

7 Ecology

7.1 Introduction

7.1.1 This chapter considers the likely significant effects on non-avian ecology associated with the construction and operation of the Killean Wind Farm (the Proposed Development). Effects on birds are considered separately in Chapter 8. The specific objectives of the chapter are to:

- describe the current ecological baseline;
- describe the assessment methodology and significance criteria used in completing the impact assessment;
- describe the potential effects, including direct, indirect and cumulative effects;
- describe the mitigation measures proposed to address the likely significant effects; and
- assess the residual effects remaining following the implementation of mitigation measures.

7.1.2 The assessment has been carried out by Dr Steve Percival of Ecology Consulting. Further details of his qualifications and experience are provided in Chapter 1.

7.1.3 The chapter is supported by:

- Technical Appendix (TA) 7.1: Phase 1 and NVC Habitat Survey 2023.
- Technical Appendix 7.2: Bat Surveys Autumn 2022 and Spring-Autumn 2023.
- Technical Appendix 7.3 (Confidential): Protected Species Surveys 2023.
- Technical Appendix 7.4: Fisheries Surveys, June 2024.
- Technical Appendix 7.5: Draft Species Protection Plan.
- Technical Appendix 7.6: Outline Biodiversity Enhancement Management Plan.

7.2 Legislation, Policy and Guidance

7.2.1 The following documents were taken into account for the ecological assessment:

Legislation

- Water Environment and Water Services (Scotland) Act 2003;
- Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora (the Habitats Directive);
- The Conservation (Natural Habitats, &c.) Regulations 1994 (as amended) (the Habitats Regulations), which transposes the Habitats Directive into law in Scotland;
- The Conservation of Habitats and Species Regulations 2017 (as amended), relating to reserved matters in Scotland including the granting of consent under Section 36 of the Electricity Act (together, "the Habitats Regulations");
- Wildlife and Countryside Act 1981 (as amended);
- Protection of Badgers Act (1992);
- The Nature Conservation (Scotland) Act 2004;
- The Wildlife and Natural Environment (Scotland) Act 2011;
- Environmental Impact Assessment Directive 85/337/EEC (the EIA Directive);
- The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 (as amended); and
- Water Environment and Water Services (Scotland) Act 2003;

Policy

- National Planning Framework 4 (NPF4) - sets out the spatial principles, regional priorities, national developments and national planning policy;
- Planning Advice Note (PAN) 1/2013 - Environmental Impact Assessment (Scottish Government 2013);
- PAN 51: Planning, Environmental Protection and Regulation (revised 2006);
- PAN 60: Planning for Natural Heritage (Scottish Government 2000);
- Scottish Executive Circular 6/1995 as amended (June 2000);
- Planning Circular 3 2011; the Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2011.

- Scottish Executive Circular 6/1995 EIR release (as amended June 2000). Information request and response under the Environmental Information (Scotland) Regulations 2004;
- Planning Circular 1/2017; Environmental Impact Assessment Regulations. Guidance on The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017 (Scottish Government, 2017);

Guidance

- Guidelines for Ecological Impact Assessment in the UK and Ireland; Terrestrial, Freshwater and Coastal (CIEEM 2018¹);
- Scottish Executive (2001) European Protected Species, Development Sites and the Planning System: Interim guidance for local authorities on licensing arrangements;
- SEPA (2014) Land Use Planning System SEPA Guidance Note 4: Planning Guidance
- on Windfarm Developments;
- SNH (2012) Assessing the cumulative impact of onshore wind energy developments;
- Good Practice during Wind Farm Construction (Scottish Renewables et al. 2019²);
- ‘Managing Natura 2000 Sites’ (European Communities 2000);
- Argyll and Bute Local Biodiversity Action Plan 2010 - 2015 (LBAP), which lists priority habitat and species, and the subsequent Biodiversity Duty Action Plan (2016-2021) prepared by Argyll and Bute Council to comply with their Biodiversity Duty;
- The UK Post-2010 Biodiversity Framework;
- The Scottish Biodiversity List (SBL) (Nature Scot 2020: <https://www.nature.scot/doc/scottish-biodiversity-list>);

¹ CIEEM. 2018. Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine. Winchester: Chartered Institute of Ecology and Environmental Management

² Scottish Renewables. 2019. Good Practice during Wind Farm Construction. Version 4.

- Scottish Government (2023). Scottish Government Draft Planning Guidance: Biodiversity, November 2023.
- NatureScot (2023). Advising on peatland, carbon-rich soils and priority peatland habitats in development management; and
- NatureScot (2023). Planning and development: protected species

7.3 Consultation

7.3.1 Consultation was undertaken primarily through the scoping process. Table 7.1 summarises the issues raised and key outcomes of this consultation relating to ecology.

Table 7.1. Consultation Responses relating to Ecology

CONSULTEE AND DATE	SCOPING / OTHER CONSULTATION	ISSUE RAISED	RESPONSE / ACTION TAKEN
NatureScot	Scoping Opinion	The proposed scope of surveys and assessment of the key ecological receptors looks to be appropriate, however we note that there are a number of watercourses and small lochans within the site boundary and that no freshwater surveys have been proposed. Watercourse crossings are likely to be required and therefore we expect at least a fisheries habitat survey to be undertaken as part of the EIA.	Noted. An updated baseline aquatic habitat survey was commissioned and the results are included in this chapter.
		It is likely that wild deer use areas within the site and, as such, should also be taken into account as part of the EIA Report - see our guidance on 'What to Consider and Include in Deer Assessment and Management at Development Sites'	Deer have been considered in this chapter.

CONSULTEE AND DATE	SCOPING / OTHER CONSULTATION	ISSUE RAISED	RESPONSE / ACTION TAKEN
		<p>Please note that we have now adopted the European Nature Information System (EUNIS) as our standard habitat classification system for terrestrial habitat data and mapping and therefore recommend that all habitat surveys should include EUNIS codes. We also request that there should be an assessment of habitat condition provided within the EIA Report - see our 'PreApplication Guidance for Onshore Wind Farms', updated in September 2023.</p>	<p>EUNIS codes have been used for the habitat survey, and habitat condition assessment has been included in this chapter.</p>
		<p>Where impacts on protected species are identified, mitigation measures should be outlined within a species protection plan. Reference to our standing advice notes for protected species may be helpful. We also refer the Applicant to our guidance on what to consider and include in Habitat Management Plans,</p>	<p>Mitigation for protected species is fully discussed in this chapter, and an outline Biodiversity Enhancement Management Plan (oBEMP) is included as Technical Appendix 7.6 which proposes enhancement measures in addition to mitigation.</p>
SEPA	Scoping Opinion	<p>EIA submission must contain a scaled plan of sensitivities, for example peat (depth and condition), GWDTE, proximity to watercourses, overlain with proposed development.</p>	<p>Potential Groundwater Dependent Terrestrial Ecosystems (GWDTE) are identified in this chapter and impacts on them are assessed fully in Chapter 9.</p>

CONSULTEE AND DATE	SCOPING / OTHER CONSULTATION	ISSUE RAISED	RESPONSE / ACTION TAKEN
Argyll District Salmon Fishery Board	Scoping Opinion	Urge that all consideration is given to the maintenance of stream habitats and water quality within and downstream of the development site throughout the project's lifetime. We fully expect Scottish Government guidelines to be followed in terms of pre, during and post development monitoring of Water quality, macroinvertebrates, and fish. There are some existing fish data collected by Argyll Fisheries Trust that may help to inform mitigation measures required to minimise any impacts from the development on the water environment.	Scottish Government guidelines will be followed at all times in terms of the required monitoring. Argyll Fisheries Trust (AFT) have undertaken this survey in June 2024 and it is reported in this chapter and TA 7.4.
Fisheries Management Scotland	Scoping Opinion	<p>Salmon Fishery Board, and the catchment relating to the Argyll Fisheries Trust. It is important that the proposals are conducted in full consultation with these organisations (see link to FMS member DSFBs and Trusts below). We have also copied this response to these organisations.</p> <p>Due to the potential for such developments to impact on migratory fish species and the fisheries they support, FMS have developed, in conjunction with Marine Scotland Science, advice for DSFBs and Trusts in dealing with planning applications. We would strongly recommend that these guidelines are fully considered throughout the planning, construction and monitoring phases of the proposed development.</p>	Scottish Government guidelines will be followed, and AFT have conducted a site survey (reported in this chapter and TA 7.4).

