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Introduction

8.1 This Chapter considers the current and future nature conservation interest of the site and surrounding area. It goes on to assess the potential effects of the proposed development on biodiversity and, where necessary, to describe proposed mitigation, compensation and enhancement measures. This Chapter considers designated sites, habitats, plants and animals (excluding birds). Potential effects on birds are considered separately in **Chapter 9: Ornithology**. Together **Chapters 8** and **9** provide an assessment of the potential effects of the proposed development on biodiversity.

8.2 The specific objectives of the Chapter are to:

- describe the current ecological baseline established from desk studies, site-specific surveys and feedback obtained during technical engagement with stakeholders;
- describe the likely evolution of the baseline without the implementation of the proposed development;
- describe the assessment methodology and significance criteria used in completing the impact assessment;
- describe the potential effects, including direct, indirect and cumulative effects;
- describe the mitigation measures proposed to address the likely significant effects; and
- assess the residual effects remaining following the implementation of mitigation and compensation and identify biodiversity enhancements; and
- identify biodiversity enhancements.

8.3 This Chapter is supported by the following Technical Appendices:

- **Technical Appendix 8.1: UK Habitat Classification (UKHab) and National Vegetation Classification (NVC) Report**;
- **Technical Appendix 8.2: Protected Mammals Report**;
- **Technical Appendix 8.3: Fish Habitat Survey Report**;
- **Technical Appendix 8.4: Outline Habitat Management Plan (OHMP);** and
- **Technical Appendix 8.5: Bat Survey Report**.

Scope and Consultation

Scoping Responses

8.4 A Scoping Report (SLR, 2023) was submitted to the Energy Consents Unit (ECU) in April 2023. Scoping responses containing comments related to non-avian ecology and nature conservation were received from the following organisations:

- NatureScot;
- Scottish Environment Protection Agency (SEPA);
- Royal Society for the Protection of Birds (RSPB);
- The Scottish Wildlife Trust (SWT);
- Perth and Kinross Council (PKC);

- Friends of the Ochils;
- Clackmannanshire Council; and
- Dunblane Community Council.

8.5 A summary of the key points from the relevant scoping responses and details of how comments have been addressed in the Environmental Impact Assessment (EIA) Report are provided in **Table 8-1.**

Table 8-1: Scoping Key Issues

Consultee	Issue Raised	Response/Action Taken
NatureScot 15/05/2023	NatureScot advised that habitat surveys should include; Phase 1 (or EUNIS) habitat survey, National Vegetation Classification (NVC) survey (of habitats listed on Annex 1 of the EC Habitats Directive and UK Biodiversity Action Plan (UKBAP) Priority Habitats), accompanied by supporting vegetation quadrat information. Surveys should also include records of any rare and scarce plant species.	Details of habitat surveys can be found in paragraph 8.77 to 8.81. Full details are included within **Technical Appendix 8.1 UKHab and NVC Report.**
	NatureScot noted that bat surveys for the five additional turbines (T11-T15) have been scoped out based on the results of the initial bat surveys conducted in 2022 indicating that the area is of relatively low value to bats. NatureScot state that reasoning must be justified, including with the use of data, within the EIA report.	Though it was the initial intention to scope out based on previous survey results, SLR undertook a full suite of bat surveys across the site in 2023. Details of these surveys can be found in paragraphs 8.115 to 8.127, with full details provided in **Technical Appendix 8.5.**
	NatureScot stated that any new tracks required to accommodate the additional turbines should be subject to the appropriate ecological surveys and assessment, including areas where track widening works are proposed.	Surveys were undertaken within the application boundary, including the existing and proposed access tracks. Results of these surveys can be found in the Baseline Conditions section below, with full details provided in **Technical Appendices 8.1, 8.2 and 8.5**.
	NatureScot welcomed the mitigation measures outlined, such as the inclusion of a Habitat Management Plan.	Mitigation measures are detailed in paragraph 8.148 to 8.162. Recommendations for further surveys and monitoring are detailed in the Further Requirements and Monitoring section below. Details of proposed habitat restoration, compensation and enhancement are provided in paragraphs 8.228 to 8.232, with full details of provided in **Technical Appendix 8.4:**

		Outline Habitat Management Plan.
	NatureScot note that NPF4 Policy 3 requires development proposals to demonstrate that they will enhance biodiversity.	Details of proposed habitat restoration, compensation and enhancement are provided in paragraphs 8.228 to 8.232, with full details of provided in **Technical Appendix 8.4: Outline Habitat Management Plan.**
Dunblane Community Council 24/04/2023	Dunblane Community Council recognised that peat surveys had been completed in the past but did not cover the entirety of the site. They advised that the mitigation of peatland damage and peatland restoration of the entire site is integral to the application succeeding.	Details of the UKHab and NVC surveys are provided in the Field Surveys section below, with full details provided in **Technical Appendix 8.1.** The proposed mitigation measures can be found in paragraph 8.148 to 8.168 and **Technical Appendix 10.2: Peat Management Plan,** with details of peatland restoration provided in **Technical Appendix 8.4: OHMP.**
Clackmannanshire Council 28/04/2023	No additional comments to the pre-application response sent 19/07/2022	See below.
	Clackmannanshire Council highlighted the Candidate Local Nature Conservation Site at Alva Moss and advised this should form part of the assessment.	Alva Moss candidate Local Nature Conservation Site (LNCS) has been included in the impact assessment, see paragraph 8.176.
	Clackmannanshire Council advised the proposals would commit to and identify measures to enhance the biodiversity value of the site if it proceeds including a commitment from landowners.	The assessment of potential impacts on biodiversity can be found in the Construction Effects section below. The proposed mitigation, compensation and enhancement measures are detailed within paragraphs 8.228 to 8.232, with full details provided in **Technical Appendix 8.4: OHMP.**
	Clackmannanshire Council advised to consider consulting with the Scottish Wildlife Trust – Stirling and Clackmannanshire Local Group Planning Volunteers Team.	See below.
Clackmannanshire Council Pre-Application response 19/07/2022	Clackmannanshire Council advises that while tracks are being built over peat it is important that restoration takes place at the same time (not afterwards). Also, floating tracks could be considered.	**Technical Appendix 3.1: Outline CEMP** and **Technical Appendix 10.2: Peat Management Plan** detail how excavated peat would be stored. Approximately 1.68km of the new access track is anticipated to be floating track.

	Clackmannanshire Council advises that a programme of peat restoration in another area as compensation for peat lost/degraded is considered.	**Technical Appendix 8.4: Outline Habitat Management Plan** details the proposed habitat restoration, compensation and enhancement. **Figure 8.4.1** shows the locations of proposed restoration areas.
SWT Stirling and Clackmannanshire Local Group Planning Volunteers Team	SWT states that the site of the proposed development contains most or all of the Alva Moss Candidate Local Nature Conservation Site (LNCS) and while not a Statutory Designation, due regard should be paid to LNCSs as per NPF4 Policy 4.	**Technical Appendix 8.4: Outline Habitat Management Plan** has considered Alva Moss, and proposed peatland restoration areas (including within Alva Moss) are shown on **Figure 8.4.1.**
	SWT acknowledge that NatureScot has been looking into the feasibility of peatland restoration on Alva Moss, concluding that it is feasible. SWT state that this consideration should be an important element of the EIA, including the interaction between the Proposed Development and the peatlands/peatland restoration of Alva Moss.	**Technical Appendix 8.4: Outline Habitat Management Plan** details the peatland restoration proposed, including that within the candidate Alva Moss LNCS.
	SWT state that there are historic records on the Site of mountain hare, which should be considered within the EIA.	Mountain hare have been considered within this ecological impact assessment, as detailed in paragraphs 8.201 to 8.203 and 8.246 to 8.247.
	SWT state that a small population of brown trout are known to be present in the high feeder waters of the River Devron, which should be considered within the EIA and that proposals should avoid a negative impact on water quality through protection of watercourses.	Fish have been considered within this ecological impact assessment (see paragraphs 8.194 to 8.197). Mitigation measures (including a 50m watercourse standoff, are detailed in the Assessment of Effects section below.
	SWT state that there are records of small pearl bordered fritillary butterflies within 5km of the centre of Alva Moss LNCS, and this species should be included within the ecology section of the EIA.	Invertebrates are not likely to be significantly impacted by the development (see paragraph 8.10) and therefore not described in detail in this Chapter. However, they are considered to be a component of biodiversity and the proposed habitat enhancements within **Technical Appendix 8.4: Outline Habitat Management Plan** will provide benefits to invertebrates through reduced grazing pressure in upland mosaic habitats.
RSPB 10/04/23	RSPB highlighted that the Scoping report states that Policies 1, 2 and 11 are to be considered. RSPB advised that equal weight should be given	**Chapter 9: Ornithology** contains full details of potential impacts on birds.

	to Policy 3 – Biodiversity, in particular policy 3(b). They requested that adequate information is provided which evidences how this Policy will be satisfied.	Proposed restoration, compensation and enhancement measures relating to biodiversity are detailed in paragraphs 8.228 to 8.232, with full details provided within **Technical Appendix 8.4: Outline Habitat Management Plan**.
	The RSPB states that they expect the HMP to include proposals for mitigation, compensation and enhancement of habitats and species on site and discuss opportunities for development and enhancement of wider Nature Networks.	The proposed mitigation, compensation and enhancement measures are detailed within paragraphs 8.228 to 8.232, with full details provided in **Technical Appendix 8.4: Outline Habitat Management Plan**.
Friends of the Ochils 21/04/2023	Friends of the Ochils requests that Craighead Windfarm adjacent to the proposed Brunt Hill Windfarm is taken into account.	Craighead Windfarm would not lead to cumulative effects on any important ecological features, and has therefore been scoped out as per the assessment methodology section.
	Friends of the Ochils requested an analysis of peat restoration on the carbon balance. They noted that Alva Moss was demonstrated as suitable for peat restoration through a feasibility study conducted by NatureScot Peatland Action. Friends of the Ochils request an analysis of the impact of the proposed windfarm on peat restoration across the site. They note that if peat restoration cannot go ahead due to the proposed development, the payback time will be longer than if peat restoration can proceed, and that no matter the outcome of the application, peat restoration requires to be taken into account in any carbon assessment within the EIA.	Analysis of peat restoration on the carbon balance can be found within **Technical Appendix 14.1: Carbon Calculator**. Details of peat depth across the site (including Alva Moss) are included within **Technical Appendix 10.2: Peat Management Plan.** Alva Moss has been considered within **Technical Appendix 8.4: Outline Habitat Management Plan** and proposed areas of peatland restoration (including those within Alva Moss) are shown on **Figure 8.4.1**.

Scottish Forestry 24/04/24	Scottish Forestry state that as woodland removal is proposed for development, the relevant Environmental Impact Assessment (EIA) regulations will apply and the EIA Report should justify and provide evidence for the need for woodland removal and the associated mitigation measures.	**Technical Appendix 3.2: Forestry** describes the existing forestry and woodland baseline, quantifies impact on forestry assets and provides recommendations for the development of forestry impact mitigation. Proposed mitigation, compensation and enhancement measures are detailed within paragraphs 8.228 to 8.232, with full details provided in **Technical Appendix 8.4: Outline Habitat Management Plan**.
	Scottish Forestry stated that trees felled must be replanted on-site or compensated for via off site planting, and that these areas should be clearly identified in a plan.	The proposed mitigation, compensation and enhancement measures are detailed within paragraphs 8.228 to 8.232, with full details provided in **Technical Appendix 8.4: Outline Habitat Management Plan**.
	Scottish Forestry highlighted that the project should consider the potential cumulative impact of existing and the proposed development on the forest resource in respect to the local and regional context. In particular, consideration must be given to the implication of felling operations on such things as habitat connectivity and biodiversity. A long term forest plan should be provided as part of the EIA Report (as a technical appendix for context) to give a strategic vision to deliver environmental and social benefits through sustainable forest management and describes the major forest operations over a 20 years period.	A forestry report has been produced, detailing the impacts of the proposed felling and providing information on compensatory planting. See **Technical Appendix 3.2: Forestry** for full details.
SEPA 01/05/23	SEPA recognised that UKHab and NVC surveys had been partially carried out for site and highlighted that this would be required for all areas of the site where infrastructure is proposed.	SLR undertook detailed habitat surveys using NVC, and UKHab for all habitats, the details of the survey are provided in **Technical Appendix 8.1.**
	SEPA recognised UKHab as an alternative to Phase 1 habitat surveys but required NVC to be used for detailed surveys, rather than converting UKHab data.	SLR undertook detailed habitat surveys using NVC, and UKHab for all habitats, the details of the survey are provided in **Technical Appendix 8.1.**
	SEPA requested the submission of a Peat Management Plan to demonstrate that the application accords with the requirements of NPF4 Policy 5, and that the submission should include a map of peat depths.	A Peat Management Plan (PMP) has been produced for the proposed development, see **Technical Appendix 10.2: Peat Management Plan**.

	SEPA request that a map demonstrating that all GWDTE are outwith a 100m radius of all excavations shallower than 1m and outwith 250m of all excavations deeper than 1m.	**Figure 10.8: GWDTEs** of **Chapter 10: Hydrology, Hydrogeology and Geology** shows the location of GWDTE in relation to infrastructure.
	SEPA stated that clear felling may be acceptable in cases where planting took place on deep peat and it is proposed through a HMP to reinstate peat-forming habitats. SEPA request that a plan be included showing how and where any timber residues will be re-used for ecological benefit, supported by a Habitat Management Plan.	The proposed mitigation, compensation and enhancement measures are detailed within paragraphs 8.228 to 8.232. Reptile hibernacula creation will utilise timber won during habitat clearance, as detailed in the Assessment of Effects section below and in **Technical Appendix 8.4: Outline Habitat Management Plan**.
Perth and Kinross Council (PKC) 19/05/23	PKC agrees with the scope of surveys outlined within the Scoping Report, subject to further information arising from field surveys and desk study to be carried out.	-
	PKC advises that biodiversity opportunities and intentions should be considered and discussed under the 'Ecology' heading.	**Technical Appendix 8.4: Outline Habitat Management Plan** details the proposed mitigation, compensation and enhancement measures.

Additional Consultation

8.6 In addition to the formal scoping process, further consultation was undertaken in June 2024 with the SWT Planning Volunteers Team, Stirling and Clackmannanshire Local Group. This consultation related to the provision of information regarding the candidate Alva Moss LNCS.

8.7 Additional consultation was also undertaken with NatureScot in December 2024, relating to the candidate Alva Moss candidate LNCS and opportunities for peatland restoration within the OHMP. SLR outlined proposed peatland restoration measures and requested further information regarding Alva Moss candidate LNCS, which was provided. Additionally, SLR requested further information with regards to Craigleith and Myreton SSSI which was not provided.

Effects Scoped Out

8.8 This assessment concentrates on the effects of construction and operation of the proposed development upon important ecological features (impacts during decommissioning have not been assessed, however it is not considered to result in any additional impacts than those considered during the assessment of effects during the construction phase – see **Chapter 6: Scoping and Consultation**). Ecological features have been scoped out of detailed assessment where there is no potential for significant effects upon the ecological receptor or where the ecological features is not considered important at a local or greater level (See **Table 8-6** and **Table 8-9**), is not a GWDTE and/or is not subject to legal or policy protection.

8.9 In accordance with the assessment methodology used (see paragraphs 8.31 to 8.50) habitats which are considered to be of relatively low ecological value (see **Table 8-6)** or would not be impacted upon by the proposed development have been scoped out of the detailed assessment. These habitats are as follows:

- ancient woodland, inland rock outcrop and scree habitat, non cereal crops, standing open water and canals, upland transition mires and quaking bogs, fen march and swamp, hedgerow and line of trees – these habitats will not be impacted directly, indirectly or cumulatively by the proposed development; and
- other cereal crops, gorse scrub, grassland habitats (other than upland acid grassland) and bracken – these habitats are of low ecological value. However, they are considered overall as part of the impact assessment of biodiversity.

8.10 Based on the desk study produced for the proposed development (**Annex A** of **Technical Appendix 8.2**) and consideration of the extent and nature of the proposed development, effects on the following species or species groups have been scoped out of the assessment. For more information on each species/group, please refer to **Table 8-9**.

- Invertebrates: NatureScot (2024a) general pre-application / scoping advice to developers for onshore wind farms state that: *"there are some species that, with standard mitigation, are unlikely to experience a significant environmental effect during construction/ operation of onshore wind farms (e.g. moths and other invertebrates, and amphibians). Such species will not require surveys to inform the EIA. Instead, we advise that you should be able to apply mitigation during construction to avoid committing an offence".* Due to the area of land take being small in comparison with the availability of similar habitats in the wider area, significant negative effects on invertebrate species are not considered likely, therefore invertebrates have been scoped out of further assessment. Invertebrates have, however, been considered overall as part of the assessment of potential impacts on biodiversity, and within **Technical Appendix 8.4: Outline Habitat Management Plan**;
- Brown hare (*Lepus europaeus*) no records of brown hare were returned during the desk study data search, and habitats within the site are considered suboptimal for this species. As such, effects on brown hare were scoped out of this assessment;
- Hedgehog (*Erinaceus europaeus*) a single record of hedgehog was returned during the desk study data search, however the habitats within the site are considered suboptimal for this species. As such, effects on hedgehog were scoped out of this assessment;
- Beaver (*Castor fiber*) have been scoped out of assessment. Although known to be present in the wider area, there is a lack of suitable habitat on site and, as such, there is no potential for significant negative effects; and
- Water voles (*Arvicola amphibius*) have been scoped out of assessment due to the lack of suitable habitat present (see **Technical Appendix 8.2**) and lack of historical records returned via the desk study data search.

Legislation, Guidance and Policy

8.11 Full details of the legislative and technical guidance can be found in **Technical Appendix 4.1: Legislation, Planning Policy and Guidance**.

Policy Context

8.12 **Table 8-2** presents the policy guidance relevant to the assessment and details how these requirements have been considered within the context of this chapter.

Table 8-2 Summary of national and local policy relevant to ecological impact assessment

Summary of Relevant Policy	Consideration in the EIA
National Planning Framework 4 (NPF4) (Scottish Government, 2023): • Policy 3 (Biodiversity) intends to protect biodiversity, reverse biodiversity loss, deliver positive effects and strengthen nature networks. • Policy 4 (Natural Places) intends to protect, restore and enhance natural assets making best use of nature-based solutions. • Policy 5 (Soils) intends to protect carbon-rich soils, restore peatlands and minimise disturbance to soils from development. • Policy 6 (Forestry, Woodland and Trees) intends to protect and expand forests, woodland and trees. Policy 11 (Energy) intends to encourage, promote and facilitate all forms of renewable energy development. Policy 20 (Blue and Green Infrastructure) intends to protect and enhance blue and green infrastructure and their networks.	Embedded and good practice mitigation measures that would be applied to reduce potential impacts and effects on ecological features are outlined in the Assessment of Effects section below. Habitat compensation and biodiversity creation and/or enhancement opportunities, and how these would be delivered, are also summarised in the Assessment of Effects section below, with full details provided in **Technical Appendix 8.4: Outline Habitat Management Plan**. The Outline Habitat Management Plan will be developed into a detailed Habitat Management Plan for approval by Perth and Kinross and Clackmannanshire councils, in consultation with relevant stakeholders, should the application be granted consent.
The Scottish Biodiversity Strategy to 2045: The Scottish Biodiversity Strategy was developed around the ambition for Scotland to restore and regenerate biodiversity across the country by 2045, driving a sustainable economy and supporting thriving communities for which nature stewardship is a key focus. To achieve this, the Strategy highlights six main objectives: 1. Accelerate restoration and regeneration; 2. Protect nature on land and at sea, across and beyond protected areas; 3. Embed nature positive farming, fishery and forestry; 4. Protect and support the recovery of vulnerable and important species and habitats; 5. Invest in nature; and 6. Take action on indirect drivers of biodiversity loss.	
Tayside Local Biodiversity Action Plan (LBAP)	Priority habitats and species listed within the Tayside LBAP have been considered within this assessment in the Baseline Condition section below and in **Technical Appendices 8.1, 8.2** and **8.5**.

Clackmannanshire Council, Biodiversity Duty Report	Priority habitats and species listed within the Tayside LBAP have been considered within this assessment in the Baseline Condition section below and in **Technical Appendices 8.1, 8.2** and **8.5**.
Scottish Biodiversity List (SBL)	Terrestrial habitats and species listed within the SBL that occur (or have potential to occur) within the site are summarised in the Baseline Condition section below with full details provided in **Technical Appendix 8.1, 8.2** and **8.5**. Mitigation to reduce potential impacts to such habitats and species is outlined in the Assessment of Effect section below, with compensation and enhancement measures also detailed in that section as well as in **Technical Appendix 8.4: Outline Habitat Management Plan**.

