VATTENFALL

## Document history

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# Chapter 6.

## Ecology and Biodiversity Assessment

## Contents

## Glossary

| Term | Definition |
|---|---|
| Environmental Impact Assessment | Environmental Impact Assessment (EIA) is a means of carrying out, in a systematic way, an assessment of the likely significant environmental effects from a development. |
| Environmental Impact Assessment Regulations | The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 (EIA Regulations) |
| Environmental Impact Assessment Report | A document reporting the findings of the EIA and produced in accordance with the EIA Regulations |
| Proposed Development | The South Kyle II Wind Farm development |
| Proposed Development Area | The area within the “Site boundary” as illustrated on Figure 1.1, Volume 2a which the Proposed Development will be located |

## List of Abbreviations

| Abbreviation | Description |
|---|---|
| AWS | Ancient Woodland Sites |
| BAI | Bat Activity Index |
| BERP | Biodiversity Enhancement and Restoration Plan |
| CEMP | Construction and Environmental Management Plan |
| CIA | Cumulative Impact Assessment |
| CIEEM | Chartered Institute of Ecology and Environmental Management |
| DGC | Dumfries and Galloway Council |
| EAC | East Ayrshire Council |
| ECoW | Environmental Clerk of Works |
| EIA | Environmental Impact Assessment |
| EIAR | Environmental Impact Assessment Report |
| EU | European Union |
| FMS | Fisheries Management Scotland |
| GFT | Galloway Fisheries Trust |
| GWDTE | Groundwater Dependent Terrestrial Ecosystems |
| HMP | Habitat Management Plan |
| IEF | Important Ecological Features |
| IUCN | International Union for Conservation of Nature |
| JNCC | Joint Nature Conservation Committee |
| LNR | Local Nature Reserves |
| LPA | Local Planning Authority |
| LWS | Local Wildlife Sites |
| MAGIC | Multi-Agency Geographic Information for the Countryside |
| OEMP | Operational Environmental Management Plan |
| NDSFB | Nith District Salmon Fisheries Board |
| NNR | National Nature Reserves |
| NPF4 | National Planning Framework 4 |
| NVC | National Vegetation Classification |
| PAN | Planning Advice Note |
| SAC | Special Areas of Conservation |
| SBL | Scottish Biodiversity List |
| SEPA | Scottish Environment Protection Agency |
| SM4 | Wildlife Acoustic Song Meter 4 |
| SNH | Scottish Natural Heritage |
| SPP | Species Protection Plan |
| SSSI | Sites of Special Scientific Interest |
| SUDS | Sustainable Urban Drainage System |
| SWSEIC | South West Scotland Environmental Information Centre |
| UNESCO | United Nations Educational Scientific and Cultural Organisation |
| WCA 1981 | Wildlife and Countryside Act 1981 (as amended) |
| WQMFMP | Water Quality, Macro-Invertebrate and Fish Monitoring Plan |
| ZoI | Zone of Influence |

## 6.1. Statement of Competence

6.1.1. The author of this chapter has over 10 years of experience in the environmental consultancy sector in ecology and conservation. During this time, they have been involved with management of onshore wind and solar development projects, production of Environmental Impact Assessment Report (EIAR) ecology chapters, scoping reports and technical baseline reports as well as client and consultee liaison. They are an experienced ecologist and ornithologist, with experience in conducting various surveys, including habitats, protected mammals, bats, reptiles/amphibians and breeding/non-breeding bird surveys. The author was assisted by a Senior Environmental Consultant who has been working as a consultant in renewable and non-renewable development sectors for 11 years, and an Associate Technical Director (Ecology) with over 17 years of experience in EcIA and Environmental Impact Assessment Report (EIAR) compilation.

## 6.2. Introduction

### Summary of Chapter

6.2.1. In order to inform the Environmental Impact Assessment (EIA), a desk study and baseline ecology surveys were undertaken in September and November 2021, between April and September 2022 and in December 2023 (see Table 6.1). All surveys were undertaken following the most relevant industry guidelines and incorporated relevant scoping responses. The proposed South Kyle II Wind Farm (hereafter referred to as the Proposed Development) is not located within any statutory sites designated for ecological interests.

6.2.2. The chapter evaluates both habitats and non-avian animal species and assesses the likely significant effects on habitats and species as well as the proposed benefits to biodiversity in line with the Environmental Impact Assessment Regulations and National Planning Framework 4 (NPF4). An assessment has been made of the predicted significance of effects of the Proposed Development on ecological interests. In line with the principles of proportionate EIA, embedded mitigation is considered at the outset of the assessment (See Section 6.7 of this chapter). Embedded mitigation proposed includes site-specific Construction Environment Management Plan (CEMP), Species Protection Plan (SPP) and appointing an Environmental Clerk of Works (ECoW) to monitor adherence to such plans.

6.2.3. Following guidance, survey and assessment, four receptors (common pipistrelle, soprano pipistrelle, noctule and Leisler's bat) were considered to be IEFs in the context of the Proposed Development and subject to further impact assessment. Following the aforementioned embedded mitigation, no significant effects were anticipated. Further mitigation in the form of an Operational Environmental Management Plan (OEMP) and outline Biodiversity Enhancement and Restoration Plan (BERP) are proposed during the operational stages. The outline BERP includes recommendations to restore bog habitats and minimise effects and impacts on ecological features including bat species and fish. It is considered that implementation of these mitigation and habitat enhancement measures will reduce the likelihood of impacts on IEFs at the appropriate biogeographical scale and provide enhancements required under NPF4.

### Contents of Chapter

6.2.4. This ecological chapter of the EIAR has been prepared by Natural Power Consultants Ltd (Natural Power) on behalf of Vattenfall Wind Power Ltd (the Applicant) in respect of the Proposed Development. The Proposed Development comprises of up to 11 wind turbines and associated infrastructure, located south-east of the B741, south of Dalmellington and south-west of New Cumnock, in East Ayrshire (see Figure 6.1: Site Location and Survey Areas, Volume 2a of the EIAR). The Proposed Development lies within the East Ayrshire Council (EAC) and Dumfries and Galloway Council (DGC) Local Planning Authority (LPA) areas.

6.2.5. This chapter provides details of the baseline ecological conditions within the Proposed Development Area and the immediate surrounding environment established through field surveys, in addition to a desk-based review to obtain additional relevant ecological data. The identified habitats and species comprising the ecological baseline are described and assessed using recognised criteria, in accordance with industry guidelines (e.g. that produced by the Chartered Institute of Ecology and Environmental Management: CIEEM, 2018[1]).

6.2.6. This EIAR chapter has been prepared following a scoping process which led to a scoping report issued to consultees in February 2022 (EIAR Volume 3, Technical Appendix 1.1: Scoping Report). and scoping responses received between April and May 2022 with a formal scoping opinion received on 29 June 2022 (EIAR Volume 3, Technical Appendix 1.2: Scoping Opinion).

6.2.7. In line with the principles of proportionate EIA, embedded mitigation is considered at the outset of the assessment (see Section 6.7 of this chapter). Furthermore, to ensure proportionality based on the likelihood of potential effects, only ecological features for which it is considered there may be significant effects in the absence of mitigation are identified as IEFs and are taken forward for a full EIA.

6.2.8. This chapter refers to the following:

Chapters (Volume 1)

- Chapter 2: Site Selection and design evolution;
- Chapter 3: Project Description;
- Chapter 7: Ornithology;
- Chapter 8: Hydrology

Appendices (Volume 3):

- Technical Appendix: 6.1: Ecology;
- Technical Appendix: 6.2 Confidential Ecology; and
- Technical Appendix 6.3: Outline Biodiversity Enhancement and Restoration Plan (BERP).

Figures (Volume 2a):

- Figure 6.1:  Site Location and Survey Areas;
- Figure 6.2: Site Location and Designated Sites;
- Figure 6.3: Phase 1 Survey Results;
- Figure 6.4: National Vegetation Classification (NVC) Survey Results
- Figure 6.5: Bat detector locations
- Figure 6.6: Protected Mammal Survey Results; and
- Figure 6.7: Fish Habitat Survey Results.

6.2.9. All Latin names for species mentioned in this chapter are listed in Technical Appendix: 6.1: Ecology , Volume 3 of the EIAR. Summaries of survey times and dates are also given in Technical Appendix: 6.1: Ecology, Volume 3.

[1] CIEEM (2018). Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal. Chartered Institute of Ecology and Environmental Management, Winchester. [Online] Available at: https://cieem.net/wp-content/uploads/2018/08/ECIA-Guidelines-Sept-2019.pdf

Full survey data, including details of survey dates, times and weather conditions, plus results data, can be provided on request.

## 6.3. Legislation, Policy and Guidance

6.3.1. The following framework of international and national legislation, planning policy and guidance, which exists to protect habitats and specific species, has been considered as part of the assessment. See also Volume 1, Chapter 4: Climate Change, Legislative and Policy Context.

### Legislation

- Council Directive 92/43/EEC (the 'Habitats Directive')[2]
- Council Directive 2000/60/EC ('Water Framework Directive')[3]
- Wildlife and Countryside Act 1981 (as amended) (WCA 1981)[4]
- The Conservation (Natural Habitats, &c.) Regulations 1994 (as amended)[5]
- The Conservation of Habitats and Species Regulations 2017[6]
- Wildlife and Natural Environment (Scotland) Act 2011[7]
- Protection of Badgers Act 1992[8]
- Nature Conservation (Scotland) Act 2004[9]
- Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017[10]
- Salmon and Freshwater Fisheries Act 2003[11]

### Policy and Guidance

6.3.2. Particular attention has also been given to the documents listed below, which include policies and cover the assessment of effects of wind farm developments on ecological features. Reference has also been made to these guidance documents across this chapter, where relevant:

- European Union (EU) Exit: The Habitats Regulations in Scotland[12]
- National Planning Policy Framework 4 (NPF4) – particularly Policy 3[13]
- UK Post 2010 Biodiversity Framework[14]
- UK Biodiversity Framework 2024[15]
- Planning Advice Note (PAN) 51: Planning, Environmental Protection and Regulation[16]
- PAN 60: Planning for Natural Heritage[17]
- PAN 1/2013 – Environmental Impact Assessment (Scottish Government 2013)[18]
- Nature Conservation: Implementation in Scotland of the Habitats and Birds Directives: Scottish Executive Circular 6/1995 as amended (June 2000)[19]
- European Protected Species, Development Sites and the Planning System: Interim guidance for local authorities on licensing arrangements[20]
- Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine (CIEEM 2018)[1]
- General Pre-application/ Scoping Advice to Developers of Onshore Wind Farms[21]
- Decommissioning and Restoration Plans for wind farms[22]

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[2] European Commission (1992) Council Directive 92/43/EEC the Conservation of Natural Habitats and of Wild Fauna and Flora [Online] Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:31992L0043&from=EN

[3] European Commission (2000) Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 Establishing a Framework for Community Action in the Field of Water Policy [Online] Available at: https://eurlex.europa.eu/resource.html?uri=cellar:5c835afb-2ec6-4577-bdf8-756d3d694eeb.0004.02/DOC_1&format=PDF

[4] UK Government (1981) Wildlife and Countryside Act 1981, Chapter 69. Part 1 [Online] Available at: http://www.legislation.gov.uk/ukpga/1981/69/section/1

[5] UK Government (2012) The Conservation (Natural Habitats, &c.) Amendment (Scotland) Regulations [Online] Available at: https://www.legislation.gov.uk/ssi/2012/228/contents/made

[6] UK Government (2017) The Conservation of Habitats and Species Regulations [Online] Available at: https://www.legislation.gov.uk/uksi/2017/1012

[7] Scottish Government (2011) Wildlife and Natural Environment (Scotland) Act 2011 [Online] Available at: http://www.legislation.gov.uk/asp/2011/6/contents/enacted

[8] UK Government (1992) Protection of Badger Act 1992 [Online] Available at: http://www.legislation.gov.uk/ukpga/1992/51/contents

[9] Scottish Government (2014) Nature Conservation (Scotland) Act 2004 [Online] Available at: http://www.legislation.gov.uk/asp/2004/6/contents

[10] UK Government (2017) Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 [Online] Available at: https://www.legislation.gov.uk/ssi/2017/101/contents/made

[11] Scottish Government (2003) Salmon and Freshwater Fisheries (Consolidation) (Scotland) Act 2003 [Online] Available at: http://www.legislation.gov.uk/asp/2003/15/contents

[12] EU Exit: The Habitats Regulations in Scotland. (2020). [Online] Available at: https://www.gov.scot/publications/eu-exit-habitats-regulations-scotland-2/pages/2/

[13] Scottish Government. (2023). *National Planning Framework 4.* Scottish Government, Edinburgh.

[14] JNCC and Defra (on behalf of the Four Countries' Biodiversity Group). 2012. UK Post-2010 Biodiversity Framework. July 2012. Available at: https://jncc.gov.uk/our-work/uk-post-2010-biodiversity-framework/ [Accessed 27/02/2023]

[15] JNCC and Defra (on behalf of the Four Countries' Biodiversity Group). 2024. UK Biodiversity Framework. May 2024. Available at: https://hub.jncc.gov.uk/assets/19a729f6-440e-4ac6-8894-cc72e84cc3bb

[16] Scottish Government. (2006). PAN 51: Planning, Environmental Protection and Regulation. Scottish Government, Edinburgh.

[17] Scottish Government. (2000 (updated 2006)). PAN 60: Planning for Natural Heritage. Scottish Government, Edinburgh.

[18] Scottish Government. (2013 (updated 2017)). PAN 1/2013 – Environmental Impact Assessment. Scottish Government, Edinburgh.

[19] Scottish Executive. (1995 (updated 2000)). Nature Conservation: Implementation in Scotland of the Habitats and Birds Directives. Scottish Executive, Rural Affairs Department, Edinburgh.

[20] Scottish Executive. (2001 (updated 2006)). European protected species, development sites and the planning system: Interim guidance for local authorities on licensing arrangements. Scottish Executive, Edinburgh.

[21] NatureScot (2020) General pre-application/ scoping advice to developers of onshore wind farms [Online] Available at: https://www.nature.scot/doc/general-pre-application-and-scoping-advice-onshore-wind-farms

[22] NatureScot (2016) Decommissioning and Restoration Plans for Wind Farms [Online] Available at: https://www.nature.scot/sites/default/files/2019-10/Guidance%20-%20Decommissioning%20and%20restoration%20plans%20for%20wind%20farms%20-%20Feb%202016.pdf

- Good Practice During Wind Farm Construction[23]
- Scottish Natural Heritage (SNH) (2012) Assessing the cumulative impact of onshore wind energy developments[24]
- NatureScot (2021) Bats and Onshore Wind Turbines: Survey, Assessment and Mitigation[25]
- NatureScot (2023) Advising on peatland, carbon-rich soils and priority peatland habitats in development management[26];
- NatureScot (2022) Developing with Nature guidance[27]
- Guidance on Assessing the Impacts of Windfarm Development Proposals on Groundwater Abstractions and Groundwater Dependent Terrestrial Ecosystems[28]
- Planning Guidance on On-shore Windfarm Developments[29]
- EU Biodiversity Strategy[30]
- Fisheries Management Scotland (FMS) guidelines[31]
- The draft Scottish Biodiversity Strategy[32] comprising;
  - 2020 Challenge for Scotland's Biodiversity[33]
  - Scottish Biodiversity List (SBL)[34]
- International Union for Conservation of Nature (IUCN) Red List (IUCN, 2021)
- East Ayrshire Local Development Plan 2 [35]

## 6.4. Method of Assessment

### Data Collection

### Desk Study

#### Statutory, National and Locally Designated Sites of Nature Conservation

6.4.1. A web-based search was undertaken to identify and provide information on statutory designated sites of nature conservation, with non-avian species and protected habitats as listed features. The search was carried out using the Multi-Agency Geographic Information for the Countryside (MAGIC) Map application tool[36] and SiteLink[37]. The search focussed on identifying the following sites:

- Special Areas of Conservation (SACs) – within 10 km of the Proposed Development Area;
- Sites of Special Scientific Interest (SSSIs) – within 5 km of the Proposed Development Area;
- National Nature Reserves (NNRs) – within 5 km of the Proposed Development Area; and
- Local Nature Reserves (LNRs) within 2 km of the Proposed Development Area.

6.4.2. Data has also been obtained from the South West Scotland Environmental Information Centre (SWSEIC) of locally important (non-statutory) Local Wildlife Sites (LWSs) within 2 km of the Proposed Development Area.

### Protected Species and Habitats

6.4.3. The SWSEIC data search also requested records of all ecological (non-avian) species of conservation interest recorded within the ten year period between 2012 – 2022 within 2 km of the Proposed Development Area, as well as known protected habitats and other priority areas, such as Ancient Woodland Sites (AWS).

### Baseline Surveys

6.4.4. A summary of the baseline ecology surveys undertaken at the Proposed Development (dates and extent of the area surveyed) is provided in Table 6.1. Where access was not available visual surveys were conducted from the

[23] Scottish Renewables, NatureScot, SEPA, Forestry Commission Scotland, Historic Environment Scotland (2019). Good Practice during Wind Farm Construction [Online] Available at: https://www.nature.scot/doc/guidance-good-practice-during-wind-farm-construction

[24] SNH (2012). *Assessing the cumulative impact of onshore wind energy developments*. SNH, Scotland.

[25] NatureScot, Natural England, Natural Resources Wales, RenewableUK, Scottish Power Renewables, Ecotricity Ltd., the University of Exeter, and Bat Conservation Trust (BCT) (2021*). Bats and Onshore Wind Turbines: Survey, Assessment and Mitigation*.

