

8 ECOLOGY

8.1 INTRODUCTION

1. This Chapter of the Environmental Assessment Report (EIA Report) identifies and assesses the potential effects that the proposed Heathland Wind Farm (the Development) may have on the ecological resources of the local environment. Analysis and assessment of baseline ecological data have enabled the identification of appropriate mitigation and compensation measures to prevent, reduce, or offset potential adverse ecological effects, as well as enhancement measures to provide beneficial effects, where possible. This assessment was undertaken by Arcus Consultancy Services Limited (Arcus).
2. This Chapter of the EIA Report is broadly structured as follows:
 - Legislation, Policy and Guidance;
 - Assessment Methodology and Significance Criteria;
 - Scoping Opinion and Consultation;
 - Baseline Methods;
 - Baseline Conditions;
 - Embedded Mitigation;
 - Assessment of Ecological Importance;
 - Ecological Impact Assessment (EcIA);
 - Assessment of Cumulative Effects;
 - Summary of Effects; and
 - Statement of Significance.
3. This Chapter of the EIA Report is supported by the following Technical Appendices (TA) provided in Volume 3 Technical Appendices:
 - Technical Appendix A8.1: Habitat Surveys;
 - Technical Appendix A8.2: Protected Species Surveys;
 - Technical Appendix A8.3: Bat Surveys;
 - Technical Appendix A8.4: Fisheries Surveys; and
 - Technical Appendix A8.5: Ecology Consultation Report.
4. This Chapter of the EIA Report is supported by Figure 8.1: Designated Sites, provided in Volume 2a EIA Report Figures.
5. Common vernacular species names are presented in this chapter (except with reference to species without such) followed by the scientific name (upon first use of the common name only).
6. The following terms are used in this chapter to describe the Development and various associated study areas:
 - The Development: the whole physical process involved in the development of Heathland Wind Farm, including wind farm construction, operation and decommissioning (i.e. not a piece of land or an area);
 - The Site: the application boundary within which the land available for turbine development and associated wind farm infrastructure is located (shown as a red line boundary (the Site) in Figure 8.1);
 - Desk Study Area: a variable radius around the Site in which pre-existing information and data have been considered; and
 - Ecology Survey Area: the area in which any given ecology survey has been undertaken. Survey areas vary among surveys and are defined further in Section 8.4.2, as well as in the associated Appendices and Figures; however, most surveys were carried out within up to 250 metres (m) of the Site, which is defined as the Ecology Survey Area (ESA).

8.2 LEGISLATION, POLICY AND GUIDANCE

7. The following guidance, legislation, policy and information sources have been considered in carrying out this assessment.

8.2.1 Legislation

- Council Directive 92/43/EEC (the 'Habitats Directive')¹;
- Council Directive 2000/60/EC ('Water Framework Directive')²;
- Wildlife and Countryside Act 1981 (as amended)³;
- Conservation (Natural Habitats, & c) Regulations 1994 (the 'Habitat Regulations')⁴;
- Wildlife and Natural Environment (Scotland) Act 2011⁵;
- Protection of Badgers Act 1992⁶;
- Nature Conservation (Scotland) Act 2004⁷;
- The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 (as amended)⁸ (the EIA Regulations); and
- Salmon and Freshwater Fisheries Act 2003⁹.

8.2.2 Policy and Guidance

- Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine¹⁰;
- General Pre-application/ Scoping Advice to Developers of Onshore Wind Farms¹¹;
- Decommissioning and Restoration Plans for wind farms¹²;
- Good Practice During Wind Farm Construction¹³;

¹ European Commission (1992) Council Directive 92/43/EEC the Conservation of Natural Habitats and of Wild Fauna and Flora. Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:31992L0043&from=EN>. Accessed on 9 August 2020.

² European Commission (2000) Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 Establishing a Framework for Community Action in the Field of Water Policy [Online] Available at: https://eur-lex.europa.eu/resource.html?uri=cellar:5c835afb-2ec6-4577-bdf8-756d3d694eeb.0004.02/DOC_1&format=PDF. Accessed on 9 August 2020.

³ UK Government (1981) Wildlife and Countryside Act 1981, Chapter 69. Part 1. Available at: <http://www.legislation.gov.uk/ukpga/1981/69/section/1>. Accessed on 9 August 2020.

⁴ Scottish Government (1994) The Conservation (Natural Habitats, &c.) Regulations 1994. Available at: <http://www.legislation.gov.uk/ukksi/1994/2716/contents/made>. Accessed on 9 August 2020.

⁵ Scottish Government (2011) Wildlife and Natural Environment (Scotland) Act 2011. Available at: <http://www.legislation.gov.uk/asp/2011/6/contents/enacted>. Accessed on 9 August 2020.

⁶ UK Government (1992) Protection of Badger Act 1992. Available at: <http://www.legislation.gov.uk/ukpga/1992/51/contents>. Accessed on 9 August 2020.

⁷ Scottish Government (2014) Nature Conservation (Scotland) Act 2004. Available at: <http://www.legislation.gov.uk/asp/2004/6/contents>. Accessed on 9 August 2020.

⁸ The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 <http://www.legislation.gov.uk/ssi/2017/101/contents/made>. Accessed on 19 November 2020.

⁹ Scottish Government (2003) Salmon and Freshwater Fisheries (Consolidation) (Scotland) Act 2003. Available at: <http://www.legislation.gov.uk/asp/2003/15/contents>. Accessed on 9 August 2020.

¹⁰ CIEEM (2018) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine. Available at: <https://cieem.net/wp-content/uploads/2018/08/ECIA-Guidelines-Sept-2019.pdf>. Accessed on 9 August 2020.

¹¹ NatureScot (2020) General pre-application/ scoping advice to developers of onshore wind farms. Available at: <https://www.nature.scot/general-pre-application-and-scoping-advice-onshore-wind-farms>. Accessed on 9 August 2020.

¹² NatureScot (2016) Decommissioning and Restoration Plans for Wind Farms. Available at: <https://www.nature.scot/guidance-decommissioning-and-restoration-plans-wind-farms-february-2016>. Accessed on 9 August 2020.

¹³ Scottish Renewables, NatureScot, SEPA, Forestry Commission Scotland, Historic Environment Scotland (2019). Good Practice during Wind Farm Construction. Available at: <https://www.nature.scot/guidance-good-practice-during-wind-farm-construction>. Accessed on 9 August 2020.

- Guidance on Assessing the Impacts of Windfarm Development Proposals on Groundwater Abstractions and Groundwater Dependent Terrestrial Ecosystems¹⁴,
 - Planning Guidance on On-shore Windfarm Developments¹⁵;
 - European Union (EU) Biodiversity Strategy¹⁶;
 - 2020 Challenge for Scotland's Biodiversity¹⁷; and
 - Scottish Biodiversity List (SBL)¹⁸.
8. In addition to the above, guidance relating to the ecology of species and habitats and to survey and assessment methods are cited in full, where appropriate, in the relevant parts of this chapter and associated Appendices. Work has been carried out in accordance with BS 42020:2013 Biodiversity – Code of Practice for Planning and Development¹⁹ by ecologists working to the Chartered Institute of Ecology and Environmental Management (CIEEM) Code of Professional Conduct²⁰.

8.3 ASSESSMENT METHODOLOGY AND SIGNIFICANCE CRITERIA

8.3.1 Scoping Responses and Consultations

9. A consultation report (Appendix A8.5) was sent by Arcus to NatureScot (formerly known as Scottish Natural Heritage) in April 2019, prior to commencement of ecology surveys, in order to discuss the proposed baseline ecology survey scope. NatureScot confirmed that they were satisfied that the proposed scope was appropriate.
10. At the time the consultation report was written, the 'Woolfords Site', an area of land lying to the east of the current Site Boundary was under consideration for development, although it was subsequently excluded during the design process. This area is referenced in the consultation report and also Appendix A8.2 (where it is referred to as the 'Additional Survey Area'.
11. A Scoping Request²¹ was submitted to the Scottish Government's Energy Consents Unit (ECU) in December 2019. Consultation responses from the relevant Statutory Consultees are shown below in Table 8.1.

Table 8.1: Statutory Consultee Responses

Consultee	Type and Date	Summary of Consultation Response	Response to Consultee
West Lothian Council	Scoping Response, 07/02/20	Generally content with the scoping request	N/A

¹⁴ SEPA (2017) Guidance on Assessing the Impacts of Windfarm Development Proposals on Groundwater Abstractions and Groundwater Dependent Terrestrial Ecosystems. Land Use Planning System SEPA Guidance Note 31. Version 3. Available at: <https://www.sepa.org.uk/media/144266/lups-gu31-guidance-on-assessing-the-impacts-of-development-proposals-on-groundwater-abstractions-and-groundwater-dependent-terrestrial-ecosystems.pdf>. Accessed on 9 August 2020.