Approach and Methods

8.13 This Chapter takes an appropriate and topic-specific approach to assessment of the proposed development within the parameters identified in **Table 3-1** of **Chapter 3: Description of Development.** This Chapter provides a worst-case assessment for biodiversity (excluding birds, see **Chapter 9**) and presents environmental information for consultees and the decision makers to comment on and determine the application within the parameters of the proposed development.

Study Area

8.14 The study area used for the EIA varies according to the ecological receptor in question, based on relevant good practice guidance. The study area used for habitats and vegetation is shown on **Figure 8.1.2** and **Figure 8.1.3** within **Technical Appendix 8.1** and includes all areas within the Site and an associated buffer zone that ensures coverage of wetland habitats within 250m of all proposed turbines and borrow pits and 100m from all other proposed infrastructure, including the access route from the A9. SEPA guidelines (SEPA, 2024) stipulate survey of a 250m buffer from excavations deeper than 1m, and a 100m buffer for excavations of less than 1m.

8.15 The study areas for relevant faunal species are summarised in the Approach and Methods section below and are described in more detail within **Technical Appendices 8.2** to **8.5**. For ease of reference, the study areas included all suitable habitat within the site including all areas within the site, as well as watercourses within 250m of proposed infrastructure (where this lies outside of the application boundary) for mammals and the Fish Habitat Assessment, and the site and 200m plus rotor radius from proposed turbines (where this lies outside the site) for bats.

Information and Data Sources

8.16 An ecological desk study was undertaken to collate available ecological information in relation to the proposed development and surrounding environment (see **Annex A** of **Technical Appendix 8.2)**. Desk study data relating to protected and notable species were acquired from the following sources:

- The Wildlife Information Centre (TWIC) was commissioned in June 2021 to provide data relating to records of protected and notable species within the site and a 10km of it for all bat species, and a 2km radius for all other protected/notable species (limited to records within the last 15 years);
- Multi-Agency Geographic Information for the Countryside (MAGIC): Information relating to statutory designated nature conservation sites within an approximate 5km radius of the centre point of the site for terrestrial mammals, extended to 10km for sites with bat interests;
- NBN Atlas: Information relating to records of protected and notable species within the site and a 2km (limited to data licenced for commercial use);
- NatureScot's Carbon and Peatland 2016 Map (SNH, 2016) was reviewed, which gives a value to indicate the likely presence of carbon rich soils, deep peat and priority peatland habitat for the site, at a coarse scale across Scotland; and
- Ancient Woodland Inventory Scotland (NatureScot, 2000): A search was made for woodlands listed on the Ancient Woodland Inventory within a 2km radius of site.

8.17 A search of the Clackmannanshire Council, and Perth and Kinross Council online planning portals for relevant ecological reports submitted for other nearby developments within 10km of the site was made, and where relevant information could be obtained, these reports were reviewed for relevant ecological information:

- Wind Prospect (2011) Burnfoot Hill Wind Farm Extension (Burnfoot North)- Environmental Statement;
- Green Cat Renewables (2015) Strathallan Wind Farm – Environmental Statement;
- Wind Prospect (2017a) Burnfoot East Wind Farm – Environmental Statement; and
- Wind Prospect (2017b) Rhodders Wind Farm – Environmental Statement.

Field Surveys

8.18 The scope of the surveys described in paragraphs 8.24 to 8.28 was agreed with NatureScot as part of the Scoping process. The Windburn Wind Farm Scoping Report (SLR, 2023) originally proposed to scope out bat activity surveys, due to the results of previous surveys undertaken within some of the site. However, due to the potential time it would take to receive Scoping responses, the decision was taken to undertake bat activity surveys on a precautionary basis, as per paragraph 8.25. The methodologies for the survey work are briefly outlined in Approach and Methods sections below. For full methodologies please refer to **Technical Appendices 8.1** to **8.5.**

Vegetation Surveys

UK Habitat Classification Survey

8.19 A UK Hab Classification survey was undertaken in July and September 2023 (see **Technical Appendix 8.1**), the survey followed methods described in the UKHab user manual (Butcher *et al*, 2023). The survey aimed to identify habitats of conservation concern, protected or notable and priority plant species and invasive/non-native species. Target notes were taken to describe any important ecological features such as flushes, bog pools and any areas of habitat subject to degradation or disturbance. Surveys were carried out within the site and buffers detailed within paragraphs 8.14 to 8.15. The survey areas are shown on **Figure 8.1.2** of **Technical Appendix 8.1.**

National Vegetation Classification Survey

8.20 An NVC survey was undertaken simultaneously with the UKHab survey in July and September 2023 using the NVC system (Rodwell, 1991) and in accordance with survey guidelines (Rodwell, 2006) (see **Technical Appendix 8.1**).

8.21 Following the NVC survey, potential GWDTEs were identified in terms of their high, moderate or low potential groundwater dependence, based on SEPA (2024). A more detailed assessment of the likely groundwater dependence of these communities was then undertaken as part of the hydrogeology assessment (**Chapter 10: Hydrology, Hydrogeology and Geology**).

Protected Species

Mammals

8.22 A walkover survey for protected and priority species (focused on otter (*Lutra lutra*), water vole, red squirrel (*Sciurus vulgaris*), badger (*Meles meles*) and other protected and priority species) was undertaken in July and August 2023. The species specifically targeted were based on the likelihood of occurrence of each species, ascertained from known species distribution and habitat suitability.

8.23 Surveys followed standard methodologies in place at the time of survey, e.g., Chanin (2003), Ward *et al*. (1994), Neal and Cheesman (1996) and Velander (1983). Surveys were carried out within all suitable habitat on site and within 50m of the application boundary and 250m upstream and/or downstream of all accessible watercourses for otter in line with relevant guidance (e.g. NatureScot, 2024b). The survey areas are shown in **Figure 8.2.1** of **Technical Appendix 8.2**.

Bats

8.24 A Daytime Bat Walkover (DBW) was undertaken to assess the suitability of habitats within the site and surrounding area for commuting and foraging bats was carried out through a review of aerial photographs, maps and target notes made during a walkover survey for protected and priority species during 2023 (as described in paragraph 8.22). During the appraisal, habitats within the site and surrounding area were assessed against specific criteria detailed within guidance of relevance to the survey period (Collins, 2023) in order to assign a 'level' of commuting and foraging suitability (i.e. High, Moderate, or Low).

8.25 A Ground Level Tree Assessment (GLTA) survey was undertaken to assess the bat roosting potential of trees that have the potential to be impacted by the proposed development. During the GLTA, trees were assessed from ground level for the presence of any potential roost features (PRFs), against the following suitability criteria (Collins, 2023):

- none: either no PRFs in tree or highly unlikely to be any;
- FAR: further assessment required to establish if PRFs are present in the tree; and
- PRF: a tree with at least one PRF present.

8.26 Where trees were categorised as 'PRF', where possible, they were further categorised as follows:

- PRF-I: PRF only suitable for individual bats or very small numbers of bats either due to size or lack of suitable surrounding habitats; and

- PRF-M: PRF suitable for multiple bats and may therefore be used by a maternity colony.

8.27 Based on the proposed 15 turbine layout provided by the Client at the scoping stage, a programme of bat activity surveys using full spectrum static bat detector units (Wildlife Acoustics SM4BATFS) was carried out at eleven turbine locations, plus two additional locations situated between turbines, during the 2023 active bat season (extending from April to mid-September in Scotland). A total of 13 static detectors were therefore deployed following BCT (Collins, 2023) and NatureScot (2021) guidance (see **Figure 8.5.1** of the **Technical Appendix 8.5** for detector locations).

8.28 Full details of the bat survey methodology can be found in **Technical Appendix 8.5**.

Fish

8.29 A fish habitat assessment was undertaken by Mhor Environmental Ltd in October 2023 to assess the potential for fish species of conservation concern (e.g. salmonids and European eel) to be present in watercourses within the study area. The survey was based on an adapted version of the methodologies developed by Hendry and Cragg-Hine (1997) and the Scottish Fisheries Co-ordination Centre (SFCC) Habitat Survey Methodology (SFCC, 2007). Full details can be found in **Technical Appendix 8.3**.

Incidental Sightings

8.30 During all ecological surveys, incidental sightings of other notable and priority fauna were also recorded.

Assessment Methods

8.31 The CIEEM Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine (CIEEM, 2018) (henceforth referred to as the CIEEM guidelines) form the basis of the impact assessment presented in this Chapter. The CIEEM guidelines have been endorsed by NatureScot.

Important Ecological Features

8.32 In accordance with the CIEEM guidelines, only ecological features (habitats, species, ecosystems and their functions/processes) which are considered to be important and potentially affected by the proposed development should be subject to detailed assessment. It is not necessary to carry out detailed assessment of features that are sufficiently widespread, unthreatened and resilient to impacts from the proposed development and will remain viable and sustainable. For this assessment, effects have been assessed for features of Local value or greater, plus any additional features subject to legal and policy protection. The Biodiversity Net Gain (BNG) – Good Practice Principles (CIRIA, 2019) require sufficient information to be retained on features scoped out of a detailed assessment to include them in a BNG design (if required). As BNG is not a statutory requirement in Scotland, such features (those scoped out and/or of less than local value) are instead considered in the overall assessment of the proposed development on biodiversity and considered within the Outline HMP.

8.33 Ecological features should be considered within a defined geographical context. For this assessment the following geographic frame of reference has been used:

- International;

- National (i.e. Scotland);
- Regional (i.e. Clackmannanshire/ Perthshire);
- Natural Heritage Zone (NHZ) (i.e. Eastern Lowlands);
- Local (i.e. within approximately 5km); and
- Less than local.

8.34 For designated sites, importance should reflect the geographical context of the designation. For example, a Site of Special Scientific Interest (SSSI) would normally be considered nationally important.

8.35 In accordance with CIEEM guidelines, the value of habitats has been measured against published selection criteria and other relevant data where available. Examples of relevant lists of criteria include those published in The Habitats Directive: selection of Special Areas of Conservation in the UK (JNCC, 2009), Guidelines for the Selection of SSSIs (JNCC, 2013) and Guidance on Establishing and Managing Local Nature Conservation Site Systems in Scotland (NatureScot, 2024c). For degraded habitats (e.g. peatland habitats) CIEEM guidelines state that the potential value of such habitats should be considered, including its possible contribution to conservation objectives, and emphasise that it is essential that the importance of these habitats are not underestimated where there is potential for restoration.

8.36 In assigning a level of value to a species population, it is necessary to consider its distribution and status, including a consideration of trends based on available historical records. Reference has therefore been made to published lists where available. Examples of relevant lists and criteria include: species of European conservation importance (as listed on Annexes II, IV and V of the Habitats Directive); species considered to be of principal importance for biodiversity in Scotland as listed on the SBL; and priority species listed on Tayside BAP and Clackmannanshire BAP.

8.37 The *Ecobat* online tool (Lintott et al, 2018) was used to assess the relative levels of bat activity at the site in the context of bat survey information collected from similar areas (within 200km of the site) at the same time of year (within 30 days) and in comparable weather conditions. *Ecobat* generates a percentile rank (and associated confidence limits) for each night where bat activity was recorded against a reference range. For example, data reported as being within the 80th percentile means that 80% of the nights within the reference range had less than or equal to the number of bat passes as the night being analysed. The guidelines (NatureScot, 2021) then split bat activity levels into activity categories using the percentiles as follows:

- 0-20th percentile – Low;
- 21st – 40th percentile – Low to Moderate;
- 41st – 60th percentile – Moderate;
- 61st – 80th percentile – Moderate to High; and
- 81st – 100th percentile – High.

8.38 The output from *Ecobat* was considered in assessing the value of bat populations recorded at the site.

Impact Assessment

8.39 The ecological impact assessment process involves the following steps:

- identifying and characterising impacts;
- incorporating measures to avoid and mitigate (reduce) these impacts;
- assessing the significance of any residual effects after mitigation;
- identifying appropriate compensation measures to offset significant residual effects (if required); and
- identifying opportunities for ecological enhancement.

8.40 When describing ecological impacts, reference has been made to the following characteristics, as appropriate:

- positive or negative;
- extent;
- magnitude;
- duration;
- timing;
- frequency; and
- reversibility.

8.41 Both direct and indirect impacts are considered. Direct ecological impacts are changes that are directly attributable to a defined action, e.g., the physical loss of habitat during the construction process. Indirect ecological impacts are attributable to an action, but which affect ecological resources through effects on an intermediary ecosystem, process, or receptor, e.g., the creation of access tracks which cause hydrological changes, which, in the absence of mitigation, could lead to the drying out of adjacent peatland habitats.

Significance of Effect

8.42 For the purposes of this assessment, in accordance with CIEEM guidelines, a 'significant effect' is defined as an effect that either supports or undermines biodiversity conservation objectives for 'important ecological features' or biodiversity in general. Conservation objectives may be specific (e.g. for a designated site) or broad (e.g. national/local nature conservation policy). Effects can be considered significant at a wide range of scales from international to less than local (paragraph 8.33). For example, a significant effect on a SSSI is likely to be of national significance while a significant effect on a regionally important population of a species is likely to be of regional significance.

8.43 Consideration of conservation status is important for evaluating the effects of impacts on individual habitats and species and assessing their significance:

- for habitats, conservation status is determined by the sum of the influences acting on the habitat that may affect its extent, structure and functions, as well as its distribution and its typical species within a given geographical area; and
- for species, conservation status is determined by the sum of influences acting on the species concerned that may affect its abundance and distribution within a given geographical area.

Avoidance, Mitigation, Compensation and Enhancement

8.44 A sequential process has been adopted to avoid, mitigate, and compensate for ecological impacts. This is often referred to as the 'mitigation hierarchy'. Awareness has also been paid to the mitigation hierarchy as provided by NPF4 of avoid, minimise, restore and offset.

8.45 It is important for the EIA to clearly differentiate between avoidance, mitigation, compensation and enhancement and these terms are defined here as follows:

- avoidance is used where an impact has been avoided, e.g., through changes in scheme design. This is normally dealt with at the project design stage and is therefore addressed in **Chapter 2: Site Description and Design Evolution.** Avoidance is considered embedded mitigation for the purposes of this assessment;
- mitigation is used to refer to measures to reduce or remedy a specific negative impact *in situ* e.g. using fencing to protect sensitive areas during construction. Mitigation measures may be located within or outwith the project site, depending on circumstances;
- compensation describes measures taken to offset the loss of, or permanent damage to ecological features, not addressed through mitigation (i.e. residual effects). Compensation measures should be similar to the ecological feature lost or damaged;
- enhancement is the provision of new benefits for biodiversity that are additional to those provided as part of mitigation or compensation measures (although they can be complementary) and result in a net benefit to biodiversity.

Cumulative Effects

8.46 Cumulative effects can result from individually insignificant but collectively significant actions taking place over a period of time or concentrated in a particular location. The potential for cumulative effects with other development proposals has been assessed here.

8.47 For aquatic features (including otter) potential cumulative effects are only likely to be significant for other developments located within the same hydrological sub-catchments.

8.48 For habitats, potential cumulative effects are only likely to be significant for other developments within the application boundary or the same hydrological catchment.

8.49 For (non-avian) terrestrial features potential cumulative effects are only likely where other developments are located within the regular range of more mobile species, e.g., bats. Cumulative effects on bats are likely to be limited to other wind farm developments and as such, for bats, the cumulative assessment has been restricted to other developments within 10km, given that foraging distances for bat species most likely to be found in Scotland are less than 5km (Collins, 2023).

8.50 The assessment of cumulative effects includes operational projects, projects under construction, consented projects which are not yet under construction, and projects for which planning applications have been submitted.

Assumptions, Limitation and Confidence

8.51 Presented here is a summary of limitations detected during the surveys; further details are presented in **Technical Appendices 8.1** to **8.5**. It should be noted that none of these limitations are considered likely to significantly affect the assessment.

8.52 The UKHab Minimum Mapping Unit (MMU) for the field survey was 400m^2, which may result in small areas of notable habitat (e.g. Priority Habitat) being excluded from UKHab output maps. In order to ensure all areas of notable habitat were effectively captured, point features and target notes detailing the location of each habitat, key species, and general condition were recorded during the field survey.

8.53 In the area to the north of the A9 road and in some of the conifer plantation areas to the north west of Sherrifmuir Road, some habitats were bounded by fencing which could not be crossed. These habitats were therefore surveyed from the boundaries using binoculars and appropriate assumptions were made. However, despite this the habitat survey results as detailed in **Technical Appendix 8.1** are considered to be an accurate reflection of the site.

8.54 Heavy rain showers occurred during the morning of the first protected mammal survey and watercourses on the site may have been high, however, this is not considered to be a significant limitation given surveys on these dates was focused on field signs within terrestrial habitats.

8.55 A section of Carim Burn in the north of the site was partially inaccessible due to deer fencing. Accessible tributaries of this watercourse were deemed unlikely to be suitable for otter or water vole, therefore the impact of limited access to this particular watercourse is thought to be minimal.

8.56 At several points across the site, small sections of various watercourses were inaccessible due to vegetation cover. This limitation is not considered significant as in each case the watercourse within the survey area was accessible and could be clearly viewed.

8.57 Two trees in close proximity to the new access track section close to the A9 were not able to be surveyed during the GLTA due to access issues, these trees therefore cannot be ruled out as having roosting potential. These trees would be included within the pre-construction surveys detailed in paragraphs 8.152-8.153, and therefore this limitation is not considered to effect the results of the assessment within this Chapter.

8.58 Due to an equipment malfunction, no bat activity data was collected at static detector location L8 during the summer survey period (see **Figure 8.5.1** of **Technical Appendix 8.5**). Despite this limitation, it is considered that data collected from the remaining 12 static detector units during this time period provide sufficient coverage and a suitable representation of bat activity data within the study area.

8.59 Due to technical issues associated with the weather station, weather data for the spring bat survey period, and temperature measurements for the summer bat survey period were obtained via the ‘Menstrie weather’ observation site on Met Office Weather Observation Website (WOW) (Met Office, 2025). While the altitude difference between the site and Menstrie Weather observation site is approximately 500m, the station is located only 5km southwest of the site. Therefore, data provided through the Met Office WOW is considered adequate for providing an indication of conditions likely to be experienced on the site during these time periods.

8.60 Limitations associated with the use of the Ecobat analysis tool have been identified. For example, the outputs of the Ecobat tool are considered in the context of wider data collection from third parties and are not accepted as a rigorous appraisal method in isolation. The assessment of effects on bats contained within this chapter draws from other information sources and therefore the limitations associated with Ecobat are not considered likely to significantly affect the assessment.

8.61 The desk study data search is limited to records publicly available for commercial use and therefore is unlikely to be comprehensive for some habitats and species. This is not considered to be a significant limitation given that the desk study exercise is used to inform survey scope and provide information on historical use of the site and surrounding area.

8.62 An ecological survey provides only a 'snapshot' of the conditions prevailing at the time of survey. Whilst it is considered unlikely that any significant evidence of protected or otherwise notable species were overlooked during the survey work, due to the nature of the subjects of ecological surveys, it is feasible that species that use the site may not have been recorded by virtue of their seasonality, cryptic behaviour, habit, or random chance. This is a standard limitation that is common to all ecological survey work. It is considered unlikely, however, that additional surveys of the Site would materially alter the conclusions of the baseline survey work. Pre-construction surveys are proposed (see paragraphs 8.152-8.153) which intend to address any issues resulting from future changes in the distribution of species within the site.

Baseline Conditions

Current Baseline

Desk Study

8.63 Initial desk study data referred to in the Scoping Report (SLR, 2023) has been updated to account for changes to the proposed development boundary. The updated desk study report can be found within **Annex A** of **Technical Appendix 8.2**.

