., McInerny. C. J., Murray, R. D., McGowan, R. Y., Zonfrillo, B., Betts, M.W., Jardine, D.C. and Grundy, D.S. (eds) (2007). The Birds of Scotland. The Scottish Ornithologists' Club, Aberlady. (Accessed 10 August, 2024)

[41] Sim, I. M. W., Eaton, M. A., Setchfield, R. P., Warren, P. K., Lindley, P. (2008). Abundance of male Black Grouse Tetrao tetrix in Britain in 2005, and change since 1995–96. Bird Study. 55. 304–313. (Accessed 10 August, 2024)

[42] Dickson, J. (ed) (2019). Argyll Bird Report 2018. The Thirtieth Argyll Bird Report with Systematic List for the Year 2018. Published by Argyll Bird Club. (Accessed 10 August, 2024)

With regards to hen harrier, NatureScot had recommended that turbines should be located over 500m from hen harrier nest sites. However, this distance was understood to be based on the upper-range disturbance distance given in their guidance (Goodship and Furness, 2022[43]), which is based on more unfamiliar and unpredictable disturbance sources such as the presence of humans or operational machinery. The disturbance guidance does not account for operational wind turbines which, after a period of habituation, pose a consistent and predictable source of disturbance. Indeed, that same guidance quotes that hen harrier have been recorded nesting within 200m-300m from operational turbines or closer (from Madders and Whitfield, 2006[44] and Ruddock and Whitfield, 2007[45]). Furthermore, in their study of a number of wind farm sites, Haworth and Fielding (2012)[46] found little evidence that turbines restrict hen harrier nesting attempts except, perhaps, at a distance of 0-200/250m. WSP also have evidence of successful nests monitored in 2018 and 2019 at the consented Stornoway Wind Farm which were located between 300-350m from an operational turbine, indicating that hen harrier can successfully habituate to the presence of operational turbines. Consequently, a 300m turbine standoff distance is considered to be sufficient and it is anticipated that hen harriers will be able to continue nesting and foraging within certain parts of the Site, away from the turbines, as well as within suitable areas of adjacent undeveloped land (e.g. within Clais Dhearg SSSI).

With regards to black grouse, NatureScot recommended that turbines should be located over 750m from black grouse leks, in line with the upper-range disturbance distance given in their guidance (Goodship and Furness, 2022[41]). However, as with hen harrier, this distance is also based on more unfamiliar and unpredictable disturbance sources, not the more consistent and predictable disturbance associated with operational wind turbines. Studies on operational wind farms in Scotland and the Austrian Alps have only found significant displacement of black grouse within 500m of operational wind turbines (Zwart et al, 2015[47] and Grünschachner-Berger and Kainer 2011[48] (*in Coppes et al, 2020*[49]) and Brunner and Friedel (2019)[50]). In the Austrian examples, displacement of black grouse was more attributed to recreational (skiing) disturbance and habitat deterioration, rather than the presence of turbines. Indeed, 500m is the stand-off distance recommended by RPSB for this project (see **Table 11.1**) and SNH (now NatureScot) are known to have recommended a 500m turbine stand-off distance from lek sites in consultation to other wind farm sites (e.g. Kennoxhead Wind Farm, South Lanarkshire). Consequently, a 500m turbine standoff distance is considered to be sufficient and it is anticipated that black grouse will be able to continue using the core lek site and other habitats within the Site, as well as within suitable areas of adjacent undeveloped land in the nearby surrounding area, such as within Clais Dhearg SSSI.

Since black grouse typically fly at a relatively low height above ground level, they are considered to be less prone to collision with turbine rotor blades (Coppes et al., 2019[44]). However, they are recognised to be vulnerable to collision with the turbine towers, particularly in poor visibility weather conditions (Coppes et al., 2019[44]). Studies conducted at Smøla Wind Farm in Norway on willow ptarmigan, a relative of black grouse, found that turbine painting turbine bases to make them more visible to birds resulted in a 48%

[43] Goodship, N.M. and Furness, R.W. (MacArthur Green) (2022). Disturbance Distances Review: An updated literature review of disturbance distances of selected bird species. NatureScot Research Report 1283. (Accessed 10 August, 2024)
[44] Madders, M. and Whitfield, D.P. 2006. Upland raptors and the assessment of wind farm impacts. Ibis 148: 43–56. (Accessed 10 August, 2024)
[45] Ruddock, M. and Whitfield, D.P. 2007. A review of disturbance distances in selected bird species. A report from Natural Research (Projects) Ltd to Scottish Natural Heritage. (Accessed 10 August, 2024)
[46] Haworth, P. and Fielding, A. (2012). A review of the impacts of terrestrial wind farms on breeding and wintering hen harriers. Haworth Conservation. (Accessed 10 August, 2024)
[47] Zwart, M. C., P. Robson, S. Rankin, M. J. Whittingham, and P. J. K. McGowan. 2015. Using environmental impact assessment and post-construction monitoring data to inform wind energy developments. Ecosphere 6(2):26. (Accessed 10 August, 2024)
[48] Grünschachner-Berger V, Kainer M (2011) Black Grouse Tetrao tetrix: how to live between skiing areas and wind-parks. Egretta 52:46–54 (Accessed 10 August, 2024)
[49] Coppes, J., Braunisch, V., Bollmann, K., Storch, I., Mollet, P., Grünschachner-Berger, V., Taubmann, J., Suchant, R and Nopp-Mayr, U. (2020). The impact of wind energy facilities on grouse: a systematic review. Journal of Ornithology (2020) 161:1–15. (Accessed 10 August, 2024)
[50] Brunner, H.; Friedel, T. (2019). Persistence and spatial distribution of Black Grouse in east Alpine wind farms: a contribution to the "wind power versus black grouse protection" debate in Austria. Nature Conservation and Landscape Planning, 51(12), 584-589 (Accessed 10 August, 2024)

reduction in collision mortalities (Stokke et al, 2020[51]). Similar measures have been used at wind farms in Spain to discourage raptors from coming into close proximity to turbines (Iberdrola, 2021[52]).

Consequently, it is proposed that this measure is implemented on the Proposed Development's turbine bases. The precise design shall be agreed in consultation with NatureScot and ABC, but the suggested option is to paint concentric black bands around the bottom 15m of each tower. To minimise their potential visual effect from an immediate landscape and visual perspective, the thickness of the bands is proposed to gradually decrease as they progress up the tower. This is intended to make the banding more subtle whilst still having the same effect in making them more visible to low-flying black grouse, and other birds.

Based on the success of the mitigation applied at Smøla Wind Farm, it is predicted that the painting of turbine bases will significantly reduce the collision risk posed to black grouse.

11.8 Potential Impacts on VORs

11.8.1 Construction

11.8.1.1 Habitat Loss

Direct habitat loss through wind farm construction may result in loss or fragmentation of nesting or foraging habitat for bird species. In the context of wind farms, this is generally considered to be of low magnitude, as construction usually only involves small losses of land associated with turbine bases, access tracks and other infrastructure compared to the overall foraging extent of many key species (Drewitt and Langston, 2006[53]). An exception to this may be, for example, where the felling of a tree would result in the loss of a traditional raptor nest.

With respect to birds, in most cases, physical land take is likely to be considerably less than any effective habitat loss due to displacement from the Site. Effects may be more widespread if developments interfere with hydrological patterns of wetland or peatland sites and associated bird species (Drewitt and Langston, 2006[49]).

Habitat within the Site is generally not considered of high value for birds at a regional or larger scale. The predominant habitat type is coniferous plantation woodland, which is of low conservation value for most VORs, either for breeding or foraging. However, the habitat is of high value for nest sites and as a foraging resource for goshawk. In addition, the Site does incorporate areas of habitat potentially used by barn owl for foraging e.g., acid grassland and valley mires.

11.8.1.2 Disturbance

Noise and visual disturbance (the presence of people and construction plant) caused by construction operations may directly displace birds from breeding sites and/or foraging areas (although the actual habitat quality remains the same) for the duration of activities, thus potentially affecting breeding success or survival. In addition to these possible effects on individuals and populations, any wind farm construction work undertaken during the bird breeding season (typically March to August, inclusive) carries a risk of destruction or damage to occupied bird nests, as well as disturbance to Schedule 1 listed bird species, if mitigation measures are not followed. The active nests of all wild bird species are protected by law, and it is necessary to take measures to ensure compliance with the relevant legislation.

