

Breackerie Wind Farm

Environmental Impact Assessment Report Volume 1 Chapter 8: Ecology

October 2023 (amended December 2024)

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8 ECOLOGY

Introduction

- 8.1 This assessment has been carried out by RPS Consulting Services Ltd. ('RPS') and evaluates the likely significant environmental effects on the ecological receptors associated with the construction, operation and decommissioning of the proposed Breackerie Wind Farm development (hereafter referred to as the 'proposed development').
- 8.2 This chapter is also supported by the following figures as contained within Volume 2: Figures:
- Figure 8.1: Phase 1 Habitat Survey Results
 - Figure 8.2: NVC Survey Results
 - Figure 8.3: GWDTE Survey Results
 - Figure 8.4: Protected Species Survey Results
- 8.3 The chapter is supported by a number of Technical Appendices (as set out within Volume 4: Technical Appendices), comprising:
- Technical Appendix 8.1: Protected Species Survey Report
 - Technical Appendix 8.2: Habitats and Ground Water Dependent Terrestrial Ecosystem (GWDTE) Survey Report
 - Technical Appendix 8.3: Bat Survey Report
 - Technical Appendix 8.4: Fish Habitat Survey Report
 - Technical Appendix 8.5: Outline Habitat Management Plan (since updated 13th November 2024)
- 8.4 All staff who have contributed to fieldwork and this chapter have an undergraduate or higher postgraduate degree in relevant subjects and hold professional membership of the Chartered Institute of Ecology and Environmental Management (CIEEM).
- 8.5 Where relevant, all Figures and Technical Appendices are referenced within the text. The naming structure used in this chapter follows common names except where no common name is typically used. Full scientific names and comprehensive species lists are provided in the Technical Appendices.

Legislation, Policy and Guidance

- 8.6 The ecology assessment has been written with cognisance to relevant legislation, policy and guidance, notably the following:

Legislation

- Council Directive 92/43/EEC of 21 May 1992 on the Conservation of Natural Habitats and Wild Flora and Fauna (the Habitats Directive);
- The Wildlife and Countryside Act 1981 (as amended) (WCA);
- Scottish Government (2019) EU Exit Habitat Regulations Scotland;
- The Wildlife and Natural Environment (Scotland) Act 2011 (as amended) (WANE Act);
- Nature Conservation (Scotland) Act 2004 (as amended) (NCA);
- The Protection of Badgers Act 1992 (as amended); and
- Salmon and Freshwater Fisheries Act 2003.

Policy

- Guidelines for Ecological Impact Assessment (EclA) (CIEEM, 2018);
- Planning Advice Note (PAN) 60: Planning for Natural Heritage (Scottish Government, 2008); and
- Guidance on Assessing the Impacts of Windfarm Development Proposals on Groundwater Abstractions and Groundwater Dependent Terrestrial Ecosystems (GWDTE) (SEPA, 2017).

Guidance

- Scottish Biodiversity List (Scottish Government, 2020);
- 2020 Challenge for Scotland's Biodiversity (Scottish Government 2015);
- Bats and Onshore Wind Turbines (NatureScot, 2019a);
- Good Practice During Wind Farm Construction (NatureScot, 2019b); and
- Advising on Peatland, Carbon-rich Soils and Priority Peatland Habitats in Development Management (NatureScot, 2023).

8.7 Where appropriate, more detail relating to specific legislation, guidance or policy is provided in the corresponding Technical Appendix for each specialist input supporting this chapter (i.e. Technical Appendices 8.1 – 8.4).

8.8 Chapter 5: Renewable Energy and Planning Policy of the EIA Report sets out the planning policy framework that is relevant to the EIA process and the proposed development. Key policies include:

- Argyll and Bute Local Development Plan 2015 (LDP) (and its Supplementary Guidance adopted 2016);
- National Planning Framework 4 (NPF4);
- Argyll and Bute Proposed LDP2;
- Scottish and UK Renewable energy and climate change legislation and policy; and
- Argyll and Bute Wind Landscape Capacity Study (LWECS)

Consultation

- 8.9 As part of the Scoping exercise, a consultation exercise was undertaken to inform the design of the proposed development and to seek agreement on potential significant environmental effects that result from the proposed development as well as the scope of any assessment work required as part of this EIA.
- 8.10 The Scoping Opinion was received from the Energy Consents Unit on 9th September 2022.
- 8.11 Consultation relevant to the ecological assessment was undertaken in 2022 with NatureScot, the Scottish Environment Protection Agency (SEPA) and Argyll District Salmon Fisheries Board who commented on aspects of methodology, sources of information, scope of assessment and cumulative development. In addition, a Gate Check process was undertaken where the Applicant produced a Gate Check report in 2023; this presented how the advice from the consultees had been considered. A summary of the consultation responses is provided in Table 8.1.

Table 8.1: Consultation Responses

Consultee	Date Received	Consultation Response	Where and how is this addressed?
NatureScot	25th July 2022	NatureScot welcome a refresh of the Phase 1 Habitat Survey and protected species surveys. NatureScot agree there is no connectivity between the proposal and Dun Ban SSSI, Balnabraid Glen SSSI, Machrihanish Dunes SSSI and therefore these can be scoped out. Consultation is recommended with Argyll Fisheries Trust (AFT) and Argyll District Salmon Fisheries Board with regards to scoping out effects on wild fish.	AFT were consulted and their comments and suggested actions are addressed in the Aquatic Ecology section of this chapter.
SEPA	7th July 2022	Regarding GWDTE's: Following NVC, layout must be modified to accommodate. Recognising that dense forestry is hard to survey, all information such as superficial geology, breaks in slopes, topography and pre-forestry historic maps should be used.	A NVC survey which includes a GWDTE assessment has been completed and the infrastructure design has considered the results of this assessment.

Consultee	Date Received	Consultation Response	Where and how is this addressed?
	16 th December 2022	Buffers of 100m for excavations shallower than 100m and 250m for deeper than 1m. Regarding peat and GWDTE's: We are reasonably satisfied that deep peat has been avoided as far as possible, given the constraints of the site. In terms of restoration, it would be ideal if the restoration could return some of the peat habitat, previously drained and planted with commercial forestry, back to a peat producing functional wetland, possibly with an overall net gain for the site post construction. We have no concerns in relation to GWDTEs at this stage.	Peatland restoration methods are detailed in the Technical Appendix 8.5: Outline Habitat Management Plan
Argyll District Salmon Fisheries Board	14th June 2022	The EIA needs to include baseline and post-construction monitoring of fish populations and macroinvertebrates.	Baseline data pertaining to fish habitat suitability has been collected and addressed in the Aquatic Ecology section of this chapter.
Argyll and Bute Council Biodiversity Officer	30th June 2022	I concur with the Ecological studies as outlined in the scoping document which will result in the following: Draft Habitat Management Plan; Protected Species Technical Survey Report; Bat Technical Survey Report; Habitat Technical Survey Report. All plans to include mitigation and form the basis for Toolbox talks, I ask that these plans are included in the CEMP and as indicated overseen by and ECoW. I note that surveys are being updated to ensure that they are within the accepted timescales of 18 months. I am satisfied with the proposals in terms of Ecological interest, these reports will inform the layout of the access routes, borrow pits and facilities associated with the proposal.	All concerns are addressed within Chapter 8: Ecology.

Assessment Methodology and Significance

Scope of Assessment

Effects Assessed in Full

8.12 The following effects were considered to be potentially significant in relation to terrestrial and aquatic ecology at the scoping stage and have been assessed in full within this chapter:

- Annex 1 protected habitats;
- Ground Water Dependent Terrestrial Ecosystems (GWDTE);
- otter;
- badger;
- pine marten;
- red squirrel;
- reptiles
- bat species;
- fish; and
- freshwater pearl mussels.

Effects Scoped Out

8.13 This assessment considers sensitive ecological receptors which are likely to be affected during the construction, operation or decommissioning phases of the proposed development. Where no significant environmental effects are anticipated on an ecological feature, or where no legal protections are afforded to a feature, these have been scoped out of any further assessment.

8.14 Assessment of statutory designated sites (which have a qualifying ecological feature) and are located within 10km of the proposed development have been scoped out, due to lack of connectivity between the designated site and the proposed development.

8.15 Deer are known to be in the area and at present numbers are actively managed through on-site stalking within the forestry plantation; this will continue through the operational phase with coordination from all landowners involved. Nearby Sites of Special Scientific Interest (SSSIs) which otherwise could be affected by dispersal of deer due to construction activities at the proposed development are unconnected due to habitat fragmentation, and none have blanket bog as a qualifying feature. Technical Appendix 8.5: Outline Habitat Management Plan describes a habitat management action to monitor deer populations to assist with successful peatland restoration efforts within the Site. Therefore, whilst it is not expected the proposed development will have significant effect to deer populations and deer have been scoped out of further assessment, a Deer Management Plan would be implemented to support habitat enhancement to compensate for the loss of bog habitat to the development.

- 8.16 RPS surveyors recorded no evidence of water vole during the protected species surveys from 6th to 9th June 2022, and furthermore, the Site is considered to have a lack of suitable habitat to support the species. Consequently, this species has been scoped out of any further assessment but will be considered during pre-construction surveys.
- 8.17 Great crested newt was scoped out of the assessment as the Site falls outwith the known range for this species. Wildcat was similarly scoped out.
- 8.18 All habitats which are of low ecological value (Table 8.12) or not considered to be affected by the proposed development have been scoped out of any further assessment.

Study Area

- 8.19 The following geographic definitions are used within this chapter to describe the proposed development and associated study areas (Table 8.2).

Table 8.2: Study Area Definitions

Term	Definition
The proposed development	Refers to the wind farm infrastructure and the whole process involved with the lifetime of Breackerie Wind Farm including construction, operation and decommissioning.
The Site	The Site comprises the area encompassed by the application boundary, containing turbines and associated infrastructure.
The Survey Area	The area within which any desk study or ecological survey has been undertaken. This area varies depending on the nature of the survey being undertaken, and these are detailed within the associated technical appendices.