CONSULTEE AND DATE	SCOPING / OTHER CONSULTATION	ISSUE RAISED	RESPONSE / ACTION TAKEN
Marine Directorate - Science Evidence Data and Digital (MD-SEDD)	Scoping opinion	<p>Provided generic scoping guidelines for onshore wind farm and overhead line development which outline how fish populations can be impacted during the construction, operation and decommissioning of a wind farm or overhead line development and informs developers as to what should be considered, in relation to freshwater and diadromous fish and fisheries, during the EIA process.</p> <p>In addition to identifying the main watercourses and waterbodies within and downstream of the proposed Development area, developers should identify and consider, at this early stage, any areas of Special Areas of Conservation where fish are a qualifying feature and proposed felling operations particularly in acid sensitive areas.</p>	An updated baseline aquatic habitat survey was commissioned and the results are included in this chapter.

7.4 Methodology

Scope of Assessment

7.4.1 The key issues for the assessment of potential ecological effects relating to onshore wind farms include the following, based on NatureScot (NS) (formerly Scottish National Heritage (SNH)) guidance published in 2018a³:

- direct loss of ecological habitat through construction of the proposed development infrastructure;
- disturbance of key protected species during construction and operation;

³ Scottish Natural Heritage. (2018a). Assessing Significance of Impacts from Onshore Wind Farms Outwith Designated Areas. SNH.

- mortality of bats through collision with wind turbine blades or towers during operation; and
- cumulative effects of wind farm collision mortality on populations of key target ecological communities/populations.

7.4.2 The assessment will consider the following potential effects:

- potential effects on habitats of conservation concern, during construction;
- potential effects on protected species recorded within the site, during construction;
- potential effects on GWDTE during construction; and
- potential effects on bats, during operation.

7.4.3 The assessment did not consider the following (as set out in the Scoping Report):

- potential effects on designated sites (due to a lack of structural or functional connectivity); and
- potential effects on ecological features during operation (excluding bats) (as no potential impact pathways were identified).

Baseline Characterisation

Study Area

7.4.4 The ecology study areas were chosen to include all areas within the potential zone of ecological influence of the Proposed Development. The specific study areas are as follows:

- Designated nature conservation sites: search area included sites designated for ecological interests within 5 km of the site (all statutory protected sites) and within 20 km (internationally important sites) - see **Figures 7.1 and 7.2**.
- The Phase 1 and National Vegetation Classification (NVC) survey area: included the Proposed Development, plus a 100 m buffer covering a total area of 12.4 km², shown in **Figures 7.3 and 7.4**.
- Cumulative Effects: other wind farm developments within NatureScot's 'Argyll West and Islands' Natural Heritage Zone (NHZ 14) are included in assessment of potential cumulative ecological effects.

Desk Study

7.4.5 The ecological desk study provided information on the ecological interests of the site, including the locations of any relevant statutory protected sites and collation of data on key species. The following sources of information were used for the desk study:

- NatureScot website (<https://sitelink.nature.scot/home>) - statutory designated site boundaries, including Sites of Special Scientific Interest (SSSI) and SSSI citation details;
- Joint Nature Conservation Committee (JNCC) website (<https://jncc.gov.uk/our-work/special-protection-areas-overview/>) - European protected site boundaries and designations (Special Areas of Conservation (SAC)/Ramsar);
- Information published in Environmental Statements (ES) and Environmental Impact Assessment (EIA) Reports for other developments in the 'Argyll West and Islands' NatureScot Natural Heritage Zone (NHZ 14);
- Argyll Biological Records Centre (via NBN Atlas - records licenced for commercial use);
- The British Deer Society (2016) for deer distribution survey results; and
- Information published in Environmental Statements (ES) and Environmental Impact Assessment (EIA) Reports for other developments in the 'Argyll West and Islands' NatureScot Natural Heritage Zone (NHZ 14) (including for the adjacent Clachaig Glen Wind Farm EIA Report).

Field Survey

7.4.6 A comprehensive range of baseline ecological surveys have been undertaken at the site between September 2021 and August 2023. These surveys comprised:

- Extended Phase 1 and NVC habitat surveys;

- Bat surveys (walked transect and static recorder surveys, in line with the current NatureScot survey guidance (NatureScot *et al.* 2021⁴); and
- Badger, water vole, otter and fisheries surveys.

7.4.7 Full details of the surveys are given in **Technical Appendices 7.1-7.4.**

Extended Phase 1 Habitat Survey

7.4.8 An extended Phase 1 survey was carried out during 1-3 August 2023, including identification and mapping of the vegetation communities present within the study area, following the standard (JNCC 2016⁵) Phase 1 survey methodology. Any rare or scarce plant species found were also recorded, and habitat suitability was assessed for protected species (to inform the need for any further surveys). Aerial photography was used to help define habitat boundaries.

NVC Habitat Survey

7.4.9 Further, more detailed, habitat surveys (Phase 2) were undertaken to map the NVC across the site at the same time as the Phase 1 surveys. This included the acquisition of vegetation species composition and percentage cover data from a series of representative quadrats from each community. These data also informed the potential GWDTE within the site. These were mapped and have been assessed as part of the hydrological impact assessment (see Chapter 9).

7.4.10 The vegetation communities within each of the survey fields were mapped to a minimum mappable polygon size of 150m². At least five 2x2 m quadrat sample of vegetation composition and cover (recorded to the estimated percentage cover) were taken in each vegetation class of the main stand types (following Rodwell *et al.* 1992⁶). The field quadrat samples were assigned to the NVC class using the MAVIS analysis software (Smart *et al.* 2016⁷) and professional judgment. The condition of the

⁴ NatureScot, Natural England *et al.* 2021. Guidance on 'Bats and Onshore Wind Turbines: Survey, Assessment and Mitigation'.

⁵ JNCC 2016. Handbook for Phase 1 habitat survey. A technique for environmental audit.

⁶ Rodwell, J. S. 1992 British Plant Communities: Volume 3 Grasslands and montane communities, Cambridge: Cambridge University Press.

habitats was assessed using the JNCC Common Standards Monitoring (JNCC 2009⁷).

Bat Surveys

- 7.4.11 The bat survey programme was designed with reference to the recent NatureScot *et al.* (2021) guidance on ‘Bats and Onshore Wind Turbines: Survey, Assessment and Mitigation’. Initial surveys were undertaken in August-September 2022, and a full season of surveys during April-September 2023 (see **Technical Appendix 7.2** for further details). The surveys comprised the following:
- Roost potential survey - to assess all potential roosts sites within the Proposed Development site and its surrounds;
 - Ground-level activity surveys - one transect-based survey each month from August-September 2022 and April-September 2023. Access was restricted to the parts of the site that could be accessed safely at night - the transect routes walked are shown in **TA Figure 7.2.1**;
 - Automated surveys at ground level - static detectors were deployed at 10 locations across the survey area representative of the habitats available and focussed on the areas where the Proposed Development would be located (in line with NatureScot *et al.* 2021 guidance). A total of 200 bat-nights’ coverage was obtained in August-September 2022 and 704 in April-September 2023 (mean 22 nights/season/location). The locations of the recorders are shown in **TA Figure 7.2.1**.
- 7.4.12 Surveys at height were considered unnecessary at this site, given the generally low-quality bat habitats present (predominantly upland conifer plantation and open moorland).

Otter and Water Vole Surveys

- 7.4.13 These surveys were carried out in June 2023. They included detailed inspection of the watercourses within and adjacent to the development footprint (focussing on the area within 200 m of the development, as per

⁷ JNCC. 2009. Common Standards Monitoring Guidance for Upland Habitats Version October 2006. JNCC, Peterborough.

NatureScot guidance⁸). Habitat suitability for these species was assessed with factors such as food resources, cover and water quality taken into consideration. A systematic search of all suitable habitat was made for signs indicating use by water vole and otter, and all signs found were mapped (following Chanin 2003⁹ and Strachan *et al.* 2011¹⁰).

Badger Surveys

- 7.4.14 Badger surveys were undertaken in June and August 2023 to cover the site plus a 100 m buffer where access/viewing was possible, following the method of Harris *et al.* (1989¹¹) and SNH (2003¹²). All areas of potential value to badgers were surveyed and any evidence of badger activity recorded including details of setts and associated soil excavation, latrines and dung pits, prints, hairs, paths and evidence of foraging activity.
- 7.4.15 As badgers are specially protected under the 1992 Badgers Act and are subject to illegal persecution, information on this species has been provided in a Confidential Appendix (**Technical Appendix 7.3**). The amount of information contained in the Confidential Appendix has been kept to a minimum but includes more detailed data that indicate sett locations. The assessment of the effects that the Proposed Development may have on this species has been included within this chapter (but without identifying sett locations).

