Chapter 7: Ecology

Contents

7. Ecology

7.1 Introduction

7.1.1 This chapter considers the potential effects of the proposed Revised Larbrax Wind Farm (the 'Proposed Development') on non-avian ecology, including designated sites, terrestrial and aquatic habitats, and protected species.

7.1.2 The specific objectives of the chapter are to:

- Consider relevant legislation, policy and guidance;
- Describe the assessment methodology and significance criteria used in completing the impact assessment;
- Describe the ecology baseline conditions;
- Assess the likely significant effects on ecology, including direct, indirect and cumulative effects associated with the Proposed Development;
- Describe the mitigation measures proposed to address the likely significant effects; and
- Assess the residual effects remaining following the implementation of mitigation.

7.1.3 Effects on avian fauna (birds) are addressed separately in **Chapter 8: Ornithology**. The effects on hydrology are addressed in **Chapter 9: Hydrology, Hydrogeology, Geology and Peat**. **Chapter 9** also considers the hydrological effects on Groundwater Dependent Terrestrial Ecosystems (GWDTEs) identified in the baseline section of this chapter. Good practice measures to avoid pollution of watercourses on and adjacent to the Site, and details of standard practice construction environmental management, are detailed in **Chapter 4: Development Description**.

7.1.4 The ecology assessment was undertaken by MacArthur Green. All staff contributing to this chapter have undergraduate and/or postgraduate degrees in relevant subjects, have extensive professional ecological impact assessment and ecological survey experience, hold professional membership of the Chartered Institute of Ecology and Environmental Management (CIEEM), and abide by the CIEEM Code of Conduct. Further details can be found in **Technical Appendix 1.1: Statement of Expertise**.

7.1.5 This chapter is supported by a number of figures which are referenced throughout the text, and which can be found at **Volume 3a: Figures**.

7.1.6 The following appendices are also referred to throughout the chapter and can be found in **Volume 4: Technical Appendices**:

- **Technical Appendix 7.1: National Vegetation Classification and Habitats Survey Report;**
- **Technical Appendix 7.2: Protected Species Survey Report;**
- **Technical Appendix 7.3: Bat Survey Report;**
- **Technical Appendix 7.4: Species Protection Plan;** and
- **Technical Appendix 7.5: Outline Biodiversity Enhancement Management Plan (OBRMP)**.

7.1.7 **Confidential Annex D** of **Technical Appendix 7.2** and **Figure 7.5C** are contained within V**olume 5: Confidential Documents** which is not publicly available due to the risk to protected species. However, they will be issued to the NatureScot and Dumfries and Galloway Council (DGC) on request.

7.2 Assessment Methodology

Legislation, Policy and Guidance

Legislation

7.2.1 This assessment is carried out in accordance with the principles contained within the following legislation:

- European Union Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora ('Habitats Directive');

- European Union Council Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for the Community action in the field of water policy ('Water Framework Directive');
- Environmental Impact Assessment Directive 85/337/EEC, as amended ('EIA Directive') (as subsequently codified by Directive 2011/92/EU, as amended by Directive 2014/52/EU);
- The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017;
- The Conservation (Natural Habitats &c.) Regulations 1994 (as amended) ('the Habitats Regulations');
- The Water Environment and Water Services (Scotland) Act 2003 (WEWS);
- Nature Conservation (Scotland) Act 2004 (as amended);
- Wildlife and Natural Environment (Scotland) Act 2011 (WANE);
- The Water Environment (Controlled Activities) (Scotland) Regulations 2011;
- Salmon and Freshwater Fisheries (Consolidation) (Scotland) Act 2003;
- Wildlife and Countryside Act 1981 (as amended); and,
- Protection of Badgers Act 1992.

Policy and Strategies

7.2.2 The following policies and strategies of relevance to the assessment have been considered:

- Joint Nature Conservation Committee (JNCC) and Department for Environment, Food and Rural Affairs (DEFRA) (2012)[1]. UK Post-2010 Biodiversity Framework;
- Scottish Executive (2004)[2] Scottish Biodiversity Strategy: It's in Your Hands;
- Scottish Government (2022a)[3]. Onshore Wind Policy Statement 2022;
- Scottish Government (2022b)[4]. Scottish Biodiversity Strategy to 2045. Tackling the Nature Emergency in Scotland;
- Scottish Government (2023a)[5]. National Planning Framework (NPF) 4;
- Dumfries and Galloway Council Adopted Local Development Plan (LDP2)[6]; and
- Dumfries & Galloway Local Biodiversity Action Plan (2009)[7].

Guidance

7.2.3 This assessment is carried out in accordance with the principles contained within the following guidance documents:

- CIEEM (2022)[8]. Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine;
- Collins, J. (2023)[9]. Bat Surveys for Professional Ecologists: Good Practice Guidelines (4th edition);
- European Commission (2020)[10]. Guidance document on wind energy developments and EU nature legislation;

[1] Joint Nature Conservation Committee and DEFRA (on behalf of the Four Counties' Biodiversity Group) (2012). UK Post-2010 Biodiversity Framework (July 2012). Available at: https://jncc.gov.uk/our-work/uk-post-2010-biodiversity-framework/
[2] Scottish Executive (2004). Scottish Biodiversity Strategy: It's in Your Hands. Available at: https://www.gov.scot/publications/scotlands-biodiversity---its-in-your-hands/
[3] Scottish Government (2022a). Onshore Wind Policy statement – available at Onshore wind: policy statement 2022 - gov.scot (www.gov.scot)
[4] Scottish Government (2022b). Scottish Biodiversity Strategy to 2045. Tackling the Nature Emergency in Scotland. Scottish Government, Edinburgh.
[5] Scottish Government (2023). National Planning Framework 4. https://www.gov.scot/publications/national-planning-framework-4/
[6] https://www.dumgal.gov.uk/ldp2
[7] https://www.dumgal.gov.uk/media/19945/Local-Biodiversity-Action-Plan/pdf/Local_Biodiversity_Action_Plan.pdf
[8] CIEEM (2022). Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine version 1.2. Chartered Institute of Ecology and Environmental Management, Winchester.
[9] Collins, J. (2023). Bat Surveys for Professional Ecologists: Good Practice Guidelines (4th edition). Bat Conservation Trust.
[10] European Commission (2020). Guidance document on wind energy developments and EU nature legislation. Available at: https://ec.europa.eu/environment/nature/natura2000/management/docs/wind_farms_en.pdf

- JNCC (2013)[11]. Guidelines for selection of biological Sites of Special Scientific Interest (SSSI);
- NatureScot, Natural England, Natural Resources Wales, RenewableUK, Scottish Power Renewables, Ecotricity Ltd, the University of Exeter & Bat Conservation Trust (BCT) (2019, with minor updates 2021)[12]. Bats and Onshore Wind Turbines – Survey, Assessment and Mitigation;
- NatureScot (2021)[13]. Assessing the cumulative landscape and visual impact of onshore wind energy developments;
- NatureScot (2023)[14]. Advising on peatland, carbon-rich soils and priority peatland habitats in development management;
- NatureScot (2024)[15]. NatureScot pre-application guidance for onshore wind farms;
- Scottish Badgers (2018)[16]. Surveying for Badgers: Good Practice Guidelines. Version 1;
- Scottish Executive (2000)[17]. Nature conservation: implementation in Scotland of EC Directives on the conservation of natural habitats and of wild flora and fauna and the conservation of wild birds ('The Habitats and Birds Directives'). Revised guidance updating Scottish Office Circular no. 6/1995;
- Scottish Executive (2000)[18]. Planning Advice Note (PAN) 60: Planning for Natural Heritage;
- Scottish Environment Protection Agency (SEPAa) (2017)[19]. Land Use Planning System Guidance Note 4 - Planning guidance on on-shore windfarm developments;
- SEPA (2017b)[20]. Land Use Planning System Guidance Note 31 - Guidance on Assessing the Impacts of Development Proposals on Groundwater Abstractions and Groundwater Dependent Terrestrial Ecosystems;
- Scottish Executive Rural Affairs Department (SERAD) (2001)[21]. European Protected Species, Development Sites and the Planning Systems: Interim guidance for local authorities on licensing arrangements;
- Scottish Government (2006)[22]. European Protected Species – terms of guidance: Chief Planner letter;
- Scottish Government (2013)[23]. Planning Advice Note 1/2013 - Environmental Impact Assessment;

[11] Joint Nature Conservation Committee (2013). Guidelines for selection of biological Sites of Special Scientific Interest (SSSI). Available at: https://jncc.gov.uk/our-work/guidelines-for-selection-of-sssis/
[12] NatureScot, Natural England, Natural Resources Wales, RenewableUK, Scottish Power Renewables, Ecotricity Ltd, the University of Exeter & Bat Conservation Trust (BCT) (2019, updated 2021). Bats and Onshore Wind Turbines – Survey, Assessment and Mitigation.
[13] NatureScot (2021). Assessing the cumulative landscape and visual impact of onshore wind energy developments. Available at https://www.nature.scot/doc/guidance-assessing-cumulative-landscape-and-visual-impact-onshore-wind-energy-developments
[14] NatureScot (2023). Advising on peatland, carbon-rich soils and priority peatland habitats in development management. Available at https://www.nature.scot/doc/advising-peatland-carbon-rich-soils-and-priority-peatland-habitats-development-management
[15] https://www.nature.scot/doc/naturescot-pre-application-guidance-onshore-wind-farms
[16] Scottish Badgers (2018). Surveying for Badgers: Good Practice Guidelines. Version 1. Available at: https://www.scottishbadgers.org.uk/wp-content/uploads/2020/12/Surveying-for-Badgers-Good-Practice-Guidelines_V1-2020-2455979.pdf
[17] Scottish Executive (2000). Nature conservation: implementation in Scotland of EC Directives on the conservation of natural habitats and of wild flora and fauna and the conservation of wild birds. Revised guidance updating Scottish Office Circular no. 6/1995. Available at: https://www.gov.scot/binaries/content/documents/govscot/publications/foi-eir-release/2020/01/foi-201900008726/documents/foi-201900008726-information-released-a/foi-201900008726-information-released-a/govscot%3Adocument/FOI%2B-%2B201900008726%2B-%2BInformation%2Breleased%2B-%2BCircular%2B6-1995%2BNature%2BConservation%2B-%2B%2527The%2BHabitats%2Band%2BBirds%2BDirectives%2527%2B%2528Updated%2BJune%2B2000%2529..PDF
[18] Scottish Executive (2000). Planning Advice Note (PAN) 60: Planning for Natural Heritage.
[19] Scottish Environment Protection Agency (2017). Land Use Planning System Guidance Note 4 – Planning guidance on on-shore windfarm developments. Available at: https://www.sepa.org.uk/media/136117/planning-guidance-on-on-shore-windfarms-developments.pdf
[20] Scottish Environment Protection Agency (2017). Land Use Planning System Guidance Note 4 – Planning guidance on on-shore windfarm developments. Available at: https://www.sepa.org.uk/media/136117/planning-guidance-on-on-shore-windfarms-developments.pdf
[21] Scottish Executive Rural Affairs Department (2001). European Protected Species, Development Sites and the Planning Systems: Interim guidance for local authorities on licensing arrangements. Available at: https://www.webarchive.org.uk/wayback/archive/20150220012946/http://www.gov.scot/Publications/2001/10/10122/File-1
[22] Scottish Government (2006). European Protected Species – terms of guidance: Chief Planner letter. Available at: https://www.gov.scot/binaries/content/documents/govscot/publications/correspondence/2006/05/european-protected-species-chief-planner-letter/documents/ec-directive-92_43_eec-conservation-natural-habitats-wild-flora-fauna-pdf/ec-directive-92_43_eec-conservation-natural-habitats-wild-flora-fauna-pdf/govscot%3Adocument/EC%2BDirective%2B92_43_EEC%2BOn%2Bthe%2BConservation%2Bof%2BNatural%2BHabitats%2Band%2Bof%2BWild%2BFlora%2Band%2BFauna.pdf
[23] https://www.gov.scot/publications/planning-advice-note-1-2013-environmental-impact-assessment/

- Scottish Government (2016)[24]. Draft Peatland and Energy Policy Statement;
- Scottish Government (2017b)[25]. Planning Circular 1/2017: Guidance on The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017;
- Scottish Government, SNH, SEPA (2017)[26]. Peatland Survey – Guidance on Developments on Peatland;
- Scottish Government (2019)[27]. The Scottish Forestry Strategy 2019 – 2029;
- Scottish Government (2020a)[28]. Scottish biodiversity strategy post-2020: statement of intent;
- Scottish Government (2020b)[29]. Securing a green recovery on a path to net zero: climate change plan 2018 – 2032 – update;
- Scottish Government (2021)[30]. Freshwater and diadromous fish and fisheries associated with onshore wind farm and transmission line developments: generic scoping guidelines;
- Scottish Government (2023b)[31]. Draft Planning Guidance: Biodiversity;
- Scottish Natural Heritage (SNH) (2015)[32]. Scotland's National Peatland Plan;
- SNH (2016a)[33]. Planning for Development: What to consider and include in deer assessments and management at development sites (Version 2);
- SNH (2016b)[34]. Planning for Development: What to consider and include in Habitat Management Plans. Version 2;
- SNH (2018)[35]. Environmental Impact Assessment Handbook – Version 5: Guidance for competent authorities, consultation bodies, and others involved in the Environmental Impact Assessment process in Scotland; and
- Scottish Renewables, SNH, SEPA, Forestry Commission (Scotland), HES, AEECoW (2019, updated 2024)[36]. Good Practice During Windfarm Construction (4th Edition).

Consultation

7.2.4 No formal EIA Scoping Opinion was issued by Dumfries and Galloway Council. Notwithstanding, consideration has been given to the consultation which has been undertaken as detailed in **Table 7.1**.

