

7. ORNITHOLOGY

7.1 Introduction

This Chapter of the Environmental Impact Assessment Report ('EIA Report') evaluates the potential effects of the Ladyfield Renewable Energy Park ('the Development') on ornithological features. This assessment was undertaken by MacArthur Green. All staff contributing to this Chapter have professional experience in ecological impact assessment and ornithology surveys. The chapter includes the following elements:

- Legislation, Policy and Guidance;
- Assessment Methodology and Significance Criteria;
- Baseline Conditions;
- Assessment of Potential Effects;
- Mitigation and Residual Effects;
- Cumulative Effect Assessment;
- Summary of Effects; and
- Statement of Significance.

This Chapter of the EIA Report is supported by the following Technical Appendix documents provided in Volume 3 Technical Appendices:

- A7.1: Ornithology;
- A7.2: Golden Eagle Displacement Evaluation;
- A7.3: Golden Eagle Population Model;
- A7.4: Confidential Ornithology; and
- A8.4: Outline Biodiversity Enhancement Plan.

This Chapter of the EIA Report is supported by the following Figures provided in Volume 2a:

- 7.1 Vantage Points and Viewsheds;
- 7.2 Site Boundary and Survey Areas;
- 7.3 Development Layout and Study Areas;
- 7.4 Black Grouse Activity: 2020 and 2021;
- 7.5 Raptor Flight Activity: Golden Eagle 2020 and 2021 Breeding Seasons;
- 7.6 Raptor Flight Activity: Golden Eagle 2020/21 and 2021/2 Non-breeding Seasons;
- 7.7 Raptor Flight Activity: Merlin;
- 7.8 Raptor Flight Activity: Peregrine Falcon;
- 7.9 Raptor Flight Activity: White-tailed Eagle;
- 7.10 Wader Activity: Greenshank;
- 7.11 Wader Activity: Golden Plover;
- 7.12 Wader Activity: Snipe and Woodcock; and
- 7.13 Golden Eagle Topography (GET) Model: Site and Surrounding Area.

The following Confidential Figures supporting this Chapter are presented in Volume 3 and have restricted availability due the sensitive nature of nest site locations shown:

- C7.1 Golden Eagle Nest Sites;
- C7.2 Golden Eagle Range 2019-2021;
- C7.3 Golden Eagle Topography (GET) Model: Wider Context;
- C7.4 Other Raptor Species Nest Locations; and
- C7.5 Hen Harrier Flight Activity and Nests.

7.2 Legislation, Policy and Guidance

The following guidance, legislation and information sources have been considered in carrying out this assessment:

7.2.1 Legislation

Relevant European legislation has been reviewed and taken into account as part of this ornithological assessment. Of particular relevance is the following European legislation:

- EU Directive 2009/147/EC on the Conservation of Wild Birds ('Birds Directive')⁷⁷;
- EU Directive 92/43/EEC on Conservation of Natural Habitats and of Wild Fauna and Flora (as amended) ('Habitats Directive')⁷⁸; and
- EU Environmental Impact Assessment Directive 2014/52/EU⁷⁹.

The following national legislation, which has been amended as a consequence of EU exit (Scottish Government, 2019⁸⁰; 2020⁸¹), is also considered as part of the ornithology assessment:

- The Wildlife and Countryside Act 1981 (as amended)⁸²;
- The Wildlife and Natural Environment (Scotland) Act 2011⁸³
- The Conservation (Natural Habitats &c.) Regulations 1994 (as amended) (The Habitats Regulations)⁸⁴;
- The Nature Conservation (Scotland) Act 2004 (as amended)⁸⁵; and
- The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 (as amended)⁸⁶.

Chapter 4: Planning Policy sets out the planning policy framework that is relevant to this EIA Report. This ornithological assessment considers the relevant aspects of Scottish Planning Policy,

⁷⁷ Directive 2009/147/EC of the European Parliament and of the Council. Available at: <https://www.legislation.gov.uk/eudr/2009/147/contents> (Accessed 30.05.23)

⁷⁸ Scottish Government (1992). Council Directive 92/43/EEC. Available at: <https://www.legislation.gov.uk/eudr/1992/43/contents>. (Accessed 30.05.23)

⁷⁹ Scottish Government (2014). Directive 2014/52/EU of the European Parliament and of the Council. Available at: <https://www.legislation.gov.uk/eudr/2014/52>. (Accessed 30.05.23)

⁸⁰ Scottish Government (2019). The Town and Country Planning and Electricity Works (EU Exit) (Scotland) (Miscellaneous Amendments) Regulations 2019. Available at: <https://www.legislation.gov.uk/ssi/2019/80/introduction/made> (Accessed 30.05.23)

⁸¹ Scottish Government (2020). EU Exit: The Habitats Regulations in Scotland. Available at: <https://www.gov.scot/publications/eu-exit-habitats-regulations-scotland-2/> (Accessed 30.05.23)

⁸² Wildlife and Countryside Act 1981. Available at: <https://www.legislation.gov.uk/ukpga/1981/69/contents>. (Accessed 30.05.23)

⁸³ Wildlife and Natural Environment (Scotland) Act 2011. Available at: <https://www.legislation.gov.uk/asp/2011/6/contents/enacted>. (Accessed 30.05.23)

⁸⁴ Scottish Government (1994) The Conservation (Natural Habitats, &c.) Regulations 1994. Available at: <https://www.legislation.gov.uk/uksi/1994/2716/contents>. (Accessed 30.05.23)

⁸⁵ Scottish Government (2004). Nature Conservation (Scotland) Act 2004. Available at: <https://www.legislation.gov.uk/asp/2004/6/contents>. (Accessed 30.05.23)

⁸⁶ Scottish Government (2017). The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017. Available at: <https://www.legislation.gov.uk/ssi/2017/101/contents>. (Accessed 30.05.23)

Planning Advice Notes and other relevant guidance. Of relevance to ornithology are the following policies:

- Scottish Planning Policy⁸⁷;
- National Planning Framework 4⁸⁸;
- UK Post-2010 Biodiversity Framework (2012)⁸⁹;
- Scottish Government (2017⁹⁰). Planning Advice Note 1/2013-Environmental Impact Assessment, Revision 1.0;
- Scottish Biodiversity Strategy to 2045. Tackling the Nature Emergency in Scotland (2022)⁹¹
- Onshore Wind Policy Statement 2022⁹²;
- Argyll and Bute Local Biodiversity Action Plan (2016)⁹³; and
- Argyll and Bute Planning Service Biodiversity Technical Note (2017)⁹⁴.

7.2.2 Guidance

The following guidance has been considered:

- CIEEM (2018). Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine version 1.1. Chartered Institute of Ecology and Environmental Management, Winchester;
- European Commission (2010). Natura 2000 Guidance Document *Wind Energy Developments and Natura 2000*. European Commission, Brussels;
- NatureScot (2020a). General pre-application and scoping advice for onshore wind farms. Guidance;
- NatureScot (2020b). The Effect of Aviation Obstruction Lighting on Birds at Wind Turbines, Communication Towers and Other Structures. NatureScot Information Note;
- Pearce-Higgins, J.W. (2021). *Climate Change and the UK's Birds*. British Trust for Ornithology Report, Thetford, Norfolk;
- Scottish Natural Heritage⁹⁵ (SNH) (2000). Windfarms and birds: calculating a theoretical collision risk assuming no avoidance action. SNH Guidance Note;

⁸⁷ Scottish Government (2014). Scottish Planning Policy. Scottish Government, Edinburgh. Available at: <https://www.gov.scot/publications/scottish-planning-policy/> (accessed 30.05.23).

⁸⁸ Scottish Government (2022). National Planning Framework 4. Available at: <https://www.gov.scot/publications/national-planning-framework-4/> (accessed 30.05.23).

⁸⁹ JNCC and Defra (on behalf of the Four Countries' Biodiversity Group) (2012). UK Post-2010 Biodiversity Framework. JNCC, Peterborough.

⁹⁰ Scottish Government (2017). Planning Advice Note 1/2013 – Environmental Impact Assessment, Revision 1.0. Scottish Government, Edinburgh. Available at: <https://www.gov.scot/publications/planning-advice-note-1-2013-environmental-impact-assessment/> (accessed 30.05.23).

⁹¹ Scottish Government (2022). Scottish Biodiversity Strategy to 2045. Tackling the Nature Emergency in Scotland. Scottish Government, Edinburgh. Available at: <https://www.gov.scot/publications/scottish-biodiversity-strategy-2045-tackling-nature-emergency-scotland/> (accessed 30.05.23).

⁹² Scottish Government (2022). *Onshore Wind Policy Statement 2022*. Scottish Government, Edinburgh.

⁹³ Argyll and Bute Council Local Biodiversity Action Plan 2010-2015. Available at https://www.argyll-bute.gov.uk/sites/default/files/migrated_files/argyll_and_bute_local_biodiversity_action_plan_monitoring_report_jun_2020_version_5.0.pdf (Accessed 28.09.23).

⁹⁴ Argyll and Bute Planning Service (2017). A Biodiversity Technical Note for Planners and Developers. Argyll and Bute Council. Available at: https://www.argyll-bute.gov.uk/sites/default/files/migrated_files/biodiversity_technical_note_feb_2017_4.pdf (accessed 28.09.23).

⁹⁵ Please note that Scottish Natural Heritage rebranded as NatureScot on 1st May 2020, however references to documents prior to this date will still refer to SNH.

- SNH (2016a). Assessing connectivity with Special Protection Areas (SPAs). Version 3;
- SNH (2016b). Environmental Statements and Annexes of Environmentally Sensitive Bird Information; Guidance for Developers, Consultants and Consultees Version 2;
- SNH (2017). Recommended Bird Survey Methods to inform impact assessment of Onshore Windfarms;
- SNH (2018a). Assessing significance of impacts from onshore windfarms on birds out with designated areas. Version 2;
- SNH (2018b). Assessing the cumulative impacts of onshore wind farms on birds. SNH Guidance Note;
- SNH (2018c). Environmental Impact Assessment Handbook – Version 5: Guidance for competent authorities, consultation bodies, and others involved in the Environmental Impact Assessment process in Scotland;
- Scottish Executive Rural Affairs Department (2000). *Habitats and Birds Directives, Nature Conservation; Implementation in Scotland of EC Directives on the Conservation of Natural Habitats and of Wild Flora and Fauna and the Conservation of Wild Birds ("the Habitats and Birds Directives")*. Revised Guidance Updating Scottish Office Circular No 6/1995; and
- Stanbury, A., Eaton, M., Aebischer, N., Balmer, D., Brown, A., Douse, A., Lindley, P., McCulloch, N., Noble, D., and Win, I. (2021). Birds of Conservation Concern 5: The population status of birds in the UK, Channel Islands and Isle of Man and second ICUN Red List assessment of extinction risk for Great Britain. *British Birds* 114: 723-747.

7.3 Assessment Methodology and Significance Criteria

7.3.1 Scoping Responses and Consultations

Consultation for this EIA Report topic was undertaken with the organisations shown in Table 7.1. Consultation Responses.

Table 7.1. Consultation Responses

Consultee	Type and Date	Summary of Consultation Response	Response to Consultee
NatureScot	Pre-scoping advice meeting on survey programme 10 th March 2020	Vantage point (VP) coverage for flight activity surveys is good and includes good coverage of the adjacent Glen Etive & Glen Fyne Special Protection Area (SPA) for golden eagle activity.	Noted. VP coverage is shown in Figure 7.1.
		Two years of ornithology surveys are required.	The baseline survey programme ran from March 2020 to March 2022, covering two breeding seasons and two non-breeding seasons (see Appendix 7.1 for details).
		Golden eagle, white-tailed eagle, black grouse, hen harrier and other raptors are likely to be present and will require assessment.	Evidence of these species' presence is presented in Section 7.4 and consideration for inclusion in assessment is presented in Section 7.5.2.
		Maintaining a minimum 500m buffer from the Glen Etive & Glen Fyne SPA boundary is essential when considering the design of the Development. Whilst the current land use indicates that golden eagle usage of the woodland is likely to be low, the flight activity surveys will be key to determining what impacts the Development would have on golden eagles and the SPA.	During the initial stages of the design layout process a 500m buffer from the SPA was kept for proposed locations of Wind Turbines. Results of baseline surveys and evidence from recent scientific studies on golden eagle behaviour around Wind Turbines in Scotland have subsequently allowed revisions to the layout so that a minimum buffer of c.300m from the SPA has been kept in the final design, which is considered sufficiently precautionary (see displacement assessment in section 7.5.5.1).
NatureScot	Pre-scoping advice in response to Ladyfield Technical Note on year 1	Advised that there is no need for a second year of flight activity surveys from VP 3 (see Figure 7.1), which was designed for recording golden eagle activity, because activity should be covered by the other VPs.	Noted. Surveys from VP 3 ceased after year 1 (see Appendix 7.1 for details). An additional VP 5 was added to cover potential Wind Turbine locations in the south of the Site (see Figure 7.1).
		Advised that one year of VP survey from VP 5 is not likely to be sufficient, especially giving that it does not	It was subsequently agreed with NatureScot (email dated 21 st February 2022 – see below) that when

Consultee	Type and Date	Summary of Consultation Response	Response to Consultee
	results, 25 th May 2021	cover some Wind Turbines in the revised layout; recommend that two years of survey work is required from VP 5.	considering the single year survey effort from VP5 alongside the golden eagle satellite tag data, that there are sufficient data available to be confident about eagle use of this area. The final layout does not contain Wind Turbines within the viewshed of VP 5 and so a second year of flight activity surveys were not required.
		Advised that the EIA Report will need to include a robust assessment of the impacts on golden eagle, not only in relation to the Glen Etive & Glen Fyne SPA, but also in the context of its Natural Heritage Zone (NHZ) population and transient birds.	Golden eagle has been assessed within the context of the SPA population, as part of the Habitats Regulations Appraisal (HRA) process, and as part of the EIA process within the context of the NHZ 14 population.
		Advised that the project will need to avoid increasing the collision risk by enhancing habitat close to the turbines. There could be a possibility of forming a buffer of 'good' habitat between the SPA and the wind farm, although the site and any changes against the existing long term forest plan for the area will need to be considered.	Collision risk modelling predicted relatively low collision rates for golden eagle (see Table 7.8). The Outline Biodiversity Enhancement Plan (OBEMP) in Appendix 8.4 and Figure 8.11 provides an outline of planned enhancement measures which would improve currently afforested habitats within the Site to create bog and heath conditions more suitable for golden eagle prey species, and increase their local abundance. Evidence on golden eagle displacement presented in Appendix 7.2 shows that regardless of habitat quality, birds are unlikely to come close to Wind Turbines, and be subject to increased collision risk. It is however likely that the habitat enhancements would directly, or indirectly benefit eagles, depending on proximity to Wind Turbines, via prey species increases.

Consultee	Type and Date	Summary of Consultation Response	Response to Consultee
		Advised that the greenshank recorded on site is at the very southern edge of its Scottish breeding range and so potential habitat management / enhancement / creation should be considered. Merlin is also scarce in Argyll and may also benefit from mitigation/ enhancement measures. It was noted that the record of the one Slavonian grebe flight above Lochan a'Mhadaidh is very unusual as it is well out-with the known breeding range and could potentially be an issue if they bred nearby.	Impacts on greenshank and merlin have been considered in Section 7.4, and the species have been considered as part of the OBEMP. No further Slavonian grebe observations were made during baseline surveys, and there is no evidence of nearby breeding, and so the species was scoped out of the assessment (Section 7.5.1).
NatureScot	Pre-scoping advice in response to Ladyfield Technical Note, 21 st & 23 rd June 2021	Advised that satellite tag data is obtained for the two tagged golden eagles in the vicinity of Ladyfield to inform the assessment.	Satellite tag data were obtained and were used to inform the final design layout, as well as the impact assessment (see Confidential Figure C7.2 and Section 7.4.2.4).
		Advised that for collision modelling, using 2km viewsheds showing visual coverage from VPs at 50m+ above ground level (instead of usual 20m) is acceptable if the Wind Turbine parameters are reflective of this.	The lower rotor tip height for the Wind Turbines used in the collision risk modelling was 44m above ground level, and so a 50m altitude viewshed is considered more appropriate than a 20m viewshed.
NatureScot	Scoping Opinion 31 st August 2021	Advised that given the sensitive location of the Site directly adjacent to the Glen Etive & Glen Fyne SPA, the EIA Report will need to include a robust assessment of the impacts on golden eagle, not only in relation to the SPA, but also in the context of its population NHZ population and transient birds. To help you do this, we suggest that satellite tag data for the two golden eagles in the vicinity of the Site should be obtained.	See responses above.

