Chapter 6: Ecology

Chapter 6
Ecology

Introduction

6.1 This chapter presents the findings of the assessment of likely significant effects, with respect to Ecology, associated with the construction, operation and decommissioning of the Proposed Development. **Chapter 7: Ornithology** assesses likely significance in relation to avian features.

6.2 The specific objectives of the chapter are to:

- Describe the ecological baseline (including desk-based studies and field surveys);
- Describe the assessment methodology and significance criteria used in completing the impact assessment;
- Describe the potential effects, including cumulative effects;
- Describe the mitigation and/or compensation measures proposed to address likely significant effects (if required);
- Identify appropriate ecological enhancement measures; and
- Assess the cumulative effects in relation to other wind farm projects currently within the planning system.

6.3 This chapter is supported by the following figures and appendices, which are referenced throughout the text:

- **EIA Report Volume 3a: Figures**
  - **Figure 6.1: Ecology Study Area**;
  - **Figure 6.2: Statutory designated areas within 10 km and non-statutory designated areas within 5 km of the Site**;
  - **Figure 6.3: Phase 1 Habitats Plan**;
  - **Figure 6.4 : National Vegetation Classification Survey Plan**;
  - **Figure 6.5: Areas of Guidance-stated Potential Groundwater Dependency (GWDTE)**;
  - **Figure 6.6: Protected Species Plan**;
  - **Figure 6.7: Static Bat Detector Equipment Locations**;
  - **Figure 6.8: Bat Activity Map**;
  - **Figure 6.10a: Outline Restoration and Enhancement Plan**;
  - **Figure 6.10b: Outline Restoration and Enhancement Plan - sketch**; and
  - **Figure 6.11: Peat Condition Assessment Map**.
- **EIA Report Volume 4: Appendices**
  - **Appendix 3.1: Outline Construction Environnemental Management Plan (CEMP)**;
  - **Appendix 6.1: Desk Study and Legal Context**;
  - **Appendix 6.2: Habitats and Vegetation (including National Vegetation Classification) Survey Report**;
  - **Appendix 6.3: Protected Species Survey Report**;

- **Appendix 6.4: Bat Survey Report**;
- **Appendix 6.6: Outline Restoration and Enhancement Plan (OREP)**;
- **Appendix 6.7: Shadow Habitat Regulations Appraisal (HRA)**;
- **Appendix 6.8: Peatland Condition Assessment**;
- **Appendix 8.2**: **Peat Survey Report**;
- **Appendix 8.3: Peat Management Plan;** and
- **Appendix 8.6: Groundwater Dependent Terrestrial Ecosystem Assessment.**

- **EIA Report Volume 5: Confidential Documents**
  - **Appendix 6.5: Badger Survey Report (CONFIDENTIAL)**; and
  - **Figure 6.9: Badger Field Signs Map (CONFIDENTIAL).**

6.4 The Study Area referenced in the above Appendices and within this Chapter is specific to the survey type and species/ taxa targeted and is determined by best practice guidelines. The Study Area and relevant buffer zones applied are provided within **Table 6.2** and illustrated in **Figure 6.1**.

6.5 This chapter should be read in conjunction with the following chapters and appendices of the Environmental Impact Assessment (EIA) Report which inform, or have been informed by, this assessment:

- **Chapter 1: Introduction**;
- **Chapter 2: Site Selection and Design Strategy**;
- **Chapter 3: Development Description**;
- **Chapter 5: Cultural Heritage**;
- **Chapter 7: Ornithology**;
- **Chapter 8: Hydrology, Hydrogeology and Peat**;
- **Appendix 3.5: Schedule of Mitigation, Good Practice, Enhancement and Monitoring.**

Methodology

Effects Scoped In to the Assessment

6.6 This assessment concentrates on the likely effects of construction, operation and decommissioning of the Proposed Development upon those ecological receptors as identified in the Scoping Report[1] and informed by review of desk-based information and field surveys, project design and embedded mitigation. Effects upon the following features are assessed in detail:

- Construction effects on statutory and non-statutory designated sites within the redline boundary;
- Construction effects on habitats of conservation concern[2];
- Construction effects on otter;
- Construction effects on mountain hare. which have been added to the assessment based on the field data collected for the species since the Scoping Report was produced;
- Operational effects on bats; and

[1] EDF Energy Renewables Ltd. Dunside Wind Farm EIA Scoping Report, Prepared by LUC. February 2022.
[2] Habitats of Conservation Concern are defined as those habitats included in the following: Conservation priorities in the Habitats Directive (i.e. Annex 1 habitats); potentially groundwater dependent; ecosystems; the Scottish Biodiversity List (SBL); Scottish Borders Local Biodiversity Action Plan priority habitats; or Ancient Woodland Inventory sites.

- Decommissioning effects.

6.7 Note that construction effects on all other protected species have been scoped out, this is discussed further below.

Effects Scoped Out of the Assessment

6.8 On the basis of the desk-based and field survey work undertaken, the professional judgement of the EIA team, experience from other relevant projects and policy guidance or standards, and feedback received from consultees, the following topic areas have been 'scoped out' of detailed assessment as proposed in the Scoping Report[1]:

- Operational effects on ecological features, including statutory and non-statutory designated sites, habitats of concern and protected species (excluding bats);
- Construction effects on red squirrel;
- Construction effects on pine marten;
- Construction and operational effects on fisheries. It is noted that consultation responses requested fisheries and freshwater pearl mussels to be included within the detailed assessment. However, these have been scoped out of detailed assessment as effects are not considered likely to be significant on the basis that habitat loss will be minimal and good practice design considerations have been implemented (e.g. offsetting all infrastructure from watercourses & waterbodies and using existing tracks where possible). In addition, construction methods in the Outline CEMP (**Appendix 3.1**) includes monitoring pre, during and post construction in line with best practice[3], The Outline Restoration and Enhancement Plan (OREP)[4] (**Appendix 6.6** and **Figure 6.10a** and **6.10b**) includes measures to mitigate and enhance the riparian corridors within the Study Area to increase habitat resilience and connectivity and provide improved wildlife corridors. This approach is standard practice on projects of this scale, nature and geographic location.

6.9 The following potential effects have been scoped out of detailed assessment on the basis of the results of desk-based and field survey work undertaken:

- Effects on invertebrates (including aquatic macro-invertebrates). These have been scoped out on the basis that habitat loss as a result of the Proposed Development is minimal. The current grouse management of the Study Area is likely to reduce the suitability for many invertebrate species. Good practice design considerations & construction methods, operational monitoring will be implemented and the OREP (**Appendix 6.6** and **Figure 6.10a** and **6.10b**) includes measures to enhance the Study Area for invertebrates.
- Construction effects on statutory and non-statutory designated sites outwith the Study Area. These have been scoped out on the basis that there is a lack of structural or functional connectivity.
- Construction effects on protected species recorded within the Study Area, excluding bats, otter and mountain hare. All other protected species have been scoped out of the assessment on the basis that the baseline data demonstrates that the Study Area is unlikely to be of importance for these species. Further information on protected species is included within **Appendix 6.1** and **Appendices 6.3-6.5**.

6.10 Although protected species have been scoped out of detailed assessment, the legislative protections afforded to these will be included for completeness in the Outline CEMP (**Appendix 3.1**), OREP and Species Protection Plans (SPP) and other embedded mitigation.

Consultation

6.11 In undertaking the assessment, consideration has been given to the Scoping responses and other consultation which has been undertaken as detailed in **Table 6.1**.

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[3] Scottish Government. Monitoring Watercourses in Relation to Onshore Wind Farm Developments -Generic Monitoring Programme. Available at: https://www.gov.scot/publications/monitoring-watercourses-in-relation-to-onshore-wind-farm-developments-generic-monitoring-programme/) [Accessed April 2023]

[4]The OREP is a practical guide, outlining key principals and actions to be implemented to protect sensitive ecological features and delivering mitigation and enhancement measures to increase biodiversity. This covers the principles associated with a Habitat Management Plan.

Table 6.1: Consultation responses

Consultee and Date	Scoping/Other Consultation	Issue Raised	Response/Action Taken
East Lothian Council (ELC)	Formal Scoping Consultation (08/04/22)	**Assessment:** The Council is broadly content with the proposed approach. The applicant has identified that there are various Local Biodiversity Sites within the Study Area.	Noted
		Mountain hare: should be included in the species walkover. There is a healthy population in the Lammermuirs and this species are now afforded full protection under Schedule 5 of the Wildlife & Countryside Act 1981, as well as some protection under the Habitats Regulations 1994 (as amended) as a species of Community Interest.	Mountain hare included within scope of field surveys and have been considered within this Chapter as appropriate.
		Otter, water vole & great crested newts: The Scoping Report notes that surveys will be carried out for otter and water vole, as well as habitat surveys for great crested newts. However, these are not included in either list at para 6.32 and 6.34 of potential effects scoped in or out. The council assumes that they would be Scoped in if anything is found (along with effects on mountain hare)	These species have been addressed as appropriate within this Chapter, commentary on those scoped in or out of the EcIA is included above.
		Habitat Management Plan: If a Habitat Management Plan (HMP) is required to mitigate significant effects, this should be included with the application. Where the HMP is draft, it should be specific enough that it is clear what this mitigation involves and to identify any significant impacts of the HMP itself.	An Outline Restoration and Enhancement Plan (OREP) provides the principles for the habitat mitigation and enhancement measures adopted by the Proposed Development. The OREP is provided in **Appendix 6.6** and **Figure 6.10a and 6.10b**.
		Baseline data: The Council holds Phase 1 data from 1997 and ecological information from other windfarms in the area which could be used to inform surveys.	LUC requested data from ELC 08.08.22 and received this data (shape files) on 10.08.22. This was used to inform field surveys.
Scottish Borders Council (SBC)	Formal Scoping Consultation (May 2022)	Relevant Local Development Plan (LDP) policies are; EP1 International Nature Conservation Sites and Protected Species, EP2 National Nature Conservation and Protected Species and EP3 Local Biodiversity.	This Chapter has taken into account and references the up-to-date policies.
		A recent Court of Justice of the European Union (CJEU) ruling means that mitigation cannot be taken into account when considering the likely significant effect of a proposal on Natura/European sites and the need for an HRA at the screening stage.	Noted, see **Appendix 6.7** Shadow Habitat Regulations Appraisal.
		"SBC do not agree with the scope set out. *- If the habitat suitability* survey for badgers finds evidence of badgers using any part of the site, the subsequent badger survey should cover at least 100 m around *turbines and other*	A badger survey of the Study Area has been undertaken in line with best practice methods, buffer zones included a minimum of 100 m

Consultee and Date	Scoping/Other Consultation	Issue Raised	Response/Action Taken
		infrastructure and 100 m either side of access tracks. *- The potential presence of reptiles should be included as part of the EIA.* *- Potential impact on amphibians and invertebrates in and around the site should also be considered.* *- Impacts on fish should be considered and assessed within the EIAR as they will be considered as part of an HRA.* *- Species and habitats surveys and assessments should consider the Scottish Borders Local Biodiversity Action Plan and Habitat Action Plans."*	around turbines and other infrastructure. Reptiles and amphibians were included within the scope of desk and field surveys and have been considered within this Chapter as appropriate. These species have been scoped out of detailed assessment as effects are not considered likely to be significant, as is standard practice on projects of this scale, nature and geographic location. Good practice design considerations & construction methods will be implemented to safeguard legal compliance. Invertebrates have been scoped out of detailed assessment as effects are not considered likely to be significant, as is standard practice on projects of this scale, nature and geographic location. Habitat loss as a result of the Proposed Development is minimal and the current land use of the Study Area is likely to reduce the suitability for many invertebrate species. Good practice design considerations & construction methods and the OREP includes measures to mitigate and enhance the Study Area for invertebrates. Operational monitoring of watercourses (including fresh water macro-invertebrates) will also be implemented. See notes on fish in response to other consultee comments. Species and habitats will be considered within the EcIA, with reference made to desk and field surveys, and referenced action plans were required to fully assess impacts.
		The methodology of assessment is acceptable.	Noted
		A full report of the Borders Notable Species and Habitats of Conservation Concern should be obtained from The Wildlife Information Centre (TWIC). Where appropriate, additional survey information and impact assessment will be required for relevant Borders Notable Species and Habitats of Conservation Concern.	Data provided by TWIC is summarised in **Appendix 6.1**. Moths and butterflies have been scoped out of detailed assessment as effects are not considered likely to be significant, as is standard practice on projects of this scale, nature and geographic location.

Consultee and Date	Scoping/Other Consultation	Issue Raised	Response/Action Taken
		Additional consultees should include Butterfly Conservation Scotland (because of the presence of locally rare moths at the Site).	Habitat loss as a result of the Proposed Development is minimal. The current land use of the Study Area is likely to reduce the suitability for many invertebrate species. Good practice design considerations & construction methods will be implemented to avoid significant impacts to most invertebrates.
		SBC agree with the requirement for an extended Phase 1 survey, NVC surveys of habitats of nature conservation and for Ground Water Dependent Terrestrial Ecosystems (GWDTES). The survey should cover the Site and 500m from the Site boundary.	GWDTE best practice requires a maximum 250 metres (m) buffer. This is a standardised methodology with considerable precedent which has been used in the assessment.
		Habitats within and around the Site and listed in the Scottish Biodiversity List (SBL) should be considered together with Borders Notable Habitats of Conservation Concern (available from TWIC) and where necessary avoidance and mitigation considered.	Habitats of conservation concern, including those of the SBL and Borders Notable Habitats of Conservation Concern have been considered at design stage and avoided wherever possible. Where not possible, the mitigation hierarchy has been employed and habitats impacted by works have been included in the impact assessment for the project.
		As part of habitat enhancement and mitigation works, there should be scope for habitat improvements around the Dye Water and Watch Water, which have already been identified in the Scoping Report as being in 'poor' and 'bad' condition, respectively.	An OREP is provided in **Appendix 6.6** and **Figure 6.10a and 6.10b.** This has been informed by SBC Supplementary Planning Guidance for Biodiversity and the principals of NPF4, Policy 3. The implementation of the OREP will result in no-net-loss of biodiversity and specifically seeks to improve riparian corridors and habitat connectivity of the Watch Water and Dye Water within the Study Area, mitigation and enhancement measures for heath and grassland habitats are also included.
		The outline Habitat Management Plan for the Site will address potential impacts from development construction until decommissioning. The HMP should be informed by SBC Supplementary Planning Guidance for Biodiversity.	
		The Council adopts a no-net-loss of biodiversity policy; losses of biodiversity are required to be compensated for and that biodiversity enhancements provided. Compensation and enhancement should be secured through a Habitat Management Plan in accordance with good practice	
		There are opportunities to enhance the local habitat network including the woodland (including riparian habitat) and moorland habitats including wetland habitat network (including blanket bog habitat) and grassland habitat.	