[26] https://www.nature.scot/doc/advising-peatland-carbon-rich-soils-and-priority-peatland-habitats-development-management#Mitigation+Measures

[27] Developing with Nature guidance | NatureScot

[28] Note 31. Version 3, [Online] Available at: https://www.sepa.org.uk/media/144266/lups-gu31-guidance-on-assessing-the-impacts-of-development-proposalson-groundwater-abstractions-and-groundwater-dependent-terrestrial-ecosystems.pdf

[29] SEPA (2014) Planning guidance on on-shore windfarm developments. Land Use Planning System SEPA Guidance Note 4. Version 9 [Online] Available at: https://www.sepa.org.uk/media/136117/planning-guidance-on-on-shore-windfarmsdevelopments.pdf

[30] European Commission EU Biodiversity Strategy [Online] Available at: http://ec.europa.eu/environment/nature/biodiversity/strategy/index_en.htm

[31] Fisheries Management Scotland (2017) Advice to Boards/Trusts on engaging with the planning process for terrestrial wind farms [Online] Available at: https://fms.scot/wp-content/uploads/2017/04/170412-Guidance-Terrestrial-windfarms.pdf.

[32] Scottish Government (December 2022) Scottish Biodiversity Strategy to 2045: Tackling the Nature Emergency in Scotland. Supporting documents - Biodiversity strategy to 2045: tackling the nature emergency - draft - gov.scot (www.gov.scot)

[33] Scottish Government (2015) Scotland's Biodiversity, a Route Map to 2020 [Online] Available at: https://www.gov.scot/publications/scotlands-biodiversity-route-map-2020/

[34] Scottish Government (2013) Scottish Biodiversity List [Online] Available at: https://www.nature.scot/scotlandsbiodiversity/scottish-biodiversity-strategy/scottish-biodiversity-list

[35] East Ayrshire Adopted Local Development Plan 2 (July 2024). Available at: https://www.east-ayrshire.gov.uk/PlanningAndTheEnvironment/development-plans-and-policies/ldp2/ldp2.aspx [Accessed 04/10/2024]

[36] MAGIC (2023). Available at: https://magic.defra.gov.uk/MagicMap.aspx [Accessed 09/08/2023]

[37] SiteLink (2023) Available at: https://sitelink.nature.scot/map [Accessed 09/08/2023]

nearest location within the Proposed Development Area. Surveys were undertaken following standard guidance, unless further details have been provided (see Survey Limitations, Section 6.4.12) . Surveys were not undertaken within the whole Proposed Development Area, they were limited to the parcel of land where works infrastructure is proposed, as shown on Figure 6.1 Site Location and Survey Areas, Volume 2a.

6.4.5. Further survey method details, along with dates of survey visits and analysis methods are provided in Technical Appendix 6.1: Ecology, Volume 3 of the EIAR. Full survey details including survey timings and weather conditions can be provided on request.

**Table 6.1: Summary of baseline ecological surveys undertaken at the Proposed Development**

| Survey | Date | Survey Area | Notes |
|---|---|---|---|
| Extended Phase 1 Habitat survey[38] | May – September 2022 | Survey Area plus 250 m buffer | The survey was 'extended' to search for and record signs of legally protected or other notable species, and to assess the potential for the habitats to support such species. Target notes were made to record features of interest. |
| National Vegetation Classification (NVC) survey[39] | May – September 2022 | Survey Area plus 250 m buffer | NVC surveys define the vegetation of selected areas more precisely and identify key sensitive areas such as potential Ground Water Dependant Terrestrial Ecosystems (GWDTE). Where areas were considered to comprise mosaics or complexes of different habitat communities, the proportion of each was estimated in percentage terms. The NVC survey also included the recording of target notes to provide further details, where necessary, and to record any features of ecological interest. |
| Bat activity survey: static detectors[25] | April – September 2022 | Survey Area | Following guidance[25], 11 full spectrum Wildlife Acoustic Song Meter 4 (SM4) static detectors were deployed in 2022 (See Section 6.4.7 – 6.4.11). |
| Preliminary bat roost assessment[40] | December 2023 | Survey Area plus 200 m buffer | Occupied and unoccupied buildings or ruins, structures such as bridges, quarries and forested areas with mature or dead trees all have the potential to provide suitable locations for roosting or hibernating bats. All such features were surveyed, and their suitability to support roosting bats determined, along with any evidence of occupation. |
| Badger, red squirrel and pine marten[41,42,43,44, 45] | November 2022 | Survey Area plus 150 m buffer | Surveys were undertaken to determine the presence of and suitability for these mammal species for which there is legal protection. |
| Otter and water vole [43,44,46,47,48] | November 2022 | Survey Area plus 200 m buffer | Surveys were undertaken to determine the presence of and suitability for these mammal species for which there is legal protection. |
| Fish habitat surveys[49,50] | August – October 2022 | In watercourses Survey Area | The survey methodology approximates in-stream habitat availability for fish as a percentage (%) within a known length of the watercourse (50 m lengths). Locations of the surveyed areas are shown in Figure 6.7, Volume 2a. Although these surveys do not identify the presence of fish, they do highlight key habitat where certain species may be present based on known habitat preferences. |
| Electrofishing surveys[51,52] | July – August 2022 | In watercourses within Survey Area | These surveys were carried out to assess the densities of juvenile salmonid species of fish present in the watercourses. |
| Freshwater invertebrate survey[53, 54] | June – August 2022 | In watercourses within Survey Area | Surveys carried out to determine the composition of freshwater macro invertebrate communities to provide an insight into watercourse health. Status classification, under the Water Framework Directive, can be calculated using the River Invertebrate Classification Tool[55]. |

[38] JNCC (2010) Handbook for Phase 1 habitat survey – a technique for environmental audit. JNCC, Peterborough.

[39] Rodwell J. S. (2006). National Vegetation Classification: Users' handbook. JNCC, Peterborough.

[40] Collins, J. (ed.) (2023). Bat Surveys for Professional Ecologists: Good Practice Guidelines (4th edition). Bat Conservation Trust, London

[41] Harris S. Cresswell P & Jefferies D., (1989). *Surveying Badgers*. The Mammal Society, London.

[42] Neal, E. and Cheeseman, C. (1996). *Badgers*. T & A D Poyser, London, pp.271.

[43] Sargent G. & Morris P. (2003). *How to Find and Identify Mammals*. The Mammal Society, London.

[44] Bang, P. & Dahlstrøm, P. (2001). *Animal Tracks and Signs*. Oxford University Press, Oxford.

[45] Cresswell, W. J., Birks, J. D. S., Dean, M., Pacheco, M., Trewhalla, W. J., Wells, D. and Wray, S. 2012. UK BAP Mammals Interim Guidance for Survey Methodologies, Impact Assessment and Mitigation. Published by The Mammal Society.

[46] Chanin, P. (2003b). Monitoring the Otter *Lutra lutra*. Conserving Natura 2000 Rivers: Monitoring Series No. 10. English Nature, Peterborough.

[47] Dean, M., Strachan, R., Gow, D. and Andrews, R. (2016). *The Water Vole Mitigation Handbook (The Mammal Society Mitigation Guidance Series).* Eds Fiona Mathews and Paul Chanin. The Mammal Society, London.

[48] Strachan, R., Moorhouse, T. & Gelling, M. (2011). *The Water Vole Conservation Handbook*. Third Edition, Wildlife Conservation Research Unit, University of Oxford, Abingdon.

[49] Restoration of Riverine Salmon Habitats: A Guidance Manual (Hendry & Cragg-Hine, 1997)

[50] SFCC (2007). Habitat Surveys: Training Course Manual. Scottish Fisheries Co-ordination Centre, Pitlochry.

[51] Scottish Fisheries Co-ordination Centre (2021). Catch Fish Using Electrofishing Techniques. Scottish Fisheries Co-ordination Centre Fisheries Management: SVQ Level 2. Inverness College UHI.

[52] Scottish Fisheries Co-ordination Centre (2021). Manage Electrofishing Operations. Scottish Fisheries Co-ordination Centre Team Leader Electrofishing Manual. Inverness/Barony College.

[53] SEPA (2011). Procedure ES-Ecol-P-010-V10, Hand Sampling of Aquatic Benthic Macro-Invertebrates

[54] Environment Agency (2017). Freshwater macro-invertebrate sampling in rivers. Version 9. Operational instruction 018_08. Bristol: Environment Agency

[55] Water Framework Directive – United Kingdom Technical Advisory Group. (2014). Invertebrates General Degradation: Walley, Hawkes, Paisley & Trigg metric in River Invertebrate Classification Tool. Stirling, Water Framework Directive – United Kingdom Advisory Group.

### Modelling parameters: Habitat Loss Calculations

6.4.6. The construction of the Proposed Development would result in some permanent habitat loss by the infrastructure footprint (e.g. access road/tracks, turbine bases, crane hardstandings, substation etc.), and habitat loss calculations are used to quantify the extent of this loss. No areas of temporary loss (i.e. those areas reinstated following construction) will be present in relation to the Proposed Development. Habitat loss calculations are provided for all Phase 1 habitats taken on for impact assessment (see Table 6.9) and are included in the impact assessment. The methods used and detailed results are provided in Technical Appendix 6.1,Volume 3.

### Modelling parameters: Static Detector Parameters and Acoustic Analysis

6.4.7. Detectors were programmed to commence recording from half an hour before sunset and continue until half an hour after sunrise, to cover the active period for all species potentially encountered within the Proposed Development Area. Detectors recorded data to a memory card which was downloaded and later analysed to identify species present. Activity levels can also be established from this data, based on the number of 'bat passes' recorded.

6.4.8. Analysis was undertaken at species level using Kaleidoscope automatic identification software. Signal parameters were 16-120 kHz, 2-500 ms, 500 ms maximum inter-syllable gap and with a minimum of two pulses. *Myotis* sp. were not identified further than genus due to the overlap between species frequency calls. Pipistrelle and *Nyctalus* sp. bats were classified to species, where possible, but were otherwise classified as species groups when it was not possible to distinguish call types to species level. Long-eared bats were classified to species (brown long-eared) based on the location of the Proposed Development, and known species distribution in the UK.

6.4.9. Quality assurance checks were performed on each group of manually identified species or noise, whereby all records were checked in groups of 200 records or less, and 10% of records were checked for larger groups.

6.4.10. A bat pass was defined as a sequence of bat pulses captured on a 15 second sound file. An individual bat can pass a particular feature on several occasions while foraging. It is therefore important to acknowledge that a bat pass is a bat activity index (BAI) that describes the amount of use bats make of an area rather than a measure of the number of individuals in a population.

6.4.11. The relative bat activity has been calculated based on the BAI recorded for each species across the Proposed Development Site. The criteria in Table 6.2 are based on the results of nearby wind farms (South Kyle I, Windy Standard III and Pencloe), professional judgement, relative abundance and difficulty in detecting different species e.g. long-eared bats (*Plecotus sp*,) are notably difficult to detect. Although the sites are not directly comparable (in terms of different deployment and analysis methods), the BAI is considered in accordance with NatureScot guidelines[25] which states that method of calculating relative activity must be clear.

**Table 6.2: Relative BAI criteria by genus**

| Genus | Low | Low - Moderate | Moderate | Moderate - High | High |
|---|---|---|---|---|---|
| *Myotis sp.* | ≤ 10 | 11 – 20 | 21 - 30 | 31 - 40 | > 41 |
| *Pipistrellus sp.* | ≤ 20 | 21 - 40 | 41 - 60 | 61 - 100 | >100 |
| *Nyctalus sp.* | ≤ 10 | 11 – 20 | 21 - 30 | 31 - 40 | > 41 |
| *Plecotus sp.* | ≤ 3 | 4 - 8 | 9 - 12 | 13 - 16 | > 17 |

*Source: Natural Power*

### Survey Limitations

6.4.12. There were limiting factors to survey methodologies, the details of which are provided in this section. It is not considered that these limitations would result in an incorrect assessment of effect or impact on the feature, the reasoning for this is provided below. The following survey limitations were experienced:

- Where access was restricted out-with the Proposed Development Area (i.e. habitat and protected mammal survey buffers), visual surveys were conducted from the nearest location within the Proposed Development Area.
- Limited access was occasionally encountered during fish habitat surveys due to windblow, in channel vegetation and numerous drops over boulders (for a full list of constraints see Volume 3, Appendix 6.1).
- Bat survey data had nights removed due to poor weather and detector malfunction. Removal of survey data due to poor weather and the failure of a detector in spring and summer is not considered to be a significant limitation due to the volume of data collected across the whole survey period. As no other detectors experienced any issues throughout their deployments, the lack of data from one detector for one survey period will not have an impact on the assessment of how bat species use the site. Removed nights are as follows;
  - Detector 3 produced no audio files during the spring deployment and Detector 2 produced no audio files during the autumn deployment. This was likely due to a microphone issue. No detector issues were recorded by surveyors during these deployments.
  - According to NatureScot *et al.* guidance[25], sub-optimal weather conditions were recorded during bat activity surveys, full details of which nights were removed are presented within Volume 3, Technical Appendix 6.1.After analysis of the bat activity data compared with the weather data, bat passes and survey effort were removed for nights where the temperature was less than 5°C or the wind speed above 10 m/s at dusk (sunset). As a result, data for eight survey nights (5, 6, 7, 8, 11 and 15 May, 26 July and 11 September) were removed from the assessment. All other nights have been included within the assessment, as these are considered to be a reflection of the general weather conditions at the Proposed Development.
- Detectors were not placed at turbine locations due to dense conifer plantation and change in layout which occurred after the bat detector locations had been selected (details in Chapter 2. Site selection and design evolution). However, guidance[25] states that when turbine locations are not available that surveys are carried out in areas of representative habitat. Where plantations are present this should include forest rides and open areas which will represent the potential post construction situation.

### Approach to Impact Assessment

6.4.13. This section presents the approach taken to the EIA and provides an overview of how the potential for impact has been determined and the method by which impact significance has been ascertained. The approach to the EIA adopted within this assessment follows the CIEEM guidelines[1], and in line with these guidelines professional judgement has been applied where appropriate. The criteria used and the underlying rationale are described further within the following sections. This approach is in accordance with the scoping opinion.

### Determining Important Ecological Features (IEFs)

6.4.14. The Assessment process involves identifying IEFs in accordance with CIEEM guidelines[1]. These ecological features and their values are determined by the criteria defined in Table 6.3.

Table 6.3: Geographical context relating to the evaluation of an IEF

| Level of value | Example of IEF |
|---|---|
| International | An internationally designated site (e.g. SAC), or site meeting criteria for international designations such as a World Heritage Site or United Nations Educational Scientific and Cultural Organisation (UNESCO) Biosphere Reserve.<br>Species populations/habitat areas present with sufficient conservation importance to meet criteria for SAC selection. |
| National | A nationally designated site such as an SSSI or an NNR, or sites meeting the criteria for national designation (such as the Joint Nature Conservation Committee (JNCC) guidelines[56]).<br>Species populations/habitat areas present with sufficient conservation importance to meet criteria for SSSI selection[56]. |
| Regional | Sites designated as local nature reserves or Local Biodiversity Sites, including LWSs. Nature Networks as outlined in NPF4[13] have been considered however these are not yet available for EAC.<br>Species populations/habitat areas at present falling short of SSSI selection criteria but with sufficient conservation importance to likely meet criteria for selection as a local site e.g. important in the context of NatureScot Natural Heritage Zone (NHZ). |
| Local | Areas of semi-natural ancient woodland smaller than 0.25 ha.<br>Areas of habitat or species populations considered to appreciably enrich the ecological resource within the local context, e.g. species-rich flushes or evidence of regular otter activity. |
| Negligible | Widespread and/or common habitats and species. Features falling below Local Importance are not normally considered in detail in the assessment process. |

6.4.15. The Proposed Development Area is located within Western Southern Uplands and Inner Solway NHZ19 and so this is the Region against which impacts are assessed. Inland sections of NHZ 19 are generally comprised of a series of upland massifs of undulating, rounded, domed, conical and craggy hills separated by valleys and vegetated by coniferous plantation, rough grazing and agriculturally improved grazing[57].

6.4.16. Attributing geographical value to a feature is generally straightforward in the case of designated sites, as the designations themselves are normally indicative of level of value. For example, a SAC designated under the Habitats Directive is explicitly of European (International) importance. However occasionally a default level of value may not be appropriate in the specific context of the Proposed Development. Where this is the case, professional judgement has been applied and rationale for decreasing or increasing the geographical level of value of a feature is given. An example of this might be bats, all of which are of international importance due to their protection under Annex IV of the Habitats Directive. However, if only very few foraging/commuting records of common and widespread bat species were made at a site, attributing international importance to the population present at the Proposed Development would be disproportionate and the importance would be reduced accordingly (noting that this does not change the protection level from a legislative standpoint).

6.4.17. Certain ecological features may be assessed as not being subject to significant effects by a Proposed Development, but due to their high legal protection they must still be considered in the EIA within the context of legal and policy implications (for example otter, for which their resting places are legally protected from destruction or obstruction).

6.4.18. Part of the process of attributing importance to a species involves defining the population to be valued and requires professional judgment to identify an ecologically coherent population against which effects on integrity[58] can be assessed (see 'Determining Significance of Ecological Effects'). For example, for wide-ranging species such as otter, it may be more appropriate to consider the otter population in a whole catchment, whereas for more localised species, such as water vole, importance may be attributed to groups of related colonies which function as a meta-population.

6.4.19. In line with the principles of proportionate EIA, embedded mitigation is considered at the outset of the assessment. IEF status has only been assigned where there is still considered to be the potential for significant effects to the integrity of the feature at the assigned value level arising from the Proposed Development, after the application of embedded measures.

## Valuing Bats

6.4.20. For the purposes of this assessment and of assigning value to bats, the guidance set out by NatureScot[25] has been followed. Table 2 in this guidance identifies the population vulnerability of bat species based on the collision risk posed for individual bat species by wind turbines as determined by behavioural characteristics, and by bat population sensitivity based upon species rarity (adapted from Wray *et al.*[59]). Table 6.4 summarises the risk of turbine impact to bat species and the sensitivity of bat populations.