¹⁵ SEPA (2014) Planning guidance on on-shore windfarm developments. Land Use Planning System SEPA Guidance Note 4. Version 9. Available at: <https://www.sepa.org.uk/media/136117/planning-guidance-on-on-shore-windfarms-developments.pdf>. Accessed on 9 August 2020.

¹⁶ European Commission (2011) EU Biodiversity Strategy. Available at: http://ec.europa.eu/environment/nature/biodiversity/strategy/index_en.htm. Accessed on 9 August 2020.

¹⁷ Scottish Government (2015) Scotland's Biodiversity, a Route Map to 2020. Available at: <https://www.gov.scot/publications/scotlands-biodiversity-route-map-2020/> Accessed on 9 August 2020.

¹⁸ Scottish Government (2013) Scottish Biodiversity List. Available at: <https://www2.gov.scot/Topics/Environment/Wildlife-Habitats/16118/Biodiversitylist/SBL>. Accessed on 9 August 2020.

¹⁹ BSI Group (2013). BS 42020:2013 – a code of practice for biodiversity in planning and development. BSI.

²⁰ CIEEM (2019). Code of Professional Conduct. Available at: <https://cieem.net/resource/code-of-conduct/> Accessed on 9 August 2020.

²¹ Arcus (2019) Heathland Wind Farm - Scoping Request

Consultee	Type and Date	Summary of Consultation Response	Response to Consultee
		with no comments on ecology.	
South Lanarkshire Council	Scoping Response,	Generally content with the scoping request with no comments on ecology	N/A
Marine Science Scotland (MSS)	Scoping Response, 18/12/19	Requests that the developer consult MSS's generic scoping guidelines, and that the following are carried out 1. Fish population surveys 2. Site specific mitigation measures including water quality and aquatic biota monitoring programme 3. Assess potential cumulative impacts on water quality and aquatic biota with developments that are hydrologically connected 4. Assess potential on water quality and fish populations associated with proposed felling and historic coal mining 5. Seek advice from SEPA regarding prevention of disturbing of North American signal crayfish 6. Consult the Forth District Salmon fishery Board, Forth Fisheries Foundation and Clyde River Foundation for info on local fish stocks	Fisheries Population Surveys and Fish Habitat Surveys have been completed by the Clyde River Foundation, and these, as well as desk-based data, used to inform the assessment on sensitive aquatic species. Appropriate recommendations to mitigate and monitor effects are included. The Forth Fisheries Trust and Forth District Salmon Fisheries Board were consulted; however, they did not provide a response. Potential cumulative impacts on water quality with developments that are hydrologically connected have been assessed in Section 7 of Chapter 10: Hydrology and Hydrogeology. SEPA were connected as part of the scoping process and had no comment regarding disturbance of North American signal crayfish. There are no confirmed records of this invasive species found within 5 km of the Site (see Desk Study results in Section 8.6.1.3).
SEPA	Scoping Response, 17/12/19	Design and development must avoid impacts to GWDTEs. Map showing locations of any GWDTE and	A GWDTE assessment was carried out during habitat surveys. Whilst habitats with potential to be GWDTEs were identified, these were mainly along forestry

Consultee	Type and Date	Summary of Consultation Response	Response to Consultee
		appropriate buffers should be provided.	rides and within low lying grassland in the southern section of the Site. These were all considered to be surface water fed (see Section 10.5.1.1 of Chapter 10: Hydrology and Hydrogeology) and no confirmed GWDEs were identified within the SEPA recommended 250 m buffer ¹⁴ of Development infrastructure.
NatureScot	Scoping Response, 31/01/20	The Scoping Report acknowledges that the bat survey timings do not accord with NatureScot's recent 2019 guidance ²⁹ , in that they missed the Apr-May survey, but that this is considered acceptable due to the general low suitability of the site for bats. Given the past results for this site, NatureScot are content with this approach.	This limitation is highlighted in Appendix A8.3 and in this chapter.
	Email, 16/06/20	NatureScot confirmed additional species and habitat surveys would be required to cover the extension of the Site boundary into Woodmuir Plantation. NatureScot confirmed no further bat surveys required.	All relevant surveys have been completed with results incorporated into this chapter.

8.3.2 Scope of Assessment

12. In summary, the scope of the EcIA includes the following elements:

- Identification of designated sites, species and habitats of nature conservation importance;
- Consideration of the potential effects on ecological features arising due to the Development, including detailed assessment of potential significant effects on Important Ecological Features (IEFs);
- Description of measures required to mitigate significant adverse effects on IEFs within or adjacent to the Site, with the aim to avoid, reduce or compensate for the effect, or offer an opportunity for enhancement; and

- Identification of residual effects on IEFs, including those considered to be significant, taking into account the above mitigation.
13. The principal ecological issues considered in this EcIA include:
- Potential effects on sites designated for nature conservation;
 - The harm and disturbance, both direct and indirect, to habitats and species arising from the construction, operation and decommissioning of the Development; and
 - The potential legal implications of the above impacts.

8.4 BASELINE METHODOLOGY

8.4.1 Desk Study Methodology

14. A desk study was conducted in July 2020 to obtain information about relevant designated nature conservation sites and records of habitats and species. The desk study searched for records of statutory and non-statutory sites of nature conservation, protected species, and priority habitats and species for nature conservation listed in the Scottish Biodiversity List (SBL)¹⁸. The Desk Study Area (DSA) comprised of a variety of areas surrounding the Site. Search distances were chosen based on the level of protection and/or ecological range of the different ecological receptors, detailed as follows:
- A radius of 5 km from the Site was searched for internationally and nationally designated statutory sites for nature conservation (e.g. a Special Area of Conservation (SAC) or Site of Special Scientific Interest (SSSI)). The search radius was extended to 10 km to include any Sites designated for mobile species (i.e. bats);
 - A radius of 2 km from the Site was searched for non-statutory sites;
 - A radius of 5 km (extending to 10 km for rare bat species) from the Site was searched for records of notable or protected species; and
 - A radius of 2 km from the Site was searched for records of invasive, non-native species.
15. Information on the above was requested from The Wildlife Information Centre (TWIC). Additional information was obtained from publicly available sources and is cited in the relevant parts of this chapter and TAs, where relevant.

8.4.2 Baseline Survey Methodology

16. Baseline ecology surveys were undertaken between June 2019 and May 2020. An overview of the survey methods is provided below and full details are presented in Appendices A8.1 through A8.4.

8.4.2.1 Extended Phase 1 Habitat Survey

17. An Extended Phase 1 Habitat Survey of the Site, including a 200 m buffer, was undertaken by Harding Ecology, on behalf of Arcus, in June and September 2019 and May 2020, following standard Joint Nature Conservation Committee (JNCC) survey methods²² (Appendix A8.1). Phase 1 Habitat Survey is a standard method for classifying and mapping British habitats.

8.4.2.2 National Vegetation Classification Survey

18. A National Vegetation Classification (NVC) Survey was undertaken on all wetlands and habitats of conservation value recorded during the Phase 1 Habitat survey. The NVC Survey involved mapping distinct areas of homogenous vegetation and recording detailed

²² JNCC (2010) Handbook for Phase 1 Habitat Survey: A technique for environmental audit. 5th Edition

descriptions of the vegetation communities, with reference to published community descriptions^{23,24,25}. Full methods are presented in Appendix A8.1.

19. In addition, the NVC Survey aimed to identify wetland habitats in accordance with the habitat's descriptions given in 'A Functional Wetland Typology for Scotland' guidance²⁶. Where wetland habitats were identified, further detailed surveys were undertaken for identification of vegetation communities with potential groundwater dependency in accordance with Scottish Environment Protection Agency (SEPA) guidance²⁷.

8.4.23 Protected Species Surveys

20. Protected Species Surveys were carried out between June and September 2019 and in May 2020 (Appendix A8.2). The Protected Species Surveys encompassed all land within the Site and extended up to a 250 m radius (Ecology Survey Area), in line with NatureScot guidance²⁸. The 250 m radius included all species considered likely to be present, but the area surveyed for each species varied depending on species-specific survey guidelines and best practise²⁸, as outlined below:

- Badger (*Meles meles*): Suitable habitats within the Site and extending up to 100 m from the Site Boundary;
- Otter (*Lutra lutra*): Suitable riparian habitats within the Site and extending up to 200 m up- and downstream of watercourses potentially impacted by the Development;
- Pine marten (*Martes martes*): Suitable habitats within the Site and extending up to 250 m from the Site Boundary;
- Red squirrel (*Sciurus vulgaris*): Suitable habitats within the Site and extending up to 50 m from the Site Boundary; and,
- Water vole (*Arvicola amphibius*): Suitable riparian habitats within the Site and extending up to 50 m up- and downstream of watercourses potentially impacted by the Development.