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[51] Stokke, B.G., Nygård, T., Falkalden, U., Pedersen, H.C. and May, R. (2020). Effect of tower base paining on willow ptarmigan collision rates with wind turbines. Ecology and Evolution 2020; 10: 5670-5679. (Accessed 10 August 2024]

[52] Iberdrola (2021). Iberdrola news webpages. Available at: - Iberdrola https://www.iberdrola.com/press-room/news/detail/iberdrola-painting-wind-turbine-blades-protect-birdlife. (Accessed 10 August 2024]

[53] Drewitt, A. L. and Langston, R. H. W. (2006). Assessing the impacts of wind farms on birds. Ibis, 148: 29-42. (Accessed 10 August, 2024)

11.8.2 Operation

11.8.2.1 Disturbance/Displacement

The displacement effects attributable to wind farms are site-specific and vary according to species and season. As displacement effectively leads to exclusion from areas of suitable habitat, it can be regarded as being like habitat loss in its effect on birds, in combination with habitat loss it can result in an increased adverse effect, as birds are not only losing habitat but are being displaced from a wider area where suitable habitat still exists that they could otherwise use. For breeding birds, displacement from nesting habitat can lead to abandonment of the territory; while loss of foraging habitat may result in a reduction in food supply, leading to reduced breeding success and/or survival rates or abandonment of the territory. The implications of such displacement at the population scale, in terms of the effect on the viability of the population, depends on the importance of the area from which birds are displaced and the capacity of alternative habitats to support displaced birds.

Noise and visual disturbance to birds due to operational wind farms is of a much lower intensity than during construction/decommissioning phases and is limited to brief maintenance activities as well as low-level noise from normal operational turbine activity.

11.8.2.2 Collision with Turbines

Flying birds may collide with turbines. Collision of a bird with turbine rotors usually results in the death of the bird. Birds may also be injured or killed by flying into other components of turbines. The effect of an individual loss on a population is influenced by several characteristics of the affected population, notably its size, density, recruitment rate (additions to the population through reproduction and immigration) and mortality rate (the natural rate of losses due to death) and emigration. In general, the effect of an individual lost from the population will be greater for species that occur at low density, are relatively long-lived and reproduce at a low rate (e.g., larger raptors and geese). Conversely, the effect will often be insignificant for short-lived species with high reproductive rates found at high densities, including most passerines.

11.8.2.3 Barrier Effects

Individual turbines, or the whole Proposed Development footprint, may present a barrier to the movement of birds, restricting or displacing birds from greater areas. Birds may avoid flying through or over wind farms by altering local flight paths or migration flyways.

The effect this would have on a population is subtle and difficult to predict with any certainty. If birds must regularly fly over or around obstacles or are forced into sub-optimal habitats, this may result in greater energy expenditure (Drewitt and Langston, 2006[49]). This will reduce the efficiency with which they accumulate energy reserves, potentially affecting their survival or breeding success.

However, with regard to the Proposed Development, it is considered that given its small scale and relatively compact turbine layout (as opposed to a more linear arrangement), it is unlikely to present a barrier to the movement of birds. Consequently, barrier effect is not considered further as a potential impact in this assessment.

11.8.3 Decommissioning

Effects related to decommissioning are anticipated to be of no greater magnitude than construction related effects, and good practice measures will be implemented in accordance with best practice at that time.

11.9 Assessment of Potential Effects on VORs

11.9.1 Golden Eagle

11.9.1.1 Construction

11.9.1.1.1 Habitat Loss

The desk study data revealed that the nearest golden eagle nest site is located over 4km from the Application Boundary and over 6km from the nearest proposed turbine. Therefore, there will be no loss of golden eagle nest sites as a result of the Proposed Development (**no effect**).

Although the field surveys did not identify any golden eagle roost sites within the survey area, examination of the golden eagle satellite tag data identified five infrequent to occasionally used roost sites within 1km of the Site. However, the closest of these was located over 250m from the development footprint. Consequently, there will be no loss of roost sites as a result of the Proposed Development (**no effect**).

In terms of the wider Proposed Development, the quantity of habitat which will be directly lost is negligible when considered in the context of the wider Site and surrounding area. A total of 8.84ha of natural habitat will be permanently lost to infrastructure (e.g. turbines, buildings, access tracks etc) as a result of the Proposed Development, which is only a small proportion (3.37% of 262ha) of the overall Site itself and is inconsequential in terms of the amount of available golden eagle habitat in the wider surrounding area which represents the nearest golden eagle territory. It's very likely that any loss of habitat is therefore predicted to be of a negligible magnitude and have a **negligible effect** at both the local (territory) or regional (NHZ level), which is **not significant** in terms of the EIA Regulations.

11.9.1.1.2 Disturbance

Examination of the golden eagle satellite tag data identified five roost sites within 1km of the Site, one of which is located within 500m of the development footprint, including one of the turbines. Although the data showed that this roost site was only used infrequently, construction activities and the general presence of humans especially within 500m may disturb birds using this roost site during the construction phase. It is important to acknowledge however that roost sites would typically only be occupied overnight (i.e. between dusk and dawn) and hence unlikely to overlap with construction hours. Additionally, the satellite tag data also identified many other roost sites in both the nearby and wider surrounding area within the territory, to which any disturbed birds may be displaced. Consequently, any disturbance and potential displacement of golden eagles from this roost site during construction is predicted to be of a negligible magnitude and have a **negligible effect** at both a local (territory) or regional (NHZ) level, which is **not significant** in terms of the EIA Regulations.

In terms of potential disturbance of golden eagles which may occur more generally in the vicinity of the Site during construction, the field survey data indicates that golden eagles rarely use the habitat and airspace associated with the Site. This was compellingly corroborated by the satellite tag data. While birds may occasionally occur over and around the Site during construction and may be disturbed and deterred by human presence and construction activities their frequency of occurrence in the vicinity of the Site compared with that in their wider core territory as well as the availability of suitable alternative habitat, particularly over and around Beinn Ghlas, suggests that any disturbance impacts would be of negligible magnitude. Given the local value of the Site to the golden eagle population, it's likely that this would result in a **negligible effect** at both the local (territory) or regional (NHZ) level, which is **not significant** in terms of the EIA Regulations.

11.9.1.2 Operation

11.9.1.2.1 Displacement/Habitat Loss

While the direct loss of habitat during construction will be negligible, the indirect loss of habitat through displacement away from the operational wind farm is expected to have a greater impact. Research into the effects of wind farm developments on golden eagle range use using satellite tag data from territorial and non-territorial birds has demonstrated that golden eagles exhibit strong avoidance of wind turbines (Fielding et al., 2021[54], 2023[55] and 2024[56]). Some of these studies have included the existing Beinn Ghlas Wind Farm affiliated with the same Beinn Ghlas hill which is located to the south of the Site. These studies have found that eagles typically do not fly within operational wind farms and recommend a wind farm displacement distance of up to 500m, although they do suggest that this is highly conservative (and that 300m is likely to be a more appropriate displacement distance).

The area from which golden eagles might be expected to be displaced from around the Proposed Development has been defined by applying the conservative 500m buffer around the proposed turbine envelope. This area is referred to as the 'golden eagle displacement area' and is shown in **Appendix 11.2: Confidential Ornithological Information, Figure 11.2.2** in relation to suitable (GET 6+) golden eagle habitat and **Figures 11.2.3** and **11.2.5** in relation to the extent and frequency of core G/LAW1 golden eagle range use, respectively.

Based on the application and interpretation of the GET model and golden eagle satellite tag data as described above, the Proposed Development and associated golden eagle displacement area would result in the effective loss of 418ha (3.76%) from the G/LAW1 golden eagles' core range (calculated to be approximately 11,115ha based on 95% kernel density analysis). In terms of suitability of the habitat from which golden eagles will be displaced, and hence effectively lost, there is 228ha of suitable (GET 6+) golden eagle habitat within the golden eagle displacement area. This represents 3.89% of total GET 6+ habitat in G/LAW1 golden eagles' wider core range (5,856ha).

As demonstrated through the heat mapping in **Appendix 11.2: Confidential Ornithological Information, Figure 11.2.5** the land within the golden eagle displacement area, which is located at the northern periphery of the G/LAW1 golden eagles' core range, is used much less frequently than those areas within the central parts of the range associated with Beinn Ghlas and the affiliated higher ground (i.e. those areas of higher quality open 6+ GET habitat). Consequently, it is reasonable to conclude that the inherent value of the habitat and airspace immediately surrounding the Site to golden eagles is low. Therefore, the actual impact of displacement and indirect habitat loss is anticipated to be much less than the areas and proportions referenced above reflect. Consequently, the actual impact of displacement and indirect habitat loss from the Proposed Development on the G/LAW1 golden eagle territory is predicted to have an impact of small magnitude. Given the local value of the Site to the golden eagle population, it's very likely that this this would result in a **negligible-minor adverse effect** at both the local (territory) or regional (NHZ) level, which is **not significant** in terms of the EIA Regulations.