- 8.20 The Site is situated on the southern end of the Kintyre peninsula centred on grid reference 163788 616729, approximately 8km southwest of Campbeltown. The present land use comprises mainly commercial coniferous forestry which is actively managed.
- 8.21 The core of the Site comprises a basin created by the surrounding hills with the Lecknacreive Burn running generally north-west to south-east. The summit of Tirfergus Hill (260 m AOD) to the north is outwith the Site boundary, while the summits of Cnoc nan Gabhar (239 m AOD) and Cnoc Odhar (277 m AOD) to the east, as well as Achnaslishaig Hill (307 m AOD) to the south and The Slate (384 m AOD) to the north-west all lie within the Site boundary.
- 8.22 The landscape comprises a rolling plateau of densely forested hills, contrasting with local summits, with a small-scale valley to the immediate east which the B842 passes through. This contains most of the settlement within the area. Land to the west and south-west

comprises steep coastal hills which drop steeply to the sea. To the north, the landform flattens into a broad lowland plain between Macrihanish and Campbeltown.

- 8.23 Settlement within the wider area is relatively sparse, with some small settlements, farms, and scattered residential properties located predominately to the eastern side of the site. Within 5km of the Site, the small settlements of Machrihanish, Drumlemble, Stewarton, Killellan and Killeonan/Knocknaha are located to the north and north-east of the Site. Other small settlements within 10km of the Site include Kilchenzie to the north, Peninver to the north-east, and Millpark and Southend to the south-east.
- 8.24 The nearest trunk road is the A83, which terminates in Campbeltown. The B842 extends south of Campbeltown via Stewarton towards Southend and serves as the primary route south of Campbeltown. It passes the Site approximately 1km to the east in a north-south orientation. The B843 extends east/west from Campbeltown to Machrihanish.
- 8.25 There are a number of minor watercourses on the Site including Allt Mor, Allt Brandon, Allt Seilich, Allt a Ghillean Dubh, Allt Airighe Glaise and Allt Criche, which flow into the Lecknacreive Burn. This runs in a generally south-easterly direction on the site and feeds into the Breackerie Water to the south of the Site. The Site straddles a number of hillsides to form a rough bowl and as such is generally well drained with an absence of lochans or pools.

Desk Based Study and Data Sources

- 8.26 RPS undertook desk studies before the commencement of all ecological surveys to identify statutory designated nature conservation sites within 10km of the Site boundary and to identify all known records of important ecological receptors within a 10km radius of the Survey Area within the last ten years. RPS sourced data from Argyll Biological Records Centre and the Highland Biological Recording Group, NatureScot's SiteLink website (NatureScot, 2020), MAGIC Map (DEFRA, 2020), the LBAP, and Ordnance Survey maps.

Field Surveys

Habitats

- 8.27 A Phase 1 Habitat survey was undertaken between 4th and 7th September 2018 and updated in August 2022 (between 29th August and 2nd September). Even though there had been no significant changes to the Site conditions, and update habitat survey was carried out to ensure this ecological data remained valid in 2023. The 2022 survey also sought to map and assess the habitat not captured in the 2018 survey due to the change in the turbine layout that had taken place since the 2018 survey was conducted. The survey was undertaken according to the "Phase 1 Habitat Survey" method, as recommended in the guidelines for baseline ecological assessment (JNCC, 2010) and 'Guidelines for Preliminary Ecological Appraisal' (CIEEM, 2017). Botanical nomenclature in this report follows that of Stace (2010). Full methods are presented in Technical Appendix 8.2.

- 8.28 A National Vegetation Classification (NVC) assessment was undertaken at the same time as the update Phase 1 survey, undertaken between 29th August and 2nd September 2022. Vegetation was mapped and described following the JNCC NVC 'Users Handbook' (JNCC, 2006). Full methods are presented in Technical Appendix 8.2.
- 8.29 Following the results of the NVC survey, RPS assessed GWDTE potential against 'Land Use Planning System Guidance Note 4 Planning Guidance on Windfarms' (LUPS GU4) (SEPA, 2017). RPS systematically sampled any NVC community, identified as a 'moderate' or 'high' potential GWDTE. Full methods are presented in Technical Appendix 8.2.

Protected Species

- 8.30 RPS Ecologists undertook a walkover for protected species between 6th and 9th June 2022. The survey area encompassed the application boundary and a buffer of up to 200m to assess the presence or likely presence of protected species, in line with CIEEM, 2023. RPS also recorded observations of other notable species of interest. Full methods are presented in Technical Appendix 8.1.
- 8.31 RPS undertook a preliminary roost assessment for bats at the same time as the protected species survey to identify any potential for roosting bat species. Full methods are presented in Technical Appendix 8.3.
- 8.32 RPS completed bat activity surveys, comprising of the deployment of static recorders during the main bat activity season (May to September 2022) covering the three critical activity periods: spring migration, maternity and autumn dispersal. Activity surveys followed NatureScot guidance 'Bats and Onshore Wind Turbines: Survey, Assessment and Mitigation' (NatureScot, 2019a). Full methods are presented in Technical Appendix 8.3.

Aquatic Ecology

- 8.33 Argyll Fisheries Trust (AFT) undertook a fish and freshwater pearl mussel habitat assessment survey on the behalf of RPS between 10th and 14th December 2022 and 13th January 2023 within the survey area plus a 250m buffer which followed the methods of Hendrey and Cragg-Hine (1997), SNH (2010) and those developed for river/fish habitat surveying (Environment Agency, 2003 and Scottish Fisheries Co-Ordination Centre ((SFCC), 2007). Predominant habitat was recorded within specific stretches, and the habitat was defined following definitions adapted from the SFCC Habitat Manual (2007), Hendrey and Cragg-Hine (1997) and Maitland (2003).
- 8.34 Full methodology and results are presented in Technical Appendix 8.4.

Other Species

- 8.35 RPS did not complete specific surveys for reptiles or protected/notable invertebrate species as part of this assessment due to the lack of biological records for such species returned in the data search. However, incidental observations were recorded during all surveys for the presence of reptiles and invertebrates.

Assessment of Significance

- 8.36 The following section explains the criteria used to assess the importance of ecological receptors and the criteria used to predict the likely significant environmental effects on the identified receptors within the Survey Area during construction, operation and decommissioning of the proposed development.

Criteria for Evaluating Importance

- 8.37 Ecological receptors identified in the baseline surveys have been evaluated following CIEEM Guidelines for Ecological Impact Assessment (2018). Ecological receptors identified as important were subject to detailed assessment and are termed Important Ecological Features (IEFs). Receptors considered widespread and unthreatened by the proposed development were scoped out of any further evaluation within this chapter.
- 8.38 The importance of an ecological receptor can be due to a variety of reasons and are defined through legislation and policies. For example, importance can be as a result of the quality or extent of designated habitats or areas, habitat or species rarity or the extent of the species range and/or decline.
- 8.39 Categories of geographical importance (from international to local level) which relate to ecological or nature conservation importance, together with examples and criteria of how to place a site - defined by its ecological attributes - are set out in EclA guidance (CIEEM, 2018). The evaluation of ecological features to a national or international importance level is relatively straight forward as guidance exists for the defining these; for example, Special Areas of Conservation (SAC) or Sites of Special Scientific Interest (SSSI). However, for identifying features at a regional or local level, criteria are not as easily defined. Where possible, the importance of ecological features identified within the Survey Area, have been defined by the geographical ranges in Table 8.3.
- 8.40 Table 8.3. below lists the criteria used to determine the value of ecological features in a geographical context.

Table 8.3: Geographical Importance of Ecological Features

Value	Definition
International	>1% of the European community species population/area of habitat extent. For example, internationally designated sites such as an SAC or a site meeting the criteria for international designations.
National (UK)	>1% of the United Kingdom species population/area of habitat extent. For example, a nationally designated site such as a SSSI or National Nature Reserve (NNR) or a site meeting the criteria for national designations.
Regional/County	>1% of the Natural heritage zone or species population/area of habitat extent. Sites which do not meet the criteria for SSSI selection but are of greater than the local criteria below.

Value	Definition
Local	Within the local area of the proposed development For example, Local Nature Reserves (LNR). Areas of semi-natural ancient woodland smaller than 0.25 ha. Local Biodiversity Action Plan (LBAP) priorities, where they occur in sufficient abundance to maintain the local resource.

- 8.41 Assessing the level of importance of a site based on 1% of a population has no underlying biological basis; however, the value is commonly considered to provide appropriate levels of protections to species populations and habitat extents. The 1% value was adopted by the Ramsar Convention 1971 and has since gained acceptance on this basis.
- 8.42 The importance of ecological receptors can also be determined by the legislative status attached to each feature. Species of European (International) conservation importance are listed on Annex II, IV and V of the Habitats Directive. Species considered of principal importance for biodiversity in Scotland (the Scottish Biodiversity List) and listed under Part 1 section 2(4) of the Nature Conservation (Scotland) Act 2004. Other species are subject to a general level of legal protection through the Wildlife and Countryside Act 1981 (as amended) and also under the Council Directive 1992/43/EEC (1992) on the Conservation of Natural Habitats and of Wild Fauna and Flora (Habitats Directive). However, there is no clear guidance for conservation importance of ecological receptors other than those of European Protected Species and nationally designated site species and importance of these other species is based on professional judgement using the characteristics outlined above.
- 8.43 CIEEM guidance makes it clear that species appearing on national lists, i.e. Schedule 1 of the Wildlife and Countryside Act 1981 (as amended) are not necessarily evaluated as nationally important by merely appearing on such lists. Evaluation importance should consider the number of individuals of a species within a geographic range, i.e. the number of a particular species likely to be affected by the proposed development and to what portion of the geographical range this constitutes.

Criteria for Evaluating Potential Impacts

- 8.44 An understanding of how ecological features will respond to the proposed development is required to determine the magnitude of any likely effects which may arise through construction or operation. It is only necessary to describe in detail the effects which are likely to be significant and impacts/effects which are unlikely to occur, or if they did happen would unlikely be significant, can be scoped out (CIEEM, 2018).

Beneficial or Adverse Effects

- 8.45 Beneficial and adverse impacts and effects are determined whether the change is in accordance with nature conservation policy and objectives:

- Beneficial – a change which improved the quality of the environment, for example, increasing species diversity or extending/improving habitat extent. This can also include reducing the rate of existing environmental decline; and
- Adverse – a change which reduces the quality of the environment, for example, habitat destruction, habitat fragmentation, loss of species or pollution events.