Consultee	Type and Date	Summary of Consultation Response	Response to Consultee
		<p>Agreed that there is no potential connectivity between the Proposal and any other designated sites, with the exception of the Glen Etive and Glen Fyne SPA.</p>	<p>Noted. All other designated sites as listed in Section 7.4 have been scoped out of the assessment.</p>
		<p>Advised the use of the Golden Eagle Topographical (GET) model for determining impacts on golden eagle.</p>	<p>The GET model (see Figure 7.13 and Confidential Figure C7.3) results have been used to determine the impacts of the Development on golden eagle.</p>
		<p>Cumulative impacts on ornithological interests from other operational and consented wind farm developments should be assessed at the NHZ level.</p>	<p>The cumulative assessment has been undertaken at an NHZ level where considered appropriate (section 7.7).</p>
		<p>Advised that as the Development is located within commercial forestry, the Applicant will need to take into account whether any ongoing forestry work has affected the recorded activity, and also what foraging habitat changes there may be from felling and restructuring should this happen during the lifetime of the proposed wind farm.</p>	<p>Any sources of disturbance were noted by surveyors during the baseline surveys. Ongoing forestry operations were restricted to small parts of the Site at any one time, and most of these activities are likely to be predictable in nature, and therefore unlikely to cause many disturbance events.</p> <p>Changes in habitats associated with the Development have been considered in the assessment. These can be negative or beneficial depending on the nature of changes and species affected.</p>
		<p>Advised that the proposed survey methodology appears to be in line with NatureScot guidance, although until they receive the EIA Report and associated technical appendices, NatureScot cannot confirm that we are content with the ornithology surveys and assessments undertaken.</p>	<p>All surveys were undertaken following NatureScot survey guidance (SNH, 2017) with the survey programme developed through consultation with NatureScot (see above). Full details are provided in Appendix 7.1.</p>

Consultee	Type and Date	Summary of Consultation Response	Response to Consultee
NatureScot	Pre-application advice in response to email update (sent to NatureScot 11 th February 2022), 21 st Feb 2022	<p>Advised that the survey data to be collected, alongside the satellite tag data obtained, would be sufficient to be confident about golden eagle use of the Site. If low use of the southern part of the Site covered by VP5 by other species can be justified, then one year of survey effort from VP 5 should be sufficient in this instance.</p> <p>Advised that the EIA Report will have to assess impacts on three pairs of golden eagles with a significant proportion of activity based on flight lines associated with the SPA pair.</p> <p>When the SPA boundary was drawn up, commercial forestry was omitted as a general guideline as the thinking at that time was that eagles have low use of forested areas, however NatureScot's understanding of eagle usage of this habitat type has now increased.</p> <p>It appears that the southwest end of the Site forms a bit of a boundary between the three pairs.</p>	<p>Noted. The final layout does not contain Wind Turbines within the viewshed of VP 5 and so a second year of flight activity surveys were not required.</p> <p>The impact assessment on golden eagle has considered the locations of nest sites and likely extents of territories to determine which pairs may be affected by the Development, and to what extent.</p> <p>The habitat preferences of golden eagles have been considered in the assessment, based on the results of flight activity surveys, Golden Eagle Topographical (GET) Modelling and habitat surveys (see Chapter 8: Ecology). This has allowed an evaluation of potential impacts of displacement and collision risk, based on habitat quality and distribution.</p>
NatureScot	Pre-application advice 15 th September 2022	<p>NatureScot stated that at the time of writing, the current advised displacement distance of golden eagles around Wind Turbines was 500 m. This advice was based on early post construction monitoring of golden eagles at Wind Farms. NatureScot stated that more recent post construction monitoring and research suggests that there may be sufficient evidence to revise the official advice to a 300 m displacement distance in the future.</p> <p>NatureScot advised that for the Development, it needs to be demonstrated that having Wind Turbines close to the SPA boundary [at the time of writing the working layout located closest Wind Turbines within</p>	Information pertaining to the suitability of a c.300 m buffer of Wind Turbines from the SPA boundary is presented in Appendix 7.2: Golden Eagle Displacement Evaluation.

Consultee	Type and Date	Summary of Consultation Response	Response to Consultee
		approximately one blade length from the SPA] would not constitute an adverse effect on site integrity by displacement, primarily by preventing SPA birds from using the SPA fully. If this cannot be demonstrated, then a larger buffer (of at least 300 m) between the Wind Turbines and the SPA would be required.	
NatureScot	Gatecheck Consultation 16 th March 2023	We note that the frozen Wind Turbine layout encompasses a 300 m buffer of the Glen Etive and Glen Fyne SPA. We understand from pre-application discussions with the Applicant that they will provide supporting documentation to support this reduced buffer distance from the SPA as part of their EIA Report and, upon provision of this, we will be able to advise if this buffer is acceptable at this site.	Information pertaining to the suitability of a c.300 m buffer of Wind Turbines from the SPA boundary is presented in Appendix 7.2: Golden Eagle Displacement Evaluation. The findings from this evaluation are considered within the assessment of operational effects on golden eagle in Section 7.5.5.1.
NatureScot	Pre-application advice 9 th May 2023	NatureScot advised that there will be a need to demonstrate in the EIA Report that a buffer of less than 300 m from the Glen Etive and Glen Fyne SPA would not constitute an adverse effect on site integrity of the SPA.	The final Development layout places the closest proposed Wind Turbines approximately 300 m from the SPA boundary, taking into consideration the available scientific evidence and consultation with NatureScot. A single Wind Turbine (T12) is 285 m from the SPA boundary, and the other 12 are 300 m or more from the SPA boundary. T12 would not get any closer to the SPA through future micrositing. Evidence is provided in Appendix 7.2: Golden Eagle Displacement Evaluation, showing the suitability of these Wind Turbine buffers from the SPA boundary.
RSPB	Scoping Opinion 9 th August 2021	Annex 1 bird species including golden eagle, white-tailed eagle, hen harrier, red-throated diver and other Birds of Conservation Concern and important Local Biodiversity Action Plan (LBAP) species including black	These species were considered among the target species during baseline surveys, and a summary of their presence is in Section 7.4.

Consultee	Type and Date	Summary of Consultation Response	Response to Consultee
		grouse may all occur within or close to the proposal and should be adequately covered within the EIA Report.	Where a potential for a significant effect has been identified, the species has been taken forward for assessment.
		Advised that the EIA Report should include a comprehensive study of bird use, throughout the year, in the area of and adjacent to the Site, in order to obtain an understanding of the potential impacts of the proposal on bird populations within the area. This should follow the standard ornithological requirements/ techniques contained within NatureScot guidance.	The results of baseline surveys are summarised in Section 7.4 and presented in detail in Appendix 7.1. The survey programme was developed through consultation with NatureScot and followed their survey guidance (SNH, 2017).
		Advised that an assessment of the forestry and open ground / loch habitat suitability should be undertaken and should consider present usage in comparison to the potential alteration of habitat and displacement effects which may occur due to the Development.	Changes in habitats associated with the Development have been considered in the assessment. These can be negative or beneficial depending on the nature of changes and species affected.
		Advised that the EIA Report should include an assessment of any access routes, construction, and maintenance of tracks. Advised that options for the grid connection should also be considered by the EIA Report, to enable a full assessment of the projects impacts.	The impacts of access track and other infrastructure construction and operation on birds have been considered in the assessment. As outlined in Chapter 2 - Development Description, the grid connection would be routed through existing forest tracks and within the A819 to a new substation on the transmission system located at Creag Dubh. This is subject to a future application subject to the Development receiving planning consent. However, a proportionate assessment of impacts during construction has been undertaken in Section 7.5.4.5 of this chapter.

Consultee	Type and Date	Summary of Consultation Response	Response to Consultee
		A cumulative assessment for impacts on golden eagles should be undertaken. There are already five active Wind Farms within a 20km radius, and these should also be included within any assessment.	The cumulative assessment has been undertaken at an NHZ level where considered appropriate (section 7.7).
		Advised that golden eagle range reports have been produced by NatureScot for NHZ 14 Argyll West and Islands, these should be accessed to inform the EIA Report of the impacts this proposal will have on the active territories within this area.	These reports were published in 2015, and since then it has been determined by NatureScot that the assumptions of the Predicting Aquila Territory (PAT) Modelling used to inform them have not been borne out by the results of satellite tag data. As such, the satellite tag data and survey results are considered more reliable indicators of current activity in this instance.
		Advised that GET modelling and available satellite tag information should also be used to assess the implications of this proposal on the golden eagle territories in this area. Detailed survey work into the current occupation level of the golden eagles especially foraging and home range usage within the area is required.	GET modelling, satellite tag data and survey results have been used to inform the assessment.
		Advised that the Argyll Raptor Study Group should be contacted in relation to all raptor species as they will be able to provide more up to date information relating to the species that may be using the area surrounding this proposal.	The Argyll Raptor Study Group was initially contacted to obtain data to inform the survey scope in 2019, and a further request was made in January 2022.
		Advised that a HRA will be required for Glen Etive and Glen Fyne SPA.	An assessment of golden eagles within an HRA context is included for each identified impact in Section 7.5.3.
		Advised advise that since there is a possibility that white-tailed eagles may occupy the area within the project lifetime, ongoing assessment and mitigation are	Pre- and during-construction ornithology surveys would take place as standard to comply with Wildlife & Countryside Act legislation for breeding birds (see

Consultee	Type and Date	Summary of Consultation Response	Response to Consultee
		required. Survey work should therefore occur throughout the planning and installation periods (as well as post-construction).	Embedded Mitigation Section 7.3.10) and post-construction monitoring would be undertaken which is applicable and proportionate to the predicted effects, and planned improvements of the OBEMP (see Appendix 8.4).
		Advised that impacts, including noise, on black grouse should be assessed and turbine placement should be avoided close to leks, especially leks comprising of four or more birds. Consideration should also be given to mitigation works for black grouse within the site and surrounding area.	The location of black grouse lek records were considered in the design layout process, and effort has been made to avoid locating Wind Turbines near these, wherever possible. Potential noise and visual impacts during the construction, operation and decommissioning periods have been assessed in Section 7.5. Species-specific mitigation for black grouse during the construction period is included in Section 7.6.1.1. Measures outlined in the OBEMP (Appendix 8.4) will improve habitats for black grouse within the Site during the operational period.
		Recommended that turbines should be setback by a distance of 1km from lochans used by red-throated divers and that this species should be considered in the cumulative assessment.	No evidence of red-throated diver (or black-throated diver) usage has been recorded during the two-year baseline survey period. The lochs are likely to be unsuitable for diver nesting due to the emergent vegetation covering much of the margins. Proposed Wind Turbine locations would be at least 400m downslope of these lochs at their closest point.
	Gatecheck Consultation 24 th March 2023	We have considered the Gatecheck report and advise a minimum of a 500 m buffer from eagle SPAs, and to ensure satellite tagging data from surrounding Golden Eagle ranges, including ranges to the west out with the SPA, is used to inform the application.	Consultation with NatureScot (above) reached an agreement that c.300 m is a sufficient buffer distance, depending on suitability of available information. This information is presented in Appendix 7.2: Golden Eagle Displacement Evaluation. The findings, which confirm that c.300 m is an appropriate distance, are considered

Consultee	Type and Date	Summary of Consultation Response	Response to Consultee
			alongside satellite tag data within the assessment of construction and operational effects on golden eagle in Sections 7.5.4 and 7.5.5 respectively.

7.3.2 Scope of Assessment

This Chapter considers the potential effects on ornithology associated with the construction, operation and decommissioning of the Development. The specific objectives of the Chapter are to:

- describe the ornithological baseline;
- describe the assessment methodology and significance criteria used in completing the assessment;
- describe the potential significance of unmitigated effects (direct or indirect) on identified Important Ornithological Features (IOFs);
- describe the mitigation measures proposed to address likely significant effects; and
- assess the residual effects remaining following the implementation of mitigation, including cumulatively with other projects.

7.3.3 Elements Scoped Out of Assessment

No potential impacts were scoped out prior to commencement of surveys.

NatureScot (SNH 2018a¹¹⁰) guidance provides a list of species potentially at risk of impacts from onshore wind farms in Scotland, either because they are rare or vulnerable or they are dependent on habitats which are limited or subject to land use change. Other non-target species recorded during baseline surveys which are considered to be of Low Nature conservation importance, as defined by Table 7.2 below, have been scoped out of the assessment.

Following consultation with NatureScot (Table 7.1), all designated sites except Glen Etive & Glen Fyne SPA have been scoped out.

7.3.4 Study Area / Survey Area

Ornithological surveys for the Development commenced in March 2020 and were completed in March 2022. They were undertaken within the Survey Areas shown in Figure 7.2 which followed SNH (2017¹¹¹) guidance (see also Appendix A7.1 Annex B for methodologies and Annex C for survey effort details).

The assessment focuses on the Site and appropriate Study Areas, based on NatureScot survey and assessment guidance (SNH 2016a¹¹²; 2017; SNH 2018a^{110,b¹¹³,c¹¹⁴}) (see Appendix 7.1 for further details). The specific Study Areas associated with this assessment are as follows:

- Ornithological designated sites: within 20 km of the Site (Figure 7.2);
- Scarce breeding birds (Schedule 1, Annex I species): up to a 2 km buffer around the Site (Figure 7.3), extending to 6 km for eagle species;
- Black grouse: up to a 1.5 km buffer around the Site (Figure 7.3);
- Breeding birds (waders): up to 500 m around the Site (Figure 7.3); and
- Flight activity surveys: within the proposed Wind Turbine area and a 500 m buffer of the outermost turbine locations, referred to for collision risk modelling (CRM) purposes as the Collision Risk Analysis Area (CRAA) (see Appendix A7.1 Annex E and Figure 7.1).

¹¹⁰ Scottish Natural Heritage (2018a). Assessing significance of impacts from onshore windfarms on birds out with designated areas. Version 2.

¹¹¹ Scottish Natural Heritage (2017). Recommended bird survey methods to inform impact assessment of onshore windfarms.

¹¹² Scottish Natural Heritage (2016a). Assessing connectivity with Special Protection Areas (SPAs). Version 3

¹¹³ Scottish Natural Heritage (2018b). Assessing the cumulative impacts of onshore wind farms on birds. SNH Guidance Note.

¹¹⁴ Scottish Natural Heritage (2018c). Environmental Impact Assessment Handbook – Version 5: Guidance for competent authorities, consultation bodies, and others involved in the Environmental Impact Assessment process in Scotland.

7.3.5 Design Parameters

The assessment of potential effects is based on the information presented in Chapter 2: Development Description. In relation to describing impacts on ornithological features, the relevant design parameters used to determine the 'worst-case' Development involve:

- A layout of 13 Wind Turbines with a hub height of 112 m and rotor diameter of 136 m. This gives an upper rotor tip height of 180 m and a lower rotor tip height of 44 m above ground.
- A construction period which would last for approximately up to 24 months, comprising civil works (approximately 18 months), Wind Turbine delivery and erection (approximately three months) and Wind Turbine commissioning and site reinstatement (approximately three months). The number of bird breeding seasons potentially disrupted would depend on the month in which construction commences and the breeding season of the potentially affected species. The main breeding season of most birds at the Site extends from March to August. For the purposes of this assessment, it is assumed that, for any given species of bird, construction activities would commence during the breeding season and would therefore potentially affect a maximum of up to three breeding seasons.
- Development infrastructure will include Wind Turbines, turbine foundations, crane hardstanding, upgrades to existing access tracks, new access tracks, underground cabling, on-site substation and battery energy storage system and maintenance building, temporary construction compound and laydown area.
- Existing access roads will be reused where possible.

7.3.6 Baseline Survey Methodology

Baseline survey methodology followed guidance from NatureScot (SNH 2017¹¹¹), '*Bird Monitoring Methods*' (Gilbert *et al.* 1998¹¹⁵) and '*Raptors: Field Guide to Surveys and Monitoring*' (Hardey *et al.* 2013¹¹⁶). A detailed description of the various survey methodologies is provided in Appendix 7.1. Surveys comprised the following programme:

- Flight activity surveys: March 2020 to March 2022;
- Scarce breeding bird surveys: March to August 2020 and March to August 2021;
- Black grouse surveys: April and May 2020 and April and May 2021;
- Breeding bird surveys: April to July 2021; and
- Winter walkover surveys: November 2020 to March 2021 and November 2021 to March 2022.