Consultee and Date	Scoping/Other Consultation	Issue Raised	Response/Action Taken
NatureScot	Formal Scoping Consultation (09/05/2022)	NatureScot advise that consideration should be given to the potential effects of construction, operation and decommissioning of the Proposed Development in relation to the qualifying interests of the River Tweed SAC, including proposed access tracks.	Access track included in field surveys and assessment. Construction operational and decommissioning effects considered in the assessment.
		It may be helpful to make contact with The Wildlife Information Centre (TWIC) regarding habitat and species information for the Site and its immediate surroundings. Please note that the lack of a record does not indicate the absence of a species.	Data provided by TWIC is summarised in **Appendix 6.1**. A lack of a record is understood not to indicate an absence of a species.
Gifford Community Council	Formal Scoping Consultation (15/04/22)	Peatlands, heath and unimproved grasslands are internationally rare complex ecosystems which support very specialised species. It is important to include invertebrate and fungi surveys in the EIA to inform whether the development footprint supports any rare species. It is also vital to carry out follow-up surveys for these groups to record whether the development or any associated interventions have had a negative impact on species diversity. The ecosystem services these taxon groups provide are essential to maintain these as functioning habitats. It would be inappropriate to consider compensation tree planting in this type of ecosystem.	Noted. Detailed vegetation surveys and desk studies have been undertaken to establish the habitats present within the Study Area. Where fungi are a component of a habitat of conservation concern, these are considered as appropriate. The OREP has been developed to provide appropriate and proportionate mitigation and enhancement measures in line with current policy and best practice guidelines. Habitat loss as a result of the Proposed Development is minimal. The current land use of the Study Area is likely to reduce the suitability for many invertebrate and fungi species, therefore detailed survey for these taxa was determined to be disproportionate in the context of the scale of the Proposed Development. These taxa were scoped out of detailed survey and assessment as effects are not considered likely to be significant as is standard practice on projects of this scale, nature and geographic location. Good practice design considerations & construction methods will be implemented to avoid significant impacts to most invertebrates.
		A resident in the area is a fungal ecologist and Research Associate, their expertise would be useful to inform the EIA.	
Fisheries Management Scotland (FMS)	Formal Scoping Consultation (15/04/22)	The Proposed Development falls within the catchment relating to the River Tweed. It is important that the proposals are conducted in full consultation with the River Tweed Commission and the Tweed Foundation, and	LUC scoped detailed surveys for fisheries and freshwater pearl mussel out of the assessment on the basis of good practice design considerations (e.g. offsetting all infrastructure from watercourses &

Consultee and Date	Scoping/Other Consultation	Issue Raised	Response/Action Taken
		FMS would be grateful if they could be involved in the project proposals. Also, due to the potential for such developments to impact on migratory fish species and the fisheries they support, FMS have developed, in conjunction with Marine Scotland Science, advice for DSFBs and Trusts in dealing with planning applications. They would strongly recommend that these guidelines are fully considered throughout the planning, construction and monitoring phases of the Proposed Development.	waterbodies). The assessment considered these habitats, taxa and species in line with best practice guidelines and where potential effects were considered to be potentially significant these were subject to detailed impact assessment.
River Tweed Commission (RTC)	Formal Scoping Consultation (05/04/22)	Following construction, there should be 3-5 years post development monitoring, with scope to extend this period if impacts are detected.	This has been included in the Outline CEMP included in **Appendix 3.1.**
		"RTC does not agree with the assessment method proposed. We note that the scoping document proposes a habitat survey only for fisheries and freshwater pearl mussel. We believe that an electro-fishing survey, data retrieval exercise and culvert survey for any potential obstructions will provide a more informed assessment of fish species presence and potential impacts on local fish populations. *Please refer to full consultation response for commentary re monitoring programme recommendations."*	Habitat loss as a result of the Proposed Development is minimal. Fisheries and freshwater pearl mussel have been scoped out of detailed assessment as effects are not considered likely to be significant on the basis that good practice design considerations have been implemented (e.g. offsetting all infrastructure from watercourses & waterbodies and using existing tracks where possible). In addition, construction methods in the Outline CEMP will include monitoring pre, during and post construction in line with best practice[5], The OREP includes measures to mitigate and enhance the Study Area. Operational monitoring of watercourses will also be implemented. This approach is standard practice on projects of this scale, nature and geographic location.
		The Tweed Foundation closely monitors the health of the fish within the catchment and hold substantive data sets on fish species presence, abundance or absence.	
Energy Consents Unit (ECU)	Formal Scoping Consultation (May 2022)	The Scottish Ministers recommend that the Company discuss and agree Baseline Fish Surveys with the local District Salmon Fishery Board and Fisheries Trust.	Habitat loss of watercourses and riparian habitat as a result of the Proposed Development is minimal. Fisheries and freshwater pearl mussel have been scoped out of detailed assessment as effects are not considered likely to be significant on the basis that good practice design considerations have

[5] Scottish Government. Monitoring Watercourses in Relation to Onshore Wind Farm Developments -Generic Monitoring Programme. Available at: https://www.gov.scot/publications/monitoring-watercourses-in-relation-to-onshore-wind-farm-developments-generic-monitoring-programme/) [Accessed April 2023]

Consultee and Date	Scoping/Other Consultation	Issue Raised	Response/Action Taken
			been implemented (e.g. offsetting all infrastructure from watercourses & waterbodies and using existing tracks where possible). In addition, construction methods in the Outline CEMP will include monitoring pre, during and post construction in line with best practice[5], The OREP includes measures to mitigate environmental effects arising as a result of the Proposed Development and to enhance biodiversity across the Study Area. Operational monitoring of watercourses will also be implemented. This approach is standard practice on projects of this scale, nature and geographic location.
		Scottish Ministers recommend that the Company contact NatureScot, Scottish Borders and East Lothian Council to discuss and agree designated sites to be included in the EIA Report and the survey work and further in-depth modelling and research to be undertaken.	Designated sites included in the assessment were agreed through consultation with all relevant consultees.
Marine Scotland Science (MSS)	Formal Scoping Consultation (May 2022)	In addition to identifying the main watercourses and waterbodies within and downstream of the Proposed Development area, developers should identify and consider, at this early stage, any Special Areas of Conservation where fish are a qualifying feature and proposed felling operations particularly in acid sensitive areas.	Habitat loss as a result of the Proposed Development is minimal. Fisheries and freshwater pearl mussel have been scoped out of detailed assessment as effects are not considered likely to be significant on the basis that good practice design considerations have been implemented (e.g. offsetting all infrastructure from watercourses & waterbodies and using existing tracks where possible). In addition, construction methods in the Outline CEMP will include monitoring pre, during and post construction in line with best practice[5], The OREP includes measures to mitigate and enhance the Study Area. Operational monitoring of watercourses will also be implemented. This approach is standard practice on projects of this scale, nature and geographic location.
		Developers will be required to provide a gate check checklist in advance of their application submission which should signpost ECU to where all matters relevant to freshwater and diadromous fish and fisheries have been presented in the EIA Report. Where matters have not been addressed or a different approach, to that specified in the advice, has been adopted the developer will be required to set out why.	
		"Developers should specifically discuss and assess potential impacts and appropriate mitigation measures associated with the following: – *any designated area, for which fish is a qualifying feature, within and/or downstream of the Proposed Development area;*	

Consultee and Date	Scoping/Other Consultation	Issue Raised	Response/Action Taken
		– *the presence of a large density of watercourses;* – *the presence of large areas of deep peat deposits;* – *known acidification problems and/or other existing pressures on fish populations in the area; and* – *proposed felling operations*	
		MSS recommends that a water quality and fish population monitoring programme is carried out to ensure that the proposed mitigation measures are effective. A robust, strategically designed and site specific monitoring programme conducted before, during and after construction can help to identify any changes, should they occur, and assist in implementing rapid remediation before long term ecological impacts occur.	
		"MSS advises that planning conditions are drawn up to ensure appropriate provision for mitigation measures and monitoring programmes, should the development be given consent. *We recommend, where required, that a Water Quality Monitoring Programme, Fisheries Monitoring Programme and the appointment of an Ecological Clerk of Works, specifically in overseeing the above monitoring programmes, is outlined within these conditions and that MSS is consulted on these programmes."*	The Applicant has committed to the appointment of an Ecological Clerk of Works (ECoW). The ECoW role is referenced throughout this chapter. The ECoW will oversee the implementation of appropriate fisheries monitoring, which is further detailed in this chapter.

6.12 Please note that several of the consultees in their responses requested that a Habitat Management Plan be provided. This had been provided via the Outline Restoration and Enhancement Plan (OREP). This is a practical guide, outlining key principals and actions to be implemented to protect sensitive ecological features and delivering mitigation and enhancement measures to increase biodiversity. The OREP document is provided in **Appendix 6.6** and **Figure 6.10a and 6.10b.**

Committed Design Considerations

Project Design Assumptions, Good Practice Measures and Embedded Design

6.13 This section should be read in conjunction with **Chapter 2** and the embedded design measures described in **Chapter 3**. An Outline CEMP has also been prepared and is included in **Appendix 3.1**.

6.14 The following design considerations relevant to ecological features include:

- Avoidance of all watercourses which form part of the River Tweed SAC maintaining a minimum 50 m buffer between them and all infrastructure;
- A minimum 50 m buffer between turbine locations and watercourses/bodies has been implemented;
- Minimisation of watercourse crossings;
- Incorporation of mammal-passable watercourse crossings;

- Avoidance of the most ecologically important habitats such as Ground Water Dependent Terrestrial Ecosystems (GWDTEs);
- Avoidance of deep peat deposits and the use of floating track construction methods where deep peat deposits cannot be avoided; and
- Avoidance of protected species resting places (including best practice buffers where appropriate).

Method of Baseline Characterisation

Extent of the Study Area

6.15 The Study Areas adopted in the assessment and reported in this chapter vary by desk and field survey, and by ecological feature, as defined by best practice (detailed in **Appendices 6.1 – 6.5).** The Study Area for this assessment is the Site plus relevant buffers as shown in **Figure 6.1** and **Figure 6.2.** The Study Areas are defined in **Table 6.2: Study Area Description**.

Table 6.2: Study Area Description

Ecological Feature	Study Area
Desk-based Studies	
Statutory Designated Sites	The Site and a 10 kilometres (km) buffer.
Non-Statutory Designated Sites	The Site and a 5 km buffer.
Existing records of Class 1 and Class 2 deep peat and carbon rich soils	The Site and a 2 km buffer.
Existing Records of Protected species (i.e. those covered by the WCA, Protection of Badgers Act and designated as EPS	The Site and a 10 km buffer for bats[6] and 5 km buffer for all other protected species
Field Surveys	
Habitat and NVC Surveys	The Site and up to 250 m buffer along the access track.
GWDTEs	The Site and up to 250 m buffer along the access track.
Protected Species: otter, water vole, badger, red squirrel and pine marten.	The Site and a buffer up to 250 m where survey methods dictate.
Protected Species: bats	The Site and a buffer in line with guidance (SNH, 2019), comprising a buffer of 100 m around proposed turbine locations and up to 100 m along the proposed access track.

Desk Study

6.16 The following legislation, policy and guidance have been taken into consideration during the preparation of the Chapter.

- The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017;
- The Conservation of Habitats and Species Regulations 2017 (as amended)[7];

[6] NatureScot (2021). Bats and onshore wind turbines - survey, assessment and mitigation. Available at: https://www.nature.scot/doc/bats-and-onshore-wind-turbines-survey-assessment-and-mitigation [Accessed March 2023]
[7] UK Government (2017). The Conservation of Habitats and Species Regulations 2017 (as amended) Available at: https://www.legislation.gov.uk/uksi/2017/1012/contents/made [Accessed March 2023]

- The Wildlife and Countryside Act 1981 (As amended) (WCA)[8];
- The Nature Conservation (Scotland) Act 2004[9];
- The Protection of Badgers Scotland Act 1992[10];
- The Water Environment and Water Services (Scotland) Act 2003 (WEWS)[11];
- The Water Environment (Controlled Activities) (Scotland) Regulations 2011[12];
- National Planning Framework 4[13];
- The Scottish Biodiversity List[14];
- Scottish Planning Policy[15] (taken into consideration prior to the implementation of NPF4),[16] and Supplementary Guidance[17];
- Scottish Borders Local Development Plan[18];
- Scottish Borders Biodiversity Action Plan[19];
- Scottish Borders Local Biodiversity Technical Note[20];
- Guidelines for EcIA in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine version 1.1. (CIEEM, 2018)[21];
- Good Practice Guidelines for Habitats and Species, Version 3 (CIEEM, 2021)[22];
- NatureScot, Planning and Development: Standing Advice and Guidance Documents. These guidance notes provide a wider range of advice and guidance in relation to species survey and methodologies, habitat and species management, onshore windfarm planning, EIA and construction methods[23].

[8] Government (1981). The Wildlife and Countryside Act 1981 (as amended). Available at: https://www.legislation.gov.uk/ukpga/1981/69/contents [Accessed March 2023]
[9] Government (2004). The Nature Conservation (Scotland) Act 2004. Available at: https://www.legislation.gov.uk/asp/2004/6/contents [Accessed March 2023]
[10] Government (1992). The Protection of Badgers Scotland Act 1992 (as amended). Available at: https://www.legislation.gov.uk/ukpga/1992/51/scotland [Accessed March 2023]
[11] Government (2003). The Water Environment and Water Services (Scotland) Act 2003 (WEWS) Available at: https://www.legislation.gov.uk/asp/2003/3/contents [Accessed March 2023]
[12] Government (2011). The Water Environment (Controlled Activities) (Scotland) Regulations 2011 Available at: https://www.legislation.gov.uk/ssi/2011/209/contents/made [Accessed March 2023]
[13] Scottish Government (2023). National planning Framework 4. Available at: https://www.gov.scot/publications/national-planning-framework-4/ [Accessed March 2023]
[14] Scottish Government (2020). Scottish Biodiversity List. Available at Scottish Biodiversity List | NatureScot
[15] Scottish Government (2014). Scottish Planning Policy. Available at: https://www.gov.scot/publications/scottish-planning-policy/pages/2/ [Accessed March 2023]
[16] Although, Scottish Planning Policy is no longer in force, this informed the scope of this Chapter prior to the adoption of NPF4.
[17] Scottish Government (2023). Supplementary Planning Guidance. Available at: https://www.gov.scot/publications/planning-series-circular-6-2013-development-planning/pages/11/#:~:text=Supplementary%20Guidance%20%2D%20status&text=Scottish%20Ministers%20envisage%20that%20to,be%20contained%20in%20Supplementary%20Guidance. [Accessed March 2023]
[18] Scottish Borders Council. Local Development Plan 2016. Available at: https://www.scotborders.gov.uk/info/20051/plans_and_guidance/121/local_development_plan [Accessed March 2023]
[19] Scottish Borders Council (2018).. Local Biodiversity Action Plan 2018.Available at: https://www.scotborders.gov.uk/downloads/file/928/local_biodiversity_action_plan [Accessed March 2023]
[20] Scottish Borders Council (2020). Local Biodiversity Technical Note 4. Available at: https://www.scotborders.gov.uk/downloads/file/7554/local_biodiversity_technical_note (Accessed February 2023)
[21] CIEEM (2018) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine version 1.1. Chartered Institute of Ecology and Environmental Management, Winchester. Available at: https://cieem.net/wp-content/uploads/2019/02/Combined-EclA-guidelines-2018-compressed.pdf [Accessed March 2023]
[22] CIEEM (2021). Good Practice Guidelines for Habitats and Species, Version 3 (May 2021). Available at : https://cieem.net/wp-content/uploads/2021/05/Good-Practice-Guide-April-2021-v6.pdf [Accessed March 2023]
[23] NatureScot. Planning and Development: Standing Advice and Guidance Documents. Available at: https://www.nature.scot/professional-advice/planning-and-development/planning-and-development-advice/planning-and-development-standing-advice-and-guidance-documents [Accessed March 2023]

- SEPA, Guidance on Assessing the Impacts of Development Proposals on Groundwater Abstractions and GWDTE[24].

