

## 8 Terrestrial Ecology

### 8.1 Introduction

- 8.1.1 This chapter considers the current non-avian (excluding birds), nature conservation interest of the site and surrounding area. It goes on to assess the likely significant effects of the proposed development on important habitats and species and, where necessary, to describe proposed mitigation, compensation and enhancement measures. This Chapter considers habitats and non-avian animal species only. Potential likely significant effects on birds are considered separately in **Chapter 9: Ornithology**. Together **Chapters 8 and 9** provide an assessment of the potential likely significant effects of the proposed development on biodiversity.
- 8.1.2 This chapter describes the likely significant effects on Terrestrial Ecology associated with the construction and operation of the new access track. The specific objectives of the chapter are to:
- describe the current baseline;
  - describe the assessment methodology and significance criteria used in completing the impact assessment;
  - describe the potential likely significant effects, including direct, indirect and cumulative effects;
  - describe the mitigation measures proposed to address the likely significant effects; and
  - assess the residual effects remaining following the implementation of mitigation and compensation and identify biodiversity enhancements.
- 8.1.3 The assessment has been carried out by Dr. Ida Bailey PhD, BSc (Hons), ACIEEM, CERPIT, Natural Capital & Nature Lead - Europe at SLR Consulting Ltd. Ida has over 17 years of experience in ecological consultancy and research both in the UK and internationally. She has a broad environmental knowledge and commercial experience including undertaking survey design, baseline surveys, collation of data, and assessment of potential impacts due to development and post construction monitoring. She has worked on a diverse range of projects both in the UK and overseas, has conducted fieldwork on three continents; and worked with a wide range of taxa including mammals, birds, habitats, invertebrates, reptiles and fish.

- 8.1.4 Services which Ida has experience of include: Ecological Due Diligence reviews (EDD); preparation of Ecological Impact Assessments (EclA); Habitat Management Plans (HMP); Ecosystem Services Statements (ESS); designing, planning, undertaking and supervision of Ecological Baseline Surveys (EBS); input to Construction Environmental Management Plans (CEMP); management of ecological supervision of construction works (ECoW); Habitat Regulations Appraisal; conservation work; ecological research; and Post Construction Monitoring (PCM).
- 8.1.5 The ecological evaluation and impact assessment approach used in this report is based on Guidelines for Ecological Impact Assessment in the United Kingdom and Ireland ('CIEEM guidelines')<sup>1</sup>. The CIEEM guidelines have been endorsed by NatureScot.
- 8.1.6 The chapter is supported by:
- Technical Appendix 8.1: Ecology Desk Study Report;
  - Technical Appendix 8.2: Vegetation Survey and Habitat Mapping Report;
  - Technical Appendix 8.3: Protected Mammal Survey Report;
  - Technical Appendix 8.4: Bat Survey Report;
  - Technical Appendix 8.5: Fish Habitat and Electro-fishing Survey Report;
  - Technical Appendix 8.6: Biodiversity Enhancement and Restoration Plan;
  - Technical Appendix 8.7: Habitats Regulations Appraisal Shadow Stage 1 Screening Report.

### 8.2 Legislation and Policy

#### Legislation

##### Conservation (Natural Habitats, &c.) Regulations 1994 (as amended)

- 8.2.2 Under the conservation (Natural Habitats, &c.) Regulations 1994 (The Habitats Regulations) (as amended in Scotland) it is an offence to deliberately capture, kill or disturb wild animals listed under Schedule 2 of the Regulations. It is also an offence to damage or destroy a breeding site or resting place of such an animal (even if the animal is not present at the time). Otter, wildcat and all bat species are listed under Schedule 2 of the Habitat Regulations.

<sup>1</sup> CIEEM. 2018. Guidelines for ecological impact assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine. <https://cieem.net/wp-content/uploads/2019/02/Combined-EclA-guidelines-2018-compressed.pdf>

### **The Conservation (Natural Habitats, &c.) Amendment (Scotland) Regulations 2019**

- 8.2.3 These Regulations amend the Conservation (Natural Habitats, &c.) Regulations 1994, which make provision for the transposition of Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora.
- 8.2.4 Regulation 2 amends schedule 2 of the 1994 Regulations to add the Eurasian beaver (otherwise known as the European beaver) to the list of European Protected Species of Animals that are given protection under the 1994 Regulations.

### **Wildlife and Countryside Act 1981 (as amended)**

- 8.2.5 Under the Wildlife and Countryside Act 1981 (as amended in Scotland) it is an offence to intentionally or recklessly:
- Kill, injure or take any wild animal listed under Schedule 5 to the Act;
  - Damage, destroy or obstruct any place used for shelter or protection by any wild animal listed under Schedule 5 to the Act; and
  - Disturb certain Schedule 5 animal species while they occupy a place used for shelter or protection.
- 8.2.6 Otter, water vole, pine marten, red squirrel, wildcat and all bat species are listed under Schedule 5 of the Act.
- 8.2.7 Water voles receive partial protection of their places of shelter only; this has long since been expected to change with water vole receiving full protection in future to align with their steep populations declines and increasing risk of extinction on mainland Great Britain.

### **Nature Conservation (Scotland) Act 2004 (as amended)**

- 8.2.8 The Nature Conservation (Scotland) Act 2004 places duties on public bodies in relation to the conservation of biodiversity, increases protection of Sites of Special Scientific Interest (SSSI), amends legislation on Nature Conservation Orders, provides for Land Management Orders for SSSIs and associated land and strengthens wildlife enforcement legislation, among other requirements. It also amends the legislation for protected species, introducing new conditions to the 'incidental results of a lawful operation' defence for all wild birds and certain species of animal and plant.
- 8.2.9 The Act places a duty on every public body to further the conservation of biodiversity consistent with the proper exercise of their functions.

- 8.2.10 It also requires Scottish Ministers to designate one or more strategies for the conservation of biodiversity as the Scottish Biodiversity Strategy, and to publish lists of species of flora, fauna and habitats of principal importance. The lists of species of flora and fauna and habitats of principal importance in Scotland is known as the Scottish Biodiversity List (SBL).

### **The Wildlife and Natural Environment (Scotland) Act 2011 (as amended)**

- 8.2.11 The Wildlife and Natural Environment (WANE) (Scotland) Act 2011 (as amended) makes changes to existing legislation covering specific wild fauna (e.g., birds, rabbits, hare etc), deer management, game management/licensing, species licensing, snaring, protection of badgers, muirburn, invasive non-native species, protected areas and enforcement/liability in relation to certain offences. In relation to bats, the WANE Act:
- 8.2.12 Introduces the offence of 'knowingly causing or permitting' certain 'acts' within Sections 6, 7 and 15A as 'offences' under the W&C Act 1981;
- 8.2.13 Permits derogation of disturbance and/or destruction of bat roosts by the appropriate authority for development purposes, subject to specific requirements of licensing; and furthermore
- 8.2.14 Wildlife crime now requires to be documented in an annual report, as a result of Section 20 of the WANE Act, which inserted a new Section 26B into the W&C Act 1981. It prescribes that Ministers must lay a report every calendar year on offences which relate to wildlife, to include information on incidences and prosecutions during the year and on research and advice relevant to those offences.

### **Protection of Badgers Act 1992 (as amended)**

- 8.2.15 The Protection of Badgers Act 1992 (as amended in Scotland) makes it illegal to kill, injure or take a badger or to interfere with a badger sett intentionally or recklessly (i.e., damage/destroy a sett). Sett interference includes disturbing badgers whilst they are occupying a sett or obstructing access to it.

### **Animals and Wildlife (Penalties, Protections and Powers) (Scotland) Act 2020**

- 8.2.16 The Animals and Wildlife (Penalties, Protections and Powers) (Scotland) Act 2020 increases the maximum available sentences in relation to a range of offences concerning animal health and welfare and wildlife; provides regulatory powers for the issuing of fixed penalty notices; and provides authorised persons with new powers regarding animals taken into their possession.

### EU-exit amendments

8.2.17 Note that the Scottish Government has passed legislation to maintain the same levels of legal protections of wildlife in Scotland post EU-exit.

### Policy

8.2.18 Planning policies relevant to ecology are summarised below. Further information regarding planning policy is provided in **Chapter 4: Climate Change, Energy and Planning Policy**.

#### National Planning Framework 4 (NFP4)

8.2.19 A revised draft of NFP4 was published on 8th November 2022. Policy 3 and 4 are of particular relevance to this Chapter. Policy 3 states that:

- a) Development proposals will contribute to the enhancement of biodiversity, including where relevant, restoring degraded habitats and building and strengthening nature networks and the connections between them. Proposals should also integrate nature-based solutions, where possible.
- b) Development proposals for national or major development, or for development that requires an Environmental Impact Assessment will only be supported where it can be demonstrated that the proposal will conserve, restore and enhance biodiversity, including nature networks so they are in a demonstrably better state than without intervention. This will include future management. To inform this, best practice assessment methods should be used. Proposals within these categories will demonstrate how they have met all of the following criteria:
  - i) the proposal is based on an understanding of the existing characteristics of the site and its local, regional and national ecological context prior to development, including the presence of any irreplaceable habitats;
  - ii) wherever feasible, nature-based solutions have been integrated and made best use of;
  - iii) an assessment of potential negative effects which should be fully mitigated in line with the mitigation hierarchy prior to identifying enhancements;
  - iv) significant biodiversity enhancements are provided, in addition to any proposed mitigation. This should include nature networks, linking to and strengthening habitat connectivity within and beyond the development, secured within a reasonable timescale and with reasonable certainty. Management arrangements for their long-term

retention and monitoring should be included, wherever appropriate; and

- v) local community benefits of the biodiversity and/or nature networks have been considered.
  - c) Proposals for local development will include appropriate measures to conserve, restore and enhance biodiversity, in accordance with national and local guidance. Measures should be proportionate to the nature and scale of development. Applications for individual householder development, or which fall within scope of (b) above, are excluded from this requirement.
  - d) Any potential adverse impacts, including cumulative impacts, of development proposals on biodiversity, nature networks and the natural environment will be minimised through careful planning and design. This will take into account the need to reverse biodiversity loss, safeguard the ecosystem services that the natural environment provides, and build resilience by enhancing nature networks and maximising the potential for restoration.
- 8.2.20 Policy 4 States that:
- a) Development proposals which by virtue of type, location or scale will have an unacceptable impact on the natural environment, will not be supported.
  - b) Development proposals that are likely to have a significant effect on an existing or proposed European site (Special Area of Conservation or Special Protection Areas) and are not directly connected with or necessary to their conservation management are required to be subject to an “appropriate assessment” of the implications for the conservation objectives.
  - c) Development proposals that will affect a National Park, National Scenic Area, Site of Special Scientific Interest or a National Nature Reserve will only be supported where:
    - i) The objectives of designation and the overall integrity of the areas will not be compromised; or
    - ii) Any significant adverse effects on the qualities for which the area has been designated are clearly outweighed by social, environmental or economic benefits of national importance. All Ramsar sites are also European sites and/ or Sites of Special Scientific Interest and are extended protection under the relevant statutory regimes.
  - d) Development proposals that affect a site designated as a local nature conservation site or landscape area in the LDP will only be supported where:

- iii) Development will not have significant adverse effects on the integrity of the area or the qualities for which it has been identified; or
  - iv) Any significant adverse effects on the integrity of the area are clearly outweighed by social, environmental or economic benefits of at least local importance.
- e) The precautionary principle will be applied in accordance with relevant legislation and Scottish Government guidance.
- f) Development proposals that are likely to have an adverse effect on species protected by legislation will only be supported where the proposal meets the relevant statutory tests. If there is reasonable evidence to suggest that a protected species is present on a site or may be affected by a proposed development, steps must be taken to establish its presence. The level of protection required by legislation must be factored into the planning and design of development, and potential impacts must be fully considered prior to the determination of any application.
- g) Development proposals in areas identified as wild land in the Nature Scot Wild Land Areas map will only be supported where the proposal:
- i) will support meeting renewable energy targets; or,
  - ii) is for small scale development directly linked to a rural business or croft, or is required to support a fragile community in a rural area. All such proposals must be accompanied by a wild land impact assessment which sets out how design, siting, or other mitigation measures have been and will be used to minimise significant impacts on the qualities of the wild land, as well as any management and monitoring arrangements where appropriate. Buffer zones around wild land will not be applied, and effects of development outwith wild land areas will not be a significant consideration.

### Biodiversity 2020

- 8.2.21 ‘Scotland’s Biodiversity, a Route Map to 2020’ (Scottish Government, 2015), has been produced to “support progress towards the 2020 Challenge and detail how the outcomes and key steps can be achieved through taking six ‘Big Steps for Nature’”. It takes a broad Natural Capital approach to valuing nature. Under each big step, there are a number of priority projects listed. The following steps and projects are of particular relevance to this assessment:

- **Step 1: Ecosystem restoration** - to reverse historical losses of habitats and ecosystems, to meet the Aichi target of restoring 15% of degraded ecosystems:
  - i) Project 1 (Restoration of peatland) including:
    - Restore peatland and sequester carbon;
  - ii) Flow Country peatland restoration;
  - iii) Project 2 - Restoration of native woodland; and
  - iv) Project 3 - Restoration of freshwaters (including controlling diffuse pollution).
- **Step 2: Investment in natural capital** - to ensure the benefits which nature provides are better understood and appreciated, leading to better management of our renewable and non-renewable natural assets:
  - i) Project 4 - Securing economic and social benefits from, and investment in, natural capital. Including via the Woodland and Peatland Carbon Codes.
- **Step 4: Conserving wildlife in Scotland** - to secure the future of priority habitats and species:
  - i) Project 9 - Conservation of priority species.
- **Step 5: Sustainable management of land and freshwater** - to ensure that environmental, social and economic elements are well balanced:
  - i) Project 10 - Improve habitat and species resilience, contribute to wider ecosystem services (such as improved natural flood management and reducing diffuse pollution).

### Scottish Border Local Biodiversity Action Plan<sup>2</sup>

- 8.2.22 The six big steps for nature that the Local Biodiversity Action Plan (LBAP) actions are set within are based around practical, collaborative action.
- 8.2.23 Of particular relevance to the proposed development, it sets out priority objectives and actions in relation to:
- Ecosystem restoration;
  - Natural capital;
  - Wildlife and habitats;
  - Conserving wildlife in Scotland; and
  - Sustainable land management and freshwater management.
- 8.2.24 For example, the LBAP actions for ecosystem restoration reflect the need to:
- Reduce pressures on ecosystems in the Scottish Borders;
  - Make space for natural processes;

<sup>2</sup> Scottish Borders Biodiversity Action Plan 2018-2028:



- Improve connectivity and habitat availability;
- Improve habitat management and support species diversity;
- Improve general water and river catchment management and avoid nutrient enrichment in priority catchments; and
- Increase resilience to climate change, (employing adaptive management and planning for unavoidable changes such as sea level rise).

### 8.3 Consultation

8.3.1 A Scoping Report<sup>3</sup> was submitted to the Energy Consents Unit (ECU) in March 2023. Scoping responses containing comments related to non-avian ecology and nature conservation were received from the following organisations:

- Scottish Borders Council - Ecology Officer (SBC)
- East Lothian Council
- Energy Consents Unit (ECU)
- Marine Sciences Scotland (MSS) - Standing Advice
- NatureScot
- Scottish Environmental Protection Agency (SEPA)
- Oxton and Channelkirk Community Council
- Royal Society for the Protection of Birds (RSPB)

8.3.2 A summary of the key points from the relevant scoping responses and details of how comments have been addressed in the EIA report are provided in **Table 8.1**.

**Table 8.1: Scoping Responses**

Consultee	Issue Raised	Response/Action Taken
SBC - Ecology Officer	We have records of Northern Brown Argus butterfly colonies within the site. Butterfly Conservation Scotland should be consulted to establish the presence/absence of protected lepidoptera within the site; Based on their advice, invertebrate surveys may be required.  An Outline Habitat Enhancement and Management Plan should be submitted with a full application to show how the	Records of Northern Brown Argus (NBA) were obtained via the desk study from within 0.4km of the site (see <b>Technical Appendix 8.1</b> ). In addition, rockrose the food plant of NBA caterpillars, was recorded growing in calcareous grassland on site (see <b>Technical Appendix 8.2</b> ). No specific NBA surveys were conducted however, the assessment is based on the assumption that there is a breeding population associated with the rockrose in the calcareous grassland habitat.  Butterfly conservation were consulted in August 2023 see paragraph <b>Error! Reference source not found.</b>

Consultee	Issue Raised	Response/Action Taken
	proposal meets the requirements of NPF4 policy 3 (Biodiversity).	An outline Biodiversity Enhancement and Restoration Plan (BERP) is provided in <b>Technical Appendix 8.6</b> .
East Lothian Council	Our interest in biodiversity of this site is in mobile species and any networks or barriers to networks which have the potential to affect East Lothian.  National Planning Framework 4 Policy 3 expects development proposals to contribute to the enhancement of biodiversity, including where relevant restoring degraded habitats and building and strengthening nature networks and the connections between them. Development proposals for national or major development, or that requires EIA, will only be supported where it can be demonstrated that the proposal will conserve, restore and enhance nature networks so that they are in a demonstrably better state than without intervention. The description of the project should therefore give information showing how this has been done.  We note that the only reference to bats relates to buildings on site, but no activity surveys are proposed. As detailed in NatureScot guidance (see <a href="https://www.nature.scot/doc/bats-and-onshore-wind-turbines-survey-assessment-and-mitigation">https://www.nature.scot/doc/bats-and-onshore-wind-turbines-survey-assessment-and-mitigation</a> ) wind farms can affect bats in a several ways, not least collision mortality and therefore consideration needs to be given to bat activity across the whole site.	Habitat connectivity is taken into account in the outline BERP <b>Technical Appendix 8.6</b> .  The outline BERP additional details plans for habitat management in relation to compensation and enhancement of biodiversity in relation to the proposed development.  Bat activity surveys have been undertaken please see <b>Technical Appendix 8.4</b> . Assessment of potential impacts to bats is discussed in Section 6.1. Internal inspections of buildings and climbed inspection of one tree, within potential zone of influence of the proposed development, is detailed in in Section 3.0 of <b>Technical Appendix 8.3</b> and addressed within this chapter.
ECU	Standing advice from Marine Scotland Science (MSS)...	See response to MSS standing advice below.  A Shadow Habitats Regulations Appraisal is provided in <b>Technical Appendix 8.7</b> .  An outline BERP is provided in <b>Technical Appendix 8.6</b> . This is aligned with NFP4 requirements to conserve, restore and enhance biodiversity.
	The Scottish Ministers note that the River Tweed Special Area of Conservation (SAC) is located within the site boundary of the proposed Development. The SAC is designated for the qualifying interests; Atlantic salmon, otter, three species of lamprey and as a watercourse typically supporting water crowfoot ( <i>Ranunculus</i> ) species. Additionally, the proposed Development is within 20km of the Fala Flow Special Protection Area (SPA) and	

<sup>3</sup> RES. 2023. Longcroft Wind Farm Scoping Report.