Statutory Designated Sites

8.64 There are no statutory designated sites within the application boundary. There are nineteen sites designated for terrestrial ecology features within 10km of the site boundary, as detailed in **Table 8-3** and illustrated on **Figure 8.1.**

Table 8-3: Statutory Designated Sites within 10km

Site Name	Desig-nation	Distance from site boundary (km) and direction	Reasons for Designation (terrestrial ecology)	Evaluation
Shelforkie Moss	SAC	1.6 north	Active raised bog; degraded raised bog.	International
Carsebreck and Rhynd Lochs	SSSI	0.9 north	Hydromorphological mire range; raised bog.	National
Quoigs Meadow	SSSI	2.1 west	Spring fen.	National
Craig Leith and Myreton Hill	SSSI	2.1 west	Upland habitat assemblage; upland mixed ash woodland; sticky catchfly *Lychnis Viscaria;* Northern brown Argus *Aricia artaxerxes.*	National
Bog Wood and Meadow	SSSI	3.3 north east	Lowland grassland fen meadow and woodland scrub.	National
Gleneagles Mire	SSSI	3.5 north	Wetlands: basin fen.	National

Dollar Glen	SSSI	3.6 east	Beetle *Stenus glacialis;* subalpine calcareous grassland; subalpine flushes.	National
Gartmorn Dam	SSSI	6.6 south east	Freshwater habitat – eutrophic loch; open water transition fen.	National
	LNR			Local
Kippenrait Glen	SAC	7.0 south west	Mixed woodland on base-rich soils associated with rocky slopes.	International
	SSSI		Beetle assemblage, cranefly *Lipsothrix ecucullata;* upland mixed ash woodland.	National
Kincardine Castle Wood	SSSI	6.9 north east	Lowland mixed broadleaved woodland.	National
Firth of Forth	SSSI	6.8 south	Beetle assemblage; lowland neutral grassland; maritime cliff; mudflats; northern brown argus *Aricia artaxerxes;* Saline lagoon; saltmarsh; sand dunes; transition grassland; vascular plant assemblage.	National
Abbey Craig	SSSI	6.9 south west	Upland mixed ash woodland; beetle assemblage.	National
River Teith	SAC	8.4 south west	River lamprey *Lampetra fluviatilis*, brook lamprey *Lampetra planeri*, sea lamprey *Petromyzon marinus* and Atlantic salmon *Salmo salar*.	International
Linn Mill	SSSI	7.8 south east	Upland mixed ash woodland.	National
Damhead Wood	SSSI	7.6 south east	Wet woodland.	National
Wester Moss	SSSI	9.3 south west	Raised bog.	National
Back Burn Wood and Meadows	SSSI	9.6 east	Upland mixed ash woodland and lowland acid grassland.	National
Devon Gorge	SSSI	9.7 east	Upland mixed ash woodland.	National

Non-Statutory Sites

8.65 There is one non-statutory designated site, and three candidate[1] non-statutory designated sites within 2km of the site boundary. Two of these sites, Alva Moss and Upper Glendevon Reservoir, sit either wholly or partially within the site boundary (see **Figure 8.2**).

Table 8-4: Non-Statutory Designated Sites within 2km

Site Name	Designation	Distance from site boundary (km)	Site Conditions	Evaluation
Alva Moss	LNCS (candidate)	Within boundary	Class 1 peatland. Blanket *sphagnum* bog, mire and acid	National

[1] CIEEM guidelines state that where an undesignated site meets criteria for designation, this should be used to guide the assessment of importance. Therefore, candidate sites are included within the assessment of effects on designated sites in this chapter.

			grasslands with nationally and locally scarce plants such as cloudberry *Rubus chamaemorus* and mossy saxifrage *Saxifraga hypnoides*. Ancient woodland also covers the majority of the site.	
Upper Glendevon Reservoir	LNCS	Within boundary	Reservoir with bogs, Scots pine *Pinus sylvestris*.	Regional
Old Wharry Burn	LNCS (candidate)	1.8	Notable species present include: Heather *Calluna vulgaris*, Harebell *Campanula rotundifolia*, Grass-of Parnassus *Parnassia palustris*, Mossy Saxifrage *Saxifraga hypnoides*, Small Heath *Coenonympha pamphilus*, as well as numerous bird species.	Regional
Black Hill	LNCS (candidate)	1.9	Wooded summit in the western Ochill Hills.	Regional

8.66 There are eight parcels of ancient woodland both ancient (semi-natural origin) long-established woodland (plantation origin) within 2km of the site. The nearest of which is an unnamed woodland, which is located approximately 0.7km west of the nearest proposed infrastructure (access track) within the site.

8.67 NatureScot's Carbon and Peatland map (SNH, 2016) indicates the potential presence of Class 1 and Class 2 peatland within the application boundary. Class 1 and 2 peatland are considered Nationally important and of high conservation value (Class 1) or potentially high conservation value and restoration potential (Class 2). Site-specific information relating to carbon-rich soils and deep peat (including a peat depth survey) is contained within **Chapter 10: Hydrology, Hydrogeology and Geology**. A description and evaluation of the habitats present on site, based on field survey data, is contained in **Table 8-6**.

Existing Records of Protected and Notable Species

8.68 **Table 8-5** provides a summary of the results of the protected and priority species search (excluding marine and avian species) detailed in paragraphs 8.22 and 8.23 (see **Annex A** of **Technical Appendix 8.2** for full details).

Table 8-5: Existing Records of Protected and Notable Non-avian Species

Species	Status*	Notes
Invertebrates		
Northern brown argus	WCA, SBL, LBAP1, LBAP2	Various records within 2km of the site.
Small heath	SBL, LBAP1	Several records within 2km (2010-2015), including closest record at 0.4km (2013).

Fish		
Atlantic Salmon	HR Sch 3 (in freshwater only), SBL, SFF, LBAP1	Records within 2km of site, confirmed present within River Devon and downstream of Alva falls
Brown trout *Salmo trutta*		Records within 2km of site Trout fry and parr noted in inflow of Broich Burn to Upper Glendevon Reservoir (Wind Prospect, 2017a).
Sea trout *Salmo trutta*	SBL	Records within 2km of site.
European eel *Anguilla anguilla*	SBL	Records within 2km of site.
Lamprey sp.	SBL	Records within 2km of site.
Mammals		
Mountain hare *Lepus timidus*	WCA Sch 5, SBL	Two records within Alva Moss.
Beaver *Castor fiber*	HR Sch 2	Seven records of beaver within Allan Water (2020).
Red squirrel	WCA Sch 5,SBL, LBAP2	Three records within 2km of site. Squirrel feeding signs (stripped cones), unconfirmed if red or grey (Wind Prospect, 2017a).
Hedgehog	SBL	Single record of dead individual on road.
Otter	WCA Sch 5, HR sch 2, SBL, LBAP2	Single otter spraint found (Wind Prospect, 2017a).
Daubenton's *Myotis daubentonii*	HR Sch2, WCA Sch5, SBL, LBAP2	Single record (2024). Three records of Daubenton's in flight, most recent from 2016. Several records found 7.5km from site (2008-2016).
Common pipistrelle *Pipistrellus pipistrellus*	HR Sch2, WCA Sch5, SBL, LBAP2	Several records within 5.8km of site (2005-2008), closest record 3.8km (2008).
Soprano pipistrelle *Pipistrellus pygmaeus*	HR Sch2, WCA Sch5, SBL, LBAP2	One record (2000).
Pipistrelle (unspecified) Pipistrellus	HR Sch2, WCA Sch5, SBL, LBAP2	Two records recorded in 2008 at 3.8km and 3.9km of site. Two passed recorded during 2015 surveys (Wind Prospect, 2017a).
Roe deer (*Capreolus capreolus*)	Deer Scotland Act, 1996	Records within 2km of site.
**Table Key: Status*		

HR Sch2 = Included on Schedule 2 of the Conservation (Natural Habitats &c) Regulations 1994 (as amended in Scotland)

HR Sch3 = Included on Schedule 3 of the Conservation (Natural Habitats, &c.) Regulations 1004 (as amended in Scotland)

WCA Sch5 = Listed on Schedule 5 of the Wildlife and Countryside Act 1981 (as amended in Scotland)

SBL = listed on Scottish Biodiversity List (SBL) (Scottish Government, 2013)

SFF = Salmon spawning beds protected under the Salmon and Freshwater Fisheries (Consolidation) (Scotland) Act 2003

LBAP1 = Tayside Local Biodiversity Action Plan, 2nd Edition 2016-2026.

LBAP2 = Clackmannanshire Council Biodiversity Duty Report 2018-2020

Biodiversity Baseline

8.69 The Convention on Biological Diversity defines biodiversity as '*the variability amount living organisms from all sources including, inter alia, terrestrial, marine, and other aquatic ecosystems and the ecological complexes of which they are a part; this includes diversity within species, between species and ecosystems*' (European Commission, 2013).

8.70 The proposed development site is comprised predominantly of open habitats such as heathland, bog and acid grassland, with some woodland within sheltered glens and small plantations. An area of coniferous plantation woodland is present within the northern part of the site.

8.71 The habitats onsite support a variety of fauna, from invertebrates, reptiles and fish to mammals such as otter, bats and deer. The watercourses within the site provide suitable habitat for fish species such as Atlantic salmon and brown trout.

8.72 Roe deer have been recorded on site, through incidental sightings during the 2023 site surveys. It is likely that the site supports a relatively small population of deer at low density. No deer management plan is in place covering the site, and therefore deer grazing is likely to be an important factor for vegetation structure and composition. Sheep are also present on site in large numbers, with evidence of sheep grazing in grassland habitats.

8.73 Ecosystem services are '*the direct and indirect contributions ecosystems provide for human wellbeing and quality of life'* (NatureScot, 2024d). Highland Spring Ltd. source water within the wider area (exact locations are not presented as they are commercially sensitive) for drinking water and there are potential hydrological links between the proposed development site and the Highland Spring water abstraction infrastructure (see **Technical Appendix 10: Hydrology, Hydrogeology and Geology** for full details). The ecosystem within the site provides a range of provisioning, regulating, cultural and supporting ecosystem services, such as food and drink, materials, carbon storage, clean air, recreation, space for wildlife and photosynthesis.

Evaluation of Biodiversity

8.74 The site is approximately 1,474ha, with some diversity of habitats however approximately 784.77ha is peatland habitat. The degradation of blanket bog due to grazing, results in approximately 284.8ha of the habitats within the site being in a non-natural state (see **Table 8-6**). The habitat variety on site is limited to peatland, mire, non-native woodland, heathland, neutral grassland and watercourses. Some habitats vary in importance from national to less than local, and support mainly common plant species.

8.75 Peatland has been identified as a national conservation priority within Scotland's National Peatland Plan (SNPP) for its importance for biodiversity, water quality, and as a carbon

store (SNH, 2015). The blanket bog habitat within the site and the potential for restoration of degraded blanket bog is of high importance to mitigate the effects of climate change.

8.76 The site is considered to have a biodiversity value of national value due to the extent of blanket bog and degraded blanket bog with the potential for restoration, and its importance as a carbon sink, during the climate crisis.

Vegetation Baseline

Evaluation of Floral Features

8.77 Habitats identified under the UKHab classification and NVC communities within the study area are shown in **Table 8-6**.

8.78 Full details of habitat surveys carried out in 2023 can be found within **Technical Appendix 8.1**. The mapped results are shown on **Figures 8.1.1** and **8.1.2** within **Technical Appendix 8.1** (with proposed infrastructure locations overlain).

8.79 **Table 8-6** also summarises the conservation listing for each habitat/community and evaluates the importance of each habitat/community within the study area. For habitats recorded in mosaic, the mosaics have been evaluated based on their floristic composition, underlying substrate and occurrence within the study area.

8.80 No plant species listed on Schedule 8 of the Wildlife and Countryside Act 1981 were recorded. Additionally, no SBL higher plant, moss or liverwort priority species were recorded within the study area during the botanical surveys in 2023.

8.81 The Tayside BAP lists both '*upland heath'* and '*blanket bog'* as priority habitats, which make up the main habitats contained within the site.

Table 8-6: Evaluation of UKHab Habitats and NVC Communities present within the Study Area

UK Habitat Type	Area (ha)	Conservation Listing*	NVC Community Name	Likely Groundwater Dependency	Description and Reason for Evaluation	Evaluation
g1b6 Other Upland Acid Grassland	640.15	LBAP1	U4 *Festuca ovina-Agrostis capillaris-Galium* saxatile grassland	-	Acid grassland occurred in large areas throughout the upland part of the site, often in mosaic with blanket bog. The habitat likely represents areas that have degraded from blanket bog or heath. Acid grasslands on the site are species poor, often with high dominance of mat-grass *Nardus strictus* (U5 communities), heath-rush *Juncus squarrosus* (U6 communities) or with high cover of pleurocarp mosses and low species diversity (U4 communities). While the above habitats are in poor condition on site, there is potential to improve the habitats through grazing management. These habitats have therefore been assessed as being of local value.	Local
			U5 *Nardus stricta-Galium saxatile* grassland	-		
			U6 *Juncus squarrosus-Festuca ovina* grassland	Moderate		
			M23 *Juncus effusus/acutiflorus-Galium palustre* rush-pasture	High	Damp, rushy areas are common across the site, where ground or surface water form damp runs though the acid grassland areas or along existing waterways. These areas are generally species poor with acidic understory and do not represent high value biodiversity. Due to the poor species diversity these areas have been assessed as being of less than local value.	Less than Local
			M25 *Molinia caerulea-Potentilla erecta* mire	-	There are a few areas dominated by purple moor-grass *Molinia caerulea* across the site. These areas are generally species-poor with a	Local

UK Habitat Type	Area (ha)	Conservation Listing*	NVC Community Name	Likely Groundwater Dependency	Description and Reason for Evaluation	Evaluation
					couple of acid grassland species in the ground layer, and do not represent high value biodiversity. While these habitats are species-poor on site, there is potential to improve the habitats through grazing management. The habitats have therefore been assessed as being of local value.	
g1c Bracken	28.66	-	U20 *Pteridium aquilinum-Galium saxatile* community	-	Bracken dominated stands were found along some of the watercourses on site. This habitat is generally considered to have limited ecological value, with low species diversity and limited value to wildlife. Given the poor species-richness and low value to wildlife, this area has been assessed as being of less than local value.	Less than Local
g3c Other Neutral Grassland	101.14	LBAP1	MG2 *Arrhenatherum elatius-Filipendula ulmaria* tall-herb grassland	-	Some neutral grassland areas dominated by tall herbs were recorded along the verges of the public road and in the enclosed grazed areas. These areas were often species-rich and offered good forage and habitat for insects and birds, particularly when scattered with scrub and trees. Due to the moderate species-richness and high value to wildlife, alongside the fact that these areas are small in size, these areas have been assessed as being of local value.	Local
			OV24 *Urtica dioica–Galium aparine* community	-		
			OV25 *Urtica dioica-Cirsium arvense* community	-		
			OV27 *Epilobium angustifolium* community	-		
g3c5 *Arrhenatheru*	9.51	LBAP1	MG1 *Arrhenatherum elatius* grassland	-	Areas of neutral and modified grassland were recorded mostly in the enclosed grassland	Less than Local

UK Habitat Type	Area (ha)	Conservation Listing*	NVC Community Name	Likely Groundwater Dependency	Description and Reason for Evaluation	Evaluation
m neutral grassland					areas to the north of the site, with some damp areas of MG9 and MG10 in small patches in the upland part of the site. These areas were mostly species-poor, with some areas of moderate species richness in some of the damper MG10 areas and in areas designated for hay cutting (labelled as MG6 but poor fit for NVC). These areas have moderate species richness in an agricultural setting but have no conservation listing and are considered to be of limited ecological value and have therefore been evaluated as being of no more than local value.	
g3c6 *Lolium-Cynosurus* neutral grassland	7.59		MG6 *Lolium perenne–Cynosurus cristatus* grassland	-		
g3c7 *Deschampsia* neutral grassland	3.76		MG9 *Holcus lanatus-Deschampsia cespitosa* grassland	Moderate		
g3c8 *Holcus-Juncus* neutral grassland	22.34		MG10 *Holcus lanatus-Juncus effusus* rush-pasture	Moderate		
g4 Modified Grassland	28.68		MG6 *Lolium perenne–Cynosurus cristatus* grassland	-		
w1g Other Woodland; Broadleaved	1		W10 *Quercus robur-Pteridium aquilinum-Rubus fruticosus* woodland	-	The areas of broadleaf and mixed woodland were recorded mostly along the main A9 road to the north of site, and in a couple of areas in the arable fields to the north. Species richness was low in these areas and the stands were very small. The areas are likely to still provide habitat for protected mammal species, particularly bats, and could form connections between larger stands of woodland. Although small in size with low species-richness, these habitats still hold potential for protected species presence and potential for	Local
w1g6 Line of Trees	0.25	LBAP1	NA	-		
w1h5 Other Woodland; Mixed	0.34	LBAP1	W10 *Quercus robur-Pteridium aquilinum-Rubus fruticosus* woodland	-		

UK Habitat Type	Area (ha)	Conservation Listing*	NVC Community Name	Likely Groundwater Dependency	Description and Reason for Evaluation	Evaluation
					connectivity, these areas have been assessed as being of local value.	
w2c Other Coniferous Woodland	70.05	LBAP1	NA	-	This community was present mostly as young, conifer plantation of Sitka Spruce (*Picea sitchensis*), with little species diversity and potential to decrease species diversity as the forest matures. There was one stand of mature conifers to the north of the site with low species-richness. Given the young age and low species-richness of the stands, these areas have been assessed as being of less than local value.	Less than Local
h1b5 Dry heaths; upland (H4030)	19.76	Annex 1, SBL, LBAP1	H12 *Calluna vulgaris-Vaccinium myrtillus* heath	-	This habitat was found primarily along the public road to the north of the site but also found in patches throughout the young conifer plantation and on the steep slopes of the gullies in the upland part of the site. The habitat was generally species-poor and invaded by grass species, resulting in a patchy community. There is an estimated 1.7 to 2.5 million ha of upland heathland in Scotland (SNH n. d.) and it is widespread in Perth and Kinross, with Tayside holding 9% of the Scottish upland heath. H12 is one of the most common forms of dry heath in Scotland (SNH n.d.). Given the very limited and fragmented amount of these habitats on the site, and the very small proportion of the Scottish heathland	Local

UK Habitat Type	Area (ha)	Conservation Listing*	NVC Community Name	Likely Groundwater Dependency	Description and Reason for Evaluation	Evaluation
					resource, it is assessed as being of no more than local value at the current time.	
h1b6 Wet heathland with cross-leaved heath; upland (H4010)	1.69	Annex 1, SBL, LBAP1	M15 *Scirpus cespitosus-Erica tetralix* wet heath	Moderate	Wet heath was found in one small area adjacent to young conifer plantation next to the public road to the north of the site. The area is species-poor and degraded, with a low chance for recovery due to the proximity of conifer plantation. The habitat is listed under Annex 1 North Atlantic Wet Heaths (H4010), with c. 370,000 ha in Scotland. The extent of this habitat in Perth and Kinross is unknown, but likely to be abundant. Given the small area and limited ecological value of this area of wet heath, the areas have been assessed as being of no more than local value at the current time.	Local
h2a Hedgerow (priority habitat)	1.04	SBL, LBAP1, Reg 37 of the Habitats Regulations	NA	-	A hedgerow was recorded to the north of the A9 at the edge of the arable fields. The hedgerow had moderate species richness, with tall grass and herb vegetation alongside it in some areas creating good habitat for insects and birds and providing connectivity throughout the arable landscape. Hedgerows are listed as a priority habitat on the SBL and in the Tayside BAP. Due to the small size of the hedgerow, the habitat has been assessed as being of local value.	Local

UK Habitat Type	Area (ha)	Conservation Listing*	NVC Community Name	Likely Groundwater Dependency	Description and Reason for Evaluation	Evaluation
h3e Gorse Scrub	0.29	LBAP1	W23 *Ulex europaeus-Rubus fruticosus* scrub	-	A small area of gorse scrub was recorded beside the public road to the north of the site, beside an area of young conifer plantation. The area comprises scattered scrub and tall grass and herb vegetation. Gorse scrub is not protected or given any priority status; however this habitat provides good habitat for birds and insects and has some ecological value particularly within the agricultural setting. Due to the small size and lack of protection status on this habitat, it has been assessed as being of less than local value.	Less than Local
f1a5 Blanket Bog (H7130)	446.65	Annex 1, SBL, LBAP1	M2 *Sphagnum cuspidatum/recurvum* bog pool community	-	Blanket bog is found across much of the upland part of the site, including within the candidate Alva Moss LNCS. The areas are on peat deeper than 0.5m and in some areas have a good layer of peat-forming *Sphagnum* sp. The blanket bog is degraded to various states across the site, with a low water table and deep hagging with exposed bare peat to the south of the site, and areas with less drainage and hagging but lower species diversity to the north of the site. There is an estimated 2.2 million ha of blanket bog in the UK (BARS, 2012), and 1.8 million ha in Scotland, representing an estimated 23% of the Scottish land area (Bruneau and Johnson, 2014). Blanket bog is a rare habitat globally, and Scotland holds a significant	National
			M17 *Scirpus cespitosus-Eriophorum vaginatum* blanket mire	-		
			M18 *Erica tetralix-Sphagnum papillosum* raised and blanket mire	-		
			M19 *Calluna vulgaris – Eriophorum vaginatum* Blanket Mire	-		