Extent

- 8.46 The extent of an impact refers to the geographical area over which the impact may occur over typically representative conditions (CIEEM, 2018). For example, increased sediment run-off in watercourses.

Magnitude of Potential Effects

- 8.47 The magnitude of an impact refers to the size, intensity, or volume of and should be quantified where possible in absolute or relative terms. For example, exact areas of habitat loss or percentage of species population decline (CIEEM, 2018). Table 8.4 defines the four levels of magnitude used in this assessment; these are generally considered to be adverse unless stated otherwise.

Table 8.4: Magnitude of Potential Effects

Level of Magnitude	Definition
Very High	Total or near loss of a population or habitat or due to disturbance, displacement, or species mortality Guide: >80% of the population/area affected.
High	A major reduction in a population or habitat or due to disturbance, displacement, or species mortality. Guide: 21-80% of the population/area affected.
Medium	A partial reduction in a population or habitat or due to disturbance, displacement, or species mortality. Guide: 6-20% of the population/area affected.
Low	A small (but apparent) reduction in a population or habitat or due to disturbance, displacement, or species mortality. Guide: 1-5% of the population/area affected.
Negligible	A very slight reduction in a population or habitat due to disturbance, displacement, or species mortality. Any reduction would be barely noticeable, equating to a 'no change' outcome. Guide: < 1% of the population/area affected.

Duration

- 8.48 CIEEM (2018) states that duration is defined in the relative context of ecological traits, such as the lifecycle of a species. The duration of an activity may differ from the duration of the resulting effect caused by the activity. Table 8.5 defines the timescales used within this assessment.

Table 8.5: Duration of Effects

Duration	Definition
Permanent	Effects continuing indefinitely beyond the span of one human generation (30+ years), except where there is likely to be substantial improvement after this period in which case the Long Term may be more applicable.
Long Term	Between 15 years up to (and including) 30 years.
Medium Term	Between 5 years up to (but not including) 15 years.
Short Term	Up to (but not including) 5 years.
Temporary	No effect

Frequency and Timing

- 8.49 The resulting effect of an impact is influenced by the number of times an activity occurs (CIEEM, 2018). For example, a vehicle driving across sensitive habitat; one vehicle may have a slight impact but the habitat may recover, however, frequent vehicle passes will significantly degrade the habitat to the point where it may not recover and be permanently lost.

Reversibility

- 8.50 An impact from which recovery is not possible within a reasonable timescale or there is no chance of action to implement successful mitigation, the impact is classed as irreversible. An impact from which spontaneous recovery or with which recovery is possible through successful mitigation is classed as reversible. It should be noted that in some cases the same activity can cause impacts which are both irreversible and reversible (CIEEM, 2018).

Sensitivity Criteria

- 8.51 The sensitivity of an ecological receptor to a particular impact should also be considered as well as the zone of influence. Sensitivity criteria is variable across the taxonomic groups and behavioural sensitivity can also vary across individuals of the same species. Sensitivity can also be dependent on species' activity, for example, species are more likely to be susceptible to disturbance during the breeding season (CIEEM, 2018). As such, professional judgement is used when assigning sensitivity to an ecological receptor. Sensitivity is determined according to the species' behaviour, outlined using the criteria in Table 8.6.

Table 8.6: Levels of Sensitivity

Level of Sensitivity	Definition
High	Species in remote areas, away from human disturbance which would result in a long-lasting reaction to a disturbance event. Habitats which are considered to have a slow recovery time and could not re-establish quickly.

Medium	Species which are tolerant to human activity which result in a short-term reaction to a disturbance event. Habitats which are considered to have a moderate recovery time.
Low	Species which are regularly subject to human disturbance which result in a brief reaction to a disturbance event. Habitats which are considered to have a quick recovery time and could readily establish.

Criteria for Evaluating Significance

- 8.52 The combination of Magnitude and Sensitivity can be applied to a significance matrix which categorises the impacts on an ecological receptor (Table 8.7). This approach takes on board the CIEEM (2018) guidance; however, it has been applied as it can help visualise levels of significance for a layperson. Professional judgement is also applied, using the criteria discussed above, to the individual ecological receptors identified to determine their sensitivity and significance within this assessment. Table 8.8 describes the significance of each effect. Effects categorised as moderate or major significance are evaluated as significant under EIA Regulations, whilst those categorised as minor or negligible significance are evaluated as not significant.

Table 8.7: Significance Matrix

Magnitude	Value				
		Very High	High	Medium	Low
	Very high	Major	Major	Major	Moderate
	High	Major	Major	Major/moderate	Minor
	Medium	Major	Major/moderate	Minor	Negligible
	Low	Moderate	Minor	Minor	Negligible
	Negligible	Minor	Negligible	Negligible	Negligible

Table 8.8: Significance Criteria

Significance Criteria	Definition
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Major	Significant effect. The effect is likely to result in a permanent/long term and a highly significant effect on the integrity of the feature. Usually only applied to adverse effects.
Moderate	Significant effect. The effect is likely to result in a medium-term with a high/medium extent. These beneficial or adverse effects are considered to be critical factors and are likely to be material in the decision-making process.
Minor	No significant effect. Likely effect the feature at an insignificant level by virtue of its limited duration and/or extent, but there would probably be no effect on its integrity. May become a decision-making issue if leading to an increase in the overall adverse effect on a particular resource or receptor.
Negligible	Negligible effect. This is not a significant effect.

Baseline Conditions

8.53 This section of the report details the results of the desk study and field surveys conducted across the Site and respective Study Areas, which provides the baseline conditions from which the impact assessment is based. This includes:

- Designated sites and desk study data;
- Habitats and vegetative communities; and
- Protected and notable species.

Desktop Study

Designated Sites

8.54 No designated sites were identified within the Site application boundary. Three statutory and five non-statutory designated sites were identified with ecologically qualifying features within a 10km radius of the Site (Table 8.9). Sites designated for geological interest were excluded, and sites relating to ornithology are considered in Chapter 9: Ornithology.

Table 8.9: Designated Sites Within 10km of the Site

Designated Sites	Designation	Distance from Site	Qualifying Features
Statutory			
Balnabraid Glen	Site of Special Scientific Interest	6km east	Wet woodland Lichen assemblage
Dun Ban	Site of Special Scientific Interest	1.5km west	Tall herb ledge Subalpine, calcareous grassland
Machrihanish Dunes	Site of Special Scientific Interest	3km north	Sand dunes

Designated Sites	Designation	Distance from Site	Qualifying Features
Non-Statutory			
Largiebaan	Scottish Wildlife Trust Reserve	Adjacent, to the south-west	N/A - locally important site for wildlife or nature interests
Loch Orodale	Local Nature Conservation Site	0.8km north	N/A - locally important site for wildlife or nature interests
Dunaverty Bay	Local Nature Conservation Site	4.7km south-east	N/A - locally important site for wildlife or nature interests
Carskey Bay	Local Nature Conservation Site	4.5km south	N/A - locally important site for wildlife or nature interests
Brunerican Bay	Local Nature Conservation Site	5km south-east	N/A - locally important site for wildlife or nature interests

8.55 The designated sites above are not considered to be affected due to distance and a lack of hydrological connectivity between the designated sites and the proposed development. As such, all designated sites have been scoped out of any further assessment.

8.56 The desk study also located twenty-two ancient woodland sites of which nine are within 2km from the proposed development.

Protected Species

8.57 The desk study was undertaken in 2019 and updated in 2022. A request was made to the Argyll Biological Records Centre and Highland Biological Recording Group for all records of notable and protected species within 10km of the Site within the last 10 years. The search did not return any records of protected species or notable species identified in the Scottish Biodiversity List or the Argyll and Bute Local Biodiversity Action Plan (LBAP). Full results of the desk study are presented in Technical Appendix 8.1: Protected Species Survey Report.

Field Survey Results

Phase 1 Habitats

8.58 Full results of the Phase 1 Habitat Survey are presented in Technical Appendix 8.2 and Figure 8.1. Table 8.10 below presents combined Phase 1 and NVC habitat areas. Table 8.12 presents a summary and evaluation of the habitats within the survey area.

8.59 No rare or red listed plant species were recorded during the vegetation surveys.

NVC Survey

8.60 Full results of the NVC survey are presented in Technical Appendix 8.2. and Figure 8.2. Table 8.10 below presents the combined Phase 1 and NVC habitat areas and Table 8.12 presents a summary and evaluation of the habitats within the Survey Area.

Table 8.10: Combined Phase 1 and NVC Habitat Areas

Phase 1 habitat code & title	Area*		National Vegetation Classification code & title	Area*	
	Absolute (ha)	Relative (%)		Absolute (ha)	Relative (%)
A1.1.1 - Broadleaved woodland - semi-natural	3.6	0.3	n.a.	3.6	0.3
A1.1.2 - Broadleaved woodland - plantation	2.82	0.2	n.a.	2.82	0.2
A1.2.2 - Coniferous woodland - plantation	670.34	48.8	n.a.	670.34	48.8
A3.2 - Coniferous Parkland/scattered trees	0.35	0.0	n.a.	0.35	0.0
A4.2 - Coniferous woodland - recently felled	505.88	36.8	n.a.	505.88	36.8
B1.1 - Acid grassland - unimproved	6.2	0.5	U4a <i>Festuca ovina</i> - <i>Agrostis capillaris</i> - <i>Galium saxatile</i> grassland, typical sub-community	6.2	0.5
B1.1-B1.2 - Acid/neutral grassland mosaic	1.05	0.1	n.a.	1.05	0.1
B1.1-C1.1 - Acid grassland - bracken mosaic	0.63	0.0	n.a.	0.63	0.0
B1.2 - Acid grassland - semi-improved	3.62	0.3	U4b <i>Festuca ovina</i> - <i>Agrostis capillaris</i> - <i>Galium saxatile</i> grassland, <i>Holcus lanatus</i> - <i>Trifolium repens</i> sub-community	3.62	0.3
B2.1-D5 - Neutral grassland - acid grassland/heath mosaic	0.99	0.1	n.a.	0.99	0.1
B4 - Improved grassland	3.84	0.3	n.a.	3.84	0.3
B5 - Marsh/marshy grassland	1.32	0.1	M23a <i>Juncus effusus</i> / <i>acutiflorus</i> - <i>Galium palustre</i> rush-pasture, <i>Juncus acutiflorus</i> sub-community	0.34	0.0
			M23b <i>Juncus effusus</i> / <i>acutiflorus</i> - <i>Galium palustre</i> rush-pasture, <i>Juncus effusus</i> sub-community	0.98	0.1