Red Squirrel

- 7.4.16 The construction of the Proposed Development will involve loss of forest habitat, so red squirrel surveys were undertaken in June 2023. The forest habitat present on much of the site (dense conifer plantation) made a comprehensive survey for this species impossible, so instead a check of accessible areas of potentially suitable habitat along track and forest rides

⁸ <https://www.nature.scot/doc/standing-advice-planning-consultations-otters>

⁹ Chanin P 2003. *Monitoring the Otter Lutra lutra*. Conserving Natura 2000 Rivers Monitoring Series No 10. English Nature, Peterborough.

¹⁰ Strachan R., Moorhouse T. and Gelling, M. 2011. *Water Vole Conservation Handbook 3rd edition*. Wildlife Conservation Research Unit, Oxford.

¹¹ Harris S, Cresswell P and Jefferies D (1989) *Surveying Badgers*, Mammal Society.

¹² Scottish Natural Heritage (2003) *Best Practice Guidance - Badger Surveys*. Inverness Badger Survey 2003. Commissioned Report No. 096.

searching for dreys and feeding signs was conducted (following the methods of Gurnell *et al.* 2009¹³).

Pine Marten

- 7.4.17 No signs of pine martens were found in the original survey for the previous Killean Wind Farm application, but a den was located in the adjacent Clachaig Glen Wind Farm surveys. A pine marten survey was therefore carried out for the Proposed Development in June 2023, comprising a systematic search for signs of pine marten presence and potential den sites within 250m of the Proposed Development, where safe access was possible. The survey methods followed Birks (2012)¹⁴.

Deer

- 7.4.18 During the scoping process, NatureScot advised that deer should be included within the assessment, so available data on deer distribution and abundance in the area were obtained from the British Deer Society (2016) and the Argyll Biological Records Centre (via NBN Atlas), and records of deer made during the site surveys were noted.

Fisheries Surveys

- 7.4.19 Argyll Fisheries Trust undertook surveys of fish habitat on the watercourses of the two river catchments within the Proposed Development: the Killean Burn and the Tayinloan Burn. The surveys focused on the stream channels adjacent to the existing forest road network and where new infrastructure (particularly site access tracks) may be constructed.
- 7.4.20 Two methods were used to assess the fish habitat, following the Scottish Fisheries Coordination Centre habitat survey protocols (SFCC 2007¹⁵): (1) identification of the morphological characteristics of the river channel, which infer their relative susceptibility to change, and (2) assessment of

¹³ Gurnell, J., P. W. W. Lurz, R. A. McDonald, and H. Pepper. 2009. Practical techniques for surveying and monitoring squirrels. Forestry Commission.

¹⁴ Birks, J. 2012. Pine marten. In: Cresswell, W.J., Birks, J.D.S., Dean, M., Pacheco, M., Trehwella, W.J., Wells, D. and Wray, S. (2012). UK BAP Mammals: Interim Guidance for Survey Methodologies, Impact Assessment and Mitigation. The Mammal Society, Southampton.

¹⁵ Scottish Fisheries Coordination Centre (2007). Habitat survey training course manual. MSS, Pitlochry, pp 1-64

suitability for salmonid fish (and freshwater pearl mussel). Full details are given in **Technical Appendix 7.4**.

Other Species

- 7.4.21 No other dedicated species-specific surveys were considered to be required, as set out in the Scoping Report (and informed by the habitat suitability assessment and the habitats that would be affected by the Proposed Development).

Assessment Methodology

- 7.4.22 The significance of the potential effects of the Proposed Development has been classified by professional consideration of the value of the receptor and the magnitude of the potential effect.
- 7.4.23 The assessment includes a full evaluation of the ecological importance of the ecological populations and communities at the site and identification of any particularly sensitive areas. The assessment has been carried out with reference to the assessment methodologies produced by Scottish Natural Heritage (2018a) for the wider countryside, and the CIEEM Guidelines (2018).

Criteria for Assessing Value (Conservation Importance)

- 7.4.24 Value (conservation importance) was assigned using the criteria set out in **Table 7.2**. Key ecological receptors included species/habitats listed on Annex I of the Habitats Directive, species specially protected under the Wildlife and Countryside Act 1981 (as amended), and the Protection of Badgers Act (1992), and species/habitats included on the Scottish Biodiversity List (SBL)
- 7.4.25 The conservation value (as defined in **Table 7.2**) of the receptors present in the study area were identified, then the magnitude of the possible impact on those receptors determined (as described in **Table 7.3**).

Table 7.2: Value (conservation importance) of species/communities

VALUE	DEFINITIONS
VERY HIGH	CITED INTEREST OF SPECIAL AREAS OF CONSERVATION (SACS) AND SSSIS. CITED MEANS MENTIONED IN THE CITATION TEXT FOR THOSE PROTECTED SITES AS A SPECIES FOR WHICH THE SITE IS DESIGNATED (SACS) OR NOTIFIED (SSSIS).
HIGH	OTHER SPECIES/HABITAT THAT CONTRIBUTE TO THE INTEGRITY OF AN SAC OR SSSI. A LOCAL POPULATION OF MORE THAN 1% OF THE NATIONAL POPULATION OF A SPECIES/HABITAT. ANY ECOLOGICALLY SENSITIVE SPECIES. EUROPEAN PROTECTED SPECIES, OR SPECIES SPECIALLY PROTECTED UNDER THE WILDLIFE AND COUNTRYSIDE ACT. OTHER SPECIALLY PROTECTED SPECIES/HABITAT.
MEDIUM	REGIONALLY IMPORTANT POPULATION OF A SPECIES/HABITAT, EITHER BECAUSE OF POPULATION SIZE OR DISTRIBUTIONAL CONTEXT. UK BIODIVERSITY ACTION PLAN (BAP) PRIORITY SPECIES (IF NOT COVERED ABOVE).
LOW	SCOTTISH BIODIVERSITY LIST SPECIES/HABITAT OR OTHER SPECIES OF CONSERVATION INTEREST NOT COVERED ABOVE
NEGLIGIBLE	GREEN-LISTED SPECIES OF FAVOURABLE CONSERVATION STATUS.

Magnitude of Impact

7.4.26 An impact is defined as a change of particular magnitude to the abundance and/or distribution of a population as a result of the Proposed Development. **Table 7.3** shows the definitions of the impact magnitude classification used for the assessment.

Table 7.3: Definition of terms relating to the magnitude of ecological impacts

Magnitude	Definition
Very High	Total loss or very major alteration to key elements/ features of the baseline conditions such that post development character/ composition/ attributes will be fundamentally changed and may be lost from the site altogether. Guide: >80% of population/habitat lost
High	Major alteration to key elements/ features of the baseline conditions such that post development character/composition/attributes will be fundamentally changed. Guide: 20-80% of population/habitat lost
Medium	Loss or alteration to one or more key elements/features of the baseline conditions such that post development character/ composition/ attributes of baseline will be partially changed. Guide: 5-20% of population/habitat lost
Low	Minor shift away from baseline conditions. Change arising from the loss/ alteration will be discernible but underlying character/composition/ attributes of baseline condition will be similar to pre-development circumstances/patterns. Guide: 1-5% of population/habitat lost
Negligible	Very slight change from baseline condition. Change barely distinguishable, approximating to the “no change” situation. Guide: <1% of population/habitat lost

Significance Criteria

7.4.27 The combined assessment of the magnitude of an impact and the value of the receptor was used to determine the significance of potential effects. These two criteria were cross tabulated to assess the overall effect and significance of that effect (Table 7.4). This gives a guide as to the determination of significance, though the final assessment was still subject to professional judgment.

Table 7.4: Matrix of magnitude of impact and sensitivity used to test the significance of effects.

	CONSERVATION VALUE					
		Very high	High	Medium	Low	Negligible
MAGNITUDE	Very high	Major	Major	Major-moderate	Moderate	Negligible
	High	Major	Major	Moderate	Minor	Negligible
	Medium	Major	Major-moderate	Minor	Negligible	Negligible
	Low	Moderate	Minor	Minor	Negligible	Negligible
	Negligible	Minor	Negligible	Negligible	Negligible	Negligible

7.4.28 The significance category of each combination is shown in each cell. Shaded cells indicate potentially significant effects in terms of the EIA Regulations.

7.4.29 The interpretation of these significance categories was as follows:

- Negligible and Minor are not normally of concern, though best practice guidance would still be followed to minimise adverse effects;
- Moderate represents a potentially significant adverse effect on which professional judgment has to be made, though for which it is likely that mitigation will reduce it below the significance threshold; and
- Major and Major-moderate represent significant adverse effects on species/communities which are regarded as significant for the purposes of EIA.

7.4.30 The SNH (2018a) wider countryside assessment guidance defines the key significance test as follows: “An impact should be judged as of concern where it would adversely affect the favourable conservation status of a species or stop a recovering species from reaching favourable conservation status, at international or national level or regionally.”