8.4.24 Bats

21. Bat Surveys were carried out with reference to NatureScot guidelines published in 2019²⁹, between April and October 2019 (the Survey Season), with all survey work undertaken by Arcus. The Development consists of fourteen turbines which categorises the project size as 'Medium' in line with the guidance²⁹. In terms of habitat quality for bats, the large extent of homogeneous Sitka spruce plantation with very few potential roost features reduces the suitability of the Site for bats and it was assessed to fall within the 'Low' habitat risk category.
22. Survey methods reflected that recommended in the guidelines²⁹ for a low risk site and is described in further detail below.

²³ Rodwell, J. S (ed.) (1991 *et seq.*). *British Plant Communities. Vol 1–5*. Cambridge University Press

²⁴ Elkington, T., Dayton, N., Jackson, D. L. and Strachan, I. M. (2001). *National Vegetation Classification: Field Guide to Mires and Heaths*. Joins Nature Conservation Committee, Peterborough

²⁵ Averis, B., Birks, J., Horsefield, D., Thompson, D. and Yeo, M. (2004). *An Illustrative Guide to British Upland Vegetation*, JNCC, Peterburgh

²⁶ SNIFFER (2009) WFD95: A Functional Wetland Typology for Scotland – Field Survey Manual. Version 1.

²⁷ SEPA (2009) Land Use Planning Systems SEPA Guidance Note 4 Planning Guidance on on-shore windfarms developments. Available at: <https://www.sepa.org.uk/media/136117/planning-guidance-on-on-shore-windfarms-developments.pdf> Accessed on 9 August 2020.

²⁸ NatureScot (2016) Protected Species Advice for Developers. Guidance on Planning and Protected Animals [Online] Available at: <https://www.nature.scot/professional-advice/planning-and-development/planning-and-development-advice/planning-and-development-protected-species>

²⁹ NatureScot, Natural England, Natural Resources Wales, Renewable UK, ScottishPower Renewables, Ecotricity Ltd, the University of Exeter and the Bat Conservation Trust (2019): Bats and Onshore Wind Turbines: Survey, Assessment and Mitigation. Version: January 2019.

Automated Static Surveys

23. The Survey Season comprises of the following three seasonal Survey Sessions, which current NatureScot guidance defines as follows;
 - Survey Session 1: April/May (Spring);
 - Survey Session 2: June-mid-August (Summer); and,
 - Survey Session 3: Mid-August-October (Autumn).
24. A total of 11 full spectrum Anabat Swift bat detectors (hereby referred to as Anabats), were deployed at ground level (detectors secured to 1m high posts) for a minimum of 10 consecutive nights across a range of habitat types, as per NatureScot guidance. The Anabats were set to record from approximately half an hour before sunset until approximately half an hour after sunrise.
25. In order to collect comparative data, Anabats were deployed at the same 11 Remote Static Survey Locations across the three Survey Sessions.

Roost Surveys

26. No specific Roost Surveys were carried out. However, initial walkovers of the ESA, including during Phase 1 Surveys and Protected Species Surveys, identified a very low number of features with suitability to support roosting bats within the ESA. This was due to the dominance of habitats within the Site by coniferous plantation woodland. Coniferous trees generally show low to negligible potential to support bats due to their lack of potential roosting features.

Limitations

27. Due to a delayed start, Survey Session 1 did not commence until the first week in June 2019, slightly outside of the advised spring survey period. As the survey period was only one week out with the advised spring survey period, it is considered a minor deviation from guidance that had a negligible impact on the robustness of the data collected, and will not affect the accuracy of the assessment for which it helped inform. Additionally, NatureScot reported via consultation (see Section 8.3.1) that, in their opinion, the late timing of the spring survey was unlikely to make much difference to the overall findings.

8.4.25 Great Crested Newt (GCN)

28. Field surveys were undertaken to establish the habitat suitability for, and presence of, GCN associated with the Site. Surveys focussed on all waterbodies within a 500 m buffer of the Site boundary.

Habitat Suitability Index (HSI)

29. All ponds within the Site and within 500m of the Site Boundary were identified prior to going to Site using aerial imagery and Ordnance Survey maps. In addition, some unmapped ponds were discovered incidentally during the survey. The suitability of the habitat provided for GCN at each pond was determined using the GCN HSI. The assessment of the pond suitability was carried out on 1st June 2019 by two Arcus ecologists.
30. Details of the HSI methods is provided in Appendix A8.2, but in summary HSI allocates a score against various suitability factors, including geographic location, pond size, presence of fish and availability of suitable terrestrial habitat. The HSI scores are calculated as the geometric mean of the ten individual habitat suitability scores, and lie between 0 and 1. These scores provide an indication as to the likelihood of a pond to support GCN. In general, ponds with high scores are more likely to support GCN than those with low scores.
31. Ponds that scored average, good or excellent were then surveyed for GCN presence or absence using Environmental Deoxyribonucleic Acid (eDNA) Analysis.

eDNA Analysis

32. Water samples were taken for eDNA analysis on 27th June 2019, during the breeding season in accordance with Natural England guidance³⁰. Water samples were collected from the perimeter of the waterbodies in accordance with Department for Environment, Food and Rural Affairs (DEFRA) technical advice note³¹ and were analysed by FERA Science Ltd in accordance with eDNA analytical protocols.

8.4.26 Fish Surveys

33. Both Fish Habitat Surveys and Fish Fauna Surveys were undertaken by Clyde River Foundation (CRF), on behalf of Arcus, on 17th September 2019. The survey methodology is detailed within Appendix A8.4 and included an assessment of any fish habitat present on Site as well as an electrofishing survey of key watercourses. The surveys were carried out as far as possible to current best practice guidelines³² and to Scottish Fisheries Co-ordination Centre (SFCC) protocol³³. Electrofishing was carried out on four sites on Mouse Water and a single site on Wormlaw Burn.

8.5 ASSESSMENT METHODOLOGY

8.5.1 Determining Importance

34. One of the key challenges in EcIA is to decide which ecological features are important and should be subject to detailed assessment. Such ecological features will be those that are considered to be most important and potentially affected by the project. Some examples of the criteria used to determine importance are defined in Table 8.2.
35. In this EcIA, only ecological features with regional importance and above (see Table 8.2, below) were considered sufficiently important to be determined as IEFs, and in accordance with CIEEM guidance, only these IEFs required assessment for potential significant effects.
36. Habitats and species of nature conservation importance are identified through policies and legislation. For example, habitats and species of international importance are listed on Annex I of the Habitats Directive. Where these are considered of principal importance for biodiversity in Scotland, these features are also listed in the Nature Conservation (Scotland) Act. Other features of importance may be listed on the SBL or as LBAP priorities. These elements provided a crucial starting point for the identification of IEFs requiring consideration in EcIA, however they did not solely determine the level of importance assigned (with the exception of internationally designed Natura 2000 sites).
37. Expert judgement also was applied to determine the level of importance and to identify IEFs. When determining the importance in the context of EcIA, contextual information regarding the value of the site to the species as well as distribution and abundance of a given species was considered. For example, where an uncommon species is recorded, but it is known to be widespread and common locally, and its range is regionally and nationally stable (regional importance as per Table 8.2), but habitats on Site are of low value to the species, the local population may be determined to be of local importance, or potentially less than local.

³⁰ Natural England (2015) Guidance: *Great Crested Newt surveys and mitigation for development projects*.

³¹ Biggs J, Ewald N, Valentini A, Gaboriaud C, Griffiths RA, Foster J, Wilkinson J, Arnett A, Williams P, and Dunn F (2014) *Analytical and methodological development for improved surveillance of the Great Crested Newt. Appendix 5. Technical advice note for field and laboratory sampling of great crested newt (Triturus cristatus) environmental DNA*. Freshwater Habitats Trust, Oxford.

³² Beaumont WRC, Taylor AAL, Lee MJ & Welton JS (2001) *Guidelines for Electric Fishing Best Practice. R&D Report W2-054/TR*. Environment Agency, Bristol, v + 184pp.

³³ SFCC (2001) *Electrofishing Team Leader Training Course Manual*. The Scottish Fisheries Co-ordination Centre, Pitlochry, 35pp.

38. Alternatively, if a population of an uncommon species is improving regionally and nationally (local importance as per Table 8.2), but habitats on site are of high value and relatively rare regionally, the species is likely to constitute a notable proportion of a regional population, and therefore the local population may be considered to be of at least regional importance.
39. Additionally, in accordance with CIEEM guidance, where a legally protected species was present within the zone of influence and there is potential for a breach of legislation, such species was considered to be an IEF.