7.3.7 Methodology for the Assessment of Effects

The significance of the potential effects of the Development has been classified by professional consideration of the sensitivity of the receptor and the magnitude of the potential effect.

7.3.7.1 Outline Assessment Process

This section defines the methods used to assess the significance of effects through the process of an evaluation of the sensitivity of a feature (a combination of nature conservation importance and conservation status) and magnitude of impact. The assessment focuses on a 'worst-case' Development as described in Chapter 4 and Design Parameters, section 7.3.5.

The evaluation for wider-countryside interests (not relating to European sites covered by the HRA process) involves the following process:

- Identifying the potential impacts associated with the Development;

¹¹⁵ Gilbert, G., Gibbons, D. W. and Evans, J. (1998). *Bird Monitoring Methods*. RSPB, Sandy.

¹¹⁶ Hardey, J., Crick, H., Wernham, C., Riley, H., Etheridge, B. and Thompson, D. (2013). *Raptors: a field guide for surveys and monitoring* (3rd edition). The Stationery Office, Edinburgh.

- Considering the likelihood of occurrence of potential impacts where appropriate;
- Defining the nature conservation importance and conservation status of the bird populations present to establish level of sensitivity;
- Establishing the magnitude of the impact (both spatial and temporal);
- Based on the above information, making a judgement as to whether or not the resultant unmitigated effect is significant with respect to the EIA Regulations;
- If a potential effect is determined to be significant, suggesting measures to mitigate or compensate the effect where required;
- Considering opportunities for enhancement where appropriate; and
- Confirming residual effects after mitigation or enhancement are considered.

7.3.7.2 Sensitivity of Ornithological Features

Determination of the level of sensitivity of an ornithological feature is based on the feature’s nature conservation importance, whilst also taking into account its conservation status. There are three levels of nature conservation importance as detailed in Table 7.2.

Table 7.2: Determining factors of a feature’s nature conservation importance

Importance	Description
High	Populations receiving protection by an SPA, Ramsar Site, Site of Special Scientific Interest (SSSI) or which would otherwise qualify under selection guidelines. Species present in nationally important numbers (>1% national breeding or wintering population).
Medium	The presence of breeding species listed on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended). The presence of breeding species listed in Annex I of the Birds Directive (but population does not meet the designation criteria under selection guidelines). The presence of rare, Red-listed breeding species noted on the latest Birds of Conservation Concern (BoCC) Red list (Stanbury <i>et al.</i> 2021 ¹¹⁷) or identified as being sensitive to Wind Farm development in SNH (2018a). Regularly occurring migratory species, which are either rare or vulnerable, or warrant special consideration on account of the proximity of migration routes, or breeding, moulting, wintering or staging areas in relation to the Development Site. Species present in regionally important numbers (>1% of NHZ or appropriate reference breeding population).
Low	All other species’ populations not covered by the above categories.

IOFs (as per CIEEM 2018¹¹⁸) taken forward for assessment are those species of high and medium nature conservation importance.

¹¹⁷ Stanbury, A., Eaton, M., Aebischer, N., Balmer, D., Brown, A., Douse, A., Lindley, P., McCulloch, N., Noble, D., and Win, I. (2021). Birds of Conservation Concern 5: The population status of birds in the UK, Channel Islands and Isle of Man and second ICUN Red List assessment of extinction risk for Great Britain. *British Birds* 114: 723-747

¹¹⁸ CIEEM (2018). Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine version 1.1. Chartered Institute of Ecology and Environmental Management, Winchester.

As defined by NatureScot (SNH 2018a), the conservation status of a species is “*the sum of the influences acting on it which may affect its long-term distribution and abundance, within the geographical area of interest*”. Conservation status is considered to be ‘favourable’ under the following circumstances:

- “population dynamics indicate that the species is maintaining itself on a long-term basis as a viable component of its habitats;
- the natural range of the species is not being reduced, nor is likely to be reduced for the foreseeable future; and
- there is (and probably will continue to be) a sufficiently large habitat to maintain its population on a long-term basis”.

NatureScot (SNH 2018a) 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*”. Thus, “*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.*”

The conservation status of an IOF therefore influences the overall sensitivity rating – for example, if a species of medium nature conservation importance has an unfavourable conservation status, its overall sensitivity would have a ‘medium-high’ range. It is then based on specific conditions and expert judgment as to what level of effect significance would be concluded, e.g., minor or moderate (see Table 7.5).

In the case of non-designated sites in Scotland, the relevant regional scale for breeding species is usually considered to be the appropriate NHZ which the Site falls within. The Development is within NHZ 14 (Argyll West & Islands). For some species, other distinct geographic areas may be more appropriate, for example if a species has been subject to a reintroduction programme, or if national censuses have used particular regions based on ecological principles.

For wintering or migratory species, the national UK population or flyway population is usually considered to be the relevant scale for determining effects on the conservation status, although again a species-specific approach is taken.

7.3.7.3 Magnitude of Impact

The magnitude of potential impacts will be identified through consideration of the Development, the degree of change to baseline conditions predicted as a result of the Development, the duration and reversibility of an effect and professional judgement, best practice guidance and legislation.

An impact is defined as a change of a particular magnitude to the abundance and/or distribution of a population as a result of the Development. Impacts can be adverse, neutral or beneficial.

In determining the magnitude of impacts, the resilience of a population to recover from temporary adverse conditions is considered in respect of each potentially affected population.

Impacts are judged in terms of magnitude in space and time. There are five levels of spatial and temporal impact magnitude as detailed in Table 7.3 and Table 7.4 respectively.

Table 7.3: Spatial Magnitude of Impact

Spatial Magnitude	Description
Very High	Total/near total loss of a bird population due to mortality or displacement. Total/near total loss of productivity in a bird population due to disturbance. Guide: >80 % of population lost or increase in additive mortality.
High	Major reduction in the status or productivity of a bird population due to mortality or displacement or disturbance. Guide: 21-80 % of population lost or increase in additive mortality.
Medium	Partial reduction in the status or productivity of a bird population due to mortality or displacement or disturbance. Guide: 6-20 % of population lost or increase in additive mortality.
Low	Small but discernible reduction in the status or productivity of a bird population due to mortality or displacement or disturbance. Guide: 1-5 % of population lost or increase in additive mortality.
Negligible	Very slight (or no discernible) reduction in the status or productivity of a bird population due to mortality or displacement or disturbance. Reduction barely discernible, approximating to the "no change" situation. Guide: <1 % of population lost or increase in additive mortality.

Table 7.4: Temporal Magnitude of Impact

Temporal Magnitude	Description
Permanent	Effects continuing indefinitely beyond the span of one human generation (taken as approximately 25-30 years), except where there is likely to be substantial improvement after this period. Where this is the case, long-term may be more appropriate.
Long-term	Approximately 15-25 years or longer.
Medium-term	Approximately 5-15 years.
Short-term	Up to approximately 5 years.
Negligible	<12 months.

7.3.7.4 Significance of Effect

The sensitivity of the IOF and the magnitude of the predicted impact will be used as a guide, in addition to professional judgement, to predict the significance of the likely effects. Table 7.5 summarises guideline criteria for assessing the significance of effects.

Table 7.5: Framework for Assessment of the Significance of Effects

Magnitude of Impact	Sensitivity of IOF				
	Very High	High	Medium	Low	Negligible
High	Major	Major	Moderate	Moderate	Minor
Medium	Major	Moderate	Moderate	Minor	Negligible
Low	Moderate	Moderate	Minor	Negligible	Negligible
Negligible	Minor	Minor	Negligible	Negligible	Negligible

Effects predicted to be of major or moderate significance are considered to be 'significant' in the context of the EIA Regulations and are shaded in light grey in the above table.

7.3.7.5 Assessment of Residual Effect Significance

If a potential effect is determined to be significant, measures to mitigate the effect to a non-significant level will be required, and the revised significance of residual effects after mitigation will be assessed.

7.3.7.6 Requirements for Mitigation

Mitigation will be required if the potential effect determines that there is an unmitigated moderate adverse or major adverse and therefore significant effect on any IOF identified in this Chapter.

7.3.7.7 Potential Cumulative Effects

The Cumulative Effect Assessment (section 7.7) presents information about the potential cumulative effects of the Development combined with other operational, consented or proposed wind farm projects.

NatureScot (SNH 2018b¹¹³) has provided guidance on assessing the cumulative effects on birds. This assessment follows the principles set out in that guidance.

Cumulative effects may include cumulative disturbance-displacement, collision mortality, habitat loss or barrier effects. Some cumulative effects, such as collision risk, may be summed quantitatively, but according to NatureScot (SNH 2018b¹¹³) "*In practice, however, some effects such as disturbance or barrier effects may need considerable additional research work to assess impacts quantitatively. A more qualitative process may have to be applied until quantitative information becomes available for developments in the area, e.g., from post-construction monitoring or research*".

The main projects likely to cause similar impacts on ornithological features are other operational developments, or those under construction, consented, or in the planning process, located within NHZ 14 or appropriate geographical reference area.

7.3.8 Information to Inform a Habitats Regulations Appraisal

The method for assessing the effects on an SPA is different from that employed for wider-countryside ornithological interests. The Habitats Directive is transposed into domestic legislation by the Conservation (Natural Habitats, &c.) Regulations 1994 (the Habitats Regulations), as amended by the Conservation (Natural Habitats, &c.) Amendment (Scotland) Regulations 2012. Regulation 48 of the Habitats Regulations indicates a number of steps to be taken by the

competent authority before granting consent (these are referred to here as a Habitats Regulations Appraisal, HRA). In order of application, the first four are:

- Step 1. Consider whether the project is directly connected to or necessary for the management of the designated site (Regulation 48 (1b)).
- If not, Step 2. Consider whether the project, alone or in combination, is likely to have a significant effect on the designated site (Regulation 48 (1a)).
- If so, Step 3. Make an Appropriate Assessment of the implications for the designated site in view of that designated site's conservation objectives (Regulation 48 (1)).
- Step 4. Consider whether it can be ascertained that the proposal would not adversely affect the integrity of the designated site ('Integrity Test') having regard to the manner in which it is proposed to be carried out or to any conditions or restrictions subject to which they propose that the consent, permission or other authorisation should be given (Regulation 48 (5 & 6)).

It has already been established that the Development does not meet the criteria for Step 1. The assessment of the likely significant effects on SPAs in relation to the Development (Step 2), and if so, whether there may be an adverse effect on the SPA's integrity (Steps 3 and 4) are presented in this chapter. The results of baseline surveys and scientific conclusions presented as part of the EIA are used to inform the appraisal process.

7.3.9 Assessment Limitations

Limitations exist on the knowledge base on how some species in general, and the populations to which they belong, react to impacts typically associated with Wind Farms. A precautionary approach is taken in these circumstances, and as such it is considered that these limitations do not affect the robustness of this assessment.

Survey methods followed NatureScot guidance (SNH 2017¹¹¹), and survey effort either met or exceeded the minimum requirements, with weather conditions appropriate for the surveys/surveys suspended (or additional surveys undertaken) where weather conditions deteriorated (refer to Appendix A7.1 Annex C for all weather data). As confirmed with NatureScot during consultation (Table 7.1) the data available are considered sufficient and appropriate for a robust assessment.

Forestry operations took place within the Site during baseline surveys, but these were always limited to a particular part of the Site at any one time. A modified forest felling and restock plan would continue throughout the lifespan of the Development, and so forestry activities recorded during the baseline period would be reflective of the future baseline during operation of the Development. All survey data are therefore considered valid.

7.3.10 Embedded Mitigation

The design layout process has sought to minimise the likelihood of significant effects on ornithological features, by undertaking the following:

- Wherever possible, locating Wind Turbines and other infrastructure in areas where habitat types are currently of low value for IOFs (i.e., conifer plantation or recent clearfell) and utilising existing forestry infrastructure;
- Locating infrastructure at least 350 m from any known nest site of a Schedule 1 breeding species;
- Locating Wind Turbines at least c.300 m from the Glen Etive & Glen Fyne SPA boundary, in order to avoid any direct habitat loss for golden eagles, or effective habitat loss within the SPA due to displacement; and
- Locating Wind Turbines at least 300 m from any known black grouse lekking location.

During the construction phase, the following embedded mitigation would be implemented to minimise the likelihood of significant effects on IOFs, and this has been taken into consideration in the assessment:

- All electrical cabling between the proposed Wind Turbines and the associated infrastructure will be underground in shallow trenches which would be reinstated post-construction and, in most cases, follow the proposed access tracks.
- Any ground disturbance areas around permanent infrastructure during construction will be temporary and land will be reinstated or restored before the construction period ends. The only excavation in these areas will be for cabling as noted above and otherwise may only be periodically used for side-casting of spoil until reinstatement.
- To ensure all reasonable precautions are taken to avoid impacts on birds during construction and decommissioning, the Applicant will appoint a suitably qualified Ecological Clerk of Works (ECoW) prior to the commencement of construction and decommissioning and they will advise the Applicant and the Principal Contractor on all ornithological matters (with the assistance of a suitably qualified/licenced ornithologist if required). The ECoW will be required to be present on Site during the construction and decommissioning periods and will carry out monitoring of works and briefings with regards to any ornithological sensitivities on the Site to the relevant staff within the Principal Contractor and subcontractors.
- A Breeding Bird Protection Plan (BBPP) will be implemented during construction of the Development. The BBPP will detail measures to ensure legal compliance and safeguard breeding birds known to be in the area and will include species-specific guidance. The BBPP shall include pre-construction surveys and good practice measures during construction. Pre- and during-construction surveys will be undertaken to check for any new breeding bird activity in the vicinity of the construction works. The ECoW will oversee the implementation of the above measures.

7.4 Baseline Conditions

7.4.1 Designated Sites

The Site does not overlap with any statutory designated sites. There is only one statutory site designated with an ornithological qualifying feature within 20 km of the Site Boundary: Glen Etive & Glen Fyne SPA, as detailed below in Table 7.6 and shown on Figures 7.2 and 7.3.

Table 7.6: Designated Sites within 20 km of the Development Site

Name	Distance (km)	Qualifying Feature(s)	Status
Glen Etive and Glen Fyne SPA	Adjacent to Site	Breeding golden eagle	Favourable Maintained 31 Jul 2015

7.4.2 Birds Recorded During Desk and Field Surveys

7.4.2.1 Flight Activity Summary

A summary of the results of the flight activity surveys conducted from 2020 to 2022 is presented in Table 7.7. It should be noted that this includes all flights recorded during the two-year survey period, only a proportion of which will be considered in the CRM for being 'at-risk', i.e., within the CRAA, within a surveyor's viewshed, and occurring at least partly at rotor height. A breakdown of 'at-risk' flight activity per species is presented in Appendix A7.1, Annex D.

Table 7.7: Flight Activity Survey Results 2020-2022

Species	Total Flights	Total Birds Recorded*	Total Bird Seconds Recorded**
Black grouse	1	1	2
Golden eagle	138	154	25,128
Golden plover	28	33	571
Greenshank	5	5	68
Greylag goose	18	56	5,041
Hen harrier	28	28	2,068
Herring gull	2	5	520
Merlin	9	10	375
Peregrine falcon	7	7	314
Pink-footed goose	9	553	93,495
Short-eared owl	2	2	15
White-tailed eagle	8	8	1,165
Whooper swan	4	6	1,054

* - this is the total number of individuals recorded, i.e., number of flight events x number of birds present, e.g., in flock.

** - this is the total of the duration of each flight event multiplied by the number of birds present in that flight event.

CRM was undertaken using the flight activity survey data across the baseline period (see Appendix A7.1 Annex E for further detail). The mean annual collision rate for each species has been calculated by summing the mean breeding season (2020 and 2021) and the mean non-breeding season (2020-2021 and 2021-2022) collision rates.

Seven species (out of a total of 13 species) were recorded during flight activity surveys, but no flights were considered to be 'at-risk' (i.e., the flights were outside of the CRAA and associated viewshed and/or were only recorded flying below lower rotor tip height, 44 m) and are therefore not included in Table 7.8.