- 7.4.31 A cumulative ecological assessment (using the same criteria as the main assessment) has been undertaken following the NatureScot guidance on 'Assessing the cumulative impacts of onshore wind farms', considering impacts on the favourable conservation status of key species/habitats within the relevant NHZ, in this case NHZ 14 'Argyll West and Islands'.

Limitations and Assumptions

- 7.4.32 No material information gaps have been identified. Inevitably with any ecological survey it cannot be guaranteed to detect all target species/individuals and surveys cannot be fully representative of all conditions (e.g. severely reduced visibility). However, in this case it was concluded that the baseline surveys provide a robust data set on which to carry out the assessment.

7.5 Current Baseline

Statutory Protected Sites

- 7.5.1 There are six statutory designated nature conservation sites in the study area around the Proposed Development, within the search area of a 20 km buffer for internationally important sites and 5 km for nationally important sites. This Chapter covers the sites with non-avian designation/notification features, and those with ornithological features are addressed in Chapter 8. The locations of the internationally important sites within 20 km are shown in **Figure 7.1**, and the nationally important sites within 5 km in **Figure 7.2**:
- Rhunahaorine Point SSSI - 1.7 km north-west from the site - notified for its natural features of coastal shingle, overwintering Greenland white-fronted geese and breeding little tern (9-25 pairs, 2006-2009). None of its non-avian features would be affected by the Proposed Development.
 - Inner Hebrides and the Minches SAC - 5km north - designated for its harbour porpoise population.
 - Tarbert Woods SAC - 13 km north-east - designated for its western acidic oak woodland.

7.5.2 The following statutory designated nature conservation sites are located within the search area but have only ornithological interest features so are assessed in Chapter 8:

- Kintyre Goose Roosts SPA/Ramsar/SSSI - 540 m north-east from the site at its closest point - a series of hill lochs (Loch Garasdale, Loch an Fhraoich, Loch Lussa, Tangy Loch and Black Loch) and an area of grassland and heath at Rhunahaorine Point on the Kintyre peninsula. It has been designated for its internationally important wintering population of Greenland white-fronted goose (1991/92-95/96 winter peak mean of 2,300, 8% of Total world population; 16% of GB).
- Sound of Gigha SPA - 600m west - designated for its wintering populations of great northern diver (2004/05-07/08 winter peak mean of 505, 20% of GB), Slavonian grebe (2008/09-12/13 winter peak mean of 37, 3.4% of GB), red-breasted merganser (2004/05-07/08 winter peak mean of 117, 2.4% of GB), and eider (2004/05-07/08 winter peak mean of 1,295, 2.2% of GB).
- Arran Moors SPA - 19 km south-east - designated for its breeding hen harrier population of European importance (21 breeding females between 1994 and 1998, 4% of GB). The site lies outside the connectivity distance from this SPA so would not affect it.

7.5.3 The potential connectivity of each of these SACs to the site is summarised in **Table 7.5**. This lists the qualifying features for each SAC, the distance from the site at its closest point and an initial assessment of whether the site could possibly be affected by the Proposed Development. No potential impact pathways were identified for any qualifying features of any SAC, so it was concluded that there would be no Likely Significant Effects (LSE) on any SAC under the Habitats Regulations.

Table 7.5: SACs/Ramsar within 20 km of the Proposed Development, their qualifying features and likely connectivity to the site.

SAC/Ramsar	Distance from site	Qualifying features	Qualifying features with impact pathway (non-avian)
Inner Hebrides and the Minches SAC	7 km	Harbour porpoise	None
Tarbert Woods SAC	13 km	Western acidic oak woodland	None

Survey Results: Habitats

Phase 1/NVC habitats

7.5.4 The Phase 1 habitats recorded in the survey area are summarised in **Table 7.6**, and their distributions are shown in **Figure 7.3**. **Table 7.6** also gives details of the NVC communities recorded and their distributions are shown in **Figure 7.4**. Further details of the Phase 1/NVC habitats are given in **Technical Appendix 7.1**. This also provides further information on the habitat condition assessment - all habitats within the survey area were classed as favourable condition, apart from the M25a wet modified bog/blanket bog (as a result of a low diversity and low cover of positive indicator species). The favourable condition habitats generally had only a low grazing pressure (there was no stock grazing the eastern moorland area and only low sheep-grazing levels on the western part) and an absence of evidence of any recent burning. The smaller areas of unfavourable habitat were in peatland that had been degraded through drainage.

7.5.5

Table 7.6: Phase 1 and NVC habitats within the ecology survey area.

Phase 1 Habitat	Phase 1 Code	NVC Class	EUNIS Code	Total Area (ha.)	% Survey Area
Acid flush	E2.1	M29	D2.3#	0.03	0.002%
		M6d	D2.22	6.72	0.56%
Acid grass	B1.1	U4a	E1.72	8.46	0.70%
Blanket bog	E1.6.1	M17a	D1.21	97.70	8.08%
		M17b	D1.21	37.89	3.13%
		M19a	D1.22	168.5	13.9%
Bog pool		M1	D1.21	0.02	<0.01%
		M3	D1.21	0.01	<0.01%
Bracken	C1.1	U20	E5.31	8.49	0.70%
		U20a	E5.31	16.78	1.39%
		U20c	E5.31	0.88	0.07%
Broad-leaved plantation	A1.1.2	W9	G1.A2#1	4.80	0.40%
Broad-leaved semi-natural woodland	A1.1.1	W7	G1.21	9.80	0.81%
Coniferous plantation	A1.2.2	-	-	329.3	27.2%
Recently-felled conifer	A4.2	-	-	215.8	17.9%
Dry heath	D1.1	H10c	F4.25	0.40	0.03%

Phase 1 Habitat	Phase 1 Code	NVC Class	EUNIS Code	Total Area (ha.)	% Survey Area
		H12	F4.21	73.95	6.12%
		H21a	F4.21	1.42	0.12%
Improved grassland	B4	MG7	E2.6	0.73	0.06%
Marshy grassland (rush pasture)	B5	M23	E3.42	31.38	2.60%
		M23a	E3.42	72.68	6.01%
		M23b	E3.41	4.05	0.33%
Mixed plantation	A1.3.2	-	-	2.20	0.18%
Neutral grass - semi-improved	B2.2	MG6	E2.112	14.40	1.19%
	B6	MG10	E3.44	10.47	0.87%
Open water	G1	-	-	10.94	0.90%
Quarry (disused)	I2.1	-	-	0.28	0.02%
Scrub - dense/continuous	A2.1	W23	E3.14	2.60	0.21%
		W7	E1.41	4.94	0.41%
Wet heath	D2	M15	F4.11	1.81	0.15%
		M15b	F4.11	24.50	2.03%
		M15c	F4.11	14.25	1.18%
		M15d	F4.11	12.94	1.07%
Wet modified bog	E1.7	M17a	D1.21	5.06	0.42%
		M19a	D1.22	5.23	0.43%
		M25a	D1.21	9.69	0.80%

Coniferous plantation and clear-fell

7.5.6 Much of the survey area was commercial coniferous plantation of various ages (including recent clear-fell), mainly comprising Sitka spruce *Picea sitchensis*. It covered 45% of the survey area, and the large majority of the infrastructure for the Proposed Development is located in this area (Figure 7.3), including 8 of the 9 proposed wind turbines.

Broad-leaved semi-natural woodland

7.5.7 Semi-natural broad-leaved woodland was found mainly in the lower western part of the survey area along the Killean Burn, with 9.8 ha. (0.8% of the survey area) in total (plus a further 7.5 ha. of scrub). None of this has been identified as ancient woodland. It was classed as NVC community W7 *Alnus glutinosa-Fraxinus excelsior-Lysimachia nemorum* woodland.

Broad-leaved/mixed plantation

- 7.5.8 There were small areas of broad-leaved plantation, also mainly along the Killean Burn (4.8 ha., 0.4% of the survey area), and a smaller area of mixed plantation (2.2 ha. 0.2% of the survey area).

Scrub

- 7.5.9 This was also found mainly along the Killean Burn and along some of the watercourses within the clear-fell/forestry. Most (4.9 ha.) was goat willow-dominated wet woody scrub (W7), though also with some gorse (W23 *Ulex europaeus-Rubus fruticosus* scrub) (2.6 ha.).

Blanket Bog

- 7.5.10 Blanket bog covered 25% of the survey area (304 ha.) and supported a species-rich peatland community. This included *Sphagnum* bog mosses, and abundant dwarf shrubs including heather *Calluna vulgaris* and cross-leaved heath *Erica tetralix*. One of the proposed wind turbines would be located on blanket bog (though on relatively shallow peat of less than 1 m depth).
- 7.5.11 The blanket bog habitat was classed as three NVC communities, M17a *Scirpus cespitosus-Eriophorum vaginatum* blanket mire, *Drosera rotundifolia-Sphagnum* spp. sub-community, M17b *Cladonia* spp sub-community and M19a *Calluna vulgaris-Eriophorum vaginatum* blanket mire, *Erica tetralix* sub-community.