[54] Fielding, A.H.; Anderson, D.; Benn, S.; Dennis, R.; Geary, M and Weston, E.D. (2021). Non-territorial GPS-tagged golden eagles Aquila chrysaetos at two Scottish wind farms: Avoidance influenced by preferred habitat distribution, wind speed and blade motion status. PLoS ONE 16(8): e0254159. (Accessed 10 August, 2024)

[55] Fielding, A.H.; Anderson, D.; Benn, S.; Taylor, J.; Tingay, R.; Weston, E.D. and Whitfield, D.P. (2023). Responses of GPS-Tagged Territorial Golden Eagles Aquila chrysaetos to Wind Turbines in Scotland. Diversity 2023, 15, 917. (Accessed 10 August, 2024)

[56] Fielding, A.H.; Anderson, D.; Benn, S.; Taylor, J.; Tingay, R.; Weston, E.D. and Whitfield, D.P. (2024). Approach Distances of Scottish Golden Eagles Aquila chrysaetos to Wind Turbines according to Blade Motion Status, Wind Speed, and Preferred Habitat. Diversity 2024, 16, 71. (Accessed 10 August, 2024)

11.9.1.2.2 Disturbance

As explained in relation to construction, the golden eagle satellite tag data identified five infrequent to occasionally used roost sites within 1km of the Site, one of which is located within 500m of the development footprint, including one of the turbines. As the roost would typically only be occupied overnight (i.e. between dusk and dawn) it is unlikely that birds would be disturbed from using it by maintenance activities, which themselves would be infrequent in occurrence. Nonetheless, the presence of a turbine at such proximity may dissuade birds from continuing to use it and may ultimately result in the abandonment of this location as a roost site. However, it is notable from analysis of the wider satellite tag data, that there are several roost sites located within 500m of the existing Beinn Ghlas Wind Farm site, including some frequently used locations. These records imply that golden eagles (and in particular, this pair) are likely to still use the roost sites in proximity to the Proposed Development with the same level of frequency to which they are currently utilised. Even if birds are displaced from the roost sites in close proximity to the Site, as discussed above, the satellite tag data identified numerous alternative roosts in the wider territory, including three much more regularly used/traditional roost sites, where golden eagles from the local territory will be able to continue to roost, well beyond the range to which disturbance from the Proposed Development may extend. Consequently, any disturbance and potential displacement of golden eagles from this roost site during construction is predicted to have an impact of negligible magnitude which, given the local value of the Site to the golden eagle population, would very likely result in a **negligible effect (not significant)** at both the local (territory) or regional (NHZ level).

11.9.1.2.3 Collision Mortality

Based on the observed flight activity, the collision risk model estimates that the Proposed Development could result in the collision of 0.02 birds per year, as calculated using the recommended 99% avoidance rate for this species (SNH, 2018b[18]). This means it would take approximately 66.5 years for one golden eagle collision to occur. Hence, it is unlikely that there would be any collisions during the Proposed Development's 50-year operational lifespan.

As discussed above in relation to indirect habitat loss as a result of golden eagle displacement from the immediate vicinity of the operational turbines, it is likely that that the risk of collision would be even less than this.

Given the above, the risk of collision is considered to be so low that it would represent an impact of negligible magnitude such that adverse effects, although permanent, are very likely to result in a **negligible effect** that is **not significant**.

11.9.2 Hen Harrier

11.9.2.1 Construction

11.9.2.1.1 Habitat Loss

As explained in **Section 11.7**, turbines have been positioned at least 300m away from the three hen harrier nest site locations used in 2021 and 2022. Although hen harriers do not always use the same nest sites traditionally, they do tend to nest in the same preferred areas within a range of several hundred metres (Hardey et al, 2013[25]). Therefore, these broad nesting areas will not be lost as a result of the development. Furthermore, the buffer zones around each previous nesting site, as well as that surrounding the core black grouse lek site, and the separation distances between the turbines by over 500m provides open access into and out of the nesting areas from nearby adjacent areas of open moorland and open scrubby woodland foraging areas associated with Clais Dhearg SSSI to the north, particularly the northern-most nesting site used in 2021. It is therefore virtually certain that birds will continue to be able to use these nesting areas following the construction of the Proposed Development and hence there will be **no effect** in terms of loss of potential hen harrier nesting sites.

No roost sites were identified within or surrounding the Site during the field surveys and so there are not anticipated to be any loss of roost sites (**no effect**).

In terms of the wider Proposed Development, the quantity of habitat which will be directly lost is negligible when considered in the context of the wider Site and surrounding area. A total of 8.84ha of natural habitat will be permanently lost to infrastructure as a result of the Proposed Development, which is only a small proportion (3.37% of 262ha) of the overall Site itself. This is likely predicted to have a **negligible effect**, which is **not significant** in terms of the EIA Regulations.

11.9.2.1.2 Disturbance

In their review of disturbance distances on selected species, Goodship and Furness (2022)[41] concluded that breeding hen harriers are disturbed by active machinery and human presence at distances of 300m-750m. Although all turbines have been positioned over 300m from the three nesting sites identified in 2021 and 2022, this has been based upon the species' documented avoidance of operational turbines, not construction activities, the impacts from which may be further reaching. Furthermore, as hen harriers do not use traditional nest sites from year to year, they could establish nesting sites anywhere within the Site or immediately surrounding area during the construction period. Therefore, any breeding hen harriers which establish a nest site within 750m of the development footprint during the construction phase may be at risk of disturbance.

The hen harrier breeding season is taken to extend from mid-March to mid-August (NatureScot, 2024[57]) and so, whilst temporary, could be affected by construction activities throughout the spring and summer months. Additionally, the impacts from the more intensive construction related disturbance (as opposed to less intensive operational disturbance) would only persist for the duration of the construction phase. Nonetheless, in the absence of mitigation, the disturbance of breeding hen harriers could result in the abandonment of the nesting attempt and the death of eggs and/or chicks (depending on the stage of the breeding cycle). Although it is possible that the displaced birds may establish a new nest site further away within the same season, as there is ample suitable habitat in the local area, this disruption could have an adverse effect on their breeding success in that season.

Although the influence of construction related disturbance would be temporary and short term as described above, the abandonment of any nest sites which may be established would have an impact of medium to large magnitude on the local hen harrier population, regardless of whether one or two pairs were affected. At the regional level, the disturbance and abandonment of up to two pairs of breeding hen harrier would represent an absence of recruitment into the breeding population (e.g. fledged hen harriers) but would not result in the loss of any hen harriers from the NHZ population. Published data from the national survey in 2015 (note that the results of the latest national survey carried out in 2023 are not yet available) recorded productivity figures of 1.9 young fledged per occupied home range in Argyll (1.4 in mainland Argyll if disregarding the island populations) and 1.1 in Scotland as a whole (Challis *et al*., 2023[29]). It could be considered that two non-breeding or failed pairs would represent the lack of recruitment of between 2.2-3.8 individuals into the population per breeding season (or 0.48-0.84 individuals into the breeding population given the annual mortality rate of 0.22 for juveniles (BTO, 2024[58])). Despite the regional value of the Site to the hen harrier population, the temporary and short-term nature of the impact means that the overall impact magnitude is likely to be small, resulting in no more than a **minor adverse effect**, which is **not significant** in terms of the EIA Regulations.

[57] NatureScot (2024). Breeding Season Dates for Key Breeding Species in Scotland. Available at: https://www.nature.scot/doc/bird-breeding-season-dates-scotland (Accessed 10 August, 2024)
[58] https://www.bto.org/understanding-birds/birdfacts/hen-harrier (Accessed 10 August, 2024)

11.9.2.2 Operation

11.9.2.2.1 Displacement/Habitat Loss

While the direct loss of habitat during construction will be negligible, the indirect loss of habitat through displacement away from the rotating turbines once the Proposed Development is operational is expected to have a greater impact. Studies have shown that hen harriers typically avoid wind turbines by around 200-250m (Haworth and Fielding, 2012[41] and Pearce-Higgins et al, 2009[59]), thereby effectively denying them access to potential foraging habitat in the immediate vicinity of each turbine. Based on the upper displacement distance, the cumulative area of suitable foraging habitat which hen harriers will effectively be prevented from using around the six wind turbines is approximately 109ha (1.09km^2). This does not include closed canopy commercial plantation forestry located within 250m of any of the proposed turbines.

Hardey et al. (2013)[25] notes breeding season ranges of 3.6km^2 and 7.3km^2 for females and males respectively but that males can range as far as 10km from the nest while females mainly remain within 300-500m of the nest. However, studies by Arroyo et al. (2009) found evidence to suggest overlap between foraging areas of birds from neighbouring territories, as was observed at the Site in 2022 when two pairs were present. In such circumstances it is reasonable to assume that the collective male foraging range for two breeding territories would be in the region of 9km^2 to 11km^2, and approximately half that for females, assuming 25-50% range overlap. Based on these figures, the loss of 1.09km^2 of foraging habitat through displacement from around the operational turbines would represent between 10-12% of male foraging habitat and an even greater proportion of female foraging habitat. If based on a single breeding pair, the loss would represent almost 15%. This may reduce the carrying capacity of the Site and immediately surrounding area to a single pair and put greater importance and reliance on the suitability of the habitat outside of the Site in order to sustain that breeding pair in the long term. It may also force those birds to forage further afield to the upper extents of their foraging ranges which in turn would increase energy expenditure and may have potential impacts on breeding success and survivorship in the longer term.