UK Habitat Type	Area (ha)	Conservation Listing*	NVC Community Name	Likely Groundwater Dependency	Description and Reason for Evaluation	Evaluation
					proportion of the world resource (Bruneau and Johnson, 2014). Due to the extent of blanket bog on site, and the national importance of the habitat in the area, blanket bog habitat has been assessed as having national value.	
f1a6 Degraded Blanket Bog	284.81	SBL, LBAP1	M20 *Eriophorum vaginatum* blanket and raised mire M19 *Calluna vulgaris – Eriophorum vaginatum* Blanket Mire	-	Some areas of M20/M19 blanket bog were classified as degraded, with the peat habitat still present but shallower and the species diversity very poor with invasion of grasses and signs of drying. Degraded blanket bog has been assessed as being of local value due to the disturbed and degraded nature of this habitat at this time.	Local
f2 Fen, marsh and swamp	2.72	LBAP1	M23 *Juncus effusus/acutiflorus-Galium palustre* rush-pasture	High	A few small rush-dominated areas have a few herbs in the ground layer under the tall rushes. While these areas have a moderate species richness, they do not meet the criteria for the purple moorgrass (*Molinia caerulea*) and rush pasture priority habitat as they lack a number of indicator species and occur outside the range for this habitat. Given the low species-richness of these habitats, they have been classified as being of less than local value.	Less than local
f2c Upland Flushes, Fens and Swamps	5.06	SBL, LBAP1	M6 *Carex echinata-Sphagnum recurvum/auriculatum* mire	High	Areas of fen usually occur in the form of M6 patches with *Sphagnum* dominating the ground layer in the upland part of the site,	Local

UK Habitat Type	Area (ha)	Conservation Listing*	NVC Community Name	Likely Groundwater Dependency	Description and Reason for Evaluation	Evaluation
			M32 *Philonotis fontana-Saxifraga stellaris* spring	High	often with a dominant layer of rushes along the side of watercourses. Some areas of the more species-rich M32 spring were recorded along the steeper slopes within acid grassland habitats, likely associated with ground water. The above flush communities are common and widespread in the uplands of the UK (Rodwell, 1991) and have been assessed as being of local value.	
			Flush, not classified in NVC	High		
f2c8 Transition mires and quaking bogs, upland (H7140)	0.12	Annex 1, SBL, LBAP1	M4 *Carex rostrata-Sphagnum recurvum* mire		Areas of transition fen occur in small areas in the upland part of the site. They were recorded as M4 patches with *Sphagnum* dominating the ground layer with bottle sedge *Carex rostrata* dominating and as M9 patches with bottle sedge dominating over a more herbaceous, less acidic ground layer. The areas were found in particularly damp areas along the side of watercourses. M4 and M9 communities are common and widespread in the uplands of the UK (Rodwell, 1991) and have been assessed as being of local value.	Local
			M9 *Carex rostrata-Calliergon cuspidatum/giganteum mire*	High		
s1a Inland rock outcrop and scree habitats	Too small to map	LBAP1	U16 *Luzula sylvatica-Vaccinium myrtillus* tall-herb community	High	A few areas of inland rock were recorded within the steep gullies on site, in the form of small rocky outcrops alongside small watercourses. These areas were associated with herb communities, usually greater woodrush *Luzula sylvatica*. These areas represent higher diversity than the surrounding acid grassland habitats due to the damp environment caused by the watercourse	Local

UK Habitat Type	Area (ha)	Conservation Listing*	NVC Community Name	Likely Groundwater Dependency	Description and Reason for Evaluation	Evaluation
					and the fact that they can't be accessed by grazing livestock. While these communities are not protected, they have been assessed as being of local value due to their moderate diversity.	
c1c7 Other Cereal Crops	34.88		NA	-	Arable land to the north of the site supports cereal and non-cereal crops. This habitat typically has low species diversity and little opportunity for enhancement. Given their low species-richness, these areas have been assessed as having less than local value.	Less than Local
c1d Non-Creal Crops	3.21		NA	-		
r1 Standing open water and canals	NA	LBAP1	NA	-	A ditch is present on site alongside the public road to the north. The ditch was dry at the time of the survey and is therefore considered low value to invertebrate, fish and mammal species. This area has been assessed as having less than local value.	Less than Local
r2a Rivers (priority habitat)	NA	LBAP1, Reg 37 of the Habitats Regulations	NA	-	The watercourses present within the site are very minor, mostly <1m wide, and represent small tributaries which feed into more significant watercourses off-site. The tributaries are not particularly notable in habitat terms, however they provide suitable habitat for a range of aquatic species and are connected to more significant watercourses and therefore are considered to be of local value.	Local
Annex 1 – listed on Annex 1 of the Wildlife and Countryside Act 1981						

UK Habitat Type	Area (ha)	Conservation Listing*	NVC Community Name	Likely Groundwater Dependency	Description and Reason for Evaluation	Evaluation
SBL – Scottish Biodiversity List LBAP1 – Tayside Local Biodiversity Action Plan LBAP2 – Clackmannanshire Council Biodiversity Duty Report 2018-2022						

Faunal Baseline

8.82 A summary of the protected, priority or otherwise notable non-avian faunal species recorded within the relevant study areas during the surveys undertaken in 2023 and/or for which records were returned during the desk study is provided in paragraphs 8.83 to 8.134. Further details are provided in **Technical Appendices 8.2 - 8.5.**

Fish

8.83 Atlantic salmon, brown trout, sea trout, European eel and lamprey sp. are known to occur within 2km of the site, additionally, Atlantic salmon are confirmed to be present within the River Devon and the Alva Burn. An assessment of habitat suitability for fish species of conservation importance is provided in **Technical Appendix 8.3.** A total of 14 locations were assessed for fisheries habitat potential (including a control) and were ranked for both Fish Habitat Quality (FUQ) and Fish Utilisation Potential (FUP).

8.84 The sampling locations ranged between low and high for FUP and poor to good for FHQ. However, connectivity between watercourses throughout the catchment was noted as significantly affected by barriers to fish migration. Barriers were identified throughout the River Devon (located downstream of the site) and considered impassable, therefore it is considered highly unlikely migratory fish species will be present within the upper reaches of this watercourse. The long box culverts under the A9 were also classed as impassable on the Buttergask Burn and Danny Burn. Habitat connectivity is integral to the survival of migratory salmonids, therefore it is considered that only resident brown trout are likely to be present within watercourses upstream of barriers, though there is potential that Atlantic salmon could ascend during optimal flow conditions.

8.85 The survey location downstream of the barriers on the Alva Burn were classified as good and considered likely to support populations of both Atlantic salmon and brown/sea trout.

8.86 Potential spawning habitat was identified within the Alva Burn and the Danny Burn.

8.87 Overall, the site does contain some habitat suitable to support fish and fish spawning, though presence of migratory fish should be confirmed through electrofishing (see paragraph 8.197).

8.88 There were few areas of suitable habitat for eel and lamprey present within the sampling locations, although not optimal, there is potential for eel and lamprey presence.

8.89 There were very few areas of suitable habitat for freshwater pearl mussel (FWPM) (*Margaritifera margaritifera*) identified during the fish habitat survey. It is considered unlikely that FWPM are present within the site, or downstream of the site given their current distribution suggests that they are absent from both Allan Water and the River Devon (Scottish Government, 2019), therefore FWPM are not considered further within this assessment.

Amphibians and Reptiles

8.90 No amphibian or reptile records were returned in the data provided by TWIC or in the review of review of ecological information available for nearby developments.

8.91 A single incidental observation was recorded of common lizard (*Zootoca vivipara*) during ornithological surveys within the site.

8.92 No evidence of amphibians was recorded on site.

8.93 The majority of the site provides suitable habitat common lizard (i.e. open bog and heath habitats). It is also possible that the site could support other reptile species such as adder (*Vipera berus*) and slow worm (*Anguis fragilis*).

8.94 The survey conducted in 2023 was outwith the active season for amphibians, however given the lack of historical records, and the fact that the site falls within an area where great crested news (*Triturus cristatus*) have limited presence and where there is a low probability of occurrence (Oldham *et al*., 2000) the habitat of the site is not considered to be of particular importance for amphibians, therefore these species have been scoped out of detailed assessment.

Mountain Hare

8.95 There are historical records of mountain hare in Alva Moss, within the site.

8.96 The upland areas of the site provide suitable habitat for mountain hare. No sightings were made on site during the 2023 surveys; however, the species is known to be elusive. Given the known presence of mountain hare in the wider area, and the suitability of habitats present, the presence of mountain hare on site cannot be ruled out.

Otter

8.97 During surveys conducted in 2015 to inform the Burnfoot Hill East Wind Farm EIA (Wind Prospect, 2017a) evidence of otter presence was recorded in the form of spraint on the Broich Burn. Burnfoot Hill East Wind Farm lies 2.1km to the east of the proposed development.

8.98 There are several watercourses on the site which consist of a mix of small burns as well as larger watercourses such as the River Devon and the Danny Burn. These watercourses provide potential commuting corridors for otter through the site, as well as providing a potential foraging resource for this species. The reservoirs to the east of the site would also provide good quality foraging habitat for otters.

8.99 The watercourses in the lower parts of site are considered to have the most suitability for foraging and provide opportunities for resting sites in the rocky features present and variations in the bank height. In the higher areas of site, watercourses would be likely be limited to commuting value for otter. Watercourses here are narrow with low banks, with less variation in vegetation cover but are well connected to boggy and marshy areas which would offer foraging opportunities.

8.100 Evidence of otter presence on site was found during the 2023 surveys, with two otter spraints found to the north of site, one on Danny Burn and one on a small tributary of the Danny Burn (See **Figure 8.2.2** and **Technical Appendix 8.2**).

Water Vole

8.101 No water vole records were returned from the desk study data search or in the review of ecological information available for other nearby developments.

8.102 Watercourses in higher areas of site were identified to have good suitability for water vole, with narrow channels and with a low flow in close proximity to foraging resource in bog habitats. However, the upland habitats are heavily grazed and lack tall vegetation to provide sheltering resource from predators. Therefore, there is limited habitat suitability within the site for water vole.

8.103 No Evidence of water vole was found during the 2023 surveys (See **Technical Appendix 8.2**).

8.104 Given the limited suitable habitat presence and lack of evidence of water vole, water voles are not likely to be present.

Badger

8.105 No records of badger were returned from the desk study data search or in the review of ecological information available for other nearby developments.

8.106 The majority of the site offers limited suitability for badger sett building and foraging, as it consists largely of open upland habitat with wet ground conditions ill-suited to sett building. Some suitable habitat was noted close to the access route with small pockets of plantation woodland and grassland present.

8.107 No evidence of badger activity was recorded during the 2023 surveys (see **Technical Appendix 8.2**), however given the suitable habitats around the access route, potential impacts on badgers have been considered within this assessment.

Pine Marten

8.108 No pine marten records were returned from the desk study data search or in the review of ecological information available for nearby developments.

8.109 Pine martens are primarily found in forested areas. The majority of the site supports open habitats pine marten may use for foraging such as heathland and grassland. However, the site does not support an abundance of woodland habitat pine marten would use for shelter and to support dens. Therefore, it is likely that the site offers limited foraging resource, likely opportunistic, for pine marten.

8.110 No field signs or suitable denning sites were found for pine marten during surveys (See **Technical Appendix 8.2**).

8.111 Given the lack of evidence of pine marten presence, pine marten are likely to be absent.

Red Squirrel

8.112 The desk study data search identified three single records of red squirrel within 2km of the site. The survey conducted in 2015 to support the Burnfoot East Wind Farm development (Wind Prospect, 2017a) noted squirrel feeding signs in coniferous woodland near the Glendevon Reservoir, however it was unknown whether these feeding signs were from red or grey squirrels.

8.113 Suitable habitat for red squirrels within the site is limited to the small pockets of conifer plantation close to the access road leading north through the site, with suitable habitat offering shelter and foraging opportunities. However, these areas are small in size and fragmented with poor habitat connectivity.

8.114 No confirmed feeding signs or dreys were recorded during the field surveys (See **Technical Appendix 8.2**) however a small area of nibbled penny buns *Boletus edulis* were recorded within one of these plantation pockets. These are a favoured food by red squirrel, among other animals. As it cannot be confirmed whether these field signs were due to red or grey squirrels, red squirrels may potentially be present on site.

Bats

8.115 Desk study data returned from TWIC identified historic records relating to least four species of bats in flight within 10km of the site; common pipistrelle, soprano pipistrelle, Daubenton's bat, and species of the genera *Pipistrellus* (see **Table 8-5**).

8.116 Full details of the results of all bat surveys can be found within **Technical Appendix 8.5**.

Habitat Suitability

8.117 Habitats within the site considered suitable to support bat roosting include pockets of broadleaved woodland and mixed woodland situated adjacent to the access track. Conifer plantation is generally considered less suitable for roosting bats when compared to deciduous or mixed woodland, and the plantation woodland present on site is very young and therefore not suitable for bat roosting.

8.118 The GLTA survey identified nine trees within 30m of the site with PRFs, summarised in **Table 8-7** and shown on **Figure 8.5.2**. For full details see **Technical Appendix 8.5**.

Table 8-7 GLTA Results

Tree no.	Categorisation / no. of PRFs	Distance from application boundary
14	PRF (two features both PRF)	1m
15	PRF	2m
16	PRF (two features both PRF)	4m
17	PRF	1m
18	PRF (two features) FAR (two features)	0m
19	PRF	15m
20	PRF	16m
21	PRF-I	5m
22	PRF (two features) PRF-M (one feature)	4m

8.119 Due to the relatively small number of PRFs, the small size of suitable habitats and lack of overall woodland coverage, the site is considered to be of low suitability for roosting bats in line with guidance (Collins, 2023).

8.120 Some linear commuting and foraging opportunities for bats were present along watercourses within the site and within pockets of woodland habitat adjacent to the proposed access track. The site is considered to be of low suitability for commuting and foraging bats due to its largely exposed nature and lack of connectivity to wider suitable habitat in line with guidance (Collins, 2023).

8.121 Overall, the habitat risk to bats is considered to be low given the small number of roost features, low quality foraging habitat and relatively isolated nature of suitable roosting habitat (NatureScot, 2021).

Activity Surveys

8.122 A total of 641 bat passes were recorded over a total of 582 nights of recording during the 2023 active bat season.

8.123 Data recorded during the activity surveys confirmed that at least five species of bat utilise the site for commuting and foraging purposes. A summary of activity relating to each of these bat species recorded during the survey period is provided in **Table 8-8**.

8.124 Due to close similarities in the echolocation call structure of certain species, some echolocation files were identified to genus only.

Table 8-8 Bat Activity Summary

Species	Mean Passes per Night (all locations combined)	Activity Summary
Common pipistrelle	0.43	The second most frequently recorded species during activity surveys. Recorded at all 13 detector locations with a total of 252 passes recorded accounting for 39.31% of total passes recorded within the site. The greatest levels of common pipistrelle activity were recorded during the autumn survey period. Average 0.43 passes/night.
Soprano pipistrelle	0.48	The most frequently recorded species during activity surveys. Recorded at all 13 detector locations with a total of 280 passes recorded accounting for 43.68% of total passes recorded within the site. The greatest levels of Soprano pipistrelle activity were recorded during the autumn survey period. Average 0.48 passes/night.
Pipistrellus	0.07	Bat activity attributed to the species of the genus Pipistrellus was recorded at all 13 detector locations with a total of 42 passes recorded accounting for 6.55% of total passes recorded within the site. The greatest levels were recorded in both the spring and autumn survey seasons. Average 0.07 passes/night.
Myotis	0.11	Myotis were recorded at nine of the 13 detector locations with a total of 62 passes recorded accounting for 9.67% of total passes recorded within the site. Average 0.11 passes/night.
Nyctalus	0	A single *Nyctalus* species pass was recorded at 1 static location during the autumn survey period, accounting for 0.16% of total passes recorded within the site. Average 0 passes per night.
Brown Long Eared *Plecotus auritus*	0.01	A total of 4 passes recorded at 1 static location within the site, accounting for 0.62% of total passes recorded within the site. Average 0.01 passes per night. However, brown long eared bats are known to produce quiet (low amplitude) calls which are not as readily picked up as other bat species calls, and often hunt using their eyes, therefore not echolocating (Collins, 2023). Therefore, there is the potential that they are present in higher numbers than the activity survey results suggest.

8.125 The greatest levels of bat activity were recorded during the autumn survey period with the average bat passes totalling 2.48 per night. The lowest levels of bat activity were recorded in summer with an average of 0.05 per night.

8.126 Although the number of bat passes at all detector locations was relatively low, there was some spatial variation. The highest number of passes was recorded at static detector L2, which lies in the south of the site, however, bat activity was recorded (at low levels) across the majority of the site.

8.127 Given that the habitat risk of the site was assessed as 'low' for bats (as paragraph 8.119), and the fact that the project is of 'large' size under the NatureScot guidelines (2021), the proposed development presents a medium initial risk level to bat species (see Table 3a in NatureScot (2021)).

8.128 Comparison of the activity data to similar sites within a 200km radius using *Ecobat* confirmed that all species except brown long eared bats recorded exhibited low activity levels during both periods of 'typical' activity and periods of 'peak activity' (see Assessment of Effects section for full details). It was not possible to confidently estimate the activity level of brown long eared bats using *Ecobat* due to the low reference range within *Ecobat,* potentially due to the fact that they are less likely to be picked up due to low amplitude calls (Collins, 2023).

Roosting Analysis

8.129 Ecobat output included an analysis of calls recorded within species specific emergence windows, which are considered to give an indication as to the likelihood of a roost nearby.

8.130 A total of five recordings of common pipistrelle were made within the emergence window. These calls were all recorded at detectors located within the south eastern part of the site, away from suitable roosting habitat identified near the access, it is therefore considered unlikely that this potential roost is situated within the site.

8.131 A total of eight recordings of soprano pipistrelle were made within the emergence window, as with common pipistrelle, all of these calls were recorded at detectors located within the south eastern part of the site and it is therefore considered unlikely that this potential roost is situated within the site.

8.132 The relatively low numbers of recordings suggests that both potential roosts are non-breeding. For full details see **Technical Appendix 8.5**.

Incidental Records

8.133 Historical records of roe deer were returned during the desk study data search. Incidental records of roe deer were made during the 2023 surveys.