Table 7.8: Collision Risk Modelling Results (collision rate per season: BS = breeding season; NBS = non-breeding season)

Species	2020 BS	2020-21 NBS	2021 BS	2021-22 NBS	Mean Annual	Years Per Collision
Golden eagle	0	0.013	0.100	0.031	0.072	13.9
Golden plover	0	0.002	0	0	0.001	1,325
Hen harrier	0.007	0	0	0.002	0.005	221
Peregrine falcon	0	0	0	<0.001	<0.001	5,853
Pink-footed goose	0	0.158	0	0	0.079	12.7
White-tailed eagle	0.034	0	0	0	0.017	59

7.4.2.2 Wildfowl

Baseline surveys recorded migratory flights of pink-footed geese over the Site (flock sizes of up to 166 individuals), most commonly on a north-south axis. There is a small resident population of greylag geese (up to 10 individuals), with activity concentrated along the River Aray, around the southern access route.

Migratory whooper swans were recorded using lochs to the east of the Site for short periods of time, particularly during autumn movements, where up to five birds were present.

Non-breeding Slavonian grebes were recorded on two occasions to the east of the Site – one observation in early March 2021 of a bird in flight above Lochan a' Mhadaidh, and a second of a bird on Loch Scardan in November 2021.

7.4.2.3 Black Grouse

Results of baseline surveys showed that there are two main black grouse lekking areas within 1.5 km of the Site Boundary: one approximately 500 m north of the Site Boundary and 800 m north of the nearest proposed Wind Turbine location; and one to the south over 1 km from the Site Boundary and over 2 km from the nearest proposed Wind Turbine location. In the northern lekking area up to four males were in attendance at a lek at any one time during surveys in 2020 and 2021, and up to five females were recorded. To the south, the lekking area hosted four males but no females were recorded.

Within the Site, two males were observed lekking on one occasion in April 2021, near the summit of Stùc Scardan, approximately 300 m distant and uphill from the nearest proposed Wind Turbine location (T13).

Black grouse were recorded in flight, mainly in the areas surrounding lek sites, with a number directed towards the Site, suggesting there may be some connectivity between the three lekking areas. Apart from the record of lekking birds on Stùc Scardan, no observations were made of black grouse utilising the Site.

7.4.2.4 Golden Eagle

During the baseline surveys, golden eagle was the most frequently recorded raptor species, with the majority of activity taking place over the open moorland within the Glen Etive & Glen Fyne SPA to the north and east of the Site.

Two or three active golden eagle territories potentially overlap with the Site, with known nest sites within each territory located over 2 km from the Site Boundary (for locations see Confidential Figure C7.1 and Confidential Appendix 7.4). For the purposes of this non-confidential chapter, the territory to the east of the Site within the SPA is referred to as EA1, with the territory to the west being EA2, and the territory to the southwest (nest site over 6 km from the nearest proposed Wind Turbine location) being EA3 (exact nest locations are not provided here).

Data on breeding locations and productivity were obtained from the Argyll Raptor Study Group in January 2022. Pair EA1 fledged one chick successfully in 2019 but failed in 2020 and 2021. Pair EA2 also fledged one chick successfully in 2019, but no breeding attempt was observed in 2020, and the nest was not checked in 2021. Pair EA3 was unsuccessful in 2019, fledged one chick in 2020, but did not lay in 2021.

Locations of other occupied neighbouring territories were also provided, which indicate that the local area is of good suitability for the species, although territories may be somewhat constrained by adjacent territories.

Satellite tag data of two territorial golden eagles (tags 582 and 816) located to the west of the Site were provided by Natural Research in 2021. One of these, individual 582 was from territory EA2, with individual 816 from EA3 to the southwest. A kernel density analysis was run on the satellite data (from April to September 2021 for individual 582, and October 2019 to September 2021 for individual 816), which presented polygons around the 50% highest density range (i.e. determined to be the core area used by each eagle) and also around the 95% density range where the occupancy was less frequent (see Confidential Figure C7.2 for outputs).

The satellite data shows that the Site was outside the 95% range for individual 582 from EA2, and almost entirely outside the 95% range for eagle 816 from EA3, except for a small area immediately to the southeast of the Site Boundary at Stùc Scardan where there were a small number of tag records. The open moorland immediately surrounding the nest sites of EA2 and EA3 as well as the moorland to the west of the nests and away from the Site are the areas mostly used by these tagged birds.

7.4.2.5 Other Raptors and Owls

Baseline surveys in 2020 and 2021 recorded breeding evidence of hen harrier and merlin within 2 km of the Site.

Hen harrier breeding was confirmed in 2020 at a nest north of the Site (over 1 km from the nearest proposed Wind Turbine location), and birds appeared to nest at a similar location in 2021, when successful breeding was probable (one juvenile bird recorded). The majority of flight activity was recorded near the nest site, but occasional flights were also observed over open moorland within and adjacent to the Site.

In 2020, a merlin breeding attempt took place at a nest located at the woodland edge of the northern Site Boundary (see Confidential Figure C7.4 and Confidential Appendix 7.4). This nest was vacant in 2021, but a breeding attempt did take place in moorland around 1 km to the north, although breeding success could not be confirmed. All recorded merlin flight activity was within the moorland outside of the Site boundary, near the two nest sites.

A white-tailed eagle nest site around 5 km north of the Site was established in 2020 and a single chick was reared there in 2021. The Argyll Raptor Study Group noted that they have recorded a lot of activity north and west of Inveraray in recent years, and do not rule out another (as yet, undiscovered) nest site within that area. Occasional white-tailed eagle flights were recorded during

baseline surveys (most often single adults but occasionally two adults), mainly over moorland surrounding the Site.

A historic peregrine nest site is within 2 km to the west of the Site Boundary, but there were no signs of occupancy during baseline surveys, and the Argyll Raptor Study Group did not provide any records of recent occupancy. Occasional peregrine flights were recorded above the Site.

Evidence of roosting barn owl was recorded inside the chimneys of a ruined building within the Site, near the River Aray. Three farm buildings in Glen Aray, within 1 km of the Site, were considered suitable for barn owl occupancy, but access was not possible to confirm.

A short-eared owl individual was recorded on one occasion in August 2021, but there was no evidence of breeding within 2 km, and the Argyll Raptor Study Group provided no historic nest records.

7.4.2.6 Waders

The majority of the Site comprises habitats that are unsuitable for breeding waders, and the only presence recorded within the Site Boundary was a small amount of snipe activity, mainly on the open moorland in the east, and non-breeding woodcock being flushed within the Site on five occasions.

To the east of the Site on the higher open moorland golden plover are common, with up to eight breeding territories recorded within 1 km of the Site in 2020, and around five territories in 2021.

During the 2020 breeding season, greenshank individuals were recorded at Lochan Sheileachan near the northeast of the Site, and in 2021, birds were recorded calling and flying north of Lochan Mhadaidh and Loch Scardan (Figure 7.9). It is possible that birds may breed by one or more of these lochs each year.

7.5 Assessment of Potential Effects

7.5.1 Ornithological Features Scoped out of the Assessment

The assessment is applied to those scoped in IOFs of medium or high nature conservation importance (Table 7.2) that are known to be present within the Site or surrounding area (as confirmed through survey results and consultations outlined above). For other target species or designated sites, the data available suggest either that activity levels and Site usage is sufficiently infrequent, Site conditions are unsuitable, collision risks are so small and/or there is no connectivity to designated sites, that unmitigated significant effects are considered very unlikely. In such cases these species and designated sites can be scoped out of the assessment.

In the case of the Development, as agreed during consultation with NatureScot (Table 7.1) all designated sites, with the exception of the Glen Etive & Glen Fyne SPA, have been scoped out due to a lack of potential connectivity.

For all non-breeding species recorded (including peregrine falcon, short-eared owl, herring gull, whooper swan, Slavonian grebe), Site usage was infrequent, if occurring at all, and results of the flight activity surveys (Table 7.7) and collision risk modelling (Table 7.8) suggest that additional mortality due to collisions would be sufficiently small at a population level to allow exclusion from assessment.

White-tailed eagle has been scoped out of the assessment, based on the information available to date. Whilst it is acknowledged that the species' population is likely to be expanding in the area, the nearest known nest is over 5 km from the Site, and the low activity levels (and low collision rates) recorded during baseline surveys do not indicate that another territory has been established any closer to the Site in recent years. Habitats within the Site are generally unsuitable for the species and there are no clear potential nest sites available. Future activity levels and Site usage are therefore also likely to be relatively low.

Hen harrier has been scoped out of the assessment due to low likelihood of disturbance-displacement impacts on nesting birds (over 1 km from the nearest proposed Wind Turbine location), the low level of suitability of the habitats within the Site compared to the surrounding moorland, and the low level of recorded Site activity (and low collision risk).

Golden plover has been scoped out of the assessment based on the distribution of breeding activity with the Study Area, being concentrated on open moorland, uphill of the Site, and over 500 m from the nearest Wind Turbine locations. No breeding activity was recorded within the Site, and predicted collision risks were very small. For similar reasons (and no predicted collision risk), snipe has also been scoped out of the assessment.

In the case of the above scoped out breeding species, embedded mitigation measures outlined in section 7.3.10 will minimise the likelihood of an impact on a breeding attempt, should one take place within a potential risk area close to construction activities. Biodiversity Enhancement Plans outlined in the OBEMP (Appendix 8.4) will also generally improve foraging and nesting conditions within the Site for these species.

7.5.2 Important Ornithological Features Scoped in to the Assessment

IOFs of medium or high nature conservation importance that have been scoped into the assessment are: black grouse, golden eagle, merlin and greenshank (Table 7.9). Due to the proximity of the Site to the Glen Etive & Glen Fyne SPA, this designated site is also scoped in as part of the HRA process.

Table 7.9: Scoped In IOFs

Feature	Nature Conservation Importance	Status
Black grouse	Medium	BoCC Red list, sensitive to Wind Farm development (SNH 2018a)
Golden eagle	High	Glen Etive & Glen Fyne qualifying feature, Annex I, Schedule 1
Merlin	Medium	Annex I, Schedule 1, BoCC Red list
Greenshank	Medium	Schedule 1, BoCC Amber list

In addition to nature conservation importance, it is necessary to consider the species' conservation status when assessing its sensitivity. Relevant conservation status information for the scoped in IOFs is detailed within Table 7.10.

Table 7.10: Conservation Status of Scoped In IOFs

IOF	Conservation Status	Information
Black grouse	Red List (HD, BDp ² , BDMp ¹ , BDMr ²)	<p>Black grouse is Red-listed due to a historical decline in the UK, without substantial recent recovery. It also qualifies due to a severe decline in the UK breeding population size of >50 % over 25 years.</p> <p>Breeding numbers in the UK declined by 80 % between 1991 and 2004. Sim <i>et al.</i> (2008¹¹⁹) estimated there to be 5,078 male black grouse in the UK in 2005, with approximately two-thirds of these occurring in Scotland. Woodward <i>et al.</i> (2020¹²⁰) estimated the UK population to be 4,850 males in 2016.</p> <p>Forrester <i>et al.</i> (2012¹²¹) estimates that there are approximately 3,344 lekking males in Scotland (2,580-4,171 range) based on the 2005 national black grouse survey, an update to the 1995-96 survey which estimated 4,700 lekking males (range of 3,550-5,750). In Scotland the breeding range is contracting, and numbers are declining, though the rate of decline varies regionally, being higher in southwestern Scotland (-49%) compared to north Scotland (-16%). Evidence therefore suggests that the national and regional populations are in unfavourable conservation status.</p> <p>Ap Rheinnalt <i>et al.</i> (2007¹²²) stated that Argyll is likely to host “fewer than 180 lekking males”, with a total of 127 lekking males recorded across mainland Argyll in 2004. This is roughly the same extent as NHZ 14, with the species being absent from much of the islands. The desk study carried out for the Cumulative Effect Assessment (see Table 7.12) collated numbers of lekking black grouse recorded during baseline surveys for each project within NHZ 14. Although in some cases the actual local black grouse lekking population is unclear, and acknowledging in a small number of cases there may be some overlap in survey areas between adjacent wind farm sites (e.g. Cour, High Constellation and Narachan wind farms), a minimum population of 125 lekking males within project survey areas in NHZ 14 (including the Development) is estimated. Accounting for other the likelihood of black grouse leks within NHZ 14 that are outside of project survey areas, and assuming a continued national decline in numbers since some baseline surveys were undertaken, the current NHZ 14 population is considered to be at least 150 lekking males.</p>

¹¹⁹ Sim, I.M.W., Eaton, M.A., Setchfield, R.P., Warren, P. & Lindley, P. 2008. Abundance of male Black Grouse Tetrao tetrix in Britain in 2005, and change since 1995–96. *Bird Study*, 55, 303–315.

¹²⁰ Woodward, I., Aebischer, N., Burnell, D., Eaton, M., Frost, T., Hall, C., Stroud, D.A. & Noble, D. (2020). Population estimates of birds in Great Britain and the United Kingdom. *British Birds* 113: 69–104.

¹²¹ Forrester, R.W., Andrews, I.J., McInerny, C.J., Murray, R. D., McGowan, R. Y., Zonfrillio, B., Betts, M. W., Jardine, D. C. & Grundy, D. S. (eds). 2012. *The Digital Birds of Scotland*. The Scottish Ornithologists Club, Aberlady.

¹²² ap Rheinnalt, T., Craik, J.C.A., Daw, P.C., Furness, R.W., Petty, S.J. & Wood, D. (2007). *Birds of Argyll*. Argyll Bird Club, Lochgilphead, Argyll.

IOF	Conservation Status	Information
Golden eagle	Annex 1, Schedule 1, BoCC Green list	<p>The Scottish golden eagle population has been relatively stable over the last few decades and has more recently shown signs of increasing, with a total of 442 breeding pairs estimated at the 2003 Scottish national census (Eaton <i>et al.</i> 2007¹²³) and 508 territories following the 2015 Scottish national census (Hayhow <i>et al.</i> 2017¹²⁴).</p> <p>The NHZ 14 golden eagle population was determined by Whitfield <i>et al.</i> (2008¹²⁵) to be in favourable conservation status with 44 ranges out of 59 known in 2003 occupied (c.75%) and relatively high productivity of 0.55 fledged young per occupied territory.</p> <p>The Scottish Raptor Study Group's golden eagle species account¹²⁶ notes that in Argyll new pairs are being found on a regular basis, and Hayhow <i>et al.</i> (2017) detected reoccupation of ranges in Argyll, a region with high levels of forestry, which were previously considered likely to remain unoccupied. For the period 2009-2018 there was no significant change in number of pairs or breeding success in NHZ 14, but during that period a mean of 71.6 home ranges were checked across Argyll, reaching as high as 105 (49 in mainland Argyll) in 2015 during the last national census. Information from the 2015 census year indicates that the current Argyll population is at least 86 pairs, with an estimated 68 pairs within NHZ 14 (extracted from Hayhow <i>et al.</i> 2017 and Challis <i>et al.</i> 2016¹²⁷), which indicates that the NHZ 14 population remains in favourable conservation status.</p>
Merlin	Schedule 1, Red list (HD, ERLOB)	<p>The last national merlin survey, carried out in 2008, suggested a national breeding population of around 1,159 breeding pairs with about 733 pairs in Scotland (Ewing <i>et al.</i> 2011¹²⁸). Comparison with the previous 1993-94 survey suggests an overall stable population, albeit with regional differences in success.</p> <p>The Scottish Raptor Monitoring Group species account for merlin¹²⁹ shows that recording of merlin territories in Argyll is patchy and so no population trends are discernible. From 2009 to 2018 up to 10 territories were checked</p>

¹²³ Eaton, M.A., Dillon, I.A., Stirling-Aird, P.K. & Whitfield, D.P. 2007. Status of Golden Eagle *Aquila chrysaetos* in Britain in 2003. *Bird Study* 54: 212–220.

¹²⁴ Daniel B. Hayhow, Stuart Benn, Andrew Stevenson, Patrick K. Stirling-Aird & Mark A. Eaton (2017) Status of Golden Eagle *Aquila chrysaetos* in Britain in 2015, *Bird Study*, 64:3, 281-294.

¹²⁵ Whitfield, D.P., Fielding, A.H., McLeod, D.R.A. & Haworth, P.F. 2008. A Conservation Framework for Golden Eagles: Implications for Their Conservation and Management in Scotland. SNH Commissioned Report 193. SNH, Battleby.

¹²⁶ <https://raptormonitoring.org/wp-content/uploads/2023/01/Golden-Eagle-trends-2009-2018.pdf>

¹²⁷ Challis, A., Wilson, M.W., Holling, M., Roos, S., Stevenson, A. & Stirling-Aird, P. (2016). Scottish Raptor Monitoring Scheme Report 2015. BTO Scotland, Stirling.