[24] Scottish Government (2016). Draft Peatland and Energy Policy Statement. Available at: https://www.gov.scot/publications/peatland-and-energy-draft-policy-statement/
[25] Scottish Government (2017). Planning Circular 1/2017: Guidance on The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017. Available at: https://www.gov.scot/publications/planning-circular-1-2017-environmental-impact-assessment-regulations-2017/
[26] https://www.gov.scot/binaries/content/documents/govscot/publications/advice-and-guidance/2018/12/peatland-survey-guidance/documents/peatland-survey-guidance-2017/peatland-survey-guidance-2017/govscot%3Adocument/Guidance%2Bon%2Bdevelopments%2Bon%2Bpeatland%2B-%2Bpeatland%2Bsurvey%2B-%2B2017.pdf
[27] https://www.gov.scot/publications/scotlands-forestry-strategy-20192029/
[28] Scottish Government (2020). Scottish biodiversity strategy post-2020: statement of intent. Available at: https://www.gov.scot/publications/scottish-biodiversity-strategy-post-2020-statement-intent/
[29] Scottish Government (2020). Securing a green recovery on a path to net zero: climate change plan 2018 – 2032 – update. Available at: https://www.gov.scot/publications/securing-green-recovery-path-net-zero-update-climate-change-plan-20182032/
[30] https://www.gov.scot/publications/freshwater-and-diadromous-fish-and-fisheries-associated-with-onshore-wind-farm-and-transmission-line-developments-generic-scoping-guidelines/
[31] Scottish Government (2023). Draft Planning Guidance: Biodiversity https://www.gov.scot/publications/scottish-government-draft-planning-guidance-biodiversity/
[32] SNH (2015). Scotland's National Peatland Plan. Available at: https://www.nature.scot/doc/scotlands-national-peatland-plan-working-our-future
[33] SNH (2016). Planning for Development: What to consider and including in deer assessments and management at development sites (Version 2). Available at: https://www.nature.scot/doc/guidance-planning-development-what-consider-and-include-habitat-management-plans
[34] SNH (2016). Planning for Development: What to considered and including in Habitat Management Plans. (Version 2). Available at: https://www.nature.scot/doc/guidance-planning-development-what-consider-and-include-habitat-management-plans
[35] SNH (2018). Environmental Impact Assessment Handbook – Version 5: Guidance for competent authorities, consultation bodies, and others involved in the Environmental Impact Assessment process in Scotland. Scottish Natural Heritage. Available at: https://www.nature.scot/doc/handbook-environmental-impact-assessment-guidance-competent-authorities-consultees-and-others
[36] Scottish Renewables, SNH, SEPA, Forestry Commission (Scotland), HES, AEECoW (2019). Good Practice During Windfarm Construction (4th Edition). Available at: https://www.nature.scot/doc/guidance-good-practice-during-wind-farm-construction

Table 7.1: Consultation responses

Consultee and Date	Scoping/Other Consultation	Issue Raised	Response/Action Taken
NatureScot 03 May 2021	Contacted by MacArthur Green to confirm the existing baseline data for bat activity via static detectors (anabats) collected in 2013 and 2017 is sufficient for the assessment and no new static bat surveys required for the Proposed Development.	Agree that there are no significant changes to land use that might result in a significant alteration to bat activity in this area. The previous survey work largely meets the requirements of the updated NatureScot bat survey guidance and further validates any justification for not needing to repeat surveys. The intention to extend the survey area for potential roosts to be in line with updated guidance is welcomed.	Noted that no new static bat activity surveys required. The Site has been resurveyed for potential roosts in 2021 and again in 2023/2024 (see **Technical Appendix 7.3** and Existing Conditions section below).

Study Area

7.2.5 The area within which the desk-based research and field surveys were undertaken varies depending on the ecological features and respective search/survey requirements. Details of the extents are described in the relevant sections in the 'Existing Conditions' section of this chapter below and **Technical Appendices 7.1 - 7.3** and their respective figures. Hereafter in this chapter, the areas covered by field surveys are termed the 'survey area' and these same areas which are considered as part of the assessment process are then collectively referred to as the 'study area' (N.B. the study area generally equates to the Site, except for designated sites where the study area is a 5 km buffer around the Site (**Figure 7.1**)).

Desk Based Research and Data Sources

7.2.6 The following data sources have informed the assessment:

- NatureScot Sitelink[37] for designated site information within 5 km of the Site;
- Ancient Woodland Inventory (AWI) Scotland[38] for ancient woodland sites within 5 km of the Site;
- Scotland's Environment Map for the Carbon and Peatland Map (2016)[39];
- National Biodiversity Network (NBN) Atlas Scotland[40] for protected or notable species records within 5 km of the Site (extended to 10 km for records of bat species) from the last 15 years (i.e., 2009 and onwards);
- The British Deer Society[41] for deer distribution survey results;
- Saving Scotland's Red Squirrels[42] for evidence of red squirrel from within 5 km of the Site;
- SEPA Water Environment Hub[43] for watercourse classifications;

[37] https://sitelink.nature.scot/home [Accessed July 2024].
[38] Ancient Woodland Inventory (Scotland). Available at: https://www.spatialdata.gov.scot/geonetwork/srv/api/records/A091F945-F744-4C8F-95B3-A09E6EF6AE33 [Accessed June 2024].
[39] https://soils.environment.gov.scot/maps/thematic-maps/carbon-and-peatland-2016-map/ [Accessed June 2024].
[40] NBN Atlas Scotland. Online. Available at: https://nbnatlas.org/ [Accessed June 2024]. Record holders are named in **Technical Appendix 7.2**.
[41] The British Deer Society (2023). Deer Distribution Survey Results. Available online: https://bds.org.uk/science-research/deer-surveys/deer-distribution-survey/ [Accessed July 2024].
[42] Scottish Squirrels. Saving Scotland's Red Squirrels. Online. Available at: https://scottishsquirrels.org.uk/ [Accessed June 2024].
[43] https://www.sepa.org.uk/data-visualisation/water-environment-hub/ [Accessed July 2024].

- The Environmental Statement (ES, 2015), associated technical appendices, survey data and figures for the Consented Larbrax Wind Farm[44];
- Ecological survey data collected in 2017 by MacArthur Green for a Section 42 planning application for the Consented Larbrax Wind Farm; and
- Relevant scientific literature on protected species' distribution, habitats distribution and conservation status etc.

Field Survey

7.2.7 The following field surveys were carried out at the Site in line with standard methodologies and best practice guidance to inform the assessment:

- National Vegetation Classification (NVC) surveys, incorporating Phase 1 habitat characterisation and potential Groundwater Dependent Terrestrial Ecosystem (GWDTE) habitats (June 2023);
- Protected species surveys (July 2021, and re-surveyed in July 2023), focusing on otter (*Lutra lutra*), water vole (*Arvicola amphibius*), badger (*Meles meles*), red squirrel (*Sciurus vulgaris*) and pine marten (*Martes martes*);
- Preliminary bat roost assessments (July 2021, re-surveyed in July 2023, and additional surveys conducted in March and June 2024 in the area around the access junction with the B738 road); and
- Bat automated activity surveys (July to September 2017).

7.2.8 Incidental records of other protected species (e.g., reptiles), or potential hibernacula (for reptiles), notable species, or invasive non-native species (INNS), were also recorded during all field surveys.

7.2.9 The full details of survey methods, species-specific legislation and results are provided within **Technical Appendices 7.1 - 7.3**. Respective survey areas are shown in **Figures 7.3 – 7.9** inclusive.

Assessing Significance

7.2.10 The significance of the potential effects has been assessed for the Proposed Development considering the spatial and temporal magnitude of the potential impacts and the sensitivity of important ecological features (IEFs).

7.2.11 The assessment method follows the process set out in CIEEM (2022)[8], and guidance on the implementation of the EU Birds and Habitats Directive (SERAD, 2001)[21].

7.2.12 The evaluation for wider countryside interests (i.e., unrelated to any Natura 2000 sites) involves the following process:

- Identification of the potential ecological effects of the Proposed Development on ecological features, including both positive and negative;
- Considering the likelihood of occurrence of potential effects;
- Defining the nature conservation value and conservation status of the ecological features present to determine sensitivity;
- Establishing the magnitude of change associated with the potential effect (both spatial and temporal);
- Based on the above information, making a professional judgement as to whether or not the resultant effect is significant in terms of the EIA Regulations[45];
- If a potential effect is determined to be significant, measures to avoid, reduce, or mitigate for the effect are suggested where required;
- Confirming residual effects after mitigation are considered; and
- Considering opportunities for enhancement where appropriate.

[44] PNE Wind UK (2015). Larbrax Wind Farm Environmental Statement. Chapter 8: Ecology.
[45] i.e., The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017.

Sensitivity

7.2.13 The sensitivity of the baseline conditions, including the importance of environmental features on or near to the Proposed Development or the sensitivity of potentially affected receptors, will be assessed in line with best practice guidance, legislation, statutory designations and/or professional judgement.

7.2.14 Determination of the level of sensitivity of an IEF is based on a combination of the feature's nature conservation value and conservation status. Nature conservation value is defined on the basis of the geographic context given in **Table 7.2**, which follows the guidance as detailed within CIEEM (2022)[8].

7.2.15 Determination of the level of importance of ecosystems, habitats and species is based on professional judgement and a combination of factors, such as level of protection, rarity, conservation status, population trends, and quality/extent of the feature onsite. Published evaluation criteria (e.g., the Scottish Biodiversity List (SBL), JNCC on selection of biological Sites of Special Scientific Interest (SSSIs)) are used where relevant. Where appropriate, information regarding the particular ecological feature's conservation status is also considered to fully define its importance. This enables an appreciation of current population or habitat trends to be incorporated into the assessment.

7.2.16 Attributing a value to an ecological feature is generally straightforward in the case of designated sites, as the designations themselves are normally indicative of an importance level. For example, a Special Area of Conservation (SAC) designated under the Habitats Directive is implicitly of European (International) importance. In the case of species, assigning value is less straightforward as contextual information about distribution and abundance is fundamental, including trends which are based on historical records. This means that even though a species may be protected through legislation at a national or international level, the relative value of the population onsite may be quite different (e.g., the site population may consist of a single transitory animal, which within the context of a thriving local/regional/national population of a species, is therefore of local or regional value rather than national or international).

7.2.17 As per CIEEM guidance[8], it is not necessary to carry out detailed assessment on ecological features that are sufficiently widespread, unthreatened, and resilient to effects of the Proposed Development. Ecological features affected by the Proposed Development and deemed to be of at least Local importance are termed IEFs and are taken forward for assessment.

Table 7.2: Approach to valuing ecological features[46]

Value of Feature in Geographical Context	Description
International	An internationally designated site (e.g., SAC).
	Site meeting criteria for international designations or qualifying species of an SAC where there is connectivity.
	Species present in internationally important numbers (>1% of biogeographic populations).
National (UK)	A nationally designated site (SSSI, or a National Nature Reserve (NNR)), or sites meeting the criterial for national designation or qualifying species where there is connectivity.
	Species present in nationally important numbers (>1% of UK population)
Regional (Natural Heritage Zone or Local Authority Area)	Species present in regionally important numbers (>1% of Natural Heritage Zone (NHZ)[47] population).
	Areas of habitat falling below criteria for selection as a SSSI (e.g., areas of semi-natural ancient woodland larger than 0.25 hectares (ha)).

[46] As adapted from Hill, D., Fasham, M., Tucker, G., Shewry, M and Shaw, P. (2005). Handbook of Biodiversity Methods – Survey, Evaluation and Monitoring. Cambridge University Press, Cambridge.
[47] Natural Heritage Zones are an established biogeographical regional classification used by NatureScot. The Proposed Development is situated within NHZ 18: Wigtown Machairs & Outer Solway Coast.

Value of Feature in Geographical Context	Description
Local	Local Nature Reserves (LNR).
	Areas of semi-natural ancient woodland smaller than 0.25 ha.
	Areas of habitat or species considered to appreciably enrich the ecological resource within the local context, e.g., species-rich flushes or hedgerows.
Negligible	Usually widespread and common habitats and species that do not meet the above criteria. Features falling below local value are not normally considered in detail in the assessment process.

Magnitude

7.2.18 Magnitude of change refers to the level of change in the extent and integrity of an ecological feature. A suitable definition of ecological 'integrity' is found within Scottish Executive circular 6/1995 updated by Scottish Executive (2000)[17] which states that "*The integrity of a site is the coherence of its ecological structure and function, across its whole area, which enables it to sustain the habitat, complex of habitats and/or the levels of populations of the species for which it was classified*". Although this definition is used specifically regarding European level designated sites (SACs and SPAs), it is applied to wider countryside habitats and species for the purposes of this assessment.

7.2.19 The magnitude of potential change will be identified through consideration of the Proposed Development, the degree of change to baseline conditions predicted as a result of the Proposed Development, how the ecological features are likely to respond to the Proposed Development, the duration and reversibility of an effect and the application of professional judgement, best practice guidance and legislation. This change can occur during construction or operation of the Proposed Development, and effects can be positive, neutral or negative.

7.2.20 The magnitude of change is measured in space and time. There are five levels of spatial effects and five levels of temporal effects as described in **Table 7.3** and **Table 7.4** below.

Table 7.3: Definition of spatial change magnitude upon the IEFs

Magnitude of Change	Definition
Very High	Would cause the loss, gain or improvement of the majority of a feature (>80%) or would be sufficient to damage/enhance a feature sufficient to immediately affect its viability.
High	Would have a major effect on the feature or its viability. For example, more than 20% habitat loss/damage or gain/improvement.
Moderate	Would have a moderate effect on the feature or its viability. For example, between 10 – 20% habitat loss/damage or gain/improvement.
Low	Would have a minor effect upon the feature or its viability. For example, less than 10% habitat loss/damage or gain/improvement.
Negligible	Minimal change on a very small scale; effects not dissimilar to those expected within a 'do nothing' scenario.

Table 7.4: Definition of temporal change magnitude upon the IEFs

Magnitude of Change	Description
Permanent	Effects continuing indefinitely beyond the span of one human generation (taken here as >30 years), except where there is likely to be substantial improvement after this period in which case the category Long Term may be more appropriate.

Magnitude of Change	Description
Long Term	Between 15 years up to (and including) 30 years.
Medium Term	Between 5 years up to (but not including) 15 years.
Short Term	Up to (but not including) 5 years.
Negligible	No effect.