Table 6.4: Level of potential vulnerability of populations of Scottish bat species

| Species | Low collision risk | Medium collision risk | High collision risk |
|---|---|---|---|
| Common species | N/A | N/A | Common pipistrelle<br>Soprano pipistrelle |
| Rare species | Brown long-eared bat<br>Daubenton's bat<br>Natterer's bat | N/A | N/A |
| Rarest species | Whiskered bat<br>Brandt's bat | N/A | Nathusius' pipistrelle<br>Noctule bat<br>Leisler's bat |

*Source: NatureScot[60]*

[56] JNCC (2022) *SSSI Guidelines* [Online] Available at -https://jncc.gov.uk/our-work/guidelines-for-selection-of-sssis/

[57] SNH. (2002). Natural Heritage Zones: A National Assessment of Scotland's Landscapes. SNH, Edinburgh.

[58] Note that integrity in this context refers to ecological integrity of a habitat type or population of a species at a defined value level, i.e. the maintenance of the conservation status of a population of a species at a specific location or geographic scale. This should not be confused with the specific term 'Site Integrity' used in Appropriate Assessment for Natura 2000 sites.

[59] Wray, S., Wells, D., Long, E. & Mitchell-Jones, T. (2010) *Valuing Bats in Ecological Impact Assessment*. IEEM In-Practice p. 23-25.

[60] Only those species which are known to occur in Scotland are included. Bat Conservation Trust (2023). Available at: Bat Surveys for Professional Ecologists: Good Practice Guidelines 4th edition

6.4.21. The guidance provided by Wray *et al.*[61] includes a framework for identifying the importance of bats in the landscapes through the evaluation of bat roosts and habitats. Applying this framework, bat roosts can be valued according to species rarity and roost status.

## Characterising Potential Effects on Features

6.4.22. Impacts on IEFs are judged in terms of magnitude and duration. Magnitude refers to the size of an impact and is determined on a quantitative basis where possible. This may relate to the area of habitat lost to the development footprint in the case of a habitat feature or predicted loss of individuals in the case of a population of a particular species. For this EIA topic, magnitude is assessed within six levels, as detailed in Table 6.5.

**Table 6.5: Criteria used within this EIA to determine the magnitude of ecological impacts**

| Impact magnitude | Description |
|---|---|
| Very highly negative | Total or almost complete loss of an ecological feature resulting in a permanent adverse effect on the integrity of the feature. The conservation status of the feature would be permanently affected. |
| Highly negative | Large-scale, permanent changes in an ecological feature, likely to change its ecological integrity. These impacts are therefore likely to result in overall changes in the conservation status of an ecological feature. |
| Moderately negative | This includes moderate-scale long-term changes in an ecological feature, or larger-scale temporary changes; however, the integrity of the ecological feature is not likely to be affected. This may result in temporary changes in the conservation status of the ecological feature, but these are reversible and unlikely to be permanent. |
| Minor negative | This includes small magnitude, long-term impacts, or moderate-scale temporary changes, and where integrity of the ecological feature is not affected. These effects are unlikely to result in overall changes in the conservation status of an ecological feature. |
| Negligible | No perceptible change in the ecological feature. |
| Positive | The changes in the ecological feature are considered to be beneficial to its ecological integrity and/or nature conservation status. |

6.4.23. The assessment also considers whether the impact is positive or negative, short-term (for example only during construction) or long-term (throughout the lifetime of the Proposed Development), reversible or permanent. The definition of permanent compared to temporary is detailed in Table 6.6.

**Table 6.6: Criteria for describing duration**

| Duration | Definition |
|---|---|
| Permanent | Effects continuing indefinitely beyond the span of one human generation (taken as approximately 25 years), except where there is likely to be substantial improvement after this period (e.g., the replacement of mature trees by young trees which need > 25 years to reach maturity, or restoration of ground after removal of a development. Such exceptions are termed “very long-term effects”). |
| Temporary | Long-term (15 - 25 years or longer; see above) |
| | Medium term (5 – 15 years) |
| | Short-term (up to 5 years) |

6.4.24. When characterising ecological impacts, it is essential to consider the likelihood that a change/activity will occur as predicted, with a degree of confidence in the impact assessment (in relation to the impact on ecological structure and function). Where possible, the degree of confidence should be predicted quantitatively. However, where this is not possible, a more qualitative approach is taken; particularly where the confidence level can only be based on expert judgement.

## Determining Significance of Potential Ecological Effects

6.4.25. Only features for which there is considered to be the potential for significant effects are identified as IEFs and taken forward for full impact assessment. Having followed the process of identifying an IEF, determining its sensitivity, and characterising potential impacts, the significance of the effect is then determined. The CIEEM guidelines[1] use only two categories to classify effects: ‘significant’ or ‘not significant’. A significant effect is defined in ecological terms as an effect on the integrity or conservation status of a defined site, habitat or species. The significance of an effect is determined by considering the value level of the feature and the magnitude of the impact and applying professional judgement as to whether the integrity/conservation status of the feature will be affected at the given value level. This concept can be applied to both designated and undesignated sites and to defined populations.

6.4.26. In this assessment, an effect that threatens the integrity of a feature is considered to be significant. It should be noted that, alongside the criteria provided, professional judgement is applied in determining the potential for a likely significant effect.

6.4.27. Where appropriate, mitigation and/or compensation measures, including the design process, are identified in order to avoid and reduce likely significant effects. It is also good practice to propose mitigation measures to reduce negative effects that are not significant. The significance of residual effects on features after the effects of mitigation have been considered can then be determined, along with any monitoring requirements. A level of certainty has been provided in relation to the success of the recommended mitigation. This has been given as a rate of confidence in the prediction, varying from high to low. Certainty associated with a design will vary according to a number of factors. Professional judgement is applied in assessing the level of certainty, and this will take into account the following points:

- Technical feasibility of what is proposed – using experience from projects where a similar measure has been carried out;
- Overall quantity of what is proposed – is it large enough to be viable? Is it of equivalent function to any habitat lost?;
- Overall quality of what is proposed – does it compare favourably with features lost or damaged?;
- Level of commitment – is there a realistic understanding of the resources and effort required to achieve predicted outcomes?;
- Provision of long-term management; and
- Timescale for predicted benefits.

### Cumulative Impact Assessment

6.4.28. The Cumulative Impact Assessment (CIA) identifies any other projects which, in combination with effects from the Proposed Development, could give rise to significant cumulative impacts on ecological features. Cumulative effects are particularly important as ecological features may be already exposed to background levels of threat or pressure and may be close to critical thresholds where further impacts could cause irreversible decline. Cumulative effects can also make habitats and species more vulnerable or sensitive to change.

6.4.29. Cumulative effects can either be additive / incremental (i.e. multiple activities/projects may give rise to a significant effect due to their proximity in time and space) and connected (i.e. different aspects of the same project which may be authorised under different consent processes).

### Trends and Predicted Future Baseline

6.4.30. Current habitat use within the Proposed Development Area comprises largely of commercial conifer plantation forestry. There is also a quarry and small areas of moorland habitat. In the absence of development, it is assumed that the habitat use within the Proposed Development Area would remain the same for the foreseeable future.

6.4.31. It is more difficult to predict changes that may occur in the longer-term (i.e. over 25 years). Climate change and the shift in species and habitat distributions that this may cause, as well as potential land management changes that this may bring about, cannot be predicted at this time. Baseline surveys carried out for the Proposed Development represent a snapshot of the ecology community present at the time and cannot be extrapolated to predict future population trends in the event of climate change, or a future change in land use at the site.

## 6.5. Consultation

6.5.1. A Scoping Report[61] for the Proposed Development was issued to consultees in February 2022 (see Appendix 1.1, Volume 3 of the EIAR). This document contained details of the assessment methodology and ecological features proposed for full EIA. As no baseline ecological surveys had been undertaken at the time of writing the Scoping Report, all features were carried forward for assessment in the EIAR.

6.5.2. All consultation considered to be relevant to this chapter is summarised in Table 6.7. The table does not repeat scoping responses listed in Table 7.6 in Chapter 7: Ornithology, Volume 1 of the EIAR.

**Table 6.7: Consultee scoping responses relating to ecology**

| Consultee | Comments/ issues raised/ recommendations | Addressed responses/outcomes |
|---|---|---|
| Nith District Salmon Fisheries Board (NDSFB)<br>8 and 11 April 2022 | Advised against conducting a walk over survey of the River Nith sites upstream of Nith lodge as it is considered that the “best evidence” gained from factual data has already been collected by NDSFB, and outweighs any information gained by further survey. | Fish habitat surveys and protected mammal surveys were carried out in this location. These were considered necessary to gain a full picture of the site. See Figures 6.1 and 6.7, Volume 2a for survey locations. |
| | Advised that aquatic surveys would be required on Knockenlee Burn, Peddinan Burn, Polmath Burn, River Nith and Knockburnie Burn. | Fish surveys were undertaken to support the proposed development were undertaken by NDSFB and as such followed their own recommendations. Surveys were undertaken on all recommended areas. |
| Galloway Fisheries Trust (GFT)<br>11 April 2022 | Advised that additional sites should be included for electrofishing and macro-invertebrate surveys if existing information was not sufficient. | Fish surveys were undertaken to support the proposed development were undertaken by GFT and as such followed their own recommendations. Surveys were undertaken on all recommended areas. |
| | Advised that any Fish Monitoring Plan would need to cover pre-construction, construction and post-construction phases. | Fish monitoring will be carried out during the pre-construction, construction and post-construction phases. Details will be provided within a Water Quality, Macro-Invertebrate and Fish Monitoring Plan (WQMFMP). |
| | Advised that any new water course crossing must ensure that fish access is protected and that if instream works are planned in a watercourse supporting trout then such works should be avoided between October to May. Stated that a fish rescue by electrofishing should take place prior to instream works in fish supporting water courses. | A watercourse crossing assessment has been carried out (further details provided in Technical Appendix 8.2: Watercourse Crossing Assessment).<br>Electrofishing surveys carried out in July and August 2022.<br>Requirements in relation to timing of works will be included in appropriate planning documents such as a CEMP. |
| | Wish to comment on any proposed Habitat Management Plan (HMP). | An outline BERP is included as Technical Appendix 6.1, Volume 3 of the EIAR which covers the role of a HMP. |
| Fisheries Management Scotland<br>15 April 2022 | Recommended that FMS guidelines[62] are fully considered throughout the planning, construction and monitoring phases. | Guidelines have been considered throughout planning phase including for production of an OEMP, CEMP and BERP. |
| Ayrshire Rivers Trust<br>21 April 2022 | Advised that the Fish Monitoring Plan should include provision for continuous monitoring of fish and macroinvertebrates and water quality parameters. Stated that an updated baseline should be recorded prior to any construction. | Details of fish monitoring are provided within the outline BERP (Technical Appendix 6.1, Volume 3 of the EIAR). |
| | Advised that the opportunity to create riparian buffer zones for the benefit of both aquatic and terrestrial species should be considered. | Whilst this has been considered, this has not included in the outline BERP. |
| SEPA<br>25 April 2022 | Advised that the following key issues must be addressed in the EIA process: | See Figure 6.1, Volume 2a for site layout including borrow pits and Chapter |

[61] Natural Power (2022). South Kyle II Wind Farm Scoping Report.

[62] Fisheries Management Scotland (2017) Advice to Boards/Trusts on engaging with the planning process for terrestrial wind farms [Online] Available at: https://fms.scot/wp-content/uploads/2017/04/170412-Guidance-Terrestrial-windfarms.pdf.

| Consultee | Comments/ issues raised/ recommendations | Addressed responses/outcomes |
|---|---|---|
| | • Mapping and assessment of impacts upon GWDTE and buffers;<br>• Peat depth survey and table detailing re-use proposals;<br>• Map and site layout of borrow pits;<br>• Schedule of mitigation including pollution prevention measures; and<br>• Decommissioning statement. | 8: Hydrology, Geology and Hydrogeology, Volume 1 for associated figures in relation to GWDTE and peat depth surveys.<br>A pollution prevention plan will be provided in the CEMP.<br>Decommissioning statement provided in Section 6.7 of this chapter. |
| NatureScot<br>3 May 2022 | Advised that a HMP should be prepared and implemented to mitigate for the loss of any key habitats. Stated that the HMP should be prepared in accordance with NatureScot guidance[63]. | An outline BERP is included as Technical Appendix 6.1, Volume 3 of the EIAR. |

*Source: Natural Power*

## 6.6. Baseline

6.6.1. This section presents the baseline environment from desk-based review and field surveys which has been used as the basis for assessing the effects from the Proposed Development.

### Desk Study

#### Statutory, National and Locally Designated Sites of Nature Conservation

6.6.2. A list of designated sites with an ecological interest (habitat or non-avian species) located near to the Proposed Development Area is provided in Table 6.8. There are four SSSIs designated for ecological interest within 5 km of the Proposed Development Area. No other relevant statutory designated sites are located within 10 km of the Proposed Development Area.

6.6.3. The locations of these sites can be found on Figure 6.2: Site Location and Designated Sites, Volume 2a of the EIAR. Designated sites with an ornithological interest are discussed in Chapter 7: Ornithology, Volume 1 of the EIAR.

**Table 6.8: Designated sites: SSSIs within 5 km of the Proposed Development Area**

| Designation | Site Name | Distance | Designation Criteria |
|---|---|---|---|
| SSSI | Bogton Loch | 1.3 km | Open water transition fen |
| SSSI | Dalmellington Moss | 1.3 km | Raised bog |
| SSSI | Ness Glen | 2.7 km | Atlantic woodland bryophyte assemblage, upland mixed ash woodland |
| SSSI | Loch Doon | 3.1 km | Arctic charr |

*Source: MAGIC, SiteLink*

[63] NatureScot (2016) Planning for Development: What to consider and include in Habitat Management Plans. Advice Note. Version 2.

#### Non-statutory Designated Sites

6.6.4. There are four non-statutory sites within 2 km of the Proposed Development Area. These are:

- Connel Burn/Benty Cowan LWS;
- Cumnock Burn/Pennyvenie Burn LWS.
- Benbeoch/Pennyvenie Glen LWS; and
- Martyrs' Moss LWS.

6.6.5. Of these sites, only Connel Burn/Benty Cowan LWS and Cumnock Burn/Pennyvenie Burn LWS lie within or immediately adjacent to the Proposed Development Area.

6.6.6. Connel Burn/Benty Cowan LWS contains a variety of upland habitats including acidic and marshy grassland, blanket bog, species-rich ledges and numerous flushes, as well as a small, semi-natural valley woodland. Cummnock Burn/Pennyvenie Burn LWS is a varied site displaying succession from bare slag to birch woodland, old broadleaved plantation and a patchwork of wet and dry acid grassland.

6.6.7. There are no LWSs with protected mammal, reptile or fish species as a qualifying feature within 500 m of the Proposed Development Area.

#### Data Search

6.6.8. The SWSEIC data of priority and protected species within 5 km (10 km for bats) of the Proposed Development Area provided records of the following protected species;

- One flowering plant: bluebell;
- Two amphibian species: common toad and common frog:
- Two reptile species: common lizard and adder;
- One fish species: Atlantic salmon;
- Three terrestrial mammal species: badger, red squirrel and otter; and
- Nine bat species: brown long-eared bat, Daubenton's bat, Natterer's bat, whiskered/Brandt's bat, Leisler's bat, noctule bat, common pipistrelle, Nathusius' pipistrelle and soprano pipistrelle; and
- One insect: large heath butterfly.

6.6.9. Additional details are provided in Technical Appendix 6.1 Ecology, Volume 3 of the EIAR

### Baseline Surveys

#### Phase 1 and NVC Results

6.6.10. The Proposed Development Area is located on land with predominantly plantation coniferous woodland and recently felled plantation coniferous woodland. Full habitat descriptions and target notes (TN) can be found in Technical Appendix 6.1, Volume 3. Habitats found during the Phase 1/NVC surveys at the Proposed Development are provided in Table 6.9 and in Figure 6.3: Phase 1 Survey Results and Figure 6.4: NVC Survey Results, Volume 2a of the EIAR.

6.6.11. Seven ponds were noted during the Phase 1 Habitat Survey. One of these ponds (TN10) was noted out-with the Proposed Development area, and three ponds (TN4, TN8 and TN9) were noted to be man-made. One pond is a Sustainable Urban Drainage System (SUDS) adjacent to the temporary construction compound (TN12), A waterfall

with a base pool (TN14) was noted with herb rich marginal vegetation. A further area of standing water was noted out-with the Proposed Development Area, approximately 1.4 km from any infrastructure.

6.6.12. An area of historic peat cutting (TN3) and an area of peat hags (TN1) were noted in areas of blanket sphagnum bog and dry modified bog respectively. Three areas of good quality blanket bog (TN2, TN6 and TN7) were noted, one of which was recorded as being partially lost due to wind farm infrastructure (TN6). One area of degraded blanket bog (TN12) was noted on the edge of a conifer plantation. The NVC survey characterised habitats to community and sub-community level, where possible. These are primarily for habitats which have GWDTE potential.

6.6.13. GWDTEs have protection under the Water Environment and Water Services (Scotland) Act 2003, to prevent deterioration, protect and enhance the status of terrestrial ecosystems, wetlands and the aquatic ecosystems they depend on. Therefore, mitigation must be undertaken when carrying out any activities that may impact upon any of these ecosystems. The NVC survey results were used to identify potential GWDTEs. Altogether three NVC communities were present which are classed in SEPA guidance[29] as indicative of potential GWDTEs, meaning that they have moderate or high dependency on groundwater in certain hydrological settings. Classification as a GWDTE does not necessarily confer any additional conservation importance to habitats present, but implies that any GWTDE habitats will be subject to further assessment in relation to impacts associated with construction of the Proposed Development. Further details on GWDTE assessment can be found in Volume 1, Chapter 8: Hydrology, Geology and Hydrogeology.