Wet Modified Bog

- 7.5.12 Wet modified bog was more restricted, covering 1.7% of the survey area (20 ha.). This habitat type was classified as M17a *Scirpus cespitosus-Eriophorum vaginatum* blanket mire, M19a *Calluna vulgaris-Eriophorum vaginatum* blanket mire, *Erica tetralix* sub-community and M25a Purple moor grass *Molinia caerulea* - Tormentil *Potentilla erecta* mire (where purple moor-grass was extensive and dominant, with little bog moss *Sphagnum* or dwarf shrub cover).

Bog pool

- 7.5.13 There were a small number of bog pools within the blanket bog habitat in the eastern part of the survey area, outside the development footprint,

including M1 *Sphagnum denticulatum* bog pool and M3 *Eriophorum angustifolium* bog pool.

Dry Dwarf Shrub Heath

- 7.5.14 Dry heathland habitats were common in the open moorland on shallower soils, covering 6.3% of the survey area (76 ha.). It was predominantly classed as NVC community H12 *Calluna vulgaris-Vaccinium myrtillus* heath, though with some smaller areas of H10c *Calluna vulgaris-Erica cinerea* heath, *Festuca ovina-Anthoxanthum odoratum* sub-community and H21a *Calluna vulgaris-Vaccinium myrtillus-Sphagnum capillifolium* heath, *Calluna vulgaris-Pteridium aquilinum* sub-community were also found. It was found mainly in the lower western part of the site, though also with some small remnant patches within the conifer forestry (including within the wind farm) (see **Figure 7.4**).

Wet Dwarf Shrub Heath

- 7.5.15 Wet heathland habitats were scarcer than the mires and dry heath, covering 4.4% of the survey area (53 ha.). They were classed as NVC communities M15b *Scirpus cespitosus-Erica tetralix* wet heath, typical sub-community, M15c *Cladonia* spp. sub-community, and M15d *Vaccinium myrtillus* sub-community. They were widely distributed across the survey area, though with only a few small remnant patches within the footprint of the proposed wind farm itself (see **Figure 7.4**).

Acid Flush

- 7.5.16 Small areas of acid flush (6.8 ha) were scattered across the eastern part of the survey area, covering only 0.6% of the survey area (**Figure 7.3**). They were mainly found along watercourses. This habitat type comprises a combination of rushes and/or sedges over a thick layer of *Sphagnum* mosses and *Polytrichum commune*. It was classified as NVC community M6d *Carex echinata - Sphagnum fallax/denticulatum* mire. There was also a small patch of M29 acid flush (0.03 ha, see **Figure 7.4**).

Marshy Grassland

- 7.5.17 Marshy grassland was another common Phase 1 habitat, covering 8.9% of the survey area. It was found mainly in the western part of the survey

area (**Figure 7.3**). Two NVC communities were identified within the marshy grassland habitat:

- M23a - *Juncus effusus/ acutiflorus-Galium palustre* rush-pasture, *Juncus acutiflorus* sub-community). It was the much the most frequent M23 sub-community (95% was this type).
- M23b - Soft/sharp-flowered rush *Juncus effusus/ acutiflorus* - Marsh bedstraw *Galium palustre* rush pasture - *Juncus effusus* sub-community).

Bracken

- 7.5.18 Patches of bracken-dominated vegetation were widespread in drier parts of the western part of the survey area. A total of 26 ha. (2.2%) of the survey area was covered in continuous bracken habitat. It was classed as NVC community U20a *Pteridium aquilinum - Galium saxatile* community, *Anthoxanthum odoratum* sub-community 95%) and U20c *Pteridium aquilinum- Galium saxatile* species-poor community (5%).

Acid Grassland

- 7.5.19 Small areas of acid grassland (8.5 ha.) were located within the western part of the survey area (**Figure 7.3**). They were classed as NVC community U4d *Festuca ovina-Agrostis capillaris-Galium saxatile* grassland, *Luzula multiflora-Rhytidiadelphus loreus* sub-community.

Neutral semi-improved and improved grassland

- 7.5.20 Much of the land alongside the lower parts of the site access track is agricultural grassland of these types (**Figure 7.3**). They covered a total area of 26 ha. (2.1% of the survey area). Most were classified as MG10 *Holcus lanatus-Juncus effusus* rush-pasture and MG6 *Lolium perenne-Cynosurus cristatus* grassland, with a smaller area of more improved MG7 *Lolium perenne* ley.

Groundwater Dependent Terrestrial Ecosystems

- 7.5.21 Three of the NVC communities recorded have been identified by SEPA as having high potential to be GWDETE:
- Marshy grassland (M25);
 - Wet heath (M16); and
 - Acid flush (M6).

- 7.5.22 A further four habitats have moderate potential to be GWDTE:
- Neutral (semi-improved grassland (MG10);
 - Marshy Grassland (M23);
 - Wet modified bog (M25); and
 - Marshy grassland (M27).
- 7.5.23 The distribution of these habitats across the site is shown in Figure 7.5. Further analysis and assessment of groundwater dependency is included in Chapter 9.

Survey Results: Bats

Desk Study

- 7.5.24 There were no records of bats within 2 km of the site from the Argyll Biological Records Centre/NBN Atlas.
- 7.5.25 The Clachaig Glen Wind Farm ES reported four bat taxa, including common and soprano pipistrelle, brown long-eared, and unidentified Myotis species (considered Daubenton's and natterer's bats). It was concluded that that site was not particularly important for bats with overall moderate activity levels, typical of the wider region.

Bat Survey Results: Bat Roost Survey

- 7.5.26 No features likely to hold roosting bats were recorded within any trees or built structures within the survey area (being predominantly coniferous plantation woodland and open moorland), apart from the broad-leaved woodland along the Killean Burn (alongside the existing track that is the proposed site access).

Bat Survey Results: Walked Transects

- 7.5.27 The bat walked transect surveys recorded six species in total, with only few records of all of these. Soprano pipistrelle (20 records in total over the autumn 2022 and spring-autumn 2023 surveys) was the most frequently encountered. Other less abundant species comprised: common pipistrelle (8 records) and Daubenton's bat (7), natterer's bat (1), noctule (4), and brown long-eared bat (3).
- 7.5.28 The walked transect surveys did not identify any areas of higher bat activity. Most records were along the forest edge in the western part of
-

the survey area. There were no records over the open moorland habitat in the eastern half of the survey area in either autumn 2022 or during the 2023 surveys.

Bat Survey Results: Static Recorders

- 7.5.29 Seven species of bat were recorded in total during the static recorder surveys. Soprano pipistrelle was the most frequently recorded species, with common pipistrelle also frequently encountered. Other less abundant species comprised: Daubenton's bat, natterer's bat, Leisler's bat, noctule and brown long-eared bat.
- 7.5.30 The bat numbers recorded within the Proposed Development in autumn 2022 and in 2023 were generally low, reflecting the low-quality bat habitat across the survey area (coniferous forest and moorland). The recommended Ecobat software (Lintott *et al.* 2018¹⁶) was not available for further assessment¹⁷, but it was still clear that the survey area was of low value to bats. The surveys did not identify any area of high bat activity that would require buffering in the wind farm design.

Survey Results: Fisheries

- 7.5.31 The watercourses within the Proposed Development are located upstream of the likely distribution of migratory salmonid fish (Atlantic salmon and sea-run brown trout). Therefore, any fish population present is likely to be limited to resident brown trout and European eel. Obstacles to fish migration found within the survey area are likely to fragment or limit the distribution of trout.
- 7.5.32 Suitable habitat for brown trout is likely to be limited to 2nd and 3rd order stream channels where there are suitable riverbed substrates. Most of the habitat within 1st order streams are less likely to support populations of brown trout.
- 7.5.33 The suitable habitat consisted mostly of low-to-moderate gradient plane-riffle and step-pool stream channel types with a mix of coarse substrates

¹⁶ Lintott, P. R., Davison, S., van Breda, J., Kubasiewicz, L., Dowse, D., Daisley, J., Haddy, E. and Mathews, F. (2018). Ecobat: An online resource to facilitate transparent, evidence-based interpretation of bat activity data. *Ecology and evolution*, 8: 935-941

¹⁷ <http://ecobat.org.uk/>

and suitable flow types. It was found mostly adjacent to the existing forest road network.