Significance

7.2.21 The predicted significance of potential effects is determined through a standard method of assessment based on professional judgement and available evidence, considering the sensitivity (nature conservation value and conservation status) of the IEF (**Table 7.3**) and the nature and magnitude of change (**Table 7.4**), in a reasoned way.

7.2.22 A 'significant effect' is an effect that either supports or undermines biodiversity conservation objectives for IEFs or for biodiversity generally[8]. Broadly, significant effects include those which result from impacts on the structure and function of defined sites, habitats or ecosystems, and the conservation status of habitats and species (including extent, abundance and distribution)[8].

7.2.23 **Table 7.5** details the significance criteria that have been used in assessing the effects of the Proposed Development.

Table 7.5: Significance criteria

Significance of Effect	Description
Major	The effect is likely to result in a long term adverse or beneficial effect on the structure and function of defined sites, habitats or ecosystems or on the conservation status of habitat and species.
Moderate	The effect is likely to result in a medium term or partially adverse or beneficial effect on the structure and function of defined sites, habitats or ecosystems or on the conservation status of habitats and species.
Minor	The effect is likely to adversely or beneficially affect the feature in the short-term at a low level by virtue of its limited duration and/or extent, but there will probably be no effect on the structure and function of defined sites, habitats or ecosystems or on the conservation status of habitats and species. The level of effect would be Minor and Not Significant.
Negligible	No material effect. The effect is assessed to be Not Significant.

7.2.24 Using these definitions, it must be decided whether there will be any effects which will be sufficient to adversely affect the IEF to the extent that its conservation status deteriorates above and beyond that which would be expected should baseline conditions remain (i.e., the 'do nothing' scenario).

7.2.25 Effects predicted to be of **Major** or **Moderate** significance are considered to be 'Significant' in the context of the EIA Regulations.

7.2.26 Where adverse effects are identified, mitigation is considered to reduce or offset effects where possible including avoidance or reduction through implementation of and compliance with best practice guidance and protected species legislation.

7.2.27 Residual effects are characterised as either adverse, neutral or beneficial and either Significant or Not Significant, taking account of mitigation proposals.

Cumulative Assessment

7.2.28 NatureScot (2021) cumulative assessment guidance[13] is used to inform the cumulative assessment in this chapter. Cumulative effects require the assessment of effects of the Proposed Development in combination with other developments, projects or activities. In the interests of focusing on the potential for significant effects, this assessment considers the potential for cumulative effects with other onshore wind farm EIA developments. The context in which these effects are considered is heavily dependent on the ecology of the feature assessed. For example, for water voles it may be appropriate to consider effects specific to individual catchments, should the distance between neighbouring catchments be sufficient to assume no movement of animals between them, whereas for other species or habitats the region/NHZ may be the relevant spatial scale. Therefore, where it is considered necessary, an assessment of cumulative effects will be made for each feature taken forward to detailed assessment, appropriate to its ecology.

Assessment Assumptions

7.2.29 The following assumptions have been made when undertaking the assessment of otherwise unmitigated effects on IEFs:

- The short-term construction phase, of approximately 12 months, would include borrow pit creation, construction of access tracks, turbine hardstandings, and other ancillary infrastructure, wind turbine erection, and Site restoration;
- All electrical cabling between the turbines and the associated infrastructure would be underground in shallow trenches which would be reinstated post-construction and, in all cases, follow the access tracks;
- The construction compound and any temporary laydowns or holding areas will be temporary infrastructure. Any disturbance or earthworks extents areas around permanent infrastructure during construction would be temporary and areas reinstated or restored before the construction phase ends;
- Habitat losses or modification to wetland habitats due to potential indirect drainage effects from infrastructure may extend out to 10 m from infrastructure (i.e., in keeping with precautionary indirect drainage assumptions within the carbon calculator);
- The embedded design mitigation and construction phase good practice measures (see sections below) will be fully applied, e.g., the presence of an Ecological Clerk of Works (ECoW), adherence to the agreed Species Protection Plan (SPP) and Construction Environmental Management Plan (CEMP); and
- Maintenance of the Proposed Development will involve vehicular access along the access tracks only, and any maintenance of turbines will be occasional, typically carried out by a small number of maintenance staff inside the turbines during normal working hours.

Assessment Limitations

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

7.2.31 Ecological surveys are limited by factors which affect the presence of plants and animals such as the time of year, migration patterns and behaviour. The ecological surveys undertaken for the Proposed Development have not therefore produced a complete list of plants and animals and the absence of evidence of any particular species should not be taken as conclusive proof that the species is not present or that it will not be present in the future. The assessment has therefore been undertaken on the basis of the existing Site conditions and species found to be present at the time of survey.

7.2.32 No notable limitations were experienced with regards to protected species or bats field surveys. Minor limitations were experienced with regards habitat surveys due to patches of dense impenetrable rhododendron within woodland areas, or the steep cliffs along the coastline, however these are not considered to affect the validity of the survey results, or the robustness of any assessments made from these data (see **Technical Appendices 7.1 – 7.3**).

7.2.33 At the time of preparing **Technical Appendix 7.3** and undertaking the bats assessment within this chapter, the online tool Ecobat[48] was unavailable. Ecobat is the guidance[12] recommended tool to objectively quantify bat activity levels at a site. In the absence of Ecobat, and on the advice of NatureScot, alternative quantitative methods are used to assess bat activity levels. Furthermore, as surveys for the Proposed Development were undertaken in 2017 and before the release and use of Ecobat, there is unlikely to be sufficient, if any, comparison data within the Ecobat database or tool to allow any meaningful comparison with the Site. As such, the data obtained from the 2017 static bat survey has been considered in accordance with NatureScot *et al*. guidance[12] as far as practicable to determine the overall Site risk level for each species of bat (see **Technical Appendix 7.3** for further details and methodology).

7.2.34 Whilst some generic limitations have been identified as described above, it is considered that there is sufficient information to enable an informed decision to be taken in relation to the identification and assessment of potential significant environmental effects on ecology.

7.3 Existing Conditions

7.3.1 This section details the results of the desk study and field surveys, providing the ecological baseline for the Site and study area, and includes:

- Statutory nature conservation designated sites (excluding those designated solely for ornithological or geological features);
- Desk study results;
- Habitats and vegetation; and
- Protected or notable species.

Desk Study

Designated Sites

7.3.2 There is one statutory designated site within the Site that contains ecological qualifying interests; Salt Pans Bay SSSI. There are no other designated sites within 5 km of the Site. Details of the designated site is provided in **Table 7.5** and location shown in **Figure 7.1**.

Table 7.6: Ecological designated sites within 5 km of the Site

Site Name	Distance to Site	Distance to Nearest Proposed New Infrastructure	Qualifying Ecological Features	Last Assessed Condition & Date
Salt Pans Bay SSSI	Within Site	70 m from access track to T1	Maritime cliff	Favourable Maintained 28/08/2002

Ancient Woodland

7.3.3 There are no areas of ancient woodland (as present on the Ancient Woodland Inventory (AWI)) within the Site; however, there are areas of ancient woodland within 5 km of the Site, the closest being an unnamed stand of long-established woodland of plantation origin approximately 787 m east of the Site and located north of Topmalloch Hill (**Figure 7.1**). Further east of this there are several other ancient woodland stands (**Figure 7.1**).

Habitats

Terrestrial Habitats

7.3.4 The Site falls within a coastal and agriculturally improved area and contains habitats consistent with this. However, there are fragmented areas of more upland character habitats, such as mires and heaths.

[48] Mammal Society (2017).

7.3.5 The Carbon and Peatland Map 2016[39] was consulted to determine likely peatland classes present. The map is a predictive tool that provides an indication of the likely presence of peat at a high level. The map has been developed as "*a high-level planning tool to promote consistency and clarity in the preparation of spatial frameworks by planning authorities*"[49]. It identifies areas of "*nationally important carbon-rich soils, deep peat and priority peatland habitat*"[50] as Class 1 and Class 2 peatlands. Class 1 peatlands are also "*likely to be of high conservation value*" and Class 2 "*of potentially high conservation value and restoration potential*".

7.3.6 **Figure 7.2** indicates that, according to this predictive tool and map, there are three areas of Class 1 peatland in the east and south of the Site, extending across Galdenoch Moor, Larbrax Moor, and Drumwhisley. There is no Class 2 peatland within the Site (or within 5 km of the Site). Much of the Site and surrounding area is underlain by Class 0[51] (mineral) soils. The remainder of the Site comprises scattered and fragmented patches of Class 3[52] and Class 5[53] soils (see **Figure 7.2**).

7.3.7 As the Carbon and Peatland Map is a high-level tool, detailed habitat and peat depth surveys have been carried out across the Site to inform siting, design and mitigation and the detailed assessment on peatland and associated habitats. The results of the habitat surveys are discussed in **Technical Appendix 7.1**, and the results of the peat depth surveys are presented and discussed in **Chapter 9** and associated Technical Appendices.

Aquatic Habitats

7.3.8 The watercourses within the Site are all minor watercourses that primarily drain to the west and directly into the North Channel and over the rocky cliffs that fringe the Site and preclude access to migratory fish. A small number the watercourses in the northeast flow into the Galdenoch Burn located further north. The majority of the watercourses within the Site also appear to have been historically straightened and channelised as part of drainage and agricultural improvement works.

7.3.9 All watercourses within the Site are unclassified by SEPA. The Galdenoch Burn to the north was classified by SEPA as part of their Water Framework Directive (WFD) classification[43] and was assessed in 2014 as having Moderate overall condition and water quality, with Good physical condition, High access for fish migration, and Good for freedom from invasive species.

7.3.10 There are a small number of standing waterbodies within the Site, the largest of which is Loch More.

Protected Species (Non-Avian)

7.3.11 A search of the NBN Atlas Scotland[40] returned records of the following protected or notable species within 5 km of the Site (10 km for bats) in the last 15 years (i.e., since 2009) (data licences and providers are detailed in **Technical Appendices 7.2** and **7.3**):

- Palmate newt (*Lissotriton helveticus*);
- Red squirrel;
- Daubenton's (*Myotis daubentonii*);
- Natterer's (*Myotis natterer*);
- *Myotis* spp.;
- Leisler's (*Nyctalus leisleri*);
- Common pipistrelle (*Pipistrellus pipistrellus*);
- Soprano pipistrelle (*Pipistrellus pygmaeus*); and

[49] https://www.nature.scot/professional-advice/planning-and-development/planning-and-development-advice/soils/carbon-and-peatland-2016-map
[50] Priority peatland habitat is land covered by peat-forming vegetation or vegetation associated with peat formation.
[51] Class 0 - Mineral soil - Peatland habitats are not typically found on such soils. No peatland vegetation.
[52] Class 3 - Dominant vegetation cover is not priority peatland habitat but is associated with wet and acidic type. Occasional peatland habitats can be found. Most soils are carbon-rich soils, with some areas of deep peat. Indicative soil = Predominantly peaty soil with some peat soil. Indicative vegetation = Peatland with some heath.
[53] Class 5 - Soil information takes precedence over vegetation data. No peatland habitat recorded. May also include areas of bare soil. Soils are carbon-rich and deep peat. Indicative soil = Peat soil. Indicative vegetation = No peatland vegetation.

- Brown long-eared bat (*Plecotus auritus*).

7.3.12 Sightings of red squirrels have been recorded on Saving Scotland's Red Squirrels' sightings map[42] within 5 km of the Site in the past 14 years (i.e., from 2010 onwards), with sightings most prevalent within the woodlands adjacent to Lochnaw Loch and Cairnhapple Wood, north-east of the Site. None of the sightings recorded were within the Site.

7.3.13 Surveys for the Consented Larbrax Wind Farm EIA[44] undertaken in 2013 noted the presence of otter, including two resting areas and numerous signs recorded in the north of the Site. Badger setts were also recorded[54]. There were incidental sightings of adder (*Vipera berus*) and common lizard (*Zootoca vivipara*).

7.3.14 As part of the assessment for the Consented Larbrax Wind Farm EIA, a Habitat Suitability Index (HSI) assessment was carried out to determine the suitability of 12 waterbodies within and in proximity to the Site for great crested newt (GCN). The waterbodies were assessed as ranging from 'poor' (five ponds) to 'below average' (four ponds), and 'average' (three ponds). Further surveys (including bottle trapping, torch surveys, netting and egg searches) at five waterbodies within 500 m of the Proposed Development at that time did not record any signs of GCN but did record palmate newt and smooth newt (*Lissotriton vulgaris*).

7.3.15 Bat surveys for the Consented Larbrax Wind Farm EIA[44] undertaken in 2013 included roost assessment surveys in May and July 2013 on trees and buildings within 200 m of the Proposed Development at that time, ground based survey in January 2014 of trees identified for felling in proximity to the B738 road, transect surveys across and around the Site in May, July, August, September and October 2013, and temporal (static detector) (anabat) surveys at six fixed locations around the Site recording monthly from May to October 2013 (five recording nights per month). The key results from these surveys indicated:

- A small Daubenton's roost at Galdenoch Castle (this feature is located 1.26 km from the nearest Proposed Development turbine (T4);
- A pipistrelle roost in an outbuilding at Meikle Larbrax (this feature is located at least 1.06 km from the nearest Proposed Development turbine (T1));
- Presence of a number of buildings with potential roost features (PRFs);
- No trees with PRFs recorded within the respective survey area;
- Transect surveys recorded low numbers of common pipistrelle, soprano pipistrelle and Daubenton's bat, with activity concentrated around Loch More, Galdenoch Castle, Green Burn, Meikle Larbrax and along a tree-lined section of the B738;
- Static surveys recorded the presence of seven bat species - common pipistrelle, soprano pipistrelle, Nathusius pipistrelle (*Pipistrellus nathusii*), Leisler's, Noctule (*Nyctalus noctula*), brown long-eared, and Daubenton's (and potentially other *Myotis* spp.);
- Over 80% of bat passes were from common pipistrelle and soprano pipistrelle, around 10% from *Myotis* spp., and around 2% from *Nyctalus* spp. (including confirmed Leisler's). Very small numbers of Nathusius pipistrelle, Noctule and brown long-eared bat recorded;
- Bat activity was highly clustered towards the two anabats at Loch More and Galdenoch Castle which accounted for 93.9% of all static survey bat activity. The remaining four anabats recording little activity; and
- Pipistrelle species activity peaked in August.