6.6.14. As part of the Extended Phase 1 survey, habitats were assessed for their suitability for protected species, including badger, otter and water vole. The habitats within the survey area were considered to be suitable for protected species and further survey was undertaken.

Table 6.9: Phase 1 and NVC communities present within the Survey Area plus 250 m where accessible

| Phase 1 Habitat Type | NVC Community | Conservation Designation | GWDTE Potential | Habitats Present in surveyed area (ha) | Permanent habitat loss as a result of the Proposed Development | |
|---|---|---|---|---|---|---|
| | | | | | Area (ha) | %* |
| A1.1.1 - Broadleaved woodland - semi-natural | | Annex 1; SBL | | 4.18 | 0.03 | 0.72 |
| A1.1.2 - Broadleaved woodland - plantation | | LBAP | | 45.83 | 2.04 | 4.45 |
| A1.2.2 - Coniferous woodland - plantation | | LBAP | | 958.35 | 11.80 | 1.23 |
| A1.3.2 - Mixed woodland - plantation | | LBAP | | 5.22 | 0.03 | 0.58 |
| A2.1 - Scrub - dense/continuous | | N/A | | 2.92 | 0 | 0 |
| A4.2 - Coniferous woodland - recently felled | | N/A | | 306.58 | 5.40 | 1.77 |
| B1.1 - Acid grassland - unimproved | | SBL; LBAP | | 56.58 | 0.19 | 0.34 |
| B1.2 - Acid grassland - semi-improved | | N/A | | 0.51 | 0 | 0 |
| B2.1 - Neutral grassland - unimproved | | SBL; LBAP | | 17.44 | 0.003 | 0.02 |
| B2.2 - Neutral grassland - semi-improved | | SBL | | 8.84 | 0 | 0 |
| B5 - Marsh/marshy grassland | | | | 57.52 | 0.09 | 0.16 |
| | M23: *Juncus effusus/ acutiflorus-Galium palustre* mire | SBL | High | | 0 | 0 |
| | M25: *Molinia caerulea-Potentilla erecta* mire | N/A | Moderate | | 0 | 0 |
| B6 - Poor semi-improved grassland | | N/A | | 3.6 | 0 | 0 |
| C1.1 - Bracken - continuous | | N/A | | 0.27 | 0 | 0 |
| C3.1 - Other tall herb and fern - ruderal | | N/A | | 2.74 | 0.15 | 5.47 |
| D1.1 - Dry dwarf shrub heath - acid | | Annex 1; SBL; LBAP | | 12.56 | 0 | 0 |
| D5 - Dry heath/acid grassland | | Annex 1; SBL; LBAP | | 11.35 | 0.03 | 0.26 |
| E1.6.1 - Blanket sphagnum bog | | Annex 1; SBL; LBAP | | 150.81 | 0.30 | 0.20 |
| E1.7 - Wet modified bog | | | | 6.73 | 0 | 0 |
| E1.8 - Dry modified bog | | Annex 1; SBL; LBAP | | 39.74 | 0.04 | 0.10 |
| E2.1 - Flush and spring - acid/neutral flush | | | | 1.95 | 0 | 0 |
| | M6 *Carex echinata* - *Sphagnum recurva*/auriculatum mire | Annex 1; SBL; LBAP | High | | 0 | 0 |
| F1 - Swamp | | | | 0.28 | 0 | 0 |
| | M4 *Carex rostrata* - *Sphagnum recurvum* mire | N/A | No | | 0 | 0 |
| | S9 *Carex rostrata* swamp | LBAP | No | | 0 | 0 |
| G1.2 - Standing water - mesotrophic | | LBAP | | 0.0002 | 0 | 0 |

**Designation Key:**

**Annex 1** – Habitats listed under Annex 1 of the Habitats Directive

**SBL** – Scottish Biodiversity List Species

**LBAP** – Listed on the East Ayrshire or Dumfries and Galloway LBAP

**All values in this table have been rounded to two decimal places. However, percentages are based on full area values and therefore calculations using area values shown may not entirely match those shown above.*

### Bats

6.6.15. Full details of bat roost and bat activity surveys, including photographs, are presented in Technical Appendix 6.1, Volume 3 of the EIAR. Locations of bat detectors are provided in Table 6.10 below and shown on Figure 6.5, Volume 2a.

### Roost Assessment

6.6.16. No potential roost features were identified within 200 m of the turbine locations or 50 m of the proposed tracks.

6.6.17. Five records of bat roosts were returned within the SWSEIC, within 10 km of the Proposed Development Area, the closest of which is c. 7 km from the Proposed Development Area. Three soprano pipistrelle roosts were noted, with abundances between 200 and 400 individuals. The remaining two roosts were common pipistrelle roosts, one with an abundance of 50+ individuals and the other unknown. All roosts were recorded between 2015 and 2016.

### Bat Activity Surveys

6.6.18. A total of 11 SM4 detectors were deployed in spring, early summer and autumn for a minimum of 14 nights each deployment, as per methods outlined by NatureScot[25]. Only nights on which suitable weather conditions were recorded (temperature 5°C or above at dusk; ground wind speed 10 m/s or less; little to no rain) have been used as "effort" records and included in analysis. Recordings which did not meet these criteria were removed from the data to avoid skewing analysis. See also Section 6.4, Survey Limitations.

6.6.19. The detector deployment locations reflect the original layout of the site. However, this is not a limitation as the habitats are similar throughout the Proposed Development Area, and the full range of habitats present have been covered by the detectors.

**Table 6.10: Bat detector locations**

| Detector number | Grid reference | Nearest proposed turbine | Distance from proposed turbine (m) | Habitat description |
|---|---|---|---|---|
| 1 | NS 52893 07490 | T05 | 636.38 | Recently felled conifer plantation adjacent to quarry |
| 2 | NS 52285 06726 | T03 | 280.47 | Edge of conifer plantation adjacent to recently felled conifer plantation |
| 3 | NS 52984 52984 | T08 | 377.89 | Near to ride in area of conifer plantation |
| 4 | NS 53281 08153 | T05 | 1318.70 | In a ride between areas of conifer plantation |
| 5 | NS 54847 08395 | T09 | 1784.24 | In an open area of dry modified bog adjacent to conifer plantation |
| 6 | NS 52592 06743 | T06 | 121.03 | Along track on the edge of conifer plantation adjacent to a section of recently felled conifer plantation |
| 7 | NS 52728 06970 | T06 | 157.06 | In an area of unimproved acid grassland between conifer plantation and recently felled conifer plantation |
| 8 | NS 53975 07404 | T09 | 558.23 | Near track in an area of recently felled conifer plantation, adjacent to an area of existing conifer plantation |
| 9 | NS 53451 06743 | T07 | 381.71 | Near to ride in area of conifer plantation |
| 10 | NS 54310 07572 | T09 | 805.21 | Along River Nith on the edge of forestry plantation and within an open area of unimproved acid grassland |
| 11 | NS 52901 06744 | T06 | 310.35 | Along a burn in an area of marshy grassland between areas of conifer plantation |

*Source: Natural Power*

6.6.20. A total of 8,294 bat passes were recorded, consisting of nine species/species groups: soprano pipistrelle, common pipistrelle, Nathusius' pipistrelle, *Pipistrellus sp.*, *Myotis sp.*, noctule, *Nyctalus sp.*, Leisler's bat and brown long-eared bat (Table 6.11). The highest number of calls were associated with common and soprano pipistrelle, with 43% and 45% of calls recorded respectively across the Proposed Development.

6.6.21. Detector 10 recorded the highest number of bat passes out of all the detector locations for all bat species (except *Myotis sp*. which was highest at Detector 11 and common pipistrelle which was highest at Detector 2): 31% of all bat passes recorded within the Proposed Development were at Detector 10 (Chart 6.1). Detector 10 (located 805.21 m from the nearest turbine) was positioned along the River Nith on the edge of forestry plantation and within an open area of unimproved acid grassland and considered to be favourable foraging habitat for bats. Detector 6 (located 121.03 m from the nearest turbine) was the detector which was positioned closest to a turbine location. Detector 8 (558.23 m from the nearest turbine) was located in open grassland habitat adjacent to recently felled conifer and is considered to represent habitats similar to those that will be present during the operational phase of the Proposed Development. In contrast to Detector 10, Detector 8 recorded comparatively fewer overall passes, representing 7% of all bat passes recorded within the Proposed Development, recording at least one pass of every species, though only one pass of *Nyctalus sp.* and Nathusis' pipistrelle (Chart 6.1).

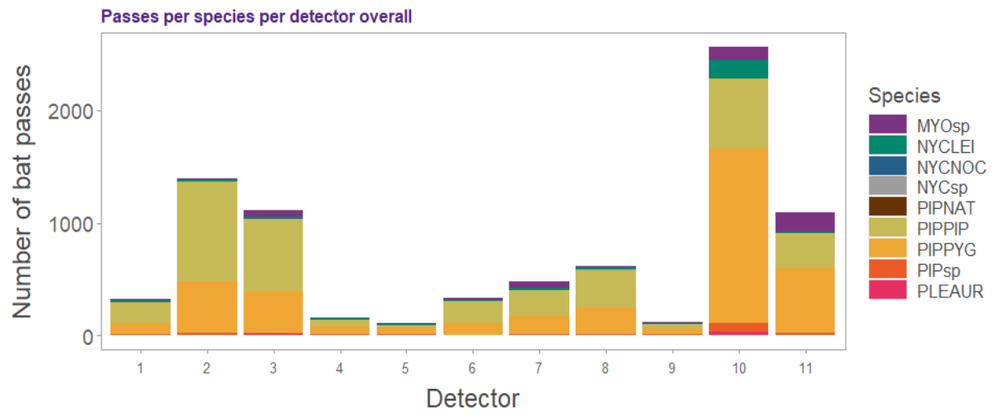
**Table 6.11: Total number of bat passes recorded during the static detector survey by season**

| Species | Spring | Summer | Autumn | Total |
|---|---|---|---|---|
| Brown long-eared | 5 | 10 | 50 | **65** |
| Common pipistrelle | 4 | 2,288 | 1,235 | **3,527** |
| Leisler's | 2 | 252 | 33 | **287** |
| *Myotis sp*. | 18 | 155 | 302 | **475** |
| Nathusis' pipistrelle | 0 | 1 | 2 | **3** |
| Noctule | 0 | 3 | 15 | **18** |

| Species | Spring | Summer | Autumn | Total |
|---|---|---|---|---|
| *Nyctalus sp.* | 0 | 6 | 0 | **6** |
| *Pipistrellus sp.* | 0 | 66 | 96 | **162** |
| Soprano pipistrelle | 12 | 1,641 | 2,098 | **3,751** |
| **Total** | **41** | **4,422** | **3,831** | **8,294** |
| **Percentage** | **0.49%** | **53.32%** | **46.19%** | **-** |

*Source: Natural Power*

**Chart 6.1: Overall bat passes per species per detector**




*Species codes correspond to each species as follows: MYOsp – Myotis sp.; NYCLEI – Leisler's; NYCNOC – noctule; NYCsp – Nyctalus sp.; PIPNAT – Nathusis' pipistrelle; PIPPIP – common pipistrelle; PIPPYG – soprano pipistrelle; PIPsp – Pipistrellus sp.; and PLEAUR – brown long-eared*

6.6.22. Detector 3 malfunctioned in spring and Detector 2 malfunctioned in autumn, as outlined in Section 6.4.12, Survey Limitations, meaning that no records were made at these locations during these deployments. However, there were detectors located in areas of similar habitat during both deployment periods and as such it is considered that spring activity at Detector 3 was likely to have been similar to that recorded at Detector 9 and autumn activity at Detector 2 was likely to have been similar to that recorded at Detector 6. Further assessment of bat activity has been based on this assumption.

6.6.23. In order to inform the likelihood of nearby roost locations, and so the potential for significant effects to bat roosts arising as a result of construction of the Proposed Development, analysis was carried out to determine how many of the bat calls recorded were within half an hour after sunset or before sunrise, categorised by detector location as shown in Technical Appendix: 6.1: Ecology. Emergence times (the time at which bats are detected on site in relation to sunset and/or sunrise), coupled with contextual behaviour information, gives a good indication for the likely distance travelled from or to (and so the proximity of) roosts; the closer to sunset activity is detected, the higher the likelihood that the bats may be roosting nearby. At each detector, except for Detector 2 and Detector 4, over 10% of bat calls were recorded within 30 minutes of sunrise or sunset, in at least one season (the highest number of passes within 30 minutes either side of sunset or sunrise was recorded at Detector 10) This is excluding the spring deployment, which recorded a comparatively low number of bat passes. The following detectors recorded activity before sunset:

- Static Bat Detector Number 3: one soprano pipistrelle in autumn
- Static Bat Detector Number 7: one common pipistrelle in summer
- Static Bat Detector Number 10: two soprano pipistrelle in summer

6.6.24. Analysis was also undertaken in relation to bat activity at different wind speeds. Further details on the number of calls at different wind speeds are provided in Technical Appendix: 6.1: Ecology. The number of calls show a clear cluster when temperatures are above 8ºC and when winds are below 5 m/s.

### Overall Risk Assessment (Bat Activity Index)

6.6.25. Using information provided within NatureScot guidance[25], an overall risk assessment has been made in relation to the Proposed Development and relative activity. The Proposed Development has been assessed as having a low (2) risk to bats as it is a medium sized project with low-risk habitat and the presence of other nearby developments. This risk level of the site, combined with the level of bat activity identified from the percentile of relative activity provided in Ecobat[64] following guidance[25], provides a classification of overall risk to species or species group is provided in Tables 6.12 – 6.14, with low assessed as between 0-4 (green), medium as 5-12 (amber) and high as 15-25 (red).

**Table 6.12: Relative Bat Activity Assessment – Spring**

| Species | Overall risk median | Overall risk maximum |
|---|---|---|
| *Myotis* sp. | 2 | 4 |
| Leisler's bat | 10 | 10 |
| Common pipistrelle | 2 | 2 |
| Soprano pipistrelle | 2 | 2 |
| Brown long-eared bat | 10 | 10 |

*Source: Natural Power*

**Table 6.13: Relative Bat Activity Assessment – Summer**

| Species | Overall risk median | Overall risk maximum |
|---|---|---|
| *Myotis* sp. | 2 | 8 |
| *Nyctalus* sp. | 2 | 2 |
| Leisler's bat | 4 | 10 |
| Noctule | 8 | 10 |
| *Pipistrellus* sp. | 2 | 6 |
| Nathusius pipistrelle | 10 | 10 |
| Common pipistrelle | 2 | 6 |
| Soprano pipistrelle | 2 | 6 |
| Brown long-eared bat | 4 | 10 |

*Source: Natural Power*

[64] [Online] Available from - http://www.ecobat.org.uk/

Table 6.14: Relative Bat Activity Assessment – Autumn

| Species | Overall risk median | Overall risk maximum |
|---|---|---|
| *Myotis* sp. | 2 | 6 |
| Leisler's bat | 6 | 10 |
| Noctule | 8 | 10 |
| *Pipistrellus* sp. | 2 | 4 |
| Nathusius pipistrelle | 4 | 4 |
| Common pipistrelle | 2 | 4 |
| Soprano pipistrelle | 2 | 10 |
| Brown long-eared bat | 4 | 10 |

*Source: Natural Power*

6.6.26. Of the bat species considered to be at high risk of collision and based on the median BAI, Leisler's were assessed as being at medium risk in spring and noctule in summer and autumn.

6.6.27. No species were assessed as being at high overall risk for the Proposed Development.

### Protected Mammals

6.6.28. Survey results are shown on Volume 2a, Figure 6.6: Protected Mammal Survey Results.

#### Badger

6.6.29. Suitable badger foraging and sett building habitat is present across the Proposed Development Area. One sett was noted during the protected species surveys. Further details are provided in the Volume 3, Confidential Technical Appendix 6.2. The sett was noted more than 250 m from proposed infrastructure.

#### Red Squirrel

6.6.30. This species is known to be present within surrounding woodland, which was previously surveyed as part of nearby developments. As agreed within scoping, no species-specific surveys were undertaken for red squirrel, though eight incidental squirrel feeding signs were found within forested areas of the Proposed Development Area. In the absence of being able to identify to species, it has been assumed that these feeding signs are red squirrel.

#### Pine marten

6.6.31. This species is known to be present within surrounding woodland, which was previously surveyed as part of nearby developments. The presence of this species was therefore assumed in areas of suitable habitat within the Proposed Development Area.

6.6.32. No species-specific surveys were undertaken for pine marten and no incidental sightings or evidence of pine marten was found during the protected mammal surveys undertaken for the Proposed Development.

#### Otter

6.6.33. There were 22 otter signs found during the protected mammal surveys undertaken for the Proposed Development. These consisted of 21 records of spraints, and one record of a potential resting place (see Volume 3, Confidential Technical Appendix 6.2 for further details). The resting place was noted more than 250 m from proposed infrastructure.

#### Water vole

6.6.34. No evidence of water vole was found during the protected mammal surveys undertaken for the Proposed Development.

### Reptiles and amphibians

6.6.35. No targeted reptile or amphibian surveys were undertaken as part of the Proposed Development. However, suitable habitats such as felled woodland and heathland with potential for reptiles, including adder and common lizard, were present within the Proposed Development Area.

6.6.36. Seven ponds and one area of standing water were noted during the Phase 1 Habitat Survey (see Volume 3, Technical Appendix 6.1 Ecology for more details). They varied in size, though many of them were noted to contain marginal or swamp vegetation. These features could provide habitat for amphibians including common frog. No targeted great crested newt surveys were undertaken due to the lack of local records and majority of suitable habitats existing more than 250 m from any infrastructure works within the Proposed Development. One area of standing water (TN10, the SUDS) will be less than 10 m from the nearest infrastructure, though is a newly created feature and therefore the presence of great crested newt will be greatly reduced.