- 7.5.34 Some of the potentially suitable habitat in the Killean Burn was found to have been modified by channel straightening and dredging which is likely to reduce the productivity of the habitat for fish.
- 7.5.35 Brown trout may also utilise some less suitable habitats in both catchments, which were mainly associated with step-pool and peat river channel types.
- 7.5.36 No freshwater pearl mussels were found during the survey. Channel type and the riverbed substrates found during the survey indicate reduced habitat suitability for this species.
- 7.5.37 Further details of the results of the fisheries habitat survey are given in **Technical Appendix 7.4**.

Survey Results: Other Protected Species

Otter

Desk Study

- 7.5.38 Otters were found along most of the watercourses during the Clachaig Glen Wind Farm surveys. There was also a record of otters along the Killean Burn at the western end of the access track from the Argyll Biological Records Centre/NBN Atlas data.

Field Survey Results

- 7.5.39 Otters were found along many of the watercourses and around several of the waterbodies across the survey area during the previous 2015 survey and the 2023 survey.

Water Vole

Desk Study

- 7.5.40 No evidence was found of any water vole activity was found either during the previous 2015 surveys, or during Clachaig Glen Wind Farm surveys. There were no records of water voles within 2 km of the site from the Argyll Biological Records Centre/NBN Atlas.

Field Survey Results

- 7.5.41 No evidence was found of any water vole activity within the site during the 2023 water vole surveys.

Badger

Desk Study

- 7.5.42 Badger signs were located within the survey area during both the 2023 baseline surveys and the previous 2015 surveys. Evidence of badger activity across the survey area was sparse, though it did include a sett immediately to the south of the Killean Burn in 2023 (50 m from the proposed access track route but on the opposite side of the watercourse) and a small number of scats and footprints in both years.

Field Survey Results

- 7.5.43 No evidence of badgers was found within the Clachaig Glen Wind Farm site during its baseline surveys. However, two recent records were found of badgers within 2 km of the Proposed Development from the Argyll Biological Records Centre/NBN Atlas data, one to the east and one to the west of the Proposed Development.

Red Squirrel

Desk Study

- 7.5.44 No evidence of red squirrels was recorded during the Clachaig Glen Wind Farm surveys, and none within 2 km of the Proposed Development from the Argyll Biological Records Centre/NBN Atlas data

Field Survey Results

- 7.5.45 No evidence was found of any red squirrel activity within the survey area during the 2023 surveys.

Pine Marten

Desk Study

- 7.5.46 Surveys undertaken for the adjacent Clachaig Glen Wind Farm did find a den of this species, 1.8 km SE from nearest proposed Killean wind turbine and 1.4 km from the Proposed Development.

Field Survey Results

- 7.5.47 No evidence was found of any pine marten activity within the site during the 2023 surveys.

Survey Results: Deer

- 7.5.48 The survey area lies within the range of reed, roe, and Sika deer (British Deer Society 2016), and the Argyll Biological Records Centre has records of all three species within 2 km of the site in the last decade.
- 7.5.49 This was confirmed through observations during the site surveys. Roe deer were occasionally observed, mainly on the lower ground and along forest/woodland edges. Sika were more often heard than seen within the main conifer plantations, though they were seen in clear-fell areas during dusk and pre-dawn surveys. Red deer were scarce, with records mainly from the higher ground in the eastern part of the survey area.

Future Baseline

- 7.5.50 In the “do nothing” scenario without the construction of the Proposed Development, it is anticipated that the current management of the site will continue and that the species/habitats currently present will continue at the site, though subject to changes occurring at the national and regional levels. There will be changes associated with forestry practice, as mature trees are harvested and then replanted. Changes are also likely to occur as a result of climate change, though would be anticipated to be minor over the lifetime of the Proposed Development.

7.6 Ecological Conservation Evaluation

Conservation Evaluation of Habitats

- 7.6.1 The conservation value of the habitats was determined using the criteria specified in **Table 7.2**. The results are summarised in **Table 7.7**. All of the species with very high - low value have been taken forward in the ecological assessment (i.e. only those with negligible value have been scoped out).

Table 7.7: Conservation Evaluation of the Habitats in the Killean Wind Farm survey area

Habitat	NVC	EU Habs Dir priority	UK BAP priority habitat	Scottish BAP habitat	Argyll LBAP habitat	Potential GWLTE	Conservation Value
Acid flush	M6d	✓	✓	✓	✓	High	High
	M29	✓	✓	✓	✓	High	High
Acid grass	U4a						Negligible
Blanket bog	M17a	✓	✓	✓	✓		High
	M17b	✓	✓	✓	✓		High
	M19a	✓	✓	✓	✓		High
Bog pool	M1	✓	✓	✓	✓		High
	M3	✓	✓	✓	✓		High
Bracken	U20a						Negligible
Broad-leaved woodland	W7	✓	✓	✓	✓	High	High
	W9	✓	✓	✓	✓		High
Broad-leaved plantation	n/a						Negligible
Coniferous plantation	n/a						Negligible
Recently-felled conifer	n/a						Negligible
Dry heath	H10c	✓	✓	✓	✓		High
	H12	✓	✓	✓	✓		High
	H21a	✓	✓	✓	✓		High
Improved grassland	MG6a						Negligible
Marshy grassland	M23a		✓	✓	✓	High	Medium
Mixed plantation	n/a						Negligible
Neutral grass - semi-improved	MG6						Negligible
	MG10					Medium	Negligible
Scrub - dense/continuous	W7		✓	✓	✓	High	Medium
	W23						Negligible
Wet heath	M15b	✓	✓	✓	✓	Medium	High
	M15c	✓	✓	✓	✓	Medium	High
	M15d	✓	✓	✓	✓	Medium	High
Wet modified bog	M17a	✓	✓	✓	✓		High
	M19a	✓	✓	✓	✓		High
	M25a	✓	✓	✓	✓	Medium	High

7.6.2

7.6.3 Seven habitats were classed as high sensitivity, through their listing as EU Habitats Directive Annex 1 habitats: blanket bog, bog pool, dry heath, wet heath, wet modified bog, acid flush and broad-leaved woodland.

7.6.4 Two habitats were classed as medium conservation value: scrub and marshy grassland (rush pasture). Both were classed as medium value for their listing as UK Biodiversity Action Plan (BAP)/Scottish Biodiversity List priority habitats.

Conservation Evaluation of Protected Species

7.6.5 The conservation value of the protected species using the survey area was determined using the criteria specified in **Table 7.2**. The results are summarised in **Table 7.8**. All of the species with very high - low value have been taken forward in the ecological assessment (i.e. only those with negligible value have been scoped out).

Table 7.8: Conservation Evaluation of the Protected Species in the Killean Wind Farm survey area

Species	European Protected Sp	Wildlife and Countryside Act Sch 5/ Badgers Act sp	UK priority sp	Scottish BAP sp	Argyll LBAP sp	Conservation Value
Badger		✓		✓		High
Otter	✓	✓	✓	✓	✓	High
Red Squirrel		✓	✓	✓	✓	High
Pine Marten		✓	✓	✓		High
Brown Trout			✓	✓		Medium
European Eel			✓	✓		Medium
Daubenton's bat	✓	✓		✓		High
Natterer's bat	✓	✓		✓		High
Noctule	✓	✓		✓	✓	High
Leisler's bat	✓	✓				High
Common pipistrelle	✓	✓	✓	✓		High
Soprano pipistrelle	✓	✓	✓	✓	✓	High
Brown long-eared bat	✓	✓		✓	✓	High
Brown Hare			✓	✓		Medium

Species	European Protected Sp	Wildlife and Countryside Act Sch 5/ Badgers Act sp	UK priority sp	Scottish BAP sp	Argyll LBAP sp	Conservation Value
Adder		✓	✓	✓	✓	High
Hedgehog			✓	✓		Medium

7.7 Assessment of Potential Effects

7.7.1 Following SNH (2018a) guidance, the assessment has focussed on the key species/habitats likely to be affected by the Proposed Development. Key species/habitats were defined using the following criteria:

- European Protected Species and Habitats (species/habitats listed on Annex 1 of the EU Habitats Directive);
- species specially protected under Schedule 5 of the 1981 Wildlife & Countryside Act; and
- species/habitats identified as priority in the UK BAP, the Scottish Biodiversity List and the Argyll and Bute LBAP.

Embedded Mitigation

7.7.2 The Proposed Development has changed through a series of design iterations in response to the constraints identified as part of the baseline studies, to reduce environmental effects (see Chapter 3: Design Evolution & Alternatives and Chapter 2: Proposed Development Description). With respect to ecology, the following changes have been incorporated to avoid or minimise negative effects:

- The layout has been designed to avoid areas of deeper peat as much as possible. This has reduced the habitat loss of more sensitive higher quality habitats such as blanket bog.
- The access track layout has been designed to maximise the use of existing tracks. Where the levels of peat exceed 1m in depth, adoption of floating access tracks will minimise disturbance of peat, where appropriate.
- Avoidance of watercourses - these have all been buffered by 50 m, apart from locations where access tracks unavoidably need to cross watercourses. See Chapter 9: Geology, Hydrology and Hydrogeological Assessment for further information regarding watercourse crossings.