6.17 References to all legislation relate to Acts or Regulations in force at the time of writing of this chapter; further information on this and the policy and guidance documents noted above are provided within **Appendix 6.1.**

6.18 A desk study was undertaken to identify known ecological features within the relevant Study Areas described above. Searches were made for those habitats and species agreed through consultation. The following data sources have informed the assessment:

- NatureScot SiteLink (statutory designated sites)[25];
- Multi-Agency Geographic Information for the Countryside (MAGIC)[26];
- The Ancient Woodland Inventory (AWI)[27];
- Scotland's Environment Mapping Service[28];
- The Carbon and Peatland Map[29]; and
- National Biodiversity Network (NBN) Atlas Scotland (under CC-BY licence)[30].

6.19 In addition, the local records centre, TWIC, were approached to request existing records for designated sites and protected species in line with the buffers outlined in **Table 6.2**. A review of this data is provided in **Appendix 6.1**

6.20 Where appropriate, other scientific resources were referred to when determining protected species behaviour or population sizes. These resources are referenced in the chapter where appropriate.

6.21 Further information relating to the desk study method is provided in **Appendix 6.1.**

Field Survey

6.22 The following field surveys were carried out to inform the assessment:

- Phase 1 Habitat Survey;
- National Vegetation Classification (NVC) Survey to provide detailed survey of potential habitats of conservation concern, these include:
  - Habitats considered to be conservation priorities in the Habitats Directive (i.e. Annex 1 habitats);
  - Habitats considered to be potentially GWDTEs;
  - Habitats included on the Scottish Biodiversity List (SBL);
  - Habitats included in Scottish Borders Local Biodiversity Action Plan (LBAP); and
  - AWI sites.
- Protected Species Surveys, including the following species/ taxa;

[24] Scottish Environment Protection Agency. Guidance Note 31. Guidance on Assessing the Impacts of Development Proposals on Groundwater Abstractions and Groundwater Dependent Terrestrial Ecosystems (GWDTE). Available at: https://www.sepa.org.uk/media/144266/lups-gu31-guidance-on-assessing-the-impacts-of-development-proposals-on-groundwater-abstractions.pdf [Accessed March 2023] **PLEASE NOTE: This guidance is currently under review as a result of the implementation of National Policy Framework 4.**
[25] NatureScot. SiteLink website. Available at https://sitelink.nature.scot/map [Accessed March 2023]

[26] Department for Environment, Food and Rural Affairs et al (n.d.) Multi-Agency Geographic Information for the Countryside [online]. Available at: http://magic.defra.gov.uk [Accessed February 2023]
[27] Scotland's Environment Mapping Service. Available at https://map.environment.gov.scot/sewebmap/ (Accessed February 2023)
[28] Scottish Environment Protection Agency (n.d.) Scotland's Environment Map [online]. Available at: https://map.environment.gov.scot/sewebmap/ [Accessed February 2023]
[29] Scotland's Soils (2016) Carbon and Peatland Map [online]. Available at: https://soils.environment.gov.scot/maps/thematic-maps/carbon-and-peatland-2016-map/ [Accessed February 2023]
[30] National Biodiversity Network Atlas (n.d.) National Biodiversity Network Atlas, Scotland [online]. Available at: https://scotland.nbnatlas.org/ [Accessed February 2023]

- Badger *Meles meles*;
- Bat static detector surveys;
- Otter *Lutra lutra*;
- Red squirrel *Sciurus vulgaris;*
- Pine marten *Martes martes; and*
- Water vole *Arvicola amphibus.*

6.23 Incidental observations of other species of conservation concern[31] , including those scoped out of assessment through the Scoping process, were also recorded (including Mountain hare *Lepus timidus*).

6.24 Ecology field surveys were undertaken between April 2022 and September 2022 (the 'survey season') as described in the relevant appendices. Field surveys were undertaken in appropriate conditions. Detailed accounts of survey rationale, methods, weather conditions, limitations and findings are provided in **Appendices 6.1 to 6.5**.

Criteria for the Assessment of Effects

Criteria for Assessing Sensitivity of Receptors

6.25 The assessment undertaken in this chapter is based on good practice methods described in CIEEM's 'Guidelines for EcIA in the UK and Ireland – Terrestrial, Freshwater and Coastal'[21].

6.26 The guidelines recommend that the 'Ecological Importance' of a given site in relation to each of its ecological features is determined within a defined geographical context. The geographical context as it relates to the Study Area, is described **in Table 6.3** below.

Table 6.3: Ecological Importance Criteria

Ecological Importance	Qualifying Criteria	Relevant Context
International	A Site is considered of International ecological importance when it supports: – An internationally designated site or candidate site (Special Protection Areas (SPA), potential SPA, Special Areas of Conservation (SAC), candidate SAC, possible SAC, Ramsar sites, proposed Ramsar sites or Biogenetic Reserve) or an area which NatureScot has determined meets the published selection criteria for such designations, irrespective of whether or not it has been notified. – A viable area of habitat type listed in Annex 1 of the Habitats Directive, or smaller areas of such habitat which are essential to maintaining the viability of that ecological resource at an international scale. – >1% of the European resource of an internationally important species, i.e. listed in Annex 1, 2 or 4 of the Habitats Directive.	Europe
UK/ National	A Site is considered of UK/National ecological importance when it supports: – A nationally designated site (Sites of Special Scientific Interest (SSSI), National Nature Reserves (NNR), Marine Nature Reserve) or a discrete area which NatureScot has determined meets the published selection criteria for national designation irrespective of whether or not it has yet been notified.	UK/ Scotland

[31] Species of conservation concern are defined as those: subject to legal protections and policy priority (Such as Scottish Biodiversity List or Local Biodiversity Action Plan priority species) as outlined within this chapter.

Ecological Importance	Qualifying Criteria	Relevant Context
	– A viable area of a priority habitat referenced in the UK Post-2010 Biodiversity Framework or SBL, or smaller areas of such habitat which are essential to maintaining the viability of that ecological resource at a national scale. – >1% of the National resource of a regularly occurring population of a nationally important species i.e. a priority species listed in the SBL and/or Schedules 1, 5 (Section 9 (1, 4a, 4b)) or 8 of the Wildlife and Countryside Act 1981.	
Regional	A Site is considered of Regional ecological importance when it supports: – Non-statutory designated sites that represent a scale, or habitat/species assemblage, of value across a number of counties which are recognised in a regional context. – Non-designated sites that the designating authority has determined meet the published ecological selection criteria for designation, particularly large or representative habitat or species assemblages of importance at a regional level. – Viable and extensive areas of legally protected habitat/habitat identified in Regional BAP or County BAP, or smaller areas of such habitats that are essential to maintaining the viability of the resource at a regional scale. – Any regularly occurring populations of an internationally/nationally important species or a species in a relevant policy which is important for the maintenance of the regional meta-population. – Semi-natural ancient woodland greater than 0.25 hectares (ha.)	South-West of Scotland
County	A Site is considered of County ecological importance when it supports: – County sites and other sites which the designating authority has determined meet the published ecological selection criteria for designation, e.g. Local Nature Conservation Sites (LNCS). – Viable areas of legally protected habitat/habitat identified in Council BAP or smaller areas of such habitats that are essential to maintaining the viability of the resource at a county scale. – Any regularly occurring population of an internationally/nationally important species of species in a relevant UK/Council BAP which is important for the maintenance of the county meta-population. – Semi-natural ancient woodland smaller than 0.25 ha. – Networks of species-rich hedgerows.	Scottish Borders Council area.
Local	A Site is considered of Local ecological importance when it supports: – Commonplace and widespread semi-natural habitats, e.g. scrub, poor semi-improved grassland, coniferous plantation woodland, intensive arable farmland, etc. which despite their ubiquity, contribute to the ecological function of the local area (habitat networks etc.).	Study Area plus a 5 km radius

Ecological Importance	Qualifying Criteria	Relevant Context
	– Isolated or species poor stands of habitat of conservation interest which contribute to the viability of the resource at a local level. – Very small, but viable, populations of internationally/nationally important species or a species in a relevant UK/Council BAP which is important for the maintenance of the local meta-population.	
Study Area	A Study Area is considered of Study Area ecological value when it supports: – Habitats of limited ecological value, e.g. amenity grassland, but which contribute to the overall function of the application site's ecological functions.	Study Area

Criteria for Assessing Magnitude of Change

6.27 Following the assessment of Ecological Importance, likely effects are identified. This process involves the study of the construction and operational methods and timescales with a view to identifying the pathways by which ecological features may experience an effect. Design and programme information presented in **Chapters 2: Site Selection and Design Strategy** and **Chapter 3** have been used to inform this stage of the assessment. Similarly, embedded mitigation and sensitive design consideration, also known as 'Good Practice Measures' (CIEEM 2018)[21] have been reviewed. Further information on these measures is provided in later sections of this chapter.

6.28 Potential effects can be grouped into the following broad types:

- **Direct habitat loss**;
- **Fragmentation** (disruption of ecological processes through fragmentation, isolation and barriers);
- **Mortality** (loss of life experienced by faunal species, either individual animals or populations, through direct contact or following pollution events, etc.); and
- **Disturbance** (disruption to ecological processes through increased human presence, noise, vibration, etc.).

6.29 Details of the potential effects that are scoped in to and out of this assessment are provided above.

Criteria for Assessing Significance

6.30 To determine significance, effects are considered with reference to the following parameters:

- Positive or negative;
- Extent;
- Magnitude;
- Duration;
- Frequency; and
- Reversibility.

6.31 A degree of confidence, based on professional judgement, is used to assess the likelihood of an effect occurring. The following scale is referred to:

- Certain/near-Certain: probability estimated at ≥95%;
- Probable: probability estimated at 50 – 90%;
- Unlikely: probability estimated at 5 – 50%; and

- Extremely unlikely: probability estimated at ≤ 5%.

6.32 Based on the combination of the parameters listed above, an effect is then considered to be either significant or not significant in EcIA terms. An effect is considered to be significant if it has the potential to affect the 'integrity' of a habitat or the 'Conservation Status' of a habitat or species. The Conservation Status of a habitat or species is determined by the sum of the influences acting on a species or habitat that may affect its extent, such as the:

- Structure and functions of the habitat;
- Distribution of the habitat and its typical species present within a given geographical area; and
- Abundance and distribution of a species within a given geographical area.

6.33 Technical definitions of integrity and conservation status follow CIEEM guidelines (CIEEM, 2018)[21].

Criteria for Assessing Sensitivity of Receptors, Magnitude of Change and Significance

6.34 The predicted significance of an effect is determined through a standard method of assessment based on best practice (CIEEM, 2018)[21] and professional judgement, considering both sensitivity and magnitude of change as detailed in **Table 6.4.**

6.35 The significance of an effect is considered within the context of the geographically-based ecological importance of the feature. For example, an effect on a habitat of local ecological importance is considered to be significant, or not significant, at a Local level. In some cases, where only a small part of an ecological feature is affected, the potential effect may be significant at a lower geographical level; for example, where only a small part of a habitat of local ecological importance is affected, the effect may only be significant at a Study Area level.

6.36 The EIA process requires that the significance of an effect is described as either 'Major, 'Moderate', 'Minor' or 'Negligible/None'. However, best practice guidance in relation to EcIA (CIEEM, 2018)[21] does not support this approach, due to the complexities of ecological processes.

6.37 To allow the potential effects identified in this chapter to be considered alongside those addressed in other topic chapters, a 'translation' from EcIA significance to EIA significance has been undertaken, as set out in **Table 6.4** below. The translation relates the geographically-based significance of ecological effects (identified through the EcIA process) to the standard terminology for significance presented in other chapters (following the EIA process), allowing direct comparison.

6.38 Effects of **Major** and **Moderate** significance are considered 'significant' in the context of the EIA Regulations (under the Electricity Works (EIA) (Scotland) Regulations 2017 (as amended).

Table 6.4: Ecological Effect 'Significance' Translation to EIA Terminology

EIA Significance Terminology	Corresponding EcIA Effect Significance Terminology
Major	International/European
	UK/National
Moderate	Regional
	County
Minor	Local
	Study Area
Negligible/ None	Not Significant

Identifying Mitigation and Assessing Residual Significance

6.39 Where likely significant effects are identified, mitigation measures are identified to avoid or reduce their significance or, where necessary, compensate for the effect. The standard mitigation hierarchy applies, whereby the following sequential measures are considered:

- **Avoidance:** the effect is avoided by removing its pathway, e.g. by changing the route of an access track or the positioning of a turbine;
- **Mitigation:** measures are taken to reduce the significance of the effect, e.g. vegetation clearance is undertaken outwith the nesting bird season;
- **Compensation:** where the effect cannot be reduced, alternative action is taken elsewhere within the Study Area, e.g. new planting proposals to replace lost vegetation; and
- **Enhancement:** where additional measures are adopted to introduce benefits for biodiversity.

6.40 In determining the potential significance of effects on ecological features, the assessment considers standard Good Practice Measures adopted which are assumed to be in place for the duration of the construction process and during operation, where relevant.

Embedded avoidance and mitigation

6.41 The following embedded avoidance measures were adopted during the design process:

- Design iteration to avoid or reduce impacts on ecological features.