Table 8.2: Determination Criteria for Ecological Importance

Importance of Receptor	Determination Criteria Examples
International	<p>The population has little or no ability to absorb change without fundamentally altering its present character (i.e. the population of a rare and sensitive species in significant decline).</p> <p>An internationally designated site (e.g. a SAC) or a site meeting criterion for international designations.</p> <p>Species present in internationally important numbers (>1% of biogeographic populations).</p>
National (i.e. Scotland)	<p>The population has low ability to absorb change without fundamentally altering its present character (i.e. the population of an uncommon or rare species in decline, or a common species in significant decline).</p> <p>A nationally designated site (e.g. a SSSI) or a site meeting criterion for national designations.</p> <p>Species present in nationally important numbers (>1% Scottish population).</p> <p>Large areas of priority habitats listed on Annex I of the Habitats Directive and smaller areas of such habitats that are essential to maintain the viability of that ecological resource.</p>
Regional Importance (i.e. South Lanarkshire Council Area)	<p>The population has moderate capacity to absorb change without significantly altering its present character. (i.e. an uncommon or rare but stable species, or a common/widespread but declining species).</p> <p>Species present in regionally important numbers (>5% South Lanarkshire population).</p> <p>Sites not meeting criteria for SSSI selection but of greater than the local criteria below.</p> <p>Priorities within the Local Biodiversity Action Plans (LBAP), where they occur in sufficient abundance to maintain the local resource.</p>
Local Importance (i.e. Community Council Area)	<p>The population is tolerant of change without detriment to its character (a common/widespread species that is stable, or an uncommon species is improving).</p> <p>A species or habitat of low conservation value.</p> <p>Scottish Wildlife Trust (SWT) Reserves and Local Nature Reserves (LNRs).</p> <p>Areas of habitat or species considered to appreciably enrich the ecological resource within the area local to the Site.</p>
Less than Local Importance (Site wide)	<p>The population is resistant to change (any population that is improving its range and abundance).</p> <p>Population of little conservation value.</p> <p>Usually widespread and common habitats and species.</p> <p>Loss of such a species from the Site would not be detrimental to the ecology of the local area.</p>

8.5.1.1 *Characterisation of Potential Effects*

40. In line with the CIEEM EcIA guidance¹⁰ where possible, consideration is given to the following characteristics when identifying potential effects of the Development on IEFs:
- **Nature of effect:** whether it is positive (beneficial) to IEFs, e.g. by increasing species diversity or extending habitat, or negative (detrimental), e.g. by loss of, or displacement from, suitable habitat;
 - **Extent:** the spatial or geographical area over which the effect may occur;
 - **Duration:** the duration of an effect as defined in relation to ecological characteristics (such as a species' life cycle) as well as human timeframes. Impacts may be described as short-, medium-, long-term, permanent or temporary;
 - **Frequency:** the number of times an activity occurs may influence the resulting effect;
 - **Timing:** this may result in an impact on an ecological feature if it coincides with critical life stages or seasons; and
 - **Reversibility:** an irreversible impact is one from which recovery is not possible within a reasonable timescale, or there is no reasonable chance of action being taken to reverse it. A reversible impact is one from which spontaneous recovery is possible or which may be counteracted by mitigation.

8.5.2 *Magnitude of Effect*

41. The magnitude of potential effects will be identified through consideration of the above effect characteristics, to determine the degree of change to baseline conditions predicted as a result of the Development. The criteria for assessing the magnitude of an effect are presented in Table 8.3.

Table 8.3: Framework for Determining Magnitude of Effects

Magnitude of Effects	Definition
High	A fundamental change to the baseline condition of the asset, leading to total loss or major alteration of character.
Medium	A material, partial loss or alteration of character.
Low	A slight, detectable, alteration of the baseline condition of the asset.
Negligible	A barely distinguishable change from baseline conditions.

8.5.3 *Significance of Effect*

42. Significance is a concept related to the weight that should be attached to effects when decisions are made. A significant effect is simply an effect that is sufficiently important to require assessment and reporting so that the decision maker is adequately informed of the environmental consequences of permitting a project. A significant effect does not necessarily equate to an effect so severe that consent for the project should be refused.
43. To determine significance in other chapters within this EIAR a matrix approach has been used. This is widely used in EIA to provided consistency across all the topics and clarity to decision makers. However, as CIEEM guidance discourages the use of the matrix approach it has not been used within this chapter.
44. For the purposes of the EcIA, the significance of effect was defined as an effect that either supports or undermines biodiversity conservation objectives for IEFs, or for biodiversity in general. Conservation objectives may be specific, broad or wide-ranging; therefore, effects can be considered as significant at a wide range of scales from international (major) to local (negligible). Significant effects encompass impacts on structure and function of defined sites, habitats or ecosystems, and the conservation status of habitats and species, including their distribution and abundance.

45. The importance of the IEF and the magnitude of the predicted effects will be used as a guide, in addition to professional judgement, to predict the significance of the likely effects.
46. Where significant effects are identified they will be qualified with reference to an appropriate geographic scale. It is important to note that the scale of a significant effect, may not be the same as the geographic context in which the feature is considered important. This enables consistency in scale when determining appropriate mitigation or compensation solutions.
47. The assessment has been undertaken assuming a micro-siting allowance of 100 m.

8.5.4 Cumulative Effects

48. Cumulative effects can result from individually insignificant but collectively significant actions taking place over a period of time or concentrated in a location. Within EcIA, cumulative effects are particularly important as many ecological features are exposed to background levels of threat or pressure and may be close to reaching critical thresholds where further impact could cause irreversible decline. It is recognised that different actions can cause cumulative effects as follows:
 - Additive/incremental effects: multiple activities/projects may give rise to a significant effect due to their proximity in time and space. These may be additive or synergistic effects; and
 - Ancillary: ancillary developments may include different aspects of the project which may be authorised under different consent processes, these will be included as part of the cumulative assessment.

8.5.5 Residual Impacts

49. Following the assessment of effects, including incorporation of embedded mitigation, all attempts will be made to avoid and mitigate significant ecological impacts, through specific, applied mitigation, whereupon an assessment of residual effects will be undertaken to determine their significance. Where residual effects result in significant impacts or require application of compensatory measures, these will be considered against the relevant policy and legal objectives to determine the outcome of the application.

8.6 BASELINE CONDITIONS

8.6.1 Desk Study Results

8.6.1.1 Statutory Designated Sites

50. Four statutory designated sites were recorded within the DSA. Information relating to these statutory designated sites is provided in Figure 8.1 and in Table 8.4 below.

Table 8.4: Statutory Designated Sites within Desk Study Area

Name	Designation	Approximate Closest Proximity to Site	Relevant Key Designated Features
Cobbinshaw Reservoir	SSSI	2 km east	Open water transition fen
Skolie Burn	SSSI	2.4 km north east	Lowland neutral grassland
Braehead Moss	SSSI	3.1 km south	Intermediate bog (raised)
	SAC		Active raised bog and degraded raised bog.
Cobbinshaw Moss	SSSI	3.3 km east	Intermediate blanket bog

8.6.1.2 Non-statutory Sites

51. Four non-statutory designated sites were recorded within the DSA. Information relating to these statutory designated sites is provided in Table 8.5 below.

Table 8.5: Non-statutory Designated Sites within Desk Study Area

Name	Designation	Approximate Distance and Direction from the Site	Relevant Key Designated Features
Hardwood Water – Woodmuir Plantation to Baad’s Mill (Proposed)	Local Biodiversity Site (LBS)	0.3 km east	Information not available
Nether Longford Moss (Proposed)	LBS	0.8 km north	Information not available
Breich Water – Breich Bridge (A706) to Bents	LBS	1.6 km north	Goldilocks Buttercup (<i>Ranunculus auricomus</i>), Monk’s-rhubarb (<i>Rumex alpinus</i>), Bulrush (<i>Typha latifolia</i>).
Breich Water – Fauldhouse to Breich Bridge and Stoneyburn (Proposed)	LBS	1.9 km northwest and northeast	Information not available

8.6.1.3 Protected and Notable Species Records

52. Table 8.6 provides a summary of recent (2000-2020) records of protected species within the DSA identified in the TWIC data and publicly available data resources. This included recent records of five internationally protected species of conservation priority, as well as other notable, protected or invasive species.