7.3.16 A subsequent Section 42 application relating to the Consented Larbrax Wind Farm involved a protected species survey refresh of the Site on 19 July 2017. The surveys found evidence of badger (including two setts, a single holed outlier and a disused larger sett, as well as some other field signs) and otter (a single spraint) using the Site with similar distribution as recorded during earlier 2013 surveys.

Fish

7.3.17 As noted in **paragraph 7.3.8** the majority of watercourses onsite are minor watercourses that have been historically straightened and channelised, and discharge to the sea over cliffs. They are generally unsuitable for fish (migratory or resident).

[54] Note that information on the location and activity of badgers is redacted from the 2015 ES.

7.3.18 Surveys for the Consented Larbrax Wind Farm EIA[44] undertaken in 2013 comprised an assessment of watercourses for their suitability to support fish passage/spawning (e.g., spawning gravels) and the locations of potential blockages to fish passage such as significant vertical waterfalls and impassable culverts. The survey found that many of the watercourses within the Site are drainage channels and were dry or of low flow at the time of survey for much of their length and were considered to have limited fish potential.

Other Species

Deer

7.3.19 Deer are not included in the assessment from a nature conservation perspective but are considered due to potential welfare issues and their potential impact on other ecological features through grazing.

7.3.20 The Deer Distribution Survey[41] results suggest that the following deer species are likely to be present in the wider local area of the Site:

- Red deer (*Cervus elaphus*);
- Roe deer (*Capreolus capreolus*); and
- Sika deer (*Cervus nippon*).

7.3.21 In terms of habitat suitability for deer species, small discrete areas of conifer plantation and broadleaved semi-natural woodland exist within the Site, with woodlands extending further east outwith the Site to the east of Larbrax Moor. These woodlands have the potential to provide shelter for deer, with open grassland and moorland areas offering grazing opportunities.

Invasive Non-Native Species (INNS)

7.3.22 INNS are a threat to biodiversity and there is a legal obligation to control their spread[55].

7.3.23 A search of the NBN Atlas Scotland[40] returned records of the following INNS within 5 km of the Site in the last 15 years (i.e., since 2009) (data licences and providers are detailed in **Technical Appendix 7.2**):

- Grey squirrel (*Sciurus carolinensis*).

7.3.24 Sightings of grey squirrels have been recorded on Saving Scotland's Red Squirrels[42] within 5 km of the Site in the past 14 years.

7.3.25 One potential mink (*Neovison vison*) scat was recorded during previous protected species surveys at the Site in 2017.

7.3.26 Rhododendron (*Rhododendron ponticum*) was recorded within the Site during habitat surveys in 2013 for the Consented Larbrax Wind Farm.

Field Surveys

7.3.27 Full details of field survey methodologies, survey timings, survey area extents, and survey results are included within **Technical Appendices 7.1 – 7.3**. The following sections summarise the existing baseline conditions as identified during these surveys.

Habitats

National Vegetation Classification (NVC) and Phase 1

7.3.28 **Technical Appendix 7.1** presents information on the habitat surveys and the detailed descriptions of all habitat types and vegetation recorded in the surveys. The habitats survey results are shown on **Figure 7.3** which display all data collected during surveys[56].

[55] See Section 14 of the Wildlife and Countryside Act 1981.
[56] The Phase 1 symbology shading in **Figure 7.3** has been used to broadly characterise stands of vegetation based on the dominant NVC community within a particular area. The Phase 1 characterisation has been utilised to allow a broader visual representation of the habitats within the survey and study area. Polygons or areas where there are mosaic NVC communities have generally been assigned a single Phase 1

7.3.29 The NVC data collected were also cross-referenced to the Phase 1 Habitat Survey Classification (JNCC, 2010)[57] to allow a broader characterisation of habitats. The extent of Phase 1 habitat types within the Site and study area was calculated using the Site-specific correlation of NVC communities to their respective Phase 1 types (see **Technical Appendix 7.1** for full details), and their extents mapped within ArcGIS software, including within mosaic areas.

7.3.30 The NVC communities and non-NVC types recorded within the study area are provided in **Annex A, Table 7.11** (located at the end of this chapter) and include proportions of particular habitat types that are found within the Site, including those within mosaic habitats. Full descriptions of the habitats, NVC communities and associated flora of the Site are provided in **Technical Appendix 7.1**.

7.3.31 **Chart 7.1** summarises the Phase 1 habitats which contribute to over 1% of the Site and shows that improved grassland, semi-improved acid grassland, and marshy grassland make up most of the Site (i.e., 52.4%). The next most common habitat type is banket bog, covering 10.3% of the Site. Several other habitat types are present with a coverage of less than 10%, and details of the NVC communities, and their respective extents underpinning these Phase 1 habitat types, along with all other communities and habitat types covering less than 1% of the Site is detailed in **Annex A, Table 7.11**.

7.3.32 As detailed in **Annex A, Table 7.11**, the Site contains a variety of habitat types, and whilst some relatively homogenous stands of vegetation occur, many of the identified communities form complex mosaics and transitional areas. The only habitat types that have subsequently been scoped-in to the assessment of effects due to their extent and nature conservation value are blanket bog and wet modified bog. Detailed descriptions of these habitat types are included in **Technical Appendix 7.1**.

7.3.33 The blanket bog within the Site would not be classified as 'near-natural'[58] as it lacks many of the features and characteristics typical of such a peatland, and it would generally instead be classified as modified/degraded due to the long history of grazing, evidence of artificial drainage, and the invasion of rhododendron in many areas.

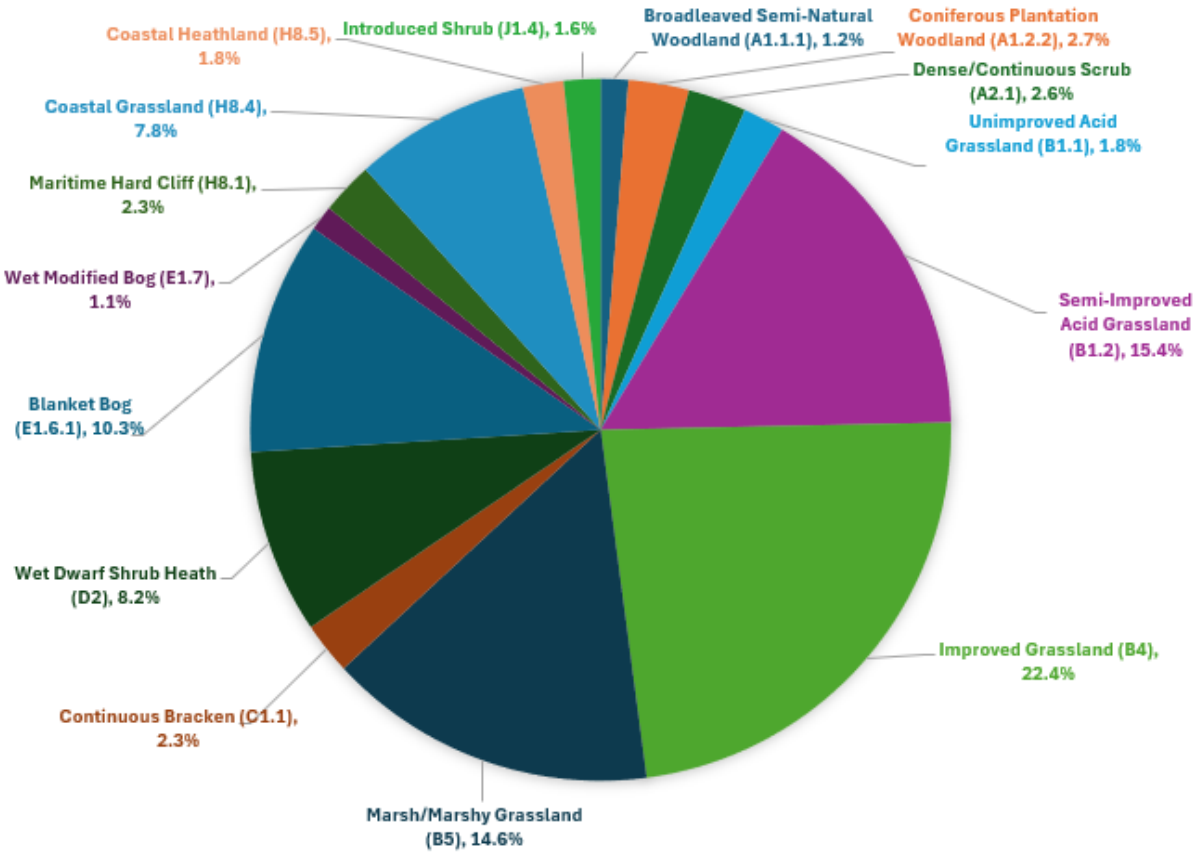
7.3.34 The INNS rhododendron was recorded extensively within the Site in both moorland and woodland settings (see **Technical Appendix 7.1** and **Figure 7.3**).

classification based on the dominant NVC type (despite some polygons containing multiple Phase 1 types, often in low percentages). Therefore, the Phase 1 characterisation is generally a broader overview, and the NVC data should be referred to for further detail in any specific area.

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

[58] As per definitions within NatureScots Peatland Condition Assessment Guidance (https://www.nature.scot/sites/default/files/2023-02/Guidance-Peatland-Action-Peatland-Condition-Assessment-Guide-A1916874.pdf) and the Peatland Code (https://www.iucn-uk-peatlandprogramme.org/sites/default/files/2023-03/FieldProtocol_%20v2_clean.pdf).

Chart 7.1 Predominant Phase 1 Habitat Types Recorded within the Site (habitat types making up <1% of the Site are not included)



Groundwater Dependent Terrestrial Ecosystems (GWDTE)

7.3.35 The NVC results were referenced against SEPA guidance[19,20] to identify those habitats which may be classified, depending on the hydrogeological setting, as being potentially groundwater dependent. Potential GWDTE NVC communities recorded within the survey area are detailed in **Technical Appendix 7.1** and shown on **Figure 7.4**.

7.3.36 GWDTE sensitivity has been assigned solely on the SEPA listings. However, many of the NVC communities on the list are common habitat types across Scotland and generally of low nature conservation value. Furthermore, depending on several factors such as geology, superficial geology, presence of peat and topography, many of the potential GWDTE communities recorded may in fact be only partially groundwater fed or not dependant on groundwater at all. Because designation as a potential GWDTE is related to groundwater dependency and not nature conservation value, GWDTE status has not been used as criteria to determine a habitat's nature conservation value and similarly does not factor in the identification of IEFs within ecological impact assessments. There is however a requirement to consider GWDTEs and the data gathered during the NVC surveys has been used to inform this assessment in **Chapter 9** and **Appendix 9.3: GWDTE Assessment**.

Annex I Habitats

7.3.37 Many NVC communities can also correlate with various Annex I habitat types listed under the Habitats Directive. The fact that an NVC community can be attributed to an Annex I type however does not necessarily mean all instances of that NVC community constitute Annex I habitat. Its status can depend on various factors such as quality, extent, species assemblages, geographical setting and substrates.

7.3.38 NVC survey data and field observations have been compared to JNCC Annex I habitat listings and descriptions[59]. Those habitats within the Site which could be considered Annex I habitats are detailed in **Technical Appendix 7.1**.

[59] https://sac.jncc.gov.uk/habitat/ [Accessed June 2024].

Scottish Biodiversity List Habitats

7.3.39 The SBL[60] is a list of animals, plants and habitats that Scottish Ministers consider to be of principal importance for biodiversity conservation in Scotland. The SBL identifies habitats which are the highest priority for biodiversity conservation in Scotland; these are termed 'priority habitats'. Some of the priority habitats are quite broad and can be correlated to many NVC types. Relevant SBL priority habitat types and corresponding associated NVC types recorded within the Site are summarised within **Technical Appendix 7.1**.

7.3.40 These SBL priority habitats correspond with the UKBAP Priority Habitats[61].

Protected Species (non-avian)

7.3.41 This section outlines the results from the protected species surveys. Detailed methodologies, survey timings, and results, including the legal status of each species, are included within **Technical Appendices 7.2 - 7.3**. Results are presented in **Figures 7.5 – 7.9**, with confidential information presented on **Figure 7.5C**.

Badger

7.3.42 Surveys for badger in 2021 recorded three setts (setts A – C); comprising two singled-holed outlier setts and one three-holed subsidiary sett. These were subsequently all found to be disused in 2023 surveys; and are therefore not shown on **Figure 7.5C**.

7.3.43 Surveys in 2023 located one additional sett (sett D) which comprised a single-holed outlier sett which exhibited signs of being active. All setts across 2021 and 2023 were found within the general area of Drumawhern, with active sett D being located 116 m away from the nearest proposed new infrastructure for the Proposed Development (**Figure 7.5C**).

7.3.44 Limited other field signs of badger were found during 2021 and 2023 surveys.

Bats

7.3.45 This section provides a summary of the field surveys and associated results for bats. Full details are contained within **Technical Appendix 7.3**.

Bat Preliminary Roost Assessment (PRA)

7.3.46 The PRA survey for the Proposed Development was undertaken in July 2021 and again in July 2023. Additional surveys were conducted in March and June 2024 in the woodland area around the access junction with the B738 road. In summary, there was one group of trees recorded in 2023 which contained low potential suitability for roosting bats (**Figure 7.6**), and no features with moderate or high suitability for roosting bats were recorded within the Site or within 200 m plus rotor radius of proposed turbine locations. The lack of roosting potential within the Site is consistent with results of previous surveys undertaken for the Consented Larbrax Wind Farm (**paragraph 7.3.15**).

Automated Activity Surveys

7.3.47 Static bat activity surveys involved the deployment of eight detectors onsite from July to September in 2017 over a total period of 35 days covering three deployment periods in summer and autumn for 11-12 consecutive nights each deployment. This resulted in 280 associated data recording nights (more than the 120 as required by NatureScot *et al*. guidance[12] for a development of this size; see **Technical Appendix 7.3**). Anabat locations are detailed on **Figure 7.6**.