Evaluation of Faunal Features

8.134 An evaluation of the non-avian faunal features which are either known to be present or considered likely to be present within the study area, is provided in **Table 8-9.**

Table 8-9: Evaluation of Faunal Features

Receptor	Legal / Conservation Listing*	Reason for Evaluation	Evaluation
Fish: Brown Trout/Sea Trout, Atlantic salmon, European eel	SBL, WCA Sch 3 (Atlantic Salmon) LBAP1, SFF	Brown trout/sea trout, Atlantic Salmon, European eel and lamprey spp. are known to be present within 2km of the site. Atlantic salmon known to be present within the River Devon and its tributaries. The fish habitat assessment concluded that there is suitable habitat for both salmonids (Atlantic salmon and brown trout), European eel and lamprey present on site. Atlantic salmon is protected under Schedule 3 of the Wildlife and countryside act, Atlantic salmon, sea trout and eel are listed on the SBL and Atlantic salmon noted as a priority species within the Tayside BAP. Based on the known presence of fish species within the area, and the presence of habitat with the potential to support these species, the watercourses on site are assessed as being of local value to fish species.	Local
Reptiles - common lizard, adders and slow worm	WCA Sch 5 (in respect of Section 9(1) and 9(5) only, SBL, LBAP1	Most of the site contains suitable habitat for supporting common lizard, both foraging and basking. Common lizard is described as being widespread throughout Scotland (Scottish Wildlife Trust, n.d.) (with the exception of the most Scottish islands). Common lizard were confirmed as present on site through an incidental sighting was recorded during the 2023 ornithology surveys. Therefore, as common lizard are widespread in the area, and given the size of the site and abundance of suitable habitat in the surrounding area, reptiles within the site are considered to be of no more than local importance. Due to the presence of suitable habitats such as heath, it is possible for both adder and slow worm to be present on site. Slow worm have wide distribution across Scotland (NatureScot, n.d.). Adder are reported to be widespread in Scotland (NatureScot, n.d.), although patchy in their distribution, however recent studies have suggested a decline in adder numbers, primarily due to habitat loss (Julian *et al*, 2024). All three species of reptile are listed on the SBL and are noted as priority species within the Tayside BAP.	Local

		Given the presence of similar suitable habitat surrounding the site, and lack of records of these species within the site, the site is assessed as being of local value to both adder and slow worm, if present.	
Mountain Hare	WCA Sch 5/	Mountain hare are known to occur in the wider area, with historical records present within the site. The upland areas of the site contain habitat suitable to support mountain hare, however no mountain hares were recorded during the 2023 surveys. Due to the presence of suitable habitat and the known presence of hares in the wider area, the site is assessed to be of local value to mountain hare.	Local
Otter	HR Sch2, WCA Sch5, SBL/	Otter are confirmed as being present on site, with spraint identified during the 2023 surveys on the Danny Burn. The site does offer suitable habitat for otter commuting and foraging, though has limited opportunity for shelter creation as the watercourses move into higher elevations within the site. Due to the presence of higher quality habitat within the surrounding habitat, and the lack of records of otter resting sites within the site, the site is assessed to be of no more than local value to otter.	Local
Badger	Protection of Badgers Act/WANE	No historical records were returned during the desk study data search and no signs of badger activity were recorded during the 2023 surveys. The majority of the site is comprised wet, upland habitat not suitable for badger, however there are some pockets of suitable habitat adjacent to the proposed access track. Given the lack of suitable habitat within the main part of the site, the site is assessed to be of no more than local value to badger.	Local
Red Squirrel	WCA Sch5, SBL	Red squirrels are known to occur in the wider area. Potential squirrel feeding signs were recorded during the 2023 survey however it is not confirmed whether these were due to red or grey squirrels. Small pockets of conifer plantation are present within the site, providing suitable habitat for squirrel however the majority of the site is unsuitable. Red squirrels are listed on the SBL. Red squirrels are known to be present in the wider area and some small areas of suitable habitat is present on site, however lack of dreys suggests that the site does not support a local population. Therefore, the site is assessed to be of no more than local importance to red squirrel.	Local
Bat assemblage	HR Sch2, WCA Sch 5, SBL	At least five bat species were recorded during the 2023 surveys: Common pipistrelle, Soprano pipistrelle, *Myotis* species, *Nyctalus* species and Brown Long Eared bat. Most activity recorded was common and soprano pipistrelle. Non pipistrelle species made up only 17% of all passes. The species recorded on site include common and widespread species and rarer species which are less widespread.	Regional

		Potential roosting habitat is found in nine trees adjacent to the access track, given the low levels of bat activity on site, it is assumed that roosts (if present) would likely be limited to small numbers of bats. As per current guidance (Reason and Wray, 2023), considering the location of the site and the maximum species of bat that the site may support based on the results of the activity survey, the bat assemblage on site is considered to be of regional importance.	
Common pipistrelle		Common pipistrelle is a common and widespread species in southern Scotland (Reason and Wray, 2023) with a population estimated to be 875,000, which is considered to have been stable since 1999 (BCT, 2024). Most foraging/commuting activity recorded across the site was attributed to soprano and common pipistrelle (recorded at all 13 locations), therefore the common pipistrelle population on site is considered to be of local value.	Local
Soprano pipistrelle		Soprano pipistrelles are similarly common and widespread in southern Scotland (Reason and Wray, 2023) with a population estimated to be 1,210,000, which has shown a long-term increase (since 1999) and been stable in the short term (since 2017) (BCT, 2024). Most foraging/commuting activity recorded across the site was attributed to soprano and common pipistrelle (recorded at all 13 locations), therefore, the soprano pipistrelle population on site is considered to be of local value.	Local
Pipistrellus sp.		As above, both common and soprano pipistrelles are common and widespread in southern Scotland (Reason and Wray, 2023). Nathusius pipistrelles are rarer in southern Scotland (Reason and Wray, 2023), and population estimates are unavailable. Given nathusius pipistrelle roosts are located close to large freshwater bodies, and foraging habitat consists of freshwater features and woodland edges, nathusius pipistrelles are not likely to be present on site. On that basis, *Pipistrellus* sp. populations within the site are assessed as being of local value.	Local
Brown long eared bat		Brown long eared bats are considered widespread in southern Scotland but not as abundant in all geographies (Reason and Wray, 2023) with population estimates of 230,000 which is considered to have been stable since 1999 (BCT, 2024). Brown long eared bat was only recorded at one static location during activity surveys, therefore, the brown long eared population within site is assessed of being of no more than local value.	Local
Myotis sp.		*Myotis* species are less widespread in Scotland. Daubenton's have a Scottish population estimated to be 235,000 considered to be stable since 1999 (BCT, 2024). Natterer's bat (*Myotis nattereri*) has estimated Scottish population of 41,000 which is considered to have been stable since 2011 (BCT, 2024). Both Daubenton's and Natterer's bat are considered widespread in southern Scotland, but not as abundant in all geographies (Reason and Wray, 2023).	Regional

		Whiskered bat (*Myotis mystacinus*) is considered to be rarer in southern Scotland (Reason and Wray, 2023) and only occur in patchy distribution within southern Scotland with population estimates not available at this time. Brant's bat (*Myotis brandtii*) are considered the rarest species in southern Scotland (Reason and Wray 2023), with current population estimates not available at this time. Given the location of the site, it is most likely that *Myotis* species recorded were Daubenton's and/or Natterer's. Commuting/foraging activity of *Myotis* species was moderate, recorded at nine static locations during activity surveys, therefore the population of *Myotis* bats on site are considered as being of regional value.	
Nyctalus sp.		*Nyctalus* species are rare in Scotland, both *Nyctalus* species are considered rare in southern Scotland (Reason and Wray, 2023). There are no population estimates available for noctule bats (*Nyctalus noctula)* but it is thought to only rarely be encountered in southern Scotland (BCT, 2024). Leisler's bats (*Nyctalus leisleri*) are uncommon in Scotland, but they are thought to occur mostly in the south of Scotland (BCT, 2024). *Nyctalus* species were only recorded at one static location during activity surveys. On that basis, the *Nyctalus* sp. population on site are considered of local value only.	Local
Deer	Deer (Scotland) Act, 1996	Roe deer were confirmed present on site through an incidental sighting during the 2023 surveys. Roe deer is a common and widespread species in Scotland, with population estimated to be between 200,000 and 350,000 (Deer Working Group, 2020). Given the widespread and abundant nature of this species, and the widespread availability of suitable habitat out with the site, the site is assessed as being of no more than local value for roe deer.	Local

**Table Key: Status*
HR Sch2 = Included on Schedule 2 of the Conservation (Natural Habitats &c) Regulations 1994 (as amended in Scotland)
WCA Sch5 = Listed on Schedule 5 of the Wildlife and Countryside Act 1981 (as amended in Scotland)
WANE = Included in the Wildlife and Natural Environments (Scotland) Act (2011)
SFF = Salmon spawning beds protected under the Salmon and Freshwater Fisheries (Consolidation) (Scotland) Act 2003
SBL = listed on Scottish Biodiversity List (SBL) (Scottish Government, 2013)
LBAP1 =Tayside Local Biodiversity Action Plan (LBAP) 2nd Ed 2016-2026
LBAP2 – Clackmannanshire Council Biodiversity Duty Report 2018-2022
Conservation Status: based on Article 17 Habitats Directive Reports 2019: Species Conservation Status Assessments 2019 (for those listed on WCA)

Cumulative Situation

8.135 **Chapter 5** contains details of all known operational and 'in planning' wind energy developments within approximately 10km of the site.

8.136 When undertaking the cumulative effects assessment, it is important to consider only those projects which could potentially contribute to significant cumulative effects with the proposed development. As set out in paragraphs 8.46 and 8.47, for this assessment potential cumulative effects have been assessed for the following features and developments:

- cumulative effects on aquatic features within the same sub-catchments and within 2km; and
- cumulative effects on bat populations, which are possible in combination with other wind farms within a 10km radius of the proposed development.

8.137 A search of the relevant planning portals was undertaken to identify any non-wind energy developments within 2km of the site which could potentially contribute to significant cumulative effects, none were identified.

8.138 Projects that meet the criteria in paragraph 8.136 and are therefore considered in this cumulative effects assessment are summarised in **Table 8-10**. These include all other developments within the relevant study areas which are either operational, under construction, consented or for which a planning application has been submitted.

Table 8-10: Other Projects Considered in Cumulative Effects Assessment

Project	Status	Distance from nearest turbine (km)	Number of Turbines
Rhodders Wind Farm	Operational	0.9	8 (102m tip height)
Burnfoot Hill Wind Farm	Operational	1.6	13 (102m tip height)
Burnfoot Hill North	Operational	1.8	2 (102m tip height)
Burnfoot Hill East	Operational	2.3	3 (135m tip height)
Williamsfield	Consented	1	4.8 (45.5m tip height)
Green Knowes Wind Farm	Operational	8.9	18 (95m tip height)
Strathallan Wind Farm	Phase 1 (4 turbines) Operational Phase 2 (5 turbines) Consented	12.1	9 (92.5 tip height)

Future Baseline

8.139 In the absence of the proposed development, the site is likely to remain as peatland, degraded peatland and acid grassland primarily used for sheep grazing. It is likely that the majority of peatland habitats within the site would continue to degrade over time.

8.140 It is noted that habitats within the candidate Alva Moss LNCS have undergone a detailed peatland restoration feasibility assessment (Central Environmental Surveys, 2019),

therefore it is possible that peatland within this area would be subject to restoration and enhancement works subject to the consent of the landowners. Given that the status of Alva Moss has remained unchanged since 2019 and is currently still a 'candidate' site, the future baseline is based on the assumption that the restoration work will not take place.

8.141 In the absence of the proposed development, it is possible that reptiles would use the site for foraging and basking and potentially hibernating in small numbers.

8.142 Mountain hares are likely to continue to utilise the site in low numbers given the presence of suitable habitat.

8.143 In the absence of the proposed development, it is possible that badger and red squirrel may start to utilise the areas of suitable habitat within the site, although suitable habitat would remain limited. It is possible that future use of the site by otter may change, although habitat within the site is of limited value and likely to remain so.

8.144 Bats may utilise suitable habitat within the site for roosting and are likely to continue to forage in low numbers across the site in future years, and in the absence of the proposed development the usage of the site by bats is expected to remain at relatively low levels.

8.145 It is understood that a deer management plan is currently being drafted for the Blackford Estate (within the north of the site) on that basis it is likely that deer numbers would reduce.

8.146 Climate change is predicted to result in complex changes to biodiversity. This may result in changes to the vegetation present or the potential for new species to colonise the site, which potentially includes non-native species, although the extent of any such changes cannot be accurately predicted at this time. However, in the absence of any detailed, quantifiable information it has been assumed that in the absence of the proposed development the ecological condition of the site is unlikely to change significantly over the next 40 years (the anticipated lifetime of the proposed development).

Assessment of Effects

8.147 The assessment of effects is based on the information outlined in **Chapter 3: Description of Development.**

Embedded Measures

8.148 The proposed development has been subject to a number of design iterations and evolution in response to the constraints identified as part of the baseline studies, to reduce environmental effects (see **Chapter 2: Site Description and Design Evolution** and **Chapter 3: Description of Development**). With respect to ecology, the following changes have been incorporated to avoid or minimise negative effects:

- it was not possible to avoid Annex 1 blanket bog and heath habitats completely, as these comprise the majority of the Site. However, flush habitats, bog pools, watercourses and areas of deepest peat have been avoided as far as possible;
- a distance of at least 50m between turbine blade tip and the nearest woodland has been established as per current guidance (NatureScot, 2021); and
- a 50m buffer zone has been applied around the primary watercourses within the site in order to reduce the risk of run off and water pollution, other than the following:
    - the crane pad for T5; and

- some of the proposed access track.

Good Practice Mitigation Measures

8.149 Full details of construction mitigation measures would be provided in a Construction Environmental Management Plan (CEMP). An outline CEMP is included as **Technical Appendix 3.1: Outline CEMP**. Good practice measures in relation to pollution risk and sediment management to be adopted during the construction and operation phases are also set out in **Chapter 10: Hydrology, Hydrogeology and Geology**. During the construction phase, good practice techniques with respect to peatland environments, as contained within 'Good Practice during Windfarm Construction' (NatureScot, 2024e), would be implemented. Further details on peat and water management during construction are provided in **Chapter 10: Hydrology, Hydrogeology and Geology, Technical Appendix 3.1: Outline CEMP** and **Technical Appendix 10.2: Peat Management Plan**.

8.150 Good practice measures to protect retained habitats during the construction phase would be implemented, including the erection of temporary protective fencing demarcating the working footprint, to be overseen and policed by the Environmental Clerk of Works (EnvCoW) (also see paragraphs 8.154 and 8.155); further details are provided in the Outline CEMP (**Technical Appendix 3.1**). Good practice techniques for vegetation and habitat reinstatement would be adopted and implemented on areas subject to disturbance during construction as soon as is practicable.

8.151 Good practice measures (SEPA, 2016) to prevent the spread of invasive species onto the site will be followed where appropriate and proportionate.

Pre-Construction Surveys

8.152 Due to the time that will have elapsed between surveys and construction commencing and the possibility that otter activity could have changed in the intervening period, and/or mountain hare, badger, red squirrel and roosting bats could have colonised suitable habitat within the site, a pre-construction survey for protected and notable species (focusing on mountain hare, otter, badger, red squirrel and roosting bats) would be undertaken. This would cover all suitable watercourses and other suitable habitat within 250m of proposed infrastructure. The results of the pre-construction survey would inform the need for further mitigation (if required) or confirm existing mitigation proposals in respect of working practices, or consultation with NatureScot, if required.

8.153 If during pre-construction surveys, invasive non-native species are identified, an Invasive Species Management Plan should be produced (or included within the final HMP) to prevent their spread across the wider landscape. Best practice guidance (SEPA, 2016) should be referred to within this plan.

Environmental Clerk of Works (EnvCoW)

8.154 A suitably qualified EnvCoW would be employed to oversee activities at key points for the duration of construction and reinstatement periods (at a frequency to be agreed with the Local Planning Authorities and NatureScot) to ensure natural heritage interests are safeguarded. The role of the EnvCoW would include the following tasks:

- to give toolbox talks to all staff onsite, e.g., an ecological induction, so staff are aware of the ecological sensitivities on the Site and the legal implications of not complying with agreed working practices;

- to agree and monitor measures designed to minimise damage to retained habitats and proposed peatland restoration areas;
- to undertake pre-construction surveys (as paragraph 8.152), pre-works checks for protected species and advise on ecological issues where required; and
- to carry out pre-construction inspections of areas which require reptile mitigation and supervision of mitigation works, where required.

8.155 The EnvCoW would also undertake additional roles such as assisting with hydrological measures checking for nesting birds and implementing the Bird Protection Plan (see **Chapter 9: Ornithology** and **Chapter 10: Hydrology, Hydrogeology and Geology**).

Reptiles

8.156 In order to comply with the Wildlife and Countryside Act 1981 mitigation would be employed to reduce the chances of inadvertently killing or injuring individual reptiles during construction works. Given the low numbers of reptiles likely to be present, the large areas of suitable habitat that would remain unaffected by the works and given also the large spatial scale of the works, fencing and translocation are not considered appropriate. Proposed mitigation therefore would involve vegetation management and the identification/removal of potential refugia and hibernacula within areas of suitable habitat, if present. The proposed site speed limit of 15mph would also reduce the likelihood of accidental injury/killing of reptiles by construction traffic.

8.157 Where appropriate and safe to do so, during the active season (typically April to October) all potential refuges within construction working areas will be removed, and construction works will employ a 'soft start' to allow any individuals to exit the area. Out with the active season, checks and removal of hibernacula will be conducted. These checks will be conducted under the guidance of the EnvCoW.

Terrestrial Mammals

8.158 Species Protection Plans would be prepared prior to construction, informed by the pre-construction surveys, to describe how works will take place in a sensitive manner, in order to avoid impacts on protected or notable species present.

8.159 Prior to initial groundworks or vehicular activity over uncleared ground during mountain hares breeding season (March to October inclusive), a 'sweep' survey for young hares would be undertaken in order to prevent the death/injury of mountain hare present.

8.160 During construction, site speed limits of 15mph would reduce the likelihood of accidental injury/killing of mammal species by construction traffic.

8.161 All potentially dangerous substance or materials within the temporary construction compound would be carefully stored to prevent then causing any harm to mammal species which may enter the compound at night.

8.162 During construction all excavations greater than 1m depth would either be covered at night or designed to include a ramp to allow animals a means of escape should they fall in.

Fish

8.163 Pre-construction electrofishing surveys should be conducted to establish a baseline against which proposed construction and post-construction phase monitoring can be

compared, so that any impacts on salmonid populations can be monitored during and after construction.

8.164 Water quality monitoring and pollution prevention measures should be adhered to during works as per **Chapter 10: Hydrology, Hydrogeology and Geology.**

Bats

8.165 Bats can be impacted by wind development through collision, habitat loss and displacement through turbine operation (Voight *et al*, 2024). Collision with wind turbines is now the leading cause of multiple mortality events in bats globally (O'Shea *et al*, 2016), with a suspected annual loss of 30,000 bats per year in the UK (Voight *et al*, 2024). Therefore, in effort to avoid these impacts, in line with current NatureScot guidance (NatureScot, 2021) turbines would be situated at least 50m from features that may be utilised by commuting and foraging bats (i.e. watercourses and woodland edge habitat).

8.166 Temporary construction lighting would be restricted to the minimum required for safety reasons, which would be required for any external construction activities during hours of darkness and low natural light. This lighting would be designed to minimise illumination, glare, or light spillage to nearby ecological features (e.g. woodland edge habitat or watercourses utilised by commuting and foraging bats). Details of construction lighting would be provided within the final CEMP.

8.167 Operational lighting would also be restricted to the minimum required for operational and security purposes. Once the development is operational, external lighting would only be provided at key areas, such as around the substation, and utilised only during essential operational activities. Lighting would be directed away from sensitive habitats such as woodland and waterbodies, wherever possible, to minimise light spill to adjacent habitats. Lighting would avoid specifications with a high UV component. Operational lighting would be agreed with the Planning Authorities prior to construction.

8.168 Any lighting required in areas of likely bat activity would be established in line with current guidance (ILP, 2023).

Construction Effects

Potential Effects

8.169 Potential effects, taking account of the good practice mitigation measures outlined in paragraphs 8.152-8.162, are addressed for each feature in turn during construction in paragraphs 8.170-8.233. Effects have been assessed only for important ecological features (i.e. those with a value of Local level or above, potential GWDTEs and/or legally protected species). These comprise:

- designated sites;
- biodiversity;
- upland acid grassland, broadleaved woodland, upland wet heath, upland dry heath, hedgerow, blanket bog, upland flushes, fens and swamps, transition mires, inland rock outcrops and scree habitats and rivers;
- invertebrates, fish, reptiles, mountain hare, otter, badger, red squirrel, bats and deer.

Designated Sites

Statutory Designated Sites

8.170 The statutory designated sites within 10km (other than those discussed in paragraphs 8.171 and 8.172) are designated for habitats and plant assemblages. The sites are all either not hydrologically connected to the sites or upstream from the site, and therefore, there is no potential for the proposed development to impact on their qualifying features due to watercourse pollution. Due to the minimum distance of 1.9km between the designated sites and the proposed development site, it is unlikely that air quality or dust will impact the designated sites with embedded measures in place.

8.171 Dollar Glen SSSI, Kippenrait Glen SSSI and Firth of Forth SSSI are also designated for their beetle assemblages, given the distance between the proposed development site and the designated sites are 6.3km, 6.7km and 6.8km respectively, there is no potential for impacts on the beetle assemblages within these designated sites. Craig Leith and Myreton Hill SSSI is designated for the northern brown argus butterfly and lies 2.4km from the proposed development site. Given that most northern brown argus colonies are known to breed on habitat patches <1ha in area, and very few areas larger than 10ha (Butterfly Conservation, n.d.), there is no potential for impacts on this population of butterfly.

8.172 The River Teith SAC is designated for lamprey species and Atlantic salmon, given that the proposed development sits outwith the River Teith catchment, there is no potential for impacts on these qualifying features.