6.42 Mitigation measures that will be implemented during the construction of the development are described in **Appendix 3.5** and include:

- The development and implementation of an Outline CEMP (**Appendix 3.1**), which will set out (amongst others) guidance on compliance with nature conservation legislation and policy. This will include:
  - Production of and compliance with a Pollution Prevention Plan (PPP) and adherence to Guidelines on Pollution Prevention (GPPs), which will significantly reduce the likelihood and severity of pollution events;
  - Production of and compliance with Construction Method Statements (CMS);
  - Production of and compliance with a Water Protection Plan (WPP). This will include the application of appropriate buffers around watercourses, which will protect riparian habitat while reducing disturbance and the likelihood of pollution events.
  - Production of and compliance with a Peat Management Plan (See **Appendix 8.3**) to set out a number of good practice measures in relation to minimising disturbance and the management of peat during construction (further detail provided in **Chapter 8**);
  - The use of temporary access tracks and 'brash mats' or other appropriate methods to reduce potential for soil erosion as appropriate;
  - An Advisory Ecological/Environmental Clerk of Works (ECoW) will be appointed to advise on the content of the CEMP and its delivery. The ECoW will be present during construction and will also monitor compliance with the CEMP and relevant legislation. The ECoW will maintain a record of activities and compliance, updated on a weekly basis throughout the construction period, which will be made available to all relevant site staff including the developer. A detailed Scope of Works for the role will be agreed with NatureScot before construction commences.
  - Best practice will be followed in relation to pollution prevention. In particular, all Guidance for Pollution Prevention (GPPs)[32] will be adhered to in detailed design and construction.
  - All watercourse crossings will be designed and constructed in line with current best practice and in accordance with a Construction Site Licence (CSL) (from SEPA) that will be necessary before works commence;
  - Regular ecological survey updates will be undertaken, to ensure survey data being relied upon during construction is not more than 12 months old as per best practice guidelines[8], in the season immediately prior to construction (particularly for mobile species, including bats, otter and badger). Where surveys find evidence of new protected

[32] NetRegs (2021) Guidance for Pollution Prevention (GPP) documents. Available at: https://www.netregs.org.uk/environmental-topics/guidance-for-pollution-prevention-gpp-documents/ [Accessed October 2022]

features (e.g. resting sites), micrositing will attempt to avoid effects. If this is not possible, the ECoW will make the necessary protected species licence applications.

- Excavations and trenches will be fenced, covered or a means of escape provided when left unattended to prevent animals falling in and becoming trapped;
- Temporary open pipe systems will be capped when unattended to prevent animals accessing them and becoming trapped;
- Production of a SPP to set out the approach to the monitoring of protected species prior to and during construction. The SPPs will include, but not be limited to, the following measures:
    1. Pre-construction update surveys will confirm the current status of the Site with regards to the protected and notable species that have been confirmed to be present within the Site.
    2. Security lighting will be designed to minimise light-spill on sensitive habitat features such as watercourses, waterbodies, and woodland edges.
    3. Pre-construction fish habitat surveys will be undertaken at watercourse crossings to provide the habitat baseline within a buffer of up to 100m upstream and downstream and to allow micrositing of the crossings away from potentially sensitive habitats wherever possible.
    4. Pre-construction surveys of proposed infrastructure routes within forested areas no more than six months prior to construction.
    5. Micrositing of the infrastructure will avoid any notable features identified (e.g. sett/drey/den) during pre-construction surveys in forested areas. If unavoidable, the ECoW will make necessary protected species licence applications.
    6. The ECoW will be consulted during micrositing and construction of watercourse crossings to ensure protection of the water environment and sensitive ecological features (including otter, water vole and fish habitat), and to ensure implementation of the design principles.
    7. Pre, during and post-construction fish habitat surveys and monitoring will be undertaken to ensure that mitigation measures are effective, that crossings maintain fish passage, and that potentially sensitive habitats are retained, and to identify any requirement for improvements or remedial works. The SPP will also detail proposals for longer-term monitoring, including fisheries
    8. The level of survey effort and the scope of SPP will be proportionate and cognisant of the limited evidence of protected species identified.
- Relevant method statements and controls will be implemented in relation to biosecurity.
- All watercourse crossings will be designed and constructed in line with current best practice and in accordance with a CSL (from SEPA) that will be necessary before works commence.

- Development and implementation of an OREP (See **Appendix 6.6** and **Figure 6.10a** and **6.10b**) which aims to improve habitat connectivity, increase biodiversity of habitats and increase climate resilience of habitats within the Study Area; and
- Post construction monitoring to ensure mitigation remains successful and proportionate.

Micrositing

6.43 The assessment considers a micrositing allowance of 100 m. It is anticipated that movement beyond 50 m would be subject to agreement with the planning authority and ECoW.

6.44 Any micrositing will also consider suitable safeguarding for protected features, as detailed within the SPP that will be finalised following further pre-construction surveys. With these micrositing precautions and procedures in place, where micrositing is utilised, then the significance of effect on ecological receptors will not be greater than those predicted within this chapter.

Cumulative Effects

6.45 The effects of the Proposed Development will be assessed in combination with predicted effects of other consented wind farm developments within 10 km of the Redline Boundary. This 10 km search area has been determined by precedent, convention and the experience of the EIA team.

Limitations and Assumptions

6.46 Ecological surveys are limited by a variety of factors which affect the presence of flora and fauna; for example, climatic variation, season, and species behaviour may mean that evidence of protected species is not always recorded during a survey. This does not mean that a species is absent; hence the surveys also record and assess the ability of habitats to support species. All ecological surveys provide a snapshot of activity for the purposes of design and assessment and cannot be relied upon for long-term interpretation of the Study Area's ecological importance i.e. prior to/during construction and decommissioning.

6.47 It is considered that survey data and the approach to assessment is sufficient to enable an informed decision to be taken in relation to the identification and assessment of likely significant environmental impacts on biodiversity. Detailed limitations in relation to the desk study and each targeted field survey are included in **Appendices 6.1 to 6.5**.

Baseline Conditions

Existing Baseline Conditions

6.48 A series of desk studies and field surveys were undertaken between April 2022 and September 2022 to establish the ecological baseline of the Study Area. A summary of these is provided within this Section. Further details are provided within **Appendices 6.1 to 6.5**.

Designated Sites

6.49 Table 6.5 lists the statutory designated sites identified within 10 km, and non-statutory designated sites identified within 5 km of the Site.

6.50 SPAs, which are designated for their ornithological interest, are detailed **in Chapter 7**. Similarly, SSSIs for which only ornithological interests qualify, are listed only within **Chapter 7**. The location of designated sites are illustrated in **Figure 6.2.**

6.51 Table 6.5 also provides commentary on those designated sites that will be taken forward for the assessment.

Table 6.5: Statutory and Non-statutory Designated Sites, including Associated Connections

Site Name	Designation	Approx. Distance and Orientation from the Site	Summary of Qualifying Feature(s)	Further Assessment Required?
Statutory Designated Sites within the Site				
River Tweed	Special Area of Conservation (SAC)	Within the Site, the river itself crosses the Site west to east, but only the eastern half (approximately) of the length is designated. The access track crosses the River Tweed SAC in a separate location.	■ Watercourses of plain to montane levels with the *Ranunculion fluitantis* and Callitricho-Batrachion vegetation. ■ Atlantic Salmon. ■ Otter. ■ Sea lamprey. ■ Brook lamprey. ■ River lamprey.	The Study Area is structurally and functionally connected to the River Tweed SAC. The SAC is designated for otters which have been recorded within the Site. Further assessment required. While the SAC's fisheries interests have been scoped out of this EIA, a standalone shadow HRA, provided in **Appendix 6.7**

Site Name	Designation	Approx. Distance and Orientation from the Site	Summary of Qualifying Feature(s)	Further Assessment Required?
				specifically considers these species within the context of the Habitat Regulations.
River Tweed	Site of Special Scientific Interest (SSSI)	Within the Site	■ Otter. ■ Atlantic salmon. ■ River lamprey. ■ Brook lamprey. ■ Sea lamprey. ■ Beetle assemblage. ■ Fly assemblage. ■ Trophic ranger river/stream. ■ Vascular plant assemblage.	The Study Area is structurally and functionally connected to the River Tweed SSSI. The SSSI is designated for otters which have been recorded within the Site. Further assessment required.
Statutory Designated Sites (outwith the Site but within 10km)				
Dogden Moss	SAC	2.7 km east	■ Active raised bogs.	Due to the distance from the Study Area, lack of structural or functional connectivity, it is unlikely that there will be any adverse environmental effects on these designated sites as a result of the Proposed Development. Therefore, effects as a result of construction or operation have been scoped out of this assessment.
Greenlaw Moor	SSSI	2.4 km east	■ Raised bog. ■ Breeding bird assemblage. ■ Pink-footed goose.	
Lammer Law	SSSI	3 km west	■ Blanket bog. ■ Sub-alpine dry heath. ■ Juniper scrub. ■ Upland assemblage.	
Crook Burn, Dyeshaugh	SSSI	4.7 km east	■ Fen meadow.	
Gordon Moss	SSSI	7.5 km south	■ Wet woodland.	
Papana Water	SSSI	7.6 km north	■ Upland mixed ash woodland.	
Danskine Loch	SSSI	7.8 km north	■ Fen woodland.	
Langtonless Cleugh	SSSI	9.2 km west	■ Upland mixed ash woodland.	
Lintmill Railway Cutting	SSSI	9.3 km south-east	■ Raised bog. ■ Breeding bird assemblage. ■ Pink-footed goose.	
Rammer Cleugh	SSSI	9.8 km north	■ Upland oak woodland.	

Site Name	Designation	Approx. Distance and Orientation from the Site	Summary of Qualifying Feature(s)	Further Assessment Required?
			■ Quaternary geology and geomorphology.	
Non-statutory Designated Sites within the Sie				
Byrecleuch Burn, Stot Cleugh (site reference number 71)	Local Biodiversity Site (LBS)	Within the Site	Cleughs and burnsides with nationally scarce plants and locally rare plants and moths.	The Study Area is structurally and functionally connected to these LBS. These LBS sites are designated due to diverse grasslands and presence of locally scarce plants. Further assessment required.
Corby Scar and Upper Watch Water (site reference number 76)	LBS	Within the Site	Acid burnsides with a high diversity of grassland plant species, including several local rarities.	
Non-Statutory Designated Sites (within 5 km)				
Watch Water (site reference number 129)	Local Nature Conservation Site (LNCS)	Immediately adjacent to the north boundary.	Burnsides, rocky banks – part wooded – with a high diversity of grassland plants, locally rare plants and moths.	The Study Area is structurally and functionally connected to this LNCS. The LNCS site is designated due to habitats. Further assessment required.
Wester Black Burn (site reference number 131)	LBS	580 m west	Burnsides and degraded moorland with one fine acid flush.	Due to the distance from the Study Area, lack of structural or functional connectivity, it is unlikely that there will be any adverse environmental effects on these designated sites as a result of the Proposed Development. Therefore, effects as a result of construction or operation have been scoped out of this assessment.
Boondreigh Burn and Raecleugh (site reference number 63)	LBS	670 m west	Burnside and base-rich flushes with many locally rare plants.	
Horseupcleuch (site reference number 99)	LBS	1.6 km north-east	Burnsides and rocky banks with fine populations of common rock-rose, supporting the northern brown argus butterfly. The only surviving Berwickshire site for wood bitter-vetch.	
Lammermuir (site reference number 131)	LBS	1.7 km west	Acid, neutral, calcareous grassland, heathland, blanket bog.	
Watch Water Reservoir (site reference number 130)	LBS	1.8 km east	Reservoir with flushes and moorland banks with breeding birds and locally rare plants and insects.	

Site Name	Designation	Approx. Distance and Orientation from the Site	Summary of Qualifying Feature(s)	Further Assessment Required?
Whalplaw Burn (upper) (site reference number 132)	LBS	2.5 km west	Burnsides and flush communities – including fine base-rich flushes and juniper.	
Kilmade Burn and Rough Cleugh (site reference number 103)	LBS	3.0 km north-east	Upland burn, associated cleughs, moorland, vestiges of woodland and small base-rich flushes, many locally rare plants and bryophytes and a nationally scarce plant.	
Cleckinshaw, Kettelshiel and Bogpark Burns (site reference number 73)	LBS	3.6 km east	Burns, wetland and flushes with breeding waders.	
Soonhope Burn upper and Longformacus Burn (site reference number 44)	LBS	3.9 km west	Upland burnsides, cleughs and flushes with notable plants.	
Houndslow West Wood (site reference number 100)	LBS	4.1 km south-west	Birch dominated semi-natural woodland and broadleaved plantation	
Cromwells and Brunta burn (site reference number 77)	LBS	4.5 km west (closest feature is the access track)	Base-rich knowes and burnside woodland-edge with a notable population of *Crepis mollis* (Hawk's beard).	
Soonhope Burn upper, The Howe (site reference number 45)	LBS	4.5 km west	Upland bursides, cleughs and flushes with both Borders Priority and UK Priority species.	
Whalplaw Burn (lower) (site reference number 53)	LBS	4.6 km west	Burnsides, cleughs and screes with juniper and fern communities and a priority reptile.	
Unnamed woodland	Ancient woodland	Closest ancient woodland: 625 m west	A range of ancient (of semi-natural origin) woodland and long-established (of plantation origin) are present within 5 km of the Redline Boundary as illustrated on **Figure 6.2.**	

Habitats and Vegetation

Phase 1 Habitat Survey

6.52 Appendix 6.2 provides detailed accounts of the phase 1 habitats and NVC vegetation communities present within the Study Area. **Figure 6.3 (a-d)** and **Figure 6.4** show Phase 1 Habitat Survey and NVC Survey mapping.

6.53 The Study Area is dominated by commercial upland moor managed primarily for sporting interests (grouse shooting) and sheep grazing. Habitats in the Study Area are dominated by managed moorland/ dry swarf shrub heath strips with mosaics of acid/ marshy grassland, improved grassland, modified heath and modified bog with localised broad-leaved woodland and conifer plantation.

6.54 The varied topographical setting also includes numerous river valleys, steep sloping hillsides (cleuchs) and gently sloping hilltop areas which predominately drain into the Dye Water catchment (a tributary of the River Tweed). The Dye Water flows to the east through the centre of the Site and joins the Whiteadder Water downstream of the Site. Notable hills within the Site include: Meikle Law (468 m Above Ordnance Datum (AOD)) in the north-west; Byrecleugh Ridge (440 m AOD) in the north, Dunside Hill (437 m AOD) in the south-east, and Wedder Lairs (486 m AOD) in the west.

6.55 The majority of the habitats within the Study Area have been heavily influenced to varying extents by grazing pressure, recent and historical burning and artificial drainage arising from commercial activities.