7.3.48 A total of seven bat species and one bat genus were recorded at these locations, with 2,289 bat registrations in total. The total number of bat passes recorded for each species across all the locations within the Site is shown below in **Table 7.7**.

7.3.49 Soprano and common pipistrelles combined accounted for 87.2% (n = 1,997) of registrations across all surveyed locations (**Table 7.7**).

[60] Available at: https://www.nature.scot/doc/scottish-biodiversity-list.
[61] JNCC (2019). UK BAP Priority Habitats. Available at: https://jncc.gov.uk/our-work/uk-bap-priority-habitats/.

Table 7.7: Total Number of Bat Passes for Each Species Across all Locations 2017

Species/Species Group	No of Registrations	Percentage of total (%)
Soprano pipistrelle	1,486	64.92
Common pipistrelle	511	22.32
Daubenton's	59	2.58
Brown long-eared	96	4.19
Nyctalus spp.	1	0.04
Nathusius' pipistrelle	1	0.04
Noctule	90	3.93
Leisler's	45	1.97
Total	**2,289**	**100**

Quantifying Activity

7.3.50 As per **paragraph 7.2.33**, at the time of preparing **Technical Appendix 7.3** the online tool Ecobat[62] was unavailable.

7.3.51 To generate a bat activity index value and allow a comparison between locations, species and seasons, the number of bat passes per hour (bpph) was calculated. This method refers to the number of bat passes as opposed to the number of individual bats recorded, as it is not possible to definitively identify individual bats and the total number of individual bats present. The bpph is used to provide a quantitative measure of bat activity across the Site.

7.3.52 Data on the activity levels for all species recorded across the Site and through the three deployments visits is provided in **Technical Appendix 7.3**. However, the activity of high collision risk species (as per **paragraph 7.3.56** below) is summarised in **Table 7.8**; see also **Figures 7.7 – 7.9**.

Table 7.8: bpph for High Collision Risk Species Across all Locations and Visits

Species/Location	Visit 1[63] bpph	Visit 2[64] bpph	Visit 3[65] bpph
Common pipistrelle			
Location 1	0.038	0.093	0.006
Location 2	0.314	0.815	0.119
Location 3	0.381	0.380	0.289
Location 4	0.029	0.046	0.050
Location 5	0.019	0.046	0.019
Location 6	0.057	0.120	0.019
Location 7	0.057	0.139	0.000
Location 8	0.019	1.333	0.096

[62] Mammal Society (2017).
[63] Survey dates: 19/07/2017 – 31/07/2017.
[64] Survey dates: 21/08/2017 – 31/08/2017.
[65] Survey dates: 22/09/2017 – 04/10/2017.

Species/Location	Visit 1[63] bpph	Visit 2[64] bpph	Visit 3[65] bpph
Soprano pipistrelle			
Location 1	0.019	0.111	0.013
Location 2	0.543	2.398	0.277
Location 3	1.505	5.639	0.377
Location 4	0.048	0.176	0.025
Location 5	0.019	0.139	0.013
Location 6	0.181	0.231	0.006
Location 7	0.229	0.444	0.006
Location 8	0.095	0.944	0.041
Nyctalus spp.[66]			
Location 1	0.029	0.046	0.013
Location 2	0.029	0.120	0.006
Location 3	0.086	0.148	0.000
Location 4	0.019	0.037	0.000
Location 5	0.000	0.120	0.006
Location 6	0.124	0.056	0.006
Location 7	0.000	0.176	0.000
Location 8	0.019	0.213	0.000

7.3.53 During all three survey deployments the maximum bpph for all species was at Location 3, situated along a woodland plantation edge and within a short distance of Loch More (**Figure 7.6**). Bats are known to use woodland edges as commuting corridors, and the waterbody provides suitable foraging opportunities. Location 3 is over 610 m from the nearest proposed turbine (T2).

7.3.54 In each survey deployment soprano pipistrelle recorded the highest relative bpph, at Location 3 each time (**Table 7.8**).

Categorising Site Risk Level

7.3.55 The Site risk level is determined by project size and habitat risk. In line with NatureScot guidance[12], the small project size combined with a low habitat risk level results in an overall Site risk assessment of '**Low/Lowest (1)**'. (see **Technical Appendix 7.3** for details).

Categorising Collision Risk, Population Abundance & Potential Vulnerability

7.3.56 The overall risk assessment of bat activity is undertaken for high collision risk species only, which were identified at the Proposed Development. As per NatureScot *et al*. (2021) guidance[12], soprano pipistrelle, common pipistrelle, Nathusius' pipistrelle[67] and *Nyctalus* spp. are species deemed to have a high collision risk.

[66] The data for Noctule, Leisler's and *Nyctalus* spp. (genus) have been combined.
[67] A single Nathusius' pipistrelle pass was recorded during surveys (**Table 7.7**) and therefore the risk to this species is considered negligible, and it is not discussed further.

7.3.57 As per NatureScot *et al*. (2021) guidance[12], common and soprano pipistrelle are also considered of common abundance and of medium population vulnerability. *Nyctalus* spp. are considered of rarest abundance and of high population vulnerability.

7.3.58 The remaining species recorded (i.e., Daubenton's and brown long-eared bat) are all considered to have a low collision risk and low population vulnerability. These low-risk species have a low risk of collision with a turbine blade, so the impact of the Proposed Development on the local bat population would likely be negligible (particularly when considering the low bpph for these species – see **Technical Appendix 7.3**).

Assessing Potential Risk

7.3.59 The methodology for assessing potential risk is detailed in **Technical Appendix 7.3.** As per **Table 7.7**, bpph numbers are generally low/very low for the high collision risk species, with only one species at one location, in one Visit recorded as having more than 2.5 bpph; i.e., soprano pipistrelle at Location 3 on Visit 2. **Figures 7.7 - 7.9** also illustrate the results of the bpph seasonal bat activity for high collision risk bat species recorded at the Proposed Development at each survey location, illustrating how bat activity varies within the Site across the year and by species. Based on the data collected, only Location 3 on Visit 2 was considered of potentially Moderate risk for soprano pipistrelle, with Location 3 being distant to proposed infrastructure, as per **paragraph 7.3.53**. All other Locations across the season were determined as Low risk or had no bat activity.

7.3.60 Overall, as can be seen from **Table 7.7** and **Figures 7.7 – 7.9**, the bpph and general Site risk for all high collision risk species is deemed to be Low, and therefore the overall collision risk to all bat species at the Proposed Development is also considered to be Low.

Otter

7.3.61 No signs of otter were recorded within the Site during the 2021 or 2023 surveys. Although the coastline adjacent to the Site is likely to support otter, the watercourses within the Site offer very limited suitability for otter, with watercourses subject to drying and having very little riparian shelter and limited foraging potential.

Pine Marten

7.3.62 No signs of pine marten were recorded within the Site during the 2021 or 2023 surveys. Although some woodland in the form of shelterbelts is present within the Site, the areas of habitat which might support pine marten are small and fragmented, and therefore offer low suitability.

Red Squirrel

7.3.63 No signs of red squirrel were recorded within the Site during the 2021 or 2023 surveys. Although some woodland in the form of shelterbelts is present within the Site, the areas of habitat which might support red squirrel are small and fragmented, and therefore offer low suitability.

Water Vole

7.3.64 No signs of water vole were recorded within the Site during the 2021 or 2023 surveys, and general habitat suitability was considered to be low.

Reptiles

7.3.65 A common lizard sighting was recorded during the 2021 surveys, no reptiles were recorded in 2023. Several features with the potential for use as hibernacula by reptiles were identified throughout the Site, including rock piles and dry-stone walls. The heath and bog habitats found throughout the Site offer suitable habitat for reptile species.

Other Species & INNS

7.3.66 Brown hare (*Lepus europaeus*) sightings were noted during the 2021 and 2023 surveys.

7.3.67 A number of mammal holes which could not be reliably attributed to any protected species were recorded throughout the Site. Some had been recorded in 2021 as in use by badgers, but were reclassified in 2023, as no signs of current use were noted. These holes may be in use by a variety of species, including red fox (*Vulpes vulpes*) and rabbit (*Oryctolagus cuniculus*).

7.3.68 No further signs or notable species, deer or INNS were recorded during the field surveys.

Important Ecological Features (IEFs)

7.3.1 A summary of the Nature Conservation Value of the IEFs identified within the Site (as confirmed through survey results and consultation outlined above) which have been taken forward to detailed assessment are detailed in **Table 7.9** below, together with the justification for inclusion. These comprise blanket bog and wet modified bog (combined receptor).

Table 7.9: Nature Conservation Value of Scoped In IEFs

IEF	Nature Conservation Value	Relevant Legislation/Guidance & Justification
Blanket bog & wet modified bog	Local	The Proposed Development would result in direct and potential indirect habitat loss for blanket bog and wet modified bog habitats. Blanket bog covers 35.72 ha (10.4%) of the Site, whilst wet modified bog covers a further 3.87 ha (1.1%) (**Chart 7.1** and **Annex A, Table 7.11**). The blanket bog communities present include M17 and M19, whereas wet modified bog is represented by M20 and M25a^[68] which are of lower relative quality. These habitats are associated with SBL blanket bog habitat with some areas also corresponding to Annex I type 7130 blanket bog habitat and priority peatland habitat. The Site also contain some areas of Class 1 peatland from the SNH Carbon and Peatland Map, although Site design has for the most part avoided these (see **Figure 7.2**). It is recognised that this definition is not solely for nature conservation and so not directly applicable to evaluating the value of a peatland. Despite the habitats' association with Annex I blanket bog, SBL blanket bog, and priority peatland classifications, the habitat within the Site is not considered to be nationally or regionally important due to its size, fragmented distribution, and quality and condition (e.g., the presence of extensive rhododendron invasion). Therefore, assigning a Nature Conservation Value higher than local is not deemed appropriate. Further, mire habitat of this quality (and greater) is relatively widespread across the local area as well as within Dumfries and Galloway, which further reduces the relative value of this habitat within the Site.

7.4 Implications of Climate Change for Existing Conditions

7.4.1 The summary of the relevant climate change projections for Dumfries and Galloway using the UK Climate Change Projections 2018[69] are:

- Temperatures are projected to increase, particularly in summer;
- Winter rainfall is projected to increase and summer rainfall is most likely to decrease;
- Heavy rain days (rainfall greater than 25 mm) are projected to increase, particularly in winter;
- Near surface wind speeds are expected to increase in the second half of the 21st century with winter months experiencing more significant effects of winds; however, the increase in wind speeds is projected to be modest; and,
- An increase in frequency of winter storms over the UK.

[68] M25a^, i.e., with a caret, indicates where the community has been assigned as wet modified bog rather than M25a, which has been assigned as marsh/marshy grassland – see **Technical Appendix 7.1** for full details.
[69] https://www.metoffice.gov.uk/research/approach/collaboration/ukcp

7.4.2 As a result of these projections, fluctuations of habitat condition and species' behaviour and distribution may occur at a local level, over time. However, the overall baseline conditions in the local area are likely to remain relatively consistent over time, and so the data allows for a robust assessment of the effects of the Proposed Development, during its lifespan, on ecology.

7.5 Future Baseline in the Absence of the Proposed Development

7.5.1 In the absence of the Proposed Development, it is likely that the IEFs would generally remain as they are at present, although numbers and distribution of species may fluctuate naturally. Vegetation and habitat composition, structure and extents within the Site may fluctuate marginally in the long-term in line with increasing or decreasing grazing or changes in agricultural practices or management.

7.6 Embedded Design Mitigation

7.6.1 As part of the iterative design process for the Proposed Development, ecological constraints identified through baseline survey results were considered to avoid or reduce negative effects on ecological features where possible (see **Chapter 3: Site Selection and Design Strategy**). This includes:

- A minimum 70 m buffer for any infrastructure or construction activity from Salt Pans Bay SSSI;
- A minimum 50 m buffer for any infrastructure or construction activity around all watercourses, except where four new watercourse crossings are required – see **Technical Appendix 9.1: Watercourse Crossings.** This will minimise effects on associated habitats and species;
- Designing track length and alignment to reduce the extent of new track land take and number of watercourse crossings required, where feasible considering topography and other environmental Site constraints;
- Avoiding deeper peatland (>1 m), blanket bog and wet modified bog, and potential high GWDTEs for the location of wind turbines and other infrastructure as far as practicable;
- A minimum 30 m buffer for any infrastructure or construction activity (100 m for pile driving and blasting works) around the entrance to any badger sett; and,
- Establishing a 50 m buffer from turbine blade tips to edge habitats, across the Site to safeguard bats, in line with relevant guidance[12].

7.7 Good Practice Measures

7.7.1 The assessment in this chapter has been carried out on the basis that all works would be carried out in line with good industry practice construction measures, guidance and legislation.

Pre-Construction and Construction

7.7.2 To ensure all reasonable precautions are taken to avoid negative effects on habitats, protected species and aquatic interests, a suitably qualified Ecological Clerk of Works (ECoW) will be appointed prior to the commencement of construction to advise the Applicant and the Contractor on all ecological matters. The ECoW will be required to be present onsite during the construction phase and will carry out monitoring of works, and briefings with regards to any ecological sensitivities on the Site to the relevant staff of the Contractor and sub-contractors.

7.7.3 An SPP (outline SPP provided in **Technical Appendix 7.4**) will be implemented during the construction phase. The SPP details measures to safeguard protected species known or likely to be in the area. The SPP includes pre-construction surveys and good practice measures during construction. Pre-construction surveys will be undertaken to check for any new protected species or features in the vicinity of the construction works. The results of the pre-construction surveys will be used to update the outline SPP ahead of construction starting. The SPP will remain a live document to be updated as required and in agreement with the ECoW where changes to the distribution and status of protected species and features are recorded.

7.7.4 There will be a contractual management requirement for the successful Contractor to develop and implement a comprehensive, Site-specific and robust CEMP in consultation with SEPA and the planning authority. This document will detail how the successful Contractor will manage the works in accordance with all commitments and mitigation detailed in the EIA Report, the SPP, statutory consents and authorisations, and good industry practice and guidance

for environmental management, including implementation of appropriate pollution prevention (particularly in relation to watercourses).