### Fish

#### Fish habitat survey

6.6.37. Survey results are shown on Volume 2a, Figure 6.7: Fish Habitat Survey Results.

6.6.38. All of the watercourses within the Proposed Development were surveyed for habitat suitability for fish. The flow characteristics were largely uniform between sections of the different watercourses, and principally comprised glides interspersed with riffles, with occasional slacks, pools and cascades. Sediment types were primarily gravel, pebble or cobble. In some areas, boulders, bedrock, clay and silt were present in very low percentages (5-10%).

6.6.39. Suitable spawning habitat for salmonid species incorporating riffle with gravel and pebble was evident within the Proposed Development. Boulder and cobble areas, providing good juvenile salmonid habitat, can be found throughout the Proposed Development in 56% of the watercourses.

6.6.40. Instream vegetation was present in 0.3% of the surveyed waterways. Bankside vegetation covered 62.2% of the banks, providing stabilisation, preventing bank erosion and giving additional cover for fish species. Additional cover for fish was provided by fallen trees.

6.6.41. Areas with pools and high flow rates suitable for adult fish were present to the north and south of the Proposed Development Area. Watercourses which showed these features most prominently were Benbrack Burn (flowing adjacent to T04), minor watercourses in Ashbeugh Glen (adjacent to the temporary construction compound) and the River Nith (to the north east of the Proposed Development Area). Clear visibility was reported in 4.4% of surveyed areas, with visibility being light peaty in 60%. Water depth averaged 0.5 m (ranging from 0.2 to 0.7 m).

6.6.42. Flow constrictions throughout the Proposed Development comprised primarily of debris from fallen trees and branches and sloped drops over boulders ranging from around 0.3 m to 3 m in height.

6.6.43. Full details of the fish habitat survey are provided in Technical Appendix 6.1, Volume 3 of the EIAR.

#### Electrofishing

6.6.44. Electrofishing surveys were carried out at seven sites (six in the vicinity of the Proposed Development and one control on the Mennock Water) by the Nith District Salmon Fishery Board in August 2022. A further three sites were surveyed by the Galloway Fisheries Trust in September 2022. Salmonid species were found to be present

at seven of the 10 sites. Six of these (sites 3, 5 and 6, DDV1, DDV3 and DKSB1) were in the vicinity of the Proposed Development and contained either good/high or excellent/very high densities of fry and parr for both Atlantic salmon and sea/brown trout (see Table 6.15). The control site contained excellent densities of fry and parr for both salmon and trout.

6.6.45. Three sites (sites 1, 2 and 4) contained no fish at the time of survey. However, historic data on the Pendinnan Burn (from 2020) proved the presence of trout fry and parr had in good to excellent densities. The absence of fish at these sites in 2022 is thought to be a result of severe drought.

6.6.46. Stone loach were the only non-salmonid species of fish found to be present during survey in 2022. They were only recorded on the River Nith (site 6) and their absence from other sites is thought to be due to the higher altitude of those sites.

6.6.47. Further details of electrofishing surveys are provided in Technical Appendix: 6.1: Ecology , Volume 3 of the EIAR.

### Freshwater Invertebrates

6.6.48. Freshwater invertebrate surveys were conducted at the same seven sites as the electrofishing surveys. In accordance with the Water Framework Directive[55], all sites produced Good ecological status classification, except that at Pedinnan Burn (site 1) which was classified as having High ecological status. These results indicate that overall water quality at the time of survey was good.

6.6.49. Further details of freshwater invertebrate surveys are provided in Technical Appendix: 6.1: Ecology, Volume 3 of the EIAR.

**Table 6.15: Pre-construction electrofishing survey results 2022**

| Watercourse (site) | Site | Grid reference | Density per 100 m² | | | | Other species |
|---|---|---|---|---|---|---|---|
| | | | Salmon fry | Salmon parr | Trout fry | Trout parr | |
| Mennock Water | Control | 283777 609803 | Excellent | Excellent | Excellent | Excellent | None |
| Pendinnan Burn | 1 | 253946 608364 | None | None | None | None | None |
| Knockenlee Burn | 2 | 253155 608817 | None | None | None | None | None |
| Knockenlee Burn | 3 | 253418 609105 | None | None | Excellent | Excellent | None |
| Polmath Burn | 4 | 254490 609906 | None | None | None | None | None |
| Knockburnie Burn | 5 | 256307 610535 | None | None | Excellent | Good | None |
| River Nith | 6 | 253890 611248 | Excellent | Good | Good | None | Stone loach |
| Pochriegavin Burn | DDV1 | 254318 604183 | None | None | High | Very high | None |
| Un-named Pochriegavin Tributary | DDV3 | 253287 604671 | None | None | Very high | Moderate | None |
| Stonecross Burn | DKSB1 | 254093 604272 | None | None | Moderate | High | None |

*Source: Nith District Salmon Fishery Board and Galloway Fisheries Trust*

## 6.7. Assessment of Potential Effects

### General Impacts

6.7.1. The main ways in which a wind farm may affect ecological receptors are via:

- The potential to adversely affect defined populations of protected species. Such an adverse effect may arise directly through habitat loss, disturbance or displacement or death during construction or operation, or collisions with turbines, or indirectly through cumulative effects;
- The potential to adversely affect defined sensitive habitats. Such an effect may arise directly through habitat loss, or indirectly due to disturbance or displacement or death during construction or operation, or collisions with turbines, or indirectly through cumulative effects; and
- The potential to have an adverse effect on the integrity of a statutory site designated for its ecological features, particularly those with an international designation such as SACs, either as a direct result of the Proposed Development or in combination with other projects.

6.7.2. In line with the principles of proportionate EIA, embedded mitigation is considered from the outset and is presented in the following section. Features have only been taken on for further impact assessment if an adverse likely significant effect cannot be concluded following the implementation of this embedded mitigation.

### Embedded Mitigation

6.7.3. Embedded mitigation measures are proposed at the outset of the Proposed Development, to reduce impacts associated with construction, operation and decommissioning, and are outlined as follows.

6.7.4. A minimum distance of 50 m has been maintained between the Proposed Development and watercourses, with the exception of four new watercourses crossings, and three existing crossings potentially requiring upgrades. See Volume 3 Technical Appendix 8.2: Watercourse Crossing Assessment for further information regarding watercourse crossings.

6.7.5. The layout of the Proposed Development has avoided impacts to sensitive habitats where possible (e.g. modified bog), and areas of peat, taking into account other constraints. Where possible, infrastructure has been located on pre-existing tracks and footpaths in order to minimise impact. Where avoidance has not been possible, the infrastructure will be constructed in such a way as to maintain the integrity and connectivity of the hydrology of hydrologically sensitive habitats. New access tracks would be designed in keeping with NatureScot good practice guidance. Further detail on hydrology is provided in Volume 1 Chapter 8: Hydrology, Geology and Hydrogeology.

6.7.6. All proposed turbine locations are over 100 m from key habitat features for bats (such as areas of woodland or scrub), which gives more than the 93.5 m buffer as set out in current NatureScot guidance[23]. This calculation is based on assumed candidate turbine dimensions set out in Chapter 3: Project Description, Volume 1 of the EIAR. Should micrositing of turbine location be required, this distance will be maintained and overseen at the construction stage by the ECoW. The required buffer distance of 93.5 m is estimated by the equation:

$$\sqrt{(50 + bl)^2 - (hh - fh)^2}$$

Where *bl* = blade length (83.35 m); *hh* = hub height (115 m); and *fh* = feature (tree) height, estimated here as 20 m.

### Construction Phase

6.7.7. A CEMP will be produced prior to construction works commencing in consultation with the LPA (see Chapter 3: Project Description, Volume 1 of the EIAR). The document will be a live document and will be updated throughout the pre-construction and construction and will:

- Include measures to safeguard habitats and species to be implemented prior to construction, during construction and post-construction; and
- Provide details of pre-construction surveys required including methods and timings.

6.7.8. A WQMFMP will be produced which will detail methods and timings of fish monitoring to be carried out at the pre-construction, construction and post-construction phases.

6.7.9. An Environmental Clerk of Works (EcoW) will be present during enabling works and throughout the construction period of the Proposed Development. They will be a suitably experienced individual, whose role would be to provide advice so that that works are carried out in accordance with environmental measures detailed in the CEMP, and to monitor compliance with relevant legislation and good practice (see Section 6.2 of this Chapter). The EcoW would contribute to all relevant CEMP documents. Once work has commenced, their role will be to provide ecological and pollution control advice and monitor compliance of all relevant mitigation measures and legislation (see also Volume 1 Chapter 8: Hydrology, Geology and Hydrogeology). The EcoW will also give regular toolbox talks to make site personnel aware of the ecological sensitivities on site.

### Construction Phase: Habitats

6.7.10. Detailed mitigation measures will be provided in the CEMP for the protection of sensitive habitats during the pre-construction, construction and post-construction phases and will consist of:

- Toolbox talks to inform contractors of the sensitive habitats at the Proposed Development;
- Marking of sensitive areas of habitat close to construction areas, to prevent accidental encroachment;
- No storage of materials or machinery permitted within exclusion zones;
- Supervised vegetation clearance by the EcoW in sensitive areas prior to construction; and
- Construction phase control measures will continue during the operational phase, through the operational management plan, where potential effects exist.

6.7.11. Where possible (and where other constraints allow) an allowance of 50 m micrositing of infrastructure will be undertaken to ensure construction does not impact on the most sensitive habitats and any other identified ecological constraints and will be completed in consultation with the EcoW. This is particularly important when working in close proximity to waterbodies and sensitive habitats. Where micrositing cannot avoid areas of sensitive habitats or features, the EcoW would discuss and agree additional required mitigation to ensure impacts are minimised.

6.7.12. Any land degraded by construction and not required for the operation of the Proposed Development, such as the construction compound and around areas of tracks, would be restored as soon as possible after construction is completed. Turves would be carefully removed during construction as far as practicable and stored following good practice for re-use in the restoration of areas not required for the operation of the Proposed Development. As such, any vegetation removed for the construction phase would be reinstated within the area of the Proposed Development, facilitating natural re-colonisation of vegetation communities. Permanent habitat loss would be limited to that required for the footprint of infrastructure and good site management practices would be implemented to minimise the risk of encroachment of the construction corridor into adjacent habitats. As far as is reasonably practicable, any notable floral species encountered will be marked with an exclusion zone or

translocated to other suitable areas of habitat or stored for reuse in reinstatement of temporary infrastructure. The implementation of these measures will reduce the potential for impacts on sensitive habitats.

6.7.13. Site activities have the potential to cause pollution through dust, siltation, leaks and spillages associated with plant and materials during the construction and operational phases. If such incidents were to occur, then these pollutants may reach waterbodies and surrounding vegetation. Therefore, these activities may directly or indirectly affect habitats and species, especially where they are hydrologically connected.

6.7.14. Pollution incidents may occur during construction as well as within the operational phase during maintenance works. Pollution prevention measures will be detailed in the CEMP and overseen by the EcoW. Pollution with regards to waterbodies is further discussed in Volume 1 Chapter 8: Hydrology, Geology and Hydrogeology. Measures to control the impact of dust on sensitive habitats would be implemented during the preparation and construction phase. These measures will be adopted, when necessary, in dry weather, in areas of active development, and will most likely involve the controlled dampening of tracks when utilised by construction vehicles. Material for construction will be imported from local quarry sources, which will have similar chemical properties to stone found within the area of the Proposed Development to ensure no alteration in soil chemistry. Further detail on the mitigation of potential dust impacts will be detailed within the CEMP.

### Construction Phase: Watercourses and Ground Water Dependant Terrestrial Ecosystems

6.7.15. The pre-construction quality of watercourses and waterbodies would be maintained during construction (see Volume 1 Chapter 8: Hydrology, Geology and Hydrogeology). Watercourse protection measures would be adopted within the CEMP and include protection against siltation and sedimentation, and pollution incidents such as the implementation of a pollution response plan and the safe storage of chemicals in bunded containers. Robust mitigation measures will be installed prior to works commencing to ensure the impacts on watercourses are minimised. Mitigation throughout the Proposed Development will be regularly monitored and maintained/replaced as required. Refuelling of vehicles and machinery will be carried out at a central designated area, on an impermeable surface, located at least 50 m away from any watercourse. Monitoring of water quality would be carried out before and during construction. The implementation of these measures would ensure impacts on protected species, such as otter and fish species, are minimised.

6.7.16. Details of how impacts upon groundwater flow are minimised and mitigated are detailed in Volume 1 Chapter 8: Hydrology, Geology and Hydrogeology.

6.7.17. A WQMFMP to monitor and protect fish populations pre-, during- and post-construction will be drafted to be agreed with the local planning authority in consultation with NatureScot and Galloway Fisheries Trust. It is proposed that this may be secured via planning condition.

### Construction Phase: Protected Species

6.7.18. A Species Protection Plan (SPP) will be produced as part of the CEMP prior to the commencement of development, detailing measures to be implemented before and during construction to protect species present in the area of the Proposed Development. This will include good practice measures to prevent accidental mortality of protected species during construction, such as:

- A suitable vehicle speed limit to be enforced within the Proposed Development;
- Warning signs installed, where appropriate, to reduce risk of collision with protected species;
- Covering of deep excavations, foundations and pipe openings (or a ramp suitable to allow a mammal to escape installed) when not active to prevent entrapment of animals;
- Pre-construction surveys undertaken for protected species, including bats, badger and otter within set buffer areas of the Proposed Development;
- If a potential resting place (e.g. bat roost) of a protected species is found within set buffer areas of construction then work will cease within appropriate (species-specific) buffers until it can be established whether it is in active use by a protected animal. If presence is confirmed, then NatureScot will be consulted to discuss possible mitigation measures and/or seek an appropriate licence;
- Lighting design will ensure watercourses and woodland remain unlit at night. Security lighting and lighting associated with the temporary compound will be low lux[65], kept to a minimum where possible, and directed away from watercourses and woodland to reduce disturbance;
- Sensitive works will be timed/phased appropriately to avoid harm to biodiversity features; and
- All site personnel will be made aware of the presence of protected species through toolbox talks.

### Operational Phase: General

6.7.19. With the exception of the operation of the wind turbines and general maintenance of the turbines, there will be little on-site activity during the operational phase, and therefore levels of disturbance will be considerably reduced relative to the construction period.

6.7.20. Where potential effects exist, control measures will be incorporated into an Operational Environmental Management Plan. In particular, the potential for pollution incidents during routine maintenance activities will be minimised by adoption of SEPA good practice guidance[66].

6.7.21. Any routine maintenance works will take place during the day where practicable to minimise the potential for disturbance to protected species within the Proposed Development (since these are mostly nocturnal/crepuscular) and a speed limit of 15 mph will be enforced for any vehicles going onto the Proposed Development, in order to reduce the risk of collision with protected species.

6.7.22. Where potential effects exist, control measures will be incorporated into an Operational Environmental Management Plan (OEMP). The OEMP will detail mitigation measures required during the operational phase relating to ecological features to ensure ongoing compliance with relevant environmental legislation.

6.7.23. In addition, an outline BERP has been prepared which includes measures for habitat enhancements and ecological monitoring and is provided as Technical Appendix 6.3, Volume 3 of the EIAR. The outline BERP includes management prescriptions and monitoring of the retained/enhanced habitats to achieve biodiversity benefits. Policy 3 of NPF4 advises the provision of enhancement measures, but at the date of this EIAR finalisation the Scottish Biodiversity Strategy and the creation of a Scottish biodiversity metric are still awaited. It is anticipated that planning conditions will enable the outline BERP to evolve to reflect future advice.

### Operation Phase: Aviation lighting

6.7.24. Lighting can at night attract insects which in turn attract foraging bats. Lighting on turbines therefore has potential to attract bats into the collision risk zone.

6.7.25. Based on the detail provided in Volume 1 Chapter 13. Aviation and Other Effects and Volume 2b, Figure 5.4a Aviation Lighting Strategy, it is proposed that 5 turbines will be fitted with aviation lighting, and the final lighting scheme has been agreed by the Civil Aviation Authority (CAA) as follows:

- Medium intensity steady-red (2,000 candela) are to be fitted on the nacelles of turbines T01, T04, T05, T09 and T10:

[65] A standardised unit of measurement of light level intensity (illuminance).

[66] SEPA, (2010). Engineering in the water environment: good practice guide - river crossings (2nd Edition), SEPA.

- A second 2,000 candela light on the nacelles of the above turbines to act as alternate in the event of a failure of the main light (both lights should not be lit at the same time);
- Lights are capable of being dimmed to 10% of peak intensity when the lowest visibility (as measured at suitable points around the wind farm by visibility measuring devices) exceeds 5 km; and
- A scheme of infra-red lighting to be agreed with the MOD to account for operators who carry night vision device capability (dimming permission is applicable only to visible lights, not infra-red lighting).

6.7.26. Bats are nocturnal and changes in lighting can have adverse effects on their feeding behaviour and commuting routes by causing disturbance. Furthermore, short wave length light (UV and blue light) attracts a range of their prey items, which has the potential to alter their natural behaviour by attracting bats to lit areas. However, red light is not particularly attractive to insects compared to other light colours and therefore using red light will reduce the risk of attracting insects and bats toward turbines.

6.7.27. Should the turbine lighting as part of the Proposed Development attract bats as a result of increased foraging potential, bats are more likely to be at risk of collision. However, recent research as described below on the potential impact of red aviation lighting fitted to turbines points towards there being no additional risk of collision for bats as a result of such lighting. There is a lack of information available on the effects of turbine lighting on bats within Europe, although a number of US studies have been conducted. A five year study undertaken in Texas[67] found that there was no significant difference between bat fatalities at turbines with lights as compared to those without. Indeed for a single species it was identified that fatalities were higher at turbines without lighting. Other studies have postulated that this apparent reduction in fatalities at turbines with red aviation lights is as a result of bats not mistaking turbines with lights for trees[68]. Numerous other studies have been conducted with the conclusion that lights on tall structures do not increase the probability of bat collisions[69,70] that bats are able to perceive and respond to cues from artificial lights[71].