This indirect loss of hen harrier foraging habitat and the reduction in carrying capacity of the Site and surrounding area to a single pair would be permanent and long-term. This may have an impact of medium to large magnitude on the local hen harrier population, regardless of whether one or two pairs were affected. At the regional level, the displacement and reduction in carrying capacity to a single pair would represent a loss of 0.67-0.80% of the NHZ population (based on the NHZ population range of between 125-150 pairs), assuming the displaced pair are unable to relocate (which is unlikely). This would represent an impact of small magnitude on the NHZ population. Given the regional value of the Site to the hen harrier population, this would likely result in a **minor adverse effect**, which is **not significant** in terms of the EIA Regulations.

11.9.2.2.2 Disturbance

Whilst the potential for disturbance impacts is more intensive during the construction phase, breeding hen harrier may still experience disturbance from operational activities, such as the operation and movement plant and vehicles and general human activities during the breeding season.

As noted above in relation to construction, while all turbines have been positioned over 300m from the three nesting sites identified in 2021 and 2022, this has been based upon the species' documented avoidance of operational turbines. It is not based on active machinery, moving vehicles or the presence of humans, the influences from which are more unpredictable and hence their disturbance impacts potentially further reaching. Furthermore, as hen harriers do not use traditional nest sites from year to year, they could establish nesting sites anywhere within the Site or immediately surrounding area in any given year throughout the Proposed Development's operational lifespan. Therefore, any breeding hen harriers that establish a nest site within 750m of the development footprint may be at risk of being disturbed by operational activities, although this may be less likely for less intrusive activities.

[59] Pearce-Higgins, J.W., Stephen, L., Langston R.H.W., Bainbridge, I.P. & Bullman, R. (2009). The distribution of breeding birds around upland wind farms. Journal of Applied Ecology 46 (6): 1323 – 1331. (Accessed 10 August, 2024)

In the absence of mitigation, the disturbance of breeding hen harriers may result in the abandonment of nesting attempts and the death of eggs and chicks if progressed to that stage. Although it is possible that the displaced birds may establish a new nest site further away within the same season, this disruption could have an adverse effect on their breeding success in that season. It may also reduce the birds' preference for the Site resulting in their abandonment of the area altogether over the longer term.

The potential for this disturbance would exist throughout the Proposed Development's lifespan unless the territories were abandoned and there were no longer any breeding hen harriers in the vicinity of the wind farm site. The potential resultant displacement and/or abandonment of the site by breeding hen harriers is likely to have an impact of medium to large magnitude on the locally occurring hen harrier population, regardless of whether one or two pairs were affected. At the regional level however, the potentially permanent disturbance and abandonment of up to two pairs of breeding hen harrier in the medium to long term would represent a loss of 1.3-1.6% of the NHZ population (based on the NHZ population range of between 125-150 pairs), assuming both displaced pairs are unable to relocate (0.67-0.80% of the NHZ population if only one pair was present/affected). This would represent an impact of medium magnitude on the NHZ population which, given the regional value of the Site to the hen harrier population, would likely result in a **moderate adverse effect**, which is considered to be **significant** in terms of the EIA Regulations.

11.9.2.2.3 Collision Mortality

Based on the observed flight activity, the collision risk model estimates that as a minimum, the Proposed Development could result in the collision of 0.06 birds per year, as calculated using the recommended 99% avoidance rate for this species (SNH, 2018b[18]). This means it would take approximately 15.5 years for one hen harrier collision to occur and potentially up to three collisions over the course of the Proposed Development's 50 year operational lifespan.

This is based on the hen harrier flight activity recorded during Year 2 during which there were two breeding pairs in the vicinity of the Site. Hence, it represents a worst-case scenario of collision risk based on the survey data. As discussed above in relation to indirect habitat loss during the operational phase of the Proposed Development however, the displacement/exclusion of hen harriers from areas immediately surrounding the turbines and the effective habitat loss that this represents may reduce the carrying capacity of the Site and immediately surrounding area to no more than a single pair. Therefore, the Year 1 collision risk output, when only a single breeding pair were present, is considered to represent a more realistic scenario of the frequency and distribution of hen harrier flight activity during the operational phase.

The collision risk based on the Year 1 survey data estimates the collision of 0.01 birds per year. This would equate to the collision of one hen harrier every 170 years. In this scenario, it is unlikely that there would be any hen harrier collisions during the Proposed Development's operational lifespan.

Taking the Year 1 collision risk estimate as the more realistic scenario, the risk of collision is considered to be so low that it would represent an impact of negligible magnitude such that adverse effects, although permanent, are very likely to result in a **negligible effect** that is **not significant**.

11.9.3 Black Grouse

11.9.3.1 Construction

11.9.3.1.1 Habitat Loss

As explained in **Section 11.7**, turbines have been positioned at least 500m away from the traditional, core black grouse lek site. Therefore, this feature will not be lost as a result of the development. Furthermore, the buffer zone provides open access into and out of the lek site from the supporting woodland and woodland edge habitat of Clais Dhearg SSSI to the north. It is therefore expected that birds will continue to use this lek site following the construction of the Proposed Development and hence there will be **no effect** in terms of loss of this core lek site.

In terms of the wider Proposed Development, the quantity of habitat which will be directly lost is negligible when considered in the context of the wider Site and surrounding area. A total of 8.84ha of natural habitat will be permanently lost as a result of the Proposed Development, which is only a small proportion (3.37% of 262ha) of the overall Site itself. This is predicted to very likely have a **negligible effect**, which is **not significant** in terms of the EIA Regulations.

11.9.3.1.2 Disturbance

In their review of disturbance distances on selected species, Goodship and Furness (2022)[41] concluded that nesting female black grouse are not passively disturbed (e.g. by increased vigilance and/or alarm calling) by human presence at distances greater than 100-150m, and lekking males at distances of 500-750m. Active disturbance (e.g. taking flight or moving away) distances were shorter with upper limits at 10-50m for nesting females and 300-500m for lekking males.

While all turbines have been positioned over 500m from the core lek site, the access track between Turbine 4 and Turbines 1 and 2 passes approximately 200m away from this lek site, while Turbines 1, 3 and 4 are located within the 750m upper-range disturbance distance. Consequently, construction activities, including initial track formation and subsequent vehicle movements, may disturb birds whilst they are using this lek site during the display period of the breeding season.

As the core lekking period is temporally restricted to periods around dawn, and occasionally dusk, between late March and mid-May, the risk of construction activities causing this disturbance is temporary. Similarly, the impacts from the more intensive construction related disturbance (as opposed to less intensive operational disturbance) would only persist for the duration of the construction phase. Nonetheless, in the absence of mitigation, the disturbance of birds attending this lek site may result in its abandonment. Although it is possible that the displaced birds may establish a new lek site further away, this disruption may have an adverse effect on the longer-term integrity and success of the black grouse population associated with the Site.

Although the influence of construction related disturbance would be temporary and short term as described above, the displacement and/or abandonment of the core lek site may potentially result in more permanent and longer-term impacts (e.g. the removal of these birds from the breeding population). Although it is unlikely that these birds would be entirely removed from the breeding population (i.e. the lek site is likely to relocate), in the worst-case scenario, this could have an impact of medium magnitude on the NHZ population. Given the regional value of the Site to the black grouse population, this would likely result in a **moderate adverse effect**, which is considered to be **significant** in terms of the EIA Regulations.

11.9.3.2 Operation

11.9.3.2.1 Displacement/Habitat Loss

While the direct loss of black grouse habitat during construction will be negligible, the indirect loss of habitat through displacement once the Proposed Development is operational is expected to have a greater impact. There is potential that birds will be discouraged from using suitable habitats in the immediate vicinity of the turbines thereby effectively constituting indirect loss of habitat. The habitat within the Site is predominantly comprised of open blanket bog, with smaller components of birch woodland, dry heath and purple moor grass rush pasture in the eastern half (see **EIA Report Chapter 10: Ecology**), which represent suitable foraging and resting/shelter habitat for black grouse. The indirect loss of this habitat through displacement may have an impact on the local black grouse population. However, black grouse were very rarely recorded using the habitats within the Site, typically only during the lek surveys which hence involved display activity and short flights to and from lek sites. More suitable supporting habitat exists to the north of the Site associated with Clais Dhearg SSSI where black grouse were also observed during the surveys. It is more likely that these areas represent the core habitats used by the black grouse population associated with the Site, as opposed to the moorland habitats within the Site, particularly those located closer to the hard edge of the coniferous plantation associated with Fearnoch Forest to the east and south of the Site.