Consultee	Issue Raised	Response/Action Taken
	<p>the Greenlaw Moor SPA. Both SPAs are designated for the qualifying interest wintering population of pink-footed geese.</p> <p>The status of the site means that the requirements of the Conservation (Natural Habitats, &amp;c.) Regulations 1994 as amended (the "Habitats Regulations") or, for reserved matters, The Conservation of Habitats and Species Regulations 2017 apply. Consequently, Scottish Ministers will be required to consider the effect of the proposal on the SPAs and the SAC by completing a Habitats Regulations Appraisal (HRA).</p> <p>NFP4... Policy 3: Biodiversity, in particular criteria b) which requires all national and major or developments requiring Environmental Impact Assessment to demonstrate that they will conserve, restore and enhance biodiversity.</p>	
MSS - Standing Advice	<p>Developers will be required to provide a completed gate check checklist (annex 1) 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.</p>	<p>The completed MSS check list can be found in has been submitted to the ECU as part of the application.</p> <p>Fish habitat surveys covered the main watercourse and tributaries within and close to the site, a desk-based search for protected areas with fisheries interests within 2km of the site was undertaken, see Section 8.4 and <b>Technical Appendix 8.5</b>. Electrofishing surveys were also undertaken and a detailed fish monitoring plan has been provided within <b>Technical Appendix 8.5</b>.</p>
NatureScot	<p>A Habitats Regulation Appraisal (HRA) will be required. We advise that sufficient information is provided in the EIA Report to enable the competent authority to carry out an appraisal of the likely impact of the proposed development on the qualifying interests of the River Tweed SAC.</p> <p>We are content that pine marten, red squirrel and beaver are scoped out of assessment for the reasons given in the Scoping Report.</p> <p>We support the use of a Habitat Management Plan (HMP) on a wind farm</p>	<p>A Shadow Habitats Regulations Appraisal is provided in <b>Technical Appendix 8.7</b>.</p> <p>These species have been scoped out of the assessment (see paragraph 8.3.7).</p> <p>An outline BERP is provided in <b>Technical Appendix 8.6</b>.</p>

Consultee	Issue Raised	Response/Action Taken
	<p>site to provide for positive management and enhancement of habitats across the development site to benefit biodiversity and not just mitigate impacts. The EIA Report should offer an outline HMP that sets out broad measures to achieve this.</p>	
SEPA	<p>We consider that the following key issues must be addressed in the Environmental Impact Assessment process.</p> <p>2.1 b) Assessment of impacts on Groundwater Dependent Terrestrial Ecosystems (GWDTEs) and map with buffer zones.</p> <p>2.1 f) Schedule of mitigation, including pollution prevention measures.</p> <p>It should be demonstrated how impacts on peat have been minimised via location, layout and design of all proposed infrastructure in line with the mitigation hierarchy. We are likely to object to proposals where infrastructure is located on peat with a depth of &gt;1m.</p> <p>The submission must include:</p> <p>3.3 b) A table which details the quantities of acrotelmic, catotelmic and amorphous peat which will be excavated for each element and where it will be re-used during reinstatement. Details of the proposed widths and depths of peat to be re-used and how it will be kept wet permanently must be included.</p> <p>4.1 a) A map demonstrating that all GWDTE are outwith a 100m radius of all excavations shallower than 1m and outwith 250m of all excavations deeper than 1m and proposed groundwater abstractions.</p>	<p>SLR undertook a UK Habitat Classification (UKHab) and NVC survey of the site. A summary of potential GWDTE noted during these surveys are provided within <b>Table 8.4</b>. Full assessment of GWDTE is provided in <b>Chapter 10: Geology, Hydrology and Hydrogeology</b>.</p> <p>Mitigation including pollution prevention is discussed in Section 8.6: Embedded Mitigation and Good Working Practices</p> <p>Micro-siting to avoid areas of deeper peat and treatment of excavated peat is discussed in <b>Chapter 10: Geology, Hydrology and Hydrogeology</b></p> <p>It has been agreed with SEPA that due to the limited peat deposits onsite that a Peat Management Plan is not required for this site. However, a Peat Landslide Hazard Risk Assessment has been provided in <b>Technical Appendix 10.2</b> which contains details of the peat probing surveys and results along with the peat slid risk assessment.</p> <p>A map illustrating the location of potential GWDTE is provided in see <b>Technical Appendix 8.2</b>. Note however, that the hydrogeology assessment has determined that most of these areas are likely surface water fed and have low GWDTE potential, <b>Chapter 10: Geology, Hydrology and Hydrogeology</b>.</p>
OCCC	<p>Section 2.1.3 of the scoping report does not mention that the Leader lies on or just beyond the western boundary of the site and is also designated as a SAC associated with the river Tweed. Hartside burn, within the site, is also a tributary to this.</p> <p>13. Whilst the approach to the ecology studies is appropriate, we draw the</p>	<p>Fish habitat surveys covered the main watercourse and tributaries within and close to the site, a desk-based search for protected areas with fisheries interests within 2km of the site was undertaken, see Section 8.4 and <b>Technical Appendix 8.5</b>.</p> <p>A Shadow Habitats Regulations Appraisal in relation to the River Tweed SAC is provided in <b>Technical Appendix 8.7</b>.</p>

Consultee	Issue Raised	Response/Action Taken
	<p>applicant’s attention to the following sightings in the Leaderwater at Oxton:</p> <p>a. Spawning Atlantic Salmon have been sighted in the vicinity of Oxton between 2020-2022.</p> <p>b. Otters have been sighted since 2019.</p>	<p>An otter survey of the watercourses within the site and a 250m buffer extending from the channel of the watercourse to identify signs of otter and potential for otter to be commuting, foraging and inhabiting the site. For more detail see <b>Technical Appendix 8.6</b>.</p>
RSPB	<p>We advise that a draft HMP should be submitted pre-consent as part of the EIA application. We welcome the commitment at paragraph 6.27 that mitigation and enhancement measures will be developed as appropriate as part of the EIA, and we recommend clear avoidance measures are also identified as per the mitigation hierarchy.</p> <p>NFP4.</p> <p>Policy 3 requires that development proposals contribute to the enhancement of biodiversity. Any potential adverse impacts including cumulative impacts on biodiversity, nature networks, and the natural environment should be minimised through careful planning and design. In particular policy 3(b) states development proposals (for major, national or those that require EIA) will only be supported where it can be demonstrated that it will conserve, restore and enhance biodiversity to ensure it is left in a demonstrably better state than without intervention.</p>	<p>Please see the outline BERP <b>Technical Appendix 8.6</b>. This is aligned with NFP4 requirements to conserve, restore and enhance biodiversity.</p>

### Additional Consultation

8.3.3 **Butterfly Conservation** were consulted in August 2023 in response to a request from SBC (see Table 8.1), regarding the likely presence of northern brown argus on site. Consultation was extended to also include reference to other lepidoptera known based on desk study records to occur within 2km of the site. Butterfly conservation responded on 29 September 2023 as follows:

*“Thanks very much for confirming that there is no intention to use the track along the Whalplaw Burn for construction access or improved as part of the scheme.*

*We have checked though our records of lepidoptera for the potential affected area by the windfarm development. We would recommend that the main species for consideration here should be the Northern Brown Argus butterfly.*

*I have attached a map which shows the location of Northern Brown Argus (NBA) habitat along the Whalplaw Burn that was mapped in a 2019 survey (in red). It is very likely that there is more habitat along the Whalplaw.*

*There are also NBA records further north along the course of the Soonhope Burn. We haven’t mapped the habitat there yet (blue area) however it is unlikely to be found on hill tops/ridges where the turbines are due to be situated.*

*NBA depends on a sole foodplant which is Common Rock-rose (Helianthemum nummularium). Common Rock-rose in this area often occurs alongside burns and tracks but it may also be present within species-rich grassland patches on thin dry soils, most often on sloping ground.*

*Common Rock-rose and NBA will no doubt both occur more widely in this area than is mapped on the attached. We would therefore recommend that ecological surveys are carried out prior to any works beginning to identify any habitats containing Common Rock-rose and then to avoid any damage to these areas during construction and operation. This would be especially important on any slopes which are south, south-east or south-west facing as these are strongly preferred by NBA...*

*From the schematic provided, the most likely areas where construction will conflict with NBA is where tracks cross into valleys (such as between T15 & T16) and where borrow pits are established (such as BP3).*

*Where ground is disturbed during construction, there may be some opportunities for enhancement through seeding with Common Rock-rose. This is only likely to be successful within valleys where the ground is thin dry rocky soil. That could include borrow pits and track verges.”*

8.3.4 Preconstruction surveys for NBA are included in embedded mitigation (paragraph 8.6.12). No calcareous grassland or rock rose was noted between T15 and T16 or in the BP3 area, this area is dominated by bracken, heath and bog and is therefore considered unlikely to be suitable for NBA or rock rose without significant habitat management (if suitable soils are present). Recommendation for increasing the rockrose population and therefore NBA habitat are included with in the outline BERP (**Technical Appendix 8.6**).



8.3.5 The ecology officer at SBC was consulted in May 2023 in relation to the approach to biodiversity enhancement in line with the requirements of NFP4. In summary the advice was that there: *“is not considered to be a one-size-fits-all approach to achieving appropriate enhancements, everything is decided on a case by case basis.”* They reiterated that overall the measures should be proportionate to the nature and scale of the development.

8.3.6 The response included reference to both habitat enhancements and installation of nest and bat boxes etc... as potentially acceptable forms of enhancement, with habitat restoration being the preferred option. They indicated that loss of trees/ nesting opportunities should be compensated for at a ratio of 1:3.

### Effects Scoped Out

8.3.7 During the scoping, a number of ecology matters were proposed to be scoped out of the EIA. The matters are described below, together with a concise justification for scoping them out:

- Pine marten, red squirrel and beaver surveys and assessment are not considered to be necessary as beaver have not been recorded within 10km of the site; there is a lack of suitable woodland habitat for pine marten, and red squirrel has not been recorded within the site and study area in the past 25 years.
- No records of great crested newt (GCN) are known within 2km of site at present, with one unconfirmed record provided in 2019 in a residential pond by a member of the public 3.9km west of the site. No eDNA surveys or activity surveys, or assessment of potential impacts on GCN have therefore been undertaken.
- Invertebrates and reptiles: In accordance with current guidance (NatureScot, 2022)<sup>4</sup>, surveys for invertebrates and reptiles (plus any other species not mentioned in our proposed approach) are not considered necessary to inform the EIA (note that the guidance states: *“...with standard mitigation, [amphibians] are unlikely to experience any significant environmental effects”* and will *“not normally require surveys to inform the EIA, unless they are European Protected Species (EPS) or qualifying features of protected areas”*. As defined in the scoping report, the NatureScot guidance will be followed *“to apply mitigation during construction to minimise impacts and avoid committing an offence”* in this chapter. A habitat-based assessment has been undertaken and will inform the assessment of potential impacts and the need for mitigation measures during construction (within a outline BERP). We note, however the SBC point in relation to likely presence of NBA butterfly (Table 8.1). We have assumed this species is

present with in calcareous grassland on site and have assessed potential impacts on this species accordingly.

- Deer: A separate deer management statement has been scoped out, based on information from the shooting tenant indicating that there are very few wild deer on site.

## 8.4 Approach and Methodology

### Scope of Assessment

8.4.2 This chapter takes an appropriate and topic-specific approach to assessment of the proposed development within the parameters identified in Table 3.1 of **Chapter 3: Proposed Development Description**. The purpose is to assess the likely significant effects of the proposed development on biodiversity (non-avian).

8.4.3 **Table 8.1** sets out consultee responses to the scoping report and details where within this chapter, the wider EIA and technical appendices, information can be found in response to the points they have raised.

### Baseline Characterisation

#### Study Area

8.4.4 The study area used for the EIA varies according to the ecological receptor in question, based on relevant good practice guidance.

8.4.5 The study areas used e.g. for protected mammal and vegetation surveys are detailed for each survey methodology set out below and are described in more detail within **Technical Appendices 8.2 - 8.5**.

8.4.6 Bat activity static survey took place at key locations on site (see Figure 8.4.1 within **Technical Appendix 8.4**).

8.4.7 Fish habitat assessment and electro-fishing surveys were conducted at key locations on site (see Figure 8.5.1 within **Technical Appendix 8.5**).

#### Desk Study

8.4.8 Desk study data were acquired for protected and notable species from the following sources:

- The Wildlife Information Centre<sup>5</sup> (TWIC)

<sup>4</sup> NatureScot. 2022. Pre-application guidance for onshore wind farms: <https://www.nature.scot/doc/naturescot-pre-application-guidance-onshore-wind-farms>

<sup>5</sup>The Wildlife Information Centre. Available online at: <http://www.wildlifeinformation.co.uk/>



8.4.9 EIA reports as part of planning applications and any post consent/construction information for wind farms and other developments within 10km of the site (where available), including:

- Amec Foster Wheeler. 2015. Fallago Rig 2 - Bat Survey Report<sup>6</sup>
- SLR Consulting. 2016. Gilston Hill Wind Farm - Ecological Impact Assessment<sup>7</sup>.
- LUC. 2022. Dunside Wind Farm - EIA Scoping Report<sup>8</sup>

8.4.10 Searches for protected and notable species data from TWIC were limited to:

- Data from all years; and
- From within 2km of the site for all species.
- From within 10km of the site for bats.

8.4.11 In addition, a fisheries desk study was carried out (see **Technical Appendix 8.5**). Information sources used for this study included:

- Bing Maps - to obtain aerial imagery to inform field surveys and access suitability to survey along steep slope;
- Ordnance Survey Map - to obtain maps for the area covered by the proposed development and to inform survey location and gradient limitations;
- Scotland's Environment Web - to obtain data on obstacles to fish migration on affected watercourses and to determine expected species within the surrounding location (~2 km area boundary);
- Scottish Environment Protection Agency (SEPA) - to review information on the SEPA Water Classification Hub regarding the classification status of watercourses with potential to be affected by the proposed development; and
- NatureScot - to perform a search to identify survey locations with relevant qualifying interests within 2km of the proposed development.

#### Habitat Surveys

8.4.12 For full details of methodology and results see **Technical Appendix 8.2**.

8.4.13 The 'survey area' incorporated all land within the site and an associated 250m survey buffer, as displayed in **Drawing 8.2.1, Technical Appendix 8.2**, to accord with Scottish Environmental Protection Agency (SEPA) guidelines relating to areas with potential groundwater dependency<sup>9</sup>.

8.4.14 A Minimum Mapping Unit for the field survey of 50x50 m (2,500m<sup>2</sup>) was used.

8.4.15 The survey was undertaken between late April and early May. A UKHab survey was conducted in conjunction with the NVC survey, in accordance with methods described in the UK Habitat Classification User Manual (Butcher *et al.*, 2020), and standard NVC methodology and guidelines (Rodwell, 1991 *et seq*, 5 volumes; and Rodwell, 2006).

8.4.16 The survey identified habitats of conservation concern including priority species and habitats protected or notable plant species (e.g. those on the SBL), and invasive non-native species. Target Notes (TNs) were also recorded to describe any particularly notable features such as flushes, areas with habitat disturbance, or habitats that were too small to map.

8.4.17 In order to effectively record Annex 1 habitats and their corresponding classification under EUNIS, the 'UK Habitat Classification - Professional Edition' has been applied in this study. This in turn allows for conversion between UKHab, Phase 1, NVC and EUNIS, as required by NatureScot for other recent projects.

8.4.18 A Habitat Condition Assessment was carried out in conjunction with the UKHab survey, through which the quality of habitats were measured using standardised habitat condition assessment criteria<sup>10</sup>. Each polygon was assigned a condition of good, moderate or poor.

8.4.19 NVC communities recorded during the survey were assessed against the Scottish Environmental Protection Agency guidelines for identifying potential Groundwater Dependent Terrestrial Ecosystems (GWDTE) (SEPA, 2017).

#### Protected, Priority and Notable Mammal Species Surveys

8.4.20 For full details of methodology and results see **Technical Appendix 8.3**.

8.4.21 The site was assessed for the presence of protected, priority and otherwise notable mammals, focussing on species that are likely to occur in the area, ascertained from known species distribution and habitat suitability. For example species listed in the Habitats Directive on Annex II and Annex IV and those listed on the Scottish Biodiversity List (SBL).

<sup>6</sup> Amex Foster Wheeler (2015). Fallago Rig 2: Bat Survey report. Prepared for EDF Energy Renewables Ltd.

<sup>7</sup> Scottish Borders Council (2017) 17/00226/FUL | Erection of a windfarm comprising of 7 wind turbines 126.5m high to tip, associated infrastructure, ancillary buildings and temporary borrow pits | Land North West Of Gilston Farm Heriot Scottish Borders. Available online: <https://eplanning.scotborders.gov.uk/online-applications/applicationDetails.do?activeTab=documents&keyVal=OLEKRMNTJS500>

<sup>8</sup> LUC Consultants (2022) Dunside Wind Farm. EIA Scoping report. Prepared for EDF Energy Renewables Ltd. Available online: <https://dunsidewindfarm.co.uk/wp-content/uploads/2022/03/11838-Dunside-EIA-Scoping-Report-CLEAN.pdf>

<sup>9</sup> SEPA. 2017. Land Use Planning System SEPA Guidance Note 31: Guidance on assessing the impacts of development proposals on groundwater abstractions and groundwater dependent terrestrial ecosystems. <https://www.sepa.org.uk/media/144266/lups-gu31-guidance-on-assessing-the-impacts-of-development-proposals-on-groundwater-abstractions.pdf>

<sup>10</sup> Standardised habitat condition assessment sheets are provided within the Biodiversity Metric 3.1 publication webpage at <https://publications.naturalengland.org.uk/publication/5850908674228224>

8.4.22 The survey focussed on Eurasian otter (*Lutra lutra*), water vole (*Arvicola amphibius*) and European badger (*Meles meles*). Any field signs of other protected or priority mammal species were recorded.

8.4.23 The survey was conducted in March and August 2023.

8.4.24 Bat roosting potential and suitable habitat was noted during the walkover in all areas that could be assessed given the challenges of surveying in dense coniferous plantation. Any trees identified within the site during the walkover survey that were identified as having features with bat roosting potential were described.

8.4.25 The survey area for ground-based mammals encompassed all potential suitable habitats within the site (access permitting) in line with relevant guidance up to a 100m survey buffer.

8.4.26 All viable watercourses 250m upstream and downstream of the development footprint, were surveyed for riparian mammals (i.e., otter, water vole plus potential invasive mammal species).

#### Bat Survey

8.4.27 Full details of bat survey methods and results can be found in **Technical Appendix 8.3** and **Technical Appendix 8.4**.

8.4.28 Automated acoustic bat detectors were placed at 16 proposed wind turbine locations, for a minimum of 14 consecutive nights for three deployment periods between May and October inclusive. They recorded from 30 minutes before dusk to 30 minutes after dawn. Detectors were a mix of Anabat Swift and Anabat Express which record full spectrum and zero-crossing data respectively.

8.4.29 Acoustic recordings were analysed in Kaleidoscop Pro, using auto ID classifiers. For all species other than common and soprano pipistrelle, the automatic call classifications were manually reviewed by an ecologist using Kaleidoscope Viewer and Analoow software.

8.4.30 Reference sites were used to measure relative bat activity levels at the site and determine the overall site risk level.

8.4.31 Where potential roost sites were identified within 30m of proposed access tracks, an interior building assessment (Buildings B (Houses 1 and 2) and C (Houses 3 and 4)) and a tree climbing survey (T43) to confirm classification of potential roosting features were carried out by an ecologist holding a NatureScot roost visitor licence (165055). The interior building assessment for bat roosts and tree climbing surveys were conducted on the 23 and 31 October 2023 in favourable survey conditions.

#### Fish Survey

8.4.32 Fish habitat surveys were conducted at 13 locations within and near to the site in August 2023 (see **Technical Appendix 8.5**).

8.4.33 The methodology for habitat assessment employed for the fieldwork was conducted under a modified version of the Scottish Fisheries Coordination Centre (SFCC)<sup>11</sup> outlined in the Environment Agency document 'Restoration of Riverine Salmon Habitats: A guidance Manual'<sup>12</sup>.

8.4.34 Where spawning gravels were present and accessible, an assessment of their quality in terms of stability, compaction and siltation was made. In addition, the bankside structure and surrounding land use was also described where appropriate. Areas surveyed included 100m<sup>2</sup> sections with target notes recorded up to 250m upstream and downstream of the survey locations.

8.4.35 Data analysis was undertaken, and evaluations were made for locations suitability for fish spawning and fish habitat quality. Each survey location was then given a rating for fish habitat quality of High, Good, Moderate, Low or Poor. Salmonid spawning potential was assessed via the SFCC Walkover Habitat Survey Protocol and Habitat Surveys Training Course Manual<sup>6</sup>. Survey locations were graded as having Optimal, Sub-Optimal or Not Suitable salmonid spawning potential.

8.4.36 Electrofishing surveys were conducted across three days from 26<sup>th</sup> to 28<sup>th</sup> September 2023 by two experienced and SFCC qualified team leads. Electrofishing surveys were led by Leigh Kelly BA MRes (licence holder - CMS-18-102) and in full accordance with SFCC protocols.

8.4.37 Weather conditions on the day of sampling were moderate (light rain/ clear) with an ambient temperature of 13°C.

8.4.38 Survey locations were determined prior to revisiting the site using fish habitat assessment data collected and reported by SLR Consulting Ltd in August 2023.

8.4.39 Fully quantitative electrofishing methods were adopted at eight survey locations, and a semi-quantitative survey was undertaken at one additional location.

<sup>11</sup> Scottish Fisheries Co-ordination Centre. (2007). Habitat Surveys Training Course Manual. pp. 1-64

<sup>12</sup> Hendry, K. and Cragg-Hine, D. (1997). Restoration of Riverine Salmon Habitats: A Guidance Manual. pp. 1-250.