8.173 Therefore, the proposed development would have no significant effects on statutory designated sites.

Non-statutory designated sites

8.174 Old Wharry Burn and Black Hill candidate LNCSs are proposed to be designated for their habitats and plant species assemblages and are a minimum of 1.8km away. These sites are both upstream of the proposed development site, and therefore there is no potential for impacts on their qualifying features due to watercourse pollution. Due to the minimum distance of 1.8km between these sites and the proposed development, it is unlikely that noise, vibration, air quality or dust would impact these designated sites.

8.175 Upper Glendevon Reservoir LNCS is within the application boundary and there is therefore potential for impacts via pollution events. As detailed in paragraph 8.148 a minimum 50m buffer has been allowed between the majority of proposed infrastructure and primary watercourses. Additionally, good practice pollution prevention measures will be in place (see **Chapter 10: Hydrology, Hydrogeology and Geology**). Additionally, although the application boundary slightly overlaps with the LNCS boundary, the works are concentrated away from the LNCS within the south of the application boundary, therefore there is limited potential for impacts and no significant effects predicted.

8.176 Alva Moss candidate LNCS is situated within the centre of the application boundary, and therefore there is the potential for impacts due to habitat loss and pollution. A total of 28.13ha of Annex 1 blanket bog would be lost from within the candidate LNCS, which would constitute a significant negative effect at the local level. There is the potential for impacts due to pollution events however as detailed in paragraph 8.148 a minimum 50m buffer has been allowed between the majority of proposed infrastructure and the primary watercourses present on site. With the implementation of good practice pollution prevention measures (**Chapter 10: Hydrology, Hydrogeology and Geology**) the likelihood of a pollution is considered to be low, therefore no significant effects are predicted due to pollution events.

Biodiversity

8.177 The European Commission provides examples of the key concerns on biodiversity to consider during an EIA, which focus on ensuring 'no-net-loss' (European Commission, 2013):

- changes in the provision of ecosystem services as a result of loss of species and habitats;
- the loss, degradation or fragmentation of habitats (including the extent or quality of the habitat, protected areas, habitat fragmentation or isolate, as impact on processes important for the creation and/or maintenance of ecosystems);
- the loss of species diversity (including species protected under the Habitats Directive and Birds Directive);
- the loss of genetic diversity;
- changes in natural environmental processes, such as continued river flow, water purification and erosion control, which can have long-term impacts on habitats and species;
- the spread of invasive alien species that can transform natural habitats and disrupt native species; and
- the effects of pollution on ecosystems and species.

8.178 Embedded mitigation measures around watercourses would allow for continued water flow of on-site watercourses. Whilst no invasive non-native species were recorded during the 2023 habitat survey, there is a risk of these species being introduced during site works. However, if best practice mitigation is implemented (see paragraph 8.151), no significant effects are likely due to the spread of invasive species.

8.179 The total loss of 46.21ha of Annex 1 habitat (detailed in **Table 8-11**), to facilitate the proposed development is considered to be a significant impact at national level.

8.180 The proposed development will result in the net gain (via peatland restoration) of approximately 206.25ha of blanket bog habitat, and the restoration of approximately 360.59ha degraded blanket bog habitat. Other habitats lost will be reinstated as per **Technical Appendix 8.4: Outline Habitat Management Plan**, therefore, there is no predicted change in the ecosystem services provided by the site.

Habitats

8.181 Impacts on habitats are categorised as follows:

- direct habitat loss – this includes habitats present under the footprint of the proposed development and includes areas which would be subject to grading and potential cable laying; and
- indirect/temporary habitat loss – indirect loss has been calculated for peatland habitats which lie within 30m of the direct habitat loss areas in line with NatureScot guidance (NatureScot, 2023); the allowance of 30m is to allow for drying effects and vegetation changes due to construction works. For other habitats an allowance for temporary loss of 5m is included to allow for possible temporary loss due to damage during construction. Floating tracks are considered conservatively in the same manner as other tracks; with a 30m buffer in peatland habitats, though in reality the drying effect is likely to be less.

8.182 For the purposes of the assessment, a precautionary approach has been taken which assumes that direct habitat loss and indirect loss of peatland habitats represents a permanent, irreversible negative effect, although in practice some areas indirectly affected may be able to be restored, e.g. during reinstatement following construction.

8.183 **Table 8-11** details the estimated direct and indirect/temporary land take for habitats present on Site, and potential GWDTE communities.

Table 8-11: Summary of Habitat Loss by UKHab Type

UK Hab Type	Associated NVC Communities	Direct Habitat Loss (ha)	Indirect or Temporary Habitat Loss (ha)	Total Loss (ha)
g16b Other upland acid grassland	U4, U5*, U6*	4.1	4.35	8.45
	M23*, M25	0.55	0.62	1.17
g1c Bracken	U20	0.02	0.05	0.07
g3c Other neutral grassland	OV24, OV27	0.2	0.58	0.78
g3c5 *Arrhenatherum* neutral grassland	MG1	1.49	0.91	2.4
g3c6 *Lolium-Cynosurus* neutral grassland	MG6	1.09	2.07	3.16
g3c7 *Deschampsia* neutral grassland	MG9*	0.21	0.17	0.38
g3c8 *Holcus-Juncus* neutral grassland	MG10*	0.38	0.32	0.7
g4 Modified grassland	MG6	0.00	0.19	0.19
w1g Other woodland; broadleaved	W10	0.00	0.02	0.02
w1h Other woodland; mixed	W10	0.00	0.01	0.01
w2c Other coniferous woodland	-	0.02	0.34	0.54
h1b5 Dry heaths; upland Annex 1 H4030	H12	0.17	0.97	1.14
h1b6 Wet heathland with cross-leaved heath; upland Annex 1 H4010	M15*	0.01	0.01	0.02

h3e Gorse scrub	W23	0.19	0.37	0.56
f1a5 Blanket bog Annex 1 H7130	M17, M18, M19, M20	7.25	37.8	45.05
f1a6 Degraded blanket bog	M19, M20	2.78	5.62	8.4
f2c Upland flushes, fens and swamps	M6*	0.06	0.24	0.3
c1c7 Other cereal crops	-	0.16	0.31	0.47
Total		**18.86**	**54.95**	**73.81**
* *Potential GWDTE habitat*				

8.184 The proposed development would result in the potential maximum loss of Annex 1 habitats as follows:

- Annex 1 blanket bog communities: direct loss of 7.25ha and the indirect loss of 37.8ha (a total loss of 45.05ha);
- degraded blanket bog: 2.78ha and indirect loss of 5.62ha (a total loss of 8.4ha);
- Annex 1 upland wet heath (M15): direct loss of 0.01ha and indirect loss of 0.01ha (total loss of 0.02ha); and
- Annex 1 upland dry heath (H12): direct loss of 0.17ha and indirect loss of 0.97ha (total loss of 1.14ha).

8.185 The total loss of up to 45.05ha of nationally important Annex 1 blanket bog habitat and 8.4ha degraded blanket bog constitutes a significant negative effect at national level.

8.186 The total loss of up to 0.02ha of Annex 1 upland wet heath (M15) habitats and 1.14ha Annex 1 upland dry heath (H12) constitutes a significant negative effect at national level.

8.187 The total loss of 8.45ha of locally important other upland acid grassland (U4, U5, U6) is not likely to constitute a significant negative effect given the low species diversity.

8.188 The total loss of 0.02ha locally important broadleaved woodland and 0.01ha locally important mixed woodland is not considered large enough to be significant.

8.189 The total loss of 0.3ha of locally important upland flushes, fens and swamp habitat (M6) is not considered large enough to be significant.

8.190 The total loss of 0.78 of locally important other neutral grassland (OV24, OV27) is not considered large enough to be significant.

8.191 The majority of infrastructure is situated a minimum of 50m away from primary watercourses (see **Chapter 3: Description of Development** for full details). Assuming that best practice pollution prevention measures are adopted, no significant effect is predicted on the running water environment. An assessment of effects specific to fish and otter is addressed separately in paragraphs 8.194 to 8.196 and 8.204 to 8.205 respectively.

GWDTE

8.192 **Table 8-11** shows the habitat loss (direct and indirect/temporary) for all potential GWDTE communities. The communities marked with an asterisk in **Table 8-11** have conferred upon them a potential to have a high or moderate groundwater dependency (based on SEPA (2024) guidance).

8.193 For a detailed assessment of the groundwater dependency of these habitats, please refer to **Chapter 10: Hydrology, Hydrogeology and Geology.** In summary, the GWDTE assessment presented in **Chapter 10** concludes that all areas of potential GWDTE are sustained by high average rainfall, surface water runoff and water logging of low permeability bedrock and superficial deposits. However, some base rich groundwater flushes are recorded and support GWDTE habitats, which have the potential to be impacted by the proposed development.

Fauna

Fish

8.194 Fish species are known to be present in the wider area and the fish habitat survey confirmed habitat within the site has the potential to support fish species.

8.195 A minimum 50m buffer has been ensured between all proposed infrastructure and the primary watercourses present on site, other than those stated in paragraph 8.148.

8.196 With the implementation of good practice pollution prevention measures (**Chapter 10: Hydrology, Hydrogeology and Geology**) the likelihood of a pollution event affecting fish within downstream watercourses is considered to be low. Therefore, no significant effect on salmonids or other fish species of conservation concern is likely.

8.197 Pre-construction electrofishing surveys are proposed to establish a baseline against which proposed construction and post-construction phase monitoring can be compared, so that any impacts on salmonid populations can be monitored during and after construction (see Assessment of Effects section).

Reptiles

8.198 Common lizard has been recorded on the site, but no other records of reptiles were returned by the desk study data search or identified during baseline surveys. The construction of the wind farm would result in the direct loss of up to 55ha of potentially suitable habitat for this species. This loss is not considered significant, given the extensive availability of similar suitable habitat within the site and the wider area, and the likely low population of common lizard present. Indirect/temporary loss of habitat has not been considered here, as it is anticipated that areas subject to drying or other temporary damage would still be utilised by common lizard for activities such as basking and potentially foraging (following habitat reinstatement).

8.199 Construction activities have some potential to cause temporary disturbance to reptiles utilising potentially suitable habitat within the site. This disturbance would likely be via noise, machinery and human presence. Given the availability of suitable habitat in the wider area, and the likely low population of reptiles present, no significant effects due to disturbance are predicted.

8.200 Good practice mitigation measures aimed at reptiles (see paragraphs 8.149 to 8.151), would be implemented during the construction phase, to prevent the inadvertent injury or killing of individuals. On the basis that the proposed measures are implemented, no

significant effects on reptiles are predicted, and no contravention of the relevant legislation is likely.

Mountain Hare

8.201 Mountain hares are known to be present in the area, and the site contains habitat suitable to support mountain hare.

8.202 The total loss of 63.07ha of suitable habitat (i.e. blanket bog, upland grassland) due to construction activities has the potential to impact mountain hare through the reduction of suitable habitat for foraging, sheltering and breeding. Densities of mountain hare within the site, if present, are likely to be low (<5/km^2) (NatureScot, 2024). Given the availability of suitable habitat in the wider area, and the likely low population of mountain hare present, no significant effects are predicted due to habitat loss.

8.203 Construction activities have the potential to disturb mountain hare and kill or injure mountain hares (especially during the breeding season of March to October), which would contravene legislation and constitute a significant negative effect at the local level given their unfavourable population status. However, following implementation of good practice measures outlined in paragraphs 8.149 to 8.151, death or injury to mountain hares during construction is not likely. As such, no significant effects would be likely to occur.

Otter

8.204 Otters were confirmed as present within the site, with the baseline surveys identifying otter spraint along the Danny Burn and a tributary of the Danny Burn. The site does contain habitat suitable for otter foraging, however there are limited opportunities for the creation of resting sites, especially within the upper reaches of the site.

8.205 Construction activities have some potential to cause temporary disturbance to otters which may use some of the watercourses and waterbodies on and around the site for foraging and commuting. This disturbance would likely be via noise and human presence. However, there is a 50m minimum stand off from most proposed infrastructure to watercourses. Otters have large home ranges and are able to adapt to a certain level of human disturbance (Chanin, 2003) and are mostly active at night. Given the majority of construction works will take place during daytime hours, the likelihood of potential disturbance to otter is low and no significant effects are predicted.

8.206 The death or injury of an individual otter during construction could have a potentially significant effect on the conservation status of this species in the local area. However, following implementation of the good practice measures outlined in paragraphs 8.158 to 8.162, death or injury to otters during construction is not likely. As such, no significant effects would be likely to occur.

Badger

8.207 The majority of habitats on site are of limited suitability for badger, however the small pockets of woodland do offer some suitability for sett building and foraging. On that basis impacts on badger cannot be ruled out.

8.208 Construction activities have the potential to cause temporary disturbance to badgers within their setts if works come within 30m of a sett, if active at the time of construction, which could constitute a likely significant short-term negative effect at a local level.

8.209 The death or injury of a badger during construction could potentially represent an offence under the relevant legislation (i.e. the Protection of Badgers Act), however, it is not likely to have a significant effect on the conservation status of this species in the local area. Additionally, following implementation of the good practice measures outlined in

paragraphs 8.149 to 8.151, death or injury to badgers during construction is not likely. As such, no significant effects would be likely to occur due to death or injury.

Red Squirrel

8.210 Historical records of red squirrel were returned during the desk-based data search, nearby to the site, and squirrel feeding signs were noted during the surveys. Much of the site is of limited suitability for red squirrel however there are some pockets of woodland near the access track which offer suitability for breeding and foraging. On that basis, impacts on red squirrels cannot be ruled out.

8.211 Construction activities have the potential to cause temporary disturbance to red squirrels within their dreys (if present) if works come within 50m of a drey during the breeding season (February to September inclusive) or within 5m of a drey outwith (as per NatureScot species planning advice (NatureScot, 2024f). This would contravene relevant legislation and constitute a likely significant short-term negative effect at a local level.

8.212 Construction activities also have the potential to cause damage to or destroy a potential red squirrel drey. This would contravene relevant legislation however, it is not likely to have a significant effect on the conservation status of this species in the local area. Therefore, no significant effects are likely due to the damage or destruction of a potential red squirrel drey.

8.213 The loss of woodland habitat has the potential to destroy suitable habitat for red squirrels, however, given the relatively small area of suitable habitat loss, and the availability of suitable habitat within the wider area, no significant effects are likely due to habitat loss.

8.214 The death or injury of an individual red squirrel during construction could have a potentially significant effect on the conservation status of this species in the local area. However, following implementation of the good practice measures outlined in paragraphs 8.158 to 8.162, death or injury to red squirrels during construction is not likely. As such, no significant effects would be likely to occur.

Bats - Roosting

8.215 The proposed development would result in the loss of a maximum of 0.03ha of potential roosting habitat (broadleaved and mixed woodland). This is a ‘worst case’ figure and in reality, this loss would be limited to a small number of trees that may be required to be lost to facilitate the widening of the existing access track.

8.216 Based on the number and categorisation of the PRFs identified during the GLTA survey, it is most likely that any bat roost present would comprise a small number of bats. Of the species with the potential to be present on site, brown long eared bats, common pipistrelle, soprano pipistrelle and noctule bats roost in trees. Based on the results of the activity surveys, any roots present are most likely to be common pipistrelle, soprano pipistrelle or Natterer’s bat (Jackson, 2015).

8.217 Ecobat output relating to calls recorded within the emergence window indicated that there is a potential presence of both a soprano and common pipistrelle roost in close proximity to the site, however results indicated that these potential roosts occurred out with the site (see paragraph 8.129 to 8.132).

8.218 The pre-construction surveys detailed in paragraphs 8.152 and 8.158 would allow any trees with confirmed bat roosts present to be avoided where possible during road widening works, however, on a precautionary basis these works have the potential to damage or destroy a bat roost, which would contravene relevant legislation and constitute a likely significant negative effect at a regional level (for Natterer’s bat) and a likely significant negative effect at a local level (for soprano and common pipistrelle bats).

8.219 Although any bats present would be likely be subject to some disturbance due to the proximity of the existing access track, there is still the potential for increased traffic and road widening works to disturb roosting bats (if present) which would contravene relevant legislation and constitute a likely significant negative effect at a regional level (for Natterer's bat) and a likely significant negative effect at a local level (for soprano and common pipistrelle bats.

Bats – Foraging and Commuting

8.220 The proposed development has the potential to impact foraging and commuting bats via habitat loss and disturbance due to noise and construction lighting.

8.221 The construction of the access track would result in the maximum loss of 0.57ha of woodland habitat (0.54ha of which is coniferous plantation). Coniferous plantation woodland is suboptimal habitat, however it can provide shade which can extend bat foraging times, provide habitat for flying insect and commuting routes for bats. Given that the coniferous habitat on site is relatively young, it is unlikely to be utilised by commuting and foraging bats using the site. Given the relatively small amount of habitat loss, and the availability of suitable habitat in the area, no significant effects are likely on foraging and commuting bats due to habitat loss.

8.222 The bat survey results indicate that the proposed turbine locations were subject to low levels of usage by bats. The loss of foraging habitat has the potential to impact foraging and commuting bats due to changes in landscape features, however, given the low levels of bat activity recorded on site, the low value of habitat to be lost and the fact construction activities would mostly take place during daylight hours during the active bat season (April to October, 07:00 - 19:00), no significant effects are likely on foraging and commuting bats due to disturbance during construction.

Deer

8.223 Roe deer were recorded incidentally on site in low numbers during the baseline surveys.

8.224 Construction activities have the potential to impact the local wild deer population through displacement during construction. However, it is unlikely that construction activities would displace wild deer to an extent that deer could cause damage on neighbouring land, that deer welfare would be adversely affected, or that other significant impacts would be caused such as increased road traffic collisions. This is due to the fact that density of deer on site are estimated to be low, and that construction activities will be restricted to the proposed access tracks and turbine infrastructure areas, with large areas of suitable habitat within the wider site, which do not form part of the construction footprint, still be available for deer to use during construction. The fact that roe deer are primarily crepuscular (i.e. most active at dawn and dusk), and therefore likely to be most active outside of the core construction hours, further reduces the extent to which wild deer are likely to be displaced off-site during construction.

8.225 Deer welfare is unlikely to be significantly affected by construction activities, as the surrounding areas will continue to offer places for food and shelter such as the moorland areas within the site away from the construction footprint. Good practice measures put in place for other species during construction, specifically safe storage of materials and covering of excavations/providing a means of escape (paragraphs 8.158 to 8.162) would also protect deer from harm during construction. It is also unlikely that construction activities would cause increased road traffic collisions. This is because the majority of the site is distant from any public roads, and because the number of deer potentially displaced would be low. The existing road (Sheriffmuir Road) joins the A9 road to the north, however there is a large area of suitable habitat between the site and the A9 road, such that deer

would be unlikely to be displaced onto the road. There would also be an increased presence of construction vehicles on the existing track, however a site speed limit of 15mph would be implemented, which would minimise the likelihood of deer traffic collisions within the site.

8.226 No significant negative effects on deer are likely due to construction of the proposed development.

Additional Mitigation, Compensation and Enhancement

8.227 Embedded mitigation and good practice measures are detailed in paragraphs 8.149 to 8.162**,** as well as in the Outline CEMP (**Technical Appendix 3.1**) and **Chapter 10: Hydrology, Hydrogeology and Geology**. No further mitigation measures are proposed to mitigate against potentially significant effects upon important ecological features during construction. However, a Habitat Management Plan (HMP) would be produced and agreed post consent. This would detail measures to compensate for the significant residual effects of habitat loss associated with the proposed development and provide significant biodiversity enhancement, in accordance with the fourth National Planning Framework (NPF4). An Outline HMP is provided in **Technical Appendix 8.4**, and a summary is provided in the following section (paragraphs 8.228 – 8.232).

Habitat Restoration and Management

8.228 Peatland has been identified as a national conservation priority within Scotland's National Peatland Plan (SNPP), for its importance for biodiversity, water quality, and as a carbon store (SNH, 2015). The SNPP states that peatland restoration is one of the priority projects highlighted in the Scottish Biodiversity Strategy Route Map towards meeting the European Union (EU) biodiversity target of restoring at least 15% of degraded ecosystems. The most extensive deepest peat soils occur under blanket bog and raised bogs, and these habitats are recognised as internationally important under the EU Habitats Directive (as priority habitats listed on Annex 1).

8.229 The broad principal aim of the Outline HMP is to plan the proposed habitat restoration and management measures which are proposed to compensate for the direct and indirect loss of sensitive natural/ semi natural habitats, notably blanket bog and wet heath, as a result of construction of the proposed development and to provide significant biodiversity enhancements, in accordance with NPF4.