The indirect loss of black grouse habitat would be permanent and long-term but is predicted to have an impact of small magnitude on the NHZ population. Given the regional value of the Site to the black grouse population, this would likely result in a **minor adverse effect**, which is considered to be **not significant** in terms of the EIA Regulations.

11.9.3.2.2 Disturbance

Whilst the potential for disturbance impacts is more intensive during the construction phase, black grouse may still experience disturbance from operational activities, such as the operation and movement plant and vehicles and general human activities, particularly during the core lekking period (around dawn, and occasionally at dusk, between late March and mid-May).

As noted above in relation to construction, while all turbines have been positioned over 500m from the core lek site, the access track between Turbine 4 and Turbines 1 and 2 passes approximately 200m away from this lek site, while Turbines 1, 3 and 4 are located within the 750m upper-range disturbance distance (Goodship and Furness, 2022[41]). Consequently, operational activities and general human presence in these areas could disturb birds whilst they are using this lek site during the display period of the breeding season.

In the absence of mitigation, the disturbance of birds attending this lek site may result in its abandonment. Although it is possible that the displaced birds may establish a new lek site further away, this disruption could have an adverse effect on the longer-term integrity and success of the black grouse population associated with the Site.

The potential for this disturbance would exist throughout the Proposed Development's lifespan unless the core lek site became abandoned and there were no longer any active lek sites within the Site. The potential resultant displacement and/or abandonment of the core lek site may potentially result in more permanent and longer-term impacts (e.g. the removal of these birds from the breeding population). Although it is unlikely that these birds would be entirely removed from the breeding population (i.e. the lek site is likely to relocate), in the worst-case scenario, this could have an impact of medium magnitude on the wider NHZ population. Given the regional value of the Site to the black grouse population, this would likely result in a **moderate adverse effect**, which is considered to be **significant** in terms of the EIA Regulations.

11.9.3.2.3 Collision Mortality

There were no black grouse flights recorded during flight activity surveys and therefore it was not possible to undertake CRM, and by inference, an absence of flight activity would indicate an extremely low risk of collision. As a result, there will be **no effect** in terms of collision mortality with the turbine blades. However, it is understood that this species is vulnerable to collisions with turbine bases and the lower parts of turbine towers. Therefore, mitigation proposed to offset this impact has been proposed in **Section 11.7**.

11.10 Additional Mitigation and Monitoring

The potential on breeding bird effects arising from construction and operation phases of the Proposed Development are considered in detail in the **Appendix 11.3: Bird Protection Plan** and summarised below for the three VORs.

11.10.1 Golden Eagle

11.10.1.1 Construction

11.10.1.1.1 Disturbance

As explained in **Section 11.9.1.1.2**, roost sites would typically only be occupied overnight (i.e. between dusk and dawn) and hence unlikely to overlap with construction hours. In order to avoid disturbance, all construction activities taking place within 500m of the roost site will be restricted to the period from one hour after sunrise to one hour before sunset. Given working hours, this is only likely to pose a restriction during winter months. Where works are proposed within 500m of the roost site a monitoring watch will be conducted between one hour before to one hour after sunset in order to identify if the roost site is in use. Only works under supervision by the Ecological Clerk of Works (ECoW) or suitable qualified ornithologist (SQO) will be permitted to take place within 500m of the roost site beyond sunset or before sunrise.

11.10.1.2 Operation

11.10.1.2.1 Disturbance

To minimise the risk of disturbing any golden eagles which may use the roost site, all operational maintenance activities taking place within 500m of the roost site will be restricted to the period from one hour after sunrise to one hour before sunset. In the relatively unlikely event that works should need to take place beyond sunset or before sunrise, works will only be permitted to take place within 500m of the roost site under supervision by the ECoW/SQO. For works required to advance beyond sunset or commence before sunrise, a monitoring watch will be conducted as described for the construction phase.

11.10.2 Hen Harrier

11.10.2.1 Pre-construction

11.10.2.1.1 Monitoring Surveys

A pre-construction raptor/hen harrier survey of the Site and a surrounding buffer of at least 1km will be carried out. Surveys will commence from mid-March to capture early season hen harrier display flight activity and will involve a combination of VP and walkover surveys followed by focal watches to identify and monitor any active nest site locations.

Immediately preceding the commencement of construction works a programme of surveys will be undertaken in the breeding season to confirm the continued presence of hen harrier and other Schedule 1 listed raptor species in the vicinity of the Proposed Development and establish whether any breeding pairs are present and where the current nest sites are located.

These surveys will also identify whether there are any other nest sites in the vicinity of the Site which could pose a constraint to the construction works.

11.10.2.2 Construction

11.10.2.2.1 Monitoring Surveys

The pre-construction raptor/hen harrier surveys will be repeated during the construction phase to identify breeding activity and the requirement for any associated works exclusion zones (taking account of disturbance distances for hen harrier) and assist the contractor to schedule the works more appropriately to avoid disturbance impacts on nesting hen harriers.

Site clearance and construction activities should ideally be timed to take place outside the main breeding season (mid-March to mid-August) to avoid nest destruction and disturbance.

Hen harriers establish new nests each year but can display high levels of site fidelity, nesting in the same location as previous years, or within a few hundred metres of it. Therefore, the hen harriers associated with the Site may be able to select nest sites in locations where disturbance is less intrusive in which to nest during breeding seasons which overlap with the construction phase.

11.10.2.2.2 Disturbance

Any active hen harrier nests which are identified during the construction phase monitoring surveys will be cordoned off to a distance 750m in line with the upper range disturbance distance in Goodship and Furness (2022)[41].

All site personnel will be made aware of the works exclusion zone through toolbox talks presented by an ECoW/SQO and construction operations will be delayed within the exclusion zone until the young have fledged and/or the nest becomes vacant (e.g. the nesting attempt fails). This will be confirmed by the ECoW/SQO prior to the recommencement of construction works. Under certain circumstances some activities may be permitted within the exclusion zone (e.g. low intensity/non-intrusive activities and/or where works are not in direct line of sight) or the extent exclusion zone reduced (e.g. once any young are fledged). Any such reductions or relaxations in the works exclusion zone will only be permitted by the ECoW/SQO, and if necessary, in consultation with NatureScot.

11.10.2.1 Operation

11.10.2.1.1 Monitoring Surveys

A programme of post-construction monitoring will be carried out to determine any effects on the distribution and breeding success of hen harriers within or immediately surrounding the Site. The monitoring will be required to identify the presence of breeding harriers which may be disturbed by operational maintenance activities and is likely to be required annually throughout the Proposed Development's operational lifespan.

The scope of the monitoring programme will be developed in consultation with NatureScot and the findings will be used to determine if effects are equivalent to, or more significant than predicted, potentially resulting in a requirement for further adaptive management to ameliorate these effects.

11.10.2.1.2 Habitat Loss/Displacement

In order to reduce the impact of effective loss of hen harrier habitat through displacement from around the turbines, it is proposed to enhance the condition of the open ground habitats in the nearby and wider surrounding area through management of the local deer population in order to reduce the grazing pressure they currently exert on the habitats. The presence of both red deer and roe deer was recognised throughout the surveys through direct observations and extensive pathways amongst the vegetation. The density at which they exist and the grazing pressure they exert on the vegetation communities of the habitats within the Site and surrounding area is considered to suppress favourable conditions for both the habitats themselves and the biodiversity they support. Indeed, grazing pressure by deer is recognised to be a long-

standing threat to the condition of the designated woodland habitats of both the adjacent Clais Dhearg SSSI[60] and Loch Etive Woods Special Area of Conservation[61] (NatureScot, 2020). Meanwhile, on the more open habitats associated with the Site, there was notably low abundance of hen harrier prey including small passerines and field voles, although no observations were made regarding their presence and abundance.

In order to improve habitat conditions for hen harrier and wider biodiversity a more dedicated and stringent deer management regime is proposed to that which is currently in place. Further details of this are provided in **EIA Report Chapter 10: Ecology** – **Appendix 10.6: Deer Management Plan**, but in summary the measures will include those outlined in the following paragraphs.

A deer culling regime will be established and implemented across the landowners wider estate, which is hereafter referred to as the "Cruach Deer Management Area" (see **Figure 10.6.1**). This includes the Site, off-Site habitat management units and the adjacent Clais Dhearg SSSI and components of Loch Etive Woods SAC.

Subject to the consenting of the Proposed Development, the deer management will involve an initial deer population assessment conducted across the landownership to determine the baseline population against which the culling regime should be devised. Over time, the deer management will aim to achieve lower deer densities. Through management of the local deer population and reduction in the grazing pressure they exert, the vegetation communities associated with the open ground habitats will be able to mature and the density of the grassland sward increase, with expansion of rush and heather coverage. This will improve habitat conditions for hen harrier by not only improving the condition and extent of nesting habitat, but also improving conditions for small passerines and vole prey.