Phase 1 habitat code & title	Area*		National Vegetation Classification code & title	Area*	
	Absolute (ha)	Relative (%)		Absolute (ha)	Relative (%)
C1.1 - Bracken - continuous	56.29	4.1	U20a <i>Pteridium aquilinum</i> - <i>Galium saxatile</i> community, <i>Anthoxanthum odoratum</i> sub-community	55.74	4.1
			U20b <i>Pteridium aquilinum</i> - <i>Galium saxatile</i> community, <i>Vaccinium myrtillus</i> - <i>Dicranum scoparium</i> sub-community	0.55	0.0
C1.1-D1.1 Bracken-dry heath mosaic	0.33	0.0	n.a.	0.33	0.0
D1.1 - Dry dwarf shrub heath - acid	5.11	0.4	H12a <i>Calluna vulgaris</i> - <i>Vaccinium myrtillus</i> heath, <i>Calluna vulgaris</i> sub-community	5.11	0.4
D1.1-E2.1 - Dry heath - flush mosaic	2.03	0.1	n.a.	2.03	0.1
D2 - Wet dwarf shrub heath	5.02	0.4	M15b <i>Trichophorum germanicum</i> - <i>Erica tetralix</i> wet heath, typical sub-community	5.02	0.4
D5 - Dry heath/acid grassland	2.43	0.2	n.a.	2.43	0.2
E1.6.1 - Blanket Sphagnum bog	55.65	4.1	M19a <i>Calluna vulgaris</i> - <i>Eriophorum vaginatum</i> blanket mire, <i>Erica tetralix</i> sub-community	55.65	4.1
E1.6.1-E2.1 - Blanket bog-acid flush mosaic	0.16	0.0	M19a <i>Calluna vulgaris</i> - <i>Eriophorum vaginatum</i> blanket mire, <i>Erica tetralix</i> sub-community	0.16	0.0
E1.7 - Wet modified bog	0.45	0.0	M25a <i>Molinia caerulea</i> - <i>Potentilla erecta</i> mire, <i>Erica tetralix</i> sub-community	0.45	0.0
E2.1 - Flush and spring - acid/neutral flush	15.18	1.1	M6c <i>Carex echinata</i> - <i>Sphagnum recurvum/auriculatum</i> mire, <i>Juncus effusus</i> sub-community	14.46	1.0
			M6d <i>Carex echinata</i> - <i>Sphagnum recurvum/auriculatum</i> mire, <i>Juncus acutiflorus</i> sub-community	0.72	0.1
I2.1 - Quarry	0.95	0.1	n.a.	0.95	0.1
J3.6 - Buildings	0	0.0	n.a.	0	0.0
Road	29.42	2.1	n.a.	29.42	2.1



Phase 1 habitat code & title	Area*		National Vegetation Classification code & title	Area*	
	Absolute (ha)	Relative (%)		Absolute (ha)	Relative (%)
Total:	1,373.66	100.	Total:	1,373.66	100.1

GWDTE Survey

- 8.61 Of the habitats recorded during the NVC survey, only one habitat was identified with a site-specific potential at 'high' level for dependency on a groundwater resource: M23a *Juncus effusus/acutiflorus-Galium palustre* rush-pasture, *Juncus acutiflorus* sub-community. All other NVC communities were classed as Low.
- 8.62 Full details of the GWDTE survey and assessment are presented in Technical Appendix 8.2. Actual GWDTE habitats are presented in Figure 8.3 and the assessment of site-specific groundwater dependency is summarised in Table 8.11 below.

Table 8.11: Assessment of Groundwater Dependency

Phase 1 Habitat Code and Title	National Vegetation Classification Code and Title	Notes	Groundwater dependency	
			Guidance	Site-specific
B2.2 Neutral grassland - semi-improved	MG10a <i>Holcus lanatus-Juncus effusus</i> rush-pasture, typical sub-community	Associated with damp areas of acid grassland invaded by rushes. No features associated with GWDTE present (e.g. springs or breaks-in-slope).	Moderate	Low
B5 Marsh/marshy grassland	M23a <i>Juncus effusus/acutiflorus-Galium palustre</i> rush-pasture, <i>Juncus acutiflorus</i> sub-community	Associated with moderately steep slopes that would be well-drained but for sustained inputs of groundwater. Relatively productive in comparison to surface water-fed M6c acid/neutral flush so presumed to be enriched with groundwater-derived bases and/or nutrients. Associated with breaks-in-slope.	High	High
D2 Wet dwarf shrub heath	M15b <i>Trichophorum cespitosum-Erica tetralix</i> wet heath, typical sub-community	Extensive on moderate slopes, and evidently dependent upon equally extensive rainfall, rather than groundwater or surface-water emergence. Ombrogenous species are present with no indicators or physical features associated with groundwater emergence.	Moderate	Low
E1.7 Wet modified bog	M25a <i>Molinia caerulea-Potentilla erecta</i> mire, <i>Erica tetralix</i> sub-community	Located on water-shedding but moderately inclined slopes/ridges, or across summits above the level of groundwater emergence. Relatively dry in character with few or no mesic species and presumed to have been derived from rain-fed blanket	Moderate	Low

Phase 1 Habitat Code and Title	National Vegetation Classification Code and Title	Notes	Groundwater dependency	
			Guidance	Site-specific
		bog and/or wet heath (through grazing).		
E2.1 Flush and spring - acid/neutral flush	M6c <i>Carex echinata-Sphagnum fallax/denticulatum</i> mire, <i>Juncus effusus</i> sub-community	Associated with the flanks of watercourses; waterlogged ground; and/or surface water draining from adjacent areas of blanket bog.	High	Low
	M6d <i>Carex echinata-Sphagnum fallax/denticulatum</i> mire, <i>Juncus acutiflorus</i> sub-community	Located in a single area above the level of groundwater emergence and associated with run-off from rain-fed (M25a) habitat.	High	Low

Protected Species

- 8.63 Full details of the protected species survey are presented in Technical Appendix 8.1 and all protected species observations are presented in Figure 8.4.
- 8.64 Evidence of otter was recorded outside the coniferous forestry plantation outwith the Site and within 200m from the Site boundary. Field signs recorded were spraints and an otter print; no resting sites were found. The small burns within the Site were identified as waterways for otters to move between associated watercourses outside the Site boundary giving potential for resting, foraging and commuting otter, and as such, otters are therefore considered further in this assessment.
- 8.65 Habitat within the Site is dominated by forestry plantation and it is considered suboptimal for water vole due to the nature of the watercourses which have a fast flow rate and lack the suitable bank structure and vegetation type required to support the species. No records of water vole from the last ten years were returned in the desk study. Therefore, it is considered unlikely that water voles are present within the Site and water vole are not considered further in this assessment.
- 8.66 The majority of the Site offers suboptimal habitat for badger foraging and sett building. Additionally, there were no records of badger presence returned by the local records centre within the last ten years. However, two potentially active badger setts were found within the Survey Area (but outwith the Site boundary) and a likely disused badger sett was recorded to the southeast of the Site, although activity status could not be confirmed at the time of the survey. Badger are therefore considered within this assessment.
- 8.67 Habitat within the Site provides suitable refuge for pine marten, including foraging and denning opportunities. No records of pine marten were returned in the desk study. The presence of the species within the Site cannot be discounted however, and the species is therefore considered further in this assessment.

- 8.68 The coniferous plantation forestry habitat within the Site offers good potential for red squirrel drey building. No feeding signs or tracks of red squirrel were sighted during the field surveys; however, given the suitability of the habitat, the presence of red squirrel within the Site cannot be discounted and the species is considered further in this assessment.
- 8.69 No targeted reptile surveys were completed; however, the Site has good potential for the presence of reptiles due to the mosaic of habitats and the abundant opportunities for basking and for refuge. No biological records were found within the last ten years of reptile species. A common lizard was sighted during the field surveys and an adder and lizard were reported incidentally during a separate Site visit.
- 8.70 Common lizards are widespread and as such would not significantly affected by the proposed development and therefore these species have been scoped out of any further assessment but will be considered during pre-construction surveys. Adder are less common and are a species of conservation concern highlighted in Argyll & Bute Council's LBAP and are therefore considered within this assessment.

Bats

- 8.71 There were no bat records returned from the desk-based search within 10km of the Site.
- 8.72 The coniferous forestry plantation offers low potential for roosting bats and no structures with bat roosting potential were identified. The habitat on Site has connectivity to the wider environment via forest rides and linear habitats. The area was deemed to have moderate foraging and commuting habitat for bat species, but low roosting potential.
- 8.73 The activity surveys undertaken through the bat activity period of 2022 across the Site identified the presence of six species of bats: *Myotis* species, *Nyctalus* species, brown long-eared, common pipistrelle, soprano pipistrelle and *Pipistrellus* species.
- 8.74 Eleven static detectors were placed throughout the Site to record bat activity (Figure 8.4), and the key results of the study in general are:
- Locations 01, 07 and 09 had the highest overall activity levels at the Site;
 - Of the three deployment periods, autumn had the greatest activity level and the greatest spread of species composition over all eleven active detector locations;
 - Common pipistrelle bats were recorded at high activity levels across all deployment periods (particularly around Locations 02, 07 and 09) and soprano pipistrelle bats were recorded at low to moderate activity levels across all deployment periods;
 - *Nyctalus* species were recorded at generally low activity levels across the Site but were most active in summer and autumn;
 - *Myotis* species' activity was recorded at various locations throughout the deployment periods, with most of the activity concentrated at location 07; and
 - Brown long-eared bats were recorded in low levels in summer and autumn only, with most of the activity also concentrated at location 07.
- 8.75 *Nyctalus* bats are the most vulnerable species due to their flight activity habits and their rarity. In particular, they frequently forage and commute high over treetops at potential

turbine Rotor Sweep Height (RSH), and therefore are subject to greater risk from turbines than any other species identified during the activity surveys.