¹²⁸ Ewing, S. R., Rebecca, G.W., Heavisides, A., Court, I.R., Lindley, P., Ruddock, M., Cohen, S. and Eaton, M.A. (2011). Breeding status of Merlins *Falco columbarius* in the UK in 2008. *Bird Study* 58: 379-389

¹²⁹ <https://raptormonitoring.org/wp-content/uploads/2023/01/Merlin-trends-2009-2018.pdf>

IOF	Conservation Status	Information
		<p>for occupancy, but it is likely that the breeding population is larger. Analysis of data for the period 2009-2018 produced no national trends in breeding number and productivity.</p> <p>The NHZ 14 population was estimated to be 13 (range 8-20) pairs in 2008 (Wilson <i>et al.</i> 2015¹³⁰) and due to the lack of reliable data and small size, is considered to be in unfavourable conservation status.</p>
Greenshank	Amber list (BL)	<p>The UK greenshank breeding population was estimated to be 1,100 pairs in 1995 (Woodward <i>et al.</i> 2020¹³¹). The Scottish breeding population has more recently been estimated as 1,297 pairs (range 851-1,792) by Wilson <i>et al.</i> (2015), although it was considered by the authors that this may be a significant underestimate.</p> <p>The NHZ 14 population was given as zero by Wilson <i>et al.</i> (2015) but the authors did believe that some NHZs may hold more pairs than estimated. Nevertheless, the NHZ 14 breeding population is likely to be small and at the southern end of its range, based on the species' distribution in the BTO Bird Atlas¹³².</p> <p>Humphreys <i>et al.</i> (2017¹³³) reported an apparent increase in the Scottish breeding population, with a moderate increase in winter numbers, suggesting that the species' national population is on balance, likely to be stable or favourable. However, the NHZ 14 population is considered to be in unfavourable conservation status due to its apparent small size.</p>
<p>BoCC Red-list criteria (Stanbury <i>et al.</i> 2020¹¹⁷) HD = historical decline in the breeding population. BDp²: severe breeding population decline over 25 years/longer term. BoCC Amber-list criteria ERLOB: threatened in Europe. BDMp¹: moderate breeding population decline over 25 years/longer term. BDMr²: moderate breeding range decline over 25 years/longer term. BL: breeding localisation</p>		

¹³⁰ Wilson, M. W., Austin, G. E., Gillings S. and Wernham, C. V. (2015). Natural Heritage Zone Bird Population Estimates. SWBSG Commissioned report number SWBSG_1504. pp72. Available from: www.swbsg.org.

¹³¹ Woodward, I., Aebischer, N., Burnell, D., Eaton, M., Frost, T., Hall, C., Stroud, D.A. & Noble, D. (2020a). Population estimates of birds in Great Britain and the United Kingdom. *British Birds* 113: 69–104.

¹³² <https://app.bto.org/mapstore>

¹³³ Humphreys, E.M., Marchant, J.H., Wilson, M.W. & Wernham, C.V. (2015). Greenshank (*Tringa nebularia*): SWBSG Species Dossier 17. Report by BTO Scotland to SWBSG as part of Project 1403. Updated by SWBSG March 2017.

7.5.3 Identified Impacts

The key ornithological impacts relating to the Development are as follows:

- Permanent or temporary direct habitat loss for birds through construction and operation of the Development infrastructure;
- Change in habitat types due to felling of existing forestry for the Development;
- Temporary disturbance as a result of construction activities, through visual and noise disturbance;
- Displacement of birds because of Wind Turbine and substation operation and maintenance, or visitor disturbance. This also includes barrier effects to commuting or migrating birds due to the presence of Wind Turbines;
- Death or injury through collision with Wind Turbine blades or other types of infrastructure associated with the Development;
- The influence of turbine lighting on bird behaviour, whether resulting in displacement or attraction; and
- Cumulative effects of the Development during construction and operation when considering other Wind Farms projects within NHZ 14.

7.5.4 Construction

The main potential effects of construction activities due to the Development are the displacement and disruption of breeding, foraging, roosting or lekking birds as a result of noise and general disturbance over a short-term period (either the duration of a particular construction activity within working hours, or the duration of the whole construction period).

Effects on breeding birds would be confined to areas in the locality of temporary construction compounds, turbines, tracks and other infrastructure. Few attempts have been made to quantify the effects of disturbance of birds due to activities of this type, and much of the available information is inconsistent. However, as a broad generalisation, larger bird species such as raptors, or those that feed in flocks in the open tend to be more susceptible to disturbance than small birds living in structurally complex habitats (such as woodland, scrub and hedgerow) (Hill *et al.* 1997¹³⁴).

Direct habitat loss would also occur due to the Development's construction, which would be both temporary (e.g., construction compounds) and longer term (access tracks, turbines and substation). This has the potential to impact on breeding or foraging individuals.

7.5.4.1 Black Grouse

Impact: lekking, foraging or breeding black grouse may be displaced during construction, either by disturbance or direct habitat loss.

Sensitivity: medium nature conservation importance (Table 7.9) and with the regional and national populations considered to be of unfavourable conservation status (Table 7.10), overall black grouse sensitivity is considered to be medium-high.

Magnitude of impact: according to an expert review by Goodship and Furness (2022¹³⁵), black grouse were determined to have a 'medium' overall likely sensitivity to disturbance, and lekking males may be disturbed at 500-750 m from source. Nesting females and non-breeding birds were assessed as having a disturbance distance of 100-150 m.

¹³⁴ Hill, D.A., D. Hockin, D. Price, G. Tucker, R. Morris, and J. Treweek. (1997). Bird disturbance: improving the quality of disturbance research. *Journal of Applied Ecology* 34:275-288.

¹³⁵ Goodship, N.M. and Furness, R.W. (2022). Disturbance Distances Review: An updated literature review of disturbance distances of selected bird species. A report from MacArthur Green to NatureScot.

NatureScot has in recent times also advocated that a buffer of up to 750 m should be applied to avoid all disturbance during the construction phase, based on information in Zwart *et al.* (2015)¹³⁶.

Baseline surveys in 2020 and 2021 recorded two main black grouse lekking areas within 1.5 km of the Site Boundary (Figure 7.4): one approximately 500 m north of the Site Boundary, and at least 750 m from the nearest proposed infrastructure, with up to four males and five females in attendance; and one to the south over 1 km from the Site Boundary with up to four males but no females present. Within the Site, two male black grouse were observed lekking on one occasion in April 2021, west of the summit of Stùc Scardan, and around 300 m from the nearest Wind Turbine.

With the northern lekking area c.750 m distant and over the brow of a hill, it is considered unlikely birds present would be disturbed by construction activity. This is also likely to be the case for the more distant lek to the south.

Within the Site, occasional lekking in the southeast could be temporarily affected by construction activities during the lekking period, and it is possible that if breeding does take place within the Site, this could also be affected. Ongoing construction activities through the year may also limit the ability of birds to move freely across the Site and thus connectivity between lekking or foraging sites could be temporarily reduced.

The embedded mitigation outlined in Section 7.3.10 includes pre-construction surveys and measures within a BBPP which would reduce the risk of disturbance to any breeding birds. Nevertheless, with the local population of potentially up to ten males contributing to a reasonably large proportion of the NHZ 14 population (given as at least 150 males), a reduction in connectivity between leks and possible unmitigated disturbance to the smaller infrequently used lek site within the Site may result in a medium magnitude, short-term impact, without any additional mitigation measures considered.

Significance of Effect: the effect on the NHZ 14 black grouse population as a result of habitat loss and construction disturbance is considered to be moderate adverse and therefore **significant** in the context of the EIA regulations.

7.5.4.2 Golden Eagle

Golden eagle is considered here within an EIA context (effects on NHZ 14 population) and an HRA context (effects on the integrity of the Glen Etive & Glen Fyne SPA).

Impact: breeding or foraging golden eagle may be displaced during construction, either by disturbance or direct habitat loss.

Sensitivity: being a qualifying feature of the adjacent Glen Etive & Glen Fyne SPA, the species has a high nature conservation importance (Table 7.10) although has a favourable conservation status and so overall, is of medium-high sensitivity.

Magnitude of Impact: all known golden eagle nest sites are at least 4 km from the Site, and so no loss of nesting habitat, or disturbance to nesting birds, would result from construction of the Development. Although flight activity surveys did pick up golden eagle flight activity over the Site, particularly over non-forested areas, relative to activity rates recorded over the adjacent moorland within the SPA (Figures 7.5 and 7.6), and concentrations of satellite tag data from birds located further west (Confidential Figure C7.2), the importance of the Site for foraging is likely to be low. This is due to a combination of habitat type (conifer plantation generally of low suitability for golden eagles), distance from nearest nest sites, and flatter topography (less suitable for soaring) over much of the area where Wind Turbines would be located (as shown from the results of the GET Model, Figure 7.13 and Confidential Figure C7.3, discussed further in Section 7.5.5.1).

¹³⁶ 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. <http://dx.doi.org/10.1890/ES14-00331.1>

Impacts of direct habitat loss within largely forested areas are considered to be negligible for any breeding pair and indeed for any individual. Although some parts of the Site may be temporarily unavailable to foraging birds during the construction period as a consequence of disturbance from construction activities, at any time this is likely to be very limited in extent within the context of a golden eagle's available foraging range. With no particular importance of the Site for foraging identified (e.g. concentrations of prey species, such as rabbit warrens), the overall magnitude of construction disturbance is considered to be negligible and short-term.

Significance of Effect: the effect on the NHZ 14 golden eagle population as a result of habitat loss and construction disturbance is considered to be minor adverse and therefore **not significant** in the context of the EIA regulations.

Effect on integrity of the SPA: with most of the Site comprising conifer plantation, the large majority of the foraging activity of pair EA1 located within the SPA is likely to take place within more suitable moorland habitats closer to the pair's nest sites. With the closest infrastructure c.300 m from the SPA boundary, no direct loss of SPA habitat would occur, although a small part of the outer extent of the pair's territory, outside of the SPA, may become temporarily unavailable due to construction activities within the Site. Evidence presented in Appendix 7.2 and results of baseline surveys suggests that this is unlikely to be important for the pair and thus the integrity of the pair's territory would be unaffected. No material effects on productivity are likely to occur, particularly over the long-term, and so overall no adverse effects on the integrity of the SPA are predicted.

7.5.4.3 Merlin

Impact: breeding or foraging merlin may be displaced during construction, either by disturbance or direct habitat loss.

Sensitivity: merlin has a medium nature conservation importance (Table 7.10) although has an unfavourable conservation status and so overall, is of medium-high sensitivity.

Magnitude of Impact: the location of the 2020 merlin breeding attempt was within an area of forest that would not be removed as part of the Development, and so no direct loss of nesting habitat would occur. Merlin foraging, as observed during baseline surveys, is likely to occur within adjacent open moorland, and so direct habitat loss associated with the Development is likely to make a negligible impact.

The 2020 nest site would be located approximately 350 m from the closest proposed Wind Turbine location. Goodship and Furness (2022) recommend a buffer zone of 300-500 m for avoiding disturbance of breeding merlin, and therefore unmitigated construction activities within up to 500 m during the breeding season may affect a breeding attempt, should one take place in that area again. Pre-construction surveys as part of the BBPP are considered embedded mitigation, and the results of these would determine whether a merlin breeding attempt may be affected by construction activities. Restrictions would be put in place to allow a breeding attempt to continue. Although it is possible that ongoing construction activities immediately prior to the breeding season may prevent a merlin breeding attempt starting within the Site, evidence from 2021 suggests a pair can nest elsewhere in the vicinity, away from a disturbance risk. Merlin prey species such as meadow pipits and skylarks are unlikely to be affected by construction disturbance beyond the immediate area of work, and so the ability of merlin to forage successfully would likely be unaffected.

A negligible, short-term impact magnitude is therefore concluded, assuming that the BBPP is implemented as planned during the breeding season,

Significance of Effect: the effect on the NHZ 14 merlin population as a result of habitat loss and construction disturbance is considered to be minor adverse and therefore **not significant** in the context of the EIA regulations.

7.5.4.4 Greenshank

Impact: breeding or foraging greenshank may be displaced during construction, either by disturbance or direct habitat loss.

Sensitivity: greenshank has a medium nature conservation importance (Table 7.10) although has an unfavourable conservation status and so overall, is of medium-high sensitivity.

Magnitude of Impact: Greenshank may use habitats such as those found within the east of the Site for nesting (i.e., boggy ground with scattered trees and rocky outcrops) but no evidence of this was recorded during baseline surveys. Birds were observed using lochs to the east of the Site Boundary in the breeding seasons (Figure 7.11), and some alarm calling and mobbing behaviour was recorded, suggesting these were breeding birds (greenshank may defend distinct, but sometimes overlapping nesting and feeding areas). Greenshank foraging usually takes place within 1.5 km of the nest, with birds occasionally foraging up to between 2.5 km (Nethersole-Thompson & Nethersole-Thompson 1979¹³⁷) and 3.0 km (Cramp & Simmons 1983¹³⁸), indicating that birds may travel some distance to feed near the Site.

Evidence therefore suggests that it is likely that lochs to the east of the Site support breeding birds for foraging, but that nesting birds further afield would not be directly affected by habitat loss or construction activities. Goodship & Furness (2022) recommend a disturbance buffer of 300-500 m for breeding greenshank. Here, the lochs used for foraging are at least 400 m from the nearest proposed infrastructure, and so although it is possible that some greenshank foraging may be affected by unmitigated construction activity during the breeding season, with the lochs all uphill of the Site, this risk is likely to be lowered. In a worst-case scenario it is possible that construction activities may affect the productivity of a breeding pair over the short-term, which based on the low NHZ 14 population could result in a low impact magnitude.

Significance of Effect: the effect on the NHZ 14 greenshank population as a result of habitat loss and construction disturbance is considered to be moderate adverse and therefore **significant** in the context of the EIA regulations.

7.5.4.5 Construction Effects relating to Grid Connection

As outlined in Chapter 2 - Development Description, the grid connection would be routed through existing forest tracks within the Site, and within the A819 road, to a new substation on the transmission system located at Creag Dubh. The infrastructure beyond the Development's connection point to the grid is considered as part of the cumulative assessment in Section 7.7, under the Creag Dhubh to Inveraray 275 kV Overhead Line project.

Due to the location of the infrastructure within relatively low sensitivity habitats for IOFs (predominantly conifer plantation or clearfell, and close to the A819 road), the usage of existing forest tracks within the Site, and the presence of an existing overhead line along a similar route outside of the Site, it is considered very unlikely that there will be any additive construction disturbance or habitat loss effects for IOFs above those described above for other Wind Farm infrastructure.

7.5.5 Operation

7.5.5.1 Displacement

Black Grouse

Impact: operation of the Development may cause some displacement of lekking, breeding or foraging black grouse from areas close to Wind Turbines and other infrastructure. It is recognised

¹³⁷ Nethersole-Thompson, D. and Nethersole-Thompson, M. (1979). Greenshanks. T&AD Poyser.

¹³⁸ Cramp, S. and Simmons, K. E. L. (1983). Handbook of the Birds of Europe, the Middle East and North Africa. The Birds of the Western Palearctic. Vol III. Waders to Gulls. Oxford University Press, Oxford.

that disturbance may occur due to maintenance activities throughout the operational phase, although since these are likely to be of shorter duration and smaller extent than construction activities, effects would be lower than those predicted for construction effects described above, and for displacement due to Wind Turbine presence described here.

Sensitivity: medium nature conservation importance, with the NHZ 14 and national populations considered to be of unfavourable conservation status. Consequently, black grouse sensitivity is considered to be medium-high.

Magnitude of impact: a review of the impact of Wind Farms on grouse species by Coppes *et al.* (2020¹³⁹) found that lekking black grouse in Scotland and Austria may be affected at up to distances of 500 m by infrastructure, with indications that effects may continue over larger distances in some instances. Evidence from Austria has suggested that black grouse leks may be adversely affected by Wind Farms, although it is not clear what the exact causes may be – potentially a combination of turbine noise, maintenance activities or collisions (Zeiler & Grünschachner-Berger 2009¹⁴⁰). Zwart *et al.* (2015¹³⁶) did not find a significant decrease in the total number of displaying males after construction at seven black grouse lekking sites in Scotland over a period of 1–7 years before and 2–8 years after construction. However, they did find that lekking sites, initially located within 500 m of the Wind Turbines (n=4 lekking sites), were further from them after construction, from a median distance of 250 m before construction to 803 m after construction. Effects were recorded even further, with lekking sites at about 1000 m being further away from the turbines after construction (Zwart *et al.* 2015).