- 8.4.40 Supplementary fish habitat assessment were conducted alongside the electrofishing assessments. The methodology for habitat assessment employed for the fieldwork was conducted under a modified version of the Scottish Fisheries Coordination Centre (SFCC)<sup>13</sup> outlined in the Environment Agency document ‘Restoration of Riverine Salmon Habitats.
- 8.4.41 Densities of fish were calculated separately for fry (young of the year) and parr for both salmon and trout. Estimates of minimum density were calculated by dividing the number of fish caught by the area of habitat surveyed.
- 8.4.42 For full details of the electrofishing methodology see **Technical Appendix 8.5.**
- Survey Limitations**
- 8.4.43 Habitat surveys can be carried out year-round, though the optimal survey season is April to August. The UKHab and NVC survey was carried out in late April and early May 2023. While considered optimal timing for habitat surveys, it is important to note that some herbs were only beginning to emerge at this time. In instances where it may not have been possible to define specific plant species, vegetation communities were classified to NVC community level only. Through utilising competent habitat surveyors, communities have been classified to at least Level 4 in the UKHab system, with relevant condition assessment criteria successfully completed for each habitat type.
- 8.4.44 The UKHab and NVC Minimum Mapping Unit for the field survey was 50 x 50m (2,500m<sup>2</sup>), which in turn may result in smaller areas of notable habitat (e.g., habitats of principle importance) being excluded from output maps. So that all areas of notable habitat were effectively captured, target notes detailing the location of each notable habitat, key species, and notes on general condition were recorded during the field survey.
- 8.4.45 An ecological study provides only a ‘snapshot’ of the conditions prevailing at the time of survey. Lack of evidence of any one protected species does not necessarily preclude them from being present on site later. Whilst it is considered unlikely that any significant evidence of protected or otherwise notable mammal species has been overlooked, due to the nature of the subjects of ecological surveys it is feasible that species that use the site may not have been recorded by virtue of their seasonality, cryptic behaviour, habit or random chance. It is considered unlikely, however, that additional surveys of the site at this time would materially alter the conclusions of this chapter.
- 8.4.46 During the mammal survey, sections of the eastern bank of the Whaplaw Burn were inaccessible due to the slope gradient. The survey was conducted from the western bank and features on the eastern bank that could be used by riparian mammals were not recorded. Therefore, this limitation has not been deemed to impact the results of the survey.
- 8.4.47 The land to the west and south of the access track could not be accessed at the time of survey. Where possible this land was surveyed from a distance with binoculars. This is a limitation to the results as much of Soonhope Burn could not be directly accessed for survey, therefore riparian mammal field signs may have been missed. Additionally, the pond near Soonhope Burn could not be accessed to conduct a HIS assessment. It is considered unlikely, however, that additional surveys of the site at this time would materially alter the conclusions of this chapter.
- 8.4.48 During the bat surveys, technical issues with the detectors, microphones, batteries, meant that it was not always possible to achieve 14 consecutive nights of recordings. One detector failed to record data for minimum ten nights during a deployment period (Location 7 in July). At five locations, the detectors had fallen during the deployment (Locations 4 and 14 in June, Location 9 in July and Locations 4 and 11 in October). Location 14 was moved to Location 14a for the second and third deployment due to cattle. Location 14 recorded during the first deployment. As the majority of locations recorded for more than ten nights, with a total of 738 complete nights recorded which exceeds the minimum number of nights (16 Anabats \* 10 nights \* 3 seasonable deployments = 480 nights of data) required for a development of this size, the small loss of data is not considered to have materially altered the overall assessment of risk. See **Technical Appendix 8.4** for more details.
- 8.4.49 During the potential bat roost surveys, one ash tree had been damaged by high winds and suffered significant limb loss. Therefore, it was deemed unsafe to climb up to the canopy branches to assess some of the features identified during the ground level PRA. However, after tree climbing the safe tree areas to check the lower roosting features of the tree, status remained unchanged as it still provided high potential to bats.

<sup>13</sup> Scottish Fisheries Co-ordination Centre. (2007). *Habitat Surveys Training Course Manual*. pp. 1-64

- 8.4.50 During the internal inspection survey for bat roosting activities in buildings within 30m of the access track, the full extent of the attic space of Building B House 2 could not be assessed due to the conversion into adjoining rooms with a sealed roof and walls and a small area of space between attic room conversion and the roof ridge beam/rafters. Therefore, a full check of wooden support beams and timber rafters for roosting bats was not possible. Also small cracks in plaster of Building C, House 3 could not be fully inspected with endoscope yet a full inspection of the loft space was otherwise successful and evidence indicated use by bats in all cases to provide a robust assessment/confirmation of roost status.
- 8.4.51 During fish habitat surveys, watercourses situated on the easterly hills which flow into Soonhope Burn were investigated but no waterflow was present at NT534560. At location NT532557, waterflow was found; however, due to safety concerns regarding the steep gradient, staff were not permitted to investigate the watercourse. Watercourses flowing into Earnsclough Water which were below T1 (Trow Burn), T2 (Hogs Burn), T3, T6 (Green Burn), T8 (Jocks Burn) could not be investigated due to no land access, margins of the watercourses within the redline boundary ceased to exist (see **Technical Appendix 8.5** for more detail).
- 8.4.52 During electrofishing surveys, During the fish habitat assessments (26.09.2023 - 28.09.2023) high amounts of filamentous algae were present in the lower catchment survey locations (T3b, T1) reducing visibility within the water course. Surveys which were conducted on 28.09.2023 were impacted by increased water levels due to rain from the previous evening, resulting in poor visibility, impact on catch efficiency and fluctuations in conductivity of the water resulting in variability in catch efficiency.

### Assessment Methods

- 8.4.53 The ecological evaluation and impact assessment approach used in this chapter is based on Guidelines for Ecological Impact Assessment in the United Kingdom and Ireland<sup>1</sup>. The CIEEM guidelines have been endorsed by NatureScot.
- 8.4.54 Proposals for biodiversity enhancement consider biodiversity as a whole, in line with relevant policy including NFP4.

### Important Ecological Features

- 8.4.55 Ecological features can be important for a variety of reasons and the rationale used to identify them is explained in the text. Importance may relate, for example, to the quality or extent of the site or habitats therein; habitat and/ or species rarity; the extent to which such habitats and/ or species are threatened throughout their range, or to their rate of decline.

### Sensitivity of Receptor

- 8.4.56 In accordance with the CIEEM guidelines, only ecological receptors (habitats, species, ecosystems and their functions/processes) which are considered to be important and potentially affected by the proposed development should be subject to detailed assessment. It is not necessary to carry out detailed assessment of receptors that are sufficiently widespread, unthreatened and resilient to impacts from the proposed development and will remain viable and sustainable. For this assessment effects have been assessed for receptors of Local value or greater, plus any additional receptors subject to legal and policy protection.
- 8.4.57 Receptors of less than local value are considered in relation to overall site biodiversity and habitat complexity.
- 8.4.58 Ecological receptors should be considered within a defined geographical context. For this assessment the following geographic frame of reference has been used:
- International;
  - National (i.e. Scotland);
  - Regional (i.e. Scottish Borders);
  - Local (i.e. within approximately 5km);
  - Less than local; and
  - Negligible.
- 8.4.59 For designated sites, importance should reflect the geographical context of the designation. For example, a Site of Special Scientific Interest (SSSI) would normally be considered nationally important.



8.4.60 In accordance with CIEEM guidelines the value of habitats has been measured against published selection criteria/ lists and other relevant data where available. Examples of relevant criteria/ lists include Annex 1 of the Habitats Directive, the Scottish Biodiversity List (SBL), the Scottish Borders Local Biodiversity Action Plan 2018-2028<sup>14</sup>, Scotland's Environment Map<sup>15</sup> and JNCC Guidelines for Selection of Biological SSSIs<sup>16</sup>.

8.4.61 In assigning a level of value to the population of a species, it is necessary to consider its distribution and status, including a consideration of trends based on available historical records. Reference has therefore been made to published lists where available. Examples of relevant lists include: Species of European conservation importance (as listed on Annexes II, IV and V of the Habitats Directive); species considered to be of principal importance for biodiversity in Scotland as listed on the SBL; priority species listed on the Scottish Borders Local Biodiversity Action Plan; and JNCC Guidelines for Selection of Biological SSSIs.

#### Magnitude of Effect

8.4.62 The ecological impact assessment process involves the following steps:

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

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

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

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

#### Significance Criteria

8.4.65 For the purposes of this assessment, in accordance with the EIA Regulations, CIEEM guidelines and British Standard BS42020:2013<sup>17</sup>, a 'significant effect' is simply one that is sufficiently important to require assessment and reporting so that the decision-maker is adequately informed as to the environmental consequences of permitting the project. It does not necessarily equate to an effect so severe that consent for the project is to be refused planning permission. This is obviously the case because many projects with significant adverse ecological effects have been lawfully permitted following EIA procedures.

8.4.66 Effects can be considered significant at a wide range of scales from international to local. For example, a significant effect on a SSSI is likely to be of national significance whilst a significant effect on a regionally important population of a species is likely to be of regional significance.

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

#### Avoidance, Mitigation, Compensation and Enhancement

8.4.68 A sequential process has been adopted to avoid, mitigate, and compensate for ecological impacts. This is often referred to as the 'mitigation hierarchy'.

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

- avoidance is used where an impact has been avoided, e.g., through changes in scheme design;
- mitigation is used to refer to measures to reduce or remedy a specific negative impact *in situ*;

<sup>14</sup> [https://www.scotborders.gov.uk/downloads/file/928/local\\_biodiversity\\_action\\_plan](https://www.scotborders.gov.uk/downloads/file/928/local_biodiversity_action_plan)

<sup>15</sup> Scot.Gov. Accessed October 2023. Scotland's Environment Map. <https://www.environment.gov.scot/maps/scotlands-environment-map/>

<sup>16</sup> JNCC. 2013: Guidelines for selection of biological SSSIs: <https://hub.jncc.gov.uk/assets/dc6466a6-1c27-46a0-96c5-b9022774f292>

<sup>17</sup> BSI. 2013. BS 42020:2013 Biodiversity - code of practice for planning and development.

- compensation describes measures taken to offset residual effects, i.e., where mitigation *in situ* is not possible; and
- enhancement is the provision of new benefits for biodiversity that are additional to those provided as part of mitigation or compensation measures, although they can be complementary.

### Cumulative Effects

- 8.4.70 Cumulative effects can result from individually insignificant but collectively significant actions taking place over a period of time or concentrated in a particular location. The potential for cumulative effects with other development proposals has been assessed here.
- 8.4.71 Assessment of cumulative effects will consider ecological connectivity considering habitats within 10km and species home ranges in terms in the absence of mitigation. For the assessment of terrestrial habitats, the potential pathways of effect would extend up to 30m for peatland and carbon rich soils (as defined above), 100m for ground water dependant terrestrial ecosystems (GWDTEs) up to 1m depth and up to 250m buffer from any direct footprint below 1m; however, may be significant in cumulative terms up to 10km.
- 8.4.72 For aquatic receptors potential cumulative effects are only likely to be significant for other developments located relatively close by (i.e., within 5km) and within the same hydrological sub-catchments.
- 8.4.73 For (non-avian) terrestrial receptors potential cumulative effects are only likely where other developments are located within the regular range of more mobile species, e.g., bats/otters, or impact the same habitats within the local area. Cumulative effects on bats are likely to be limited to other wind farm developments and as such, for bats, the cumulative assessment has been restricted to other developments within 10km. Otters may have a home range of up to 50km<sup>18</sup> and can range along water courses but also between catchments. Given the complexity and abundance of the freshwater network in the catchment, it is assumed that otters that may disperse out from the River Tweed SAC (one designated feature) will likely be ecologically connected to the Site and within the zone of influence of the works. A range of 250m is assumed for potential direct impacts and up to 10km geographic distance is assumed for potential indirect effect (given that 50km of watercourse home range could be accommodated within a 10km direct range).

- 8.4.74 The assessment includes operational projects, projects under construction, consented projects which are not yet under construction, and projects for which planning applications have been submitted.

## 8.5 Baseline

- 8.5.1 Detailed survey results can be found in **Technical Appendices 8.1 to 8.5**. Results are summarised here for ease of reference.

### Current Baseline

#### Statutory and Designated Sites

- 8.5.2 There are six statutory designated sites within 10km of the site, but no non-statutory designated sites or ancient woodlands were found within 2km of the site (see **Technical Appendix 8.1**), details are provided in **Table 8.2**.

**Table 8.2: Statutory Designated Sites within 10km of the Site**

Site Name	Designation	Approximate Distance and Direction from Site Boundary	Reasons for Designation	Evaluation
River Tweed	SAC	Within site	Water courses of plain to montane levels with the Ranunculion fluitantis and Callitriche-Batrachion vegetation; otter ( <i>Lutra lutra</i> ), Atlantic Salmon ( <i>Salmo salar</i> ), brook lamprey ( <i>Lampetra planeri</i> ), river lamprey ( <i>Lampetra fluviatili</i> ), and sea lamprey ( <i>Petromyzon marinus</i> ).	European value
	SSSI			National value
Lammer Law	SSSI	800m N	Blanket bog and juniper scrub	
Airhouse Wood	SSSI	4.5km SW	Upland oak ancient woodland	
Danskine Loch	SSSI	7.5km N	Fens and fen woodland	
Papana Water	SSSI	8.4km N	Upland mixed ash woodland	
Fala Flow	Ramsar	8.9km	Blanket bog	International value
	SSSI			National value

<sup>18</sup> Chanin. 2003. Monitoring the otter: Conserving Natura 2000 rivers. Monitoring Series No. 10. [https://cieem.net/wp-content/uploads/2019/07/otter\\_monitoring.pdf](https://cieem.net/wp-content/uploads/2019/07/otter_monitoring.pdf)

### Protected, Priority and Notable Species

8.5.3 Details of species recorded within 2km of the proposed site can be found in **Technical Appendix 8.1**. The desk study data (from the local records centre and relevant ecological reports), includes records for the following protected, priority or notable species from within 2km of the site:

- Six species of plants;
- 20 species of insect;
- One species of amphibian and one species of reptile;
- Four species of fish; and
- Eight species of mammals, including the legally protected species of Eurasian otter (*Lutra lutra*), Eurasian badger (*Meles meles*) and Eurasian red squirrel (*Sciurus vulgaris*).

8.5.4 No species of bat were recorded within 2km of the site. Within 10km of the site, eight bat species were recorded, including Daubenton's bat (*Myotis Daubentonii*), Natterer's bat (*Myotis nattereri*), common noctule (*Nyctalus noctule*), Leisler's bat (*Nyctalus leisleri*), Nathusius' pipistrelle (*Pipistrellus nathusii*), common pipistrelle (*Pipistrellus pipistrellus*), Soprano pipistrelle (*Pipistrellus pygmaeus*), brown long-eared bat (*Plecotus auritusall*).

8.5.5 Records also include four species of invasive/ non-native species:

- Hybrid bluebell (*Hyacinthoides non-scripta* x *hispanica* = *H. x massartiana*);
- Seep monkeyflower (*Mimulus guttatus*); and
- Common snowberry (*Symphoricarpos albus*); and
- Eurasian grey squirrel (*Sciurus carolinensis*).

8.5.6 **Table 8.3** provides a summary of the results of the protected, priority and notable vertebrate and plant species returned in the search within a 2km radius of the site. Invertebrates, with the exception of northern brown argus butterfly (scoped in at the request of SBC), have been scoped out of need for specific assessment (with a habitat approach taken with due regard of invertebrates and provision of good working practices and embedded mitigation to avoid any significant effects to invertebrates) and are therefore not included as per 'Effects Scoped Out' in Section 8.3.

8.5.7 As defined within the Longcroft Wind Farm scoping report<sup>19</sup>, the NatureScot guidance will be followed 'to apply mitigation during construction to minimise impacts and avoid committing an offence' in this chapter. A habitat-based assessment has been undertaken and will inform the assessment of potential impacts and the need for mitigation measures during construction (within an outline Biodiversity Enhancement and Restoration Plan (BERP)). We note, however, the SBC point in relation to likely presence of NBA butterfly (**Table 8.1**). We have assumed this species is present with in calcareous grassland on site and have assessed potential impacts on this species accordingly. Aquatic macro-invertebrates will be addressed through assessment of effects on rivers/streams and prey species (i.e., fish and otter) of the River Tweed SAC. Note there are no freshwater pearl mussel (*Margaritifera margaritifera*; FWPM) within the Tweed Catchment.

**Table 8.3: Summary of Protected and Notable Species Data Records Within 2km of Site**

Species	Nearest Location to Site	Data Source	Last Record	Protection/Conservation Status (see Technical Appendix 8.1, Table 3 for Definitions)
<b>Flora</b>				
Diphasiastrum alpinum	0.3km W	Botanical Society of Britain and Ireland (vc81) 2000	24/06/2011	HSD5
Gymnocarpium dryopteris	Within site	Botanical Society of Britain and Ireland (vc81) 2000	07/08/2009	ScotBL
Chenopodium bonus-henricus	1km SW	Botanical Society of Britain and Ireland (vc82)	08/07/2009	RLGB.VU, ScotBL
Euphrasia arctica subsp. borealis	Within site	Botanical Society of Britain and Ireland (vc81) 2000	24/06/2011	RLGB.DD
Euphrasia micrantha	0.1km W	Botanical Society of Britain and Ireland (vc81) 2000	07/08/2009	RLGB.DD
Sedum villosum	0.2km W	Botanical Society of Britain and Ireland (vc81) 2000	24/06/2011	NS-excludes, RLGB.Lr(NT)
<b>Northern Brown Argus Butterfly</b>				
Aricia artaxerxes	0.4km W	Butterfly Conservation - Scottish Borders Butterflies	15/07/2014	RLGB.VU, ScotBL, UKBAP
<b>Reptiles &amp; Amphibians</b>				
Newt sp Triturus	1.4km W	Mercer, J.	21/09/2003	

<sup>19</sup> SLR Consulting on behalf of RES, 2023.

Species	Nearest Location to Site	Data Source	Last Record	Protection/Conservation Status (see Technical Appendix 8.1, Table 3 for Definitions)
Adder <i>Vipera berus</i>	Within site	ARG-UK and ARC Record Pool data	12/05/2012	Bern3, ScotBL, UKBAP, WCA5/9.1k/l
<b>Mammals</b>				
Brown hare	0.2km NW	Biological Re	08/07/2017	ScotBL, UKBAP
Eurasian badger <i>Meles Meles</i>	Within site	TWIC	08/05/2015	Bern3, PBA
Eurasian otter <i>Lutra lutra</i>	2.2km S	SNH (NatureScot)	09/11/2011	Bern2, HabRegs2, HSD2p, HSD4, ScotBL, UKBAP, WCA5/9.4b, WCA5/9.4c
Eurasian red squirrel <i>Sciurus vulgaris</i>	Within site	SBBRC	09/1994	Bern3, RLGB.EN, ScotBL, UKBAP, WCA5/9.1k/l, WCA5/9.1t, WCA5/9.4.a, WCA5/9.4b, WCA5/9.4c
European rabbit <i>Oryctolagus cuniculus</i>	0.4km NW	BTO	05/05/2018	
Mountain hare	Within site	BTO	23/06/2019	Bern3, HabRegs4, HSD5, RLGB.Lr(NT), ScotBL, UKBAP
Roe deer <i>Capreolus capreolus</i>	1.8km NW	BTO	23/06/2019	Bern3
Stoat <i>Mustela erminea</i>	2.5km SW	Recorder - Mercer, J.	08/12/2002	Bern3
<b>Fish</b>				
European eel <i>Anguilla anguilla</i>	0.7km W	Tweed Foundation	10/07/2003	OSPAR, RLGLB.CR, ScotBL, UKBAP, FFFCE
Atlantic salmon <i>Salmo salar</i>	0.5km E	Tweed Foundation	10/07/2003	Bern3, HabRegs4, HSD2p, HSD5, OSPAR, ScotBL, UKBAP, SFFA
Brown trout <i>Salmo trutta</i>	Within site	SNH - Lamprey survey	25/08/2004	ScotBL, UKBAP, SFFA
Lamprey sp <i>Lampetra</i>	2.6 km W	Tweed Foundation	24/07/2001	SFFA

### Vegetation

8.5.8 **Table 8.4** summarises the plant communities and habitats recorded on site. This includes peatland habitats such as blanket bog, and habitats with potential to be Ground Water Dependent Terrestrial Ecosystems (GWDTE).

8.5.9 The hydrogeology assessment, **Chapter 10**, has determined that most of the areas identified using NVC as having moderate or high GWDTE potential are more likely to be surface water dependant and therefore have low GWDTE potential. The exception is a mosaic of U20/U4a/M23b which is partially associated with a spring and while likely largely surface water dependant may benefit some ground water input. A full GWDTE assessment is provided in **Chapter 10**, they are therefore not assessed separately in this chapter.