Operation

7.7.5 In line with best practice guidance on bats (NatureScot *et al*., 2021)[12] the Proposed Development will utilise the method of reduced rotation speed whilst idling by feathering, at all wind turbines, to reduce collision risks to bats during the bat active period (April to October). The guidance notes that, "*The reduction in speed resulting from feathering compared with normal idling may reduce fatality rates by up to 50 %*". Given the known presence of high collision risk bat species onsite, this measure will be put in place from the start of the operational phase of the Proposed Development, and it does not result in any loss of output.

7.7.6 Operational phase environmental management plans following relevant best practice and guidance will be in place during operation of the Proposed Development, these will for example include provisions for, but not limited to, ongoing pollution prevention control measures.

7.8 Micrositing

7.8.1 Any micrositing of infrastructure will be based on a review of existing ecological data, the completion of required pre-construction surveys and consultation with the ECoW, to take into consideration the potential for direct encroachment onto protected species features, sensitive habitats or GWDTEs, or indirect alteration of hydrological flows supporting sensitive habitats or GWDTEs. Any micrositing will also take into consideration any buffer distances on protected features identified, as detailed within the SPP (**Technical Appendix 7.4**). Micrositing infrastructure within the sought micrositing tolerance (100 m) is unlikely to change the significance of effects identified in the ecology assessment.

7.9 Scope of the Assessment

Effects Assessed in Full

7.9.1 Following a review of the desk-based assessment, field surveys and professional judgement, effects, both temporary and permanent, upon the following features are assessed in detail:

- Terrestrial habitats – effects include direct (i.e., derived from land-take) and indirect on blanket bog and wet modified bog.

Effects Scoped Out

7.9.2 On the basis of the professional judgement of the EIA team, experience from other relevant projects and policy guidance**Error! Bookmark not defined.** or standards, generally common and widely distributed habitats or species which do not fall within the following categories were scoped out of the detailed assessment:

- Habitats listed in Annex I to the Habitats Directive, and species listed in Annex II to the Habitats Directive (i.e. European Union Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora);
- UK Biodiversity Action Plan (UKBAP)[70] or Scottish Biodiversity List (SBL) Priority Habitats[71]; and
- Habitats or species protected by other legislation such as the Wildlife and Countryside Act 1981 (as amended) the Nature Conservation (Scotland) Act 2004 (as amended), or The Protection of Badgers Act 1992.

7.9.3 Beaver (*Castor fiber*), wildcat (*Felix sylvestris*) and great crested newt (GCN) (*Triturus cristatus*) are scoped out of the assessment due to the absence of suitable habitat (GCN) or the survey area being located outwith the known range or distribution (beaver and wildcat).

7.9.4 Decommissioning effects are scoped out of detailed assessment as the future baseline conditions of the Site and surrounding area, on which to base the assessment, is not yet known, and the proposals for decommissioning/repowering is not yet determined/known. In general, decommissioning effects are usually

[70] https://hub.jncc.gov.uk/assets/cb0ef1c9-2325-4d17-9f87-a5c84fe400bd
[71] https://www.nature.scot/doc/scottish-biodiversity-list

considered for the purposes of ecology assessment to be similar to (or likely less than) those of construction effects in nature and are likely to be of shorter duration. Decommissioning of the Proposed Development would involve the removal of infrastructure and restoration of the associated ground. Restoration would seek to return areas to their pre-construction habitat type, or as similar as feasible depending on local substrates, topography, hydrology etc. As a result, decommissioning will not lead to any further direct or indirect habitat losses above those already occurred during construction, rather, it is predicted that due to restoration of habitats in these areas, there would be a net positive effect. Therefore, on this basis, decommissioning effects are not assessed. Furthermore, prior to decommissioning a Decommissioning Environmental Management Plan (DEMP) will be required as a standard planning condition and will set out environmental protection measures and restoration principles which will be implemented. This DEMP will be agreed with relevant consultees.

7.9.5 Further ecological features and potential effects have been scoped out of the detailed assessment based on the results of the desk based study and survey work undertaken for the Proposed Development and the professional judgement of the EIA team and experience from other relevant projects and policy guidance or standards and following the iterative design, embedded mitigation measures, and project assumptions detailed above, due to a lack of potential significant effect at a relevant species population or habitat extent scale. This includes effects from the construction and operational phases of the Proposed Development, as well as cumulative effects. Details of ecological features and effects scoped out after further data searches and post-survey are provided below.

Designated Sites and Ancient Woodland

7.9.6 Salt Pans Bay SSSI is located within the Site, with the nearest proposed infrastructure being 70 m from the access track to T1. Given the distance to the SSSI, the nature of construction works on the access track, and with good practice measures and embedded mitigation (as descried above) it is not expected there would be any adverse effects on the non-hydrologically dependent qualifying feature of this SSSI, i.e., maritime cliff and its associated coastal dry heath, and it is therefore scoped out of the assessment.

7.9.7 There are no areas of ancient woodland within the Site, with the closest stand being 787 m east of the Site, and as such it has been scoped out of further assessment due to no predicted direct or indirect effects.

Terrestrial Habitats (excluding blanket bog and wet modified bog)

7.9.8 As per **paragraph 7.9.2** above, habitats considered to be of low conservation value and are very common habitat types locally and regionally are scoped out of the assessment. Within the study area, these include coniferous plantation woodland, dense/continuous scrub, unimproved and semi-improved acid grassland, semi-improved neutral grassland, improved grassland, bracken, introduced shrub, arable and bare ground.

7.9.9 Marshy grassland is scoped out of the assessment. Marshy grassland is the third most dominant habitat across the study area (**Chart 7.1**) and covers 50.58 ha (14.65%) of the study area. It comprises MG10, M23, M25 and M27 NVC communities and a soft rush (*Juncus effusus*) dominated non-NVC rush pasture community (i.e., 'Je'). With the exception of M27, these communities are overwhelmingly dominated by either rushes (*Juncus* spp.) or purple moor-grass (*Molinia caerulea*) and are often species-poor and grazed, often consisting of little more than a dense sward of rushes or purple moor-grass with some grasses and common herbs; full descriptions of these communities are provided in **Technical Appendix 7.1** and their respective extents are detailed in **Annex A, Table 7.11**. The range of marshy grassland communities present within the study area are common habitat types locally, regionally and nationally and the relatively small direct and indirect losses predicted, as per **Annex A, Table 7.11**, are of minor significance. These marshy grassland communities are considered potential GWDTEs in line with SEPA guidance[19,20]. However, designation as a GWDTE does not infer an intrinsic biodiversity value, and GWDTE status has not been used as criteria to determine conservation value in the ecology assessment. There is however a statutory requirement to consider GWDTEs and the data gathered during the NVC surveys has been used to inform this assessment (see **Chapter 9**).

7.9.10 A number of other habitats recorded within the study area are of local importance, some due to their listing as Annex I habitats or SBL Priority Habitats (see **Technical Appendix 7.1**). However, as they occupy such small areas within the study area, they are species-poor examples, and/or any direct or indirect effects on the habitat will not occur or will be negligible in magnitude (particularly due to embedded mitigation assumptions described above) all effects on them are scoped out of the assessment. These habitats are broadleaved semi-natural woodland, dry dwarf shrub heath, wet dwarf shrub heath, acid/neutral flush, maritime cliff, coastal heathland, coastal grassland, and standing and running water (see also **Annex A, Table 7.11**).

Aquatic Habitats and Species

7.9.11 Effects on aquatic habitats including standing water, running water and fisheries interests are scoped-out of the assessment. Watercourses onsite are generally considered largely unsuitable for resident fish and inaccessible to migratory fish (see paragraphs **7.3.8, 7.3.17** - **7.3.18**).

7.9.12 The Proposed Development has the potential to impact negatively on water quality and hydrogeomorphology in the absence of mitigation. However, to avoid direct or indirect impacts on these features a minimum 50 m buffer distance between infrastructure and watercourses has been maintained where possible, except where a watercourse crossing cannot be avoided. The design of permanent and temporary access track water crossings would comply with SEPA good practice guidance to minimise impacts on fish and their habitat. The embedded mitigation includes that construction work would comply with a CEMP, which would be monitored by a suitably experienced ECoW. The CEMP would include good practice mitigation for effective silt and pollution prevention and undertaking works in accordance with SEPA best practice guidance. With this embedded mitigation in place, water pollution impacts and associated likely significant effects associated with the Proposed Development on watercourses and aquatic ecology are considered unlikely and therefore these pollution impacts are scoped out of further assessment. Further assessments of watercourses are provided in **Chapter 9**.

Protected Species

7.9.13 Effects on otter, water vole, pine marten, red squirrel and reptiles are scoped out of the assessment due to the absence of protected features, lack of suitable habitat, limited desk-based assessment or field evidence within the Site (see Existing Conditions section above), and/or lack of potential effects from the Proposed Development.

7.9.14 Effects on badger are scoped out. Limited field signs of badger were found during 2021 and 2023 surveys, with the setts recorded in 2021 noted as disused in 2023. One active single-holed outlier sett was recorded in 2023, located 116 m away from the nearest proposed new infrastructure for the Proposed Development and along an existing farm track subject to baseline levels of disturbance from farming activities (**Figure 7.5C**). Given the limited amount of activity and lack of protected features, the only one of which is outwith standard protection buffer distances recommended in relevant NatureScot guidance[72] then any potential effects on badger are likely Negligible/Minor. The SPP (**Technical Appendix 7.4**) will outline best practice measures for minimising disturbance, including carrying out pre-construction surveys and monitoring, complying with protected species legislation, and outlining provisions for species licencing where this may be required. Consequently, all effects on badger are scoped out.

7.9.15 Effects on brown hare are scoped out of the assessment. These are mobile species capable of avoiding disturbance except when the juveniles (leverets) are very young. Best practice guidance during construction, as detailed in the SPP (**Technical Appendix 7.4**) will ensure that all reasonably practicable measures are taken during the hares' breeding season to comply with wildlife legislation, and no significant effects are anticipated on the species.

7.9.16 Effects on bats (roosting) are scoped out of the assessment. No features with moderate or high potential to support roosting bats were identified within the Site, and no key features capable of supporting maternity roosts, significant hibernation roosts and/or swarming sites within the Site, or within 200 m plus rotor radius, have been detected. Disturbance to and displacement of roosting bats, and damage to roosts, or removal of roosts are therefore scoped out of the assessment.

7.9.17 Effects on bats (foraging/commuting) are scoped out of the assessment. Construction would mainly take place during daylight hours during the season when bats are active (April to October, inclusive), therefore any disturbance to foraging and commuting bats of any species is unlikely to occur or would likely be negligible in magnitude and is therefore scoped-out.

7.9.18 Overall, the SPP (draft in **Technical Appendix 7.4**) includes suitable mitigation measures to ensure compliance with protected species legislation during construction, should any evidence be found during pre-construction surveys.

7.9.19 Operational and cumulative effects arising from potential collision mortality for low collision risk bat species are scoped out of the assessment (as per NatureScot *et al*., 2021)[12]. These effects on brown long-eared and Daubenton's bat are therefore scoped out of the assessment.

[72] NatureScot Standing advice for planning consultations – Badgers. Available at https://www.nature.scot/doc/standing-advice-planning-consultations-badgers#:~:text=Design%20the%20development%20and%20construction,key%20sources%20of%20water%20for

7.9.20 Operational and cumulative effects arising from potential collision mortality for high collision risk bat species are also scoped out of the assessment. These species comprise pipistrelle species and *Nyctalus* spp. In line with NatureScot guidance[12], the small project size combined with a low habitat risk level and the absence of roost potential results in an overall Site risk assessment of 'Low/Lowest'. Following subsequent analysis of the temporal data bpph values were generally low (**Table 7.8**) and no high risk locations were identified for any of these species (**Figures 7.7 – 7.9**). A single, Moderate risk location was identified for soprano pipistrelle at Location 3 on Visit 2 (**Figure 7.8**); however, this is located over 610 m from the nearest proposed turbine (T2). All other locations, for all high risk species, across all seasons had low risk, or no activity (see **Technical Appendix 7.3** and the Existing Conditions section above for full details and analysis). Given the low levels of bat activity and the above discussion, and consideration of the baseline survey results and prevailing habitats, as well as the good practice measures detailed in **paragraph 7.7.5**, it is considered any collision risks for bats would be Minor/Negligible and they are scoped out of the detailed assessment.

7.9.21 Effects on all other IEFs during operation of the Proposed Development have been scoped out. Maintenance of the Proposed Development will involve vehicular access along the access tracks only, and any maintenance of turbines will be occasional, typically carried out by a small number of maintenance staff inside the turbines during normal working hours. This is unlikely to result in any operational effects on any species or habitats recorded at and around the Proposed Development.

Other Species

Deer

7.9.22 Effects on deer are scoped out of the assessment. The desk study indicates deer are likely present in the vicinity of the Site. There are only a small number of small, isolated and fragmented woodland blocks within the Site (**Figure 7.3**) which would only potentially support very low numbers of deer. Construction effects are expected to be minimal due to the timing of works (i.e., primarily during the day, with deer more active during evening/nights), and a short-term construction phase. If individuals are displaced during construction, there is abundant similar and more suitable habitat locally. Operational effects are not anticipated as there is no deer fencing around the Site and therefore deer may use and pass through uninhibited. The Proposed Development footprint is small, and habitat loss has been minimised. Due to the extensive amount of similar and better suitable habitat in the surrounding land, particularly east of the Site where there is more extensive woodland, and its availability and accessibility, this loss of grazing and sheltering habitat is expected to be negligible to the wide-ranging species. The size and location of the Proposed Development is not considered to pose a barrier to any local movements or migrations of deer.

7.9.23 Overall, as a result of the size and location of the Proposed Development, temporary construction period, the retention of woodland, minimal habitat loss, and the extensive suitable and better habitat and commuting corridors locally within the Site and beyond, no negative effects on deer are predicted. Due to minimal displacement expected outwith the Site during construction and operation, no negative effects, through increased browsing/trampling on surrounding habitats are expected.