- 8.76 An assessment of risk from the development concerning bat displacement and mortality was made using parameters outlined in the most recent industry standard guidance (NatureScot, 2019a). Overall, the development is considered as presenting Medium risk to bats.
- 8.77 Full details of the bat surveys are presented in Technical Appendix 8.3.

Aquatic Ecology

- 8.78 Argyll Fisheries Trust undertook a habitat survey on the upper reaches of Abhainn Breacairigh and the Conieglen Water catchments to determine suitability of the habitat for salmonid fish and freshwater pearl mussel. Full details of the survey are presented in Technical Appendix 8.4.
- 8.79 The main findings of the assessment were as follows:
- Stream habitats in the upper reach of the main channel of Abhainn Breacairigh and Conieglen Water consisted mostly of a mix of coarse substrates suitable for salmonid fish in lower and moderate gradient habitat.
 - The smaller patches of higher gradient habitat found in the main channels and most of the tributary streams (including the Lecknacreive Burn) are mostly unsuitable for salmonid fish.
 - The distribution of natural impassable obstacles to fish migration and historical fish survey data indicate that migratory salmonid fish can utilise the much of the Abhainn Breacairigh and Conieglen Water for spawning and juvenile nursery habitat. The major tributary of the Lecknacreive Burn and all minor tributaries are not accessible to migratory fish.
 - It is likely that the habitat upstream of the impassable obstacles support populations of resident brown trout and possibly European eel where habitat is suitable.
 - The habitat in the Homeston Burn (Conieglen Water) may be suitable for freshwater pearl mussel, but the instability of riverbed substrates in Abhainn Breacairigh and Lecknacreive Burn is unlikely to support mussels.
- 8.80 It is recommended that pre-construction baseline electrofishing surveys are undertaken in the areas deemed suitable for fish to establish the presence/absence of fish populations. These pre-commencement surveys must be carried out between June and September, with the optimal survey months being August and September.

Evaluation of Sensitive Ecological Receptors

Tables 8.12 and 8.13 provide an evaluation of the ecological receptors identified during the desk study and field surveys and rationale for scoping in/out of further assessment. Habitat mosaics have not been included in the evaluation; further details on these can be found in in Technical Appendix 8.2.

Table 8.12: Summary of Phase 1 and NVC Habitats

Phase 1 habitat code & title	National Vegetation Classification code & title	Notes	Importance
A1.1.1 Broadleaved woodland - semi-natural	W7 <i>Alnus glutinosa</i> - <i>Fraxinus excelsior</i> - <i>Lysimachia nemorum</i> woodland	- Small extents of mainly non-native species lining watercourses with a single area of W7 woodland. - Included in the Argyll & Bute LBAP, SBL and Habitats Directive. - Extent in Argyll & Bute not known	Local
A1.1.2 Broadleaved woodland - plantation	n.a.	- Small extents of mainly non-native species. - Included in the Argyll & Bute LBAP, SBL and Habitats Directive. - Extent in Argyll & Bute not known	Local
A1.2.2 Coniferous woodland - plantation	n.a.	- Extensive, but very species-poor and uneven habitat dominated by non-native species. - Not included in the Argyll & Bute LBAP, SBL or Habitats Directive. - Extent in Argyll & Bute not known	Site
A3.2 Coniferous Parkland/scattered trees	n.a.	- Singletons or small groups of trees, generally non-native species - Not included in the Argyll & Bute LBAP, SBL or Habitats Directive. - Extent in Argyll & Bute not known	Site
A4.2 Coniferous woodland - recently felled	n.a.	- Highly disturbed, dynamic, secondary habitat. - Not included in the Argyll & Bute LBAP, SBL or Habitats Directive - Extent in Argyll & Bute not known and subject to regular change	Site
B1.1 Acid grassland - unimproved	U4a <i>Festuca ovina</i> - <i>Agrostis capillaris</i> - <i>Galium saxatile</i> grassland, typical sub-community	- Patchy, small areas of lightly grazed species-poor, uneven, indistinctive vegetation. - Not included in the Argyll & Bute LBAP, SBL or Habitats Directive - Extent in Argyll & Bute not known	Site
B1.2 Acid grassland - semi-improved	U4b <i>Festuca ovina</i> - <i>Agrostis capillaris</i> - <i>Galium saxatile</i> grassland, <i>Holcus lanatus</i> - <i>Trifolium repens</i> sub-community	- Small areas often associated with low species-richness, evenness and distinctiveness as a result of improvement. - Not included within the Argyll & Bute LBAP, SBL or Habitats Directive.	Site

Phase 1 habitat code & title	National Vegetation Classification code & title	Notes	Importance
		Extent in Argyll & Bute not known.	
B4 Improved grassland	n.a.	- Moderately extensive areas of extremely low species-richness, evenness and distinctiveness. - Habitat intensively managed, associated with pastoral grassland. - Not included in the Argyll & Bute LBAP, SBL or Habitats Directive. - Extent in Argyll & Bute not known.	Site
B5 Marsh/marshy grassland	M23a <i>Juncus effusus/acutiflorus-Galium palustre</i> rush-pasture, <i>Juncus acutiflorus</i> sub-community	- Moderately extensive areas, with moderately species-rich assemblage. - Habitat type associated with potential for GWDTE's. - Included within the Argyll & Bute LBAP, SBL but not the Habitats Directive. - Extent in Argyll & Bute not known.	Local
	M23b <i>Juncus effusus/acutiflorus-Galium palustre</i> rush-pasture, <i>Juncus effusus</i> sub-community	- Moderately extensive areas of low species-richness, evenness and distinctiveness. - Included within the Argyll & Bute LBAP, SBL but not the Habitats Directive. - Extent in Argyll & Bute not known.	Local
C1.1 Bracken - continuous	U20a <i>Pteridium aquilinum-Galium saxatile</i> community, <i>Anthoxanthum odoratum</i> sub-community	- Moderate extents, species-poor, uneven and indistinctive vegetation dominated by a single, highly invasive, native species. - Undergrowth with poorer species assemblage as the bracken spreads over time. - Not included within the Argyll & Bute LBAP, SBL or Habitats Directive. - Extent in Argyll & Bute not known.	Site
	U20b <i>Pteridium aquilinum-Galium saxatile</i> community, <i>Vaccinium myrtillus-Dicranum scoparium</i> sub-community		

Phase 1 habitat code & title	National Vegetation Classification code & title	Notes	Importance
D1.1 Dry dwarf shrub heath - acid	H12a <i>Calluna vulgaris</i> - <i>Vaccinium myrtillus</i> heath, <i>Calluna vulgaris</i> sub-community	- Area of small extent of species-poor assemblage, dominated by heather and moss. - Associated with enclosure within the plantation, cessation of grazing and re-establishment of the heath - Included within the Argyll & Bute LBAP, SBL and Habitats Directive. - Extent in Argyll & Bute not known.	Local
D2 Wet dwarf shrub heath	M15b <i>Trichophorum cespitosum</i> - <i>Erica tetralix</i> wet heath, typical sub-community	- Small area of species-poor, uneven and indistinct vegetation dominated by heather, moss and purple moor-grass. - Habitat type associated with potential for GWDTE's, but this habitat has been assessed as low groundwater dependency at this Site. - Included within the Argyll & Bute LBAP, SBL and Habitats Directive. - Extent in Argyll & Bute not known.	Local
D5 Dry heath/acid grassland	n.a.	- Limited extent, species-poor assemblage associated with dry heath and acid grassland mosaic. - Not included within the Argyll & Bute LBAP, SBL or Habitats Directive. - Extent in Argyll & Bute not known.	Site
E1.6.1 Blanket <i>Sphagnum</i> bog	M19a <i>Calluna vulgaris</i> - <i>Eriophorum vaginatum</i> blanket mire, <i>Erica tetralix</i> sub-community	- Moderately extensive habitat, with peat >0.5 m deep - Variable vegetation composition that includes <i>Sphagnum</i> bog moss. - Included in the Argyll & Bute LBAP, SBL and Habitats Directive. - Extent in Argyll & Bute not known.	Local
E1.7 Wet modified bog	M25a <i>Molinia caerulea</i> - <i>Potentilla erecta</i> mire, <i>Erica tetralix</i> sub-community	- Small area of species-poor, uneven and indistinctive habitat, dominated by purple moor grass. - Habitat type associated with potential for GWDTE's, but this habitat has been assessed as low groundwater dependency at this Site.	Local

Phase 1 habitat code & title	National Vegetation Classification code & title	Notes	Importance
		- Included within the Argyll & Bute LBAP, SBL and Habitats Directive. - Extent in Argyll & Bute not known.	
E2.1 Flush and spring - acid/neutral flush	M6c <i>Carex echinata-Sphagnum fallax/denticulatum</i> mire, <i>Juncus effusus</i> sub-community	- Small areas of species-poor, uneven habitat dominated by mosses. - Habitat type associated with potential for GWDTE's, but this habitat has been assessed as low groundwater dependency at this Site. - Included within the Argyll & Bute LBAP, SBL but not the Habitats Directive. - Extent in Argyll & Bute not known.	Local
	M6d <i>Carex echinata-Sphagnum recurvum/auriculatum</i> mire, <i>Juncus acutiflorus</i> sub-community		
I2.1 Quarry J3.6 Buildings	n.a.	- Low species-richness, evenness and distinctiveness. - Quarry and building habitat created by human agency.	Site

Table 8.13: Summary of Protected Species

Species	Conservation Legal Status	Notes	Importance
Otter	European protected species (EPS), Wildlife and Countryside Act (WCA), SBL, LBAP	Watercourses within the survey area offer good potential for otter foraging and commuting. Evidence of otter was recorded mainly outside the forestry plantation and within 200 m of the Site boundary. Field signs recorded were spraints and an otter print; no resting sites were found. Craigaig Water and Breackerie Water, as well as Killypole Loch (outwith the proposed development area) offer good potential for otter foraging and resting sites whilst the burns within the survey area provide connectivity with the wider landscape. No otter resting sites were recorded within the Site boundary during the survey, but the likelihood of otters using the Site is high. No records of otter in the last ten years were returned in the desk study.	Local
Badger	Protection of Badgers Act	The majority of the Site is commercial plantation forestry which offers suboptimal habitat for badger foraging and sett building. However, two potentially active badger sets were found within the Survey Area (but outwith the Site boundary) and a likely disused badger sett was recorded to the south-east of the Site. No records of badger presence returned by the desk study within the last 10 years.	Site
Pine Marten	EPS, WCA, SBL	Habitat within the survey area provides suitable foraging and den sites for pine marten with many rocky outcrops and tree crevices present. No records of pine marten were returned in the desk study. No field signs of the presence of pine marten were found.	Site
Red Squirrel	WCA, SBL, LBAP	The plantation forest habitat within the Site offers potential for red squirrel for foraging and resting.	Local
Bats	EPS, SBL, LBAP (soprano pipistrelle, brown long-eared, noctule bat)	The Site is dominated by coniferous plantation woodland interspersed with open watercourses and rides of varying sizes. The coniferous plantation offers low potential for roosting bats and no trees or structures with bat roosting potential were identified. The activity surveys undertaken identified the presence of six species of bats: <i>Myotis</i> species, <i>Nyctalus</i> species, brown long-	Local