8.5.10 Two notable plant species were identified during the field survey:

- Common juniper *Juniperus communis* (SBL and Scottish Borders LBAP species) as shown on **Drawing 8.6.1 of Technical Appendix 8.6**. It is also a qualifying feature of the nearby by (800m) Lammer Law SSSI. On site juniper recorded as scattered occurrences along the banks of Whaplaw Burn within the south of the survey area. As species, that is classified on the SBL as watching brief only, and is only present as scattered individuals in one area of the site, Juniper has been evaluated at this site as being of Local Value; and
- Wild pansy *Viola tricolour* (SBL and Scottish Borders LBAP species), was recorded within upland acid grassland habitat in several locations within the survey area. It is a species that is listed on the SBL as requiring conservation action, that has declined nationally by >25% in the past c. 25 years, is classified on the ICUN red list as near threatened and is present at multiple locations within the site. It is however considered that the population size and extent on site is unlikely to be of national significance and therefore wild pansy has been evaluated at this site as being of Regional Value.

8.5.11 In addition, common rock rose the food plant of northern brown argus butterfly caterpillars was recorded in upland calcareous grassland habitat (shown on **Drawing 8.6.1 of Technical Appendix 8.6**), desk study data indicate that it is present at only 9 locations within 2km of the site. Rockrose is not listed on the SBL but, because of its importance to northern brown argus populations, it has been classified at the same level of value as northern brown argus on the assumption that the plants on site support a population of these butterflies. Northern brown argus is listed on the SBL as 'avoid negative impacts' and is listed as vulnerable on the ICUN red list, desk study data indicate it is present at only two locations within 2km of the site. The populations within the local area are considered to be significant at a regional level. Northern brown argus and rockrose are therefore considered of Regional Value in the context of this site.



**Table 8.4: Summary of Vegetation Communities Recorded and Corresponding Annex I and SBL Habitat Types and Potential GWDTE Status**

UKHab classification	Corresponding NVC communities	Area (ha)	Annex I habitat	SBL Priority Habitat	Potential GWDTE Status	Description and Reason for Evaluation	Evaluation
Winter stubble (c1c5)	NA	10.35	NA	NA	NA	Arable land has relatively low value for biodiversity and is widespread in the local area. It is there for considered to be of less than local importance.	Less than local value
Non-cereal crops (c1d)							
Other upland acid grassland (g1b6)	U4 Festuca ovina - Agrostis capillaris - Galium saxatile grassland	66.40	N/A	N/A	N/A	The up-land acid grassland at this site may in many places (especially U4) likely represents former heathland converted to grassland by grazing.	Local value
	U5 Nardus stricta - Galium saxatile grassland	70.29	N/A*	Nardus stricta - Galium saxatile grassland	N/A	These habitats are generally widespread in the local/ regional area. It does however represent two NVC communities on the SBL priority habitat list and supports wild pansy and SBL species in need of conservation action.	
	U6 Juncus squarrosus - Festuca ovina grassland	2.84	N/A*	Juncus squarrosus - Festuca ovina grassland	Moderate**	This habitat is therefore considered of local importance.	
	JE (Not NVC) While similar in appearance to the M23b and MG10 rush pasture communities, the underlying ground flora more closely resembled that of an acid grassland.	13.44	N/A	N/A	N/A		
Bracken (g1c)	U20 Pteridium aquilinum - Galium saxatile community	193.55	N/A	N/A	N/A	Given the lack of species diversity associated with this habitat and as it is common and widespread distribution in Scotland, this habitat is considered to be less than local value.	Less than local value
Upland calcareous grassland (g2b)	CG10 Festuca ovina - Agrostis capillaris - Thymus praecox grassland	1.06	N/A*	Upland calcareous grassland	High**	<p>This habitat was rare on site, likely representative of the sparse, patchily distributed small areas/ deposits derived from calcareous beds in the turbidite succession of the Gala Group in the region.</p> <p>The habitat supports plant species such as rockrose that prefer these calcium/ magnesium rich soil conditions and may not occur in other habitats, these in turn support specialist invertebrates such as northern brown argus.</p> <p>The patchy nature of these calcareous grasslands means that they likely represent steppingstones for the dispersal of meta-populations of specialist species across the local/ regional areas. The removal of any one location could therefore have significant knock-on effects for calcareous grassland habitat connectivity. The example of this type of grassland on site is not considered to be of sufficient extent or quality (e.g., botanical richness) to be considered of national importance. Calcareous grassland on site is therefore considered of regional value.</p>	Regional value
Other neutral grassland (g3c)	MG10 Holcus lanatus - Juncus effusus rush pasture	0.90	N/A	N/A	Moderate	While this habitat has value in terms of habitat diversity and for example providing rough grassland for small mammals and their predators, it lacks species diversity and is widespread in Scotland, it is therefore, and is therefore considered to be of less than local value.	Less than local value
	MG1 Arrhenatherum elatius grassland	1.55	N/A	N/A	N/A		
Modified grassland (g4)	MG6 Lolium perenne - Cynosurus cristatus grassland	43.62	N/A	N/A	N/A	Modified grassland habitat lacks species diversity and is widespread in Scotland, it is therefore considered to be of less than local value.	Less than local value
	MG7 Lolium perenne leys and related grasslands	1.23					

UKHab classification	Corresponding NVC communities	Area (ha)	Annex I habitat	SBL Priority Habitat	Potential GWDTE Status	Description and Reason for Evaluation	Evaluation
Upland birchwoods (w1e)	W11 <i>Quercus petraea</i> - <i>Betula pubescens</i> - <i>Oxalis acetosella</i> woodland	1.79	N/A	Upland birchwoods	N/A	Upland birch woodland is an SBL priority habitat, it occurs in two small stands on site. Such woodland was likely more extensive in the past having been replaced by heath and grassland following felling and grazing. These are not considered to be sufficiently large in extent to be of regional or national value, however they are likely to be important in the local context including as steppingstones for connectivity between woodlands in the local area. No botanical species or species dependant on specific upland birch woodland specialist flora were recorded. These woods are therefore considered to be of local value.	Local value
Other coniferous woodland (w2c)	N/A - mapped as CF	9.88	N/A	N/A	N/A	While it does have some value to woodland species other coniferous woodland habitat lacks species diversity, and under typical clear fell type management, also lacks the structural woodland diversity to maximise its biodiversity potential. It is dominated by non-native conifers that can be invasive into nearby natural habitats (e.g. Sitka spruce regeneration). In addition, such forestry is widespread in Scotland, it is therefore, it is considered to be of less than local value.	Less than local value
Upland heathland (h1b)	H9 <i>Calluna vulgaris</i> - <i>Deschampsia flexuosa</i> heath	299.95	H4030 European dry heath	Upland heathland	N/A	Dry heath is extensive in the region and on site. Its extent is probably reduced in extent by conversion to grassland via grazing. Dry heath is an SBL priority habitat and a European Annex1 habitat. The examples of this habitat on site are species poor and significantly modified from their more species rich state, and ground condition dependant distribution by grazing and burning. From aerial imagery this appears typical of the dry heath in the local area. The poor and somewhat fragmented condition of this habitat on site means that it is considered only to be of local value.	Local value
	H10 <i>Calluna vulgaris</i> - <i>Erica cinerea</i> heath	0.66					
	H12 <i>Calluna vulgaris</i> - <i>Vaccinium myrtillus</i> heath	85.83					
	H18 <i>Vaccinium myrtillus</i> - <i>Deschampsia flexuosa</i> heath	42.83					
	H21 <i>Calluna vulgaris</i> - <i>Vaccinium myrtillus</i> - <i>Sphagnum capillifolium</i> heath	0.71					
	RB (no NVC could be determined) burnt heathland	142.10					
Gorse scrub (h3e)	W23 <i>Ulex europaeus</i> - <i>Rubus fruticosus</i> scrub	0.11	N/A	N/A	N/A	This habitat can provide valuable nectar and nest site resources, however, the extent of this habitat on site was very small and it is not a priority habitat. It is therefore considered of less than local value.	Less than local value
Blanket bog (f1a) Vegetation on peat > 50cm	M19*** <i>Calluna vulgaris</i> - <i>Eriophorum vaginatum</i> blanket mire	15.63	H7130 Blanket mire	Blanket bog	N/A	Under recent NatureScot guidance in relation to developments in peatlands <sup>20</sup> , M19 is considered likely to be a priority peatland type. Priority peatlands are considered to be of national interest.	National value
	M20 <i>Eriophorum vaginatum</i> blanket mire	15.59	N/A	Blanket bog	N/A	Blanket-bog Under recent NatureScot guidance in relation to developments in peatlands, M20 and M25 are not considered likely to be a priority peatland types. The guidance states that impacts on these communities are unlikely to raise issues of national interest. These degraded bog habitats are however listed as priority habitats on the SBL and will be valuable in terms of the connectivity of bog habitats more widely. They are therefore considered of regional value.	Regional value
	M25 <i>Molinia caerulea</i> - <i>Potentilla erecta</i> mire	0.97					
Note M25 is only be considered a peatland habitat where it is on deep peat.							

Peatlands encompasses all organic deposits greater than 50 cm deep together with any shallower organic deposits supporting typical peatland vegetation<sup>21</sup>. However, Scotland's National Peat Plan<sup>21</sup> considers blanket bog to typically occur on peat >0.5m deep, this is the same peat depth which separates carbon rich soils from peat soils<sup>20</sup>. Therefore, we consider that peat habitats on peat >0.5m have greater value than those on peat <0.5m. Bog habitats on peat less than 0.5cm deep could alternatively be classified as wet heath however the vegetation is a better fit to bog communities.

<sup>20</sup> <https://www.nature.scot/doc/advising-peatland-carbon-rich-soils-and-priority-peatland-habitats-development-management>

<sup>21</sup> <https://www.nature.scot/doc/scotlands-national-peatland-plan-working-our-future#3.+What+are+peatlands?>

UKHab classification	Corresponding NVC communities	Area (ha)	Annex I habitat	SBL Priority Habitat	Potential GWDTE Status	Description and Reason for Evaluation	Evaluation
Blanket bog (f1a) Vegetation on peat < 50cm  Could alternatively be classified as Wet heath (h1b6) based on peat depth but vegetation is not characteristic	M19*** Calluna vulgaris - Eriophorum vaginatum blanket mire	79.71	H7130 Blanket mire	Blanket bog	N/A	Under recent NatureScot guidance in relation to developments in peatlands <sup>22</sup> , M19 is considered likely to be a priority peatland type. However, in this context it is on peat <0.5m deep and so is considered to be of only regional value.	Regional value
	M20 Eriophorum vaginatum blanket mire	138.78	N/A	Blanket bog	N/A	Under recent NatureScot guidance in relation to developments in peatlands, M20 and M25 are not considered likely to be a priority peatland types. The guidance states that impacts on these communities are unlikely to raise issues of national interest.  These degraded bog habitats are however listed as priority habitats on the SBL and will be valuable in terms of the connectivity of bog habitats more widely, where these habitats exist on peat <0.5m deep they are considered to be of local value.	Local value
Purple moor grass and rush pasture (f2b)	M23 Juncus effusus/ acutiflorus - Galium palustre rush pasture and M25 on peat <0.5m	45.57	N/A	Purple moor grass and rush pastures	High	The species diversity of this habitat was not considered generally high enough for it to meet the criteria for the Annex1 habitat of the same name (UKHab F2b5). This species poor version is likely to be widespread in damp places with mineral soils in the wider area as it is on site. Like most wetland habitats it will have value in terms of a range of ecosystem services such as water regulation, carbon sequestration and supporting wetland biodiversity and connectivity. It is therefore considered of local value.	Local value
Upland flushes fens and swamps (f2c)	M6 Juncus echinata - Sphagnum fallax/ denticulatum mire	3.44	N/A	Upland flushes, fens and swamps	High	These flush communities are common throughout the Scottish uplands and are on the SBL priority habitats list. The examples on site are not of unusual extent or high floral diversity. Like most wetland habitats they will have value in terms of a range of ecosystem services such as water regulation, carbon sequestration and supporting wetland biodiversity and connectivity. It is therefore considered of local value. have been assessed as having local value.	Local value
Rivers (r2a)	N/A	-	N/A	Rivers	N/A	Two main watercourses and associated minor tributaries intersect the survey area; the Whaplaw Burn and Soonhope Burn. Both watercourses form part of the River Tweed SAC and have therefore been classified as priority habitat. These watercourses are fairly small (<5m wide) and only contribute a small proportion of the catchment for the internationally important SAC. Watercourses in general have very high connectivity and value for biodiversity movement and flows of natural resources. Although small, these watercourses form part of the SAC are therefore considered of national value.	National value

\* Due to a lack of species diversity in the sward, the U5 *Nardus stricta* - *Galium saxatile* community identified during the survey is not considered to conform to the Annex I habitat '6230 Species-rich *Nardus* grassland on siliceous substrates in mountain areas'.

\*\*Moderately groundwater dependant based on hydrogeological setting

\*\*\* Includes M19-M20 mosaics

<sup>22</sup> <https://www.nature.scot/doc/advising-peatland-carbon-rich-soils-and-priority-peatland-habitats-development-management>

### Protected and Notable Species

8.5.12 **Table 8.6** provides a summary of the protected and notable fauna species recorded on site including, otter, adder (*Vipera berus*), common lizard (*Zootoca vivipara*) bats and fish. Full details of results can be found in the relevant **Technical Appendices 8.3 to 8.5**.

#### Bats

8.5.13 Four structures and eight trees within the access track survey area were assessed for their suitability to support roosting bats, provided on Figure 8.3.3 of **Technical Appendix 8.3**. Two structures offered moderate suitability for roosting bats, two structures had negligible suitability, four trees had high suitability, one tree had moderate suitability, and three trees had low suitability.

8.5.14 Of the structures and trees identified, two buildings and one tree were within 30m of the proposed access track, considered the zone of influence (“Zol”) of any potential indirect disturbance due to increased noise, vibration and dust during construction phases and modification to the access track. No direct habitat loss or impacts to the features were predicted. To account for potential effects of disturbance the following surveys were carried out to further the assessment and define appropriate methods.

8.5.15 Buildings B and C (TN24 and TN25), as shown on Figure 8.3.3 in **Technical Appendix 8.3**, were inspected internally and externally. Buildings B and C are both semi-detached with houses named accordingly (Houses 1 and 2 plus Houses 3 and 4, respectively).

8.5.16 Building B - House 1: A large accumulation of droppings in patches were identified in centralised space within the loft, not near the gable ends. External inspection identified loose slates and possible gap in window fixing in loft space that may offer ingress/egress to bats. Evidence suggested repeated use of structure by bats over a period of time with larger accumulation of droppings in House 1 as compared to House 2 (all in one Building together). Droppings collected.

8.5.17 Building B - House 2: Evidence of bats foraging around the building and inside the converted attic space were recorded (i.e., bat droppings attached to the exterior windows and on interior walls within the upstairs converted attic space including in the eaves). Access was not achieved to the full attic space (i.e., gable end areas between the rafters and attic space walls only); therefore, it is assumed that bat roost activity may be present in this area also that would be attributable to the bat activity detected (i.e., possible location for bats to be present in roost feature). No evidence of maternity roosts or bachelor colonies were found in the building (cautionary judgement made given limitations of full access to inspection).

8.5.18 Building C - House 3: Two dead pipistrelle bats were detected (suspected species indeterminate due to decay) in the loft space. Large areas of saturation from droppings and urine were present on the loft insulation. No live bats were observed at time of survey. Likely seasonal summer roost. No evidence of activity at gable end. Large cracks in plaster wall that endoscope could not reach fully so identified as a potential roost feature within loft space. Droppings and carcass collected.

8.5.19 Building C - House 4: Two patches of droppings observed and collected from the loft space. No other evidence or obvious features for ingress/egress were identified. Eaves narrow that limited access throughout loft space; yet, sufficient evidence gathered to confirm roost status.

8.5.20 One large ash tree (TN43) was inspected internally and externally. The main feature on the tree was a large trunk cavity 4m up from the ground. The cavity showed evidence of previous use by barn owl and jackdaw due to presence of pellets and nests (to be addressed in **Chapter 9: Ornithology**). The cavity is exposed on the northern aspect from an adjoining hole in the tree, that also extends vertically into the main stem for 40cm and horizontally for 100cm. No evidence of bats was found within the cavity at the time of survey but it does provide dry conditions for multiple bats to use during the summer as a transitional day roost. Features higher up the tree were not checked due to substantial damage caused by recent storms, including Storm Babet. The status of the tree as having high potential for bat roosting remains unchanged following the further tree climbing checks.

8.5.21 In terms of habitat risk for bat collision with turbines, there are no buildings, structures, with moderate and/or high bat roosting potential within 200m plus the rotor radius of wind turbines or within 95m of trees. Foraging habitat quality and connectivity within this buffer area is low with a largely treeless environment and small open upland burns and a fairly homogenous area of open moorland and marshy grassland habitat present, resulting in a habitat risk classification of ‘Low’.

8.5.22 Six species of bat were recorded during acoustic surveys.

8.5.23 **Table 8.5** summarises the results of the static bat detector survey, for the 16 recording locations. For a more detailed breakdown of survey results, refer to the results table in **Technical Appendix 8.4**.



**Table 8.5: Total number of bat passes for each species across all 16 locations**

Species/Species Group	No of Registrations	Percentage of total (%)	Mean Bat Passes Per Hour*	Mean Bat Passes Per Night	Collision Risk	Relative population abundance
Common pipistrelle	459	54.84	0.05	0.48	High	Common
Soprano pipistrelle	287	34.29	0.03	0.30	High	Common
Brown long-eared	26	3.11	0.003	0.03	Low	Rarer
Daubenton's	35	4.18	0.004	0.04	Low	Rarer
Natterer's	2	0.24	0.0002	0.002	High	Rarest
Noctule	28	3.35	0.003	0.03	Low	Rarer
Total	837	100	0.10	0.89	NA	NA

The number of hours the detectors recorded for each visit was based on an assumed time. Visit 1 recorded 8 hours per night, visit 2 recorded 9 hours per night, visit 3 recorded 14 hours per night. Any failed recordings were not included in the calculations.

### Fish Habitat

8.5.24 Fish habitat quality ranged from: Good (T1, T3b); Moderate (T3a, T4, T6, T7, T8, T10, T11); Poor (T2, T5, T12); and Low (T9). No habitat identified at the time were deemed to be High. Optimal (T3b, T6, T7); Sub-Optimal (T1, T3a, T4, T5, T8, T10, T11) and Not Suitable (T2, T9, T12). No large areas surveys regarding substrate composition were deemed Optimal/ Sub-Optimal habitat for juvenile lamprey, though undercutting of banks has the potential to support European eel.

8.5.25 For more detailed results and information on the survey locations referenced in the paragraph above see **Technical Appendix 8.5**.

8.5.26 Fish presence/ likely absence: Both Atlantic salmon and brown/ sea trout were present across survey locations within the site. Atlantic salmon parr (1++) were present on the Whalplaw Burn, below an in river barrier/ obstacle (2m height) identified during the September 2023 fish habitat surveys. This barrier was deemed impassable under low water conditions due to the rock formation which is most likely why salmon were not present within the most upper reaches of the Whalplaw Burn at survey locations T5 and T6.

8.5.27 Atlantic salmon fry (0+) were present at sites only within Soonhope Burn (T7, T8) at locations where undercut banks with more prominent and faster waters were observed. Trout fry (0+) and parr (1++) were present across all electrofished survey locations, though it is mostly likely trout found within the Whalplaw Burn above T3a are brown trout as up-stream migration of sea trout is unlikely to be possible. In addition, only trout were found at survey location T10 where migrating is likely to be impeded by a culvert. Thus, all trout found within Whalplaw Burn above the culvert are most likely to remain as brown trout.

8.5.28 No suitable eel habitat was found across all surveyed locations, as undercut banks were very shallow, and there was lack of rock formation providing suitable hiding substrate. Lamprey habitat was found at the control site (C1) where sand substrate in large patches was found to have residing river lamprey and where fast water flow was present.

8.5.29 For full details of electrofishing results see **Technical Appendix 8.5**.

8.5.30 The designated species features of the River Tweed Special Area of Conservation (SAC) include otter and fish (that were present in surveys: Atlantic salmon, brown trout and river lamprey) that will be assessed as individual receptors below.