6.7.28. Given that bat behaviour from a number of different species in the US recorded no proof of bats avoiding or being attracted to wind turbines equipped with aviation lighting, it is assumed that there is likely a similar behaviour observed within UK species. Therefore, the addition of red aviation lighting to five turbines does not pose any additional risk to bats and as it is not considered any further.

### Decommissioning

6.7.29. Embedded mitigation of decommissioning activities will follow that proposed for the embedded mitigation of construction activities, including pre-decommissioning surveys and ecological supervision of activities.

## Feature Assessment

6.7.30. On the basis of the description of the ecological baseline, together with the legislation and guidance, a summary of the habitats and species within the Proposed Development Area is provided in Table 6.16 below. Similar habitats with comparable impacts and conservation interest have been grouped together as the outcomes are expected to be equivalent.

6.7.31. All LWS sites have been scoped out of this assessment as any associated IEFs known to be present within the proposed development being assessed separately.

6.7.32. Habitats which hold little to no conservation interest and with negligible geographical value which will not be permanently lost as part of the Proposed Development have also been scoped out of this assessment. These habitats include poor semi-improved grassland and bracken and ruderal tall herb and fern (accounting for 0.21% /3.6 ha and 0.17% /3.01 ha of the total area within the survey area respectively).

6.7.33. Great crested newt were scoped out of assessment due to the lack of local records returned within the SWSEIC search and absence of suitable habitat within 250 m of infrastructure within the Proposed Development[72]. This species is therefore not discussed further.

6.7.34. Where no significant effects are likely with the application of embedded mitigation as outlined in Section 6.7, Embedded Mitigation above this is specified, and the feature is not considered an IEF requiring EIA.

**Table 6.16: Summary of designated sites, habitats and species and their conservation importance. IEFs are shown as bold**

| Feature | Covering legislation and guidance/conservation designation* | Geographical level of value | IEF | Justification |
|---|---|---|---|---|
| Bogton Loch SSSI | SSSIs are areas of special interest due to faunal, floral, geological or physiographical features and are notified under the Wildlife & Countryside Act. | National | No | The site is of importance for its open water transition fen habitats and is located 1.3 km to the west of the Proposed Development Area. Given the distance of the Proposed Development from the SSSI and the absence of hydrological connectivity there will be no negative effects on the features for which the site was classified. Therefore, Bogton Loch SSSI is not considered to be an IEF and is not discussed further in this chapter. |
| Dalmellington Moss SSSI | SSSIs are areas of special interest due to faunal, floral, geological or physiographical features and are notified under the Wildlife & Countryside Act. | National | No | The site is of importance for its raised bog habitats and is located 1.3 km to the west of the Proposed Development Area. Given the distance of the Proposed Development from the SSSI and the absence of hydrological connectivity there will be no negative effects on the features for which the site was classified. Therefore, Dalmellington Moss SSSI is not considered to be an IEF and is not discussed further in this chapter. |

[67] Bennett VJ, Hale AM. (2014) Red aviation lights on wind turbines do not increase bat-turbine collisions. *Animal Conservation.* 2014;17:354–358.

[68] Cryan PM, Gorreson M, Hein CD and Dalton DC (2014) Behavior of bats at wind turbines, University of New Mexico, Albuquerque, NM, September 29, 2014

[69] Arnett, E.B., 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. & Tankersley, R.D. (2008). Patterns of bat fatalities at wind energy facilities in North America. *J. Wildl. Manage.* **72**, 61–78.

[70] Baerwald, E.F., Edworthy, J., Holder, M. & Barclay, R.M.R. (2009). A large-scale mitigation experiment to reduce bat fatalities at wind energy facilities. J. Wildl. Manage. 73, 1077–1081.

[71] Cryan PM, Brown AC (2007) Migration of bats past a remote island offers clues toward the problem of bat fatalities at wind turbines Biological Conservation 139

[72] ARG UK (2010) ARG UK Advice Note 5: *Great crested newt habitat suitability index.*

| Feature | Covering legislation and guidance/conservation designation* | Geographical level of value | IEF | Justification |
|---|---|---|---|---|
| Ness Glen SSSI | SSSIs are areas of special interest due to faunal, floral, geological or physiographical features and are notified under the Wildlife & Countryside Act. | National | No | The site is of importance for its upland mixed ash woodland habitats and Atlantic woodland bryophyte assemblage and is located 2.7 km to the south-west of the Proposed Development Area. Given the distance of the Proposed Development from the SSSI there will be no negative effects on the features for which the site was classified. Therefore, Ness Glen SSSI is not considered to be an IEF and is not discussed further in this chapter. |
| Loch Doon SSSI | SSSIs are areas of special interest due to faunal, floral, geological or physiographical features and are notified under the Wildlife & Countryside Act. | National | No | The site is of importance for its Atlantic charr population and is located 3.1 km to the south of the Proposed Development Area (c. 5.6 km from the nearest proposed wind turbine). There is no ecological link to the Proposed Development Area. Given the distance of the Proposed Development from the SSSI and the absence of hydrological connectivity there will be no negative effects on the features for which the site was classified. Therefore, Loch Doon SSSI is not considered to be an IEF and is not discussed further in this chapter. |
| Semi-natural broadleaved woodland and scrub | Annex 1; SBL; GWDTE | Negligible | No | None of this habitat will be permanently lost as part of the Proposed Development. Habitats present within the surveyed Proposed Development are limited to small areas where recent native tree species replanting has occurred on recently felled coniferous plantation, and therefore this habitat is not considered to be an IEF |
| Broadleaved, coniferous and mixed plantation woodland and recently felled coniferous woodland | N/A | Negligible | No | These habitats cover 56.68% (999.92 ha) of the total area of surveyed habitat within the Proposed Development Area. With the exception of mixed woodland, these habitats will experience a permanent loss of 6.21% in relation to the Proposed Development. The habitats in the Proposed Development hold little to no conservation interest and are widespread throughout Scotland. In addition the outline BERP includes measures for compensating and enhancing broadleaved habitats which will result in a net biodiversity gain in line with requirements of NPF4[13]. This habitat is therefore not considered to be an IEF. |
| Acid grassland (unimproved and semi-improved) | SBL, LBAP | Local | No | Unimproved acid grassland covers 3.32% (56.60 ha) of the total area of surveyed habitat within the Proposed Development Area. Semi-improved acid grassland covers an additional 0.03% (0.51 ha) of the total area of surveyed habitat. Unimproved acid grassland will experience a permanent loss of 0.33% in relation to the Proposed Development. These habitats are widespread throughout Scotland on well-drained acid soils and in the uplands of Scotland, this is the most extensive grassland broad habitat[73]. Additionally, upland acid grassland is included in the SBL as a 'watching brief only', requiring monitoring to prevent decline and it is included within the LBAP as an important habitat for upland birds.<br>There is the potential for an indirect impact from dust created during construction works, or from accidental pollution. A pollution prevention plan and measures to control dust will be included in the CEMP and monitored by the ECoW, and so it is considered that embedded mitigation is sufficient to prevent adverse effects to this habitat. Given the relatively small area of habitat loss from the Proposed Development and the low conservation value this habitat is not considered to be an IEF in the context of the Proposed Development. |
| Unimproved neutral grassland | SBL; GWDTE | Local | No | Unimproved neutral grassland covers 1.02% (17.46 ha) of the total area of surveyed habitat within the Proposed Development Area. Semi-improved neutral grassland covers an additional 0.52% (8.84 ha) of the total area of surveyed habitat. Unimproved neutral grassland will experience a permanent loss of 0.02% in relation to the Proposed Development.<br>There is potential for an indirect impact from dust created during construction works, or from accidental pollution. A pollution prevention plan and measures to control dust will be included in the CEMP and monitored by the ECoW, so it is considered that embedded mitigation is sufficient to prevent adverse effects to this habitat and as such no significant effects of the Proposed Development on the integrity of this feature are likely. Therefore, this habitat is not considered to be an IEF. |

[73] https://www.nature.scot/sites/default/files/2018-02/Broad%20Habitat%20-%20Acid%20Grassland.pdf (Last accessed March 2024)

| Feature | Covering legislation and guidance/conservation designation* | Geographical level of value | IEF | Justification |
|---|---|---|---|---|
| | | | | Given that this habitat has high potential for being a GWDTE the Proposed Development could impact on the hydrology of this habitat. Further discussion of GWDTEs is presented in Chapter 8: Hydrology, Geology and Hydrogeology. |
| Marshy grassland | SBL; GWDTE | Local | No | This habitat covers 3.35% (57.17 ha) of the total area of surveyed habitat within the Proposed Development Area. This habitat will experience a permanent loss of 0.16% in relation to the Proposed Development.<br>All marshy grassland habitats found within the Proposed Development Area are priority habitats on the SBL (M23) and are usually associated with small header streams arising near the tops of the hill. Some of these streams have M23 marshy grassland along their banks and are present beside or crossing potential tracks or existing tracks due to be upgraded. Protection for watercourses is embedded in the project design through good practice. Protection measures will be outlined in the CEMP. Further information on watercourses can be found in Chapter 8: Hydrology, Geology and Hydrogeology.<br>There is also the potential for an indirect impact from dust created during construction works, or from accidental pollution. A pollution prevention plan and measures to control dust will be included in the CEMP and monitored by the ECoW, and so it is considered that embedded mitigation is sufficient to prevent adverse effects to this habitat and as such no significant effects of the Proposed Development on the integrity of this feature are likely. Therefore, this habitat is not considered to be an IEF.<br>Habitat M23 and M25 have high potential for being a GWDTE. Given that some infrastructure will be located within 250 m of these habitats, the Proposed Development could impact on the hydrology of this habitat. In line with NPF Policy 5, M25 is a priority peatland community of which impacts are unlikely to raise issues of national interest for peat[74], owing to historic management pressures. Further discussion of GWDTEs and peat are presented in Chapter 8: Hydrology, Geology and Hydrogeology. |
| Dry dwarf shrub heath / mosaic of acid grassland and dry heath | Annex 1; SBL; LBAP | Local | No | These habitats cover 1.40% (23.92 ha) of the total area within the survey area. Dry heath/acid grassland will experience a permanent loss of 0.22% in relation to the Proposed Development. Dwarf shrub heath and dry heath are both priority habitats on Annex 1, SBL and LBAP<br>There is potential for an indirect impact from dust created during construction works, or from accidental pollution. A pollution prevention plan and measures to control dust will be included in the CEMP and monitored by the ECoW, and so it is considered that embedded mitigation is sufficient to prevent adverse effects to this habitat arising from construction. The scale of habitat loss from the Proposed Development represents a low proportion of the community found within the Proposed Development Area and as such no significant effects of the Proposed Development on the integrity of this feature are likely. Therefore, the habitat is not considered to be an IEF. |
| Blanket sphagnum bog | Annex 1; SBL; LBAP | Local | No | These habitats cover 8.85% (150.84 ha) of the total area within the survey area. This habitat will experience a permanent loss of 0.20% in relation to the Proposed Development. Three areas of good quality blanket bog and one area of degraded blanket bog were noted during the Phase 1 Habitat survey.<br>This habitat corresponds to the Annex 1 and SBL priority habitat 'Blanket Bog' which is a common and widespread habitat in south-west Scotland and is rarely pristine when found in the agricultural plantation forestry setting, however in these areas this habitat type shows less modification than that which has been classed as wet modified bog. There is also the potential for an indirect impact from dust created during construction works, or from accidental pollution. A pollution prevention plan and measures to control dust will be included in the CEMP and monitored by the ECoW, and so it is considered that embedded mitigation is sufficient to prevent adverse effects to this habitat and as such no significant effects of the Proposed Development on the condition of this feature are likely. Therefore, this habitat is not considered to be an IEF. In addition, the outline BERP includes measures for |

[74] Advising on peatland, carbon-rich soils and priority peatland habitats in development management | NatureScot [Accessed 25/03/2024]

| Feature | Covering legislation and guidance/conservation designation* | Geographical level of value | IEF | Justification |
|---|---|---|---|---|
| | | | | compensating and enhancing bog habitats which will result in a net biodiversity gain in line with requirements of NPF4[13].<br>Habitats M4 and M25 have high potential for being a GWDTE. Given that some infrastructure will be located within 250 m of these habitats, the Proposed Development could impact on the hydrology of this habitat. In line with NPF Policy 5, M25 is a priority peatland community of which impacts are unlikely to raise issues of national interest for peat[78], owing to historic management pressures.<br>Further discussion of GWDTEs and peat is presented in Volume 1, Chapter 8: Hydrology, Geology and Hydrogeology. |
| Modified bog (wet and dry) | Annex 1; SBL | Local | No | These habitats cover 39.76% (46.49 ha) of the total area within the survey area. Dry modified bog will experience a permanent loss of 0.11% in relation to the Proposed Development.<br>There is also the potential for an indirect impact from dust created during construction works, or from accidental pollution. A pollution prevention plan and measures to control dust will be included in the CEMP and monitored by the ECoW, and so it is considered that embedded mitigation is sufficient to prevent adverse effects to this habitat and as such no significant effects of the Proposed Development on the condition of this feature are likely. Therefore, this habitat is not considered to be an IEF. In addition, the outline BERP includes measures for compensating and enhancing bog habitats which will result in a net biodiversity gain in line with requirements of NPF4[13].<br>The habitat M25 has high potential for being a GWDTE. Given that some infrastructure will be located within 250 m of these habitats, the Proposed Development could impact on the hydrology of this habitat. In line with NPF Policy 5, M25 is a priority peatland community of which impacts are unlikely to raise issues of national interest for peat[78], owing to historic management pressures. Further discussion of GWDTEs and peat are presented in Chapter 8: Hydrology, Geology and Hydrogeology. |
| Flush and spring - acid/neutral flush | Annex 1, SBL, LBAP | Regional | No | This habitat covers 0.11% (1.94 ha) of the total area within the survey area. None of this habitat will be permanently lost as part of the Proposed Development.<br>Acid/neutral flush habitats is included in the SBL as a 'watching brief only'. This means that the habitat has only low conservation value despite the LBAP and Annex 1 status. Areas subject to unavoidable temporary impacts will be monitored for restoration as soon as practicable following completion of construction.<br>The habitat M6 has high potential for being a GWDTE. Given that some infrastructure will be located within 250 m of these habitats, the Proposed Development could impact on the hydrology of this habitat. Further discussion of GWDTEs is presented in Chapter 8: Hydrology, Geology and Hydrogeology.<br>There is also the potential for an indirect impact from dust created during construction works, or from accidental pollution. A pollution prevention plan and measures to control dust will be included in the CEMP and monitored by the ECoW.<br>As no areas of this habitat will be lost to the Proposed Development, it is considered that embedded mitigation is sufficient to prevent long-term adverse effects. As such, no significant effects on the integrity of this feature are likely as a result of the Proposed Development. Therefore, this habitat is not considered to be an IEF. |
| Swamp | SBL, LBAP | Local | No | This habitat covers 0.02% (0.28 ha) of the total area within the survey area of surveyed habitat. None of this habitat will be permanently lost as part of the Proposed Development, however, the potential for an indirect impact from dust created during construction works. The habitat will be identified within the CEMP and marked during construction to ensure that there is no disturbance or damage to the habitat, e.g. from tracking by works vehicles. Measures to control dust will be included in the CEMP and monitored by the ECoW, and so it is considered that embedded mitigation is sufficient to prevent adverse effects to this habitat and as such no significant effects of the |

| Feature | Covering legislation and guidance/conservation designation* | Geographical level of value | IEF | Justification |
|---|---|---|---|---|
| | | | | Proposed Development on the integrity of this feature are likely. Therefore, this habitat is not considered to be an IEF.<br>The habitat M4 has high potential for being a GWDTE. Given that some infrastructure will be located within 250 m of these habitats, the Proposed Development could impact on the hydrology of this habitat. Further discussion of GWDTEs is presented in Chapter 8: Hydrology, Geology and Hydrogeology. |
| Standing water | LBAP | Local | No | Seven ponds and one area of standing water are present within the Proposed Development Area. The closest pond to any infrastructure (TN10, the SUDS) will be less than 10 m from an existing access track to be upgraded, and approximately 20 m from the temporary construction compound. All remaining ponds are more than 250 m from infrastructure, with the area of standing water more than 1.4 km from the nearest infrastructure.<br>Construction works within 50 m of any standing water will require the presence of an ECoW, which will be prescribed within the CEMP. The CEMP will also include measures to protect the pond during construction such as through the provision of a silt fence or splash guard, sensitive use of spoil/drainage and high visibility barriers to reduce the potential impacts on the pond.<br>There is also the potential for an indirect impact from dust created during construction works, or from accidental pollution on the River Nith during construction.<br>A pollution prevention plan and measures to control dust will be included in the CEMP and monitored by the ECoW. It is therefore considered that embedded mitigation is sufficient to prevent adverse effects to this habitat and as such no significant effects on the integrity of this feature are likely as a result of the Proposed Development. Therefore, this habitat is not considered to be an IEF. |
| **Bats (common pipistrelle, soprano pipistrelle, Leisler's, noctule** and ***Nyctalus sp.*****)** | **Habitat Regulations; WCA 1981; SBL** | **Local** | **Yes** | **The Proposed Development offers some limited foraging and commuting corridors along the River Nith and several smaller burns. The open moorland, bog and coniferous plantation habitat within the Proposed Development is considered low quality for foraging bats.**<br>**The overall collision risk for bats at the Proposed Development is considered to be low to moderate. Noctule and Leisler's bat are considered to be rare in Scotland and are only found in the south-west of the country. Common and soprano pipistrelle are common and widespread and known to occur throughout Scotland. Soprano pipistrelle and common pipistrelle had the highest activity levels at the Proposed Development and a low -medium collision risk was predicted for these species. Leisler's bat and noctule are both also predicted to have a low to medium collision risk. The Proposed Development is therefore considered of local conservation importance for these species of bats.**<br>**Due to the levels of activity of these bat species at the Proposed Development and the rarity of some species recorded, the Proposed Development has potential to cause a significant effect on bats. Therefore,** common **pipistrelle, soprano pipistrelle, Leisler's, noctule and *Nyctalus* sp are considered to be an IEF and have been taken through for further assessment.** |
| Bats (Nathusius' pipistrelle, brown long-eared and *Myotis sp.*) | Conservation Regulations; WCA 1981; SBL | Local | No | Whilst a low – medium collision risk was predicted for Nathusius' pipistrelle, this was based on a total of three passes of Nathusius' pipistrelle were recorded on three different detectors and as such activity is considered to be low. Both *Myotis sp.* and brown long-eared were predicted to have low to medium collision risk. However, due to either low levels of activity at the Proposed Development Area (Nathusius' pipistrelle) or low species vulnerability in Scotland[25] (brown long-eared and *Myotis sp.*), the Proposed Development is considered not to cause a likely significant effect on these species. Therefore, they are not considered to be an IEF. |
| Protected mammals | Conservation Regulations; WCA 1981; SBL | Local | No | Signs of badger, otter and red squirrel were found within the Proposed Development Area. No signs of other protected mammal species were found. All species recorded are widespread across Scotland and in the Proposed |