8.230 The proposed restoration includes a total of 611.9ha of peatland habitat within Rhodders Farm and Blackford Estates (proposed habitat management areas are shown on **Figure 8.4.1** of **Technical Appendix 8.4**). Additionally, 162.29ha of wet and dry heath creation and 14.43ha of riparian habitat creation is proposed.

8.231 The Outline HMP sets out the following management goals:

- blanket bog restoration through active blanket bog restoration and grazing management;
- heathland restoration and grassland enhancement through creation of native wet and dry heath from existing acid grassland and existing grassland improvement through grazing management;
- riparian tree planting along riparian corridors;
- enhancement of reptile habitat through the creation of reptile hibernacula; and

- reinstatement of habitats temporarily disturbed during construction;

8.232 The success of the management goals set out in paragraph 8.231 will be monitored through a variety of habitat and species monitoring methods, see **Technical Appendix 8.4** for full details.

Residual Effects

8.233 The loss of blanket bog habitat within the Alva Moss candidate LNCS is considered to constitute a significant negative effect at a national level. However, this loss of habitat is offset through peatland restoration outlined within **Technical Appendix 8.4**.

8.234 The loss of habitats (including Annex 1 habitats) during the construction phase is considered to constitute a significant negative effect on biodiversity at a national level, however the habitat restoration and enhancement proposed would provide an increase in the ecosystem services provided by the site, resulting in a residual significant positive effect.

8.235 During the construction phase, the permanent loss of up to 14.36ha and indirect loss of 25.42ha of bog habitats (Annex 1 blanket bog) is considered to constitute a significant negative effect at the international level, and the permanent loss of up to 21.99ha and indirect loss of 12.05ha of wet heath habitats would constitute a significant negative effect at the regional level. The permanent loss of 1.92ha and indirect loss of 6.28ha of degraded blanket bog and the permanent loss of up to 0.02ha and indirect loss of 2.99ha of dry heath habitats would constitute a significant negative effect at the local level.

8.236 The habitat restoration and enhancement measures detailed in paragraph 8.321 and **Technical Appendix 8.4** delivers approximately 10 times the area of blanket bog loss, plus an additional 77.4ha of enhancement. This restoration and enhancement would offset the significant negative effects outlined in paragraph 8.185.

8.237 Potential significant negative effects due to disturbance of badgers within their setts (if active) is considered likely during the construction phase (paragraph 8.208). If required, i.e. if disturbance of a badger sett is unavoidable, the mitigation measure detailed in paragraph 8.152 would allow a licence to be sought from NatureScot in order for the works to proceed. No residual significant effects are therefore likely.

8.238 Construction activities have the potential to cause significant negative effects on red squirrel due to disturbance (if present) (paragraphs 8.210 to 8.214). If required, i.e. if disturbance of squirrels in an active drey is unavoidable, the mitigation measure detailed in paragraph 8.152 would allow a licence to be sought from NatureScot in order for the works to proceed. No residual significant effects on red squirrel are therefore likely.

8.239 Construction activities have the potential to cause a likely significant negative effect at a regional level (for Natterer's bat) and a likely significant negative effect at a local level (for soprano and common pipistrelle bats) due to disturbance and/or damage or destruction of roosts (if present). If required, the mitigation measure detailed in paragraph 8.152 would allow a licence to be sought from NatureScot in order for the works to proceed. This licence would also include, if appropriate, appropriate mitigation such as the prevision of a compensatory roost resource. Therefore, no residual significant effects on roosting bats are likely.

8.240 Following the employment of mitigation and compensation measures, no significant residual effects are predicted for important ecological features (other than biodiversity and habitats, which are offset via proposed restoration) during the construction phase.

Operational Effects

Potential Effects

8.241 Operational effects (assuming that the stated good practice mitigation measures, as set out in the Assessment of Effects section and **Chapter 10: Hydrology, Hydrogeology and Geology**, are implemented), are addressed for relevant features in paragraphs 8.243 - 8.261.

8.242 Effects have been assessed only for important ecological features (i.e. those with a value of Local level or above) and/or legally protected species. These comprise:

- habitats; and
- invertebrates, fish, reptiles, mountain hare, otter, badger, red squirrel, bats and deer.

Habitats

8.243 During the operational phase, no significant effects on retained habitats are predicted. Infrastructure would be in place and only occasional service vehicles would be present on the site, with the potential for incidents and spillages affecting sensitive habitats considered to be very low. In addition to this, good practice measures would be implemented further reducing the risk of an incident occurring.

Fauna

Fish

8.244 During the operational phase, maintenance traffic would be minimal. No hazardous chemicals would be stored on the site during the operational phase. During major maintenance events, temporary storage of hazardous chemicals could occur on site, but would be subject to implementation of standard pollution prevention control measures (see paragraph 8.149). Several of the watercourses and waterbodies that occur on site have the potential for fish, however there is a 50m standoff between most proposed infrastructure and watercourse (other than those listed in paragraph 8.148), as a result there would be limited mechanisms for causing water pollution, and as such no significant effects upon fish are predicted during operation.

Reptiles

8.245 During the operation of the proposed development, only minimal maintenance traffic would be present on the site and this would be restricted to driving along onsite access tracks only, with an applied speed limit similar to that in place during construction. As a result of this, no significant effects upon reptiles are predicted during operation.

Mountain Hare

8.246 Suitable habitat for mountain hares is present on site, and therefore presence cannot be ruled out. There is therefore a potential for injury / death during maintenance works.

8.247 During the operation phase, it is assumed that vehicle traffic would be minimal, and subject to similar speed limits to those in place during construction. It is assumed that all vehicular access would be taken using the access tracks on site, therefore there is no potential for the death/injury of juveniles within a shelter. The risk of injury and mortality to adult/ young-adult hares is considered unlikely due to their agility, therefore, no significant effects on mountain hare are likely during operation.

Otter

8.248 Human activity associated with wind farm maintenance would be limited to the permanent infrastructure areas and only minimal maintenance traffic would be present, which would be restricted to the access tracks and subject to similar speed limits to those in place during construction. As discussed in the 'Construction Effects' section, paragraph 8.204, there is some evidence of otter using the site however most activity is concentrated around the Danny Burn to the north of the site, away from the main works. On that basis, otter presence within the site and within 250m of proposed infrastructure is likely to be occasional and therefore the potential for otter to be affected during wind farm operation is low.

8.249 No hazardous chemicals would be stored on the site during the operational phase, and activities involving excavations would have ceased. During major maintenance events, temporary storage of hazardous chemicals could occur onsite, but would be subject to implementation of standard pollution prevention control measures and works would not take place within 50m of any watercourses, other than those listed in paragraph 8.148. As a result, there would be limited mechanisms present for causing water pollution.

8.250 Based on the above, assuming that all stated good practice measures are implemented, no significant effects on otter are likely during operation.

Badger and Red Squirrel

8.251 Suitable habitat for badger and red squirrel is limited to the vicinity around the proposed access track and therefore presence cannot be ruled out. There is therefore a potential risk of both disturbance and injury / death of these species during maintenance works.

8.252 During the operation phase, it is assumed that vehicle traffic would be minimal, and subject to similar speed limits to those in place during construction. The remaining habitat within the site is of limited potential to badger and red squirrel, and therefore presence is likely to be occasional. On that basis, potential for badger and red squirrel to be affected during wind farm operation is low. Based on this, no significant effects on badger or red squirrel are likely during operation.

Bats - Roosting

8.253 Increased vehicle traffic utilising the access road has the potential to disturb roosting bats (if present), however, during operation it is assumed that vehicle traffic would be minimal. Given that the potential roosting habitat is situated along an existing road, it is assumed that any roosts present would already be habituated to some disturbance due to traffic, therefore no significant effects on roosting bats are likely.

Bats – Foraging and Commuting

8.254 Operational wind turbines can affect bats in a number of ways, although the main concerns relate to collision mortality, barotrauma and other injuries resulting from collision with, or flying in very close proximity to, moving turbine blades (NatureScot, 2021). As described in paragraph 8.27, activity surveys were undertaken within the site at 13 locations, and the results indicated low levels of bat activity.

8.255 Based on NatureScot guidance (NatureScot, 2021), the proposed development presents a medium initial risk to bats (see paragraph 8.127). However, this is likely to be an overestimation due to the proposed development being considered of 'large' size as turbines are >100m in height ('large' developments' usually consist of >40 turbines).

8.256 In accordance with guidance (NatureScot, 2021) recorded bat activity data confirmed that at least five species and two species groups of bat classified as 'high risk' of collision with turbines utilise the site:

- common pipistrelle;
- soprano pipistrelle;
- brown long eared bat;
- *Pipistrellus* sp.;
- *Nyctalus* sp.; and
- *Myotis* sp.

8.257 Risks have been assessed for each species/ species in **Table 8-12**.

Table 8-12 Assessment of effects on bat species

Species/ Group	Assessment
Common pipistrelle	Classified as high collision risk (NatureScot, 2021), however as common pipistrelle are relatively common in Scotland, overall population vulnerability is classified as medium. Collision analysis indicates that during periods of both typical and peak activity, collision risk for common pipistrelle bats was low at all locations. Although there remains a risk that the operational wind farm could result in the killing or injury of a common pipistrelle, it is unlikely that this would negatively affect the favourable conservation status of the local population. Therefore, no significant effects on common pipistrelles are likely.
Soprano pipistrelle	Classified as high collision risk (NatureScot, 2021), however as common pipistrelle are relatively common in Scotland, overall population vulnerability is classified as medium. Collision analysis indicates that during periods of both typical and peak activity, collision risk for soprano pipistrelle bats was low at all locations. Although there remains a risk that the operational wind farm could result in the killing or injury of a soprano pipistrelle, it is unlikely that this would negatively affect the favourable conservation status of the local population. Therefore, no significant effects on soprano pipistrelles are likely.
Pipistrellus sp.	As above, both common and soprano pipistrelle are classed as medium vulnerability. Nathusius pipistrelle is also classed as high collision risk but is one of the rarest bat species in Scotland and therefore classed as high vulnerability. Due to the habitat present on site, it is unlikely that the Nathusius pipistrelles are present. Collision analysis indicates that during periods of both typical and peak activity, collision risk for *Pipistrellus* sp. bats was low at all locations. Although there remains a risk that the operational wind farm could result in the killing or injury of a *Pipistrellus* sp. bat, it is unlikely that this would negatively affect the conservation status of the local population. Therefore, no significant effects on *Pipistrellus* sp. are likely.
Brown long eared	Classified as low collision risk, overall population classified as low vulnerability. Collision risk analysis was not possible for brown long eared bats. However, brown long eared bats were only recorded on 4 nights at one static location during activity surveys. Although there remains a risk that the operational wind farm could result in the killing or injury of a brown long eared bat, it is unlikely that this would negatively affect the favourable conservation status of the local population. Therefore, no significant effects on brown long eared bats are likely.
Nyctalus sp.	Both noctule and Leiser's bats are among the rarest bat species in Scotland, and classified as high collision risk, therefore overall population vulnerability is classified as high. Collision analysis indicates that during periods of both typical and peak activity, collision risk for *Nyctalus* sp. bats was low at all locations.

	Only one record of *Nyctalus* sp. was recorded during the activity surveys. However, there remains a risk that the operational wind farm could result in killing or injuring a *Nyctalus* sp. bat, which could possibly negatively affect the conservation status of the local population. Should this happen, it would be considered a significant negative effect at the local level.
Myotis sp.	Both Daubenton's and Natterers bats are classified as rarer species in Scotland, however they are classified as low collision risk, therefore their overall population vulnerability is classified as low. Whiskered and Brant's bat are both among the rarest bat species in Scotland, however, have a low collision risk, therefore their overall population vulnerability is classified as medium. Given the location of the site, it is most likely that *Myotis* species recorded were Daubenton's and/or Natterer's. Collision analysis indicates that during periods of both typical and peak activity, collision risk for *Myotis* sp. bats was low at all locations. However, there remains a risk that the operational wind farm could result in killing or injuring a *Myotis* sp. bat, which could possibly negatively affect the conservation status of the local population. Should this happen, it would be considered a significant negative effect at the local level.

8.258 Given the low risk to bats at the Site, no specific mitigation (e.g. turbine curtailment) or monitoring is considered necessary, in line with current guidelines (NatureScot, 2021).

Deer

8.259 Potential impacts in relation to deer during the operational phase relate to possible changes in grazing areas resulting from the measures outlined in **Technical Appendix 8.4**, and collision risk with site traffic/maintenance vehicles.

8.260 Only minimal maintenance traffic would be present during the operational phase, which would be subject to the 15mph site speed limit, such that increased traffic collision risk would be minimal. Significant displacement, and therefore any impacts on neighbouring habitats and roads, is not likely during the operational phase due to minimal disturbance.

8.261 Overall, no significant adverse effects are predicted upon wild deer, or resulting from wild deer, during the operational phase. Given that no significant adverse effects are predicted for both the construction and operational phases, a draft deer management statement is not required, following the criteria within the relevant NatureScot guidelines (SNH, 2016).

Mitigation, Compensation and Enhancement

8.262 There are significant negative effects at the local level predicted on bats due to collision risk during the operational phase. Good practice involving 'feathering' whereby turbine blades would be pitched out of the wind to reduce rotation speeds (to below 2rpm) while idling would be employed. The reduction in speed created through feathering compared with idling alone has the potential to reduce bat fatality rate by up to 50% (NatureScot, 2021).

8.263 No specific mitigation measures are required for the operational phase. However, compensation and enhancement measures provided as part of the Outline HMP (see paragraphs 8.228 to 8.232 and **Technical Appendix 8.4**) would remain in place during the operational phase.

Residual Effects

8.264 Feathering of turbine blades (paragraph 8.262) would result in a reduction of collision risk to foraging and commuting bats to a level which is not considered to be significant.

8.265 No significant residual effects are anticipated during the operational phase.

Cumulative Effects

Construction Phase

Habitats

8.266 Cumulative effects on important habitats have been considered for other windfarms within 10km of the proposed development (see **Table 8-10**). **Table 8-13** contains the habitat loss predicted for developments considered within this cumulative assessment, where available. Where habitat loss information was not available for a project, cumulative impacts have not been assessed.

Table 8-13: Cumulative Habitat Loss

Receptor	Project	Status	Impact
Wet Heath	Burnfoot East Wind Farm	Operational	Permanent loss of 1.08ha wet heath and additional drainage effects (stated to be minor). Effect considered negligible, mitigated for through increase of existing Habitat Management Area within Burnfoot Windfarm Land Management Plan to account for predicted habitat loss.
Blanket Bog	Burnfoot Hill Wind Farm Extension (Burnfoot North)	Operational	Loss of c1.1ha blanket bog/acid grassland mosaics significant at a local level. Habitat Management Plan proposed to improve areas of bog habitat through grazing management.
	Strathallan Wind Farm	Consented – under construction	Impact on bog habitats within areas to be felled, no significant impacts predicted. No habitat restoration/enhancement proposed.
	Rhodders Wind Farm	Operational	Loss of 3.73ha *Calluna vulgaris – Eriophorum vaginatum* blanket mire significant at the County level, loss of c.2.02ha blanket bog/acid grassland mosaic habitat significant at the local level. Habitat Management Plan

			proposed to improve areas of bog through grazing control.

8.267 Two operational wind farms within 10km of the proposed development have contributed to the cumulative direct loss of a minimum of 6.85ha blanket bog habitat, which does not include associated indirect effects. This cumulative total will be increased due to habitat loss associated with the Strathallan Wind Farm Phase 1 and Phase 2, though specific measurements were not given, and other developments in **Table 8-10** for which habitat loss information was not available. When the additional loss (both direct and indirect) predicted due to the proposed development is accounted for, the total cumulative loss of blanket bog habitat is 60.3ha. While this loss of blanket bog is considered a significant negative effect, habitat losses associated with each development (including the proposed development) will be restored through habitat restoration works likely larger than the area lost. Therefore, no significant cumulative effects on blanket bog are predicted.

8.268 The operational Burnfoot East Wind Farm involved the loss of 1.08ha of wet heath habitats, which, when added to the predicted habitat loss for the proposed development totals a cumulative loss of 1.1ha. Given the small amount of habitat loss, and the fact that habitat loss will be offset through habitat restoration works for each development, no significant cumulative effects on wet heath habitats are predicted.

Aquatic Features

8.269 For the cumulative effects on aquatic features during construction, the only potential for significant cumulative effects would be via the discharge of particulate matter into watercourses, or through a pollution incident. Wind farms which are already operational are not likely to give rise to significant cumulative effects and therefore the assessment has been restricted to wind farms and other developments within the same catchment which are yet to be constructed.

8.270 The watercourses onsite fall into three water catchments; the Allan Water, the River Devon and the Wharry Burn (for full details see **Chapter 10 Hydrology, Hydrogeology and Geology**.) Strathallan Wind Farm falls within the Allan Water catchment therefore there is the potential for cumulative effects on aquatic features through accidental pollution events. The ES (Green Cat Renewables, 2015) states that a CEMP and a Pollution Management Plan will be adhered to, outlining mitigation measures to reduce potential impacts to the water environment, including an incident response plan. Therefore, no significant cumulative effects on aquatic features are predicted.

Operational Phase

Habitats

8.271 Given there will be no residual negative effects on habitats during the operation of the proposed development (see paragraph 8.243), no significant cumulative effects on habitats are predicted.

Aquatic Features

8.272 It is assumed that all operational wind farms will be managed in accordance with best practice, industry standards and relevant legislation, planning policy and guidance regulated by statutory consultees. These standards ensure that potential impacts on the

water environmental are controlled at source. Therefore, no significant cumulative effects on aquatic features are predicted.

Bats

8.273 The following developments predicted no significant impacts on bats:

- Rhodders Wind Farm;
- Burnfoot East Wind Farm;
- Burnfoot Extension (North) Wind Farm; and
- Strathallan Wind Farm.

8.274 Information relating to bats for the remaining developments listed in **Table 8-8** was not available, and therefore not taken into consideration for this assessment of cumulative effects.

8.275 Given that the low levels of bat activity recorded at the proposed development, no significant cumulative effects on bats are predicted.

Further Survey Requirements and Monitoring

Habitat Monitoring

8.276 Botanical monitoring would be undertaken as part of the HMP, as detailed in **Technical Appendix 8.4**, and summarised below:

- drone survey/aerial photography survey of the HMP areas to document baseline and monitor vegetation changes;
- ground based botanical monitoring using Common Standards Monitoring (CSM) vegetation condition quadrats;
- blanket bog condition assessments using criteria within NatureScot's Peatland Action Peatland Condition Assessment Guide (NatureScot, 2023); and
- monitoring of survival and condition of riparian tree planting.

8.277 Hydrological monitoring would also be undertaken as part of the HMP, as detailed in **Technical Appendix 8.4**, and summarised below:

- monitoring of water table height within active blanket bog restoration areas via dipwells; and
- checks of blanket bog restoration dams to highlight any maintenance requirements.

Hydrological Monitoring

8.278 Water quality monitoring before and during the construction phase will be undertaken for the surface water catchments that drain from the site to ensure that none of the tributaries of the main channels are carrying pollutants or suspended solids. Monitoring will be carried out at a specified frequency (determined by the construction phase) on these catchments. For further details see **Chapter 10: Hydrology, Hydrogeology and Geology**.

8.279 Hydrological monitoring via dipwells will take place pre-construction (to provide a baseline) and at regular intervals post-construction to monitor water table height within proposed active blanket bog restoration areas to monitor the efficacy of the habitat restoration measures employed.

8.280 In order to monitor the effectiveness of the ditch blocking methods, checks will be made to monitor for damage and highlight required maintenance.

8.281 Full details of the hydrological monitoring proposed are contained within **Technical Appendix 8.4 Outline Habitat Management Plan.**

Species Monitoring

8.282 As stated in paragraph 8.197, electrofishing surveys prior to construction commencement are recommended in order to establish a baseline. Fish monitoring should take place throughout construction and post construction in order to monitor the effect of construction activities on fish populations.

8.283 As stated in paragraph 8.152, pre-construction surveys will be undertaken to take account of any changes in distribution of any protected or notable species likely to be present within the site.

8.284 For full details of further monitoring proposed, see **Technical Appendix 8.4**.

8.285 See **Chapter 9: Ornithology** for details of the ornithological post consent monitoring programme.

Summary of Predicted Effects

Proposed Development

8.286 **Table** provides a summary of effects on important ecological features, mitigation, compensation and enhancement measures and residual effects.