Table 8.6: Recent records of protected and notable species within the DSA

Species	Conservation/ Legal Status	Nearest Record to Site	Number of Record(s) & Year(s) of Record(s)
Mammals			
Common pipistrelle (<i>Pipistrellus pipistrellus</i>)	HR, WCA	2.6 km NE	36 (2010-2019)
Daubenton’s bat (<i>Myotis daubentii</i>)	HR, WCA, SBL	0.6 km W	8 (2000 – 2016)
Myotis bat species	HR, WCA, SBL	On western edge of site	16 (2000-2019)
Natterer’s bat (<i>Myotis nattereri</i>)	HR, WCA, SBL	0.6 km W	5 (2000-2010)
Pipistrelle bat species	HR, WCA, SBL	2.6 km NE	17 (2003-2010)
Soprano pipistrelle (<i>Pipistrellus pygmaeus</i>)	HR, WCA, SBL	2.6 km NE	38 (2010-2019)
Eurasian badger	PBA	1.2 km NW	13 (2002-2013)
European otter	HR, WCA, SBL	0.4 km NE	5 (2000-2017)
European water vole	WCA, SBL	2.3 km NW	7 (2001-2015)
West European hedgehog (<i>Erinaceus europaeus</i>)	SBL	1.1 km N	30 (2006-2019)
Reptiles & Amphibians			

Species	Conservation/ Legal Status	Nearest Record to Site	Number of Record(s) & Year(s) of Record(s)
Common frog (<i>Rano temporaria</i>)	WCA, SBL	1 km N	28 (2004-2018)
Common toad (<i>Bufo bufo</i>)	WCA, SBL	3.4 km N	5 (2010-2015)
Slow worm (<i>Anguis fragilis</i>)	SBL	2.2 km NW	1 (2004)
Invertebrates			
Broom moth (<i>Ceramica pisi</i>)	SBL	4.8 km NW	1 (2014)
Dark brocade moth (<i>Mniotype adusta</i>)	SBL	4.8 km NW	1 (2014)
Double dart moth (<i>Graphiphora augur</i>)	SBL	3.4 km N	1 (2010)
Ghost moth (<i>Hepialus humuli humuli</i>)	SBL	4.2 km NE	1 (2007)
Haworth's Minor moth (<i>Celaena haworthii</i>)	SBL	4.8 km NW	3 (2010-2013)
Large heath butterfly (<i>Coenonympha tullia</i>)	SBL	3.6 km E	2 (2003 and 2006)
Latticed heath moth (<i>Chiasmia clathrate</i>)	SBL	3.7 km NW	10 (2007-2013)
Minor shoulder-knot moth (<i>Brachylomia viminalis</i>)	SBL	3.4 km N	1 (2014)
Sallow moth (<i>Cirrhia icteritia</i>)	SBL	3.4 km N	1 (2010)
Shaded broad-bar moth (<i>Scotopteryx chenopodiata</i>)	SBL	3.4 km N	1 (2010)
Small heath butterfly (<i>Coenonympha pamphilus</i>)	SBL	On western edge of site	14 (2003-2015)
Small pearl-bordered fritillary (<i>Boloria selene</i>)	SBL	4.2 km NW	1 (2010)
Small phoenix moth (<i>Ecliptopera silaceata</i>)	SBL	4.9 km NW	4 (2010-2014)
Small square-spot moth (<i>Diarsia rubi</i>)	SBL	3.4 km N	1 (2010)
White ermine moth (<i>Spilosoma lubricipeda</i>)	SBL	4.9 km NW	2 (2014)
Plants			
Greater butterfly orchid (<i>Platanthera chlorantha</i>)	SBL	1 km N	5 (2000-2011)
Invasive Species			
Eastern grey squirrel	N/A	2 km N	1 (2014)
Japanese knotweed	N/A	2 km N	3 (2019)
Key: HR: The Conservation (Natural Habitats, &c.) Regulations 1994 WCA: Wildlife and Countryside Act 1981 SBL: Scottish Biodiversity List PBA: Protection of Badgers Act			

8.6.1.4 Grid Connection

53. The precise grid route has not been confirmed; therefore, it is not yet possible to accurately assess for potential effects on ecological receptors along the route. However, based on a predicted 16 km route between the Development and the substation in Wishaw, the following potential constraints have been identified:
- Protected Species: the route dissects several different habitats (including woodland, watercourses, agricultural land and moorland) suitable to support protected species, (such as badger, otter and water vole). Therefore, baseline protected species surveys would be undertaken.
 - Habitats: all land within the wayleave (and an appropriate buffer) would be subject to a detailed habitat survey in order to identify habitats with conservation value or sensitivity (i.e. groundwater dependent terrestrial ecosystems).
 - Designated Sites: the following designated sites were identified within 2 km of the proposed grid route:
 - Clyde Valley Woods SAC (designated for woodland habitats);
 - Garrion Gill SSSI (designated for woodland habitats);
 - King's Hill LNR; and
 - Greenhead Moss and Perchy Pond LNR.
54. The route would be designed to minimise negative effects on the ecological constraints. This would be achieved through careful planning to avoid designated sites and sensitive habitats, as well as avoiding disturbance to protected species identified from baseline surveys via mitigation methods. These measures would be undertaken to reduce the likelihood of any significant effects on ecological receptors. No full assessment of potential effects of the grid connection on ecological receptors has been undertaken.

8.6.2 Baseline Survey Results

8.6.2.1 Habitats & Botany

55. Full survey results and detailed, large-scale figures of Phase 1 habitats and NVC communities, are provided in Appendix A8.1, however a summary of the Habitat & Botany survey results is presented below and in Table 8.7.
56. The majority of the Site consists of plantation forest – commercially stocked mature Sitka spruce (*Picea sitchensis*) interspersed with areas of younger growth Sitka and clearfell. A number of areas have been recently restocked with both coniferous and broadleaved species. Remnant vegetation within the plantation falls within the ride system between forestry coupes. Vegetation within these consist of predominately mire habitats of wet modified bog, blanket bog and wet heath. Areas of shallower peat and mineral soils, where habitats are mesotrophically influenced by the underlying strata, generally contain marshy grassland swards.

Table 8.7: Summary of the Phase 1 Habitats and their Areas within the Site

Phase 1 Code and Title	Summary Description	Associated NVC Communities	Area of Habitat (ha)
A1.1.1 Broadleaved woodland – semi-natural	A single small stand of semi-natural broadleaved woodland was recorded in the southern survey buffer, on the bank between the path to Wilsontown and Mouse Burn. This consisted of relatively recent birch (<i>Betula</i>) species colonisation, over a ground flora dominated by tufted hair-grass (<i>Deschampsia cespitosa</i>) on less well drained soils – corresponding to the W7c <i>Alnus glutinosa-Fraxinus excelsior-Lysimachia nemorum</i> woodland, <i>Deschampsia cespitosa</i> sub-community. On steeper, better drained substrates within this stand, the presence of heather (<i>Calluna vulgaris</i>) and acid grassland species indicated the heathier W17 <i>Quercus petraea-Betula pubescens-Dicranum majus</i> woodland community.	W7c, W17	0.17
A1.1.2 Broadleaved woodland – plantation	Broadleaved plantation stands were scattered around the survey area, with stands noted by the A704, in Woodmuir Plantation in the north of the Site and buffer area, along the track leading east from Hendry's Corse, at the head of Mouse Water, to the east of Moutainblaw Farm, and around Mouse Water in the south of the Site.	Non-NVC	19.42
A1.2.2 Coniferous woodland – plantation	Coniferous plantation was the most widespread habitat present on Site, with stands of various ages from recent restock to mature trees. Sitka spruce was the most widespread species, with hybrid larch (<i>Larix x marschlinsi</i>) and, particularly in the north of the Site, lodgepole pine (<i>Pinus contorta</i>) also planted through the stands. Single species stands of hybrid larch were frequent, with occasional stands apparently of Japanese larch (<i>L. kaempferi</i>) also present. Norway spruce (<i>Picea abies</i>) and Scots pine (<i>Pinus sylvestris</i>) were also planted in stands of mixed conifers, in the Woodmuir Plantation area and the Site buffer east of Mountainblaw Farm respectively.	Non-NVC	752.79
A1.3.2 Mixed woodland – plantation	Stands of mixed plantation were scattered across the Site and buffer. Two mature mixed plantation stands, each enclosed in drystone walls, were noted within the Site. These consisted of a mixture of Scots pine, European larch (<i>Larix decidua</i>), Sitka spruce, Norway spruce, downy birch (<i>Betula pubescens</i>) and rowan (<i>Sorbus aucuparia</i>).	Non-NVC	20.07
A2.1 Scrub – dense/continuous	Dense/continuous scrub stands were scarce on Site. A small area of continuous grey willow (<i>Salix cinerea</i>) was present at the south side of the lochan in the west of the Site, growing over saturated ground and a soft-rush (<i>Juncus effusus</i>) dominated sward. This corresponded to the W1 <i>Salix cinerea-Galium palustre</i> wet woodland	Non-NVC, W1	0.75