| Feature | Covering legislation and guidance/conservation designation* | Geographical level of value | IEF | Justification |
|---|---|---|---|---|
| | | | | Development. The levels of activity recorded indicate that while all species are present within the Proposed Development this is unlikely to be in sufficient numbers to consider the population of greater than Local value.<br>Pre-construction mammal surveys included in the embedded mitigation will confirm signs and/or resting places such as badger setts, otter couches and squirrel dreys. Works will not be carried out within specific buffers of protected mammal resting places unless done so under licence from NatureScot.<br>All potential impacts to protected mammals will be mitigated under embedded mitigation, including embedded mitigation to avoid indirect impacts such as pollution of watercourses. Therefore, a significant effect on the integrity of the local population is considered unlikely and protected mammals are not considered to be an IEF. |
| Reptiles and amphibians | WCA 1981 (protected against trade); SBL; LBAP | Local | No | Consultation with SWSEIC provided records of common lizard, adder, common toad and common frog within 5 km of the Proposed Development.<br>No species specific surveys were undertaken, however suitable habitat for a variety of common and widespread reptile and amphibian species exists within the Proposed Development Site. All species present within the local area are widespread and common throughout Scotland and therefore if present within the Proposed Development are considered to be of Local value.<br>Through the embedded mitigation, adherence to a SPP and presence of an ECoW, a significant effect on the integrity of the local populations is considered unlikely. Therefore, a significant effect on the integrity of the local population is considered unlikely and reptiles and amphibians are not considered to be an IEF. |
| Fish | Conservation Regulations; WCA 1981; SBL (brown/sea trout only) | Local | No | Suitable spawning habitat for salmonid species was noted within the Proposed Development, including good juvenile salmonid habitat in more than half the watercourses. Instream vegetation also provided cover for fish species. Where salmonid species were found in the sampling sites four of six sites, including the control), they contained either good or excellent densities of fry and parr for both Atlantic salmon and sea/brown trout.<br>Four new and three potential upgrades of existing watercourse crossings are proposed within the Proposed Development and hence, potential for direct impacts to fish.<br>Additionally, there is potential for indirect impacts to fish through pollution or sedimentation caused by construction works. Watercourses within the Proposed Development are primarily uppermost tributaries of burns and so are unlikely to support large fish populations, though good spawning habitat for migratory and non-migratory fish species may exist further downstream. Further information on watercourses can be found in Chapter 8: Hydrology, Geology and Hydrogeology.<br>As such, a pollution prevention plan and measures to control dust will be included in the CEMP and monitored by the ECoW. It is therefore considered that embedded mitigation is sufficient to prevent adverse effects to fish and as such no significant effects of the Proposed Development on this feature are likely. Additionally, a fish monitoring plan is provided within the outline EMP (Technical Appendix 6.1, Volume 3 of the EIAR). This includes pre-construction, construction and post-construction water quality, macro-invertebrate and fish surveys. Therefore, fish are not considered to be an IEF and are not discussed further in this chapter. |

*Source: Natural Power*

## Impact Assessment

6.7.35. One feature, bat species, has been identified as an IEF, requiring EcIA following the application of embedded mitigation (see Section 6.7.3 – 6.7.9, Embedded Mitigation). An impact assessment for these species is provided below for the construction and operation periods.

## Bats

### Construction

6.7.36. The coniferous plantation and open moorland habitats around the proposed turbines are considered low quality for roosting bats. Static detector data highlighted low activity before sunset with only three passes recorded at any of the static detectors within open habitat (Detector 7 and Detector 10) and one pass at a static detector near to conifer plantation (Detector 3). Overall, 19.12% of passes were recorded within open habitat, within 0.5 hours of sunset. Of this total, almost half of these passes were recorded at Detector 10 (8.38%, 499 passes), which was placed in suitable foraging habitat along the River Nith, on the edge of forestry plantation and within an open area of unimproved acid grassland. Detector 10 is located approximately 230 m from the nearest infrastructure (an existing track to be upgraded) and 805.21 m from the nearest proposed turbine (T09). A further 3.23% of passes were recorded near to conifer plantation, within 0.5 hours of sunset. Therefore, it is considered unlikely that there are any significant roost locations within 200 m of turbine locations (see Volume 2a, Figure 6.1).

6.7.37. While no impacts are predicted, the SPP will include provisions for the ECoW to carry out supervised vegetation clearance checks in sensitive areas prior to construction, as well as pre-construction surveys of potential bat roosts on any trees or structures with potential to support roosting bats within 30 m of working areas. Additionally, all turbines will be greater than 100 m from the forestry edges, including turbines in remaining conifer plantation which will be keyholed to a suitable distance from the forest edge. No potential roost features were identified within these plantations.

6.7.38. The loss of habitat to the Proposed Development will not significantly reduce the foraging opportunities within the Proposed Development Area. Although some foraging and commuting behaviour may be altered as a result of construction this is likely to be a short-term impact. Furthermore, the implementation of lighting mitigation as specifically included within SPP and outlined within embedded mitigation (see Section 6.7.3-6.7.9) means that any disruption caused by construction works will be reduced. Thus, the likelihood of significant effects of displacement or disturbance to foraging or commuting bats during construction is considered negligible.

6.7.39. Bats are considered to be of Local nature conservation importance and after application of embedded mitigation the likely effect of displacement or disturbance to foraging or commuting bats during construction is considered to be **negligible** and **not significant**.

### Operation

6.7.40. During the operational phase, rotating turbines present a risk to flying bats resulting in potential collision when flying in close proximity to turbines. Research by Exeter University[75] found that most bat fatalities at UK wind farms were common pipistrelle, soprano pipistrelle and noctule bats. The study also found that the percentage casualty rates for soprano pipistrelle, common pipistrelle and noctule bats were higher than the relative proportions of their calls recorded from ground level acoustic surveys.

6.7.41. The Proposed Development Area offers some foraging and commuting corridors along the forestry edge and burns. The overall bat activity level within the Proposed Development Area is considered to be low. The Proposed Development is therefore considered of Local conservation importance for all occurring species of bats.

6.7.42. Bat activity levels are classified according to the guidance provided by NatureScot[25] and relative activity levels based on the BAI, with results shown in Table 6.13 and Table 6.14.

### Soprano and Common Pipistrelle

6.7.43. Soprano and common pipistrelle bats were the most frequently recorded species at the Proposed Development, accounting for 87.75% of all recorded bat passes. Though these were recorded in low numbers in spring, potentially due to the cold weather (of all bat passes, 0.19% of the total *Pipistrellus sp.* activity was recorded in spring, while 47.37% and 40.19% passes were recorded in summer and autumn respectively). Both of these species are assessed as having a high collision risk with wind turbines, but due to the species being common and widespread across Scotland they have only a medium population vulnerability to wind turbines[25].

6.7.44. Overall, high activity levels of soprano and common pipistrelle were recorded across all detectors respectively of all bat passes recorded throughout the static detector survey (see in Volume 3, Technical Appendix 6.1). Low activity levels were recorded at all locations in spring, though this was comparable across all bat species at the Proposed Development. The highest number of passes for soprano and common pipistrelle were recorded at Detector 10 and Detector 2 respectively, representing 41.24% and 25.06% of all passes for each of those species. Detector 2 is located 280.47 m from the nearest proposed turbine (T03) and Detector 10 is located 805.21 m from the nearest proposed turbine (T09). Both detectors are located near to the edge of forestry plantation adjacent to open areas of recently felled conifer (Detector 2) or unimproved grassland (Detector 10).

6.7.45. Detector 8 (located 558.23 m from the nearest turbine (T09)) was located in open grassland habitat adjacent to recently felled conifer and is considered to represent habitats similar to those that will be present during the operational phase of the Proposed Development. Detector 8 recorded comparatively fewer overall passes (239 and 333 passes of soprano and common pipistrelle respectively) in contrast to Detector 10 (1,547 and 625 passes of soprano and common pipistrelle respectively), which was located in suitable foraging habitat adjacent to the River Nith. The suitable foraging habitat at Detector 10 likely explains the comparatively higher number of passes at this location.

6.7.46. All turbines will be greater than 100 m from the forestry edges. No potential roost features were identified within these plantations.

6.7.47. Following the baseline surveys at the Proposed Development, the relative activity levels of both soprano and common pipistrelle were assessed as being at medium overall risk (Table 6.14).

6.7.48. An outline BERP has been provided in Volume 3, Technical Appendix 6.3 and includes measures to monitor bat activity on site during operation, with potential mitigation included in Section 6.7, Embedded Mitigation.

6.7.49. It is therefore considered that operational effects of the Proposed Development on common and soprano pipistrelle due to collisions would not affect the integrity of the local populations of these species and therefore considered to be **minor negative** and **not significant**.

### *Nyctalus* species (noctule and Leisler's bat)

6.7.50. Leisler's bat and noctule bats are assessed as having high population sensitivity in NatureScot guidance[25]. For the survey period, they were assessed as having low to medium risk at the Proposed Development. Leisler's bat, Noctule and *Nyctalus* sp. accounted for 3.46%, 0.22% and 0.07% of all recorded bat passes respectively. The

[75] DEFRA (2016). Understanding the Risk to European Protected Species (bats) at Onshore Wind Turbine Sites to inform Risk Management. University of Exeter.

highest number of passes for Leisler's and noctule were recorded at Detector 10 and Detector 3 respectively, representing 56.45% and 33.33% of all passes for each of those species. Detector 3 is located 465 m from the nearest proposed turbine (T08) and Detector 10 is located 918 m from the nearest proposed turbine (T02) along the River Nith. Detector 3 is located near to a ride within an area of conifer plantation.

6.7.51. Over half of all Leisler's passes (56.45% of Leisler's; 52.09% of all *Nyctalus* sp.) were recorded at Detector 10 (along the River Nith). A total of 162 Leisler's passes were recorded at Detector 10, and 20 passes were recorded at Detector 8, in the area considered to represent habitats similar to those that will be present during the operational phase of the Proposed Development. One pass of *Nyctalus sp.* and two passes of Noctule were recorded at Detector 8, though these species were recorded in comparatively low numbers across all detectors.

6.7.52. All turbines will be greater than 100 m from the forestry edges. No potential roost features were identified within these plantations.

6.7.53. Overall, the activity levels and collision risk assessment (Table 6.14) indicates that the Proposed Development Area is used by *Nyctalus* bats during the survey period with the risk to Leisler's bat and *Nyctalus sp.* considered to be low to medium and the risk to noctule bat was low.

6.7.54. An outline EMP has been provided in Technical Appendix 6.3 and includes measures to monitor bat activity on site during operation, with potential mitigation included in Section 6.7, Embedded Mitigation.

6.7.55. It is therefore considered that operational effects of the Proposed Development on *Nyctalus* sp. due to collisions would not affect the integrity of the local populations of these species and therefore considered to be **minor negative** and **not significant**.

## Conclusions

6.7.56. Avoidance of impacts has been included throughout the design of the Proposed Development, such as positioning the turbines over 100 m from forest edges. Following embedded mitigation incorporated within the scheme design and the adherence to a CEMP, it is predicted that the Proposed Development would have no significant effects on any IEFs. There would be a minor negative (not significant) effect on common pipistrelle, soprano pipistrelle and on *Nyctalus sp.* (noctule and Leisler's bat).

6.7.57. Despite the absence of significant effects, monitoring measures are proposed for bats and an outline BERP is proposed with the aim of restoring bog habitats within the Proposed Development Area, reducing bat habitat suitability surrounding the turbines to reduce the likelihood of bat collisions and carrying out operational bat monitoring, including carcass searching. It is considered that these measures will reduce the magnitude of the residual impacts to bats in the local area and result in an significant biodiversity net benefit for the proposed development in line with requirements of NPF4.

## Biodiversity Enhancement

6.7.58. At the time of writing this EIA chapter, policy changes relating to biodiversity are open to consultation by the Scottish Government, it is therefore, acknowledged that guidance may change.

6.7.59. NPF4 Policy 3b[13] requires an EIA to demonstrate that biodiversity will be in the "demonstrably better state" and that the five criteria of Policy 3b have been met. These criteria are that:

1. the proposal is based on an understanding of the existing characteristics of the site and its local, regional and national ecological context prior to development, including the presence of any irreplaceable habitats;
2. wherever feasible, nature-based solutions have been integrated and made best use of;
3. an assessment of potential negative effects which should be fully mitigated in line with the mitigation hierarchy prior to identifying enhancements; significant biodiversity enhancements are provided, in addition to any proposed mitigation. This should include nature networks, linking to and strengthening habitat connectivity within and beyond the development, secured within a reasonable timescale and with reasonable certainty. Management arrangements for their long-term retention and monitoring should be included, wherever appropriate; and
4. local community benefits of the biodiversity and/or nature networks have been considered.

6.7.60. In order to fulfil these criteria, this EIA provides baseline survey information, an assessment based on mitigation hierarchy (avoid, mitigate, compensate) and details of the compensation and enhancements proposed. The assessment of the Proposed Development is based on an understanding of the existing characteristics of the Proposed Development Area and the baseline local, regional and national ecological context.

6.7.61. Within their scoping response, NatureScot requested that an outline HMP should be submitted with this EIA. Measures for habitats have been included within an outline BERP which includes all measures for habitat mitigation / enhancement and operational monitoring recommendations. Management proposals in the outline BERP include bog restoration, broadleaved riparian planting, and operational bat monitoring. The outline BERP will also include details on the removal of tree/scrub regeneration within 93.5 m of turbines to reduce bat collisions (including microsited locations). The outline BERP will also include management prescriptions and monitoring of the retained/enhanced habitats to achieve biodiversity benefits.

6.7.62. The net habitat enhancements have not been calculated using a biodiversity metric (such as the Natural England Biodiversity Net Gain metric) as at the time of writing there is not a metric available for use in Scotland. This is reflective of the Draft Biodiversity Guidance which references the difficulties in using established metrics in Scotland, due to the habitats present within the Proposed Development and comparative abundance of those upland habitats in Scotland compared to England, as such Natural England's Biodiversity Metric 4.0 was not considered applicable. Instead, the proportions of habitats created compared to those lost have been calculated in Table 6.17 to ensure overall biodiversity net benefit. Table 6.17 does not include commercial coniferous plantation habitats, either existing or recently felled, or habitats where any loss associated with the Proposed Development was less than 1% of the existing habitats present within the surveyed area (see Table 6.9).

**Table 6.17: Habitat Enhancement compared with habitat loss**

| Habitat Type | Permanent loss (ha) | Habitat creation (ha) | Net habitat creation[76] (ha) | Habitat present in surveyed area (ha) |
|---|---|---|---|---|
| A1.1.1 - Broadleaved woodland - semi-natural | 0.03 | 0.00 | -0.03 | 4.18 |
| A1.1.2 - Broadleaved woodland - plantation | 2.04 | 15.00 | 12.96 | 45.83 |
| A1.3.2 - Mixed woodland - plantation | 0.03 | 0.00 | -0.03 | 5.22 |
| A2.1 - Scrub - dense/continuous | 0.05 | 0.00 | -0.05 | 2.92 |
| C3.1 - Other tall herb and fern - ruderal | 0.15 | 0.00 | -0.15 | 2.74 |

[76] Habitat creation refers to both compensation and enhancement

| Habitat Type | Permanent loss (ha) | Habitat creation (ha) | Net habitat creation[76] (ha) | Habitat present in surveyed area (ha) |
|---|---|---|---|---|
| **Total loss / gain woods and associated habitats** | **2.30** | **15.00** | **12.7** | **9.84** |
| D5 - Dry heath/acid grassland | 0.03 | 0.00 | -0.03 | 11.35 |
| E1.6.1 - Blanket sphagnum bog | 0.30 | 30.00 | 29.70 | 150.81 |
| E1.8 - Dry modified bog | 0.04 | 0.00 | -0.04 | 39.74 |
| **Total loss / gain bogs and associated habitats** | **0.37** | **30.00** | **29.63** | **201.90** |

*Source: Natural Power*

6.7.63. The proposed compensation and enhancement measures have been designed to provide maximum ecological benefit. Discussion are currently underway with Forestry Land Scotland on the most appropriate locations to undertaken compensation and enhancement, in addition to management proposed on land within the boundary of the Proposed Development, and adjacent land which is under control of the Developer. Prescriptions described within the outline BERP would complement the long-term plans for the wider area, strengthening habitat connectivity within and beyond the Proposed Development.