The off-Site habitat enhancement area is approximately 74ha in area while the open ground and scattered woodland habitats associated Clais Dhearg SSSI located within approximately 1km to the north of the Site constitute an area of at least 271ha. While it is acknowledged that these areas are already in reasonable condition for hen harrier given they already support the species, the overall improvement in habitat conditions across the combined 345ha will offset the effective loss of 109ha through displacement from suitable habitats immediately surrounding the turbines (see **Section 11.9.2.2.1**). This does not include habitat enhancements within the Site, particularly those areas which are over 250m from the turbines which birds may still be reasonably expected to utilise.

As stated in the assessment of operational phase habitat loss/displacement (see **Section 11.9.2.2.1**), the exclusion of hen harriers from suitable habitat immediately surrounding the turbines may reduce the carrying capacity of the Site and immediately surrounding area to a single pair (although as outlined earlier in this Section, available prey resource across the Site was poor). It would also put greater importance and reliance on the suitability of the habitat outside of the Site in order to sustain that breeding pair in the long term. The principle aim of the habitat enhancements, therefore, is to ensure that habitat conditions in the vicinity of the Site (e.g. within the foraging range of hen harrier), particularly within the off-Site habitat enhancement area and Clais Dhearg SSSI, remain sufficient to support the maintenance of at least a single pair of breeding hen harrier.

No targeted management of the habitat will be carried out immediately surrounding the turbines to dissuade hen harriers from venturing into their proximity where they may be at increased risk of collision with the rotating blades. However, the very requirement for this habitat management for hen harriers is to offset the effective loss of habitat from which they will be displaced in proximity to the turbines. Therefore, there is a low expectation that hen harriers will venture in close proximity to the turbines.

In order to quantify the success of the deer management for hen harrier, pre- and post-construction habitat condition and prey availability monitoring surveys will be carried out in the open ground habitats of the Site, the southern part of the adjacent Clais Dhearg SSSI and the off-Site habitat enhancement area. The full scope and objectives of these monitoring surveys will be determined in consultation with NatureScot

[60] NatureScot SiteLink WebSite – Clais Dhearg SSSI. Available at https://sitelink.nature.scot/site/357. (Accessed 10 August, 2014)
[61] NatureScot SiteLink WebSite – Loch Etive Woods SAC. Available at https://sitelink.nature.scot/site/8295. (Accessed 10 August 2024]

subsequent to the Proposed Development's consent, but their overall aims will be to detect and document the improved sward density and composition and prey abundance and distribution. The monitoring surveys will be conducted in post-construction years 1, 2, 3, 5, 10 and 15 with the pre-construction surveys representing the baseline conditions upon which improvements will be identified and measured. The findings of each monitoring year's surveys will be reported to NatureScot and ABC.

Should the deer management measures result in a lack of improvement to the habitat conditions and prey availability to the point that the area is no longer able to support at least one breeding pair of hen harriers, as determined through post-construction monitoring surveys detailed in **Section 11.10.2.1**, then adaptive measures may need to be investigated in order deliver further habitat enhancements for hen harrier in the wider area. Any such adaptive measures would be developed in consultation with NatureScot.

11.10.2.1.3 Disturbance

In order for operational activities to take place during the breeding season without risk of disturbing breeding hen harriers the monitoring surveys outlined above will need to be carried out annually throughout the Proposed Development's operational lifespan.

Works exclusion zones will be established around any active hen harrier nests which are identified during these monitoring surveys. The nesting attempts will be monitored by a Suitably Qualified Ornithologist (SQO), and exclusion zones will only be relaxed if the SQO deems the risk of disturbance to be low (e.g. based on the nature of the works, line of sight, stage of the breeding attempt etc), and will only be lifted once the young have fledged and/or the nest becomes vacant (e.g. the nesting attempt fails). An operational phase breeding bird management protocol will be drafted prior to the commencement of works setting out the monitoring surveys and protocols to be followed in evaluating the possible relaxation of works exclusions. Post construction monitoring will be carried out annually in years 1 - 5, and every five years thereafter.

11.10.3 Black Grouse

11.10.3.1 Pre-construction

A pre-construction black grouse lek survey of the Site and a surrounding buffer of at least 750m will be carried out and will involve walkover surveys of all suitable lekking habitat, including inspections of the core lek site as well as the other ad-hoc, peripheral lek sites. Surveys will take place during the core lekking period (late March to mid-May).

The purpose of these surveys will be to confirm the continued presence of black grouse, the attendance of lek sites and the number of lekking males, in the vicinity of the Proposed Development. These surveys will identify whether any of the ad hoc, peripheral lek sites have become more regularly used and/or if any other lek sites have been established in the vicinity of the Site which could pose a constraint to the construction works.

11.10.3.2 Construction

11.10.3.2.1 Monitoring Surveys

The pre-construction black grouse lek surveys will be repeated during the construction phase to identify the requirement for any associated works exclusion zones and assist the contractor to schedule the works more appropriately to avoid disturbance impacts on lekking black grouse. Any works exclusion zones which are required to be established around active black grouse lek sites will take account of disturbance distances discussed for black grouse in **Section 11.10.3.2.2**11.10.2.2.2.

11.10.3.2.2 Disturbance

In the absence of mitigation, disturbance from construction activities has the potential to result in the displacement and/or abandonment of the core black grouse lek. The lekking period is temporally restricted to periods around dawn, and occasionally dusk, between late March and mid-May. Therefore, in order to avoid such disturbance, all construction activities taking place between late March to mid-May within 750m of the core lek site will be restricted to the period from one hour after sunrise to one hour before sunset. This is only likely to pose a significant constraint between late March and mid-April when sunset and sunrise times occur closer to daily construction start and finish times, particularly once the clocks go forward at the end of March.

11.10.3.3 Operation

11.10.3.3.1 Monitoring Surveys

Following the completion of the construction phase, a programme of post-construction monitoring will be carried out to determine whether the presence of the Proposed Development has any effects on the distribution and activity status of lekking black grouse within and immediately surrounding the Site. Additionally, this monitoring will be required to identify the presence of lekking black grouse which may be disturbed by operational maintenance activities (measures for which are discussed below). As such, this monitoring is likely to be required annually throughout the Proposed Development's operational lifespan.

The scope of the monitoring programme will be developed in consultation with NatureScot but will broadly follow the same methods of the pre- and during construction surveys detailed above.

The findings of the post-construction monitoring will be used to determine if effects are equivalent to, or more significant than predicted, potentially resulting in a requirement for further adaptive management to ameliorate these effects.

11.10.3.3.2 Disturbance

In order for operational activities to take place during the breeding season without risk of disturbing lekking black grouse works exclusion zones of 750m will be established around known lek sites. The exclusion zones will only be implemented between late March to mid-May with works being restricted to the period from one hour after sunrise to one hour before sunset during this time.

The lek sites will be monitored by an SQO and exclusion zones will only be relaxed if the SQO deems the risk of disturbance to be low (e.g. based on the nature of the works, line of sight, stage of the lekking season etc), and will only be lifted after mid-May once the lekking period is over. An operational phase breeding bird management protocol will be drafted prior to the commencement of works setting out the monitoring surveys and protocols to be followed in evaluating the possible relaxation of works exclusions.

11.10.3.3.3 Collision Mortality

As stated in **Section 11.9.3.2.3**, there were no black grouse flights recorded during the specific flight activity surveys. Nonetheless, black grouse were recorded flying across the Site during other dedicated surveys (e.g. black grouse surveys and SBBS), particularly within, and just beyond the northern parts of the Site.

Section 11.7 details embedded mitigation including the painting of turbine bases to make them more visible to black grouse commuting to/from lek sites in low light levels. It is considered that this will reduce the potential for collisions. Dedicated carcass searches are typically undertaken to monitor turbine collision mortality impacts. However, this is not considered to be suitable at the Site, given the low number of black grouse and hence the low potential collision incident rate that such monitoring would be tasked with identifying. Instead, it is simply proposed to develop and implement a protocol for recording and reporting black grouse (and other bird) carcasses throughout the wind farm's operational lifespan in order to monitor the effectiveness of this mitigation measure. For black grouse in particular, given that birds are more likely to collide with the turbine bases, it is much more likely that any deceased birds would be found on the hardstanding immediately adjacent to the turbine tower, as opposed to having been deflected into the vegetation of the surrounding habitat as birds are more likely to be following collision with the turbine blades.

11.10.3.3.4 Monitoring Surveys

Following the completion of the construction phase, a programme of post-construction monitoring will be carried out to determine whether the presence of the Proposed Development has any effects on the presence of black grouse and in particular the location(s) and attendance of lek sites located within and immediately surrounding the Site.

The scope of the monitoring programme will be developed in consultation with NatureScot but will broadly follow the same methods of the pre- and during construction surveys detailed above.

The findings of the post-construction monitoring will be used to determine if effects are equivalent to, or more significant than predicted, potentially resulting in a requirement for further adaptive management to ameliorate these effects.