**Table 8.6: Summary of Protected and Notable Species**

Species	Protection/ Conservation Status*	Description of signs and justification for evaluation	Evaluation
Eurasian otter <i>Lutra lutra</i>	Bern2, HabRegs2, HSD2p, HSD4, ScotBL, UKBAP, WCA5/9.4b, WCA5/9.4c	One couch and three spraints. The three main watercourses/ riparian zones are considered suitable foraging and commuting habitat of varying quality with limited potential for resting/ places of shelter.  Otter is an internationally and nationally protected species. In the context of this site there is otter activity was relatively low at the time of survey and the lack of bank side cover make it unlikely that this site is a key area for otter in the wider area. Otter at this site are therefore considered of Local value	Local value
Wild deer		Information from the shooting tenant indicates that there are very few deer on site. They are therefore considered of less than local value.	Less than local value
Adder <i>Vipera berus</i>	Bern3, ScotBL, UKBAP, WCA5/9.1k/1	One adder was observed during protected species surveys ( <b>Technical Appendix 8.3</b> ). Adder were also recorded frequently by during ornithological visits, with seven sightings and a shed skin noted ( <b>Technical Appendix 8.3</b> ).	Local value

Species	Protection/ Conservation Status*	Description of signs and justification for evaluation	Evaluation	Species	Protection/ Conservation Status*	Description of signs and justification for evaluation	Evaluation
		Adder are likely to be widespread in the local area, the desk study data contained three records within 2km of the site. There was no evidence to suggest that this site supports an unusually dense population and similar suitable habitat is abundant in the wider area. The Adder population is therefore considered of local value.					
Common lizard <i>Zootoca vivipara</i>	Bern3, ScotBL, UKBAP, WCA5/9.1k/1	Common lizard were observed during ornithological visits ( <b>Technical Appendix 8.3</b> ).  Common lizard are widespread in Scotland (NatureScot, website) and there was no evidence to suggest that this site supports an unusually dense population. In addition, similar suitable habitat is abundant in the wider area. Th common lizard population is therefore considered of local value.	Local value	Common pipistrelle <i>Pipistrellus pipistrellus</i>	HR Sch2, WCA Sch5, SBL	The level of bat activity on site was considered to be overall low relative to reference sites, with the majority of bat activity due to common pipistrelle species. Risk assessment score based on average comparison sites deemed to be overall Low risk for (high collision risk species) Common pipistrelle, Soprano pipistrelle and <i>Nyctalus</i> Spp as defined in <b>Technical Appendix 8.4</b> Table 6-10. Noting that there is seasonal variations for all species per turbine location with some high activity noted as detailed within <b>Technical Appendix 8.4</b> Figures 2, 3 and 4 evidencing high levels of activity for common pipistrelle at common pipistrelle activity was high at location 12 in spring and locations 6,7,8,13, 14 and 16 in summer; Soprano pipistrelle at location 4, 10 11, 13, 14a, 15 and 16 in summer; and Noctule activity, only recorded during spring and summer at certain locations, ranged from low to moderate.  Overall risk to low collision risk species (i.e., Daubenton's, Natterer's, and brown long-eared bats) was concluded to be negligible.  In addition, the site has limited roosting potential for bat. Two buildings (semi-detached equating to 4 'houses') and one tree are within 30m of the proposed track, considered the zone of influence ("Zoi") of potential disturbance due to increased noise, vibration and dust during construction phases and modification to the access track. All four 'houses' are confirmed roosts (Buildings B and C) that are located just within the predicted zone of influence of indirect disturbance from access track amendments as detailed within <b>Technical Appendix 8.3</b> .	Local value
Mountain hare <i>Lepus timidus</i>	HabRegs4, WCA Sch5, SBL, SB-LBAP	One historical record of mountain hare from within the site as recorded in 2019 as detailed in <b>Technical Appendix 8.1</b> . One sighting was made on site (see <b>Technical Appendix 8.3</b> ) on the lower hill slopes, near to the watercourse, on Site. The mountain hare is a species of 'Community interest' listed on Annex V of the Habitats Directive and so has some protection under the Habitats Regulations 1994 (as amended). None were recorded on site yet are known to be an elusive species that is associated with heather moorlands, particularly those which are managed by burning in strips for red grouse; albeit, their numbers have declined locally where favourable habitat such as former grouse moors has been afforested or heather has been removed by excessive grazing by other animals. In this heavily grazed site, a population has been detected in recent years.	Local value	Soprano pipistrelle <i>Pipistrellus pygmaeus</i>		The bat populations on site are considered to be of varying values, attributable to the relative abundance in Scotland, for all species identified to be present: Common: Common and Soprano pipistrelle; rarer: brown long-eared, Daubenton's and Natterer's and rarest: Nathusius' and Noctule.	Local value
				Brown long-eared <i>Plecotus auritus</i>			Local value
				Daubentons <i>Myotis Daubentonii</i>			Local value
				Natterer's <i>Myotis nattereri</i>		The distribution of the bat species was also consulted within the mammal Society Atlas of the Mammals of GB and NI to define evaluation <sup>23</sup> .	National
				Noctule <i>Nyctalus noctule</i>			National

<sup>23</sup> Mammal Society. 2020. Atlas of the mammals of Great Britain and Northern Ireland. Pelagic. DOI: <https://doi.org/10.53061/XTWI9286>

Species	Protection/ Conservation Status*	Description of signs and justification for evaluation	Evaluation
<b>Fish</b>			
European eel <i>Anguilla anguilla</i>	OSPAR, RGLB.CR, ScotBL, UKBAP, FFFCE	No eels were captured during electrofishing and habitat on site was considered to be typically unsuitable. Eel are therefore considered to be either absent at site or present at only very low density. The site is therefore considered to be of less than local value for eel.	Less than local value
Atlantic salmon <i>Salmo salar</i>	Bern3, HabRegs4, HSD2p, HSD5, OSPAR, ScotBL, UKBAP, SFFA	Juvenile salmon were present at multiple locations on site. In addition, the populations on site are hydrologically connected with the River Tweed SAC which is designated among other things for Atlantic salmon and otter. Otter are a wide ranging species and the trout on site and migrating to site likely for part of the diet of the Tweed otter population. The salmon on site likely form part of the River Tweed meta-population. However, reflection the small portion of the River Tweed catchment on site they represent only a small part of the meta-population and are therefore considered of regional rather than national or higher importance in the context of the site.	Regional value
Brown trout <i>Salmo trutta</i>	ScotBL, UKBAP, SFFA	Juvenile trout were present at multiple locations on site. In addition, the populations on site are hydrologically connected with the River Tweed SAC which is designated among other things for Otter. Otter are a wide ranging species and the trout on site and migrating to site likely for part of the diet of the Tweed otter population. However, reflection the small portion of the River Tweed catchment. The trout population on site is therefore considered of local importance.	Local value
Lamprey spp. including river lamprey <i>Lampetra fluviatilis</i>	SFFA	Juvenile river lamprey were present at one location, a control site on the Kelhope Burn outwith the site and not hydrologically connected to the windfarms potential downstream zone of influence. None were found on site however due to their presence within the same sub-catchment as the site and their patchy nature of sample locations it is assumed that they are present. The assumed population on site is hydrologically connected with the River Tweed SAC which it is partly-designated for this species. The lamprey on site likely form part of the River Tweed meta-population. However, reflection the small portion of the River Tweed catchment on site they represent only a small part of the meta-population and are therefore considered of regional rather than national or higher importance in the context of the site.	Regional value
Three spined stickle back <i>Gasterosteus aculeatus</i>	NA	These are common and widespread species and their populations here are therefore considered of less than local value (but they still contribute towards	Less than local value

Species	Protection/ Conservation Status*	Description of signs and justification for evaluation	Evaluation
		the overall biodiversity value of the aquatic habitats).	
Stone loach <i>Barbatula barbatula</i>	NA		Less than local value
Minnow <i>Phoxinus phoxinus</i>	NA		

\* see Technical Appendix 8.1, Table 3 for Definitions

### Future Baseline

- 8.5.31 In the absence of the proposed development, the site is likely to remain as open moorland (with blanket bog and heath habitats) primarily used for game shooting.
- 8.5.32 Note however that new legislation is being considered by the Scottish government in relation to licencing grouse shooting and restricting muir burn. At the same time estates are increasingly taking advantage of new markets for carbon and other credits typically via peatland restoration and afforestation as well as nature-related agri-environment climate schemes (AECS). It is impossible to say for certain in relation to this estate how the future will unfold however, it is reasonable to assume that some level of habitat change and improvement for biodiversity and carbon sequestration is likely in response to the above pressures and opportunities.
- 8.5.33 In the absence of the proposed development, it is likely that otter and bats will continue to utilise suitable habitat within the site. To allow for possible changes in the distribution of protected species, a pre-construction survey is proposed to ensure legislative compliance during construction, as detailed in Section 8.6 (Pre-construction Surveys).
- 8.5.34 Climate change is predicted to result in complex changes to biodiversity. This may result in changes to the vegetation present or the potential for new species to colonise the site, which potentially includes non-native species, although the extent of any such changes cannot be accurately predicted at this time. However, in the absence of any detailed, quantifiable information it has been assumed that in the absence of the proposed development the ecological condition of the site is unlikely to change significantly due to climate change over the next 30 years.

## Cumulative Situation

- 8.5.35 When undertaking the cumulative effects assessment, it is important to consider only those projects which could potentially contribute to significant cumulative effects with the proposed development. For this assessment potential cumulative effects have been assessed for the following receptors and developments:
- cumulative effects on reptiles within 2km;
  - cumulative effects on aquatic receptors (riparian habitats and fish) within the same sub-catchment (in this instance considered to be the Leader Water catchment, the largest watercourse hydrologically connected to the site within 5km);
  - cumulative loss of the same habitats within 10km; and
  - cumulative effects on otter and bat populations, which are possible in combination with other wind farms within a 10km radius of the Turbine Developable Area.
- 8.5.36 Other projects considered for inclusion in the cumulative effects assessment are detailed in **Table 8.7**. These include all other developments within the relevant study areas which are either operational, under construction, consented or for which a planning application has been submitted.
- 8.5.37 All ten cumulative sites are considered in relation to bats as they are within 10km of the site. Only three are within the same sub-catchment (Leader Water) as the site, these are assessed in relation to cumulative impacts on aquatic receptors.

**Table 8.7: Other Projects Considered in Cumulative Effects Assessment**

Project	Status	Distance from Site (km)	Number of Turbines	River Sub-Catchment
Fallago Rig Wind Farm	Operational	<5	48	Dye Water - White Adder Water - Tweed
Ditchers Law Wind Farm	Application	<5	15	Leader Water - Tweed
Dunside Wind Farm	Application	<5	15	Dye Water - White Adder Water - Tweed
Newlands Hill Wind Farm	Scoping	5-10	17	Faseny Water - White Adder Water - Tweed
Keith Hill Wind Farm	Operational	5-10	5	Humbie Water - Birns Water - Tyne
Pogbie I Wind Farm	Operational	5-10	6	Humbie Water - Birns Water - Tyne
Pogbie II Wind Farm	Operational	5-10	6	Humbie Water - Birns Water - Tyne
Dun law I Wind Farm	Operational	5-10	26	Humbie Water - Birns Water - Tyne
Dun law II Wind Farm	Operational	5-10	35	Humbie Water - Birns Water - Tyne Leader Water - Tweed
Toddleburn Wind Farm	Operational	5-10	12	Leader Water - Tweed Gala Water - Tweed

## 8.6 Assessment of Potential Effects

- 8.6.1 The assessment of effects is based on the information outlined in **Chapter 3: Proposed Development Description**.
- 8.6.2 The potential effects on designated sites are considered within **Technical Appendix 8.7: Shadow Habitats Regulations Appraisal Screening Report** with six features of the River Tweed being taken forward in this assessment for the River Tweed SAC (rivers/riparian habitats, otter and fish).
- 8.6.3 Potential effects on protected species and habitats (including qualifying features of designated sites) include the following:
- Direct and indirect habitat loss/degradation;
  - Direct and indirect impacts to aquatic receptors from:
    - In/near water works;
    - Reduced water quality (water and soil contamination);
    - Changes to waterflow;
  - Direct and indirect habitat degradation resulting from:
    - Changes to waterflow;
    - Reduced air quality (dust);
  - Direct and indirect mortality (killing or injury);
  - Direct and indirect disturbance to species due to:
    - Noise/ vibration;
    - Lighting/ visual disturbance;
    - Visual disturbance from plant/ machinery, site operatives and construction activities;
  - Direct and indirect displacement of prey species; and
  - Invasive non-native species (INNS).

### Embedded Measures

- 8.6.4 The proposed development has been subject to a number of design iterations and evolution in response to the constraints identified as part of the baseline studies, to reduce environmental effects (see **Chapter 2: Design Evolution & Alternatives** and **Chapter 3: Proposed Development Description**). With respect to ecology the following changes have been incorporated to avoid or minimise negative effects:
- The layout has been designed to avoid areas of deeper peat as much as possible - this has reduced the habitat loss of more sensitive higher quality habitats such as blanket bog.
  - The access track layout has been designed in order to maximise the use and upgrade of existing tracks as far as reasonably practicable. Where the levels of



peat exceed 1m in depth, adoption of floating access tracks will minimise disturbance of peat, where appropriate.

- New watercourse crossings have been avoided in the design of the access track layout as far as possible; however, there are 7 new watercourse crossings (5 existing track crossings) required for the proposed development.
- The layout has been designed to avoid areas of Annex 1 and priority habitat, including a 30m buffer where possible and relocation of turbines and infrastructure, in so far as possible, to avoid any impact on these areas. 8 small sections of access track remain that will account for a direct footprint of <0.001ha and indirect footprint of an additional <0.001ha considering the 30m buffer (as per NatureScot guidance).
- Following guidance outlined by (NatureScot, 2021)<sup>24</sup> calculations on the buffer size between turbine blade tip and the nearest woodland were estimated to be 95m. The following measurements were used in the below equation which gave this figure and are as follows; blade length (bl) =85m, hub height (hh) = 135m and feature height (fh) ((woodland)) = 25m. This buffer should be maintained around the turbine locations.

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

- A 100m micro-siting tolerance for turbines and all other infrastructure would be applied to the proposed development enabling impacts on higher quality areas of habitat to be reduced or avoided.

### Good Practice Measures

#### Good Practice Mitigation Measures

- 8.6.5 Full details of construction mitigation measures would be provided in a Construction Environmental Management Plan (CEMP). An outline CEMP is included as **Technical Appendix 3.1**. The CEMP includes measure to mitigate potential impacts due to dust.

- 8.6.6 Good practice measures in relation to pollution risk and sediment management to be adopted during the construction and operation phases are also set out in **Chapter 10: Geology, Hydrology & Hydrogeology**. During the construction phase, good practice techniques with respect to peatland environments, as contained within **Chapter 10: Geology, Hydrology & Hydrogeology**. During the construction phase, good practice techniques with respect to peatland environments, as contained within 'Advising on peatland, carbon-rich soils and priority peatland habitats in development management' (NatureScot, 2023) and 'Good Practice during Windfarm Construction' (SNH, 2019), would be implemented. Further details on peat and water management during construction are provided in **Chapter 10: Geology, Hydrology & Hydrogeology, Technical Appendix 3.1: Outline CEMP and Technical Appendix 10.2: Peat Landslide Hazard Risk Assessment**.

- 8.6.7 Good practice measures to protect retained habitats during the construction phase would be implemented, including the erection of temporary protective fencing demarcating the working footprint, to be overseen and policed by the Environmental Clerk of Works (ECoW); further details are provided in the outline CEMP. Good practice techniques for vegetation and habitat reinstatement would be adopted and implemented on areas subject to disturbance during construction as soon as is practicable as per guidance in the 'Good Practice during Windfarm Construction'<sup>25</sup>.

#### General Mitigation for Protected Species

- 8.6.8 During construction, site speed limits of 15mph would reduce the likelihood of accidental direct/ indirect injury/ killing of animals or unplanned indirect effects of habitat loss/degradation by construction traffic.
- 8.6.9 All potentially dangerous substance or materials within the temporary construction compound would be carefully stored to prevent then causing any harm to any nocturnal animals which may enter the compound at night.
- 8.6.10 During construction all excavations greater than 1m depth would either be covered at night or designed to include a ramp to allow animals a means of escape should they fall in.
- 8.6.11 A procedure should be in place during the construction phase which outlines what to do if any protected species or its resting place is encountered during works.

<sup>24</sup> NatureScot. 2021. Bats and onshore wind turbines - survey, assessment and mitigation: <https://www.nature.scot/doc/bats-and-onshore-wind-turbines-survey-assessment-and-mitigation>

<sup>25</sup> NatureScot 2019. Guidance - Good practice during windfarm construction. <https://www.nature.scot/doc/guidance-good-practice-during-wind-farm-construction>

### Pre-Construction Surveys

8.6.12 Due to the time that will have elapsed since the last surveys and the possibility that otter activity could have changed in the intervening period, a pre-construction survey for otter and other key species including fish, northern brown argus butterfly, its food plant rockrose, juniper and wild pansy would be undertaken. This would cover all watercourses and other suitable habitat within 250m of wind farm infrastructure (access permitting). The results of the pre-construction survey would inform the need for further mitigation (if required) in respect of working practices, or consultation with NatureScot and butterfly conservation if required.

### Species Licensing

8.6.13 Where surveys identify legally protected features, licensing may be appropriate with the first preference to avoid impacts wherever possible. In the event that avoidance is not possible, then species licence applications to NatureScot may be relevant (e.g., if a place of otter shelter is identified within 250m of the proposed works).

8.6.14 Evidence of bats using buildings B and C as roosts and features on one ash tree (TN43) that could be used by multiple bats will require further presence/likely absence surveys pre-construction to establish use, species and individual number estimates (since the features exist just within a 30m zone of influence of potential indirect disturbance effects) resulting from access track works. See **Technical Appendix 8.3** for more details. No direct impacts of habitat loss/ damage to any confirmed/ suspected roosts are predicted based on current survey evidence. Therefore, there is potential for works to disturb roosting bats if they create a higher level of noise, vibrations and dust than current use of access track. Presence/likely absence surveys should be conducted pre-construction in the optimal months (May - August inclusive) to add to the baseline data collated. These surveys will provide evidence to support a bat species licencing application to NatureScot (to permit what would be otherwise unlawful acts within 30m of these features). Licensed bat ecologist supervision and mitigation will be prescribed in a mitigation plan (e.g., restricting timing of works seasonally and at dusk/dawn plus lighting considerations within 30m of the features) to support the licence application accordingly and will require to be strictly adhered to, to protect the legal status of the roost and individual bats.

### Environmental Clerk of Works

8.6.15 A suitably qualified ECoW would be employed for the duration of the construction and reinstatement periods, to ensure natural heritage interests are safeguarded, although this may not necessarily be a full-time role throughout. The role of the ECoW would include the following tasks:

- to give toolbox talks to all staff onsite, e.g., an ecological induction, so staff are aware of the ecological sensitivities on the site and the legal implications of not complying with agreed working practices;
- to undertake pre-construction surveys and checks for otter and advise on ecological issues where required; and
- to carry out pre-construction inspections of areas which require reptile mitigation and supervision of mitigation works, where required.

8.6.16 The ECoW would also undertake additional roles such as assisting with hydrological measures or checking for nesting birds (see **Chapter 9: Ornithology** and **Chapter 10: Geology, Hydrology and Hydrogeology**).

### Surface Water and Peat Soils

8.6.17 Good practice measures in relation to pollution risk, sediment management and watercourse crossings to be adopted during the construction and operation phases are set out in **Chapter 10 and Technical Appendix 3.1: Outline CEMP**. These will be implemented during construction, reinstatement and habitat restoration required to fulfil the aims of the outline BERP.

8.6.18 During the construction phase, good practice techniques with respect to peatland environments, as contained within SHN guidance for good practice during wind farm construction (SNH, 2019), would be implemented.

### Retained Habitat and Habitat Reinstatement

8.6.19 Good practice measures to protect retained habitats during the construction phase would be implemented, including the erection of temporary protective fencing demarcating the working footprint, to be overseen by the ECoW.

8.6.20 Good practice techniques for vegetation and habitat reinstatement would be adopted and implemented on areas subject to disturbance during construction as soon as is practicable.

## Reptiles

- 8.6.21 In order to comply with the Wildlife and Countryside Act 1981 (as amended in Scotland) mitigation would be employed to reduce the chances of inadvertently killing or injuring individual reptiles during construction and operation. Given the low numbers of reptiles likely to be present, the large areas of suitable habitat that would remain unaffected by the works and given also the large spatial scale of the works, fencing and translocation are not considered appropriate. Proposed mitigation therefore would involve identification/removal of potential refugia and hibernacula within areas of suitable habitat, if present. The proposed site speed limit of 15mph would also reduce the likelihood of accidental injury/killing of reptiles by construction traffic.
- 8.6.22 Where appropriate and safe to do so, during the active season (typically April to October) all potential refuges within construction working areas will be removed, and construction works will employ a 'soft start' to allow any individuals to exit the area. Out with the active season, checks and removal of hibernacula will be conducted. These checks will be conducted under the guidance of the ECoW.