6.7.64. Through minimising the loss of existing habitats of conservation interest, whilst also creating new habitats that will be more favourable to a wide range of ecological interests with increased habitat connectivity, the proposed development will result in biodiversity net benefit.

6.7.65. For further details see the outline BERP in Volume 3, Technical Appendix 6.3.

## 6.8. Cumulative Effects

6.8.1. The following section assesses the predicted cumulative impacts and potential effects on IEFs from the Proposed Development along with all other plans or projects within an appropriate Zone of Influence (ZoI) following guidance[24]. Only IEFs for which a greater than negligible residual impact is predicted are considered in the cumulative impact assessment, as negligible impacts will not result in a detectable increase in cumulative impacts.

6.8.2. The context in which cumulative effects are considered depends upon the ecology of the species or habitat in question. Of all protected mammal species observed, bats are most likely to be affected by additional wind farm development because of the distances travelled by some species of foraging bat and the cumulative risks to bat populations as a result of collision with wind turbines during operation. The implementation of good practice measures regarding buffer distances of turbines from forestry edges to reduce impacts on commuting and foraging bats reduces likelihood of cumulative impact. Although the assessment has not identified any significant effects, as they are on IEF, common, soprano and Nathusius' pipistrelle, *Nyctalus* sp., *Myotis* sp. and brown long-eared bats, have been retained for cumulative assessment.

6.8.3. Following agreement at scoping, cumulative effects have been considered only for wind developments of more than three turbines within 10 km of the Proposed Development which is considered to be an appropriate ZoI for bat species. Projects of three or less turbines were excluded due to the lack of publicly available data for developments of this size. Only IEFs for which a greater than negligible residual impact is predicted are considered, as negligible impacts will not result in a detectable increase in cumulative impacts.

6.8.4. Within this ZoI there are a total of 28 developments that have been included in the Cumulative Impact Assessment, which include:

- 10 operational wind farms;
- 11 consented wind farms;
- One wind farm at construction stage; and
- Six wind farms at the application stage.

6.8.5. It should be noted that cumulative assessments may be complicated by the lack of availability of EcIA/EIAR chapters and appraisals for consented developments and, where this information is available, survey periods and methods may differ between sites. Furthermore, some wind farms may have been in existence for many years, and thus contemporary data may not be available (see Table 6.18).

**Table 6.18: Cumulative Impact Assessment**

| Site | No. Turbines | Distance to Proposed Development (km) | Site status | Baseline bat surveys undertaken | Bat Assessment |
|---|---|---|---|---|---|
| **Proposed Development** | **11** | **0 km** | | **2022** | **Bats considered to be of Local value.**<br>**Relative activity levels of both soprano and common pipistrelle were assessed as being at medium overall risk, for Leisler's bat and *Nyctalus* sp. to be low to medium and the risk to noctule bat was low.**<br>**Following the implementation of embedded mitigation and the BERP, it is considered that the operational effects of the Proposed Development on bat species due to collisions would not affect the integrity of the local populations and therefore considered to be minor negative and not significant.** |
| South Kyle | 50 | 0.5 km | Consented | 2010, 2012 | Bats considered to be of Regional value. |

| Site | No. Turbines | Distance to Proposed Development (km) | Site status | Baseline bat surveys undertaken | Bat Assessment |
|---|---|---|---|---|---|
| | | | | | There was no evidence of any bat roosts within 500 m of the proposed wind farm infrastructure. Habitat quality for foraging and commuting bats within the majority of the survey area was considered to be relatively low. *Myotis* and *Pipistrellus sp*. were identified during both transect and static detector surveys. There were 93 passes recorded during transect surveys (91 *Pipistrellus sp*. and 2 Myotis sp.) and 3,501 during static detector survey including (2,111 *Pipistrellus sp*. and 390 *Myotis* sp.). The majority of bat passes were of commuting bats.<br>Prior to mitigation the potential impact is considered low to negligible. Mitigation includes pre-construction roost surveys, and an operational monitoring plan to be undertaken 2 years post construction. Following mitigation the residual impact is considered **low, not significant.** |
| Enoch Hill | 16 | 1.8 km | Under construction | 2012, 2013, 2014 | The Development Site was assessed as being of Local value to all bat species. No results are given within the Chapter and the Technical Appendix is not in the public domain.<br>Overall bat activity levels were reported as low, however twice as much activity was recorded for Leisler's/Nyctalus sp. when compared to pipistrelle species. No bat roosts were identified within the Development Site and the habitat is considered generally unsuitable for providing roosting habitat, although there were roosts identified but >1.5 km from the nearest wind farm infrastructure. Likely bat activity within the Development Site is therefore limited to foraging and commuting which is likely to be in the lower-lying, sheltered areas of the Development Site, along edge habitats and along watercourses. Bat activity recorded during transect surveys was generally low. Bat activity (dominated by pipistrelle bats) was concentrated near the boundaries, along sheltered valleys, along watercourses within the Development Site.<br>Mitigation measures include pre-construction surveys, sensitive timing/phasing of works, keeping artificial lighting to a minimum and ensuring it is directed away from sensitive species and habitats, NatureScot licence applications where appropriate, compliance with the CEMP, works to be overseen by an ECoW and adoption of best practice.<br>Residual effects on bats were considered to be **negligible** for operation, to small (low) for construction and not significant. |
| North Kyle | 49 | 3.2 km | Under construction | 2017, 2018 | Regional for *Nyctalus* spp., and Nathusius' pipistrelle. Local for all other bat species recorded on-site.<br>Six trees and two structures with bat roost potential were recorded during surveys. One tree was found to have high bat roost potential. Four trees showed moderate bat roost potential and one tree low potential. The two structures were assessed to have low bat roost potential. A total of ten bat species and two genus classifications were recorded for the site, species recorded were soprano pipistrelle, common pipistrelle, Nathusius' pipistrelle, Leisler's, noctule, Daubenton's, Natterer's, whiskered, Brandt's, and brown long-eared. Mitigation to include construction species protection plans, post construction monitoring including acoustic detectors and carcass searches, potentially leading to feathering of blades. To reduce impacts on bat species to **minor adverse and not significant** for *Nyctalus* and *Pipistrellus* species. |
| Benbrack Variation | 18 | 3.6 km | Operational | 2011, 2013 | All bats species encountered in the bat surveys are considered to be of Local value.<br>No bat roosts were identified and the site is considered to be generally unsuitable to provide roosting habitat for bats. Overall bat activity levels were generally considered to be low. Very low numbers of bats were recorded; 864 passes recorded from the static detector surveys, which included Pipistrelle and Myotis species. It was considered that pre-mitigation effects would be negligible and not significant. Mitigation measures proposed included best practice measures, such as clearly defined working areas, implemented via a CEMP, appointment of an ECoW, work only being carried out during daylight hours and updated bat roost survey pre-construction. The magnitude of residual effects was considered **negligible and not significant**. |
| Windy Standard II | 30 | 4.1 km | Operational | N/A | There has been no systematic survey of the fauna of the study area. Data collection has been undertaken routinely during other surveys with information gathered from other parties. No mention of bats or other species discussed in this impact assessment, published in 2001. |
| Windy Standard III | 20 | 4.4 km | Consented | 2012 | Common and soprano pipistrelle, Daubenton's bat and brown long-ear bats considered to be of Local value. No trees or buildings with potential bat roost features recorded. The timings of bat activity recorded during the automated bat surveys indicated that no bat roosts |

| Site | No. Turbines | Distance to Proposed Development (km) | Site status | Baseline bat surveys undertaken | Bat Assessment |
|---|---|---|---|---|---|
| | | | | | were located within or in the vicinity of the proposed wind farm, supporting the results of the walkover survey. Very low levels of bat activity were identified during the transect and static detector surveys. **No significant effects** predicted on local bat populations. |
| Over hill | 11 | 4.6 km | Consented | 2014 to 2016 | Bat species considered to be of Local value.<br>Seven bat species were recorded during the survey periods: common pipistrelle, soprano pipistrelle, Daubenton's bat, whiskered bat, Leisler's bat, noctule bat and brown long-eared bat. These species are considered to appreciably enrich the ecological resource within the local context. No effects on roosting bats are likely. Collision impacts on *Nyctalus* and *Pipistrellus* species assessed as **minor adverse and Not Significant**. Additional mitigation included a pre-commencement monitoring programme for Nyctalus bat activity; and production of a Species Protection Plan. |
| Pencloe | 19 | 5.1 km | Under construction | 2013 | Bats considered to be of Local value. No likely roost sites identified. Very low levels of bat activity were recorded on the site. The static monitoring recorded 303 bat passes in total and identified the presence of Myotis bat species. Common and soprano pipistrelle were recorded during transect surveys (22 passes in total). No significant impacts were anticipated on bats during construction, the apparent absence of suitable roosting habitat within the application site suggests that individual bats only use the site for commuting or foraging. Construction will only occur during the day to reduce potential disturbance to any bats, bat buffers to forest edges will be maintained. Broadleaved planting and habitat improvements will be implemented via an HMP. Following mitigation, impacts are considered **low and not significant.** |
| Greenburn | 16 | 6.5 km | Consented | 2017 - 2018 | Bats considered to be of Regional value. Prior to mitigation impacts were assessed to be moderate as a result of wind turbine mortality (collision / barotrauma) affecting Leisler's, noctule, common and soprano pipistrelle bats. Additional mitigation included a pre-commencement monitoring programme for *Nyctalus* bat activity; and production of a Species Protection Plan. Following mitigation, impacts are considered **low and not significant.** |
| Windy Standard I (operational) | 36 | 6.7 km | Operational | 1993 - 1995 | Windy Standard I was submitted prior to the current assessment requirements for EIA however no greater than low magnitude non-significant effects have been predicted for any ecological feature as a result of the construction and operation of any of the Windy Standard Complex wind farms. These turbines will be decommissioned and replaced by Windy Standard I Repower if consent is granted. |
| Windy Standard I Repower (Proposed Development) | 8 | 6.7 km | Submitted | 2020 | Bat species considered to be of Local value. Habitat within the Proposed Development considered to be of low suitability for foraging and commuting bats. Soprano pipistrelle was the most recorded species. Assessment of relative activity determined low to moderate bat activity. A **low negative impact** was predicted for common, soprano and Nathusius' pipistrelles, Myotis sp. and brown long-eared and a **moderate negative** impact for noctule and Leisler's bat. No significant effects predicted. |
| Knockkippen | 12 | 7.5 km | Submitted | 2020 and 2021 | Bats considered to be of Regional value. At least seven bat species were recorded using the Site during the bat activity surveys, including species whose populations are not currently at a favourable conservation status (e.g. Leisler's bat). Bat activity was generally low at the locations that are typical of conditions where wind turbines are proposed. Activity levels were comparatively higher at locations near to watercourses and woodland edges, including non-native conifer plantations. The Site was used by at least five species of bat that are at high risk of wind turbine mortality, including Leisler's bat and noctule. No confirmed bat roosts were identified within 200 m of the proposed wind turbine locations; however, it is possible that there are roost sites within the wider survey area.<br>Additional mitigation included a pre-commencement monitoring programme for *Nyctalus* bat activity; and production of a Species Protection Plan. |
| Afton | 25 | 7.5 km | Operational | ES submitted 2004 | A bat roost assessment undertaken during baseline surveys. There are no structures or trees present within the study area suitable for use as bat roosts. In addition, much of the adjacent forestry is unsuitable for roosting bats as the trees are not yet of sufficient size to afford good roosting opportunities, and much of the forestry around the reservoir has been or is being felled.<br>Pipistrelle bats are considered likely to be present in the general area and may use the adjacent forested habitats in low densities. However, the 2024 report stated that there was no evidence that bats are present in the study area, which did not contain any forested areas and is considered unlikely to support an important foraging resource for bats. |

| Site | No. Turbines | Distance to Proposed Development (km) | Site status | Baseline bat surveys undertaken | Bat Assessment |
|---|---|---|---|---|---|
| Polquhairn | 9 | 8.4 km | Consented | | No confirmed roosts were within 30 m of the Proposed Development. Trees with bat roost potential within 30 m of the Proposed Development were inspected, but did not show signs of use by bats. Overall, effects on *Pipistrellus* sp. bats was assessed to be **Minor and Not Significant**; for *Nyctalus* sp. and *Myotis* sp. bats as Negligible and Not Significant. |
| Dersalloch | 23 | 8.5 km | Operational | 2010 - 2011 | Soprano pipistrelle – Minor adverse and Noctule – Minor adverse |
| Sclenteuch | 10 | 9.1 km | Submitted | 2021 | No potential roosting features (PRFs) were found during surveys undertaken within 250 m of proposed wind turbine locations. relative abundance at median activity levels was low for brown long-eared bat, low/moderate for Nathusius's pipistrelle and Myotis bats, moderate for noctule, moderate/high for Leisler's bat and high for common and soprano pipistrelle (for all seasons and detectors combined). The relative abundance at maximum activity levels was assessed to be moderate/high for BLE and high for all other species (for all seasons and detectors combined). |
| Windy Rig | 12 | 9.4 km | Consented | 2014 | Bats considered to be of less than Local ecological value.<br>The baseline surveys indicated low to very low activity levels and low species diversity of common/widespread species in overall sub-optimal habitat. 45 bat passes were recorded during transect surveys; 44 of these were Pipistrelle species, and 690 bat passes were recorded during static detector surveys; 607 of these were Pipistrelle and 81 Myotis species.<br>Prior to mitigation the magnitude of impacts to bat species are considered low and not significant. Mitigation includes reducing 'light leakage' during construction, best practice measures implemented via a CEMP and appointment of an ECoW. The magnitude of residual impacts is identified as **slight and not significant**, with bat activity assessed as of negligible ecological value at a cumulative scale. |
| **Cumulative residual assessment** | 302 (330 if Windy Standard 1 Repower does not gain consent) | | | | The CIA considered developments within 10 km of the Proposed Development, but not all of these sites lie within the foraging distance of the bat species recorded at the Proposed Development. For example, of the 17 plans and projects (including the Proposed Development), five (144 turbines) lie within the maximum foraging distance (4 km) of soprano pipistrelle (the species that accounted for the large majority of records at the Proposed Development). Therefore, there is no route for the majority of the aforementioned plans / projects to impact upon the bat populations that utilise the Proposed Development.<br>For all wind farm sites included in the CIA, potential bat roosting sites, where present, should be protected through embedded mitigation measures and so no significant effects on roosting sites was concluded. During the operation stage of the projects assessed, one project (Windy Standard Repower) identified moderate negative but not significant effects on *Nyctalus* and Myotis sp. only, the remaining projects were all assessed as having negligible to low / minor adverse impacts. Therefore, when looked at cumulatively, it is considered unlikely that the low impact of collision predicted at each wind farm site would not result in an overall change in the status to the local bat populations. Therefore, no significant cumulative effect on bats is predicted.<br>However, it is acknowledged that there is a level of uncertainty in this prediction due to the lack of data and shared results of any monitoring on bats once projects become operational, as there is no definitive relationship between the level of bat activity on a site and the number of actual collisions. As a result, operational monitoring is proposed to be undertaken at South Kyle 2 Wind Farm, following the methodology used at South Kyle Wind Farm. |

*Source: Natural Power*

## 6.9. Conclusions

6.9.1. It is predicted that, following the implementation of embedded mitigation, the Proposed Development would not have any significant effects on any IEFs. It has been assessed that there would be a minor negative (not significant) effect on common pipistrelle, soprano pipistrelle, noctule, Leisler's bat and *Nyctalus sp.* species.

## 6.10. Mitigation and Residual Effects

6.10.1. For all IEFs, although no species-specific mitigation is required, various embedded measures (described in Section 6.7, Embedded Mitigation) will be implemented to ensure compliance with legislation, and to follow good practice guidance with regards to habitats and protected species.

6.10.2. In addition, an outline BERP has been prepared and is provided in Technical Appendix 6.1, Volume 3. Despite the absence of significant effects, the outline BERP discusses the restoration areas of bog habitats within the Proposed Development Area, as well as reducing potential collision impacts on bats. No significant effects are predicted.

**Table 6.19: Summary of pre-mitigation effects and residual effects on each IEF, and the residual significance of effect**

| IEF | Conservation importance | Nature of potential pre-mitigation impact | Magnitude of pre-mitigation impact | Significance of pre-mitigation effect | Specific mitigation/ compensation measure | Magnitude of residual impact | Residual significance | Level of certainty |
|---|---|---|---|---|---|---|---|---|
| **Construction** | | | | | | | | |
| Bats (common pipistrelle, soprano pipistrelle, Leisler's, noctule and *Nyctalus sp.*) | Local | Displacement or disturbance to roosting, foraging or commuting bats from construction activity and/or through habitat loss. | Negligible | Not significant | Embedded mitigation implemented via construction phase plans such as the CEMP. | Negligible | Not significant | Certain |
| **Operation** | | | | | | | | |
| Common and soprano pipistrelle | Local | Collision risk | Low negative | Not significant | Outline BERP to include removal of tree/scrub regeneration within 93.5 m of turbines to reduce bat collisions. Bat monitoring will be carried out during the operational stage, including carcass searching. | Low negative | Not significant | Probable |
| Noctule, Leisler's bat and *Nyctalus sp.* | Local | Collision risk | Low negative | Not significant | | Low negative | Not significant | Probable |

*Source: Natural Power*

## 6.11. Statement of Significance

6.11.1. An assessment has been made of the predicted significance of effects of the Proposed Development on ecological interests.

6.11.2. In relation to bats, the effects as a result of the Proposed Development are assessed as being low – moderate negative but not significant.

6.11.3. By applying effective mitigation measures, mainly through the design process (embedded mitigation) and following good practice guidelines during construction including production of an outline BERP, the magnitude of residual effects of the Proposed Development are assessed as being low/negligible in terms of magnitude, and thus not significant.