6.56 A total of 19 phase 1 primary habitat categories were recorded within the Study Area. **Table 6.6** provides a summary of the habitat composition of the Study Area with their absolute area and relative proportions.

Table 6.6: Habitats Recorded within the Study Area

Phase 1 Habitat	Area within Study Area (Ha)	Proportion of Study Area (%)
A1.1.1 Broadleaved woodland (semi-natural)	3.20	0.16
A1.1.2 Broadleaved woodland (plantation)	3.81	0.19
A1.2.2 Coniferous woodland (plantation)	0.41	0.02
A3.3 Mixed scattered trees	1.98	0.10
B1.1 Acid grassland (unimproved)	30.09	1.50
B1.2 Acid grassland (semi-improved)	23.16	1.16
B2.2 Neutral grassland (semi-improved)	8.40	0.42
B4 Improved grassland	60.02	3.00
B5 Marshy grassland	94.65	4.72
C1.1 Bracken (continuous)	99.50	4.97
C1.2 Bracken (scattered)	47.27	2.36
D1 Dry dwarf shrub heath	781.95	39.03
D5 Dry heath/acid grassland	417.55	20.84
E1.8 Dry modified bog	385.05	19.22
E2.1 Acid flush	0.83	0.04
HS Hard standing	43.46	2.17
J3.6 Buildings	1.31	0.07

Phase 1 Habitat	Area within Study Area (Ha)	Proportion of Study Area (%)
J4 Bare ground	0.73	0.04
RA Restricted Access	0.25	0.01
Total	**2003.63**	**100%**

National Vegetation Classification (NVC)

6.57 Detailed NVC descriptions are provided in **Appendix 6.2**, and mapped in **Figure 6.4**

6.58 NVC is a more detailed and precise means of describing vegetation communities than Phase 1 Habitat nomenclature. NVC was undertaken when potential habitats of conservation concern were identified during field survey and their extent and species assemblage was of sufficient quality to identify and map.

6.59 As described in **Appendix 6.2,** and illustrated in **Figure 6.4**, not all habitats identified using the phase 1 codes have a corresponding NVC code. The majority of habitats within the Study Area are considered to be common and widespread within the context of the wider landscape and are scoped out of the assessment. However, habitats of likely conservation concern were subject to NVC. Habitats that do have NVC codes are summarised in **Table 6.7** below, the table confirms those habitats taken forward for assessment.

6.60 Woodlands within the Study Area were predominantly of plantation origin, therefore these were not NVC surveyed as the woodland habitats were not identified to be on conservation concern. However, in some woodland areas the ground layer plant communities present were NVC surveyed where potential habitats of conservation concern could be present.

Table 6.7: Habitats of Conservation Concern

Phase 1 Habitat	NVC Code where appropriate	Legislative/Policy Priority
A1.1.1 Broadleaved woodland (semi-natural)	W11 *Quercus petraea-Betula pubescens-Oxalis acetosella* woodland	Scottish Biodiversity List (SBL) (Upland birchwoods) Local Biodiversity Action Plan (LBAP)
B5 Marshy grassland	M23 *Juncus effusus/ acutiflorus-Galium paluste* rush-pasture M25 *Molina caerulea-Potentilla erecta* mire MG10 *Holcus lanatus-Juncus effusus* rush-pasture	M25 - Annex 1 Habitat (Blanket bogs/ degraded bog) High potential GWDTE (M23) Moderate potential GWDTE (M25, MG10) – LBAP (M23, M25)
D1 Dry dwarf shrub heath	*H9 Calluna vulgaris-Deschampsia flexuosa* heath H12 *Calluna vulgaris-Vaccinium myrtillus* heath	Annex 1 Habitat (H4030 European dry heaths) SBL (Upland Heathland)
D2 Wet dwarf shrub heath	M15 *Scirpus cespitosus-Erica tetralix* wet heath	Annex 1 Habitat (H4010 Northern Atlantic wet heaths with *Erica tetralix*) Moderate potential GWDTE (M15) SBL (Upland Heathland)
D5 Dry heath/ acid grassland	U2 *Deschampsia flexuosa* grassland	Annex 1 Habitat (H4030 European dry heaths – H9 and H12)

Phase 1 Habitat	NVC Code where appropriate	Legislative/Policy Priority
	U4 *Festuca ovina-Agrostis capillaris-Galium saxatile* grassland U5 *Nardus stricta-Galium saxatile* grassland H9 *Calluna vulgaris-Deschampsia flexuosa* heath *H12 Calluna vulgaris-Vaccinium myrtillus* heath	SBL (Upland Heathland)
E1.8 Dry modified bog	M19 *Calluna vulgaris-Eriophorum vaginatum* blanket mire M20 *Eriophorum vaginatum* blanket and raised mire	Annex 1 Habitat (H7130 Blanket bogs) SBL (Blanket Bogs)
E2.1 Acid/neutral flush	M6 *Carex echinata-Sphagnum fallax/denticulatum* mire	High potential GWDTE (M6)
E2.3 Bryophyte-dominated spring	M37 *Palustriella comutata-Festuca rubra* spring	Annex 1 Habitat (H7220 Hard-water springs depositing lime; M37) High potential GWDTE (M37) SBL (Upland Flushes, Fens and Swamps)

Groundwater Dependent Terrestrial Ecosystems (GWDTEs)

6.61 Seven NVC communities were recorded which, according to guidance[24], may indicate groundwater dependency. **Table 6.8** summarises the NVC communities of those potential GWDTEs. The middle column notes the potential groundwater dependency according to the guidance, with the far right-hand column providing the outcome of an assessment of likely groundwater dependency (with verification via hydrological survey) based on the actual onsite condition, habitat assemblage and topography of the potential GWDTE. The details of the hydrological survey which confirmed the actual groundwater dependency of the NVC communities potentially affected by the Proposed Development are detailed in **Chapter 8**.

Table 6.8: Potential and Actual Ground Water Dependency

Potential GWDTE NVC Code	Ground Water Dependency	
	Guidance	Actual
M6 *Carex echinata-Sphagnum fallax/ denticulatum* mire	High	Low – only very small patches of this plant community was present within the Study Area and was too small to map.
M15 *Scirpus cespitosus-Erica tetralix* wet heath	Moderate	Low
M23 *Juncus effusus/ acutiflorus-Galium paluste* rush-pasture	High	Low – only very small patches of this plant community was present within the Study Area and was too small to map.
M25 *Molina caerulea-Potentilla erecta* mire	Moderate	Low
M32 - *Philonotis fontana - Saxifraga stellaris* spring	High	Low

Potential GWDTE NVC Code	Ground Water Dependency	
	Guidance	Actual
M37 *Palustriella comutata-Festuca rubra* spring	High	Moderate
MG10 *Holcus lanatus-Juncus effusus* rush-pasture	Moderate	Low

Peat Soils

6.62 Peat is present throughout the Study Area, however owing to the geological structure of the Study Area and the extensive practice of burning, the majority of the Study Area consists of peat depth ranging from <0.25-0.5 m. Areas of deeper peat were localised to gentle sloping hills in the south (Upper Knowe), south-west (Meikle Namels Ridge), north-west (Meikle Law) and north (Byrecleugh Ridge) where peats deposits ranged from 0.5->2 m.

6.63 *Sphagnum* spp. cover across the Study Area was rare, often occurring as small patches <1m^2, indicating the majority of peatland to be 'modified', according to the guidance[4]. Additionally, areas of bare peat were common, generally comprising small patches, as well as extensive patches as a result of recent burning, both which are indicative of 'modified' conditions. Land management practices are responsible for the majority of the peatland within the Study Area being classified as 'modified'. Sheep graze within the Study Area and are likely to have contributed to modifying sensitive habitats by trampling and fertilising habitats through their urine and faeces, both contributing to fragmenting Sphagnum carpets. However, the majority of habitats within the Study Area have been heavily influenced by historical and continued burning.

6.64 This is particularly evident when considering that the most common and widespread habitat was H9 dry heath which accounted for 37% of the Study Area. H9 is the least natural form of upland heath, which is produced and maintained by intensive management. However, across the Study Area there are small, fragmented areas of semi-natural condition peatlands supporting a variety of priority habitats and species.

6.65 Peat soils are assessed in detail in **Chapter 8,** which is supported by **Appendix 8.3 Peat Survey Report, Appendix 6.8 Peat Condition Assessment** and **Figure 6.11 Peat Condition Assessment Map.**

Protected Species

Badger

6.66 The desk study identified 22 records of badger within 5 km of the Site since 2000.

6.67 The habitats within the Study Area offers limited suitability for sett-building and is also sub-optimal for foraging and commuting due to disturbance as a result of the current land use. The field survey identified one sett and low levels of field evidence of foraging badgers, focused around Stot Cleugh watercourse. Although the Study Area is likely to be part of territory for one badger clan, the lack of main/ breeding setts suggest that it is unlikely to form important core territories to support a breeding population. While it is difficult to extrapolate population sizes from the available survey data, the sett identified was not a main/ breeding sett and limited field evidence suggests that this area is only part of a wider territory for the local badger population. The Study Area is also well connected to similar habitats in the wider landscape.

6.68 Further details of badger surveys undertaken, results, and data analysis are provided in **Confidential Figure 6.9** and **Appendix 6.5.**

Bat

6.69 The desk study returned no records of bats within the Site and 4,045 historical records within the 10 km.

6.70 27 trees were recorded within the Study Area as having 'Low' to 'Moderate' Bat Roost Potential (BRP)(**Figure 6.6**). However, only four of 'Moderate' potential trees were recorded, thus the Study Area generally lacks favourable roosting and foraging opportunities for significant numbers of bats.

6.71 Regarding foraging opportunities, the numerous watercourses and drainage channels present throughout the Study Area are likely to provide the most productive invertebrate prey source, however the open heathland and grassland habitats have

been managed for grouse, which has included grazing and historical burning which will reduce the suitability for invertebrates and therefore, foraging bats. For the reasons stated, the habitat suitability is considered to be low.

6.72 Field studies comprised automatic static bat detector sample and analysis. A total of 13 static detectors were deployed for a minimum of 14 consecutive nights during each of the three 2022 survey seasons (i.e. Spring: April/May; Summer: June/July/August; Autumn: September/October). The locations of static bat detectors are included in **Figure 6.7**.

6.73 Surveys identified the following species within the Study Area. Details of survey methods adopted are provided in **Appendix 6.4:**

- Common pipistrelle *Pipistrellus pipistrellus;*
- Soprano pipistrelle *Pipistrellus pygmaeus;*
- Unidentified *Pipistrellus* species;
- Brown long-eared bat *Plecotus auratus*;
- Unidentified *Myotis* species;
- Daubenton's bat *Myotis 6-28aubentoniid*;
- Leisler's bat *Nyctalus leisleri;*
- Noctule bat *Nyctalus noctule*; and
- Unidentified *Nyctalus* species.

6.74 Some calls of *Myotis* and *Pipistrellus* species could not be identified to species level, therefore they have been identified to genus level only (see **Assessment Limitations** above).

6.75 Bat activity varied according to the location within the Study Area, by season and by species or species group. By far the highest level of activity was recorded at detector 4 which was located in the north-west of the Study Area and 350 m north-west of broadleaved woodland, approximately 1.1 km from the closest proposed location at turbine 3, during autumn. Activity levels across the rest of the Study Area were much lower, during all other survey periods. Further details of seasonal activity is included in **Figure 6.8**.

6.76 Pipistrellus spp. were dominant during the static surveys, accounting for 78.36% of the total bat passes recorded across all three seasons. In comparison, all other species recorded during the surveys were found to be present in very low numbers, with Nyctalus spp. accounting for 14.97% of all bat passes and all other bats making up the remaining 6.64%

6.77 Having evaluated the habitat risk as Low and the project size as Large, in accordance with NatureScot guidance[6], the Site is assessed as having a Site Risk Level of 3, which equates to a Medium site risk for collision effects on bats. **Appendix 6.4** provides a detailed evaluation of habitat risk.

6.78 The bat collision risk assessment concluded that the Study Area poses the following risk levels to each bat species recorded:

- **Pipistrelle species:** While the risk to individuals is moderate, at a population level, the risk to Pipistrellus species is considered low due to common and soprano pipistrelle being the two most common bat species with an extensive distribution across the United Kingdom.
- **Noctule:** While the risk to individuals is low across the Study Area, the low activity levels recorded for noctule implies that the risk to individual noctules is low, and at a population level minimal.
- **Leisler's bat:** While the risk to individuals is moderate to high, the very low activity levels recorded for Leisler's bat implies that the risk at a population level is very low.

6.79 In line with NatureScot guidelines, collision risk assessment was not required for Daubenton's bats, or brown long-eared bats as they are not considered at significant risk of collision with turbine blades.

6.80 Further details of bat surveys undertaken, results and data analysis are provided in **Appendix 6.4.**

Otter

6.81 The desk study identified 5 records of otter within 5 km of the Site since 2000. Surveys identified suitable habitat for otter. Many of the larger watercourses and drainage channels within the Study Area offer suitable conditions for commuting and foraging, although shelter was limited across the Study Area. However, the Study Area has been heavily impacted by human disturbance including historical and recent grazing or burning which reduces the overall suitability for sheltering, foraging and commuting otters.

6.82 Three temporary resting sites were identified on the Dye Water and nine spraint cluster locations were recorded on the same watercourse at various locations within the central section of the Study Area. In addition, spraint was also recorded at one location on Bogan Burn and two locations on Kersons Cleugh watercourse.

6.83 The levels of activity recorded indicate that while the Study Area forms part of a territory for an otter population, it is unlikely to be a core territorial area, unlikely to be of importance to breeding due to the lack of holts.

6.84 Further details of otter surveys undertaken, results and data analysis are provided in **Appendix 6.3.**

Water Vole

6.85 The Study Area supported suitable habitat for sheltering and foraging water voles, primarily along the tributaries of Dye Water. However, no field signs were recorded during field survey and no existing records were identified by the desk study. Further details of water vole surveys undertaken, results and data analysis are provided in **Appendix 6.3.**

Mountain Hare

6.86 The desk study identified 111 records of mountain hare within 5 km of the Site since 2000. The field survey recorded forty-six sightings of the species within the Study Area. Mountain hare are associated with heath moorland habitats, the habitats that are managed for grouse within the Study Area are particularly suitable. The species rest in scrapes above ground. The Study Area provides suitable sheltering and foraging resources for the species. Further details are provided in **Appendix 6.3.**

Other

6.87 The desk study identified existing records of the following species within 5 km of the Site since 2000:

- Two records of lamprey (species undetermined);
- 15 records of Atlantic salmon *Salmo salar;*
- Ten records of common lizard *Zootoca vivipara*; and
- Two records of adder *Vipera berus*.