Species	Conservation Legal Status	Notes	Importance
		eared, common pipistrelle, soprano pipistrelle and <i>Pipistrellus</i> species. <i>Nyctalus</i> spp. bats are the most vulnerable species due to their flight activity habits and their rarity. In particular, they frequently forage and commute high over treetops at potential turbine Rotor Sweep Height (RSH), and therefore may be subject to greater risk from turbines than any other species identified during the activity surveys.	
Reptiles (common lizard, adder)	WCA, LBAP (adder)	No targeted reptile surveys were completed; however, the Site has good potential for the presence of reptiles due to the mosaic of habitats and the abundant opportunities for basking and for refuge. No biological records were found within the last ten years of reptile species. A common lizard was sighted during the field surveys and an adder and lizard were reported incidentally during a separate Site visit.	Local
Aquatic Ecology (fish and freshwater pearl mussels)	Salmon spawning beds protected under the Salmon and Freshwater Fisheries Act (SFF), SBL, LBAP (Atlantic salmon)	The upper reach of the main channel of Abhainn Breacairigh and Conieglen Water are suitable for salmonid fish in lower and moderate gradient habitat. Migratory salmonid fish can utilise the much of the Abhainn Breacairigh and Conieglen Water for spawning and juvenile nursery habitat. It is likely that the habitat upstream of the impassable obstacles support populations of resident brown trout and possibly European eel where habitat is suitable. The habitat in the Homeston Burn (Conieglen Water) may be suitable for freshwater pearl mussel, but the instability of riverbed substrates in Abhainn Breacairigh and Lecknacreive Burn is unlikely to support mussels. It is recommended to undertake a pre-commencement baseline electrofishing survey directed by the findings of the habitat survey to see whether fish populations are present or not.	Local

Cumulative Impacts

- 8.81 The impact of the proposed development to ecological receptors should be assessed cumulatively with other wind farms within the local area. The cumulative impact can be hydrological, affecting aquatic receptors within the same catchments or other developments affecting terrestrial species as a result of construction or operation. At the time of writing, there are no consented or operational windfarms known within 10km of the Proposed Breackerie Development. The closest wind installation is a single 100 kilowatt turbine (30 metres high to hub height) at Kildalloig Farm, 10.3km to the northeast. Consequently, it is considered that there will be no cumulative impact from the Breackerie Development in regard to ecology and this has been scoped out of further assessment.

Future Site Baseline

- 8.82 The future baseline for the Site, presuming the area is left 'as is', is to assume grazing from livestock and deer would continue. Existing peat drains and haggs will continue to degrade further the existing *Sphagnum* bog habitats present around the Survey Area.
- 8.83 The surrounding plantation forestry within and outwith the Survey Area would continue to be developed and existing stands of coniferous plantation would continue to be managed as a commercial crop.

Assessment of Effects

- 8.84 Chapter 3: Project Description details the infrastructure of the proposed development. This is used to assess the likely significant environmental effects as a result of the proposed development.

General Good Practice

- 8.85 A Construction Environmental Management Plan (CEMP) would be produced to detail good practice measures relating to all elements of construction. General good practice measures including general pollution prevention are detailed in Chapter 10: Geology, Hydrology and Peat. The CEMP would also detail measures undertaken to conduct best working practices in relation to working within peatlands as well as sediment management in relation to water crossings. Habitats will be retained where possible with a 'working footprint' clearly marked by temporary fencing/markers, allowing for reinstatement of habitats as soon as possible after any potential disruption.
- 8.86 The CEMP should detail a sufficient framework to be overseen by an Ecological Clerk of Works (ECoW).

Ecological Clerk of Works

- 8.87 To ensure the ecological features of The Site are preserved, a suitably qualified Ecological Clerk of Works should be employed over the course of the construction phase. The ECoW role would include:

- The provision of toolbox talks to all on-site staff so that employees are aware of the sensitive ecological features which may be impacted by certain construction activities and aware of the potential legal implications of non-compliance;
- Undertake monitoring to ensure minimal damage to retained features;
- Undertake pre-construction surveys and checks i.e. prior to vegetation clearance to minimise impacts to reptile species.

Pre-construction Surveys

- 8.88 There will be a time lapse between the last baseline surveys and the commencement of construction. As such, there is the potential that the ecological conditions on-site could change. Pre-construction checks for fish, otter, badger, red squirrel, pine marten and bat roosts should therefore be undertaken before construction begins.
- 8.89 Additionally, if the pre-construction surveys identify a change in the baseline condition, or if previously unrecorded protected species are identified then relevant species licences should be obtained and mitigation drawn up and agreed with Regulators.

General good practice in relation to species

- 8.90 Mitigation will be required to comply with The Wildlife and Countryside Act 1981 (as amended in Scotland) to avoid the reckless killing or injury of an animal. It is considered that the proposed development will not impact reptiles and amphibians, and as such, it is considered that amphibian fencing or translocations will not be required. However, vegetation will be checked prior to clearance to remove any potential refugia which would encourage species to the area. Additionally, areas of ground can be pre-cut (under ECoW supervision) to encourage the dispersal of reptile and amphibian species from an area.
- 8.91 All exposed excavations/pipework should be capped overnight, or access ramps installed to allow a means of escape for species such as otter or badger should they accidentally become trapped. All machinery will be checked each morning for the presence of animals in the unlikely event that an individual may be resting beneath or within them.
- 8.92 Night-time working near watercourses (i.e. defined here as between one before sunset to one hour after sunrise) should be avoided. As such, construction activities should be undertaken during daylight hours in order to avoid the crepuscular (twilight) activity periods of otters and bats, and the nocturnal activity periods of badgers. However, if this is not possible and twilight works are necessary then any artificial lighting must be directed specifically onto the works area for the duration of the active works only.
- 8.93 A 20mph speed restriction will be imposed throughout the Site to reduce the likelihood of death of mobile species such as reptiles, otter and badger due to increased Site traffic during the construction phase.
- 8.94 Concerning reptiles, prior to any de-vegetation works the area should be checked by an ecologist to ensure no harm comes to reptiles as a result of the construction activities, this includes:

- Vegetation being cleared in a two-phase cut undertaken during the reptile active season (April - October) in temperatures between 9 - 18°C.
- Any potential refugia and/or hibernacula features identified for reptiles in the works area should be dismantled under the supervision of a suitably experienced ecologist, relocated and recreated in an appropriate area in the vicinity of suitable habitat following the guidance provided in Edgar *et al.* (2010).
- Appropriate speed limits adopted on Site by all vehicles to reduce any collision with reptiles and allow displacement.

Identification and Evaluation of Key Effects

- 8.95 Potentially adverse environmental effects from the construction phase include habitat loss or degradation and as a result a loss of habitats suitable to support protected species, alterations to habitat composition as a result of disruption to the existing hydrological connectivity of wetland habitats, and pollution events including chemical/fuel spillage, siltation of watercourses for construction, felling of areas of forestry plantation, and light and noise pollution. Disturbance to protected species may similarly occur, reducing their ability to utilise the Site as part of their territories for foraging or commuting.
- 8.96 Potentially adverse effects from the operational phase such as pollution events related to maintenance, road fatalities are unlikely to impact habitats or species presence further. The main risk is to bat species and barotrauma or collision with turbine blades.
- 8.97 Potentially adverse effects from decommissioning are considered to be similar in nature to those of the construction phase; however, these are generally thought to be at a smaller scale and are therefore likely to be smaller in magnitude.

Construction Effects

Habitats

- 8.98 Potential effects to habitats during the construction phase of the proposed development have been considered. Effects to habitats are dependent on the method of construction, the habitat present, and previous activities such as afforestation which might affect the quality or nature of the habitat. Three separate parameters have been used to predict the potential effects to habitats present from the construction phase of the proposed development:
- Permanent Direct Habitat Loss – the permanent footprint of any component of the infrastructure of a development which would not be restored following construction. This includes tracks, turbine bases and hardstandings, substations and all areas of permanent drainage;
 - Temporary Direct Habitat Loss – any infrastructure component that would be restored following construction, for example batching plants, turbine laydown areas and construction compounds. This area also includes a 10m buffer surrounding areas of infrastructure to allow a working area for machinery which would be restored following construction of the proposed development; and

- Permanent Indirect Habitat Change – a 30m buffer has been applied to the permanent footprint for each component of the proposed development within the Site boundary (in adherence with NatureScot guidance, issued in 2023) where hydrologically dependent habitats are present to account for the potential alterations to habitats through changes to hydrological regimes.

8.99 Table 8.14 details the habitats affected by the proposed development, the likely type of effect, the aggregate area and the percentage of the Site's habitat which will be affected.