Table 8-14 Summary of Effects on Important Ecological Features

Receptor	Potential Effect	Embedded Mitigation/Good Practice	Significance of Effect	Additional Mitigation/Compensation	Residual Effect
Construction Phase					
Designated Sites	Permanent loss of 28.13ha Alva Moss candidate LNCS. Pollution of water environment.	Avoidance of habitat loss where possible. A minimum 50m buffer between proposed infrastructure and primary watercourses present.	Significant negative effect at a national level due to habitat loss.	Compensation, restoration and enhancement of 611.9ha blanket bog via the OHMP.	Significant negative effect at a national level, offset through proposed habitat restoration via the OHMP leading to an overall positive effect.
Biodiversity	Loss of ecosystem services due to habitat loss.	Avoidance of habitat loss where possible.	Significant negative effect at a national level.	Compensation, restoration and enhancement of 611.9ha blanket bog, 162.29ha wet and dry heathland creation and riparian habitat creation via tree planting (14.43ha) via the OHMP.	Significant negative effect at national level offset through proposed habitat restoration and enhancement leading to an increase in ecosystem services provided by the site.
Blanket bog	Permanent loss (direct and indirect) of up to 45.05ha of Annex 1 blanket bog habitat.	Avoidance of blanket bog where possible.	Significant at a national level.	Compensation, restoration and enhancement of 611.9ha blanket bog via the OHMP.	Significant negative effect at a national level but offset through proposed habitat restoration and enhancement within the OHMP leading to an overall positive effect.
Degraded Blanket Bog	Permanent loss (direct and indirect) of up to 8.4ha of	Avoidance of degraded blanket bog where possible.	Significant at national level.	Compensation, restoration and enhancement of 611.9ha blanket bog via the OHMP.	Significant negative effect at a national level but offset through proposed habitat

	degraded blanket bog habitat.				restoration and enhancement within the OHMP leading to an overall positive effect.
Heathland Habitat	Permanent loss (direct and indirect) of up to 1.16ha of Annex 1 heathland habitat (upland dry heath and upland wet heath).	Avoidance of heathland habitat where possible.	Significant at a national level.	Compensation, restoration and enhancement of 162.29ha wet and dry heathland creation via the OHMP.	Significant negative effect at a national level but offset through proposed habitat restoration and enhancement as detailed in the OHMP leading to an overall positive effect.
Upland Acid Grassland	Total direct and indirect loss of 8.45ha of upland acid grassland.	Avoidance of acid grassland where possible.	Not significant	Grassland enhancement through grazing management via the OHMP.	Not significant.
Neutral Grassland	Total direct and indirect loss of 0.78ha neutral grassland habitat.	Avoidance of neutral grassland habitat where possible.	Not significant.	Grassland enhancement through grazing management via the OHMP.	Not significant.
Fens, flushes and swamp	Total direct and indirect loss of 0.3ha of fen, flushes and swamp habitat.	Avoidance of fen, flushes and swamp habitat where possible.	Not significant.	-	Not significant
Woodland Habitat	Total loss (direct and indirect) of 0.03ha woodland habitat.	Avoidance of woodland habitats where possible.	Not significant.	Riparian habitat creation via tree planting (14.43ha) via the OHMP.	Not significant.
Fish	Water quality impacts on fish habitat.	A minimum 50m buffer between proposed infrastructure and primary	Not significant	Hydrological and pollution prevention measures (detailed in Chapter 10 and the Outline CEMP); including adherence to SEPA PPGs/GPPS.	Not significant.

		watercourses present.			
Reptiles	Loss of up to 55ha of suitable habitat for reptiles.	Vegetation management and identification/removal of potential refugia and hibernacula, if present. Site speed limit of 15mph. 'Soft start' to construction during active season, checks for reptiles outwith active season.	Not significant	Reinstatement of habitat subject to temporary loss.	Not significant.
Mountain hares	Loss of up to 63.07ha habitat suitable for mountain hares. Risk of injury/death of mountain hares.	Covering/ramping of excavations. Site speed limit of 15mph. Suitable storage of materials.	Not significant	Pre-construction surveys.	Not significant.
Otter	Temporary disturbance, injury and/ or death of otter.	Covering/ramping of excavations. Site speed limit of 15mph. Suitable storage of materials.	Not significant	Pre-construction surveys.	Not significant.
Badger	Temporary disturbance of badgers in setts,	Covering/ramping of excavations.	Significant short-term negative effect at a local level.	Pre-construction surveys.	Not significant.

	death. Injury of badgers.	Site speed limit of 15mph. Suitable storage of materials.			
Red squirrel	Temporary disturbance of red squirrels within dreys, damage/destruction of a drey, habitat loss.	Covering/ramping of excavations. Site speed limit of 15mph.	Potential significant negative effect at the local level due to temporary disturbance.	Pre-construction surveys.	Not significant.
Bats -Roosting	Disturbance to roosting bats, damage/destruction of a roost.	Avoidance of woodland habitat where possible. Daylight construction hours (07:00 – 19:00).	Potential significant negative effect at regional level (Natterers's) and local level (common and soprano pipistrelle) due to disturbance or damage/destruction of a roost.	Pre-construction surveys.	Not significant.
Bats – foraging and commuting	Habitat loss and disturbance to commuting and foraging bats.	Avoidance of woodland habitat where possible. Daylight construction hours (07:00 – 19:00).	Not significant.	Riparian habitat creation via tree planting (14.43ha) via the OHMP.	Not significant.
Roe deer	Displacement, loss of suitable grazing habitat, death/injury of individual deer.	Covering/ramping of excavations. Site speed limit of 15mph.	Not Significant	None.	Not Significant

		Suitable storage of materials.			
Operational Phase					
Habitats	Damage to habitats due to vehicle movement and pollution.	Suitable storage of materials. Vehicle use of access tracks only.	Not significant.	None.	Not significant.
Fish	Damage to aquatic habitats due to pollution incidents.	A minimum 50m buffer between proposed infrastructure and primary watercourses present. Suitable storage of materials.	Not significant.	None.	Not significant.
Reptiles	Death/injury due to vehicle movement.	Vehicle use of access tracks only. Site speed limit.	Not significant.	None.	Not significant.
Mountain hares	Death/injury due to vehicle movement.	Vehicle use of access tracks only. Site speed limit.	Not significant.	None.	Not significant.
Otter	Disturbance due to human activity/ vehicles on site. Death/injury due to vehicle movement.	A minimum 50m buffer between proposed infrastructure and primary watercourses present.	Not significant.	None.	Not significant.

	Damage of aquatic habitats due to pollution incidents.	Suitable storage of materials. Vehicle use of access tracks only. Site speed limit.			
Badger and red squirrel	Death/injury due to vehicle movement.	Vehicle use of access tracks only. Site speed limit.	Not significant.	None.	Not significant.
Bats - roosting	Disturbance due to increased vehicle movement.	Turbines sited away from bat habitat.	Not significant	None	Not significant
Bats – commuting and foraging.	Collision with moving turbines/barotrauma.	Turbines sited away from bat habitat	Potential significant negative effect on *Nyctalus* and *Myotis* sp. bats due to collision risk.	Feathering of turbine blades.	Not significant.
Deer	Changes in grazing areas due to habitat management works outlined in the OHMP. Death/injury due to vehicle movement.	Vehicle use of access tracks only. Site speed limit.	Not significant.	None.	Not significant.

Cumulative Effects

8.287 Significant cumulative effects, during both the construction and operational phases, are unlikely, as detailed in the Assessment of Effects section.

Statement of Significance

8.288 Following the avoidance of important features during the project design where possible, and with the implementation of the proposed good practice measures and additional mitigation, impacts would be minimised as far as possible.

8.289 The proposed development would result in a significant negative effect on proposed designated sites (Alva Moss candidate LNCS) and biodiversity at national level due to loss of Annex 1 habitat. However, this habitat loss would be compensated by a significant positive effect through the peatland restoration proposed, to be delivered via an HMP.

8.290 The proposed development would result in a significant negative effect for the loss of blanket bog and wet heath at the national level, and for the loss of degraded blanket bog and dry heath at the local level. However, this habitat loss would be compensated through the peatland restoration proposed, to be delivered via a HMP, which would result in an overall positive effect.

8.291 The proposed development has the potential to result in significant negative effects on the following species during the construction phase:

- significant short-term negative effect on badger at a local level due to temporary disturbance;
- significant short-term negative effect on red squirrels at a local level due to temporary disturbance;
- significant negative effect on red squirrels at a local level due to damage/ destruction of dreys;
- significant negative effect on roosting Natterer's bats at a regional level due to disturbance of bats within a roost;
- significant negative effect on roosting common and soprano pipistrelles at a local level due to disturbance of bats within a roost;
- significant negative effect on roosting Natterer's bats at a regional level due to damage/destruction of a bat roost; and
- significant negative effect on roosting common and soprano pipistrelle bats at a local level due to damage/destruction of a bat roost.

8.292 Following the implementation of secondary mitigation measures (including pre-construction surveys and directional lighting), no significant residual effects on badger, red squirrels or bats due to disturbance are predicted during the construction phase.

8.293 Following the implementation of secondary mitigation measures, no significant residual effects on red squirrels or roosting bats due to damage or destruction of a drey/roost are predicted during the construction phase.

8.294 During the operational phase, there is the potential for significant negative effects at the local level on *Nyctlaus* and *Myotis* sp. bats due to collision risk. Following secondary mitigation in the form of blade 'feathering', no significant residual effects on bats are predicted during operation.

8.295 With the implementation of continued good practice measures and the implementation of the proposed outline HMP, no other significant negative effects are predicted during the operation phase.

8.296 The overall biodiversity value of the site would increase through the restoration of blanket bog habitat, creation of riparian habitat and the restoration and enhancement of heath and blanket bog habitats. This work is partially to compensate for the loss of habitats (particularly Annex 1 heath and blanket bog) for infrastructure construction but goes further and restores a much larger area of blanket bog than lost, enhancing the habitat value of the site and helping tackle the climate crisis.

References

Arnett, E., Brown, W. K., Erickson, W.P., Fiedler, J.K., Hamilton, B.L., Henry, T.H., Jain, A., Johnson, G.D., Kerns, J., Koford, R.R., Nicholson, C.P., O'Connell, T.J., Piorkowski, M.D. and Tankersley, R.D. (2008). Patterns of Bat Fatalities at Wind Energy Facilities in North America. *The Journal of Wildlife Management* **72(1)**, pp 61-78.

BARS (2012) *Biodiversity Action Reporting System* [Previously available online] Available at: http://ukbars.defra.gov.uk/ [Accessed April 2025].

Battersby, J. (ed) & Tracking Mammals Partnership (2005) UK Mammals Species Status and Population Trends. First Report by the Tracking Mammals Partnership. JNCC/Tracking Mammals Partnership, Peterborough.

BCT (2024) The National Bat Monitoring Programme Annual Report 2023. Bat Conservation Trust, London. Available at: www.bats.org.uk/our-work/national-bat-monitoringprogramme/reports/nbmp-annual-report [Accessed April 2025].

Bruneau, P. M. C. & Johnson, S. M. (2014) *Scotland's peatland – definitions and information resources*. Scottish Natural Heritage Commissioned Report No 701.

Butcher B., Carey P., Edmonds R., Norton L and Treweek J. (2023) *The UK Habitat Classification User Manual* Version 2.

Butterfly Conservation (n.d.), Northern brown argus factsheet. Butterfly Conservation Scotland. Available at: https://butterfly-conservation.org/sites/default/files/northern-brown-argus-factsheet-2017.pdf [Accessed April 2025].

Central Environmental Surveys (2019). *Peatland Restoration Feasibility Survey of Alva Moss and Menstrie Moss (Ochil Hills) 2019/20 for Friends of the Ochils*.

Chanin P (2003) Ecology of the European Otter. Conserving Natura 2000 Rivers, *Ecology Series No. 10.* English Nature, Peterborough.

CIEEM (2018) *Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine*. Chartered Institute of Ecology and Environmental Management, Winchester. Version 1.3 - updated September 2024.

CIRIA (2019). Biodiversity Net Gain – Good Practice Principles for Development. A Practical Guide. Construction Industry Research and Information Association. London

Clackmannanshire Council (2022) *Clackmannanshire Council, Biodiversity Duty Report*, 2018-2022.

Collins, J. (ed.) (2023) Bat Surveys for Professional Ecologists: Good Practice Guidelines (4th edition). The Bat Conservation Trust, London. ISBN-978-1-7395126-0-6.

Deer Working Group (2020) The Management of Wild Deer in Scotland. Report of the Deer Working Group, The Scottish Government.

European Commission (2013). Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment. Available at: https://op.europa.eu/en/publication-detail/-/publication/3ed0e578-7f24-4073-81c9-f279c6d4b3cf/language-en [Accessed April 2025].

Green Cat Renewables (2015) *Strathallan Wind Farm – Environmental Statement*.

Hendry K & Cragg-Hine D (1997). Restoration of riverine salmon habitats. *Fisheries Technical Manual 4* Environment Agency, Bristol.

IPL (2023). GN08/23 Bats and Artificial Lighting at Night. Institute of Lightings Professionals, Bat Conservation Trust. Rugby. Available online from: https://www.bats.org.uk/news/2023/08/bats-and-artificial-lighting-at-night-ilp-guidance-note-update-released [Accessed April 2025].

Jackson, D (2015). *Bats in Trees Information Leaflet*, updated 2018. The Bat Conservation Trust.

JNCC (2009) *The Habitats Directive: selection of Special Areas of Conservation in the UK*, 2nd edition (2005, updated 2009). Available at: https://hub.jncc.gov.uk/assets/5d20b480-9cc1-490f-9599-da6003928434 [Accessed April 2025].

JNCC (2013) *Guidelines for selection of biological SSSIs*. Available at: https://hub.jncc.gov.uk/assets/dc6466a6-1c27-46a0-96c5-b9022774f292 [Accessed April 2025].

Julian et al, 2024 *An overview of the Scottish National Adder Survey 2022-2024*, The Glasgow Naturalist, Volume 28 part 2, 51-56

Lintott *et al* (2018) Ecobat: An online resource to facilitate transparent, evidence-based interpretation of bat activity data. Ecology and Evolution 2018:B:935-941.

Met Office (2025) *Weather Observation Website (WOW).* Available at: https://wow.metoffice.gov.uk/ [Accessed April 2025].

NatureScot (2000) Ancient Woodland Inventory. Available at: https://opendata.nature.scot/datasets/ancient-woodland-inventory/explore?location=56.596005%2C-4.307542%2C7.55 [Accessed July 2025].

NatureScot (2016) *Peatland Action- Peatland Condition Assessment Guide*. Available at: https://www.nature.scot/sites/default/files/2023-02/Guidance-Peatland-Action-Peatland-Condition-Assessment-Guide-A1916874.pdf

NatureScot (2021) *Bats and onshore wind turbines – survey, assessment and mitigation*. Available at: https://www.nature.scot/doc/bats-and-onshore-wind-turbines-survey-assessment-and-mitigation [Accessed April 2025].

NatureScot (2023) *Advising on peatland, carbon-rich soils and priority peatland habitats in development management*. Available at: https://www.nature.scot/doc/advising-peatland-carbon-rich-soils-and-priority-peatland-habitats-development-management [Accessed April 2025].

NatureScot (2024a) *General pre-application and scoping advice for onshore wind farms*. Available at: https://www.nature.scot/doc/general-pre-application-and-scoping-advice-onshore-wind-farms [Accessed April 2025].

NatureScot (2024b) *Standing advice for planning consultations – Otter.* Available at: https://www.nature.scot/doc/standing-advice-planning-consultations-otters [Accessed April 2025].

NatureScot (2024c) *Guidance on Establishing and Managing Local Nature Conservation Site Systems in Scotland – 2023 update*. Available at: https://www.nature.scot/sites/default/files/2024-04/lncs-guidance-march-2024-accessible.pdf [Accessed April 2025].

NatureScot (2024d) Ecosystem services- Natures Benefit. Available at: https://www.nature.scot/scotlands-biodiversity/scottish-biodiversity-strategy/ecosystem-approach/ecosystem-services-natures-benefits [Accessed April 2025].

NatureScot (2024e) *Good practice during wind farm construction.* Available at: https://www.nature.scot/doc/good-practice-during-wind-farm-construction [Accessed April 2025].

NatureScot (2024f) *Standing advice for planning consultations – Red Squirrels*. Available at: https://www.nature.scot/doc/standing-advice-planning-consultations-red-squirrels [Accessed April 2025].

NatureScot (n.d.) Slow worm. Available at: https://www.nature.scot/plants-animals-and-fungi/amphibians-and-reptiles/slow-worm [Accessed April 2025].

Neal and Cheeseman (1996) Badgers. Poyser, London.

Oldham, R.S., Keeble, J., Swan, M.J.S. and Jeffcote, M. (2000) Evaluating the Suitability of Habitat for the Great Crested Newt (*Triturus cristatus*), *The Herpetological Journal*, Vol 10 pp. 143-155.

O'Shea, T.J., Cryan, P.M., Hayman, D.T.S., Plowright, R.K., and Streicker, D.G. (2016). Multiple mortality events in bats: a global review. Mammal Review. Volume 46, Issue 3, 175-190. Available online from: https://doi.org/10.1111/mam.12064 [Accessed April 2025].

Reason, P.F. and Wray, S. (2023). *UK Bat Mitigation Guidelines: a guide to impact assessment, mitigation and compensation for developments affecting bats*. Version 1.1. Chartered Institute of Ecology and Environmental Management, Ampfield.

Rodwell J.S (Editor) (1991 et seq.) *British Plant Communities*. Cambridge University Press.

Rodwell, J.S, (2006), *NVC Users' Handbook*, 68 pages, ISBN 978 1 86107 574 1.

Scottish Government (2013) Scottish Government Scottish Biodiversity List SBL. Available at: https://www.nature.scot/doc/scottish-biodiversity-list [Accessed in April 2025].

Scottish Government (2019) European community directive https://jncc.gov.uk/jncc-assets/Art17/S1029-SC-Habitats-Directive-Art17-2019.pdf

Scottish Fisheries Co-ordination Centre (SFCC) (2007) Introductory electrofishing training manual & electrofishing team leader training manual. Available at: http://www.sfcc.co.uk/resources/electrofishing.html [Accessed in April 2025].

SEPA (2016). Biosecurity and management of invasive and non-native species for construction sites and Controlled Activities. Available online: https://www.sepa.org.uk/media/163480/biosecurity-and-management-of-invasive-non-native-species-construction-sites.pdf [Accessed April 2025].

SEPA (2024). Guidance on Assessing the Impacts of Development Proposals on Groundwater Abstractions and Groundwater Dependent Terrestrial Ecosystems. *Land Use Planning System SEPA Guidance Note 31* (LUPS – GN31). Version 3 Issued 11 September 2017.

SLR (2023) *Environmental Impact Assessment Scoping Report – Windburn Wind Farm.*

SNH (2015) *Scotland's National Peatland Plan: Working for our future*. [Online] Available at: https://www.nature.scot/sites/default/files/2017-07/A1697542%20-%20150730%20-%20peatland_plan.pdf [Accessed April 2025]

SNH (2016) Planning for development: What to consider and include in deer assessments and management at development sites. Version 2, March 2016. Available at: https://www.nature.scot/doc/what-consider-and-include-deer-assessment-and-management-development-sites [Accessed April 2025].

SNH (2016) Carbon and Peatland 2016 Map. Available at: http://soils.environment.gov.scot/maps/thematic-maps/carbon-and-peatland-2016map/[Accessed April 2025].

Tayside Biodiversity Partnership (2016) *Tayside Local Biodiversity Action Plan*, 2nd Edition 2016-2026.

Velander (1983) *Pine marten survey of Scotland, England and Wales 1980-1982*. London, The Vincent Wildlife Trust.

Voight, C.C., Bernard, E., Chun-Chia Huang, J., Frick, W.F., Kerbiriou, C., MacEwan, K., Mathews, F., Rodríguez-Durán, A., Scholz, C., Webala, P.W., Welbergen, J., Whitby, M. (2024). Toward solving the global green–green dilemma between wind energy production and bat conservation. BioScience, Volume 74, Issue 4, Pages 240–252. Available online: https://doi.org/10.1093/biosci/biae023 [Accessed April 2025].

Ward, D., Holmes, N. and José P (1994) *The New Rivers and Wildlife Handbook*. RSPB, Bedfordshire.

Wind Prospect (2011) Burnfoot Hill Wind Farm Extension (Burnfoot North)- *Environmental Statement*

Wind Prospect (2017a) *Burnfoot East Wind Farm – Environmental Statement*

Wind Prospect (2017b) *Rhodders Wind Farm – Environmental Statement*