6.88 There were no existing records of the following species within the 5 km Study Area:

- Reptile: grass snake *Natrix Helvetica* and slow-worm *Angus fragilis* – habitats within the Study provide some limited suitability for reptile species. However, these are highly mobile species that are likely to be present in in low densities therefore the Proposed Development is unlikely have a significant effect on breeding populations; and
- Great crested newt *Triturus cristatus* – the Study Area lacked suitable pond/ standing water habitats to support breeding populations of this species.

6.89 Further details are provided in **Appendix 6.1.**

6.90 All other protected species have been scoped out of the assessment on the basis that the baseline data demonstrates that the Study Area is unlikely to be of importance for these species.

Future Baseline in the Absence of the Proposed Development

6.91 Ecological features are rarely static in their extent, distribution and condition. Habitats and species populations are dynamic and so the prediction of future baseline is complex.

6.92 However, in the absence of the Proposed Development it is likely that the heath and grassland habitats that currently dominate a large proportion of the Study Area would continue to be subject to the existing grouse management practices. This would involve continued grazing and potentially burning of heathland, which would continue to affect the habitats of conservation

concern and protected species assemblages discussed in this Chapter. Therefore, the constituent habitats and species present within the Study Area and their current range and distribution, are likely to stay broadly similar to the existing baseline.

Implications of Climate Change

6.93 The predicted effects of climate change are likely to have a bearing on the future ecological status of the Study Area. The UK Climate Projections (most recently UKCP18) generally predicts hotter, drier summers and milder, wetter winters, with an increase in the number of heavy rain days and the frequency of winter storms.

6.94 These predicted changes in climate may result in changes to vegetation assemblages; however, it is unlikely that climate change will have a significant bearing on the structure and function of the upland habitats present within the Study Area and surrounding area.

6.95 However, individual species may be adversely affected by the predicted changes in climate if conditions affect the survival rate of the animals at a critical life stage (such as at hibernation or during breeding). For example, otter and water vole may be affected by either periods of drought or episodic heavy rain affecting success during the breeding season and/ or food availability. The distribution of species in the uplands may therefore be altered as a result of projected climate change, although the exact nature of the effects is difficult to predict due to the complex nature of interactions between species and their resources.

Ecological Importance

6.96 Table 6.9 provides an interpretation of the Ecological Importance of the Study Area for those habitats and species scoped into the assessment. Details of the locations of designated areas within **Table 6.9** are included in **Figure 6.2** and habitats of conservation concern are included in **Figures 6.3, 6.4** and **6.5**. A detailed account of these habitats is provided in **Appendix 6.2.** As common and widespread habitats have been scoped out, only habitats of conservation interest[2] are included in the assessment. For ease of assessment, habitats are grouped by 'conservation interest type', using the highest level of importance (i.e. Annex 1 classification supersedes SBL-listed, and SBL-listed supersedes LBAP status). Note that the habitats and protected listed on the LBAP are all also listed on the SBL and so are not repeated.

Table 6.9: Ecological importance Assessment

Ecological Feature	Ecological Importance of Site for Ecological Feature	Rationale
Designated Sites (See **Figure 6.2**)		
River Tweed SAC	Local	This designated site covers the catchment of the River Tweed, this is a significant area within the south-east of Scotland. The Site is designated for watercourses of plain to montane levels with the *Ranunculion fluitantis and Callitricho-Batrachion* vegetation, Atlantic salmon, otter, sea lamprey, brook lamprey and river lamprey. However, only a very small part of the SAC lies within the Site, this is comprised of the Dye Water that runs from west to east through the centre of the Study Area. Ultimately, the viability of the SAC is not reliant on the function of the component within the Site. A further short section of the Blackadder Water, also part of the designation, flows below the existing access track. The Site is considered to be of **Local** level importance.
River Tweed SSSI	Local	This designated site covers a significant area within the south-east of Scotland. This designation occupies a smaller area than the SAC, however the two designations overlap. The SSSI is designated for trophic river/ stream habitats and its beetle, fly and vascular plant assemblage. However, only a very small part of the SSSI lies within the Site, this is comprised of the Dye Water that runs from west to east through the centre of the Study Area.

Ecological Feature	Ecological Importance of Site for Ecological Feature	Rationale
		The Site is considered to be of **Local** level importance.
Byrecleuch Burn, Stot Cleugh LBS	**County**	The Site is located within the south-east of the Site and is designated by the Local Authority due to the presence of cleughs and burnsides with nationally scarce plants and locally rare plants and moths. The LBS is located almost entirely within the Site, therefore the Site is considered to be of **County** level importance.
Corby Scar and Upper Watch Water LBS	**County**	The Site is located predominantly within the south-east and is designated by the Local Authority due to the presence of acid burnsides with a high diversity of grassland plant species, including several local rarities. The LBS is located almost entirely within the Site, therefore the Site is considered to be of **County** level importance.
Habitats of Conservation Concern (See **Figure 6.3, 6.4** and **6.5**)		
Annex 1 Habitat - H7130 Blanket bogs/ degraded bog	**Local**	Phase 1 Habitat: B5 Marshy grassland and E1.8 Dry modified bog. NVC codes: M19, M20, M25 Degraded modified bog is present to the south-west of the Site and localised patches in proximity to the existing Fallago Rig sub-station to the west of the Study Area and forms part of a heath/ dry modified bog/ acid grassland mosaic associated with grouse moorland management practices. Habitats in a degraded state are considered with regards to their *potential* value. As such, the bog habitats within the Site are currently heavily modified examples of an Annex 1 habitat due to land management practices and one that is common in the wider landscape. However they have potential to form functional examples of Annex 1 habitat, albeit in relatively small, isolated areas that are mosaic of heath and acid grassland that could become a valuable component of the wider local resource. The Site is considered to be of **Local** level importance.
Annex 1 Habitat (H4030 European dry heaths)	**Local**	Phase 1 Habitat: D2 Wet dwarf shrub heath and D5 Dry heath/ acid grassland NVC Code: M15, H9, H12 Dry heath is present in the same broad areas as the degraded modified bog above forming part of a heath/ dry modified bog/ acid grassland mosaic associated with grouse moor land management practices. Habitats in a degraded state are considered with regards to their *potential* value. As such, the heath habitats within the Study Area are heavily modified examples of an Annex 1 habitat due to current land management practices and one that is common in the wider landscape. However they have potential to form functional examples of Annex 1 habitat, albeit in relatively small, isolated areas that are mosaic of heath and acid grassland that could become a valuable component of the wider local resource. The Site is considered to be of **Local** level importance.

Ecological Feature	Ecological Importance of Site for Ecological Feature	Rationale
High potential GWDTE	**Local**	Phase 1 Habitat: B5 Marshy grassland, E2.1 Acid/neutral flush, NVC Code: M23, M6, M37 These habitats are also associated with the same broad areas as the degraded modified bog and dry heath above forming part of a heath/ dry modified bog/ acid grassland mosaic associated with grouse moor land management practices. M6 and M23 habitats were only present in very small areas that were too small to map. It is a heavily modified habitat due to current land management practices and one that is common in the wider landscape. The Site is considered to be of **Local** level importance.
Moderate potential GWDTE	**Local**	Phase 1 Habitat: B5 Marshy grassland NVC Code: MG10 This habitat is also associated with the same broad areas as the degraded modified bog and dry heath above forming part of a heath/ dry modified bog/ acid grassland mosaic associated with grouse moor land management practices. It is a heavily modified habitat due to current land management practices and one that is common in the wider landscape. The Site is considered to be of **Local** level importance.
SBL (Upland birchwoods)	**Local**	Phase 1 Habitat: A1.1.1 Broadleaved woodland (semi-natural) NVC Code: W11 This habitat occurs in one localised area in the vicinity of Byrecleugh Burn. This habitat is isolated in relation to other woodland in the area and relatively uncommon in the wider landscape. The Site is considered to be of **Local** level importance.
SBL (Upland Heathland)	**Local**	Phase 1 Habitat: D5 Dry heath/ acid grassland NVC Code: U2, U4, U5 These habitats are also associated with the same broad areas as the degraded modified bog and dry heath above forming part of a heath/ dry modified bog/ acid grassland mosaic associated with grouse moor land management practices. It is a heavily modified habitat due to current land management practices and one that is common in the wider landscape. The Site is considered to be of **Local** level importance.
Protected Species (See **Figure 6.6**)		
Otter	**Local**	Evidence of otter was predominantly along the Dye Water which runs from west to east across the centre of the Site and forms a small part of the River Tweed SAC/ SSSI which includes otter as a qualifying species. However, this was limited to one temporary resting place and spraints of varying ages. It is considered likely that the Study Area forms non- core part of a large territory, however the Site is outwith the core breeding territory that will be present to the east of the Site. The Site is considered to be of **Local** level importance.
Mountain hare	**Local**	Mountain hare were recorded across the Site. The heathland mosaic habitats that dominate the Site provides suitable above ground sheltering opportunities and foraging resources. This habitat is also common in the

Ecological Feature	Ecological Importance of Site for Ecological Feature	Rationale
		wider landscape, however the specific land management practices of the Study Area create particularly optimal habitat for the species. The Site is considered to be of **Local** level importance.
Bats	**Study Area**	The Site does not support known bat roosting sites. Bat activity across the Site was low and the assemblage was dominated by common and widespread pipistrelle species. From the desk study assessments it is considered that the wider landscape displays similar habitats with likelihood that activity level is also low in these areas due to lack of roosting opportunities and linear vegetation features to aid commuting and foraging. The Site is considered to be of **Study Area** level importance.

Identification of Likely Significant Effects

6.97 The assessment of effects is based on the project description as outlined in **Chapter 3** and the embedded mitigation by design described in **Chapter 2**. Unless otherwise stated, potential effects identified are considered to be adverse.

6.98 Table 6.10 provides a summary of the project interactions that are assessed in relation to each of the key receptors scoped into this assessment.

Table 6.10: Identification of Likely Effects

Ecological Feature	Development Activity	Likely Effect Pathway	Likely Effect
Construction			
Designated sites within the Site: River Tweed SAC/ SSSI, Byrecleugh burn LBS, Designated sites within the Site: Corby Scar and Stot Cleugh LBS. Lammermuir LNCS	■ Surface vegetation clearance; ■ Excavation for construction of turbine platforms and infrastructure; ■ Construction of turbine platforms and infrastructure; and ■ Presence and use of fuelled plant.	■ Physical removal of habitat; ■ Changes in water quality and volume; ■ Change in hydrological regime of peatland habitats; and ■ Pollution event.	Direct habitat loss Habitat fragmentation Disturbance Mortality (Otters)
Habitats of Conservation Concern	■ Surface vegetation clearance; ■ Excavation for construction of turbine platforms and infrastructure. ■ Construction of turbine platforms and infrastructure; and ■ Presence and use of fuelled plant.	■ Physical removal of habitat; ■ Changes in water quality and volume; ■ Change in hydrological regime of peatland habitats; and ■ Pollution event.	Direct habitat loss Habitat fragmentation

Ecological Feature	Development Activity	Likely Effect Pathway	Likely Effect
Otter	■ Surface vegetation clearance; ■ Excavation for construction of turbine platforms and infrastructure; and ■ Construction of turbine platforms and infrastructure.	■ Physical removal of habitat; ■ Changes in water quality and volume; and ■ Change in hydrological regime	Habitat fragmentation Mortality Disturbance
Mountain hare	■ Surface vegetation clearance; and ■ Excavation for construction of turbine platforms and infrastructure.	■ Physical removal of habitat; and ■ Death of individual animals as a result of earth works or human/ vehicle presence.	Habitat loss Mortality
Operation			
Bats	■ Operation of turbines at night (taken to be 30 minutes prior to sunset until 30 minutes after sunrise.	■ Loss of commuting lines and foraging habitat due to the presence of turbines; ■ Changes in air pressure around operational turbines and along commuting and foraging corridors; and ■ Accidental collision with turbine blade	Habitat fragmentation Mortality

Assessment of Effects

Potential Construction Effects

6.99 In this section, drawing on **Table 6.1**, an assessment is made of the significance of likely effects on ecological features during construction, in the absence of mitigation.

Designated Sites within Study Area

6.100 Four designated Sites were recorded within the Site, these comprise theRiver Tweed SAC/ SSSI and Byrecleugh Burn LBS, Corby Scar and Stot Cleugh LBS (**Figure 6.2**). As outlined in **Table 6.9** the Site is considered to be of Local ecological importance to the integrity and viability of these features.

6.101 Potential construction effects on designated sites are:

- Direct habitat loss as a result of the removal of habitat; and/ or a pollution event;
- Habitat fragmentation as a result of vegetation removal and/ or changes to hydrological regime (particularly within peatland habitats); and
- Potential disturbance and/ or mortality of designated qualifying features of the River Tweed SAC and SSSI (i.e. otter, Atlantic salmon, sea lamprey, brook lamprey, river lamprey, beetle, fly and vascular plant assemblages). Potential construction effects on otter are discussed separately below.

6.102 There will be no direct habitat loss or fragmentation on designated sites within the Site as a result of the Proposed Development.

6.103 Embedded design avoidance and mitigation measures (**Appendix 3.1**) will avoid development in the vicinity and protection of qualifying features of these designated sites. Where possible existing access track routes have been utilised and the number of water crossings minimised to a single crossing. Infrastructure has been located away from watercourses to safeguard the water environment and the qualifying features of designated areas during construction. The Outline CEMP (**Appendix 3.1**) provides detailed pollution prevention measures to reduce the likelihood of significant effects of construction activities. The OREP (**Appendix 6.6** and **Figure 6.10a** and **6.10b**) will improve habitat connectivity and resilience by introducing native riparian woodland/ shrub habitats, diverse grassland and improving heath/ modified bog habitats across the Study Area.

6.104 The River Tweed SAC and SSSI covers a significant area within the south-east of Scotland. However, only a very small part of the SAC and SSSI lies within the Study Area (less than 1%). Therefore, the Study Area is of very limited value to the wider integrity of the River Tweed SAC/ SSSI.

6.105 Although Byrecleugh Burn LBS, Corby Scar and Stot Cleugh LBS are within the Site, no development is planned in the vicinity of these areas. The current land use of the Study Area only provides limited ecological value to the integrity to these designated sites.