Based on a likely displacement impact of lekking birds within 500 m, the main lekking locations to the north and south of the Site (800 m and over 2 km from the closest Wind Turbine) would unlikely be lost due to the presence of operational infrastructure, although the locations of lekking birds in the north may be altered. It is more likely that the infrequent, smaller lek site near the summit of Stùc Scardan, and around 300 m from the nearest Wind Turbine may be affected, although the scientific evidence presented above suggests that a relocation of lekking behaviour rather than a loss is the more likely outcome. Nevertheless, it is possible that a worst-case loss of two males (c.1.3 % of the estimated NHZ 14 population of at least 150 males), alongside a potential reduction in connectivity between lek sites and possible displacement of any breeding, due to the presence of Wind Turbines within the Site may result in an impact of low and long-term magnitude on the NHZ 14 population.

Significance of Effect: the effect on the NHZ 14 black grouse population as a result of operational displacement is considered to be moderate adverse and therefore **significant** in the context of the EIA regulations.

Golden Eagle

Impact: Golden eagles may be at risk of displacement from foraging habitat, thereby potentially impacting on productivity, fitness and survival rates of the NHZ 14 and Glen Etive & Glen Fyne SPA populations.

Sensitivity: being a qualifying feature of the adjacent Glen Etive & Glen Fyne SPA, the species has a high nature conservation importance (Table 7.10) although has a favourable conservation status and so overall, is of medium-high sensitivity.

Magnitude of Impact: during the design layout process, considerable effort was made to minimise the risks of displacement to golden eagle, by ensuring that the location of Wind Turbines would be in areas that are of relatively lower value for foraging (see consultation Table 7.1 and Embedded Mitigation section 7.3.10). A desk study exercise was undertaken to try and quantify the likely extent of displacement of golden eagles around Wind Turbines within the Site, and the consequent

¹³⁹ Coppes, J., V. Braunisch, K. Bollmann, I. Storch, P. Mollet, V. Grünschachner-Berger, J. Taubmann, R. Suchant, and U. Nopp-Mayr. (2020). The impact of wind energy facilities on grouse: a systematic review. *Journal of Ornithology* 161:1–15.

¹⁴⁰ Zeiler H., V. Grünschachner-Berger (2009). Impact of wind power plants on black grouse, *Lyrurus tetrix* in Alpine Regions. *Folia Zool.* 58(2): 173–182

impacts of associated loss of any foraging habitat. This is presented in Appendix 7.2. The evaluation used the following information:

- Aerial imagery and National Vegetation Classification (NVC) habitat survey results within and surrounding the Development Site (as described in Chapter 8: Ecology), used to determine habitat type and quality for foraging golden eagles;
- Golden Eagle Topographical (GET) Model outputs of the Site and surrounding SPA (Figure 7.14 and Confidential Figure 7.3), used to understand relative suitability of the topography for golden eagle; and
- Scientific articles investigating the behaviour of golden eagles in relation to Scottish wind farms (Fielding *et al.* 2021¹⁴¹; 2022¹⁴²) as well as others on eagle ecology.

Based on the information gathered, the following was concluded:

- Using evidence from scientific studies, a displacement extent of 300 m around Wind Turbines is a reasonably precautionary maximum value, with shorter buffer distances suitable in better habitat and topographical conditions for golden eagle foraging;
- As a consequence, with suitable minimum buffers of c.300 m from the SPA employed on Site for all Wind Turbines (the closest, T12, being 285 m distant, but with a commitment of not getting any closer due to micrositing), the Development layout would result in no effective SPA habitat loss due to displacement;
- The mean GET model score within 300 m of Wind Turbines is 4.6, suggesting generally unpreferred Site conditions (preferred areas being ranked 6-10 by the GET model); and
- Habitat quality and topographical conditions within the Site are generally of low suitability for foraging golden eagle, with better conditions only occurring along the eastern margins, and particularly to the south, in open moorland closer to T13.

Within the context of the local breeding population, the Site is therefore likely to be of relatively low value, and loss of areas around Wind Turbines is unlikely to affect productivity or survival rates. Therefore, the magnitude of impact due to displacement of golden eagles around Wind Turbines is considered to be of negligible magnitude over the long-term.

Significance of Effect: the effect on the NHZ 14 golden eagle population as a result of operational displacement is considered to be minor adverse and therefore **not significant** in the context of the EIA regulations.

Effect on integrity of the SPA: as the Wind Turbines would generally be located in areas of lower golden eagle suitability (based on GET score and habitat type) outside of the SPA, their presence is unlikely to affect the ability of SPA pair EA1 to forage successfully, or the viability of their territory. Although some small losses of more suitable foraging habitat may occur outside of the SPA, e.g., near T13 in the south, the likely limited spatial extent of this suggests that no adverse effect on the integrity of the SPA would occur due to displacement.

Merlin

Impact: merlin may be at risk of displacement from nesting or foraging habitat, thereby impacting on productivity, fitness and survival rates.

Sensitivity: medium-high.

Magnitude of Impact: as outlined above in the Construction effects section 7.5.4.3, a nest site occupied in 2020 was located towards the northern edge of a conifer plantation approximately 350 m from the closest proposed Wind Turbine location. There is little evidence as to whether merlin

¹⁴¹ Fielding AH, Anderson D, Benn S, Dennis R, Geary M, Weston E, *et al.* (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. <https://doi.org/10.1371/journal.pone.0254159>

¹⁴² Fielding, A.H., Anderson, D., Benn, S., Dennis, R., Geary, M., Weston, E. and Whitfield, D.P. (2022), Responses of dispersing GPS-tagged Golden Eagles (*Aquila chrysaetos*) to multiple wind farms across Scotland. *Ibis*, 164: 102-117. <https://doi.org/10.1111/ibi.12996>

are affected by the presence of Wind Turbines, or a Wind Farm development as a whole, although some studies (e.g. Pearce-Higgins *et al.* 2012¹⁴³) have shown that merlin prey species such as skylark are largely unaffected, meaning that reduction in food availability is unlikely to be a relevant factor. As Goodship and Furness (2022) have recommended a buffer zone of 300-500 m for avoiding disturbance of breeding merlin, it is possible that this may also apply to displacement around operational Wind Turbines, although a degree of screening due to surrounding conifer woodland, and the likelihood that birds would forage in open moorland further away from Wind Turbines means that nesting may continue unaffected.

On balance, and based on the evidence from 2021 where there was change in nest site to nearby open moorland, it is more likely that merlin would relocate rather than abandon the area, should the presence of Wind Turbines affect the birds at the 2020 nest site. As such, a negligible impact magnitude over the long-term is predicted.

Significance of Effect: the effect on the NHZ 14 merlin population as a result of operational displacement is considered to be minor adverse and therefore **not significant** in the context of the EIA regulations.

Greenshank

Impact: greenshank may be at risk of displacement from nesting or foraging habitat, thereby impacting on productivity, fitness and survival rates.

Sensitivity: medium-high.

Magnitude of Impact: baseline studies recorded greenshank around the lochs to the east of the Site during the breeding season. Although no evidence of nesting was recorded, it is likely that these lochs formed part of at least one breeding pair's foraging territory.

There is a lack of scientific studies as to how tolerant greenshank may be around operational Wind Turbines, although Humphreys *et al.* (2017¹⁴⁴) report that some unpublished studies for NatureScot have suggested that greenshanks do not show a high level of behavioural displacement around Wind Turbines. During the Public Inquiry for the Achany Wind Farm in Sutherland, where greenshank was identified as an issue, a 200 m zone of potential displacement was proposed, based on scientific evidence provided by Professor Des Thompson in his principal precognition (SNH, 2007¹⁴⁵).

Post-construction monitoring of the Bhlairaidh Wind Farm from 2018-20 recorded up to three territories within 500 m of operational Wind Turbines (SSE Renewables, 2021¹⁴⁶) The Lochluichart Extension II Wind Farm EIA Report references evidence in from post-construction monitoring for Lochluichart Extension which suggests that birds were not displaced by the presence of operational Wind Turbines, with four to five territories in the area around the Lochluichart wind farms and Corriemoillie Wind Farm. Displacement impacts, if they occur, are therefore likely to be at distances of under 500 m.

As the lochs to the east are at least 400 m from the nearest Wind Turbine, it is more likely than not that greenshank would continue to use the lochs for foraging. However, it is possible that breeding birds may use closer habitat within the Site during the breeding season for other purposes, e.g., mating, nesting or chick-rearing, and so as a precaution, an unmitigated impact of low magnitude over the long term is predicted, due to the small size of NHZ 14 population.

¹⁴³ Pearce-Higgins, J.W., Stephen, L., Douse, A. and Langston, R.H.W. (2012). Greater impacts of Windfarms on bird populations during construction than subsequent operation: results of a multi-site and multi-species analysis. *Journal of Applied Ecology* 49: 386-394.

¹⁴⁴ Humphreys, E.M., Marchant, J.H., Wilson, M.W. & Wernham, C.V. (2015). Greenshank (*Tringa nebularia*): SWBSG Species Dossier 17. Report by BTO Scotland to SWBSG as part of Project 1403. Updated by SWBSG March 2017.

¹⁴⁵ Scottish Natural Heritage (2007). Proposed Wind Farm Development at Achany Estate, Lairg Sutherland: Principal Precognition of Desmond Thompson BSc, PhD, DSc.

¹⁴⁶ SSE Renewables (2021). Bhlairaidh Wind Farm Extension Environmental Impact Assessment Report.

Significance of Effect: The effect on greenshank from operational displacement is classified as moderate adverse and is therefore **significant** in the context of the EIA Regulations.

7.5.5.2 Collision Risk

Birds that utilise the airspace within the Development at potential collision heights would be at risk of collision with wind turbines. For the CRM methods used see Appendix 7.1.

Results of the CRM are presented in Table 7.8. Black grouse, merlin and greenshank are not included in this table because no flight activity was recorded during flight activity surveys that was 'at-risk' – i.e., within 500 m of a Wind Turbine and at rotor height. Whilst it cannot be concluded for certain that collision rates for these IOFs would be zero, it is likely that the risks are very low and so a negligible, long-term impact magnitude is predicted. The unmitigated effects on these IOFs from collision risk is therefore considered to be negligible and therefore **not significant** in the context of the EIA Regulations.

Golden Eagle

Impact: birds flying within the Site may be subject to a collision risk with Wind Turbines, thereby increasing the annual mortality rate of the population above background levels.

Sensitivity: medium-high.

Magnitude of impact: as shown in Table 7.8, the predicted mean annual collision rate for golden eagles is 0.072 birds, or one collision every 13.9 years. This did however vary from one every 76.9 years in 2020-21, to one every 7.6 years in 2021-22.

Assuming a current NHZ 14 population of at least 68 breeding pairs, the worst-case additional mortality would equate to a 1.1 % increase above the baseline mortality rate of 0.0488^[147]. Surveyor notes showed that birds recorded over the Site were a combination of adult and immature birds, suggesting that not all collision mortality would be attributable to breeding birds, and therefore directly affect the NHZ 14 breeding population. The additional mortality increase is therefore likely to be below 1 %.

The impacts associated with this level of additional mortality on the NHZ 14 population (breeders, and non-breeders which are assumed to belong to the NHZ population) was investigated using a population model (see Appendix A7.3 for details), based on the Golden Eagle Population Model (GEPM) developed by Whitfield *et al.* (2004^[148]) and used by Whitfield *et al.* (2008) to assess NHZ conservation status as part of the Golden Eagle Conservation Framework report. According to Whitfield *et al.* (2008) NHZ 14 was likely to be in favourable conservation status, based on tests of territory occupancy rates, demographic parameters and observed trends from the 2003 national golden eagle census.

Input data on territory numbers, occupancy and productivity were obtained from Hayhow *et al.* (2017^[124]) and Scottish Raptor Monitoring Scheme annual reports, with survival rates being those previously used by Whitfield *et al.* (2008). The findings from the modelling for the Development are:

- The information provided from the 2015 national census (Hayhow *et al.* 2017) suggests that the NHZ 14 population is likely to still be in favourable conservation status, with an apparent increase from 44 to 68 pairs since 2003;
- Under the most realistic unimpacted (baseline) scenario, growth would continue until the NHZ's carrying capacity of 91 pairs is reached, within a model prediction of eight years;

¹⁴⁷ This is based on an adult annual survival rate of 0.9512, as used by Whitfield *et al.* (2008). A conservation framework for golden eagles: implications for their conservation and management in Scotland. Scottish Natural Heritage Commissioned Report No.193 (ROAME No. F05AC306).

¹⁴⁸ Whitfield, D.P., Fielding, A.H., McLeod, D.R.A. & Haworth, P.F. (2004). Modelling the effects of persecution on the population dynamics of golden eagles in Scotland. *Biological Conservation* 119: 319–333.

- with additional mortality due to predicted collisions at the Development (0.072 per year), the population growth rate would be largely unchanged from the baseline scenario. There would be no delay to the carrying capacity being reached after eight years; and
- with continued growth predicted over the long-term, despite additional mortality associated with collisions due to the Development, it is predicted that favourable conservation status would be maintained.

Based on these findings, the impact of additional collision mortality on the NHZ 14 golden eagle population is considered to be of negligible, long-term magnitude.

Significance of Effect: The effect on golden eagle from collisions is classified as minor adverse and is therefore **not significant** in the context of the EIA Regulations.

Effect on integrity of the SPA: at the time of citation in 2010, the Glen Etive & Glen Fyne SPA golden eagle population was assumed to be 19 active territories, taken from the 2003 national golden eagle census data. The SPA was last assessed for NatureScot in 2015, presumably using national census data from that year, and was considered to be in favourable, maintained condition. Assuming that 19 territories remain active, a worst-case collision rate of 0.072 birds per year (taken to be adult breeders) would result in an increase over baseline mortality rate by 3.9 %. This is likely to be an overestimate of the risks to the SPA population for the reasons outlined below.

- As recorded during baseline surveys and demonstrated within a golden eagle population which is in favourable conservation status, it is likely that a sizeable proportion of birds present on Site are not SPA breeding birds, and are either wandering immatures or non-breeders, or breeding birds from neighbouring non-SPA territories.
- Recently published studies of satellite-tagged golden eagle behaviour in relation to operational Wind Turbines in Scotland (Fielding *et al.* 2021¹⁴¹; 2022¹⁴²) have shown that, contrary to evidence in other countries, golden eagles are almost wholly displaced within and immediately around an operational Wind Farm, with no clear evidence of habituation occurring over time. Whilst the two impacts are not mutually exclusive, it is considered that displacement is the primary risk to golden eagles, rather than collisions. Indeed, Fielding *et al.* (2021) conclude that their results suggest that “*collision risk is not a substantive factor in young Scottish golden eagles, and so anticipating population impacts of wind farms should be based on habitat loss and not additional mortality*”. Fielding *et al.* (2022) state that despite a potentially high exposure to collision risk, collisions are rare and in over 20 years only three golden eagle collision fatalities in Scotland were known to the authors (with approximately 5,500 Wind Turbines in construction or operational in 2020¹⁴⁹). It is therefore possible that, from the results of these studies, the collision rate is an overestimate of actual risk, since the species’ 99 % avoidance rate, as recommended by NatureScot¹⁵⁰ for use in the Band *et al.* (2007¹⁵¹) collision model, was primarily based on evidence taken from wind farms in the USA (Whitfield, 2009¹⁵²), where Fielding *et al.* (2022) note that studies have found, or presumed, that golden eagles are relatively susceptible to collision compared to in Scotland.

The GEPM in Appendix A7.3 also investigated the impacts of additional mortality due to collisions on the Glen Etive & Glen Fyne SPA population. It was assumed that the survival and productivity rates used for the NHZ 14 would be applicable to the SPA population, and suitably precautionary. The conclusions from the modelling were:

¹⁴⁹ <https://www.zerowastescotland.org.uk/resources/future-onshore-wind-decommissioning-scotland>

¹⁵⁰ <https://www.nature.scot/doc/wind-farm-impacts-birds-use-avoidance-rates-naturescot-wind-farm-collision-risk-model>

¹⁵¹ 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.