## Otter

- 8.6.23 During construction and operation, site speed limits of 15mph would reduce the likelihood of accidental injury/killing of otter by construction traffic.
- 8.6.24 All potentially dangerous substance or materials within the temporary construction compound or elsewhere on site would be carefully stored to prevent then causing any harm to otters which may enter the compound at night.
- 8.6.25 During construction and operation all excavations greater than 1m depth would either be covered at night or designed to include a ramp to allow otter and other animals a means of escape should they fall in.
- 8.6.26 Pre-construction surveys will be required that will identify any 'places of shelter' in riparian habitats within 250m of proposed works and up to 50m inland from riparian habitats. In the event that a place of shelter is identified, the works will be assessed by the ECoW and a suitably qualified/experienced Ecologist advise on appropriate next steps; including, the need for monitoring under licence (e.g., infra-red cameras) and if required a licence application to NatureScot to permit otherwise unlawful site activities (e.g., direct impacts to otter shelter such as holt damage and/or disturbance via noise and vibration).

## Fish

- 8.6.27 In stream works with potential to cause siltation events downstream where salmon may be spawning, should avoid the peak spawning and alevin (when hatchlings are in the redds prior to dispersal as fry) periods for salmon, which is November to April inclusive<sup>26</sup>. This should be informed and refined via - surveys.
- 8.6.28 In stream works should be supervised by the ECoW who should have suitable aquatic and fish management experience.

## Fish Monitoring

- 8.6.29 Prior to construction commencing a fish monitoring plan including surveys pre-construction, during construction and post construction would be agreed with the SBC in consultation with the local fisheries board. This would likely include electro-fishing surveys to establish and monitor fish population sizes and demography at key locations. These data would facilitate identification and mitigation of any potential impacts to fish that may occur during the construction period.
- 8.6.30 Fish survey should be supplemented with macroinvertebrate and water quality sampling is at all survey locations. The purpose of these data is to provide a longer-term water quality monitoring that can be compared over the duration of the project. Baseline ecological condition for watercourses will be used as an indicator of overall watercourse health over time.

## Construction Effects

### Potential Effects

- 8.6.31 Potential effects, assuming that the good practice mitigation and embedded mitigation measures outlined in above in Section 8.6 are implemented, are addressed for each receptor as appropriate in turn in Table 8.9.
- 8.6.32 Effects have been assessed only for important ecological receptors (i.e., those that are protected by law or policy and those with a value of Local level or above). These comprise:
- Designated sites;
  - Habitats: Other upland acid grassland; upland calcareous grassland; upland birchwoods; upland dry heath; blanket bog; purple moor grass and rush pasture; upland flushes, fens and swamps; and rivers and streams.
  - Fauna: Otter, reptiles (adder and common lizard), mountain hare, bats, NBA and fish (Atlantic salmon, brown trout, lamprey spp. including river lamprey); and

<sup>26</sup> <https://www.nature.scot/plants-animals-and-fungi/fish/freshwater-fish/atlantic-salmon>

- Flora: Juniper, wild pansy and common rockrose.

8.6.33 Potential GWDTs are assessed in **Chapter 10: Geology, Hydrology and Hydrogeology**, and so are not assessed separately in this chapter.

#### Habitats

8.6.34 Impacts on habitats are categorised as follows:

- Direct habitat loss - this includes habitats present under the footprint of the proposed development and includes areas which would be subject to cut and fill, grading and potential cable laying; and
- Indirect/temporary habitat loss- indirect loss has been calculated for peatland habitats on deep peat (>50cm) which lie within 30m of the direct habitat loss areas (as per NatureScot guidance<sup>20</sup>); this is to allow for drying effects and hydrological and vegetation changes due to excavations and implantation of infrastructure during construction<sup>27</sup>. For peatlands on carbon-rich soils and other wetland habitats hydrological impacts are anticipated to extend less far from works and we have therefore used a buffer of 10m. For other habitats an allowance for indirect/ temporary loss of 5m is included to allow for possible temporary loss due to damage during construction and potentially increased vulnerability to drought.

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

8.6.36 **Table 8.8** details the estimated direct and indirect/temporary land take for habitats of local or greater value present on site. Loss of habitats of less than local value includes bracken (4.54/ 0.99ha) largely due to borrow pits, other neutral grassland (0.64/ 0.74ha), modified grassland (0.59/ 0.88 ha) and arable land (8.77/ 0.32 ha) due to off-site facilities, direct/ indirect loss.

8.6.37 All infrastructure is situated a minimum of 50m away from watercourses, other than 12 watercourses (8 new; 4 existing) as detailed in **Chapter 3: Proposed Development Description** (for full details). Assuming that best practice pollution prevention measures are adopted, no significant effect is predicted on the running water environment.

8.6.38 Proposed watercourse crossing locations are set out in **Technical Appendix 10.3: Watercourse Crossing Schedule**. There are eight new proposed crossing points. Seven of these appear to be associated with nearly dry or vegetated ditches and drainage features rather than higher value freshwater habitats or watercourse locations with fish habitat potential. The eighth, location 12 is associated with surface water pools with sphagnum moss present of moderate depth with low flow. Based on photographs these are likely M1 or M2 bog pool communities.

8.6.39 One proposed new crossing will be a closed culvert, the other seven including location 12 will be either closed culverts or bottomless crossings. For now, the worse case scenario that all will be closed culverts is assumed as a precautionary approach.

<sup>27</sup><https://www.iucn-uk-peatlandprogramme.org/sites/default/files/2019-05/3%20Drainage%20final%20-%205th%20November%202014.pdf>



**Table 8.8: Summary of Habitat Loss**

UK Hab Type	Direct Loss (ha)	Infrastructure causing Loss	Indirect/ Temporary Loss (ha)	Total Loss (ha)
Upland acid grassland	0.62	Hardstanding Tracks	1.58	2.2
Upland calcareous grassland	none	na	none	0
Upland birchwoods	none	na	none	0
Upland dry heath	17.02	Borrow pit Hardstanding Tracks Temporary concrete plant Turbine foundations	11.12	28.14
Blanket bog (priority peatland) - Peat >50cm (M19 and M19/M20 mosaic)	0.12	Battery storage Tracks	1.21	1.33
Blanket bog (non-priority peatland) - Peat >50cm (M20 and M25)	0.03	Hardstanding	0.26	0.29
Wet heath/ Blanket bog (priority peatland) - Peat <50cm (M19 and M19/M20 mosaic)	2.25	Hardstanding Tracks Turbine foundations Battery storage Substation compound	3.73	5.98
Wet heath/ Blanket bog (non-priority peatland) - Peat <50cm (M20)	4.94	Hardstanding Tracks Turbine foundations Battery storage Substation compound Borrow pit search area	5.48	10.42
Purple moor grass and rush pasture (M23 and M25 on peat <0.5m)	0.5	Hardstanding Tracks Turbine foundations	1.34	1.84
Upland flushes, fens and swamps	none	na	none	0
Rivers and streams*	< 0.001*	na	none	< 0.001*

\* The design of the new crossings is to be fully determined by the Contractor. For the purposes of this assessment, a worst case scenario is taken forward as a precautionary approach, in that the design will be mainly closed culverts and some bridges (e.g., WC11) with the natural watercourse bed lost for the full crossing width (estimated at 7m). The watercourses are narrow or dry in these areas so we have used a precautionary watercourse width of 50cm (equivalent to 7m x 0.5m x 8 new crossings = 28m<sup>2</sup>, < 0.001 ha. Water flow and up-down stream connectivity for wildlife will be maintained.

**Assessment: Protected Areas Habitats Flora and Fauna**

8.6.40 **Table 8.9** summarises the expected impacts during construction on habitats and notable/ protected species of local or greater value within the context of the site and those with legal or policy protection; including Annexes of the Habitats Directive. In the interests of conciseness, justification for the assessment is contained within the Table.

8.6.41 A Shadow Habitat Regulations Appraisal (HRA) Screening Report, in relation to relevant International / European protected areas, is provided in **Technical Appendix 8.7**.

8.6.42 The assessment considers all Embedded Mitigation and Good Working Practices, detailed in **Section 8.6**, and Mitigation and Enhancements measures detailed in **Section 8.7**.

**Table 8.9: Impacts on Protected Areas, Habitats Flora and Fauna During Construction**

Species/Feature	Evaluation	Justification for Significance	Significance (Considering Embedded Mitigation, Good Working Practices, Mitigation and Enhancements)
River Tweed SAC & SSSI	International value	This site is part of the designated site and downstream reaches are therefore hydrologically linked with watercourses on the proposed wind farm site. No significant impacts are anticipated on populations of qualifying species of this site due to construction assuming that embedded mitigation/ good working practices are strictly adhered to (see below for Atlantic salmon, brown trout, lamprey spp. including river lamprey, and otter). A Shadow HRA Screening assessment is provided in <b>Technical Appendix 8.7</b> that concludes LSEs to riverine habitats, otter and fish in the absence of mitigation. The embedded mitigation and good working practices detailed in this assessment address the potential LSEs to avoid adverse impacts on the integrity of the SAC and its designated features.	Significant negative impacts at a local level prior to mitigation/ compensation (i.e., BERP).  No significant effects following mitigation/ compensation. Potential positive effect (based on Outline BERP).
Lammer Law SSSI	National value	There are no clear routes to potential impacts to the qualifying features of this site blanket bog and juniper scrub which is over 800m from proposed construction work. Embedded mitigation and good working practices will avoid impacts of dust/habitat quality.	No significant effects predicted.

Species/Feature	Evaluation	Justification for Significance	Significance (Considering Embedded Mitigation, Good Working Practices, Mitigation and Enhancements)
Airhouse Wood SSSI	National value	There are no clear routes to potential impacts to the qualifying features of this site upland oak wood which is 4.5km from proposed construction work.	No significant effects predicted.
Danskine Loch SSSI	National value	There are no clear routes to potential impacts to the qualifying features of this site fens and fen woodland which is 7.5km from proposed construction work.	No significant effects predicted.
Papana Water SSSI	National value	There are no clear routes to potential impacts to the qualifying features of this upland mixed ash woodland which is 8.4km from proposed construction work.	No significant effects predicted.
Fala Flow Ramsar & SSSI	International value	There are no clear routes to potential impacts to the non-avian qualifying features of this site blanket bog which is 8.9km from proposed construction work. Neither is it hydrologically connected. A habitat regulations assessment is provided in <b>Technical Appendix 8.7</b> .	No significant effects predicted.
Juniper	Local value	The area where juniper was recoded on site is over 100m from the nearest infrastructure (T1). No negative direct or indirect impacts of construction are therefore anticipated with strict adherence to embedded mitigation/good working practices (preventing risks of dust/habitat degradation). The Outline BERP, includes measures to increase the population of juniper via inclusion of this species in riparian planting. Therefore, positive effects on this species are likely. It is not possible to assess if these will be significant at a local scale until the details of the planting proposals have been finalised (e.g., in the detailed BERP post-consent). This would be particularly likely if proposals enhance connectivity with Lammer Law SSSI or other local populations.	No significant effects following mitigation/compensation. Potential positive effect (based on Outline BERP) at a local level.
Wild pansy	Regional value	Wild pansy grows at this site in NVC U4 acid grassland. 1.98ha loss of U4 acid grassland is expected (direct loss of 0.86ha and indirect loss of 1.12ha) during construction. This comprises 3 % of the 66 ha of U4 habitat on site. It is unclear what proportion if any of the pansy population lies within the area to be lost. We have therefore assumed that it is distributed roughly evenly across the available habitat and that at least 3% of the plants on site will be lost (a worst-case scenario could be the full population). This is	Significant negative impacts at a local level prior to mitigation/compensation.  No significant effects following mitigation/compensation.

Species/Feature	Evaluation	Justification for Significance	Significance (Considering Embedded Mitigation, Good Working Practices, Mitigation and Enhancements)
		a small proportion of the onsite population and therefore would be considered significant at a local rather than regional level.  Mitigation paragraph 126722.32896.126764, recommends plant rescue, seed collection and sowing in appropriate location to compensate for this loss, pre-construction surveys as specified in the embedded mitigation (paragraph 8.6.12) will allow more accurate determination of the population of pansy's to be lost and therefore the number of new plants that need to be established in compensation.	
Rockrose	Regional value	The area where rockrose was recoded on site and the areas where it is likely to be present based on maps of NBA habitat and potential habitat provided by butterfly conservation and field survey data of calcareous grassland (g2b 1.06ha on-site), are over 100m from the nearest infrastructure (T1). No loss of calcareous grassland or rockrose plants or other direct or indirect impacts of construction on this species are therefore anticipated. The BERP, includes measures to increase the population of rockrose via seeding. Therefore, positive effects on this species are likely. It is not possible to assess if these will be significant at a local scale until the details of the seeding proposals have been finalised (e.g., in the detailed BERP post-consent).	No significant effects predicted.  Potential positive effects.
Northern brown argus (NBA)	Regional value	NBA is dependent on rockrose. No negative impacts on the rockrose population are expected (see above) and positive effects are likely. Therefore, no negative and potentially positive impacts on NBA are considered likely. As per butterfly conservation recommendations (paragraph 8.3.3) and embedded mitigation (paragraph 8.6.12), any populations of rockrose or NBA that have not been identified to date will be surveyed for to allow for appropriate mitigation prior to construction. Identifying new locations is however considered unlikely as suitable habitat (calcareous grassland) has not been identified in proximity to infrastructure.	No significant effects predicted.  Potential positive effects.
Upland acid grassland	Local value	Direct loss of 0.62ha of U4 upland acid grassland will result from construction of	No significant effects predicted.

Species/Feature	Evaluation	Justification for Significance	Significance (Considering Embedded Mitigation, Good Working Practices, Mitigation and Enhancements)
		hard standing and access tracks with indirect loss of further 1.58ha (total loss of 2.2ha). Wild pansy (SBL and Scottish Borders LBAP species) was recorded within upland acid grassland habitat in several locations within the survey area. The examples of this habitat on site are species poor and significantly modified from their more species rich state, and ground condition dependant on distribution of grazing and burning. Goal 2, restoration of heathland and other open up-land habitats, and Goal 4, to maintain or enhance the population of wild pansy on site, of the Outline BERP (see <b>Technical Appendix 8.6</b> ) provides enhancement measures to address habitat losses through improvement of remaining habitat.	Potential positive effects.
Upland calcareous grassland	Regional value	No direct or indirect loss of this habitat is anticipated.	No significant effects predicted. Potential positive effects following implementation of measures detailed in Outline BERP.
Upland birchwoods	Local value	No direct or indirect loss of this habitat is anticipated. Riparian woodland planting recommended in the BERP may increase habitat extent and connectivity. It is not possible to assess if these will be significant at a local scale until the details of the planting proposals have been finalised (e.g. in the detailed BERP post-consent).	No significant effects predicted.  Potential positive effects.
Upland dry heath	Local value	Direct loss of 17.02ha of upland dry heath habitat plus indirect temporary loss of 11.12ha are anticipated from construction of borrow pits, hard standing, tracks, temporary concrete plant and turbine foundations (28.14ha in total). The examples of this habitat on site are species poor and significantly modified from their more species rich state, and ground condition dependant on distribution of grazing and burning. Goal 2, restoration of heathland and other open up-land habitats, of the Outline BERP (see <b>Technical Appendix 8.6</b> ) provides enhancement measures to address habitat losses through improvement of remaining habitats. It is not possible to assess if these	Significant negative impacts at a local level prior to mitigation/compensation (i.e., BERP).  No significant effects following mitigation/compensation.

Species/Feature	Evaluation	Justification for Significance	Significance (Considering Embedded Mitigation, Good Working Practices, Mitigation and Enhancements)
		will be significant at a local scale until the details of the enhancement proposals have been finalised (e.g., in the detailed BERP post-consent). No significant impacts on this habitat are anticipated following mitigation/compensation.	
Blanket bog (priority peatland) - Peat >50cm	National value	Direct habitat loss of 0.12 ha of priority peatland >50cm peat depth and 1.21 indirect temporary loss (1.33ha in total). Goal 1 of the Outline BERP aims to rewet degraded peatland to raise its water table and condition. The objective of the enhancement measures is to address habitat losses through improvement of remaining habitats. It is not possible to assess if these will be significant at a national scale until the details of the enhancement proposals have been finalised (e.g., in the detailed BERP post-consent). No significant impacts on this habitat are anticipated following mitigation/compensation.	Significant negative impacts at a local level prior to mitigation/compensation (i.e., BERP).  No significant effects following mitigation/compensation.
Blanket bog (non-priority peatland) - Peat >50cm	Regional value	Direct habitat loss of 0.03 ha of priority peatland <50cm peat depth and 0.26 indirect temporary loss (0.29ha in total). Goal 1 of the Outline BERP aims to rewet degraded peatland to raise its water table and condition. The objective of the enhancement measures is to address habitat losses through improvement of remaining habitats. It is not possible to assess if these will be significant at a national scale until the details of the enhancement proposals have been finalised (e.g., in the detailed BERP post-consent). No significant impacts on this habitat are anticipated following mitigation/compensation.	Significant negative impacts at a local level prior to mitigation/compensation (i.e., BERP).  No significant effects following mitigation/compensation.
Blanket bog (priority peatland) - Peat <50cm	Regional value	Bog pools identified in <b>Technical Appendix 10.3</b> in association with proposed watercourse crossing 12, could be directly lost or degraded without appropriate mitigation (set out in paragraph 133572.32896.133614). As the pools are small and within shallower peat this would represent a negative impact at a local level in the absence of mitigation.  5.8ha of habitat will be lost (total between direct and indirect). Assuming embedded mitigation, additional mitigation and	Significant negative impacts at a local level prior to mitigation/compensation (i.e., BERP).  No significant effects following mitigation/compensation.

Species/Feature	Evaluation	Justification for Significance	Significance (Considering Embedded Mitigation, Good Working Practices, Mitigation and Enhancements)
		compensation (the Outline BERP- <b>Technical Appendix 8.6</b> ) are implemented no significant negative effects are anticipated following mitigation/compensation.	
Wet heath/blanket bog (non-priority peatland) - Peat <50cm	Local value	Direct loss of 4.94ha and indirect temporary loss of 5.48ha (10.42 ha in total) will result from construction of hard standings, tracks, turbine foundations, battery storage, substation compound and borrow pits. Goal 1 of the Outline BERP aims to rewet degraded peatland to raise its water table and condition. The objective of the enhancement measures is to address habitat losses through improvement of remaining habitats. It is not possible to assess if these will be significant at a national scale until the details of the enhancement proposals have been finalised (e.g., in the detailed BERP post-consent). No significant impacts on this habitat are anticipated following mitigation/compensation.	Significant negative impacts at a local level prior to mitigation/compensation (i.e. BERP).  No significant effects following mitigation/compensation.
Purple moor grass and rush pasture	Local value	Direct loss of 0.5ha and indirect temporary loss of 1.34ha (1.84ha in total) will result from construction of hard standings, tracks and turbine foundations. Goal 1 of the Outline BERP aims to rewet degraded peatland to raise its water table and condition. The objective of the enhancement measures is to address habitat losses through improvement of remaining habitats. It is not possible to assess if these will be significant at a national scale until the details of the enhancement proposals have been finalised (e.g., in the detailed BERP post-consent). No significant impacts on this habitat are anticipated following mitigation/compensation.	Significant negative impacts at a local level prior to mitigation/compensation (i.e., BERP).  No significant effects following mitigation/compensation.
Upland flushes, fens and swamps	Local value	No losses or indirect effects predicted.	No significant effects predicted.
Rivers and streams	National value	Minimal loss of this habitat is anticipated through construction of access tracks (12 locations including 8 new crossings) equating to <0.001ha.  There is a potential route to impact from pollution and sedimentation; however, good practice mitigation to protect water quality, and the natural stream bed is implemented as per the embedded mitigation section and that set out in <b>Chapter 10</b> . No significant impacts on this habitat are anticipate.	Significant negative impacts at a local level prior to mitigation/compensation (i.e., Outline CEMP and Outline BERP).  No significant effects following mitigation/compensation predicted.