Cumulative Effects

7.9.24 The purpose of the assessment of cumulative effects is to identify situations where effects on habitats or species populations that may be non-significant from individual developments, are judged to be significant when combined with nearby existing or proposed projects. In the interests of focusing on the potential for similar significant effects, this assessment considers the potential for cumulative effects with other wind farm developments that are consented or at application submitted stage (operational and under-construction developments are considered part of the baseline). Wind farm projects at scoping stage have been scoped out of the cumulative assessment because they generally do not have sufficient information on potential effects to be included, as the baseline survey period is ongoing, or results have not been published. Projects that have been refused or withdrawn are also scoped out.

7.9.25 Small projects with three or fewer turbines have also been excluded from the cumulative assessment as often these projects are not subject to the same level of detail of assessment, and so there are no directly comparable data. Because of the small scale of such projects, effects are likely to be negligible on the IEFs assessed. Additionally, it should be noted that the three operational turbines at Meikle Galdenoch will be removed if the Proposed Development is consented.

7.9.26 No wind farm developments fulfilling the above criteria fall within 15 km of the Proposed Development, and as such cumulative effects on all IEFs are scoped-out of the assessment and not considered further.

7.10 Assessment of Effects

7.10.1 The assessment of effects identified above is based on the project description as outlined in **Chapter 4: Development Description**. Unless otherwise stated, potential effects identified are considered to be negative.

Construction Effects

7.10.2 This section provides an assessment of the likely effects of the construction of the Proposed Development upon the scoped-in IEFs, namely blanket bog and wet modified bog.

Predicted Construction Effects

7.10.3 The most tangible effect during construction of the Proposed Development would be direct habitat loss due to the construction of infrastructure such as new access tracks, turbines, hardstandings, laydown areas, compounds, borrow pits and substation. Much of this infrastructure would be permanent, however the temporary construction compound, temporary crane pad sections and borrow pits would be restored at the end of construction.

7.10.4 There may also be some indirect habitat losses to wetland habitats due to potential drainage effects. For the purposes of this assessment, it is assumed that habitat losses to wetland habitats due to indirect drainage effects may extend out to 10 m from infrastructure (i.e., in keeping with precautionary indirect drainage assumptions within the carbon calculator guidance[73]). It is expected that any indirect drainage effects would only impact wetland habitat such as blanket bog, wet modified bog, wet heath, flushes etc. No indirect drainage effects are expected to impact or alter the quality or composition of non-wetland habitats, such as dry heath, bracken, acid grassland etc., as such only direct habitat loss applies to these habitats.

7.10.5 Temporary habitat losses due to the creation of temporary infrastructure, one borrow pit, and earthworks cut and fill areas have been calculated separately. These have been considered separately to permanent infrastructure as although these areas would be restored at the end of the construction phase and therefore would not show a loss in habitat extent, the habitat type resulting after restoration may not be the same as the original due to changes in topographical or hydrological conditions. In particular, areas of land take for this temporary infrastructure may represent permanent losses for habitat types such as blanket bog/wet modified bog due to the effects on the structure and function of the habitat type, and the complexities and longer timescales involved in restoring these particular habitat types.

7.10.6 **Table 7.10** details the estimated relative losses expected to occur for blanket bog and wet modified bog, for all new permanent and temporary infrastructure.

Table 7.10: Estimated Loss of IEF Habitats in study area for Permanent and Temporary Infrastructure

Phase 1 Habitat Type	Extent in Site (ha)	NVC Community[74]	Direct Habitat Loss (ha)	Direct Habitat Loss as a % of Phase 1 Type	Indirect Habitat Loss (ha)	Indirect Habitat Loss as a % of Phase 1 Type
Permanent						
Blanket Bog[75]	35.72	M17, M19	0.09	0.24	0.28	0.78
Wet Modified Bog[75]	3.87	M25a^	0.05	1.35	0.15	3.77

[73] SEPA (undated). Windfarm Carbon Calculator Web Tool User Guidance. Available at https://informatics.sepa.org.uk/CarbonCalculator/assets/Carbon_calculator_User_Guidance.pdf
[74] Only specific IEF habitats, communities or features subject to habitat losses are presented within this table. Any IEF communities not listed here are not subject to any predicted direct or indirect habitat losses. Full details of habitat losses for all habitat types are presented in **Annex A, Table 7.11**.
[75] Blanket bog and wet modified bog are a combined IEF receptor, however they have been separated in **Table 7.10** for displaying respective estimated losses of each habitat type.

Phase 1 Habitat Type	Extent in Site (ha)	NVC Community[74]	Direct Habitat Loss (ha)	Direct Habitat Loss as a % of Phase 1 Type	Indirect Habitat Loss (ha)	Indirect Habitat Loss as a % of Phase 1 Type
Temporary						
Blanket Bog[75]	35.72	M17, M19	0.04	0.11	N/A	N/A
Wet Modified Bog[75]	3.87	M25a^	0.03	0.68	N/A	N/A

Blanket Bog & Wet Modified Bog

7.10.7 **Effect**: Impacts upon blanket bog and wet modified habitats will be direct (through permanent and temporary habitat loss) and indirect (through potential drying effects upon neighbouring bog habitats) occurring from the construction phase into the operational phase. Direct loss would occur in areas where permanent infrastructure such as tracks, wind turbine foundations, and hardstandings are sited on these habitat types. The excavation of these habitat types for temporary infrastructure would also likely lead to the losses of blanket bog and wet modified bog due to the long-term effect on the ecological and hydrological structure and function of these habitat types. In addition, there may be indirect losses as a result of drainage around infrastructure (precautionarily around 10 m from infrastructure is assumed[73]) and disruption to hydrological flows.

7.10.8 **Nature Conservation Value**: Local (as detailed in **Table 7.9**).

7.10.9 **Conservation Status**: Conservation Status of this habitat as assessed in the 2019 JNCC report by the UK on blanket bog is 'Unfavourable Bad' and 'Stable' at the UK level[76].

7.10.10 **Magnitude of Effect**: The UK has an estimated 2,182,200 ha of blanket bog[76] of which around 1,759,000 to 1,800,000 ha is in Scotland[77] (approximately 23 % of the land area[78]).

7.10.11 Blanket bog covers 35.72 ha (10.4%) of the Site, with M17 and M19 NVC communities comprising the blanket bog vegetation (see **Annex A, Table 7.11**). As per **Table 7.10**, the direct habitat loss for blanket bog is predicted to be 0.09 ha due to permanent infrastructure with up to an additional 0.04 ha due to temporary works areas (in this case areas of cut and fill associated with an access track). This results in a potential total direct loss of 0.13 ha, equivalent to 0.36 % of the blanket bog within the Site.

7.10.12 Wet modified bog covers 3.87 ha (1.1%) of the Site and is comprised of lower quality M20 and M25a^. As per **Table 7.10**, the direct habitat loss for wet modified bog is predicted to be 0.05 ha due to permanent infrastructure with up to an additional 0.03 ha due to the temporary works areas (again due to cut and fill associated with an access track). This results in a potential total direct loss of 0.08 ha, equivalent to 2.1% of the wet modified bog within the Site.

7.10.13 For this blanket mire resource as a whole, i.e., combining blanket bog and wet modified bog, direct losses amount to 0.14 ha for permanent infrastructure and 0.07 ha for temporary works areas giving a total of 0.21 ha, or 0.53%, of the combined resource within the Site. The area of blanket bog and wet modified bog subject to habitat loss has been restricted to a section of new access track located between the Site entrance and the construction compound (see **Figure 7.3**). The alignment of the track here has followed a more elevated ridge on shallower peat and peaty-soils and avoided larger areas of deep peat immediately to the north and the south. The track here also passes through a mixed mosaic of blanket bog, wet modified bog, dry heath and bracken along this small ridge, rather than passing through larger and homogenous areas of M17 or M19 blanket bog to the north and south (**Figure 7.3**).

7.10.14 In addition, there may be some indirect losses because of the zone of drainage around infrastructure. The actual distance of the effects of drainage on a peatland is highly variable and depends on various factors such as the type

[76] JNCC (2019). Article 17 Habitats Directive Report 2019: Species Conservation Status Assessments 2019. H7130 - Blanket bogs, United Kingdom. https://jncc.gov.uk/jncc-assets/Art17/H7130-UK-Habitats-Directive-Art17-2019.pdf.
[77] JNCC (2019). Article 17 Habitats Directive Report 2019: Species Conservation Status Assessments 2019. H7130 - Blanket bogs, Scotland https://jncc.gov.uk/jncc-assets/Art17/H7130-SC-Habitats-Directive-Art17-2019.pdf.
[78] https://www.nature.scot/landscapes-habitats-and-ecosystems/habitat-types/mountains-heaths-and-bogs/blanket-bog

of peatland and its characteristics and properties of the peat; the type, size distribution and frequency of drainage feature; and whether the drainage affects the acrotelm, penetrates the catotelm, or both. Consequently, drainage effects can be restricted to just a few metres around the feature or extend out to tens of metres, or further (e.g., see review within Landry & Rochefort (2012)[79]). The hydraulic conductivity of the peatland is one of the key variables which affect the extent of drainage. In general, less decomposed more fibric peatlands (which tend to be found commonly in fen type habitats) generally have a higher hydraulic conductivity and drainage effects can extend to around 50 m, whilst in more decomposed (less fibrous) peat drainage effects may only extend to around 2 m. Blanket bog habitats commonly are associated with more highly decomposed peats (Nayak *et al*. 2008[80]). For this assessment, indirect effects are precautionarily assumed to extend out to 10 m from infrastructure (as per carbon calculator guidance[73]).

7.10.15 As per **Table 7.10**, if indirect drainage effects are fully realised out to 10 m around permanent infrastructure in all blanket bog and wet modified bog areas, then the total predicted potential habitat modification or losses increase by 0.28 ha for blanket bog and 0.15 ha for wet modified bog. This worst-case scenario of direct and indirect habitat loss for permanent and temporary works areas is an overall total of 0.41 ha or 1.15 % of the Sites blanket bog and 0.23 ha or 5.94% of the Sites wet modified bog. For this blanket mire resource as a whole, i.e., combining blanket bog and wet modified bog, direct and indirect losses for permanent and temporary works areas overall amount to 0.64 ha, or 1.62% of the combined resource within the Site.

7.10.16 However, it is considered highly unlikely that indirect drainage effects of this scale (i.e., out to 10 m either side of all permanent infrastructure) would occur or would have such an effect on the habitat as to result in any notable effect on the type of bog present or shifts to a lower conservation value habitat type (such as acid grassland for example). For instance, Stewart & Lance (1991)[81] in their study found that a lowering of the water table next to drains was slight and confined to just a few metres either side of the drain, on sloping ground the uphill zone of drawdown was even narrower. Subtle variations in plant species abundance were noted, with species dependent on high water-tables having a lower cover-abundance near to drains, and species with drier heathland affinities having higher cover than at places farther away. However, there were no wholescale changes in vegetation or the species assemblage; for instance, declines in Sphagna cover were highly localised and took nearly 20 years to achieve statistical significance. Anecdotal observations from wind farms around Scotland also suggest that bog habitats readily persist around infrastructure and within this 10 m zone of possible influence.

7.10.17 It should also be noted that the predicted indirect losses due to drainage are calculated in GIS and based on the habitat survey mapping, there may be small-scale local specific factors such as those relating to natural breaks in hydrology, geology or topography, or the presence of non-wetland habitats that act as a barrier or buffer, that would prevent the full predicted indirect drainage effects from materialising.

7.10.18 Overall, evidence suggests that if some drainage effects materialise locally around infrastructure due to the Proposed Development, then the most likely effect will not be a major change in overall bog habitat type but rather a potential change in vegetation micro-topography, certain species cover, or abundance that may result in a subtle NVC community or sub-community shift, and which may only be apparent in the long term. If severe indirect drying effects are observed long term, then wet modified bog/blanket bog may transition to wet heath (e.g., NVC type M15), dry modified bog, or dry heath. Wet and dry heaths are still habitats of conservation interest, being Annex I, UKBAP and SBL Priority Habitats also.

7.10.19 When considering the small scale of the above habitat losses (i.e., direct and precautionary indirect effects on up to 1.62 % of the combined blanket bog and wet modified bog within the Site and accounting for the relative abundance, distribution and quality of the blanket bog and wet modified bog within the Site and wider area, an effect magnitude of **low spatial** (c.f. **Table 7.3**) and **long-term temporal** is appropriate.

7.10.20 **Significance of Effect**: Given the above consideration of Nature Conservation Value, Conservation Status and Magnitude of Effect, the effect significance is considered to be **Minor adverse** and **Not Significant**.

[79] Landry, J. & Rochefort, L. (2012). The Drainage of Peatlands: Impacts and Rewetting Techniques. Peatland Ecology Research Group, Université Laval, Quebec.
[80] Nayak, R.A., Miller, D., Nolan, A., Smith, P., Smith, J. (2008). Calculating carbon savings from wind farms on Scottish peat lands - A New Approach.
[81] Stewart, A.J.A. & Lance, A.N. (1991). Effects of Moor Draining on the Hydrology and Vegetation of Northern Pennine Blanket Bog. Journal of Applied Ecology 28: 1105-1117.

Committed Additional Mitigation/Enhancement

7.10.21 General good practice and embedded design mitigation measures for habitats and species, such as complying with best practice, micrositing provisions, presence of an ECoW and adherence to a detailed CEMP and SPP are included in the relevant sections above.

7.10.22 No significant construction effects have been identified for blanket bog and wet modified bog habitats; therefore no additional or bespoke mitigation measures are required in the context of the EIA Regulations. However, a number of additional mitigation, compensation and enhancement measures, such as blanket bog restoration, are proposed as part of the Proposed Development's OBEMP, see the Predicted Operational Effects section below.

Residual Construction Effects

7.10.23 No significant residual effects are identified. Effects on blanket bog and wet modified bog have been assessed as being Minor adverse (Not Significant) (as per the assessment section above).

Operational Effects

7.10.24 This section provides an assessment of the likely effects of the operation of the Proposed Development upon the scoped-in IEFs, namely blanket bog and wet modified bog.