Phase 1 Code and Title	Summary Description	Associated NVC Communities	Area of Habitat (ha)
	community. Another stand of dense grey willow classed as W1 was present in the southwest of the Site, growing with colonising Sitka spruce over damp ground.		
A2.2 Scrub – scattered	Scattered scrub was much more frequent across the survey area, typically consisting of grey willow or sometimes eared willow (<i>Salix aurita</i>) growing on damp substrates along rides and track verges. More significant areas of this scattered scrub were classed as W1 and included in habitat mosaics. Some stands of young self-seeded Sitka spruce and larch species were also classed as scattered scrub.	Non-NVC, W1, W3, W23, W24, W24x	1.79
A3.1 Scattered trees – broadleaved	Several stands of scattered trees were recorded during the survey, of planted origin but too spaced to class as plantation. These included two rows of scattered mature beech (<i>Fagus sylvatica</i>) along field margins, one in the southern buffer above Upper Haywood and one in the western buffer by Wester Heathland.	Non-NVC, W7c	0.04
A3.2 Scattered trees – coniferous	Two areas of modified bog at the Site margins were noted with scattered established Sitka spruce.	Non-NVC	1.24
A3.3 Scattered trees – mixed	A section of the lower Wormlaw Burn valley was sparsely planted with alder (<i>Alnus glutinosa</i>) and goat willow (<i>Salix caprea</i>), and scattered mixed planting was also recorded in this area. In the southwest of the Site, red alder (<i>Alnus rubra</i>) and other broadleaved species were planted along a track verge.	Non-NVC	1.07
A4.2 Recently felled woodland – coniferous	A considerable area of clearfell was present on Site, with the largest continuous area present at the head of Mouse Water and on the east side of Hendry's Corse. Other stands were noted in the southwest of the Site and buffer, and in the west of the Site south of Tormywheel Wind Farm. Recently clearfelled areas, mainly in the east of the Site, had not undergone any significant vegetation colonisation. In older clearfelled areas, typical colonising vegetation included soft-rush and tufted hair-grass on damper ground, and rosebay willowherb (<i>Chamerion angustifolium</i>) and acid grassland species on drier ground. Occasionally other species, such as hare's-tail cottongrass (<i>Eriophorum vaginatum</i>), purple moor-grass (<i>Molinia caerulea</i>) or reed canary-grass (<i>Phalaris arundinacea</i>) were abundant.	Non-NVC (U2, U4, Je, M20, M23b, M25, OV27, S28)	100.17
B1.1 Acid grassland – unimproved	Unimproved acid grassland communities were frequent within the survey area, with the most extensive stands present in the southern buffer south of Worm Law, the western buffer at Tormywheel Wind Farm, and in the southwest end of the Site and	U2, U2a, U2b, U4, U4a, U4e, U5, U5a, U5b, U6, U6a, Je	22.89

Phase 1 Code and Title	Summary Description	Associated NVC Communities	Area of Habitat (ha)
	buffer on old mining bings. Less extensive stands were present in drier sections of plantation rides within the Site, usually in mosaic with other habitats.		
B1.2 Acid grassland – semi-improved	Semi-improved acid grassland was frequent in the southern Site buffer, above Upper Haywood and Mountainblaw Farm, where stands were heavily grazed by livestock.	U4, U4b, U5a	4.81
B2.1 Neutral grassland – unimproved	Unimproved neutral grassland dominated by tufted hair-grass was frequent across the survey area, where it typically formed rank, tussocky, species-poor swards along rides, track verges and burn valleys.	MG1, MG1a, MG1e, MG5,	8.58
B2.2 Neutral grassland – semi-improved	Semi-improved neutral grassland was present in areas with livestock grazing and active management (fertiliser application and/or rush topping) in the Woolfords area, the southern Site buffer and by Wester Heathland in the western buffer.	MG6	2.84
B4 Improved grassland	One field within the southern Site buffer, above Upper Haywood, was classed as improved grassland. This field had undergone significant management interventions to produce an improved grazing or silage pasture, and consisted of a species-poor MG6 perennial rye grass (<i>Lolium perenne</i>) sward. Other improved pastures in the area were outside the survey boundary.	MG6	1.90
B5 Marsh/marshy grassland	This Phase 1 habitat type was one of the most frequent and widespread across the survey area. It was found across a significant proportion of the Woolfords area and open ground in the Site buffers, and was frequent along burn valleys, plantation rides and track rides within the Site. The majority of stands consisted of various forms of rush-pasture. Although some of these habitats (MG9, MG10, M23 & M25) are listed as having high potential to groundwater dependent ³⁴ , there were no floristic elements that suggested base-enrichment derived from groundwater and were all concluded to be fed by surface water.	MG9/MG10a, MG10a, Je, M23a, M23b, M25, M25b, M27, M28a, S28	60.69
C3.1 Tall herb and fern – tall ruderal	Two main types of tall ruderal vegetation were present on Site, the OV24 <i>Urtica dioica-Galium aparine</i> community, dominated by common nettle (<i>Urtica dioica</i>), and the OV27 <i>Chamerion angustifolium</i> community, dominated by rosebay willowherb.	OV24, OV27	0.98
D1.1 Dry dwarf shrub heath – acid	Dry dwarf shrub heath was scarce across the survey area, due to the generally wet substrates and deeper peat deposits. However, stands were identified in Woodmuir	H12, H12a, H12c, H21a	0.55

³⁴ SEPA (2017) *Guidance Note 31: Guidance on Assessing the Impacts of Development Proposals on Groundwater Abstractions and Groundwater Dependent Terrestrial Ecosystems*.

Phase 1 Code and Title	Summary Description	Associated NVC Communities	Area of Habitat (ha)
	Plantation, on Pateshill Wind Farm and around Harwood Water in the northern buffer, and in the southwest of the Site, typically on peat substrates with a lower water table.		
D5 Dry heath/acid grassland mosaic	A small area on a south-facing slope to the north of Woodmuir Plantation, characterised by bilberry (<i>Vaccinium myrtillus</i>), heath bedstraw (<i>Galium saxatile</i>) and tormentil (<i>Potentilla erecta</i>).	H12c, U5d, U2b	0.58
E1.6.1 Blanket bog	M19 <i>Calluna vulgaris-Eriophorum vaginatum</i> blanket mire was present in the survey area, with relatively unmodified stands identified in the northwest Site buffer either side of Tormywheel Wind Farm, along some plantation rides in the north of the Site, and within stock fencing at the western edge of the Woolfords area. M19 stands were often considered in transition to a more modified M20 blanket mire habitat, due to the effects of grazing, draining and conifer colonisation. Some stands, particularly in plantation rides, were difficult to determine, due to the similar species assemblage present in the M19 and M20b communities. Sphagnum cover, tussock structure and evidence of modification were used to classify these stands; however, it is noted that this approach is subjective and is likely to vary between surveyor and site.	M2, M17a, M17b, M19, M19a, M19b	13.41
E1.7 Wet modified bog	Wet modified bog was the most widespread peatland habitat present within the survey area, forming large expanses in the east Site buffer and the northwest Site buffer around Tormywheel Wind Farm, and frequently present along plantation rides within the Site. Although M25 is listed as having high potential to groundwater dependent ³⁴ , there were no floristic elements that suggested base-enrichment derived from groundwater and were all concluded to be fed by surface water.	M3, M17, M17a, M19, M20a, M20b, M25, M25a	84.17
E1.8 Dry modified bog	Dry modified bog habitat was much less extensive than wet modified bog. It was typically found on peat substrates that had undergone intensive modification resulting in drying, or on the tops of hills where the substrate was likely to be shallower and less able to retain rainwater.	M20, M20a, M20b, U2, U5, U6	5.41
E2.1 Flush/spring – acid/neutral	Acid and neutral flush habitat was frequent across the survey area, typically dominating natural drainage lines, vegetated artificial drainage grips and sometimes watercourse banks. The most widespread form was the M6c <i>Juncus effusus/acutiflorus-Sphagnum fallax</i> mire, <i>Juncus effusus</i> sub-community, an acid flush habitat. Some of these habitats (M6 & M23) are listed as having high potential to groundwater dependent ³⁴ , however, there were no floristic elements that	M4, M6a, M6b, M6c, M6d, M6x, M23a, M23b	11.71