Species/Feature	Evaluation	Justification for Significance	Significance (Considering Embedded Mitigation, Good Working Practices, Mitigation and Enhancements)
		Furthermore, positive effects may arise from measures set out within the Outline BERP (e.g., riparian woodland creation).	
Eurasian otter	Local value	One couch and three spraints were recorded on site. The death or injury of an individual otter during construction could potentially have a significant effect on the conservation status of this species in the local area. However, following implementation of the good practice measures outlined in Section 8.6, death or injury to otters during construction is not likely. As such, no significant effects would be predicted to occur.  Construction activities have some potential to cause temporary disturbance to otters which may use some of the watercourses and waterbodies on and around the site for foraging and commuting. This disturbance would likely be via noise and human presence. However, there is a 50m minimum stand off to infrastructure to watercourses other than watercourse crossings. Given the low levels of otter activity detected on Site, the fact that otters have large home ranges and are able to adapt to a certain level of human disturbance <sup>18</sup> and as such, the likelihood of potential disturbance to otter is low, and the strict adherence to good working practices, embedded mitigation, pre-construction surveys, ECoW, species licensing (if required, not currently deemed to be required), no significant effects are predicted.  Furthermore, positive effects may arise from measures set out within the Outline BERP (e.g., riparian woodland creation).	No significant effects predicted.  No contravention of the relevant legislation and policy is likely following mitigation/compensation predicted.
Adder	Local value	Adder and common lizard have been recorded on the site. The construction of the wind farm would result in the direct loss of up to 22ha of potentially suitable habitat for these species. This loss is not considered significant, given the extensive availability of similar suitable habitats within the site. Indirect/temporary loss of habitat has been discounted, as it is anticipated that areas subject to drying or other temporary damage would still be used by reptiles for activities	Significant negative impacts at a local level prior to mitigation/compensation.  No significant effects following mitigation/compensation.
Common lizard	Local value		



Species/Feature	Evaluation	Justification for Significance	Significance (Considering Embedded Mitigation, Good Working Practices, Mitigation and Enhancements)
		<p>such as basking and potentially foraging (following habitat reinstatement).</p> <p>Good practice mitigation measures aimed at reptiles (see Section 8.6), would be implemented during the construction phase, to prevent the inadvertent injury or killing of individuals. On the basis that the proposed measures are implemented, no significant effects are predicted, and no contravention of the relevant legislation is likely.</p>	
Deer	Less than local value	<p>Deer are scarce on site based on evidence from the shooting tenant. The death or injury of an individual during construction is unlikely to have a significant effect on the conservation status of this species in the local area although there are welfare considerations. However, following implementation of the good practice measures outlined in Section 8.6, death or injury to deer during construction is not likely. As such, no significant effects would be predicted to occur.</p> <p>Construction activities have some potential to cause temporary disturbance to deer which may displace them from nearby habitats. This disturbance would likely be via noise and human presence. This temporary displacement is not considered significant, given the extensive availability of similar suitable habitats within the site and wider area, especially as deer are highly mobile species. In addition, as the numbers of deer on site are low, their displacement to other areas is considered unlikely to have significant negative impacts on surrounding habitats. There will be a presence of an ECoW on Site and good working measures will require to be followed. As such no significant effects are predicted.</p>	<p>No significant effects following mitigation/compensation.</p> <p>No contravention of the relevant legislation / policy is likely.</p>
Mountain hare	Local value	<p>Construction activities have potential to cause direct mortality and disturbance to this species as well as direct and indirect habitat losses/degradation used for shelter, foraging and commuting. The death or injury of an individual during construction is unlikely to have a significant effect on the conservation status of the population in the local area.</p>	<p>No significant negative effects are predicted. No contravention of the relevant legislation and policy is likely following mitigation/good working practices.</p>

Species/Feature	Evaluation	Justification for Significance	Significance (Considering Embedded Mitigation, Good Working Practices, Mitigation and Enhancements)
		<p>However, following implementation of the good practice measures (including pre-construction surveys) and with due regard to mitigation measures outlined in Section 8.6, construction effects are not likely significant. The role of the pre-construction surveys, ECoW, need for licensing to lawfully permit any direct effects including disturbance effects or otherwise (i.e., indirect disturbance of mountain hare within upland terrestrial habitats) are of particular relevance. As such, no significant effects would be predicted to occur.</p> <p>Moorland restoration (reducing grazing and muirburn in selected areas) will seek to improve conditions for mountain hare on Site (Goal 2 in <b>Technical Appendix 8.6</b>).</p>	<p>Potential positive effects via mitigation/compensation.</p>
Bats	Local (common pipistrelle, soprano pipistrelle, brown long-eared and Daubenton's) and National value (Natterer's and Noctule)	<p>Construction activities have potential to cause temporary disturbance to the levels of common, rarer and rarest species bat activity on site (with exception of Noctules in buildings as would not be likely to use these features). No direct effects (e.g., of direct mortality or loss of roosts) are predicted during construction.</p> <p>The site has limited roosting potential for bats. Two buildings and one tree are within 30m of the proposed track, considered the zone of influence ("Zol") of potential disturbance due to increased noise, vibration and dust during construction phases and modification to the access track. Confirmed roosts in (Buildings B and C/Houses 1, 2, 3 and 4) are just within the zone of influence of indirect disturbance during the access track works, as detailed within <b>Technical Appendix 8.3</b>.</p> <p>The bat population on site is therefore considered to be of local and national value (species specific) for bat species identified to be present on Site.</p> <p>The death or injury of an individual during construction is unlikely to have a significant effect on the conservation status of bat species populations of local value; although,</p>	<p>Significant negative impacts at a local and national level prior to mitigation/compensation (i.e., pre-construction surveys, licensing, ECoW and measures detailed in Outline BERP).</p> <p>No significant effects following mitigation/compensation. No contravention of the relevant legislation / policy is likely with strict adherence to licensing application and process in agreement with /approved licence from NatureScot (Section 8.7).</p>

Species/Feature	Evaluation	Justification for Significance	Significance (Considering Embedded Mitigation, Good Working Practices, Mitigation and Enhancements)
		<p>there are welfare considerations. However, following implementation of the good practice measures outlined in Section 8.6 and with due regard to mitigation measures detailed in Section 8.7, death or injury to bats during construction is not likely. The role of the pre-construction surveys, ECoW, need for licensing to lawfully permit any disturbance effects or otherwise (i.e., indirect disturbance of roost within Building B) are of particular relevance. As such, no significant effects would be predicted to occur. Furthermore, measures for bats detailed within the Outline BERP are designed to increase opportunities for roosting bats on Site.</p> <p>The death or injury of an individual during construction may have a significant effect on the conservation status of bat species populations of national value. Further mitigation and enhancement measures are required to address as detailed within Section 8.7 and the Outline BERP (Technical Appendix 8.6).</p>	
Atlantic salmon	Regional value	<p>Limited temporary loss of riparian habitat is expected to be minor as all proposed new watercourse crossings are in locations that have no or very poor potential to support fish e.g. are usually dry or vegetated channels. Potential impacts to fish are therefore from pollution and sedimentation during construction.</p> <p>No noise impacts on adult migration or spawning fish are likely as in stream works will be conducted outwith the main spawning season when adult will likely be lower in the river system.</p> <p>The site where river lamprey was recorded is a control site that is outwith the potential downstream zone of influence for the wind farm. We have however assumed that lamprey is also present in watercourse on site but went undetected.</p> <p>Assuming good practice mitigation to protect water quality (to reduce risks of indirect mortality), and the natural stream bed is implemented as per the embedded mitigation section and that set out in Chapter</p>	<p>No significant effects predicted and no contravention of the relevant legislation and policy is likely following mitigation/compensation.</p> <p>Potential positive effects resulting from implementation of measures within Outline BERP (e.g., riparian woodland planting and rewetting of peatland habitats).</p>
Trout (sea and brown)	Local value		
Lamprey including river lamprey	Regional value		

Species/Feature	Evaluation	Justification for Significance	Significance (Considering Embedded Mitigation, Good Working Practices, Mitigation and Enhancements)
		<p>10. No significant impacts on fish are anticipate.</p> <p>Riparian enhancement measures e.g., tree planting as set out in the BERP (Technical Appendix 8.6) have potential to benefit fish through shading and cooling of water and increased insect fall (food). This may result in positive impacts on fish condition and survival.</p>	

### Operational Effects

8.6.43 Table 8.10 summarises the expected operational impacts on Annex II, protected and priority species and any populations of local or greater value within the context of the site. In the interests of conciseness, justification for the assessment is contained within the Table.

**Table 8.10: Impacts on Protected areas, Habitats, Flora and Fauna During Operation**

Species	Evaluation	Justification for significance	Significance
River Tweed SAC & SSSI	International value	<p>This site is hydrologically linked with watercourse on the proposed wind farm site. No significant impacts are anticipated on populations of qualifying species of this site during operation assuming that embedded mitigation is implemented (see below for lamprey spp. including river lamprey, Atlantic salmon and otter). A habitat regulations screening report is provided in Technical Appendix 8.7, for all six qualifying features.</p> <p>There is a 50m minimum stand off to infrastructure to watercourses (with the exception of access tracks that may lead to occasional lighting effects on river or pollution impacts from vehicle fuel spills from passing vehicles or maintenance works); yet, with adherence to good working practice and embedded mitigation (detailed in Chapter 10) no significant effects are predicted.</p>	No significant effects predicted with adoption of embedded mitigation and good working practices.
Lammer Law SSSI	National value	There are no clear routes to potential impacts to the qualifying features of this site blanket bog and juniper scrub which is over 800m from the site.	No significant effects predicted.
Airhouse Wood SSSI	National value	There are no clear routes to potential impacts to the qualifying features of this site upland oak wood which is 4.5km from the site.	No significant effects predicted.

Species	Evaluation	Justification for significance	Significance
Danskine Loch SSSI	National value	There are no clear routes to potential impacts to the qualifying features of this site fens and fen woodland which is 7.5km from the site.	No significant effects predicted.
Papana Water SSSI	National value	There are no clear routes to potential impacts to the qualifying features of this upland mixed ash woodland which is 8.4km from the site.	No significant effects predicted.
Fala Flow Ramsar & SSSI	International value	There are no clear routes to potential impacts to the non-avian qualifying features of this site blanket bog which is 8.9km from the site.	No significant effects predicted.
Juniper	Local value	There are no clear routes to impact such as loss of habitat or indirect impacts which could affect the populations of these species during the operation of the wind farm.	No significant effects predicted.
Wild pansy	Regional value		
Rock rose	Regional value		
Northern brown argus	Regional value		
Terrestrial habitats	Local- national value	No loss or direct or indirect impacts to terrestrial habitats are anticipated during the operation of the wind farm	No significant effects predicted.
Rivers and streams	National value	There is a potential route to impact from pollution and sedimentation and temporary changes in water flow (in access track construction); however, good practice practices and embedded mitigation to protect water quality, and the natural stream bed will be implemented as per the embedded mitigation section and that set out in Chapter 10. No significant impacts on this habitat are anticipated.	No significant effects following mitigation/ compensation.
Eurasian otter	Local value	<p>One couch and three spraints were recorded on site. The death or injury of an individual otter during operation could potentially have a significant effect on the conservation status of this species population in the local area. However, following implementation of the good practice measures such as a traffic speed limit as outlined in paragraphs 8.6.238.6.25, death or injury to otters during operation is not likely. As such, no significant effects would be predicted to occur.</p> <p>Operational activities such as turbine maintenance have some potential to cause temporary disturbance to otters which may use some of the watercourses and waterbodies on and around the site for foraging and commuting. Minor, occasional disturbance would be possible via noise and human presence. However, there is a 50m minimum stand off to infrastructure to watercourses (with the exception of access tracks that may lead to occasional lighting effects on river from passing vehicles or maintenance works).</p>	<p>No significant effects following mitigation/ compensation predicted.</p> <p>No contravention of the relevant legislation and policy is likely.</p>

Species	Evaluation	Justification for significance	Significance
		Otters have large home ranges and are able to adapt to a certain level of human disturbance (Chanin, 2003) and as such, the likelihood of potential disturbance to otter would be minor and occasional during operation, and no significant effects are predicted.	
Adder	Local value	Adder and common lizard have been recorded on the site. The operation of the wind farm is most likely to impact reptiles via road traffic fatalities.  Good practice mitigation measures aimed at reptiles (see Section 8.6), would be implemented during the construction phase, to prevent the inadvertent injury or killing of individuals. On the basis that the proposed measures are implemented, no significant effects are predicted, and no contravention of the relevant legislation is likely.	No significant effects predicted.  No contravention of the relevant legislation or policy is likely.
Common lizard	Local value		
Deer	Less than local value	<p>Operational activities have some potential to cause temporary disturbance to deer which may displace them from nearby habitats. This disturbance would likely be via noise and human presence. This temporary displacement is not considered significant, given the extensive availability of similar suitable habitats within the site and wider area, especially as deer are highly mobile species.</p> <p>In addition, as the numbers of deer on site are low, their displacement to other areas is considered unlikely to have significant negative impacts on surrounding habitats. As such no significant effects are predicted.</p> <p>Deer are scarce on site based on evidence from the shooting tenant. The death or injury of an individual during operation is unlikely to have a significant effect on the conservation status of this species in the local area although there are welfare considerations. However, following implementation of the good practice measures outlined in Section 8.6, death or injury to deer during operations is not likely. As such, no significant effects would be predicted to occur.</p>	<p>No significant effects predicted.</p> <p>No contravention of the relevant legislation or policy is likely.</p>
Bats	Local (common pipistrelle, soprano pipistrelle, brown long-eared and Daubenton's) and National value (Natterer's, Noctule)	<p>Operational wind turbines can affect bats in a number of ways, although the main concerns relate to collision mortality, barotrauma and other injuries resulting from collision with, or flying in very close proximity to, moving turbine blades (NatureScot et al., 2021)<sup>24</sup>. A study on bat mortality at wind farm sites in the UK found fatality rates to range from 0-5.25 bats per turbine per month (Mathews et al., 2016). Understanding of the key factors which result in some wind farms posing a high risk of collision to bats is incomplete. Though, a number of elements were highlighted in a review of the interactions of bats with wind farms (Arnett et al., 2008) which may influence the risk to bat populations.</p> <ul style="list-style-type: none"> <li>Bats are more likely killed on nights with warm air temperatures and low wind speed.</li> </ul>	<p>No likely significant effects predicted in operational phase based on current site baseline.</p> <p>No significant effects following mitigation/ compensation (with species licensing route to be strictly</p>

Species	Evaluation	Justification for significance	Significance
		<ul style="list-style-type: none"> <li>Most bat fatalities occur in late summer/early autumn.</li> <li>Mitigation for bat collision should be applied to the wind farm as a whole and not at individual turbine locations.</li> <li>There may be an attraction between bats/or their insect prey, and wind turbines which would not be captured during pre-construction surveys.</li> </ul> <p><b>Bat species, which are more vulnerable to collision mortality, are species which are adapted to fly in uncluttered air space, (i.e., away from vegetation). This includes both soprano and common pipistrelle and Nyctalus Spp. as high-risk species relevant to this assessment.</b></p> <p><b>Additional analysis (for other projects) carried out by SPR (Scottish Power Renewables) also predicts that without mitigation there is potential for fatality rates to be high for both Pipistrellus species.</b></p> <p>The overall collision risk assessment was undertaken for high collision risk species which were identified within the proposed development (i.e., common pipistrelle, soprano pipistrelle and Nyctalus spp.). As a 'Medium' sized project with a 'Low' habitat risk classification, the site is assessed as having an overall collision risk to bats of 'Low/Lowest'. Therefore, without mitigation, the risk of bat mortality during the operation phase is considered to be significant at the local level for both pipistrellus species (common and soprano), Daubenton's, brown long-eared, Nyctalus and Natterer's (all species identified via activity surveys). See Technical Appendix 8.4 for full details.</p> <p>Mitigation will therefore be implemented during the operational phase to reduce the risk of turbine-related bat mortality and is outlined below in Section 8.7.</p> <p>As such no significant effects on bat populations will be predicted via collision.</p> <p>No works that are likely to damage or disturb roosts are predicted during operation of the wind farm. Confirmed roosts within the zone of influence of indirect disturbance to bats during the construction phase (i.e., roosting within Buildings B and C) is predicted. One tree with high roost potential (subject to partial tree climb) was also identified. Further surveys will be necessary to establish the species present; nevertheless, no direct or indirect effects of disturbance are predicted for the operational phase to roosting bats within these structures since the vehicular traffic will be minimal increase to current levels of traffic on the access track and set back &gt;20m from access track route when operational (considered</p>	<p>adhered to should additional roosts be identified during construction phase so that no contravention of the relevant legislation and policy is likely (e.g., a new roost identified within feature closer to access track would require to be assessed accordingly).</p>

Species	Evaluation	Justification for significance	Significance
		beyond zone of influence of indirect disturbance effects when operational).	
Mountain hare	Local value	Operational activities have potential to cause minor direct mortality (vehicular movements) and disturbance to this species as well as direct and indirect habitat losses/degradation used for shelter, when this species are foraging and commuting. The death or injury of an individual during operation is unlikely to have a significant effect on the conservation status of the population in the local area. However, following implementation of the good practice measures outlined in Section 8.6 and with due regard to mitigation measures detailed in Section 8.7. Impacts to this species during operation are not likely. As such, no significant effects would be predicted to occur.	<p>No significant negative effects are predicted.</p> <p>Potential positive effects with adherence to mitigation / enhancement measures (e.g., BERP).</p> <p>No contravention of the relevant legislation and policy is likely.</p>
Atlantic salmon	Regional value	No loss of fish habitat is expected during the operational stage. Potential impacts to fish are therefore from pollution and sedimentation e.g., during track maintenance or accidental spillage of fuel.	No significant negative effects are predicted with strict adherence to mitigation/compensation measures). No contravention of the relevant legislation and policy is likely.
Trout (sea and brown)	Local value		
Lamprey spp. including river lamprey	Regional value		

### Decommissioning Effects

- 8.6.44 Effects during decommissioning are expected to be similar to those during construction, however no additional loss of habitat would be expected, and habitat would be reinstated following removal of any infrastructure as appropriate. Embedded mitigation would be the same as during construction. Therefore, no significant effects are anticipated during decommissioning.

## 8.7 Mitigation, Compensation and Enhancement

- 8.7.1 **Table 8.9** and **8.10** detail measures to address potential likely significant effects to receptors during construction and operation respectively. This section provides further detail, where necessary, to account for mitigation, compensation and enhancement measures. This does not repeat the embedded mitigation and good working practices detailed in Section 8.6.



### Construction Mitigation

- 8.7.2 To mitigate and compensate for the loss of any wild pansy plants during construction, plant rescue and relocation should be carried out prior to construction. In addition, seed should be carried out to allow seeds to be used in reinstatement works where suitable soil conditions exist for this species.
- 8.7.3 The watercourse crossing at location 12 which is likely associated bog pools (Priority peatland communities- NVC M1 or M2) will be bottomless and designed to avoid negative impacts on the pools or their hydrology.
- 8.7.4 As detailed within Section 8.5, evidence of bats using buildings B and C as roosts and features on one ash tree (TN43) that could be used by multiple bats will require further presence/likely absence surveys pre-construction to establish use, species and individual number estimates (since the features exist just within a 30m zone of influence of potential indirect disturbance effects) resulting from access track works. See **Technical Appendix 8.3** for more details. No direct impacts of habitat loss/ damage to any confirmed/ suspected roosts are predicted based on current survey evidence. Therefore, there is potential for works to disturb roosting bats if they create a higher level of noise, vibrations and dust than current use of access track. Presence/likely absence surveys should be conducted pre-construction in the optimal months (May - August inclusive) to add to the baseline data collated. These surveys will provide evidence to support a bat species licencing application to NatureScot (to permit what would be otherwise unlawful acts within 30m of these features). Licensed bat ecologist supervision and mitigation will be prescribed in a mitigation plan (e.g., restricting timing of works seasonally and at dusk/dawn plus lighting considerations within 30m of the features) to support the licence application accordingly and will require to be strictly adhered to, to protect the legal status of the roost and individual bats.

### Operation Mitigation

- 8.7.5 No tree clearance will be required so that turbines are set within locations that will reduce the risk of collision to bat species that do not tend to fly across open space. A distance of at least 95m between turbine blade tip and the nearest woodland (i.e., coniferous plantation woodland as compared to Turbine 18) will be established during the construction phase of the proposed development and maintained as per current bat guidance (NatureScot, 2021, see Section 8.6.1).

- 8.7.6 Mitigation will be implemented during operation in order to reduce the risk of turbine-related bat mortality specifically for Pipistrellus and Nyctalus species, though this will also further mitigate for all bat species. The mitigation measures will comprise curtailment of the operation of all wind turbines during certain weather conditions at certain times of year (in particular spring and summer). In the event the scheme is consented, a Bat Mitigation and Monitoring Plan will require to be provided pre-construction.
- 8.7.7 Based on work done at other operational windfarms in upland forested sites (in south-west Scotland), 90% of Pipistrellus bat activity occurs when wind speeds are below 5.5 m/s and temperatures are above 11°C at nacelle height. The curtailment will therefore apply between 30 minutes post-sunset and 40 minutes pre-sunrise and will be implemented at each turbine between 1st April - 31st October each year. The mitigation will be implemented for the lifetime of the proposed development, unless monitoring results necessitate a change in curtailment regime.
- 8.7.8 The implementation of the curtailment will be via software which will automatically send a “pause” command to the relevant turbine, when the parameters are met, initiating a feathering of the blades. This will slow the rotation speed of the blades to below 1 RPM (i.e., slower than the second hand of a clock). This is a tried and tested method, already being successfully applied on other wind farm sites in Scotland.
- 8.7.9 Monitoring would comprise measurement of bat activity and fatality rates and would be undertaken annually until validation of the initial curtailment parameters and any amendments are established in consultation with NatureScot. Bat activity monitoring would comprise the use of static bat detectors (based at ground level) at six randomly selected wind turbines during July - September inclusive which is when most fatalities are found to occur. This represents a precautionary approach, because if bat fatality rates are sufficiently low during this period, they are unlikely to be greater at other times of year - if the mitigation is effective during this period, it will also be effective during periods of lower levels of activity. The use of six turbines is considered to provide a representative sample (37.5%) of turbines to be sampled) and is coincident with the number of turbines which can reliably be searched by a dog team in a single day.