6.106 In considering the above, the significance of potential effects on designated sites is detailed in **Table 6.11**. Significance is assessed within the context of the Ecological Importance of the Study Area as defined within **Table 6.4.**

Table 6.11: Assessment of Significance of Likely Construction Effects - Designated Sites within Study Area

Parameter	Likely Effect	
	Direct Habitat Loss	Habitat Fragmentation
Extent	There will be no direct habitat loss within Designated sites within the Site as a result of construction activities.	There will be no habitat fragmentation within Designated sites within the Site. Habitat connectivity will be enhanced as a result of the Proposed Development as a result of construction activities.
Magnitude	There will be no change to the conservation status or the integrity of qualifying features of designated sites within the Site as a result of habitat loss during the construction process.	There will be no change to the conservation status or the integrity of qualifying features of designated sites within the Site as a result of habitat fragmentation during the construction process.
Duration	Permanent	Permanent
Frequency	One-off event during construction	One-off event during construction
Reversibility	Irreversible	Reversible
Likelihood	Unlikely	Extremely unlikely
Significance (EcIA)	**Not significant**	**Not significant**
Significance (EIA)	**Not significant**	**Not significant**

Habitats of Conservation Concern

6.107 The habitats of conservation concern outlined within **Table 6.8** are considered to be of **Local** level Ecological Importance, in line with the **Table 6.9**. The habitats of concern recorded within the Study Area are considered to be of ecological value in relation to their legal/ policy status, however due to current grouse management practices that dominate the Study Area, these habitats are disturbed and degraded in condition and species diversity is generally low. However, these habitats have the potential to contribute to the overall ecological function of the Study Area, and provide connectivity through the Study Area.

6.108 Potential construction effects on designated sites are:

- Direct habitat loss as a result of the removal of habitat; and/ or a pollution event; and
- Habitat fragmentation as a result of vegetation removal and/ or changes to hydrological regime (particularly within peatland habitats).

6.109 Approximately 34.1 Ha (1.7%) of the Study Area's total habitat resource is forecast to be lost to the Proposed Development. Of this, approximately 32.768 Ha of habitats of conservation concern will be directly lost, this equates to 1.6% of the total habitats of conservation concern within the Study Area. The habitats of conservation concern which will be lost as a result of the Proposed Development are predominantly from within dry/ modified bog, heath and marshy/ acid grassland habitats.

6.110 Table 6.12 details the total area to be lost, of each habitat type of conservation concern (as defined in **Table 6.8** above), arising from turbine locations and associated infrastructure.

Table 6.12: Habitat Loss Calculations - Habitats of Conservation Concern

NVC Code	Area to be Lost (Ha)	Total of Habitat Type Within the Study Area (Ha)	% of Study Area Habitat Resource to be Lost
H9 Calluna vulgaris-Deschampsia flexuosa heath	10.029	756.339	1.326
H12 *Calluna vulgaris-Vaccinium myrtillus* heath	3.437	132.755	2.589
M6 *Carex echinata-Sphagnum fallax/denticulatum* mire	0.364	5.495	6.624
M19 *Calluna vulgaris-Eriophorum vaginatum* blanket mire	2.406	42.240	5.696
M20 *Eriophorum vaginatum* blanket and raised mire	8.757	397.341	2.204
M23 *Juncus effusus/ acutiflorus-Galium paluste* rush-pasture	1.560	156.035	0.100
M25 *Molina caerulea-Potentilla erecta* mire	1.0114	9.022	11.210
U2 *Deschampsia flexuosa* grassland	1.792	107.694	1.664
U4 *Festuca ovina-Agrostis capillaris-Galium saxatile* grassland	2.680	106.319	2.521
U5 *Nardus stricta-Galium saxatile* grassland	0.080	22.484	0.356
U20 *Pteridium aquilinum - Galium saxatile* community	0.652	115.466	0.565
Total	**32.768**	**1851.190**	**1.7%**

6.111 Table 6.12 above highlights the limited nature of habitat loss within the Study Area. Notably, in totality, less than2% of the Study Area's habitat of conservation interest will be lost. The Study Area is dominated by a mosaic of heathland and grassland utilised for grouse management, with habitats of conservation concern predominately being located within watercourse corridors. Areas of wet/ dry modified bog and heath and marshy grasslands are highly modified and disturbed as a result of the current land use.

6.112 There is no loss of the following habitats/ vegetation communities that represent habitats of conservation concern:

- W11 *Quercus petraea-Betula pubescens-Oxalis acetosella* woodland (Scottish Biodiversity List, Local Biodiversity Action Plan);
- MG10 *Holcus lanatus-Juncus effusus* rush-pasture (Moderate potential GWDTE, Scottish Biodiversity List);
- M15 *Scirpus cespitosus-Erica tetralix* wet heath (Annex 1 Habitat, Moderate potential GWDTE, Scottish Biodiversity List); and
- M37 *Palustriella comutata-Festuca rubra* spring (Annex 1 Habitat, High potential GWDTE, Scottish Biodiversity List).

6.113 Based on the small areas of habitat loss, no significant effects are predicted for the following habitat types:

- H9 *Calluna vulgaris-Deschampsia flexuosa* heath;
- H12 *Calluna vulgaris-Vaccinium myrtillus* heath;
- M6 *Carex echinata-Sphagnum fallax/denticulatum* mire;
- M19 *Calluna vulgaris-Eriophorum vaginatum* blanket mire;
- M20 *Eriophorum vaginatum* blanket and raised mire;
- M23 *Juncus effusus/ acutiflorus-Galium paluste rush*-pasture;
- M25 *Molina caerulea-Potentilla erecta* mire;
- U2 *Deschampsia flexuosa* grassland;
- U4 *Festuca ovina-Agrostis capillaris-Galium saxatile* grassland;
- U5 *Nardus stricta-Galium saxatile* grassland; and
- U20 *Pteridium aquilinum - Galium saxatile* community.

6.114 The proportion of habitats of conservation concern to be lost in comparison to the available resource within the Study Area is limited and the losses are not considered to adversely affect the integrity of these habitats in a wider context.

6.115 Habitat fragmentation, particularly of peat-forming habitats, largely relates to changes in the hydrological regime of the Study Area as a result of construction activities. The effect on the hydrological regime of habitats is assessed in **Chapter 8**. The peat survey report in **Appendix 8.2** has confirmed that:

- 38.1% of probes were recorded as having a depth of less than 25 cm. These probes are not classified as peat.
- 43.1% of probes were recorded as having a peat depth of between 25-50 cm. These probes are classified as organo-mineral soils and not formally considered to be peat.
- 16.2% of probes were recorded as having a peat depth of between 50-100 cm.
- 2.7% of the probes were recorded as having a peat depth of over 100 cm. With 0.5% of this being between 200 – 299 cm deep at its deepest.

6.116 Therefore, all peat soils within the Study Area are less than 300 cm in depth. The design of the layout (See **Chapter 2**) has avoided areas of deeper peat as far as possible.

6.117 In considering the above, the significance of potential effects on habitats is detailed in **Table 6.13**. Significance is assessed within the context of the Ecological Importance of the Study Area, with these habitats being of Study Area level importance as defined within **Table 6.9.**

6.118 The OREP (**Appendix 6.6** and **Figure 6.10a** and **6.10b**) will improve habitat connectivity and resilience of habitats of conservation concern by introducing native riparian woodland/ shrub habitats, diverse grassland and improving heath/ modified bog habitats across the Study Area.

Table 6.13: Assessment of Significance of Likely Construction Effects – Habitats of Conservation Concern

Parameter	Likely Effect	
	Direct Habitat Loss	Habitat Fragmentation
Extent	Loss of habitats of conservation concern as a result of construction is limited to a very small proportion of the overall resource present within the Study Area.	The design process has sought to avoid habitats of conservation concern as far as possible. A commitment to utilise the existing access tracks within the Site as far as is practical means that habitat fragmentation is limited. The network of watercourses within the Study Area will be maintained. There will be no fragmentation of habitats of conservation concern within the Study Area as a result of construction. Habitat connectivity will be enhanced by the OREP as a result of the Proposed Development.
Magnitude	Loss of habitats of conservation concern as a result of construction is extremely unlikely to affect the viability or function of habitats within the Study Area.	There will be no change to the structure or function of habitats of conservation concern within the Study Area as a result of habitat fragmentation during the construction process.
Duration	Permanent	Permanent
Frequency	One-off event during construction	One-off event during construction
Reversibility	Irreversible	Reversible
Likelihood	Certain	Unlikely
Significance (EcIA)	**Not significant**	**Not significant**
Significance (EIA)	**Not significant**	**Not significant**

Otter

6.119 Potential construction effects on otter are:

- Habitat fragmentation as a result of vegetation removal and/ or changes to hydrological regime (particularly within peatland habitats);
- Mortality in relation to entrapment and/ or presence of heavy machinery during excavation and construction of turbine platforms and infrastructure; and
- Disturbance due to construction noise, lighting and/ or presence of heavy machinery in proximity to watercourses during excavation and construction of turbine platforms and infrastructure.

6.120 Otter activity in the Study Area was concentrated around the Dye Water, here one temporary resting site and nine spraint locations were recorded. Spraint was also recorded at one location on Bogan Burn and two locations on Kersons Cleugh watercourse.

6.121 These watercourses within the Study Area are considered to be sub-optimal for sheltering, commuting and foraging otters due to human disturbance including historical and recent grazing or burning which reduces the overall suitability for sheltering, foraging and commuting otters. This is evident by the low levels of otter field signs recorded during field surveys. The lack of sheltering resources indicates that the Study Area is unlikely to form a core part of the breeding territory for the species.

However, these species are of ecological importance due to their conservation (legal) status and have the potential to contribute to the overall ecological function and provide connectivity through the Study Area.

6.122 The excavation and construction of turbine platforms and infrastructure, has potential to pose a mortality risk to otters and may also disrupt their commuting and foraging, particularly if hydrological regimes are altered. Disturbance through an increased human and vehicle presence, resulting in increased noise and vibration.

6.123 The design process has considered the potential effects on otter, and their known distribution within the Study Area. With exception of the single new watercourse crossing and minor road surfacing and localised widening of the existing Fallago Rig access road, no construction works will take place within 50 m of a watercourse/waterbody. Strict pollution prevention measures will be implemented. The CEMP will include SPPs, an advisory ECoW and commitment to follow GPPs, the works are unlikely to adversely affect otter.

6.124 In considering the above, the significance of likely effects on Otters is detailed in **Table 6.14**. Significance is assessed within the context of the Ecological Importance of the Study Area for bats as being of Study Area level Ecological Importance as defined within **Table 6.4**.

Table 6.14: Assessment of Significance of Likely Construction Effects – Otter

Parameter	Likely Effect		
	Habitat Fragmentation	Mortality	Disturbance
Extent	Limited to new water crossings which will include mammal ledges to allow movement of otters and other small mammals through the channel.	Limited to vicinity of single new water crossing.	Limited to vicinity of single new water crossing.
Magnitude	Limited to relatively small areas of habitat in proximity to water crossings, where commuting patterns could be disrupted.	Limited to a very small number of otters, based on the lack of resting places identified during surveys.	Limited to isolated construction events.
Duration	During construction (24 months).	During construction (24 months), irreversible to the individuals killed.	Intermittent during construction (24 months).
Frequency	One-off event during construction.	Potentially repeated during construction phase.	Intermittent during construction
Reversibility	Reversible	Irreversible	Reversible
Likelihood	Unlikely	Unlikely	Unlikely
Significance (EcIA)	**Not significant**	**Significant at Study Area level**	**Not significant**
Significance (EIA)	**Not significant**	**Minor significance**	**Not significant**

Mountain Hare

Potential construction effects on mountain hare are:

- Habitat loss as a result of vegetation removal; and
- Mortality in relation to entrapment and/or presence of heavy machinery during excavation and construction of turbine platforms and infrastructure.

6.125 Presence of mountain hare was recorded within heath habitats throughout the Study Area. The Study Area provides suitable above ground sheltering and foraging resources for the species within the mosaic heathland habitats that dominate the Study Area.

6.126 Habitat loss will arise as a result of vegetation removal and earthworks in relation to construction of turbine platforms and infrastructure. However, direct habitat loss is minimal in relation to the suitable habitat resources that will remain within the Study Area.

6.127 The vegetation removal, earthworks and increased vehicle movements in relation to the construction of turbine platforms and infrastructure have potential to pose a mortality risk to mountain hare. Mountain hare are a highly mobile species, which shelter above ground, therefore mortality is unlikely. However, during the breeding season, the effect could be significant at the **Study Area** level.

6.128 Mountain hare are of ecological importance due to their conservation (legal) status and have the potential to contribute to the overall ecological function of the Site and provide connectivity through the Study Area. The Outline CEMP will include SPPs, an Advisory ECoW and commitment to follow GPPs. The works are unlikely to adversely affect mountain hare.

6.129 In considering the above, the significance of likely effects on mountain hare is detailed in **Table 6.15**. Significance is assessed within the context of the Ecological Importance of the Study Area for bats as being of Study Area level Ecological Importance as defined within **Table 6.4.**

Table 6.15: Assessment of Significance of Likely Construction Effects – Mountain Hare

Parameter	Likely Effect	
	Habitat Loss	Mortality
Extent	Habitat loss within the Study Area is limited in relation to the habitat resource available within the Study Area and wider landscape.	Limited to vicinity of earthworks and access tracks.
Magnitude	Limited to relatively small areas of habitat in proximity to vicinity of earthworks and access tracks.	Limited to a very small number of mountain hare.
Duration	During construction (24 months).	During construction (24 months), irreversible to the individuals killed.
Frequency	One-off event during construction.	Potentially repeated during construction phase.
Reversibility	Reversible	Irreversible
Likelihood	Unlikely	Unlikely
Significance (EcIA)	**Not significant**	**Significant at Study Area level**
Significance (EIA)	**Not significant**	**Minor significance**

Potential Operational Effects

Bats

6.130 Bats present within the Site are considered to be of Study Area level Ecological Importance, in line with **Table 6.9**. The Study Area generally lacks favourable roosting opportunities for bats due to the dominance of managed grouse heathland. Habitats within the Study Area only provide limited opportunities for foraging and commuting bats. This is evident by the low levels of bat activity recorded during field surveys. However, these species are of ecological importance due to their

conservation (legal) status and have the potential to contribute to the overall ecological function and provide connectivity through the Study Area.

6.131 Likely effects on bats during operation have been identified as:

- Habitat fragmentation in relation to lost commuting lines and foraging habitat due to the presence of turbines; and
- Mortality in relation to barotrauma caused by changes in air pressure around turbines, and direct collision with turbine blades.

6.132 Potential operational effects are predominantly associated with the operation of turbines at night, particularly 30 minutes prior to sunset until 30 minutes after sunrise.

6.133 It is widely acknowledged that common and widespread bat species (such as common and soprano pipistrelle (which accounted for the vast majority of bats recorded)) favour linear features such as forest edges and watercourses for commuting and foraging. Bat activity was generally low (albeit variable) across the Study Area and seasons, and the species assemblages largely comprised common and widespread species. However, the installation of turbines near linear features, particularly watercourses, is likely to pose a mortality risk to bats and may also disrupt their commuting and foraging. The loss of a small number of individuals from a small population can have a substantial effect on the local population and may adversely affect the distribution of bats.