Phase 1 Code and Title	Summary Description	Associated NVC Communities	Area of Habitat (ha)
	suggested base-enrichment derived from groundwater and were all concluded to be fed by surface water.		
F1 Swamp	Swamp habitats were noted across the survey area. They were typically small in extent, with the exception of a large swamp stand at the headwaters of Harwood Water in the northern Site buffer, and a sizable swamp stand in the Wormlaw Burn valley within the Site. Small stands dominated by reed sweet-grass (<i>Glyceria maxima</i>) were noted on Site in Woodmuir Plantation and to the east of Mountainblaw Farm, on growing on wet ground. These were classified as S5 <i>Glyceria maxima</i> swamp, and were referable to the species-poor S5a <i>Glyceria maxima</i> sub-community.	S4, S5, S9, S9a, S9b, S10, S12, S14, S19, S22, S22a, S26, OV26	1.83
F2.1 Marginal swamp		S9a, S27	
F2.2 Inundation swamp		S22	
G1 Standing water	Two small lochans were present in the north and west of the Site, and small ponds were noted in the west of the Site and in the southern Site buffer. The lochans and most of the ponds were acid in character, and probably best characterised as oligotrophic. However, a pond in the southern buffer above Upper Haywood was present over calcareous bedrock and was probably best characterised as mesotrophic. This pond was of particular conservation interest, and also supported slender sedge (<i>Carex lasiocarpa</i>), a locally rare species, and mare's-tail (<i>Hippuris vulgaris</i>).	A9a, A16	1.40
G2 Running water	Small watercourses were frequent across the site. These typically supported little instream vegetation, and had associated acid and neutral flush habitats	Non-NVC	1.19
I2.1 Rock exposure and waste – quarry	No natural rock exposures were noted during the survey. Two quarries were present within the Site, and were being used to win stone for track construction on Site.	Non-NVC	2.33
J1.2 Cultivated/disturbed land – amenity grassland	Amenity grassland was restricted to mown grassland and in enclosed land by Mountainblaw Farm. Where accessed, stands primarily consisted of the MG6 Lolium perenne-Cynosurus cristatus semi-improved grassland community.	MG6	0.47
J1.3 Cultivated/disturbed land – ephemeral/short perennial	This habitat was frequently present along track verges and colonising bare ground.	Non-NVC, various	0.53
J1.4 Cultivated/disturbed land – introduced shrub	Introduced shrub was restricted to the southwest corner of the Site, where scattered bridewort (<i>Spiraea agg.</i>), snowberry (<i>Symphoricarpos albus</i>) and Japanese rose (<i>Rosa rugosa</i>) were noted. Along the A704 and track verges, garden escapes including montbretia (<i>Crocsmia x crocosmiiflora</i>), aunt-eliza (<i>C. paniculata</i>), soft lady's-mantle (<i>Alchemilla mollis</i>), ivy (<i>Hedera helix agg.</i>) and pendulous sedge (<i>Carex pendula</i>) were recorded.	Non-NVC	0.01

Phase 1 Code and Title	Summary Description	Associated NVC Communities	Area of Habitat (ha)
J2.4 Boundaries – fence	Stock fencing was the most widespread boundary type present in the survey area.	Non-NVC	N/A
J2.5 Boundaries – wall	Drystone walls were noted in the southern Site buffer, and around two mixed plantation blocks within the Site.	Non-NVC	N/A
J3.6 Built-up areas – buildings	Built structures were rarely encountered, with the exception of wind turbines on the Tormywheel Wind Farm, adjacent to the Site. Small communications or weather mast structures were noted by Wester Heathland and on Tormywheel Wind Farm. One farm outbuilding at Mountainblaw Farm was included within the survey area.	Non-NVC	1.84
J4 Bare ground	Bare ground, in the form of the forestry and wind farm track networks, was spread across the survey area. Small areas of hardstanding were also noted next to tracks in the Woodmuir Plantation area. Some tracks, notably in the Woodmuir Plantation and to the east of Mountainblaw Farm, were not capped with gravel.	Non-NVC	21.31

8.6.2.2 Habitat Suitability for Protected Species

57. The Extended Phase 1 Habitat Survey, as reported in Appendix A8.1, identified suitable habitat for a number of protected species, these include:
- Otters associated with watercourses and waterbodies throughout the area;
 - Badgers within drier parts of the Survey Area;
 - Water voles surrounding Wormlaw Burn exiting the southern boundary of the Site;
 - Great crested newts and other amphibian species within waterbodies and surrounding swamp and marshy grassland habitats;
 - Bats, with limited potential roosting opportunities presented by a few mature trees and standing deadwood. Suitable foraging habitat was also identified throughout the survey area.
58. The Fish Habitat Survey, as reported in Appendix A8.4, identified suitable habitat for resident brown trout (*Salmo trutta*) within the Mouse Water.

8.6.2.3 Protected Species

59. A summary of the Protected Species Survey results is presented below. Full survey results are presented Appendix A8.2.

Badger

60. Habitats within the ESA varied in their suitability to support badger. Successfully constructed setts were only recorded in small pockets of mixed woodland located on gradual slopes which were slightly drier than the surrounding areas. The dense Sitka spruce plantation that dominates the Site is generally considered to be suboptimal for badgers due to the lack of foraging potential that it provides.
61. The results of the badger survey, including sett locations, are presented in a Confidential Annex to Appendix A8.2.

Otter

62. The Extended Phase 1 Survey identified that otter habitat was present throughout the Site. Specifically, sections of both of the Mouse Water and Wormlaw Burn where the plantation does not overshadow, the watercourses are considered to offer good potential for both foraging and shelter. Consultation with the Clyde Fisheries Trust indicate that the headwaters of the Mouse Water likely provide the most suitable habitat for brown trout and as such may provide a food source for otters. Additionally, a small number of waterbodies present to the southeast of the Site which are known to support breeding populations of amphibians are likely to provide a season source of prey for otters in the spring. The larger waterbodies in the north and west of the Site are also likely to provide good foraging potential. Connectivity between watercourses and waterbodies on Site and in the surrounding areas is considered to be good.
63. No resting sites were found for this species and low levels of otter activity were recorded on Site. Multiple spraints were found at a small pond in the south of the ESA, likely to be associated with seasonal amphibian spawning.

Pine marten

64. No evidence or sightings of pine marten were recorded during the surveys. Although several pockets of suitable habitat exist within the ESA, most of the habitat present was considered to be of low value. This, combined with the absence of pine marten records found during the Desk Study suggest that it is unlikely to be present on Site.

Red squirrel

65. No evidence or sightings of red squirrel were recorded during the surveys. Although several pockets of suitable habitat exist within the ESA, most of the habitat present was

considered to be of low value. This, combined with the absence of red squirrel records found during the Desk Study suggest that is unlikely to be present on Site.

Water vole

66. No evidence or sightings of water vole were recorded during the surveys. The ESA was found to provide some habitat suitable for water vole. Although many of the burns were surrounded by soft rush which is often used as a food source by the species, the burns within the survey area contained shallow water depths running over stone/rock stream beds between peat banking. These conditions are generally unsuitable for the species. One exception to this was found in the south-east of the survey area where the Wormlaw Burn exits the plantation forestry and passes through the surrounding farmland. The slow flowing water within the burn at this point, along with suitable banking for the creation of burrows and ample food resources in the surrounding area, make this potentially suitable for the species, though no evidence of water vole activity was found.

Other species

67. Blanket bog, scrub, felled plantation, forest rides and remnant dry stone walls were present throughout the ESA, all of which offer foraging, refuge and hibernation resources for reptiles, including adder (*Vipera berus*) and common lizard³⁵. Despite this, no sightings of reptiles were recorded within the ESA. Several common frogs were recorded during the Protected Species Surveys, indicating that the prevailing wet conditions throughout the ESA provide ample aquatic and terrestrial habitat for common amphibian species, such as common frog and common toad (*Bufo bufo*)³⁶.

8.6.24 Bats

68. A summary of the Bat Survey results is presented below. Full survey results and supporting data are provided Appendix A8.3.
69. The majority of the Site consists of plantation forest – commercially stocked mature Sitka spruce interspersed with areas of clearfell. Sitka spruce does not typically produce gaps or cavities in its trunk or bark, features that would be used by roosting bats. This type of habitat is generally not considered to be favoured by bats, however, the extensive ride and forest track system provide forest edge habitats. Bats use woodland edges for commuting and foraging and consequently can also use the open spaces outwith the woodland edge as foraging areas.
70. The Mouse Water and Wormlaw Burn also provide commuting and foraging potential across the Site and provide some connectivity with the wider area. The habitats in the wider landscape comprise of a mosaic of commercial quarries, plantation forestry and farmland. The majority of the forestry in the local area is commercial in nature, with only a scattering of stands of mixed woodland or broad leaf woodland habitats. The open farmland habitats are largely poor upland grazing with little potential for bats.
71. A total of 2724 bat passes were recorded over a total of 4136 survey hours across the Survey Season, giving a total mean BAI of 0.66 passes per hour (pph) for the Site. This represents 1 bat pass every 40 mins in real time.
72. In total, three bat species and two genus classifications were recorded within the Site during the bat surveys. Species recorded were common pipistrelle, soprano pipistrelle, and brown long-eared bat (*Plecotus auritus*). Bat registrations identified to genus level were *Nyctalus* spp. and *Myotis* spp.

³⁵ The Herpetological Conservation Trust (2007). National Amphibian and Reptile Recording Scheme, Habitat Recording Guide

³⁶ Joint Nature Conservation Committee (2014) Common Standards Monitoring Guidance for Reptiles and Amphibians, Version February 2004. JNCC, Peterborough.