The layout has been designed to avoid areas of Annex 1 and priority habitat, including a 30m buffer where possible.

- Avoidance of bat preferred habitat features - a minimum 50 m buffer has been maintained between wind turbine blade tips and the nearest woodland edge, as set out in current NatureScot guidance (NatureScot *et al.* 2021).
- Avoidance of badger setts - all setts found during the baseline surveys have been avoided by a minimum 50 m buffer.

Construction Effects

Direct Effects: Loss of Habitat (Direct loss or degradation of habitat through construction of the wind farm and its associated infrastructure)

7.7.3 Table 7.9 summarises the areas of each habitat that would be lost permanently to each component of the Proposed Development. It also gives the total loss of each habitat, and the percentage that this loss represents of the whole survey area.

Table 7.9: Predicted Permanent Habitat Loss associated with the Proposed Development

Habitat	NVC	Substation	Access Tracks	Turbines/hardstandings	Total permanent loss (ha.)	% survey area resource lost permanently
Blanket bog	M17b	0	0.05	0.04	0.09	0.2%
	M19a	0	0.15	0.49	0.65	0.4%
Bracken	U20a	0	0.05	0	0.05	0.3%
Clear fell	-	0.60	1.53	0.96	3.09	1.4%
Conifer plantation	-	0	1.20	6.92	8.11	2.5%
Rush pasture	M23a	0	0.15	0	0.15	0.2%
Semi-improved grass	MG6	0	0.02	0	0.02	0.1%
Wet heath	M15b	0	0.004	0	0.004	0.02%
Wet modified bog	M19a	0	0.29	0.27	0.56	2.8%

7.7.4 **Table 7.10** summarises the additional areas of each habitat that would be lost temporarily to each component of the Proposed Development (which would be restored following construction). The Table also gives the total (temporary) loss of each habitat, and the percentage that this loss represents of the whole survey area.

Table 7.10: Predicted Temporary Habitat Loss associated with the Proposed Development

Habitat	NVC	Batching plant	Construction compound	Access tracks	Total temporary loss (ha.)	% survey area resource lost temporarily
Acid flush	M6d	0	0	0.01	0.01	0.1%
Blanket bog	M17a	0	0	0.002	0.002	0.002%
	M17b	0	0	0.14	0.14	0.4%
	M19a	0	0	0.32	0.32	0.2%
Bracken	U20a	0.18	0.16	0.12	0.46	2.7%
Clear fell	-	0	0	2.87	2.87	1.3%
Conifer plantation	-	0.20	0	2.19	2.39	0.7%
Rush pasture	M23a	0.01	0.2	0.22	0.45	0.6%
Semi-improved grass	MG10	0	0	0.02	0.02	0.2%
	MG6	0	0	0.04	0.04	0.3%
Wet heath	M15b	0	0	0.03	0.03	0.1%
Wet modified bog	M19a	0	0	0.39	0.39	1.9%

7.7.5 Additional to the temporary losses in **Table 7.10**, there would also be temporary loss of habitat from up to six potential borrow pits that form part of the Proposed Development. Only potential indicative search areas have currently been identified for these, so it is not possible to calculate the precise habitat loss that these would involve. **Table 7.11** gives the cover of each habitat type in all the potential locations combined.

Table 7.11: Killean Wind Farm borrow pit search area habitats

Habitat	NVC	Total temporary loss (ha.)	% survey area resource lost
Blanket bog	M17a	0.47	0.5%
Clear fell	-	5.43	2.5%

Habitat	NVC	Total temporary loss (ha.)	% survey area resource lost
Conifer plantation	-	0.3	0.1%
Disused quarry	-	0.07	30.0%
Wet heath	M15b	0.79	3.2%

7.7.6 There would be a direct loss of five high value habitats:

- Acid flush (M6d) - temporary loss of 0.01 ha .- this equates to 0.1% of this habitat within the survey area. Habitat loss would be an effect of negligible magnitude on this high value community, which would be of negligible significance (and hence not a significant impact in EIA terms).
- Blanket bog (M17a/b, M19a) - permanent loss of 0.74 ha., temporary loss of 0.46 ha. and possible loss of up to 0.47 ha. for a borrow pit - together this equates to 2.0% of this habitat within the survey area. Habitat loss would be an effect of low magnitude on this high value community, which would be of minor significance, and not significant.
- Wet modified bog (M19a) - permanent loss of 0.56 ha. and temporary loss of 0.39 ha. - together this equates to 4.7% of this habitat within the survey area. Habitat loss would be an effect of low magnitude on this high value community, which would be of low significance, and not significant.
- Wet heath (M15b) - permanent loss of 0.004 ha., temporary loss of 0.03 ha. and possible loss of up to 0.79 ha .for a borrow pit - together this equates to 3.3% of this habitat within the survey area. Habitat loss would be an effect of low magnitude on this high value community, which would be of minor significance (and hence not a significant impact in EIA terms).

7.7.7 There would also be direct loss of one medium value habitat:

- Marshy grassland (M23a) - permanent loss of 0.15 ha. and temporary loss of 0.45 ha. - together this equates to 0.8% of area of this habitat within the survey area. Habitat loss would be an effect of negligible magnitude on this medium value community, which would be of negligible significance, and not significant.

7.7.8 There would additionally be a loss of 80m of hedgerow that will be removed for the construction of the site access turning circle to the west of the A83 (Figure 2.7). This hedgerow is a species-poor hawthorn hedge, of medium value (as it is a UK priority habitat). This would be a negligible magnitude effect of negligible significance, and not significant.

7.7.9 There would be no effects on any other habitats of conservation value.

Effects of Habitat Loss on Key Species

7.7.10 Key species that could be affected by the Proposed Development have been defined as those present or likely to be present in the potential impact zone of the Proposed Development.

7.7.11 Effects on high value species are predicted as follows:

- Otter - a single holt and a single couch were found during the baseline surveys, but both were outside the potential impact zone for this species in the northern part of the survey area. There were, however, numerous records of otter spraints and other evidence of activity along most of the watercourses and waterbodies within the survey area. Damage to any holts/couches would be significant in EIA terms without mitigation, so pre-construction surveys would be required to inform the need for any mitigation measures (see Section 7.8), to ensure that any significant effects on this species were avoided.
- Badger - there were no records from the potential impact zone for this species (30 m, the closest sett was 50 m from the proposed access track but across a watercourse, the Killean Burn) but there is habitat suitable in that zone so future use of this zone cannot be ruled out. Damage to any active setts would be significant in EIA terms without mitigation, so pre-construction surveys would be required to inform the need for any mitigation measures (see Section 7.8).
- Pine marten - no evidence of this species was located during the baseline surveys, but a den was found just over 1 km south from the Proposed Development during the Clachaig Glen Wind Farm surveys, so it is possible, given the habitat present, that this species could occur here in the future. Damage to any active dens would be significant in EIA terms without mitigation, so pre-construction surveys would be

required to inform the need for any mitigation measures (see Section 7.8).

- Red squirrel - no evidence of this species was located during the baseline surveys, but it is possible, given the habitat present, that this species could occur here in the future. Damage to any active dreys would be significant in EIA terms without mitigation, so pre-construction surveys would be required to inform the need for any mitigation measures (see Section 7.8).
- Bats - there would be no loss of any potential bat roosts. There would be a negligible loss of habitat in terms of their foraging ranges and preferred habitats. This very small loss of foraging habitat of negligible magnitude on high value receptors results in an effect of negligible significance (as per Table 7.4) for all of the bat species affected and would not be significant.

7.7.12 Construction works in proximity to watercourses could adversely affect Brown trout and European eel (both medium value species) through the loss of stream habitats and riparian vegetation, and blocking of fish passage along streams. The embedded mitigation, avoiding works where possible in this zone, would mean that such effects would be of only low magnitude, at most minor significance and not significant.

7.7.13 The loss of low/negligible areas of habitat for the other medium and low value species (including red, roe and Sika deer), in the context of their ranges, would be of at most minor significance and not significant.

Indirect Effects: Construction Disturbance (Noise and Visual)

7.7.14 Noise and visual disturbance associated with construction activities could potentially affect breeding and foraging species in the locality of the site. Species that are disturbed at breeding sites are vulnerable to a variety of potential effects that could lead to a reduction in the productivity or survival of their populations. Species subject to disturbance outside the breeding season may also feed less efficiently or resort to less favoured roosting areas, either of which may reduce their survival prospects. The potential impact will vary between species according to each species' tolerance of disturbance from human activity and the availability of suitable alternative breeding and foraging habitat.