¹⁵² Whitfield, D.P. (2009) Collision avoidance of golden eagles at wind farms under the ‘Band’ collision risk model. Report to SNH.

- under an unimpacted (baseline) scenario it would take five years before the SPA's possible carrying capacity of 23 pairs is reached;
- with additional mortality due to predicted collisions at the Development (0.072 per year), there would be no delay for the carrying capacity to be reached after five years; and
- with continued growth, or stability of population predicted over the long-term, despite additional mortality associated with collisions due to the Development, it is predicted that favourable condition of the SPA would be maintained.

Therefore based on the information available, it is considered that the collision risk posed by the Development to golden eagles is very low, and even if a breeding adult collision did take place during the operational period of the Development, it is likely that due to the favourable conservation status of the population, a replacement bird would move in to the territory, which would continue to be occupied. It can therefore be reasonably concluded that there would be no adverse effect on the integrity of the SPA due to collision risks.

7.5.5.3 Lighting

As the Wind Turbines would be in excess of 150 m to blade tip, they are required to be lit pursuant to Article 222 of the UK Air Navigation Order (ANO) 2016. As advised by NatureScot (2020b¹⁵³), there are potential lighting impacts on birds which therefore require consideration within an EIA.

All IOFs

Impact: effects on IOFs might arise as a consequence of deployment of obstruction lighting on Wind Turbines over 150 m to blade tip. In addition to lighting on the turbines themselves, any permanent lighting of the substation and BESS compound may also affect birds utilising the area around the substation for breeding or foraging.

Lighting could have various effects on birds: they may be attracted to lights and thereby placed at higher risk of collisions, have migration patterns disrupted, show avoidance of lights with a consequent displacement impact, or be subject to increased predation threat. NatureScot (2020b¹⁵³) has identified attraction (phototaxis) as posing the principal threat to birds, in relation to Wind Turbines.

Sensitivity: medium-high.

Magnitude of Impact:

In NatureScot's (2020a¹⁵⁴) advice on the scope of assessment for turbine lighting, it is identified that an assessment of the possible impacts of lighting on birds may be required in the following three situations, where risk is greater:

- Wind Turbines on or adjacent to a seabird colony that hosts burrow nesting species;
- Wind Turbines that are on or adjacent to protected areas that host large concentrations of wintering waterbirds, where such sites are located within open country away from other sources of artificial light; and
- where Wind Farms are located on migratory corridors or bottlenecks for nocturnally migrating passerines.

It is clear that the Development does not fit the first two situations. In the case of migrating species, there is no evidence to suggest that the Site is of any importance as a migration route, with relatively few wildfowl flights recorded for example. The habitats on Site are generally unpreferred for most species, and the topography within the Site itself does not suggest that it

¹⁵³ NatureScot (2020b). The Effect of Aviation Obstruction Lighting on Birds at Wind Turbines, Communication Towers and Other Structures. NatureScot Information Note.

¹⁵⁴ NatureScot (2020a). General pre-application and scoping advice for onshore wind farms. Guidance.

would be a significant flight corridor (with birds more likely to follow Glen Shira and Glen Aray), and it is distant from coastal areas which would be of greater importance to continental migrants.

As such, based on the guidance provided by NatureScot (2020a¹⁵⁴, 2020b¹⁵³), it is considered that there is little evidence to indicate that any species would be significantly impacted either negatively or positively by lighting requirements of the Development. An impact of negligible, long-term magnitude is therefore predicted for all IOFs.

The substation and BESS compound would be situated within an area of existing mature conifer plantation, close to the A819 road on the western edge of the Site. It is over 1 km from any recorded Schedule 1 species' nest site, or black grouse lek, and therefore the impacts to all IOFs from lighting are considered to be of negligible magnitude.

Significance of Effect: the level of significance of lighting on IOFs is predicted to be negligible and **not significant** in the context of the EIA Regulations.

Effect on integrity of the SPA: although the substation and BESS compound is within 150 m of the Glen Etive & Glen Fyne SPA, due to its location, it is very unlikely to be within or near habitat used by golden eagles. As such, no adverse effects on the integrity of the SPA are predicted.

7.5.6 Decommissioning

Decommissioning effects for the Development are difficult to predict with any confidence because of the long timeframe until their occurrence. Decommissioning impacts are considered for the purpose of this chapter to be similar in nature to those of construction impacts but are likely to be of shorter duration. The significance of effects predicted in the Construction section 7.5.4 are therefore considered appropriately precautionary for assessing decommissioning effects on IOFs.

7.6 Mitigation and Residual Effects

7.6.1 Construction

The only identified effects during the construction phase (and decommissioning phase) that were considered to be significant are disturbance to lekking black grouse and breeding greenshank at feeding lochs (moderate adverse). Specific construction mitigation for these two species, in addition to standard procedures within the BBPP, has been considered and is summarised below.

No other significant effects were predicted for any IOF, and therefore no specific mitigation other than the embedded mitigation outlined in section 7.3.10 (BBPP, ECoW and pre-construction surveys) is required for golden eagle or merlin. These measures will aim to ensure that no breeding activity is disrupted by construction activities.

7.6.1.1 Black Grouse

Specific pre-construction surveys for lekking black grouse will be undertaken during the main black grouse lekking season (March to May, following methodology provided by Gilbert *et al.* (1998¹¹⁵) and NatureScot (SNH 2017¹¹¹) to provide an up-to-date understanding of where black grouse are lekking within 750 m of the Development.

To avoid a significant disturbance effect occurring during construction, the BBPP will also extend to protection of black grouse leks (as well as nest sites). If pre-construction surveys do record lekking black grouse within a potential disturbance zone (up to 750 m of any proposed works), all potentially disturbing construction activities would be prohibited until a risk assessment is undertaken. The risk assessment would consider the likelihood and possible implications of the associated construction activities on the lek and set out necessary measures to ensure that no disturbance occurs. Restrictions to construction activity would likely be within two hours of dawn during core lekking period of March to May, but the exact timing of restrictions and/or extent of any disturbance-free zone, within which any construction activity that is considered to be potentially disturbing would be prohibited in that area until the core lekking period has passed,

would be agreed with NatureScot. Furthermore, to minimise the possibility of disturbance outside these times to any leks within 750 m of access tracks, a maximum speed limit of 15 mph will be enforced, and personnel will remain within vehicles wherever possible. Where possible, gates within 750 m of lek sites will remain open after first arrival, therefore avoiding the need for every subsequent entry to open and close the gate and the associated potential disturbance to the lek due to pedestrian activity.

The ECoW will oversee the implementation of the above measures.

Following the mitigation detailed above, the residual effect for the NHZ 14 black grouse population as a result of construction disturbance is considered to be minor adverse and therefore **not significant** in the context of the EIA regulations.

7.6.1.2 Greenshank

As part of the BBPP, pre-construction surveys during the greenshank breeding season (April to July) would aim to locate any active nest sites within 500 m of construction activities. In addition to this, the ECoW or an appropriately qualified ornithologist will monitor greenshank activity around the lochs to the east of the Site to determine whether they are likely to form a key part of any breeding pair's territory, should it be possible that any construction activity may significantly disturb breeding adults, or dependent young. If this is considered to be the case, restrictions would be placed on construction activities within up to 500 m of feeding lochs or dependent young, with the nature, extent and duration of this dependent on Site-specific conditions, and confirmed after a risk assessment is conducted by the ECoW.

Following the mitigation detailed above, the residual effect for the NHZ 14 breeding greenshank population as a result of construction disturbance is considered to be minor adverse and therefore **not significant** in the context of the EIA regulations.

7.6.2 Operation

Significant displacement effects during operation were identified for lekking or breeding black grouse (moderate adverse), and breeding greenshank (moderate adverse). Specific additional mitigation has been considered and is summarised below.

No significant effects were predicted for golden eagle or merlin, and therefore no specific mitigation is required due to minor adverse effects, however the aims of the OBEMP (Appendix 8.4) are designed to benefit these, and other species.

7.6.2.1 Black Grouse

As identified in Section 7.5.5.1, lekking or breeding black grouse may be displaced from areas within 500 m of Wind Turbines.

Black grouse have been identified as a key ornithological feature in the OBEMP (Appendix 8.4), with Aim 3 (Maintain or increase the local population of black grouse and increase connectivity between lek sites) specifically determined to deliver focussed habitat enhancement to maintain or increase black grouse numbers. The final HMP (to be agreed with Argyll & Bute Council and NatureScot prior to the commencement of the Development's construction period, should planning consent be granted) would include confirmed Management Units and detailed Management Prescriptions.

The main benefits for black grouse, planned under the OBEMP would be:

- Removal of conifer woodland and restore ground to previous mire/heath habitats suitable for breeding/feeding black grouse;
- Possible small, discrete areas of native woodland planting, subject to an evaluation of ground conditions; and
- Peatland restoration in open moorland close to the occasional lek site near the summit of Stùc Scardan.

Following the mitigation detailed above, the residual effect for black grouse during operation of the Development is considered to be minor adverse and therefore **not significant** in the context of the EIA regulations.

7.6.2.2 Greenshank

As identified in Section 7.5.5.1, greenshank may be displaced from areas within up to 500 m of Wind Turbines, which could be used during the breeding season for nesting, feeding or chick-rearing.

Aim 4 of the OBEMP is to "Maintain or increase the local population of breeding greenshank". Measures as part of the HMP would benefit breeding greenshank by providing enhanced nesting and chick-rearing habitats within the Site, including:

- Removal of conifer woodland and restoration of bog/heath habitats close to feeding lochs which would provide opportunities for nesting e.g., beside rocky outcrops, remnant tree stumps, and for chick-rearing; and
- Peatland restoration in open moorland close to feeding lochs near the summit of Stùc Scardan, which could provide better breeding habitat.

Following the mitigation detailed above, the residual effect for greenshank during operation of the Development is considered to be minor adverse and therefore **not significant** in the context of the EIA regulations.

7.7 Cumulative Effect Assessment

This Section presents information about the potential cumulative effects of the Development combined with other operational, consented or proposed projects that are located within the appropriate spatial context on the basis of the species considered.

It also includes the scope and requirements of an in-combination assessment required as part of the HRA process to determine any adverse effects on the integrity of any European sites, in this case the Glen Etive & Glen Fyne SPA.

7.7.1 Methods

NatureScot (SNH 2018b¹¹³) has provided guidance on assessing the cumulative effects on birds. This assessment follows the principles set out in that guidance.

Cumulative effects may include cumulative disturbance-displacement, collision mortality, habitat loss or barrier effects. Some cumulative impacts, such as collision risk, may be summed quantitatively, but according to NatureScot "*In practice, however, some effects such as disturbance or barrier effects may need considerable additional research work to assess impacts quantitatively. A more qualitative process may have to be applied until quantitative information becomes available for developments in the area, e.g. from post-construction monitoring or research*" (SNH 2018b¹¹³).

The main projects likely to cause similar effects to those associated with the Development are other operational Wind Farm developments, or those under construction, consented, or in the planning process within NHZ 14 (Table 7.11). In addition to this, two other infrastructure projects have been identified:

- The installed Inveraray to Crossaig Overhead Line (OHL) reinforcement, directly to the south of the Development Site; and
- The proposed Creag Dhubh to Inveraray 275 kV OHL directly to the west of the Development Site along Glen Aray.

Wind Farm projects at scoping stage have been scoped out of the cumulative assessment because either they do not have sufficient information on potential effects to be included; because the baseline survey period is ongoing; or because results have not been published. Projects that have

been refused (and no longer capable of appeal) or withdrawn have also been scoped out of the cumulative assessment.

Small Wind Farm projects with three or fewer turbines have also been scoped out from the cumulative assessment as often these projects are not subject to the same level of detail of ornithological assessment, and so there are no directly comparable data. Because of the small scale of such projects, effects are likely to be negligible on the IOFs assessed here.

7.7.2 Scope of Cumulative Assessment

Based on the conclusions of the assessment presented in Section 7.5 and the committed mitigation outlined in Sections 7.3.10 and 7.6, the following IOFs and impacts have been scoped out of the cumulative assessment due to a lack of likely significant effects and no/ negligible contribution to a cumulative effect:

- Cumulative construction effects for all IOFs when embedded and additional mitigation measures are implemented (no reduction in numbers of breeding attempts or black grouse lekking predicted);
- Cumulative collision effects for all IOFs, except golden eagle, due to low or no predicted collision risk;
- Cumulative operational displacement effects for golden eagle and merlin due to no or negligible long-term impacts (e.g., productivity or survival rates) predicted on the NHZ 14 populations due to the Development alone; and
- Cumulative operational displacement effects for greenshank due to a lack of recorded presence/ impacts/ assessment presented in other Wind Farm EIAs within NHZ 14.

The remaining cumulative effects are therefore considered below:

- Cumulative operational displacement effects for black grouse; and
- Cumulative collision risks for golden eagle.

7.7.3 Other NHZ 14 Projects Included in Cumulative Assessment

Table 7.11 identifies the Wind Farm projects in NHZ 14 that have been scoped into the cumulative assessment, and their latest known status. This information was obtained from a combination of the last updated version of the NatureScot wind farm database¹⁵⁵ (mid 2019) and an extensive search of the Argyll & Bute Council Planning portal for changes/new projects between 2019 and April 2023.

Table 7.11: Other NHZ 14 Wind Farm Projects

Wind Farm	Status	No. Turbines	EIA Info Available
A'Chruach	Operational	21	EIA chapter
Allt Dearg	Operational	12	EIA chapter
An Suidhe	Operational	23	no information
Beinn an Tuirc	Operational	46	Some info from Beinn an Tuirc Phase 3 ES
Beinn an Tuirc 2	Operational	19	EIA chapter

¹⁵⁵ <https://spatialdata.gov.scot/geonetwork/srv/eng/catalog.search#/metadata/b57cabf0-0551-4c57-ae39-d32720e22ab6>

Wind Farm	Status	No. Turbines	EIA Info Available
Beinn Ghlas	Operational	14	Some info from Beinn an Tuirc Phase 3 ES
Carraig Gheal	Operational	20	EIA chapter
Clachan Flats	Operational	9	EIA chapter
Cour	Operational	10	EIA chapter
Cruach Mhor	Operational	35	EIA chapter
Deucheran Hill	Operational	9	EIA chapter
Freasdail	Operational	11	EIA chapter
Sròndoire	Operational	3 (but adjacent to Allt Dearg)	EIA chapter
Tangy I*	Operational	15	EIA chapter
Tangy II*	Operational	7	EIA Technical Appendix and Information from Tangy III ES
A'Chruach Phase 2	Approved	2 (but adjacent to A'Chruach)	EIA chapter
Airigh	Approved	14	EIA and SEI chapters
Beinn An Tuirc Phase 3	Approved	18	Ornithology Technical Report
Blary Hill	Approved	14	EIA chapter
Eascairt	Approved	13	ES chapter
Tangy IV*	Approved	16 (repowering)	EIA chapter
High Constellation	Approved	10	EIA chapter
Clachaig Glen	Pending	12	EIA chapter
Killean Wind Farm	Pending	20	EIA chapter
Rowan Wind Farm previously Kilberry Wind Farm	Pending	13	EIA chapter
Sheirdrim Hill	Pending (appeal)	19	EIA Chapter
Narachan	Pending	11	EIA Chapter

* it is planned that Tangy Wind Farm and Extension is replaced with Tangy IV repowering scheme, and so it would not be accurate to consider all Tangy projects together as part of the cumulative

assessment. It is therefore assumed that Tangy IV would become operational rather than Tangy I and Extension being decommissioned without replacement.

7.7.4 Black Grouse

According to Table 7.12, eight other Wind Farm projects within NHZ 14 may impact upon lekking black grouse, with a worst-case total of 32 birds within a potential zone of influence, according to each project's available information. Including the two birds that are most likely to be affected by the Development, this would account for up to 21 % of the NHZ population of lekking males (likely to be at least 150 birds). Although up to 30 lekking males were recorded within a potential zone of influence of the Inveraray to Crossaig OHL Reinforcement project, operational effects on all species were scoped out of the project's assessment because birds are already habituated to the presence of an existing powerline.