Predicted Operational Effects

Blanket Bog & Wet Modified Bog

7.10.25 **Effect**: All likely direct and indirect adverse effects on habitats have been considered in the Construction Effects section above. Although the majority of habitat loss is associated with infrastructure required for the operation of the Proposed Development (rather than temporary construction infrastructure), the physical loss of habitat would occur during the construction stage and is therefore considered above. Indirect effects on wetland habitats would largely occur during the operational phase as potential drying effects become established. However, for ease and clarity of assessing effects on habitats these are considered together in Construction Effects.

7.10.26 However, a number of additional mitigation, compensation and enhancement measures, such as blanket bog restoration and enhancement, are proposed for the operational phase as part of the Proposed Development's OBEMP, as detailed in **Technical Appendix 7.5** and outlined below.

7.10.27 Enhancement, restoration and creation of habitats through the delivery of a BEMP during the operational phase would reduce effects on habitats further. Overall, the BEMP would aim to achieve significant biodiversity enhancement at the Proposed Development, in line with objectives outlined in NPF4 Policy 3[82], the Onshore Wind Policy Statement[83], and the Scottish Biodiversity Strategy to 2045[84]. The BEMP would include provisions for the protection, maintenance, restoration and/or enhancement of moorland and bog habitats locally. Furthermore, the BEMP would deliver native broadleaved enhancement of existing degraded areas and provide a scheme of INNS removal from the Site to benefit moorland, woodland, and other habitats and biodiversity in general. The OBEMP is provided in **Technical Appendix 7.5**[85], also see **Figure 7.10**.

7.10.28 **Nature Conservation Value**: Local (as detailed in **Table 7.9**).

7.10.29 **Conservation Status**: Conservation Status of this habitat as assessed in the 2019 JNCC report by the UK on blanket bog is 'Unfavourable Bad' and 'Stable' at the UK level[76].

7.10.30 **Magnitude of Effect:** The OBEMP is based on several identified land parcels or areas[86] for each respective habitat management and biodiversity enhancement proposal. Specifically, with respect to blanket bog/wet modified bog (priority peatlands and deep peat habitats), the OBEMP includes 13.01 ha of bog/peatland restoration and enhancement measures, with the potential to also reclaim up to approximately a further 2.31 ha of peatland habitats

[82] Scottish Government (2023). National Planning Framework (NPF) 4.
[83] Scottish Government (2022). Onshore Wind Policy Statement 2022.
[84] Scottish Government (2022). Scottish Biodiversity Strategy to 2045. Tackling the Nature Emergency in Scotland.
[85] The detailed and final BEMP would be agreed with DGC and NatureScot in advance of construction and would ensure the Proposed Development secures significant biodiversity enhancements through restoring degraded habitats and strengthening nature networks.
[86] These areas may be refined following further specialist surveys and feedback from relevant consultees, and all areas may not be taken forward for the final BEMP, and other areas and/or proposals may also be considered (if deemed necessary); however, the Applicant remains committed to delivering significant biodiversity enhancement at the Proposed Development.

from INNS. The area of restoration and enhancement proposed exceeds the recommendations contained with relevant NatureScot guidance[14] (see **Technical Appendix 7.5** for full details).

7.10.31 Blanket bog and wet modified bog cover 39.59 ha of the Site. The restoration and enhancement of at least 13.01 ha of degraded blanket bog/wet modified bog into better condition represents an improvement to 32.8% of the baseline extent of blanket bog and wet modified bog within the Site. When considering the scale of the proposals in relation to the Site, an effect magnitude of **high spatial** (c.f. **Table 7.3**) and **long-term temporal** is appropriate.

7.10.32 **Significance of Effect:** Given the above consideration of Nature Conservation Value, Conservation Status and Magnitude of Effect, the effect significance is considered to be **Moderate beneficial** and **Significant**.

Committed Additional Mitigation/Enhancement

7.10.33 Beneficial operational effects have been identified via the OBEMP, as detailed above.

Residual Operational Effects

7.10.34 Effects on blanket bog and wet modified bog have been assessed as being Moderate beneficial (Significant) (as per the assessment section above).

7.11 Interrelationship Between Effects

7.11.1 The potential effects of the Proposed Development are considered above in terms of effects on ecology as a discrete environmental topic. Indirect and secondary effects resulting from the interaction of direct effects arising both within a topic area and interrelated with other topics areas are also possible.

7.11.2 The potential interrelationship between direct habitat loss and effects on protected species has been accounted for. Negligible/Minor indirect effects to protected species may occur due to effects of habitat loss for prey items, but this is taken into account under the habitat loss assessment above.

7.11.3 Of the other topics with potential to affect ecological receptors, those effects identified in **Chapter 8** and **Chapter 9** are most likely to produce a measurable effect. Interrelated effects could potentially occur due to loss or reduction in quality of habitats via hydrological changes. These are already taken account of via the assessment of GWDTEs in **Chapter 9**. Changes to the ornithological assemblage as a result of the Proposed Development may also affect protected species, either as prey items or as competitors, but the level of change is likely to be negligible.

7.11.4 In summary, no significant interrelated effects in relation to ecology are predicted due to the Proposed Development.

7.12 Further Survey Requirements and Monitoring

7.12.1 Further protected species surveys will be undertaken, in advance of construction, in accordance with the SPP (see **Technical Appendix 7.4**).

7.12.2 Operational phase monitoring for habitats and INNS will be undertaken as part of the final BEMP, see outline proposals within **Technical Appendix 7.5**.

7.13 Summary of Likely Significant Effects

7.13.1 No significant adverse effects are likely in relation to direct and indirect impacts on blanket bog and wet modified bog habitats during construction. The implementation of peatland restoration measures through the BEMP (as detailed in **Technical Appendix 7.5**) is likely to result in a **Moderate beneficial (significant)** effect on peatland habitats within the Site in the long-term during operation.

Annex A: Habitat Baseline Composition and Habitat Loss Calculations for the Site

Table 7.11: Habitat Baseline Composition and Habitat Loss Calculations for the Site

		Site and Study Area (Baseline)				Permanent Infrastructure Direct Loss		Permanent Infrastructure Indirect Loss (only applies to Wetland Habitats)[87]		Temporary Direct Loss	
Phase 1 Description (Code)	NVC	Phase 1 Area (ha)	Phase 1 % of Site	NVC Area (ha)	% of NVC Type within Site	NVC Area (ha)	% Loss of Phase 1 Type within Site	NVC Area (ha)	% Loss of Phase 1 Type within Site	NVC Area (ha)	% Loss of Phase 1 Type within Site
Totals		345.26	100%	345.26	100%	3.45	1.00%	1.99	0.58%	3.52	1.02%
Broadleaved Semi-Natural Woodland (A.1.1.1)	W4b	4.22	1.22%	0.51	0.15%	<0.001	1.76%	0	0%	<0.001	0.21%
	W10			3.70	1.07%	0.07		0		0.01	
Coniferous Plantation Woodland (A1.2.2)	CP	9.30	2.69%	9.30	2.69%	0	0%	0	0%	0	0%
Dense/Continuous Scrub (A2.1)	W23	8.97	2.60%	8.97	2.60%	0.11	1.28%	0	0%	0.06	0.67%
Unimproved Acid Grassland (B1.1)	U4	6.34	1.84%	5.26	1.52%	0.02	0.30%	0	0%	0.004	0.07%
	U2a			0.43	0.12%	0		0		0	
	U6a			0.65	0.19%	0		0		0	
Semi-Improved Acid Grassland (B1.2)	U4b	53.24	15.42%	53.24	15.42%	1.08	2.03%	0	0%	1.34	2.51%
	HI	0.26	0.07%	0.22	0.06%	0.02	6.09%	0	0%	0.001	0.57%

[87] Based upon the precautionary 10 m indirect drainage assumption.

		Site and Study Area (Baseline)				Permanent Infrastructure Direct Loss		Permanent Infrastructure Indirect Loss (only applies to Wetland Habitats)[87]		Temporary Direct Loss	
Phase 1 Description (Code)	NVC	Phase 1 Area (ha)	Phase 1 % of Site	NVC Area (ha)	% of NVC Type within Site	NVC Area (ha)	% Loss of Phase 1 Type within Site	NVC Area (ha)	% Loss of Phase 1 Type within Site	NVC Area (ha)	% Loss of Phase 1 Type within Site
Semi-Improved Neutral Grassland (B2.2)	Hm			0.04	0.01%	0		0		0	
Improved Grassland (B4)	MG6a	77.34	22.40%	77.34	22.40%	0.46	0.60%	0	0%	0.75	0.97%
Marsh/Marshy Grassland (B5)	M25a	50.58	14.65%	9.12	2.64%	0.13	1.55%	0.19	2.35%	0.06	2.02%
	Je			14.20	4.11%	0.30		0.38		0.49	
	M23b			1.58	0.46%	0.003		0.02		0.02	
	MG10a			13.12	3.80%	0.17		0.25		0.36	
	M23a			7.28	2.11%	0.18		0.35		0.09	
	M25b			0.05	0.01%	0		0		0	
	M27b			5.18	1.50%	0		0		0	
	M27a			0.05	0.01%	0		0		0	
Continuous Bracken (C1.1)	U20	7.98	2.31%	7.98	2.31%	0.05	0.58%	0	0%	0.02	0.27%
Acid Dry Dwarf Shrub Heath (D1.1)	H9c	0.82	0.24%	0.82	0.24%	0.03	4.27%	0	0%	0.02	2.15%
Wet Dwarf Shrub Heath (D2)	M15b	28.25	8.18%	23.36	6.77%	0.11	0.44%	0.29	1.23%	0.03	0.12%
	M15a			4.89	1.42%	0.01		0.05		0.003	
Blanket Bog (E1.6.1)	M17a	35.72	10.35%	13.28	3.85%	0.02	0.24%	0.04	0.78%	0.004	0.11%

		Site and Study Area (Baseline)				Permanent Infrastructure Direct Loss		Permanent Infrastructure Indirect Loss (only applies to Wetland Habitats)[87]		Temporary Direct Loss	
Phase 1 Description (Code)	NVC	Phase 1 Area (ha)	Phase 1 % of Site	NVC Area (ha)	% of NVC Type within Site	NVC Area (ha)	% Loss of Phase 1 Type within Site	NVC Area (ha)	% Loss of Phase 1 Type within Site	NVC Area (ha)	% Loss of Phase 1 Type within Site
	M19b			10.02	2.90%	0		0.05		0	
	M19a			2.15	0.62%	0.07		0.19		0.04	
	M17b			10.27	2.97%	0		0		0	
Wet Modified Bog (E1.7)	M25a^	3.87	1.12%	3.78	1.09%	0.05	1.35%	0.15	3.77%	0.03	0.68%
	M20a			0.10	0.03%	0		0		0	
Acid/Neutral Flush (E2.1)	M6c	3.38	0.98%	2.90	0.84%	0.003	0.22%	0.01	0.85%	0.003	0.11%
	M6d			0.47	0.14%	0.004		0.02		0.001	
Standing Water (G1)	SW	3.28	0.95%	3.28	0.95%	0	0%	0	0%	0	0%
Running Water (G2)	RW	0.10	0.03%	0.10	0.03%	0	0%	0	0%	0	0%
Maritime Hard Cliff (H8.1)	RK	8.02	2.32%	8.02	2.32%	0	0%	0	0%	0	0%
Coastal Grassland (H8.4)	MC8	27.07	7.84%	3.39	0.98%	0	0.97%	0	0%	0	0.64%
	MC10b			5.82	1.69%	0.08		0		0.05	
	MC10c			8.34	2.42%	0.19		0		0.11	
	MC8d			9.41	2.72%	0		0		0.01	
	MC10			0.12	0.03%	0		0		0	
Coastal Heathland (H8.5)	H7	6.26	1.81%	6.26	1.81%	0	0%	0	0%	0	0%

		Site and Study Area (Baseline)				Permanent Infrastructure Direct Loss		Permanent Infrastructure Indirect Loss (only applies to Wetland Habitats)[87]		Temporary Direct Loss	
Phase 1 Description (Code)	NVC	Phase 1 Area (ha)	Phase 1 % of Site	NVC Area (ha)	% of NVC Type within Site	NVC Area (ha)	% Loss of Phase 1 Type within Site	NVC Area (ha)	% Loss of Phase 1 Type within Site	NVC Area (ha)	% Loss of Phase 1 Type within Site
Quarry (I2.1)	QY	0.11	0.03%	0.11	0.03%	0	0%	0	0%	0	0%
Arable (J1.1)	AR	2.30	0.67%	2.30	0.67%	0	0%	0	0%	0	0%
Introduced Shrub (J1.4)	RP	5.60	1.62%	5.60	1.62%	0.02	0.31%	0	0%	0.005	0.08
Building (J3.6)	BD	0.03	0.01%	0.03	0.01%	0	0%	0	0%	0	0%
Bare Ground (J4)	BG	2.21	0.64%	2.21	0.64%	0.27	12.04%	0	0%	0.02	0.94%

Glossary/Abbreviations

Table 7.12: Glossary

Term in Full	Abbreviation	Meaning
Chartered Institute of Ecology and Environmental Management	CIEEM	Organisation.
Ecological Clerk of Works	ECoW	Role.
Groundwater Dependent Terrestrial Ecosystems	GWDTE	A category of wetlands whose vegetation is dependent on groundwater.
Important Ecological Feature	IEF	Term - habitats, species and ecosystems, including ecosystem function and processes, that may be affected, with reference to a geographical context in which they are considered important.
Invasive Non-Native Species	INNS	Those species that are introduced, intentionally or unintentionally, outside of their natural geographic range, causing environmental, social and/or economic impacts.
National Nature Reserve	NNR	Designation.
National Vegetation Classification	NVC	The British National Vegetation Classification or NVC is a system of classifying natural habitat types in Great Britain according to the vegetation they contain.
Outline Biodiversity Enhancement Management Plan	OBEMP	Document produced detailing the outline habitat management and biodiversity enhancement proposals.
Special Area of Conservation	SAC	Statutory designation.
Species Protection Plan	SPP	Document produced prior to construction commencing (during the discharge of conditions) to ensure the safeguarding of protected species.
Site of Special Scientific Interest	SSSI	Statutory designation.