11.10.4 General Breeding Birds

11.10.4.1 Construction

11.10.4.1.1 Monitoring Surveys and Pre-works Checks

The pre-construction raptor/hen harrier surveys detailed above will identify any breeding bird activity and the requirement for any associated works exclusion zones and assist the contractor to schedule the works more appropriately to avoid disturbance impacts on breeding birds.

During the breeding season, pre-felling/pre-construction checks would be made ahead of the works in all areas of potential bird nesting habitat by the ECoW/SQO in order to check for the presence of nesting birds.

11.10.4.1.2 Disturbance

Any active nest sites which are identified during the construction phase monitoring surveys and/or pre-works check will be cordoned off to a distance which will be commensurate with the sensitivity of the species in question and with adherence to relevant guidance (e.g. Goodship and Furness, 2022[41]). For example, an exclusion zone of 10m may be acceptable for more disturbance-tolerant species while exclusion zones of up to 750m may be required for more sensitive and/or specially protected species such as those listed on Annex 1 of the EU Birds Directive and/or Schedule 1 of the Wildlife and Countryside Act 1981 (as amended). All site personnel would be made aware of the works exclusion zone through toolbox talks presented by the ECoW/SQO and construction operations will be delayed within the exclusion zone until

the young have fledged and the nest becomes vacant. This will be confirmed by the ECoW/ecologist prior to the recommencement of construction.

11.11 Residual Effects

11.11.1 Golden Eagle

11.11.1.1 Construction

Identification and monitoring of roost sites within the G/LAW1 golden eagle territory and additional mitigation through the implementation of disturbance free buffer zones around dusk and dawn will negate disturbance to roost sites. In the relatively unlikely event that works should need to take place beyond sunset or before sunrise, works will only be permitted to take place within 500m of the roost site under supervision by the ECoW/SQO. For works required to advance beyond sunset or commence before sunrise, a monitoring watch will be conducted as described for the construction phase. Due to the local value of the Site to the golden eagle population alongside the planned mitigation measures (detailed in the BPP) it is anticipated that there will be a reduced impact from the temporary loss of foraging habitat and displacement during construction activities at both the local (territory) or regional (NHZ) level. The residual effect on the golden eagle population is therefore predicted to be very likely **negligible** and **not significant**.

11.11.1.2 Operation

Due to the tendency for golden eagle to avoid areas surrounding turbines collision mortality is determined to have **no effect** on golden eagle. This displacement and loss of foraging habitat is predicted to be a localised effect within the territory covered by the golden eagle population. Where maintenance works are required during the operational period, additional mitigation, as outlined above, will negate disturbance to roost sites. The significance of any residual effects on the NHZ golden eagle population are predicted to be very likely **negligible** and therefore **not significant**.

11.11.2 Hen harrier

11.11.2.1 Construction

Construction phase surveys to determine the presence of hen harrier nests alongside suitable mitigation measures during construction activities will minimise the risk of disturbance and displacement to hen harrier. This will include timing of works outside of the main breeding season (mid-March to mid-August) and maintaining a 750m buffer around identified nest locations (detailed in the BPP). The residual effect on the NHZ hen harrier population is predicted to be very likely **negligible** and therefore **not significant**.

11.11.2.2 Operation

Whilst the implementation of a more dedicated and stringent deer management regime is anticipated to improve habitat conditions for hen harriers in the vicinity of the Site, the principle aim is to ensure that habitat conditions, particularly within the Habitat Management Units (HMU) of the oHMP and Clais Dhearg SSSI, remain sufficient to support the maintenance of at least a single pair of breeding hen harrier. Therefore, it is still anticipated that one pair of hen harriers would be displaced from the Site and immediately surrounding area. Additionally, where maintenance works are required during the operational period, additional mitigation, as outlined above, will negate disturbance to any nest sites. Consequently, the residual effect on the NHZ hen harrier population is still predicted to be very likely **minor adverse**, but **not significant**.

11.11.3 Black Grouse

11.11.3.1 Construction

The additional mitigation through timing of construction activities outside of the lekking periods and use of exclusion zones around identified lek sites will avoid disturbance impacts on black grouse and minimise displacement. The residual effect on the NHZ black grouse population is predicted to be very likely **negligible** and therefore **not significant**.

11.11.3.2 Operation

Where maintenance works are required during the operational period, additional mitigation, as outlined above will negate disturbance to any lek sites. Additionally painting the turbine bases with concentric bands is anticipated to significantly reduce the collision risk posed to locally occurring black grouse on the Site, such that the residual effect on the NHZ population is predicted to be very likely **negligible**.

11.11.4 Summary of Residual Effects

Table 11.12 presents a summary of impacts and effect significance on VORs both prior to and after the implementation of mitigation.

TABLE 11.12: SUMMARY OF RESIDUAL EFFECTS ON VORS

SPECIES	DEVELOPMENT PHASE	IMPACT	PRE-MITIGATION EFFECT SIGNIFICANCE	MITIGATION	RESIDUAL EFFECT SIGNIFICANCE
Golden Eagle	Construction	Habitat Loss – Nest Sites	No Effect	None	No Effect
		Habitat Loss – Roost Sites	No Effect	None	No Effect
		Habitat Loss – Foraging	Negligible (Not Significant)	None	Negligible (Not Significant)
		Disturbance – Roost Sites	Negligible (Not Significant)	Temporal works restrictions within 500m of the known roost sites unless approved by the ECoW/SQO through monitoring.	Negligible (Not Significant)
		Disturbance -Foraging	Negligible (Not Significant)	None	Negligible (Not Significant)
	Operation	Displacement/Habitat Loss	Negligible-Minor Adverse (Not Significant)	None	Negligible-Minor (Not Significant)
		Disturbance	Negligible (Not Significant)	Temporal works restrictions within 500m of the known roost sites unless approved by the ECoW/SQO through monitoring.	Negligible (Not Significant)
		Collision Mortality	No Effect	None	No Effect
Hen Harrier	Construction	Habitat Loss – Nest Sites	No Effect	None	No Effect
		Habitat Loss – Roost Sites	No Effect	None	No Effect
		Habitat Loss – Foraging	Negligible (Not Significant)	None	Negligible (Not Significant)

SPECIES	DEVELOPMENT PHASE	IMPACT	PRE-MITIGATION EFFECT SIGNIFICANCE	MITIGATION	RESIDUAL EFFECT SIGNIFICANCE
		Disturbance	Minor Adverse Effect (Not Significant)	Pre- and during construction monitoring surveys and temporal works exclusion zones around active nest sites.	Negligible (Not Significant)
	Operation	Displacement/Habitat Loss	Minor Adverse Effect (Not Significant)	More dedicated, stringent deer management to improve open ground habitat conditions in areas surrounding the Site.	Minor Adverse Effect (Not Significant) - the aim of the habitat enhancement is to ensure the maintenance of at least a single breeding pair in the area.
		Disturbance	Moderate Adverse Effect (Significant)	Operational monitoring surveys and sensitive timing of works or works exclusion zones around active nest sites.	Negligible (Not Significant)
		Collision Mortality	No Effect	None	No Effect
Black Grouse	Construction	Habitat Loss – Lek Sites	No Effect	None	No Effect
		Habitat Loss – Foraging	Negligible Effect (Not Significant)	More dedicated, stringent deer management to improve open ground habitat conditions in areas surrounding the Site.	Negligible Effect (Not Significant)
		Disturbance	Moderate Adverse Effect (Significant)	Pre- and during construction monitoring surveys and temporal works exclusion zones around active lek sites.	Negligible Effect (Not Significant)

SPECIES	DEVELOPMENT PHASE	IMPACT	PRE-MITIGATION EFFECT SIGNIFICANCE	MITIGATION	RESIDUAL EFFECT SIGNIFICANCE
	Operation	Displacement/Habitat Loss	Minor Adverse Effect (Not Significant)	More dedicated, stringent deer management to improve open ground habitat conditions in areas surrounding the Site.	Minor Adverse Effect (Not Significant)
		Disturbance	Moderate Adverse Effect (Significant)	Operational monitoring surveys and sensitive timing of works or temporal works exclusion zones around active lek sites.	Negligible Effect (Not Significant)
		Collision Mortality	No Effect	Painted turbine bases and implementation of a carcass reporting protocol.	No Effect

11.12 Cumulative Assessment

11.12.1 Construction

For ornithological receptors, effects arising from activities during the construction phase are generally not considered in a cumulative sense. This is because the short-term duration of potential impacts and uncertainties in relation to the likelihood of temporal overlap with the construction phases of other developments means that additive effects are difficult to predict. They are also much less likely to arise due to their temporal separation. Consequently, consideration of cumulative effects is limited to effects predicted during the operational phase, when additive effects on regional populations are more likely to coincide and result in significant effects. Hence, cumulative effects during construction are concluded to be not significant for all species.