6.134 Therefore, the Proposed Development could have an adverse effect on bats in terms of their mortality and population viability within the Study Area. By observing a 50 m buffer between turbine blades and the edges of watercourses and woodlands, both potential effects are reduced.

6.135 In considering the above, the significance of likely effects on bats is detailed in **Table 6.16.** Significance is assessed within the context of the Ecological Importance of the Study Area for bats as being of Study Area level importance as defined within **Table 6.4**.

Table 6.16: Assessment of Significance of Likely Operational Effects – Bats

Parameter	Likely Effect	
	Habitat Fragmentation	Mortality
Extent	Turbine areas where commuting and foraging lines may be fragmented.	Turbine areas where collision and/ or barotrauma may be experienced.
Magnitude	Very low. Likely limited to a small number of potential foraging and commuting routes. Other routes will persist.	Low given the low levels of activity across the Study Area. However the loss of a small number of bats from small populations will be proportionally high and will affect the bat population of the Study Area.
Duration	Potentially repeatedly during operational lifetime.	Potentially repeatedly during operational lifetime.
Frequency	Potentially repeatedly during operational lifetime.	Potentially repeatedly during operational lifetime.
Reversibility	Irreversible at an individual level, but reversible at the population level, albeit slowly.	Reversible upon decommissioning, at the population level, but irreversible to those individuals killed.
Likelihood	Probable	Probable
Significance (EcIA)	**Not significant**	**Significant at Study Area level**
Significance (EIA)	**Not significant**	**Minor significance**

Potential Cumulative Effects

6.136 In this section, the potential cumulative effects of the Proposed Development with other wind farm developments are considered. This includes schemes within 10 km which are currently at EIA Scoping stage, are the subject of a valid planning application, or which have been consented but are not operational, and where there is sufficient information to enable them to be included in the assessment. Operational wind farms are not considered in this cumulative assessment of effects because these are considered to be part of the baseline conditions.

6.137 Table 6.17 provides details of wind farms identified within 10 km of the Site. As both projects are at design/Scoping stage, a search of Scottish Borders Council's and East Lothian Council's planning portals, and dedicated scheme websites, have not provided sufficient information on these proposals to allow a cumulative assessment to be completed.

Table 6.17: Wind Farms in the Planning System within 10 km of the Proposed Development

Wind Farm Development	Number of Turbines	Status	Notes	Distance (km)	Co-ordinates (x, y)	Tip height (m)
Wedderlie Farm	5	Design/Scoping – detailed project data not available at this stage.	Managed upland habitat	5.79	365449, 654723	149.9
Newlands Hill[33]	17	Design/Scoping – detailed project data not available at this stage.	Managed upland habitat	6.46	359792, 664694	200

6.138 A review of aerial photography of these developments indicate that these Sites are dominated by managed upland habitats. Habitats present in these developments are likely to be broadly similar in composition to the Study Area, therefore of similar ecological importance. The above developments are also likely to support low levels of similar protected species to that present in the Study Area. It is likely, then, that forthcoming assessments of these sites will identify no significant effects on ecological receptors (in EIA terms). When considered cumulatively, at an appropriate geographical level (County) it is considered unlikely that effects on ecological features will be significant.

Decommissioning

6.139 Decommissioning effects are unclear given the Proposed Development's operational life and the manner in which ecological features at the Site could change over such a long period. However, while decommissioning effects are not assessed further, it is unlikely that the significance of effects experienced at that time will be greater than those assessed for the construction phase.

Mitigation and Enhancement

6.140 This section provides information relating to the avoidance, mitigation and enhancement measures to be implemented by the Proposed Development via the OREP (**Appendix 6.6** and **Figure 6.10a** and **6.10b**). The aim of which is to demonstrate contribution to the enhancement of biodiversity as a result of the Proposed Development. This includes the strengthening of habitat networks and restoration of degraded habitats.

6.141 Areas identified within the OREP for mitigation and enhancement will be further refined within the Detailed Restoration and Enhancement Plan to be produced post-consent. This will require to have cognisance of the following:

- Areas of higher grade peat and head waters will be avoided during shrub/ tree planting;
- Appropriate exclusion zones will be established to protect Heritage sites (See **Chapter 5**);
- Appropriate planting schedules will be developed to include native shrub and tree planting of local provenance and appropriate to the soil and hydrological conditions present;

[33] Belltown Power. Newlands Hill Energy Hub website. Available at: https://www.newlandshillwindenergyhub.com/ [Accessed April 2023]

- Areas identified for mitigation/ enhancement will require further consideration in relation to terrain, soil conditions and hydrological regimes within the Site;
- Works will be undertaken under the guidance of an Ecological Clerk of Work; and
- Grazing regimes of the OREP area and resulting pressures will require to be reviewed and taken into account when developing the detailed planting schedules for habitat mitigation and enhancement areas.

Mitigation During Construction

6.142 No significant effects (in EIA terms) have been identified during construction of the Proposed Development, as such under the requirements of the EIA regulations, no additional mitigation is necessary. However, the following measures will be implemented to safeguard legal compliance in relation to protecting designated sites, habitats of conservation concern and protected species. This will be achieved through the measures established in the Outline CEMP (See **Appendix 3.1**).

6.143 The following mitigation and enhancement principles will be implemented as part of the OREP, further details are included in **Appendix 6.6** and **Figure 6.10a** and **6.10b**:

- Areas to the south and centre of the Study Area have been identified for heath/ bog habitat improvement which will include drain blocking;
- The enhancement or riparian corridors (see below) will be supported by the improvement a number of grassland areas to include more diverse species rich native grasslands; and
- The proposed single new watercrossing (an Arch section culvert) will be designed to support the passage of mammals/fish and other species.

Mitigation During Operation

6.144 Operational effects on bats were identified as a result of mortality. However, these were only significant at the Study Area level, therefore this is not considered to be significant in the context of the EIA Regulations (refer to **Table 6.4**), and therefore no specific additional mitigation is required.

6.145 However, as will be established in the CEMP, SPPs will be implemented during operation of the Proposed Development. This will include details of a programme of bat mortality monitoring once the Proposed Development is operational. Where monitoring provides results that highlight potential concerns regarding bat mortality at specific locations, additional measures will be considered that alter the blade rotation to reduce the risks to bats, for example reduced rotation speed while idling and/or curtailment of specific turbines during seasons, times and wind conditions of high risk.

Enhancement

6.146 The Proposed Development offers an opportunity to introduce interventions that will improve the biodiversity, and overall ecological importance, of the Study Area, which currently experiences intensive upland management regimes. The following enhancement measures are further developed in the OREP (**Appendix 6.6**):

- Watercourses that run from west to east within the Study Area will benefit from the creation of enhanced riparian corridors, which will include native broadleaved trees, shrubs and potentially understory planting. This will provide greater habitat connectivity to the wider landscape and create suitable habitats for sheltering and foraging for a range of species, particularly those qualifying features of designated areas within the Study Area.
- Habitat enhancement to provide areas of species rich native grassland, heath improvement and rewetting/drainage blocking to encourage bog restoration. These measures will be developed to specifically address local and national biodiversity priorities.

Assessment of Residual Effects

Residual Construction Effects

6.147 Subject to adherence with all embedded and species-specific mitigation, no significant residual construction effects have been identified as all construction effects are determined to be not significant in the context of the EIA Regulations (**Table 6.4**).

Residual Operational Effects

6.148 Pre-mitigation assessment of effects identified minor significant effects in relation to bats during the operational phase. However, these operational effects are significant only at the Study Area level, therefore these are not significant in EIA terms.

6.149 Notwithstanding the absence of significant effects (in EIA terms), the Proposed Development will see the implementation of extensive habitat enhancement interventions (described in the OREP in **Appendix 6.6** and **Figure 6.10a** and **6.10b)**. These measures will result in a more diverse assemblage of habitats, better able to support a wide range of floral and faunal species, including those considered to be conservation priorities, and those associated with adjacent sites designated for their ecological importance.

Residual Cumulative Effects

Residual Cumulative Construction Effects

6.150 No significant residual cumulative effects have been identified as all construction effects are determined to be not significant in the context of the EIA Regulations (**Table 6.4**).

Residual Cumulative Operational Effects

6.151 The effects of the Proposed Development have been assessed in combination with predicted effects of other consented wind farm developments within 10 km of the Redline Boundary. No significant residual cumulative effects have been identified as all operational effects are determined to be not significant in the context of the EIA Regulations (**Table 6.4**).

Monitoring

6.152 The development of an integrated post-consent monitoring plan will be implemented as part of the Outline CEMP and OREP for the Proposed Development. This will include:

- Monitoring of planted trees to assess their success of establishment and ongoing health with regards to disease or grazing.

6.153 There is also the need to update protected species surveys prior to construction. This will be addressed in the SPP, as will ongoing monitoring requirements. This will include the following:

- Pre-construction surveys of all watercrossings immediately prior to construction (i.e. with season immediately prior) to assess use of the locations by otter;
- Pre-construction protected species surveys of proposed infrastructure locations and access routes no more than six months prior to construction, to assess the current status and usage of the Site;
- Pre-construction fish habitat surveys in the season prior, to microsite the crossings away from potentially sensitive habitats wherever possible, and to confirm the habitat baseline within a buffer of up to 100 m upstream and downstream;
- Monitoring of a range of ecological features by the ECoW throughout construction of the Proposed Development;
- Post-construction fish habitat surveys and monitoring programme to be established in line with best practice[5] to ensure mitigation measures are effective, that crossings maintain fish passage, and that potentially sensitive habitats are retained, and to identify any requirement for improvements or remedial works; and
- A programme of bat mortality monitoring will be implemented once the Proposed Development is operational, this will be in line with relevant best practice guidelines.

Summary

6.154 No significant effects on ecology in EIA terminology (i.e. effects considered ‘Major’ or ‘Moderate’ as per **Table 6.4**) were identified prior to, or following, the application of additional mitigation.

Glossary/Abbreviations

Table 6.18: Glossary and abbreviations

Term in Full	Abbreviation	Meaning/Description
Advisory Environmental Clerk of Works	AECoW	A suitably experienced individual tasked with overseeing the management of the risks on construction sites associated with managing and protecting the environment and biodiversity.
Ancient Woodland Inventory	AWI	A map-based tool that is a provisional guide to the location of Scotland's ancient woodlands, defined as land that is currently wooded and has been continually wooded, since at least 1860.
Construction Method Statements	CMS	A series of method statements that describes in a logical sequence exactly how a job is to be carried out in a way that secures health and safety and includes all the control measures required.
Construction Site Licence	CSL	This licence will require the holder to adhere to a Pollution Prevention Plan that SEPA has reviewed and must consider: ■ Site drainage plans; ■ Pollution mitigation measures; ■ Maintenance and inspection programmes; ■ Rapid response contingency measures; and ■ Potential impact of construction on the water environment.
Court of Justice of the European Union	CJEU	The Court of Justice of the European Union (CJEU) is the judicial branch of the European Union (EU).
Ecological Impact Assessment	EcIA	The process of identifying, quantifying and evaluating potential effects of development-related or other proposed actions on habitats, species and ecosystems.
East Lothian Council	ELC	
European Protected Species	EPS	These are species of plants and animals (other than birds) protected by law throughout the European Union.
Fisheries Management Scotland	FMS	
Guidelines on Pollution Prevention	GPP	SEPAs standard suite of pollution prevention guidance documents.
Habitat Regulations Appraisal	HRA	The Conservation (Natural Habitats, &c.) Regulations 1994 as amended (the "1994 Habitats Regulations") apply to European Sites. Under these regulations, all competent authorities must consider whether any plan or project could affect a European site before it can be authorised or carried out.
River Tweed Commission	RTC	A regional charity that sims to promote and improve the health of aquatic ecosystems, and understand the biology and ecology of all freshwater fish species, their environment and factors that affect them.
Ground Water Dependent Ecosystems	GWDTE	Plant communities that are, at least in part, dependent on an input of nutrients via groundwater for their composition and continuing presence.

Term in Full	Abbreviation	Meaning/Description
Local Biodiversity Action Plan	LBAP	The Scottish Borders Council Local Biodiversity Action Plan sets out over priority conservation projects being implemented to help assess, maintain and enhance a wide range of habitats and species across the Council area.
Local Biodiversity Site	LBS	Areas considered to be locally important for natural heritage and that could be damaged by the Proposed Development.
National Biodiversity Network Atlas	NBN Atlas	An online tool that provides a platform to host biological records for education and research.
National Nature Reserves	NNR	Areas of land set aside for nature, to promote their conservation and enjoyment, selected and designated under the National Parks and Access to the Countryside Act 1949 (as amended).
National Vegetation Classification	NVC	A standard method of assessing and classifying plant communities in accordance with a published classification system.
Outline Construction Environmental Management Plan	OCEMP	An outline Construction Environmental Management Plan provides a framework from which a final Construction Environmental Management Plan (CEMP) will be developed to avoid, minimise or mitigate any construction effects on the environment.
Outline Restoration and Enhancement Plan	OREP	This is a practical guide, outlining key principals and actions to be implemented to protect sensitive ecological features and delivering mitigation and enhancement measures to increase biodiversity.
Pollution Prevention Plan	PPP	Are a series of plans that provide details of the measures required to reduces or eliminates risk of pollution at source.
Ramsar site	Ramsar	A site classified under the Convention on Wetlands of International Importance.
Special Areas of Conservation	SAC	A site that is designated for the protection of one or more special habitats and/or species – terrestrial or marine – listed in the Habitats Directive.
Scottish Borders Council	SBC	The local planning authority
Scottish Biodiversity List	SBL	A list of animals, plants and habitats that Scottish Ministers consider to be of principal importance for biodiversity conservation in Scotland
Scottish Environment Protection Agency	SEPA	Are the principal environmental regulator.
Special Protection Areas	SPA	A site that is selected to protect one or more rare, threatened or vulnerable bird species listed in Annex I of the Birds Directive, or certain regularly occurring migratory species.
Species Protection Plan	SPP	A series of species (or taxa) specific protection plans that identify how a proposal may impact a protected species, provides an approach that enables works to go ahead while safeguarding the species, including requirements for protected species licencing
Sites of Special Scientific Interest	SSSI	Those areas of land and water that are considered to best represent Scotland's natural heritage in terms of their flora, fauna, geology and/or geomorphology.
The Wildlife Information Centre	TWIC	A records centre that maintains a database of biological records found within the south-east of Scotland.

Term in Full	Abbreviation	Meaning/Description
Water Protection Plan	WPP	An action plan identifies activities or projects needed to mitigate existing and future threats to source water quality and to improve the resilience of the water supply