Table 8.14: Predicted Effects to Habitat Present from Construction of the Proposed Development

Phase 1 Habitat Code and Title	Permanent Direct Habitat Loss (ha)	Temporary Direct Habitat Loss (ha)	Permanent Indirect Habitat Change (ha)	Total Area of Habitat Affected (ha)	Total Area of Habitat Within Site (ha)	% of Total Habitat Within Site Affected
A1.1.2 - Broadleaved woodland - plantation	0.19	0.23	n/a	0.42	46.49	0.90%
A1.2.2 - Coniferous woodland - plantation	7.34	12.45	n/a	19.79	800.17	2.47%
A4.2 - Coniferous woodland - recently felled	8.24	10.00	n/a	18.24	514.25	3.55%
B1.1 - Acid grassland - unimproved	0.02	0.07	n/a	0.09	6.84	1.32%
B4 - Improved grassland	0.01	0.07	0.04	0.12	42.00	0.29%
B5 - Marsh/marshy grassland	0.09	0.07	0.26	0.42	35.77	1.17%
C1.1 - Bracken - continuous	0.12	0.43	0.01	0.56	99.88	0.56%
D1.1 - Dry dwarf shrub heath - acid	0.01	0.03	n/a	0.04	7.47	0.54%
D2 - Wet dwarf shrub heath	0.10	0.27	n/a	0.37	5.02	7.37%
E1.6.1 - Blanket <i>Sphagnum</i> bog	0.58	0.83	n/a	1.41	253.55	0.56%
E2.1 - Flush and spring - acid/neutral flush	0.32	0.97	n/a	1.29	24.12	5.35%
I2.1 - Quarry	0.00	0.06	n/a	0.06	0.94	6.38%

Total	17.02	25.48	0.31	42.81		
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Table Notes: In addition to the above effects to habitats from the wind farm infrastructure, keyhole areas will be created in the forestry plantation at each turbine location and to create access to the temporary construction compound. The total area of this permanently felled coniferous plantation woodland will be 53.51ha. Other habitats present within these keyholes are not expected to be affected.

- 8.100 Total permanent direct habitat loss as a result of the proposed development is approximately 17.02ha. This equates to approximately 0.93% of all habitats within the Survey Area.
- 8.101 In addition to the permanent direct effects to habitats from the footprint of the proposed development, consideration has been given to the temporary effects from areas of infrastructure such as construction compounds and a buffer to allow construction of the development. This equates to a temporary effect to habitats of 25.48ha or 1.39% of the total habitats present.
- 8.102 Furthermore, consideration has been given to the ongoing indirect effects from the footprint of the development to habitats which are reliant on hydrological influences and so might be altered through the course of the development. The total indirect permanent effect to habitats is therefore calculated as 0.31ha or 0.02% of the total habitats present.
- 8.103 Habitats of high conservation value or sensitivity which may potentially be affected by construction of the proposed development are areas of broadleaved plantation woodland (0.42ha affected), marshy grassland (0.42ha affected), dry and wet dwarf shrub heath (0.04ha and 0.37ha affected, respectively), blanket *Sphagnum* bog (1.41ha affected) and flush and spring habitats (1.29ha affected). Of these habitats, only the M23a marshy grassland has the potential to be reliant on ground water influences at this Site and is therefore potential GWDTE habitat. Habitat that is potentially groundwater fed is addressed within Chapter 10: Geology, Hydrology and Peat.
- 8.104 In addition to the direct and indirect effects of construction to the habitats present, further impacts which might affect habitats include pollution related events such as oil spills and sedimentation from run-off of silt laden waters. General pollution prevention and best practice measures will be implemented to reduce these risks, with further best practice mitigation measures relating to such impacts presented in Chapter 10: Geology, Hydrology and Peat. A suite of pre, during and post-construction water quality monitoring will be carried out and this is also addressed within Chapter 10. These measures will be followed to reduce the risk of an impact to habitats. Similarly, it is considered that there will be no significant adverse effects to non-statutory designated sites where pollution pathways exist from the Site.
- 8.105 Taking into account the habitats present, those with the highest sensitivity (high as defined by Table 8.6) and the magnitude of impact (low as defined by Table 8.4), the effects of the construction of the proposed development to habitats are predicted as **Minor** adverse and **Not Significant**.

Otter

- 8.106 In the absence of mitigation, the loss of habitat within the Survey Area is unlikely to affect otter. Otter activity is most commonly associated with watercourses (though they will forage across terrestrial habitats at certain times of year) and all signs of the species were identified along the Site boundary (as illustrated within Figure 8.4 within Volume 2). Increased siltation of watercourses as a result of infrastructure construction may adversely affect the watercourses utilised by otter, however not significantly due to the pollution prevention and best practice measures implemented to reduce these risks. Construction works will take place outside the usual crepuscular activity period of otter, so risk of death through vehicle collision is low. Pre-construction surveys are recommended prior to the commencement of works, in particular in those areas subject to new or upgraded watercourse crossings, to confirm otters have not moved into the Site. If otter presence is recorded close to working areas, mitigation measures would be employed to avoid significant disturbance. As such, it is considered that construction will have a **Negligible** impact meaning **No Significant** effect on otter.

Badger

- 8.107 In the absence of mitigation, the loss of habitat within the Site is unlikely to affect badger, as the majority of the Site offers suboptimal habitat for badger foraging and sett building. However, two potentially active badger sets were found within the Survey Area (but outwith the Site boundary) and a likely disused badger sett was recorded in the southeast of the Site. Badger are a highly mobile species and the increased construction traffic machinery may pose a traffic collision risk to any individuals that move into the area between the date the survey was undertaken and the start of the construction phase, although typical vehicle movement would be outwith their nocturnal activity period. Pre-construction surveys are therefore proposed prior to the commencement of works, and if badger presence is recorded close to working areas, mitigation measures would be employed to avoid significant disturbance. As such, it is considered that construction would have a **Minor** adverse impact meaning **No Significant** effect on badger.

Pine Marten

- 8.108 In the absence of mitigation, the loss of habitat within the Survey Area has the potential to affect habitat pine marten use for foraging and refuge. Although no evidence of pine marten denning sites was noted during the baseline field surveys, habitat within the Site provides suitable refuge for the species and their presence cannot be discounted. Pine marten prefer native woodlands but will create dens in coniferous plantation and are known to avoid large areas of open ground, which would limit their range to the plantation on Site. There is an estimated permanent loss of 53.51ha of coniferous plantation, with a temporary loss of 57.84ha once plantation around the site is restocked. The reduction of foraging habitat and habitat suitable for places of shelter is likely; however, no evidence of den sites was identified during the field surveys. Pre-construction surveys are proposed prior to the commencement of works, and if pine marten presence is recorded close to working areas, mitigation measures will be employed to avoid significant disturbance. Pine marten are known to be susceptible to disturbance from humans, and there is the potential for low levels of displacement as a result of construction activities. It is therefore

considered that construction will have a **Negligible** impact meaning **No Significant** effect on pine marten.

Red Squirrel

- 8.109 In the absence of mitigation, the loss of woodland habitat within the Survey Area has the potential to affect red squirrel. Red squirrel prefer well connected native woodlands however will reside in coniferous plantation. Pre-construction surveys are proposed prior to the commencement of works, and if red squirrel presence is recorded close to working areas, mitigation measures would be employed to avoid significant disturbance. Red squirrels create and use numerous dreys within a given area therefore it is considered that if any individuals are subject to low level displacement as result of construction activities, they will have other resting sites available in the area. It is therefore considered that construction will have a **Negligible** impact meaning **No Significant** effect on red squirrel.

Reptiles

- 8.110 Without appropriate mitigation the loss of habitat is unlikely to affect reptile species. It is anticipated that permanent loss of suitable reptile habitat is minimal.
- 8.111 Reptiles are known to be susceptible to disturbance from humans, and there is the potential for low levels of displacement as a result of construction activities. It is therefore considered that construction will have a **Minor** adverse impact meaning **No Significant** effect on reptile species.

Bats

- 8.112 The coniferous plantation within the boundary of the Site is sub-optimal for roosting bats, and no roosts were identified within the Survey Area. The loss of plantation and open ground habitats is therefore likely to have a negligible effect on bat roost potential.
- 8.113 The loss of habitat is likely to fragment the linear corridors created by plantation rides (in addition to creating new corridors) and edges which bats forage and commute along, and also reduce the tree canopy used by high flying *Nyctalus* species. The extent of habitat loss, however, is not significant and construction during the bat activity season (dusk-dawn, April-October) will be during daylight hours. As such, construction activities are likely to have a negligible impact on foraging bat species, resulting in a **Minor** adverse, **Non-significant** effect.

Aquatic Ecology

- 8.114 In the absence of mitigation, the construction phase has the potential to directly, and indirectly, have an adverse effect on fish species, particularly in proximity to the proposed new and upgraded water crossings. The mitigation detailed here will aid in the reduction of potential impacts arising from construction; however, there is still the potential that construction will adversely affect the watercourses and fish species.
- 8.115 Felling and impacts arising from construction (including increased siltation from groundworks, increased erosion from drainage, changes to hydrological connectivity or accidental pollution) all have the potential to affect fish and FWPM populations adversely.

These are likely to be localised (particularly at water crossing points) impacts, and as such, due to dissipation with increased distance from impact source, the potential effects to fish and FWPM will decrease with distance.

- 8.116 Due to the areas of plantation required to be felled during the construction phase, there is the risk of increased acidification of the watercourses. However, mitigation will be embedded by the avoidance of working within or near watercourses (a 50m minimum buffer is recommended) where possible, and as such this is predicted to have a **Minor** adverse impact on fish species and FWPM resulting in a **Non-significant** effect.
- 8.117 Pre-commencement baseline electrofishing and FWPM population surveys will aid in the identification of the most sensitive areas and avoid any potential effects upon these species.

Cumulative Construction Impact

- 8.118 There are no consented or operational windfarms known within 10km of the proposed development. Consequently, it is considered that there will be no cumulative construction impact from the Breackerie development in regards to ecology.

Further Mitigation, Compensation and Enhancement

- 8.119 General good practice and embedded mitigation is included in Section 8.86 *et seq.* however, no further mitigation is proposed for the construction phase as no significant environmental effects are predicted. An Outline Habitat Management Plan (OHMP) has been produced (Technical Appendix 8.5, **since updated 13th November 2024**) which details further mitigation, compensation and enhancement measures which will be implemented in order to counteract residual effects of habitat loss or species loss which may arise from the construction phase.
- 8.120 To account for the loss of peatland habitat, the HMP outlines areas where degraded bog could have hags reprofiled and/or drains blocked in order to raise the water table and restore the peatland back to blanket bog condition. **This includes an area at The Slate of approximately 7ha, and also an area south of turbine 2 of approximately 30.96ha which is proposed as a forestry to restored bog area.** Due to the small areas lost during construction, and habitat available for improved management, the restoration of bog habitats across the Site has the potential to result in a minor beneficial impact.