11.12.2 Operation

11.12.2.1 Habitat Loss/Displacement

11.12.2.1.1 Golden Eagle

Cumulative operational habitat loss/displacement effects to golden eagle are considered in relation to the loss of suitable GET 6+ habitat for those birds which are most likely to be affected by the Proposed Development itself (i.e. birds associated with the nearest G/LAW1 territory through displacement from existing wind farms or forestry).

There are two other existing wind farm developments which overlap with the core range of the G/LAW1 birds' territory: Beinn Ghlas and Carrigh Gheal. Beinn Ghlas Wind Farm is located in the centre of the G/LAW1 core range and with the application of the 500m conservative displacement buffer occupied an area of approximately 251ha. Meanwhile, the 500m buffer around Carriag Gheal Wind Farm only partially overlaps with the southern extent of the G/LAW1 core range by approximately 55ha of the wind farm's 500m displacement buffer. Within these areas, there are 229ha and 33ha of suitable GET 6+ habitat from which golden eagles are theoretically displaced from/denied access to. This represents 3.2% of the potential GET 6+ habitat within the G/LAW1 golden eagles' core range (8,145ha).

On top of this, there is 2,735ha of closed canopy forestry within the G/LAW1 core range which excludes birds from a further 2,027ha (24.9%) of potential GET6+ habitat within the G/LAW1 golden eagles' core range.

Based on the above, golden eagles from the G/LAW1 territory are therefore already theoretically excluded from 3,041ha (27.4%) of their core range (11,115ha), from which they are displaced from, or unable to use 2,289ha (28.1%) of potentially GET 6+ habitat (8,145ha).

As stated in **Section 11.9.1.2.1** the Proposed Development and 500m golden eagle displacement area will theoretically result in the exclusion of golden eagles from 418ha (3.76%) of the G/LAW1 birds' core range within which there is 228ha of suitable (GET 6+), which represents 3.89% of total GET 6+ habitat in wider G/LAW1 core range (5,856ha). However, as demonstrated through the heat mapping in **Appendix 11.2: Confidential Ornithological Information, Figure 11.2.5** the land within the golden eagle displacement area is used much less frequently than those areas within the central parts of the range associated with Beinn Ghlas and the affiliated higher ground. Therefore, the inherent value of the habitat and airspace immediately surrounding the Site from which golden eagles are predicted to be displaced is considered to be low.

Therefore, the additional impact of displacement and indirect habitat loss which the Proposed Development is anticipated to contribute to the broader cumulative loss of suitable GET 6+ habitat from existing wind farms and commercial forestry is predicted to be negligible against the baseline availability and utilisation

of the core territory and available GET6+ habitat. Given the local value of the Site to the golden eagle population, this would result in a **negligible cumulative effect** at both the local (territory) or regional (NHZ) level.

11.12.2.1.2 Hen Harrier

Cumulative operational habitat loss/displacement effects to hen harrier are considered in relation to the loss of suitable nesting and foraging habitat for those birds which are most likely to be affected by the Proposed Development itself (i.e. territories of birds associated with the regional NHZ population through displacement from existing wind farms or forestry). It has previously been discussed that the suitable habitat within the Proposed Development has the potential to support up to two breeding pairs of hen harrier.

There are two other existing wind farm developments within the potential territory range: Beinn Ghlas and Carrigh Gheal. In addition, there is 2,735ha of closed canopy forestry within the potential territory range which excludes birds from a further 2,027ha of potential habitat for hen harriers within the NHZ.

Therefore, the additional impact of displacement and indirect habitat loss which the Proposed Development is anticipated to contribute to the broader cumulative loss of suitable foraging, nesting, and roosting habitats from existing wind farms and commercial forestry is predicted to be negligible against the baseline availability and utilisation of the local territories and available habitats in the region. Therefore, this would result in a **negligible cumulative effect** at both the local (territory) or regional (NHZ) level, that is **not significant**.

11.12.2.1.3 Black grouse

Cumulative operational habitat loss/displacement effects to black grouse are considered in relation to the loss of suitable lekking, nesting and foraging habitat for those birds which are most likely to be affected by the Proposed Development itself (i.e. sub-populations of birds associated with the regional NHZ population through displacement from existing wind farms). The dispersal pattern of black grouse is known to be very local and within a radius of 5km of their natal sites, so cumulative impacts are likely to be realised on a smaller scale than that of the NHZ.

There is a single existing wind farm development within the potential 5km range of this sub-population: Beinn Ghlas. No effects were reported by this operational scheme.

There are no other proposed wind farm developments within 5km of the Site (e.g. at full application stage, consented or under construction). In the wider NHZ, only six wind farms reported effects on black grouse, ranging from neutral to neutral to minor adverse. These comprised:

- A'Chruach – an operational 21 turbine scheme – low magnitude disturbance at site level only;
- A'Chruach Phase 2 – a consented two turbine extension to A'Chruach – negligible effects;
- Blarghour – a consented 17 turbine scheme – no residual effects;
- Creag Dhubh – a consented nine turbine scheme – low magnitude minor adverse displacement effect during construction;
- Cruach Mhor – an operational 35 turbine scheme – neutral to negligible effects; and
- Ladyfield – a 14 turbine site at application stage – minor adverse construction disturbance and operational displacement effects after mitigation.

Therefore, there is no additional impact of displacement and indirect habitat loss which the Proposed Development is anticipated to contribute to the broader cumulative loss of suitable foraging, nesting, and lekking habitats from existing wind farms is predicted to be negligible against the baseline availability and utilisation of the local sub-populations and available habitats in the region. Therefore, this would result in a **negligible cumulative effect** at both the local (sub-population) or regional (NHZ) level, that is **not significant**.

11.12.2.2 Collision Risk

The assessment of collision risk for the Proposed Development on its own concludes that there may be 0.02 golden eagle collisions and 0.01 hen harrier collisions per year (there were no black grouse flights recorded within the collision risk zone during the survey period, and therefore collision risk modelling was not undertaken for this species). These predictions equate to the likely mortality of one golden eagle every 66.5 years and one hen harrier every 170 years. Additionally, in relation to golden eagle, their observed avoidance of operational wind farms as discussed in **Section 11.9.1.2.1** means their risk of collision is likely to be even less than this. This means that there is an extremely low likelihood of there being any golden eagle, hen harrier or black grouse collisions during the Proposed Development's 50 year operational lifespan. Consequently, it is considered that the risk of collision mortality from the Proposed Development is so low that it is unlikely to contribute to the predicted effects of collision mortality from other wind farms in order to result in a significant effect on the regional (NHZ) population. Therefore, this would result in a **negligible cumulative effect** that is **not significant**.

11.13 Summary

The baseline surveys conducted to inform this EIA Report have identified an ornithological assemblage associated with the Site and surrounding area that is typical of the transitional lower altitude open moorland and coniferous plantation forestry habitats of mid-Argyll, with use of the Site by target species largely being confined to a small number of key species.

Although several bird species of conservation concern were recorded over and/or around the Site, most were not considered to be present frequently enough or in significant numbers for the Site to represent an important resource to them, or to be located on an important flyway. Therefore, further consideration of most recorded species of conservation concern was not required within the EIA Report. Following an assessment of the distribution, abundance, and frequency of occurrence of all target species recorded through the desk study and programme of ornithological surveys, three VORs were scoped into the impact assessment: golden eagle, hen harrier, and black grouse.

The Site does not overlap with any statutory or non-statutory designated sites of ornithological interest. The closest such site is Glen Etive and Glen Fyne SPA, designated for its population of golden eagle, which is located over 6km from the nearest part of the Site (access track) and over 8km from the wind farm site, which is beyond the recognised 6km core foraging range for golden eagles. Consequently, this designated site was scoped out of the assessment.

The impact assessment identified that the construction of the Proposed Development would only result in adverse effects on hen harrier and black grouse (both via disturbance related impacts). However, mitigation measures secured through a BPP are proposed to minimise the effects of such disturbance on both black grouse and hen harriers during the construction phase in the interests of good practice and legal compliance. This would therefore reduce the residual effects on both species to **not significant**.

Regarding the operation of the Proposed Development, adverse effects on golden eagle (displacement/habitat loss), hen harrier (displacement/habitat loss and disturbance) and black grouse (displacement/habitat loss and disturbance) were predicted. The only significant effect was disturbance to nesting hen harrier and/or lekking black grouse. As outlined above, the proposed mitigation measures secured through **Appendix 11.3: Bird Protection Plan** (including post-construction monitoring surveys) and **EIA Report Chapter 10: Ecology** – **Appendix 10.5: Outline Habitat Management Plan** would reduce residual effects on both VORs to **not significant**.

With regards to cumulative effects of the Proposed Development in combination with those of other wind farm developments, none were predicted on any of the three VORs: golden eagle, hen harrier, or black grouse.