- 8.7.10 Carcass searching would be undertaken within a 50 m radius at the same six turbines every two weeks from 1st July until end of September i.e., seven searches in total. The estimate of two weeks persistence of corpses, and therefore the intervals between search dates will be further confirmed by undertaking a carcass persistence trial at the site prior to undertaking carcass searching. Carcass searching will be undertaken using dogs, so that an effective observer efficiency rate of 80% or more can be achieved.
- 8.7.11 Following each annual monitoring period, if the number of bat fatalities is less than two bats per turbine per year, the operator may propose amendments to reduce the curtailment parameters. If the number of bat fatalities is greater than two bats per turbine per year, the operator shall be obligated to propose amendments to strengthen the mitigation. Any changes proposed will be consulted on with NatureScot and implemented the following year with repeated monitoring using the methods described above unless otherwise varied (e.g., to investigate condition in which fatalities are occurring).
- 8.7.12 No other specific mitigation measures are required for the operational phase. However, compensation and enhancement measures provided as part of the outline BERP (**Technical Appendix 8.6**) would remain in place during the operational phase.

### Enhancement and Compensation

- 8.7.13 The Outline BERP (**Technical Appendix 8.6**) provides detail of enhancement measures relating to all relevant features; including for:
- Juniper;
  - Wild pansy;
  - Rock rose;
  - Northern brown argus;
  - Upland acid grassland;
  - Upland calcareous grassland;
  - Upland birchwoods;
  - Upland dry heath;
  - Blanket bog (priority and non-priority);
  - Wet heath/blanket bog (priority and non-priority peatland);
  - Purple moor grass and rush pasture;
  - Rivers and streams (qualifying feature of River Tweed SAC);
  - Otter (qualifying feature of River Tweed SAC);
  - Mountain hare;
  - Bats; and

- Fish including Atlantic salmon and lamprey (qualifying features of River Tweed SAC).

## 8.8 Further Survey Requirements and Monitoring

### Habitat Monitoring

- 8.8.2 Vegetation monitoring would be undertaken as part of the outline BERP, as detailed in Table 6.1 of **Technical Appendix 8.6**.

### Species Monitoring

- 8.8.3 Pre-construction surveys will be undertaken to take account of any changes in distribution of fauna with particular regard to otter and bats.
- 8.8.4 Fish monitoring will take place preconstruction, throughout construction and post construction to monitor the effect of construction activities on fish populations on Site.
- 8.8.5 Macroinvertebrate sampling is recommended to be conducted at repeated survey locations as per Technical Appendix 8.5.
- 8.8.6 Bat monitoring will continue during the operational phase as part of the proposed mitigation outlined in Section 8.7.

### Hydrological Monitoring

- 8.8.7 Water quality monitoring will take place prior to construction and at regular intervals during construction to monitor pollutants and suspended soils. A regular water quality monitoring for a period post construction to determine potential long terms effects of the proposed development on water quality will also be undertaken. See Chapter 10 Geology Hydrology, and Hydrogeology for full details.

## 8.9 Assessment of Cumulative Effects

- 8.9.1 **Table 8.11** sets out sites with potential to contribute to cumulative effects during the construction phase. **Table 8.12** sets out sites with potential to contribute to cumulative effects during the operational phase.

### Limitations

- 8.9.2 No environmental assessment or other relevant documentation could be identified for Fallago Rig Wind Farm, Pogbie I and II Wind Farms, Dunlaw I and II Wind Farms and Toddleburn Wind Farm. These are older sites that were constructed back as far back as the 1990s. Due to lack of information for these sites, it was therefore not possible to assess the significance of cumulative effects associated with each in relation to the proposed development.

Table 8.11: Potential Cumulative Effects Assessment - Construction

Project/ No. Turbines	Status	Distance from Site (km)	Details	Assessment of Cumulative Effects
<b>Habitats</b>				
Fallago Rig Wind Farm / 48	Operational	<5	No relevant information found.	Assessment of significant not possible in absence of information.
Ditchers Law Wind Farm / 15	Application	<5	Loss of approximately 1.25ha of rush pasture comprising M23a, M23b/b and M23b is predicted during the construction phase of the Proposed Development. Approximately 1.81ha of MG9 rush pasture would also be lost during construction. This was however considered not significant.	Not significant.
Dunside Wind Farm/ 15	Application	<5	The site was found to be dominated by upland heathland with mosaics of acid grassland, rush pasture, improved grassland, modified bog and localised woodland plantations. Approximately 32.768ha of habitats of conservation concern (comprising upland heathland, degraded blanket bog, flush, rush pasture and acid grassland) would be directly lost during construction. This equated to less than 2% of total area of habitats of conservation concern recorded within the survey area. The effect of direct and indirect habitat loss as a result of the proposed development was predicted to be not significant.	Significant. In consideration of blanket bog priority peatland habitat. Outline BERP measures will address any cumulative effects thereby making the effect not significant.
<b>Otter and Rivers/Streams (Riparian Habitats)</b>				
Fallago Rig I Wind Farm / 48	Operational	<5	No relevant information found	Not significant.
Ditchers Law Wind Farm / 15	Application	<5	The site is formed of several watercourses and associated tributaries (of which the Kelhope Burn forms part of the River Tweed SAC) which have potential to support otter. One spraint and one slide were recorded on the Kelhope Burn during baseline surveys, however no resting places were identified. Given the distance from infrastructure and lack of resting places identified, no significant effects during the construction phase were predicted.  Four designated riparian/ aquatic sites were subject to detailed assessment: the River Tweed SAC, Roughy Burn LBS, Kelhope Burn - Dod Cleugh to Hazeldean Wood provisional Local Biodiversity Site (pLBS) and Carfremill pLBS. With implementation of detailed mitigation measures (siting turbines at least	Not significant.

Project/ No. Turbines	Status	Distance from Site (km)	Details	Assessment of Cumulative Effects
			50m from watercourses, minimising works within the vicinity of watercourses, reducing the requirement for new watercrossings) potential effects on these sites during construction were considered not significant.	
Dunside Wind Farm/ 15	Application	<5	Otter was included in the scope of baseline desk study and field survey and were considered within the ecology chapter of the EIA. Otter activity, in the form of spraints and a temporary resting site, were largely focused around lower elevations of the Dye Water (part of the River Tweed SAC). Elsewhere within the site, watercourses were considered to be sub-optimal for otter as a result of current and historic land management practices in the area. With implementation of embedded mitigation measures (no works within 50m of waterbodies, development of a Species Protection Plan, adherence to Guidelines for Pollution Prevention) likely effects on such species were assessed as not significant.	Not significant.
Newlands Hill Wind Farm	Scoping	5-10	A protected mammal survey carried out in 2021 identified evidence of otter activity at only one location within the survey area, with areas of scrub and woodland also noted to support habitat suitability for the species. It was determined that due to the lack of hydrological connectivity between the application site and the River Tweed SAC, and limited evidence of otter activity recorded within the survey area, significant effects on the SAC and associated features (otter) could be scoped out of further assessment.	Not significant.
Keith Hill Wind Farm	Operational	5-10	Habitats within the site were considered to be largely unsuitable for otter, being dominated by agricultural grassland and dense conifer plantation. Otters were known to be present in the local area however no field signs indicating species presence were recorded during baseline field surveys carried out in 2008. The ecology chapter concludes by stating 'With implementation of mitigation and compensation measures...it is not considered the proposals will have a noticeable detrimental effect on the ecological value of the local area'.	Not significant.
Pogbie I Wind Farm	Operational	5-10	No relevant information found	Assumed not significant.
Pogbie II Wind Farm	Operational	5-10	No relevant information found	Assumed not significant.
Dun law I Wind Farm	Operational	5-10	No relevant information found	Assumed not significant.



Project/ No. Turbines	Status	Distance from Site (km)	Details	Assessment of Cumulative Effects
Dun law II Wind Farm	Operational	5-10	No relevant information found	Assumed not significant.
Toddleburn Wind Farm	Operational	5-10	No relevant information found	Assumed not significant.
<b>Bats</b>				
Fallago Rig I Wind Farm / 48	Operational	<5	No relevant information found	Assumed not significant.
Ditchers Law Wind Farm / 15	Application	<5	<p>A range of commuting activity was recorded throughout the site, with common pipistrelle, soprano pipistrelle, <i>Myotis</i> species, <i>Nyctalus</i> species and brown long-eared bat recorded during static detector surveys. The greatest levels of bat activity were recorded near turbine locations within the northern section of the Site, with a peak in common and soprano pipistrelle activity noted during the month of August. However, with implementation of appropriate mitigation (no works during hours of darkness) disturbance to commuting bats as a result of construction was considered to be not significant.</p> <p>There are four aquatic/ riparian designated sites within the site: River Tweed SAC and SSSI, Byrecleuch Burn, Stot Cleugh Local Biodiversity Site (LBS) and Corby Scar and Upper Watch Water LBS. In the absence of mitigation, potential effects include: direct habitat loss habitat fragmentation, disturbance and/or mortality to features associated with the River Tweed SAC and SSSI (otter, Atlantic Salmon, sea, brook and river lamprey, beetle, and vascular plants).</p> <p>No direct habitat loss or fragmentation on designated sites from construction of the proposed development were predicted in the assessment. Embedded mitigation was also considered to avoid damage or disturbance to qualifying features (i.e. utilising existing access tracks where possible, number of required water crossings minimised, infrastructure designed away from watercourses to safeguard the water environment) and as such predicted effects to important aquatic environments were considered not significant.</p>	Not significant.
Dunside Wind Farm / 15	Application	<5	The study area was found to lack favourable roosting opportunities for bats, and commuting and foraging suitability was considered to be low. Static detector surveys identified bats of the genera <i>Pipistrellus</i> ,	Not significant.

Project/ No. Turbines	Status	Distance from Site (km)	Details	Assessment of Cumulative Effects
			<i>Myotis</i> , <i>Nyctalus</i> and <i>Plecotus</i> to utilise the site. Bats were however scoped out of detailed assessment for the construction phase as effects were not considered to be significant.	
Newlands Hill Wind Farm / 17	Scoping	5-10	The scoping report considered direct impacts in the absence of mitigation to include mortality, habitat loss, and disturbance. Indirect impacts may relate to loss/ changes in food resource, fragmentation of populations, and habitat degradation. The assessment of potential effects on bats will therefore be considered through the EIA process.	Assessment of significant not possible in absence of information.
Keith Hill Wind Farm / 5	Operational	5-10	Habitats within the site varied in suitability for supporting commuting and foraging bats, with areas of modified grassland classified and low suitability and woodland edge considered greater suitability. Bat species recorded in flight during static activity surveys included common and soprano pipistrelle, <i>Myotis</i> species, brown long-eared, and noctule. The site was considered to be of 'low' value to local noctule, <i>Myotis</i> species and brown long-eared populations, and 'local' value to populations of pipistrelle bats. No construction phase impacts were however predicted.	Not significant.
Pogbie I Wind Farm / 6	Operational	5-10	No relevant information found	Assessment of significant not possible in absence of information.
Pogbie II Wind Farm / 6	Operational	5-10	No relevant information found	Assessment of significant not possible in absence of information.
Dun law I Wind Farm / 26	Operational	5-10	No relevant information found	Assessment of significant not possible in absence of information.
Dun law II Wind Farm / 35	Operational	5-10	No relevant information found	Assessment of significant not possible in absence of information.
Toddleburn Wind Farm / 12	Operational	5-10	No relevant information found	Assessment of significant not possible in absence of information.

**Reptiles**

Project/ No. Turbines	Status	Distance from Site (km)	Details	Assessment of Cumulative Effects
Fallago Rig I Wind Farm / 48	Operational	<5	No relevant information found	Assessment of significant not possible in absence of information.
Ditchers Law Wind Farm / 15	Application	<5	No reptiles were recorded during baseline field surveys, and with the exception of small areas of rough grassland, the site was considered sub-optimal for reptiles. With implementation of appropriate mitigation measures (dismantling of potential hibernacula and vegetation clearance overseen by an ECoW), effects of construction on reptile species were considered not significant.	Not significant.
Dunside Wind Farm/ 15	Application	<5	Reptiles were scoped out of detailed assessment as effects were not considered to be significant.	Assessment of significant not possible in absence of information.
<b>Fish</b>				
Fallago Rig I Wind Farm / 48	Operational	<5	No relevant information found	Assessment of significant not possible in absence of information.
Ditchers Law Wind Farm / 15	Scoping	<5	Salmon, brook, lamprey and trout were recorded during baseline surveys. With implementation of a range of embedded mitigation measures, potential effects on such species during the construction phase were considered not significant.	Not significant.
Dunside Wind Farm/ 15	Application	<5	Fish and freshwater pearl mussel were scoped out of detailed assessment as effects were not considered to be significant on the basis that good practice design considerations were implemented, monitoring and mitigation measures are outlined and adhered to as part of a Construction Environmental Management Plan (CEMP) for the site.	Not significant.
<b>Mountain Hare</b>				
Fallago Rig I Wind Farm / 48	Operational	<5	No relevant information found	Assessment of significant not possible in absence of information.
Ditchers Law Wind Farm / 15	Application	<5	Mountain hare was scoped out of detailed assessment and therefore considered to be not significant.	Not significant
Dunside Wind Farm/ 15	Application	<5	Mountain hare was recorded in several locations within the study area. Potential construction effects on mountain hare were considered to relate to direct habitat loss from vegetation removal and mortality	Not significant

Project/ No. Turbines	Status	Distance from Site (km)	Details	Assessment of Cumulative Effects
			associated with collision with vehicles/ machinery. With implementation of appropriate mitigation measures (Species Protection Plan, advisory ECoW), construction effects were predicted to be not significant.	

Table 8.12: Potential Cumulative Effects Assessment - Operation

Project/ No. Turbines	Status	Distance from Site (km)	Details	Assessment of Cumulative Effects
<b>Habitats</b>				
Fallago Rig Wind Farm / 48	Operational	<5	No relevant information found.	Assessment of significant not possible in absence of information.
Ditchers Law Wind Farm / 15	Application	<5	Given that habitats affected by the development were deemed to be 'less than local value' and the limited activity that would take place after construction, no significant effects on habitats was predicted.	Not significant.
Dunside Wind Farm/ 15	Application	<5	Operational effects on habitats were considered to be not significant.	Not significant.
<b>Otter / River/Stream (Riparian Habitats)</b>				
Fallago Rig Wind Farm / 48	Operational	<5	No relevant information found.	Assessment of significant not possible in absence of information.
Ditchers Law Wind Farm / 15	Application	<5	As activity would be limited to occasional maintenance at discrete locations for short periods of time, no significant effect on otter populations or riparian habitat during the operational phase were predicted.	Not significant.
Dunside Wind Farm/ 15	Application	<5	Otter was included in the scope of baseline desk study and field survey and were considered within the ecology chapter of the EIA. These species were however scoped out of detailed assessment as effects were not considered to be significant.	Not significant.
Newlands Hill Wind Farm	Scoping	5-10	Effects on otter and aquatic/ riparian habitat during the operational phase were considered to be not significant.	Cannot be determined based on information available at scoping stage.
Keith Hill Wind Farm	Operational	5-10	Operational effects on otter were not considered likely.	Not significant.
Pogbie I Wind Farm	Operational	5-10	No relevant information found	Assessment of significant not possible in absence of information.

Project/ No. Turbines	Status	Distance from Site (km)	Details	Assessment of Cumulative Effects
Pogbie II Wind Farm	Operational	5-10	No relevant information found	Assessment of significant not possible in absence of information.
Dun law I Wind Farm	Operational	5-10	No relevant information found	Assessment of significant not possible in absence of information.
Dun law II Wind Farm	Operational	5-10	No relevant information found	Assessment of significant not possible in absence of information.
Toddleburn Wind Farm	Operational	5-10	No relevant information found	Assessment of significant not possible in absence of information.
<b>Bats</b>				
Fallago Rig Wind Farm/ 48	Operational	<5	No relevant information found	Assessment of significant not possible in absence of information.
Ditchers Law Wind Farm / 15	Application	<5	Static activity surveys identified that the greatest levels of bat activity were recorded near turbine locations within the northern section of the Site, with a peak in common and soprano pipistrelle activity noted during the month of August. As common and soprano pipistrelle are high collision risk species the high levels of activity at certain locations within the site may result in a significant effect. However, with implementation of a turbine featuring regime, the overall likely effect was considered not significant.	Potentially significant in absence of mitigation, enhancements and monitoring. Not significant when measures incorporated.
Dunside Wind Farm / 15	Application	<5	Habitats within the survey area were found to support limited opportunities for commuting, foraging and roosting bats due to the dominance of open moorland. Likely effects on bats during the operational phase relate to habitat fragmentation (loss of commuting and foraging habitat), and mortality (relating to barotrauma and collision with turbines). With implementation of appropriate mitigation measures (development and adherence to a Species Protection Plan and minimising security lighting)  Having evaluated the habitat risk as low and the project size as large the site, was assessed as medium risk for collision effects on bats. Moderate risk to Pipistrellus species	Potentially significant in absence of mitigation, enhancements and monitoring. Not significant when measures incorporated.

Project/ No. Turbines	Status	Distance from Site (km)	Details	Assessment of Cumulative Effects
			individuals considered Low at population level. Noctules risk Low at individual level and minimal at population level. Leisler's bats moderate risk at individual level and very low at population level. The site was considered to be of Study Area importance level for bats. Likely effects on bats during operation included habitat fragmentation and mortality in relation to barotrauma.	
Newlands Hill Wind Farm / 17	Scoping	5-10	The scoping report considered direct impacts in the absence of mitigation to include mortality, habitat loss, and disturbance. Indirect impacts may relate to loss/ changes in food resource, fragmentation of populations, and habitat degradation. The assessment of potential effects on bats will therefore be considered through the EIA process.	Cannot be determined based on information available at scoping stage.
Keith Hill Wind Farm / 5	Operational	5-10	With implementation of mitigation measures proposed, operational effects on bats were not considered likely.	Not significant.
Pogbie I Wind Farm / 6	Operational	5-10	No relevant information found	Assessment of significant not possible in absence of information.
Pogbie II Wind Farm / 6	Operational	5-10	No relevant information found	Assessment of significant not possible in absence of information.
Dun law I Wind Farm / 26	Operational	5-10	No relevant information found	Assessment of significant not possible in absence of information.
Dun law II Wind Farm / 35	Operational	5-10	No relevant information found	Assessment of significant not possible in absence of information.
Toddleburn Wind Farm / 12	Operational	5-10	No relevant information found	Assessment of significant not possible in absence of information.
<b>Reptiles</b>				
Fallago Rig Wind Farm / 48	Operational	<5	No relevant information found	Assessment of significant not possible in absence of information.

Project/ No. Turbines	Status	Distance from Site (km)	Details	Assessment of Cumulative Effects
Ditchers Law Wind Farm / 15	Application	<5	Due to the intermittent nature of turbine maintenance visits that would take place during the operational phase, the overall effect on reptiles species during such period is not considered to be significant.	Not significant.
Dunside Wind Farm/ 15	Application	<5	Reptiles were scoped out of detailed assessment as effects were not considered to be significant.	Not significant.
Fish				
Fallago Rig Wind Farm / 48	Operational	<5	No relevant information found	Assessment of significant not possible in absence of information.
Ditchers Law Wind Farm / 15	Application	<5	Due to limited maintenance and management activity likely to occur during the operational phase (and associated effect pathway into local watercourses), effects on Atlantic salmon, lamprey and trout populations during this period were assessed as not significant.	Not significant.
Dunside Wind Farm/ 15	Application	<5	Fish and freshwater pear mussel were scoped out of detailed assessment as effects were not considered likely to be significant.	Not significant.

## 8.10 Summary

- 8.10.1 Following the avoidance of important receptors during the design of the proposed development where possible, and with the implementation of the proposed good practice measures and additional mitigation, impacts would be minimised as far as possible.
- 8.10.2 Potential significant effects during operation on bats were identified, but following the mitigation, enhancement and compensatory measures detailed herein this assessment and the outline BERP (**Technical Appendix 8.6**) no significant effect are considered likely during the construction and operation phases; including for bats, during the operational phase.