Residual Construction Phase Affects

- 8.121 Assuming best practice and mitigation is followed, no significant residual effects are expected on the ecological features present.

Operational Effects

- 8.122 It is assumed that any maintenance which would require construction activities at the proposed development will follow best practice and guidance from the CEMP and be treated as if this was still under the construction phase.

Habitats

- 8.123 Once the infrastructure is in place, it is not anticipated that any further habitat loss would be experienced as a result of the proposed development. The use of service vehicles across the Site has the potential for fuel spills/pollution events; however, the frequency of this is likely to be very low, and the implementation of best practice (i.e. all vehicles must contain spill kits) would result in a negligible impact on habitats during operation leading to a **Minor** adverse, **Non-significant** effect.

Otter

- 8.124 It is considered that the operational phase will not adversely impact otter. Due to distance of turbines to habitats suitable to support otter, noise from turbines is considered to be of low magnitude. Operation will be near continuous and as such, there is potential for habituation to the presence and noise of turbines. Otter occupy large ranges and can easily move away from areas of disturbance, prior to habituation. No places of shelter were identified during surveys and as such any initial displacement is only likely to temporarily impact foraging activity at a low level. As such operation is likely to have a **Negligible** adverse **Non-significant** effect on otter.

Badger

- 8.125 It is predicted that the operational phase will not adversely impact badger. Due to the distance of turbines to habitats suitable to support badger, noise from turbines is considered to be of low magnitude. The operational phase will be near-continuous, and as such, badger are likely to habituate to the presence and noise of turbines. Badger occupy large ranges and can easily move away from areas of disturbance, prior to habituation. However, human disturbance from Site maintenance is likely, though this will primarily be limited to infrastructure areas (trackways and turbine hardstand). Minimal Site vehicle activity is expected, and the implementation of speed limits would remain from the best practice of the construction phase. No active setts were confirmed within the Site during the surveys and as such, initial displacement is only likely to temporarily impact foraging activity at a low level. Therefore, operation is likely to have a **Negligible** adverse **Non-significant** effect on badger.

Pine marten and Red Squirrel

- 8.126 It is predicted the operational phase will not adversely impact pine marten or red squirrel. Operation of the proposed development will be near-continuous and as such, both species are most likely to habituate to the presence and noise of turbines. However, human disturbance from Site maintenance is likely, though this will primarily be limited to infrastructure areas (trackways and turbine hardstand). Minimal Site vehicle activity is expected, and the implementation of speed limits would remain from the best practice of the construction phase. As such, the operation is likely to have a **Negligible** adverse **Non-significant** effect on pine marten or red squirrel.

Reptiles

- 8.127 Any operational impacts are likely to be related to disturbance and potential injury/fatality due to vehicles on the Site. Road use is expected to be less than during the construction phase with the implementation of speed limits remaining from the best practice of the construction phase. As such, the operation is likely to have a **Negligible** adverse **Non-significant** effect on reptiles.

Bats

- 8.128 The development was considered to present a medium risk for all bat species, based on a worst-case scenario. This takes into account the Site risk level of high and the overall activity level of moderate.
- 8.129 The operational effect on bat species is likely to be from a direct collision with turbine blades or as a result of barotrauma (injury/death caused by the change in air pressure in the wake of rotating turbine blades).
- 8.130 *Nyctalus* spp. (Leisler's and noctule) bats were recoded as having a low level of activity at almost all of the detector locations throughout the Site. These species are the most vulnerable due to their flight activity habits and their rarity. In particular, they frequently forage and commute high over treetops at potential turbine Rotor Sweep Height (RSH), and therefore may be subject to greater risk from the turbines than any other species identified during the activity surveys. Impacts on individual bat species and their population is detailed in full in Technical Appendix 8.3.
- 8.131 Although the coniferous forestry plantation and open moorland offers limited quality foraging habitat that could be used by small numbers of foraging bats, there are several watercourses and waterbodies offering good foraging and commuting habitat and connectivity to the Site.
- 8.132 To minimise the identified potential negative effects to bat populations from the proposed scheme, a number of best practice mitigation measures are recommended. In addition to the production of a Bat Species Protection Plan these include:
- adjustment of turbine locations to avoid key habitats/features (e.g. watercourses);
 - management of the habitat (detailed within the HMP);
 - operational monitoring/carcass searches (completed monthly between May and September); and
 - feathering/pitching of turbine blades during high-risk periods (ie. warm evenings in summer with low wind speeds).
- 8.133 It is considered in Britain that most bat activity is located within close proximity to habitats/features attractive to the species and as such, a minimum buffer of 50 m between the turbine blade tip and the edge of nearby habitat/features is recommended (NatureScot 2019a). The precise buffer distance has been calculated using a set formula detailed in Technical Appendix 8.3, and this comprises the in-built mitigation for bat species.
- 8.134 NatureScot (2019a) guidance suggests 'feathering' – pitching the blades out of the wind – to below 2rpm while idling, and in increasing the cut-in speed during 'high-risk periods'

(dusk-dawn, April-October) can reduce bat mortality on wind farms by up to 50%. The option of 'feathering' does not result in loss of output from the turbine and is recommended as best practice wherever possible.

- 8.135 Following successful implementation of the mitigation it is expected that the impacts will have a **Minor** adverse **Non-significant** effect on bat species.

Aquatic Ecology

- 8.136 Standard pollution control measures will be implemented which include safe storage of materials at an appropriate distance from watercourses and waterbodies. As such, there exists the potential for a **Minor** adverse **Non-significant** effect on watercourses and wetland habitats during the operational phase of the proposed development.

Operational Phase Cumulative Impact

- 8.137 As there are no consented or operational windfarms known within 10km of the proposed Breackerie development, it is considered that there will be no cumulative operational impact from the Breackerie development in regards to ecological interests.

Further Mitigation, Compensation and Enhancement

- 8.138 It is not thought that any additional mitigation measures will be required during the operational phase. The HMP will detail post-construction monitoring to ensure the conditions on Site remain the same and that adverse effects are minimised to ecological receptors for the duration of the proposed development. Additional enhancement measures for habitats will also be implemented to provide a potential net biodiversity gain.

Residual Operational Effects

- 8.139 No significant effects on bat species are expected following the implementation of successful mitigation.
- 8.140 No other effects are expected on other ecological receptors as a result of the operational phase.

Decommissioning Effects

- 8.141 It is considered that the effects of decommissioning will follow that of the construction effects and as such, no significant impacts are predicted.

Further Survey and Monitoring Requirements

- 8.142 As requested by the Argyll District Salmon Fisheries Board, baseline electrofishing and macroinvertebrate surveys would be carried out directed by the habitat suitability surveys. This will determine fish population size, existing macroinvertebrate assemblages and whether freshwater pearl mussels are present and ultimately, whether the mitigation measures employed are successful in protecting fish and shellfish populations present in the watercourses.

- 8.143 Pre-construction surveys within 3 months of the commencement of the construction phase for badger, otter, pine marten and red squirrel will be carried out.
- 8.144 Post-construction monitoring during the operational phase comprising bat carcass searches around turbines (caused through collision or barotrauma) should be undertaken during the first two years of the operational phase, across high-risk periods of activity. In the event that mortality is recorded, further activities should be implemented to reduce the risk of mortality.
- 8.145 Vegetation monitoring and deer population estimates will be required to aid with peatland restoration efforts as outlined within the HMP; details of all monitoring activities are outlined in Appendix 8.5.

Summary of Predicted Effects

- 8.146 A summary of likely significant effects on Important Ecological Features is provided in Table 8.15.

Table 8.15: Summary of Effects

Predicted effect	Good Practice Measures	Significance	Predicted Effect	Additional Compensation/Mitigation	Residual Significance	Residual effect
Construction Phase						
Permanent loss of coniferous plantation	Hydrological mitigation measures.	Not Significant	Minor	None	Not Significant	Negligible
Permanent loss of habitats Including blanket bog	Hydrological mitigation measures and clearly defined working area to minimise the unnecessary effect.	Not Significant	Minor	Creation of HMP and restoration of blanket bog to increase net biodiversity	Not Significant	Negligible
Potential disturbance to GWDTE habitats	Hydrological mitigation measures and clearly defined working area to minimise the unnecessary effect.	Not Significant	Minor	Creation of and adherence to a CEMP	Not Significant	Negligible
Unintentional disturbance/injury/death of otter, badger, pine marten and red squirrel.	Pre-construction surveys, cover excavations and limit vehicle speed on-site.	Not Significant	Negligible	Creation of and adherence to a CEMP	Not Significant	Negligible
Impacts to water quality from run-off (impacting fish/FWPM populations)	Hydrological mitigation measures	Not Significant	Minor	Creation of and adherence to a CEMP	Not Significant	Negligible
Unintentional injury/death of reptile species	Remove hibernacula features, pre-cut areas to encourage dispersal prior to de-vegetation works (overseen by an ECoW)	Not Significant	Minor	Creation of and adherence to a CEMP	Not Significant	Negligible

Predicted effect	Good Practice Measures	Significance	Predicted Effect	Additional Compensation/Mitigation	Residual Significance	Residual effect
	Control of Vehicle speed on Site					
Operational Phase						
Unintentional disturbance/injury/death of otter, badger, pine marten and red squirrel.	Maintain on-site speed limits, follow good practice guidelines for potential construction maintenance works.	Not Significant	Negligible	Follow post-construction monitoring as detailed in HMP/SPP to ensure on-site conditions do not deteriorate over time.	Not Significant	Negligible
Bats – turbine collision/barotrauma	Turbine location to ensure a minimum distance of a 50m buffer between blade tip and habitat/feature. Post-construction monitoring including carcass searches. 'Feathering' of rotors.	Significant for <i>Nyctalus</i> spp. only	Moderate	Creation of a SPP for bats.	Not Significant	Negligible
Damage to habitats/watercourses from pollution events	Hydrological mitigation measures. Maintain a buffer of 50 m from watercourses, store any on-site materials appropriately.	Not Significant	Minor	None	Not Significant	Negligible

Statement of Significance

- 8.147 Following the implementation of good practice, embedded mitigation and detailed mitigation and enhancement for habitats, and measures to mitigate for the risk of potential collision of bat species with turbine blades, no significant environmental effects are predicted as a result of the proposed development alone or in combination with other nearby developments.

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