- 7.7.15 The key species that could be affected are the same as those that could be affected by habitat loss, as set out above.
- 7.7.16 From the current baseline data, there is no evidence that any key species would be affected by construction disturbance. However, the possibility that these species could move into the impact zone (and therefore potentially be significantly affected by disturbance) before construction cannot be ruled out. Therefore, pre-construction surveys will be required to inform the need for any mitigation measures.

Pollution Impacts

- 7.7.17 Fish populations would be particularly vulnerable to pollution incidents into the watercourses, including the medium value brown trout and European eel. This could include siltation from ground disturbance, accelerated or exacerbated erosion of watercourse banksides, hydrological changes to watercourses and surface water run-off, pollution of watercourses, and the blocking or hindering of the upstream/downstream migration of fish, and could, in the absence of mitigation, result in significant impacts on these species' populations.
- 7.7.18 Otter populations could similarly be significantly affected, either directly by pollution or indirectly through reductions in their fish prey populations.

Operational Effects

- 7.7.19 The only operational phase ecological impact taken forward for assessment is collision risk to bats. There would be potential for some disturbance to key species during the operational phase of the Proposed Development, from vehicle use of the new access track moving to/from the site, but this would be of negligible magnitude and not significant for all species.

Bat Collision Risk

- 7.7.20 Collision mortality, barotrauma and other injuries to bats have all been reported at operational wind farms, though these need to be considered in the context of other forms of anthropogenic mortality. The approach taken with this bat collision risk assessment has been to follow NatureScot *et al.* (2021) guidance on the assessment process, with the key criterion being any effect on Favourable Conservation Status. Vulnerability to

collision is based on relative abundance, collision risk and activity recorded at the site.

7.7.21 For the first stage of the assessment, the site has been assessed as follows (using the assessment criteria set out in NatureScot *et al.* 2021):

- Habitat Quality - **LOW** - the Proposed Development did not have any likely bat roost features, and supported only low quality foraging habitat that would be likely to be used by only small numbers of foraging bats (as found during the baseline bat surveys).
- Project size - **SMALL** - on the basis of the number of wind turbines (<10 - the Proposed Development has 9 wind turbines).
- Cross-tabulating these gives a score of 1, i.e. this is a **LOW-RISK SITE**.

7.7.22 For the Stage 2 risk assessment:

- With low site risk, and with all species recorded at only low activity levels¹⁸ this gives a Low risk overall. No bat species would be likely to be significantly affected by the Proposed Development.

Effects on Protected Sites

7.7.23 There are no likely effects of the Proposed Development on any protected sites in relation to non-avian ecology due to a lack of structural or functional connectivity.

7.8 Mitigation

7.8.1 The mitigation hierarchy has been followed throughout the design of the Proposed Development. More sensitive and high value habitats/species have been avoided where possible, and impacts minimised. The Proposed Development could, though, still result in a number of significant ecological effects, so a package of mitigation measures has been proposed in order to reduce the magnitude of these effects and ensure that there are no significant residual effects, and to ensure compliance with the nature conservation legislation.

¹⁸ Determined using professional judgement of the baseline data. The recommended ECOBAT software is not currently available.

Mitigation of the Construction Phase

- 7.8.2 The applicant has committed to the production of a Construction Environmental Management Plan (CEMP) to the satisfaction of NatureScot and other relevant stakeholders, before construction commences, and would follow Windfarm Good Construction Guidance, Scottish Renewables *et al* (2019). An Outline CEMP is included within Technical Appendix 2.1. A Species Protection Plan will be required to ensure compliance with the Wildlife and Countryside Act (a) to avoid any impacts to species specially protected under Schedule 5 of that Act and (b) to avoid any damage to active setts/holts/hibernacula. A draft Species Protection Plan is included within **Technical Appendix 7.5**. This will include employment of an Ecological Clerk of Works (ECoW) to monitor compliance.
- 7.8.3 Given the predicted habitat losses (including blanket bog (M17a/b, M19a), wet heath (M15b) and wet modified bog (M19a)), a Biodiversity Enhancement Management Plan (BEMP) will be implemented to deliver a net gain in peatland habitat. A draft outline BEMP is included in **Technical Appendix 7.6**. The BEMP will deliver benefits to the peatland habitats). It will include enhancement of 17.6 ha. of peatland. This will ensure that habitat losses are offset through an increase in peatland habitat quality and that there will be an overall net gain.
- 7.8.4 Otters were present along most of the watercourses, and badgers were also found during the baseline surveys. It is also possible that other protected species such as red squirrel, pine marten and water vole could move into the potential impact zone of the Proposed Development in the future. Further surveys for these species will therefore be undertaken immediately prior to construction. If any were found, then appropriate mitigation would be implemented and/or licence sought from NatureScot (as set out in the Species Protection Plan in **Technical Appendix 7.5**).
- 7.8.5 Potential impacts on fisheries will be mitigated by using best practice protocols to address potential fish access issues, silt management and pollution risks (as set out in the CEMP). This would include ensuring that stream crossings allow for fish passage in both upstream and downstream directions.

Mitigation of the Operational Phase

- 7.8.6 No significant collision risk was predicted for any bat species, so no mitigation is required.
- 7.8.7 No mitigation for the operational phase of the Proposed Development will be required.

7.9 Assessment of Residual Effects

- 7.9.1 Following mitigation, the residual ecological effects of the Proposed Development will be a non-significant loss of a small amount of upland moorland habitat, a non-significant risk of disturbance during construction, a non-significant risk of pollution, and a non-significant risk of bat collision with the wind turbines.
- 7.9.2 None of these will have any long-term impact on the integrity of the site's ecological features or the conservation status of the species found here, and no significant residual ecological effects are predicted.

7.10 Assessment of Cumulative Effects

- 7.10.1 The potential for cumulative ecological effects were considered following NatureScot guidance, considering impacts on the favourable conservation status of key species within the relevant NHZ (in this case NHZ 14 Argyll West and Islands). In particular, the proposed Clachaig Glen Wind Farm lies adjacent to the southern edge of the Proposed Development.
- 7.10.2 All of the potential effects of the Proposed Development have the potential to contribute to cumulative ecological impacts. However, the predicted residual effects of the Proposed Development, with regard to habitat loss and disturbance are so low that these would not make any material contribution to any potentially significant cumulative impact at the NHZ level.
- 7.10.3 Consideration of the cumulative collision risk to bats was carried out to determine whether the Proposed Development could materially contribute to a potentially significant cumulative collision risk. However, given the combination of low collision risks resulting from the Proposed Development once the proposed mitigation measures are implemented, and the gains from the proposed BEMP, it was concluded that these would

not make any material contribution to any potentially significant cumulative impact at the NHZ level.

7.11 Summary

- 7.11.1 **Table 7.12** provides a summary of the effects of the Proposed Development on features of ecological interest detailed within this chapter.
- 7.11.2 Overall, there are not likely to be any significant residual effects on ecology as a result of the Proposed Development assuming that the mitigation measures referred to in this chapter are adopted (and which are required to ensure compliance with the nature conservation legislation). The Proposed Development would not affect the favourable conservation status of any species/community of conservation importance within the NHZ, either alone or in-combination with other schemes. It would also not contribute to any Likely Significant Effect on any SPA qualifying interests. No effects would result in any breach of the Habitats Regulations.

Table 7.12: Summary of Residual Effects of the Proposed Development

POTENTIAL ENVIRONMENTAL EFFECT	SIGNIFICANT YES/NO	MITIGATION	MEANS OF IMPLEMENTATION	RESIDUAL EFFECT
Direct habitat loss from construction	Yes	Avoidance of more sensitive habitats in design process	Design mitigation, CEMP	Not significant
Disturbance to European Protected Species, Schedule 5 species and badgers during construction	Yes	Pre-construction survey checks; if present avoid disturbing activity in proximity with species-specific buffer zone implemented.	Species Protection Plan, CEMP	Not significant
Disturbance to other key ecological receptors	Yes	Pre-construction survey and impacts avoided.	Species Protection Plan, CEMP	Not significant

POTENTIAL ENVIRONMENTAL EFFECT	SIGNIFICANT YES/NO	MITIGATION	MEANS OF IMPLEMENTATION	RESIDUAL EFFECT
Construction impacts on fisheries (pollution/access)	Yes	Minimise works in proximity to watercourses, use of best practice protocols to address potential fish access issues, silt management and pollution risks	Design mitigation, CEMP	Not significant
Operational phase collision risk to bats	No	None required	-	Not significant
Cumulative ecological impacts	No	None required	-	Not significant