In the unlikely scenario that all projects become fully operational, and with the population likely to be in decline even without the presence of Wind Farms, a worst-case unmitigated significant cumulative effect on the NHZ 14 population would be the likely outcome, based on the large proportion of NHZ 14 lekking males potentially affected. Whilst it is possible that some losses may occur due to displacement around Wind Turbines, the evidence from scientific studies presented in section 7.5.5.1 suggests that relocation of leks is more likely in many cases. The commitment to mitigation and habitat management at the Development and other Wind Farm sites, including Cour, High Constellation and Airigh where higher numbers were recorded, is likely to result in the continuation of lekking and foraging activity at a number of project sites across the NHZ. This is more likely to lead to a residual cumulative effect of minor adverse and therefore **not significant**. Because of the planned habitat management outlined in the OBEMP aiming to improve conditions within the Site for black grouse, the Development is unlikely to contribute materially towards this cumulative effect.

Table 7.12 Predicted Cumulative Effects within NHZ 14 Relating to Black Grouse

Project	Disturbance-displacement	Number of lekking males affected by operational displacement
Operational		
Allt Dearg	No information available (likely similar to adjacent Sròndoire). Allt Dearg Landscape and Habitat Enhancement Plan includes habitat improvements for black grouse.	0
Clachan Flats	Present but no evidence of breeding within 2km	0
Cruach Mhor	No leks recorded within Survey Area although three males were recorded in suitable habitat. Black grouse may be affected in the short-term by tree clearance rather than ongoing displacement effects. Management areas will help offset any losses.	0
Sròndoire	Black grouse were observed at two locations (single males with one female) and heard from another two locations. Allt Dearg Landscape and Habitat Enhancement Plan includes habitat improvements for black grouse, and this will be enhanced for Sròndoire.	2
Cour	Recorded at three separate leks in 2007 and 2008. Leks were at distances of approximately 500 m, 750 m and 2 km from infrastructure. Numbers of black grouse were low with a maximum of three males and one female recorded at each of these leks.	0
A'Chruach	Lek of three birds c.200 m outside Site. A Black Grouse Biodiversity Enhancement Plan is a consent condition of development.	3
Beinn an Tuirc Extension	Local population of one to five lekking males, with nearest lek of a single male around 500 m from forestry removal area and nearest turbine. Activities would be restricted temporally and spatially during construction period and so displacement unlikely.	0
Freasdail	Single male recorded 1km east, and three males located approximately 825 m south-east.	0

Project	Disturbance-displacement	Number of lekking males affected by operational displacement
Inveraray to Crossaig OHL Reinforcement	Eight lek sites identified within survey area with up to around 30 males present. Operational barrier effects and disturbance scoped out of assessment as data around existing infrastructure suggests that birds have already habituated to the presence of an OHL.	[30]
Approved		
Beinn an Tuirc Phase 3	Within 1.5 km of the footprint of the Development, there were 11 males at six lekking locations. Two leks were recorded within 300 m of infrastructure, although one close to a borrow pit would likely be screened, with two males at the other location likely being able to move from disturbance.	2
Blary Hill	A maximum of four leks with a maximum of two males, and two nests recorded in 2012. No leks within 300 m of turbines. Three to five males within wider Study Area, which may be affected.	3-5
Eascairt	Three lekking locations, over 1.4 km from nearest turbine. Two males recorded closer to Site at "temporary display Sites" unlikely to be significantly affected.	0
High Constellation	Infrastructure within 400 m of up to six males and three females, and within 700 m of an additional lekking male. Biodiversity Enhancement Plan designed to provide enhanced habitat for black grouse over wide area.	7
Airigh	One lek of up to six males, which is within 400 m of proposed infrastructure may be affected. Spatial and temporal restrictions are planned to minimise the potential effect on black grouse, alongside habitat improvements outlined in the Outline Conservation Management Plan.	6
Application		
A'Chruach Extension	Recorded displaying at one lek Site in 2012 and 2013. Single males were observed at several other locations throughout the baseline survey period but generally outwith the main lekking	0

Project	Disturbance-displacement	Number of lekking males affected by operational displacement
	period. A maximum of three males were recorded displaying at one location, over 800 m from nearest turbine.	
Clachaig Glen	Four black grouse leks were recorded in 2015. These leks were very small with two males recorded displaying at one lek and single males at the other three. No leks were within 600 m of the nearest infrastructure and so displacement effects are unlikely.	0
Killean	Closest lek is 780 m from turbines, and 150 m from access track. Maximum of three males could be displaced, if unmitigated.	3
Tangy IV (repowering)	No turbines within 900 m of two black grouse leks	0
Rowan	Several leks within 1.5 km, some within site boundary but none within 500 m of a turbine.	0
Sheirdrim Hill	Maximum of five males recorded within 1.5km of development. Lek of 4 males may be vulnerable to operational effects.	4
Narachan	A maximum of ten males displaying at eight different locations within 1.5 km of the core site. All lek sites holding two or more males were buffered by at least 500 m from proposed turbine locations.	0
Creag Dhubh to Inveraray 275 kV OHL	One lek approximately 1.7 km from proposed development	0

7.1.1 Golden Eagle

Based on the collision rate estimates from other Wind Farm projects within NHZ 14 (Table 7.13), the predicted cumulative golden eagle collision rate would be 0.968 birds per year. When including the estimated annual collision rate of 0.072 for the Development, the total cumulative collision rate would be 1.04, or roughly one bird per year. A 'moderate' collision risk was identified for golden eagle in relation to the operational Inveraray to Crossaig OHL Reinforcement project (no CRM was undertaken) but this risk was reduced to negligible by a commitment to mitigate by line marking in

key areas. For the Creag Dhubh to Inveraray 275 kV OHL project, a low collision risk was predicted based on the location and height of flight activity recorded in relation to the proposed development's infrastructure.

Table 7.13 Predicted Cumulative Effects within NHZ 14 Relating to Golden Eagle

Project	Collision mortality	Annual rate: All and [breeding only]
Operational		
Allt Dearg	For non-breeding adult and sub-adult golden eagles in combination, using an avoidance rate of 99%, there is predicted to be an additional loss of 1.78 birds per 25 years due to Allt Dearg wind farm (0.071 per annum).	0.071 [0.000]
Beinn an Tuirc	0.01 collisions per year (unknown avoidance rate). There have been no recorded collisions to date from monitoring studies of the operational wind farm.	0.01 [0.01]
Beinn Ghlas	0.17 collisions per year (from Glen Lonan SEI. Unknown avoidance rate.)	0.17 [0.17]
Carraig Gheal	One collision every 13 years at a 95% avoidance rate. Converted to 0.015 (one collision every 65 years) at a 99% avoidance rate.	0.015 [0.015]
Clachan Flats	No CRM undertaken	0
Cruach Mhor	No CRM undertaken	0
Deucheran Hill	One collision every 777 years (unknown avoidance rate). (0.001 collisions per annum)	0.001 [0.001]
Sròndoire	0.52 collisions over 25 years (99% avoidance rate). (0.021 collisions per annum)	0.021 [0.000]
A'Chruach	Single flight recorded during flight activity surveys. No CRM conducted.	0
Cour	Five flight events during baseline surveys. One non-breeding bird collision every 36 years predicted (99% avoidance rate). (0.028 collisions per annum).	0.028 [0.000]
Beinn an Tuirc Extension	0.15963 collisions per year (one collision every 6.3 years) at 98% avoidance rate for territorial pair. Converted to 0.080 collisions per year at 99% avoidance rate.	0.0897 [0.080]

Project	Collision mortality	Annual rate: All and [breeding only]
	0.01949 collisions per year (one every 51 years) for non-breeding birds. Converted to 0.0097 per year at 99% avoidance rate. Total annual collisions = 0.0897.	
Freasdail	0.002 collisions per year (99% avoidance rate), or one every 500 years.	0.002 [0.000]
Inveraray to Crossaig OHL Reinforcement	Moderate flight activity rates giving a moderate collision risk is predicted which has the potential to result in a significant effect. In order to mitigate the potential for significant effects identified for golden eagle, four locations along the proposed development have been identified for marking. Residual collision risk considered negligible.	n/a
Approved		
Beinn an Tuirc Phase 3	Annual collision rate of 0.023 or one every 43 years, at 99% avoidance rate. Assumed to be non-breeding birds.	0.023 [0.000]
Blary Hill	Annual collision rate of 0.001 per year at 99% avoidance.	0.001 [0.001]
Eascairt	0.071 collisions per year, equating to one collision every 14.15 years (99% avoidance rate).	0.071 [0.071]
High Constellation	Mean collision rate of 0.099 per year at 99 % avoidance rate.	0.099 [0.099]
Application		
A'Chruach Extension	No CRM undertaken	0
Clachaig Glen	The estimated collision risk to golden eagles, using an avoidance rate of 99% predicts the loss of approximately 2.4 golden eagles over a period of 25 years. This equates to an annual mortality of 0.096.	0.096 [0.000]
Glen Lonan	0.062 collisions per year (0.018 during breeding season and 0.045 during non-breeding season) at 99% avoidance rate.	0.062 [0.062]
Killean	No CRM undertaken.	0
Ardtaraig	0.018 collisions per breeding season and 0.077 per non-breeding season.	0.101

Project	Collision mortality	Annual rate: All and [breeding only]
		[0.077]
Airigh	Zero to 0.0658 collisions per year, with an average annual collision rate of 0.022, or one collision every 45 years predicted (99% avoidance rate).	0.022 [0.022 but some immature flights recorded]
Tangy IV	No at-risk flights	0
Rowan	0.02830 collisions per annum at 99 % avoidance rate.	0.02830
Sheirdrim Hill	Scoped out due to low activity rates and likely very low risk of collision mortality.	0
Narachan	0.057 collisions per year at 99 % avoidance rate.	0.057 [0.057]
Creag Dhubh to Inveraray 275 kV OHL	Most recorded flights were over the higher ground either side of the Proposed Development. The low flight activity crossing the Proposed Development at collision risk heights suggests a low collision risk.	n/a

As shown in Table 7.13 it is the case that based on survey results for a number of other projects, golden eagle collision risk is not necessarily attributable to NHZ breeding birds, and so this should be seen as a worst-case estimate. This level of cumulative effect on the NHZ 14 population was investigated using the golden eagle population model (see Appendix 7.4 for details).

The model predicts that despite the total additional mortality associated with the Development and other wind farm projects (1.04 per year), annual growth of the NHZ 14 population (taken to be 68 pairs) will continue, albeit at a reduced rate of 3.1 % (compared to 3.4 % without any additional mortality). The time taken until the population can theoretically reach carrying capacity (91 pairs) would be delayed by one year, from eight to nine years.

These predicted levels of effect on the NHZ are likely to be an overestimate because non-breeding non-NHZ individuals (e.g. wandering sub-adults) are also likely to be present, and therefore at potential risk of collisions. It also assumes that all projects within the NHZ will become operational with a full rollout of the proposed number of Wind Turbines.

However, with continued growth predicted over the long-term, despite additional mortality associated with collisions due to the Development and other projects, it is predicted that favourable conservation status would still be attained, and therefore that no significant effects would occur on the NHZ 14 population as a result of additional mortality associated with collisions.

The overall significance of this cumulative effect on the NHZ 14 population is considered to be no more than minor adverse and therefore **not significant** in the context of the EIA Regulations.

7.7.5 In-combination Assessment

The assessment in Section 7.5 determined that one Glen Etive & Glen Fyne SPA golden eagle pair's territory (EA1) may overlap with the Site, and thus may be affected by the Development. However, because no loss of SPA extent, no significant loss of non-SPA golden eagle territory, or no reduction in population was predicted due to the Development alone, there would be no adverse effect on the integrity of the SPA.

Therefore, in order for the Development to contribute towards an in-combination adverse effect on integrity, it would have to be established whether other projects may also adversely impact on the golden eagle SPA population.

NatureScot (SNH, 2016a¹¹²) guidance has been used to help identify connectivity between other projects and the Glen Etive & Glen Fyne SPA. For golden eagle, the core foraging range from the nest site during the breeding season is given as 6 km, and this has been used as a worst-case buffer to determine whether any other projects may affect golden eagle pair EA1.

From the information collected for the cumulative assessment, the projects within around 6 km of the SPA are:

- The nine turbine Clachan Flats Wind Farm, operational since 2009 and 3.7 km to the south of the nearest nest site, outside of the SPA;
- The installed Inveraray to Crossaig OHL reinforcement, directly to the south of the Development Site (over 7 km from nearest nest site); and
- The proposed Creag Dhubh to Inveraray 275 kV OHL directly to the west of the Development Site along Glen Aray (5.8 km from nearest nest site).

All large hydro power schemes within the 6 km search area have been operational since the 1950-1960s and so are considered part of the baseline.

Based on the location, extent and nature of the projects listed above, it is considered unlikely that any would be found within an important part of territory EA1 (or any other SPA territory), or take up a significant proportion of the territory and so in-combination habitat loss and displacement impacts would be negligible. For the Inveraray to Crossaig OHL reinforcement, an

existing powerline has been in this location over a long-term period and so the difference with the upgraded project will be negligible.

No collision modelling or operational monitoring data are available for Clachan Flats Wind Farm, but although the risk of collisions with Wind Turbines or overhead powerlines would not be zero, the likelihood of this occurring at any of the three project sites is very low, and so in-combination collision risk is also likely to be negligible for pair EA1, and the SPA population as a whole. Overall, it can be reasonably concluded that there would not be a significant in-combination effect on territory/pair EA1, or the SPA population as a whole, due to the Development and other projects, and so no adverse in-combination effects on the integrity of the SPA are predicted.

7.8 Summary of Effects

Table 7.14 provides a summary of the effects detailed within this chapter.

Table 7.14 Predicted Summary of Effects

IOF	Potential Effect	Significance of Effect	Mitigation Proposed	Residual Effect
Construction Phase				
Black grouse	Habitat loss and disturbance	Moderate adverse Significant	Spatial and temporal restrictions of construction activity around lek sites	Minor adverse Not significant
Golden eagle		Minor adverse Not significant	None required	Minor adverse Not significant
Merlin		Minor adverse Not significant	None required	Minor adverse Not significant
Greenshank		Moderate adverse Significant	Monitoring construction activity within 500 m of feeding lochs and restrictions if required.	Minor adverse Not significant
Glen Etive & Glen Fyne SPA	Disturbance	No adverse effect on integrity	None required	No adverse effect on integrity
Operation Phase				
Black grouse	Displacement	Moderate adverse Significant	HMP – forest restructuring and moorland restoration.	Minor adverse Not significant
	Collision risk	Negligible Not significant	None required [any new fencing for HMP would be marked]	Minor adverse Not significant

IOF	Potential Effect	Significance of Effect	Mitigation Proposed	Residual Effect
	Lighting	Minor adverse Not significant	None required	Minor adverse Not significant
Golden eagle	Displacement	Minor adverse Not significant	None required [HMP would benefit foraging opportunities]	Minor adverse Not significant
	Collision risk	Minor adverse Not significant	None required	Minor adverse Not significant
	Lighting	Minor adverse Not significant	None required	Minor adverse Not significant
Merlin	Displacement	Minor adverse Not significant	None required [HMP would benefit nesting and foraging opportunities]	Minor adverse Not significant
	Collision risk	Negligible Not significant	None required	Minor adverse Not significant
	Lighting	Minor adverse Not significant	None required	Minor adverse Not significant
Greenshank	Displacement	Moderate adverse Significant	HMP – forestry removal and moorland restoration.	Minor adverse Not significant
	Collision risk	Negligible Not significant	None required	Minor adverse Not significant
	Lighting	Minor adverse Not significant	None required	Minor adverse Not significant

IOF	Potential Effect	Significance of Effect	Mitigation Proposed	Residual Effect
Glen Etive & Glen Fyne SPA	Displacement	No adverse effect on integrity	None required [HMP would benefit golden eagle foraging opportunities]	No adverse effect on integrity
	Collision risk	No adverse effect on integrity	None required	No adverse effect on integrity
	Lighting	No adverse effect on integrity	None required	No adverse effect on integrity

7.9 Statement of Significance

For all IOFs, the predicted residual levels of significance of effects during the construction, operational and decommissioning stages of the Development are considered to be no more than of **minor adverse** and therefore **not significant**, when taking into consideration any required mitigation measures. Non-significant cumulative effects were also predicted for all IOFs, including operational displacement of black grouse when considering a reasonable level of precaution in the likelihood of all NHZ 14 projects becoming operational, and taking into account other projects' habitat enhancement plans designed for black grouse. The contribution of the Development to the cumulative effect would be negligible, particularly when mitigation in the form of the HMP enhancements for black grouse are implemented.

There are no adverse effects on the integrity of any European Site predicted as a result of the Development, alone or in-combination with any other projects, when including mitigation measures.