73. High collision risk species recorded comprised common pipistrelle, soprano pipistrelle, and *Nyctalus* spp. All other bat species recorded are categorised as low collision risk (*Myotis* sp. and brown long-eared bat).
74. Of the activity recorded, the majority (60.61%) was attributed to common pipistrelle, with 36.56% attributed to soprano pipistrelle. *Myotis* sp. accounted for 1.43% of the total. *Nyctalus* sp. and brown long-eared bat (BLE) (*Plecotus auritus*) were recorded infrequently, making up 0.99% and 0.33% of activity recorded, respectively.
75. Activity was recorded at all survey locations, however, notable spatial variation in the level of activity was evident. Over 70% of all bat passes were recorded at four locations situated within woodland edge habitat in close proximity to watercourses.
76. Ecobat³⁷ was used to gain estimates of relative bat activity recorded at the Site. The guidance²⁹ explains that "*The tool compares data entered by the user with bat survey information collected from similar areas at the same time of year. Ecobat generates a percentile rank for each night of activity and provides a numerical way of interpreting the levels of bat activity recorded at a site across regions in Britain*". Data from the Site was compared with data within a range of 100km of the Site and within 30 days of the survey date.
77. Based on Ecobat assessment³⁷, applied as per NatureScot guidance, activity recorded across all survey locations varied greatly between the low activity category (0-20th median percentiles and the moderate to high activity category (61st-80th median percentile). With the exception of common pipistrelle and soprano pipistrelle, all bat species fell within the low and low to moderate categories with respect to their relative activity levels. Both common pipistrelle and soprano pipistrelle fell within the category of moderate to high activity levels.
78. The risk assessment concluded a 'Medium' overall risk for common pipistrelle and soprano pipistrelle and a 'Low' overall risk for *Nyctalus* spp. However, at a finer scale this risk varies greatly by Anabat location, time of year and species, and this is highlighted in further detail in Appendix A8.3.

8.6.25 Fisheries

79. A summary of the Fisheries Survey results is presented below. Full survey results and supporting data are provided in Appendix A8.4.
80. Fish Habitat Surveys recorded variable habitat suitability to support salmonid fish across the Site with approximately one third of the total habitat likely to be productive for juvenile trout.
81. Brown trout dominate the fish communities in most Scottish river systems and it was the only species found within the Site in 2019. Trout were not common, suggesting relatively limited spawning and rearing success despite the apparent availability of suitable habitats. In the extreme headwaters of rivers, trout numbers generally decrease with distance upstream, so the pattern of distribution observed was not unusual, nor was the low density of fish encountered but in natural streams it is frequently much higher. There are indications that trout are unusually rare across the entire Mouse Water subcatchment (McColl et al. 2013) but there is no recent work to confirm or deny that. The overall habitat picture downstream of the Site is, however, one of considerable degradation due to dredging and land drainage works and historical data suggest a lack of successful spawning.
82. Within the Site, the watercourses have been subject to significant degradation and reworking; the trout populations there are probably subject to fragmentation by culverts and other potential barriers and this may account for their relative rarity. The culvert

³⁷ <http://www.ecobat.org.uk/>

immediately downstream of the Site may effectively isolate it from upstream-migrating pre-spawning fish, making the resident trout populations much more susceptible to extirpation.

8.7 EMBEDDED MITIGATION

83. Application of the 'mitigation hierarchy' has been achieved throughout the Development process, with the identification and incorporation of methods for the avoidance of impacts and application of embedded mitigation. Measures to avoid or reduce potential ecological effects has been incorporated into the design of the Development ('embedded mitigation'). This includes 'mitigation by design' whereby aspects of the Development have been re-designed to avoid or reduce ecological effects. This type of mitigation is particularly beneficial for ecological resources as there is greater certainty that it will be delivered.
84. Embedded mitigation also includes 'mitigation by practice' whereby mitigation is actively implemented during the Development process. Embedded mitigation is taken into consideration when undertaking the assessment of significant effects. If significant effects are predicted further mitigation is detailed.

8.7.1 Mitigation by Design

85. Ecological features have been considered at all stages of the Development design, from initial feasibility to final layout. This has helped to avoid or greatly reduce impacts on IEFs and other ecological features. A critical design consideration has been the avoidance of habitats with high conservation value or sensitivity, which has been largely achieved by siting the majority of the Development infrastructure in coniferous plantation and making use of existing forestry tracks.
86. The sensitive designs (e.g. of watercourse crossing and culverts) presented in Chapter 3 - The Development of this EIA Report have been developed to safeguard the water environment, which will also help effectively mitigate construction-related direct and indirect impacts to fish and other aquatic features.
87. Good practice design mitigation measures will be adopted to minimise the risk of bats colliding with operational turbines, in accordance with NatureScot published guidance²⁹. Turbines will have a 50m separation distance between blade tips and high-value bat habitats, such as woodland, riparian habitats, and forest edges.

8.7.2 Mitigation by Practice: Construction

88. In addition to the incorporation of effective mitigation through Development design, the following Sections outline mitigation of Development impacts through practice, particularly with the aim of safeguarding of protected species during Development construction and operation and to restore and enhance peatland habitats. It is anticipated that these elements will be included in a Habitat Management Plan (HMP) (see Section 8.7.5, below) and relevant Protection Plans, as part of the wider environmental management of Development construction and operation.

8.7.2.1 Environmental Clerk of Works (ECoW)

89. A suitably qualified and experienced Environmental Clerk of Works (ECoW) will be appointed to provide appropriate ecological and environmental advice during construction, including the monitoring of compliance with conservation legislation, the recommendations of this EIA Report and any subsequent planning conditions.
90. Before construction begins, the ECoW and the project hydrologist will undertake a review of design and drainage plans to inform the requirement for micro-siting, to minimise the potential for effects to sensitive habitats, and to assist in the identification of appropriate

locations for commencement of reinstatement works. Where possible, the ECoW will advise on the drainage design to minimise hydrological disruption and reduce the risk of scour and erosion. The ECoW will also monitor and advise on the implementation of pollution prevention and good working practices throughout construction, to protect both terrestrial and aquatic ecosystems from accidental pollution.

8.7.2 Construction Phase Mitigation for Protected Species

91. Pre-construction Surveys for protected species, such as otter and badger, will be undertaken to provide up-to-date information about the distribution and abundance of the protected species identified in the baseline. The results of the surveys will inform the need for Species Protection Plans and associated mitigation and licencing requirements, all of which will be developed in line with NatureScot guidance.

8.7.2.3 Construction Phase Mitigation for Aquatic Habitats

92. Mitigation presented with in Chapter 10 - Hydrology and Hydrogeology of this EIA Report to safeguard the water environment, will also effectively mitigate construction-related impacts to fish such as the direct and indirect effect of pollution and sedimentation from instream works and surface water run-off.

8.7.3 Mitigation by Practice: Operation

93. To minimise the risk of bats colliding with operational turbines, the 50m separation distance between blade tips and high-value bat habitats implemented during construction, will be maintained throughout the operational life of the Development by ensuring that tree regeneration does not encroach on the buffer.

8.7.4 Mitigation by Practice: Decommissioning

94. Decommissioning activities are anticipated to be of a similar character to those of Development construction and so the construction phase embedded mitigation outlined above is considered appropriate to the decommissioning phase.

8.7.5 Habitat Management Plan

95. Habitat Management will be implemented in accordance with the Heathland Wind Farm Habitat Management Plan (HMP). It is anticipated that a detailed HMP will be written and developed in full following consent, and in consultation with NatureScot, South Lanarkshire Council and West Lothian Council, where relevant.
96. Upon consent, the development of the HMP will be informed, where necessary, by further site appraisal to ensure the appropriate methods and plans are to be implemented.
97. Once developed, the HMP will remain an active document and will be reviewed on a regular basis by appropriate stakeholders.

8.8 DETERMINATION OF ECOLOGICAL IMPORTANCE

98. Table 8.8 evaluates the importance of ecological features associated with Development, and determines which ecological features, based on both their intrinsic value and their potential to be affected by wind farm development, are considered to be IEFs. Each ecological feature has been assigned a level of importance in accordance with the geographical scale outlined in Table 8.2.
99. Features of Local or Less than Local value, and those to which impacts can be categorically ruled out, are scoped out of further assessment. However, if impacts to such features – even if not significant in terms of EcIA – may result in legal offences then suitable safeguards will be presented in Section 8.9.

Table 8.8: Evaluation of Ecological Importance

Ecological Feature	Evaluation Rationale	Scale of Importance	IEF/Action
Nationally and Internationally Designated Statutory Sites			
Cobbinshaw Reservoir SSSI	<ul style="list-style-type: none"> Cobbinshaw Reservoir SSSI covers an area of 61.87 ha and is designated due to the presence of open water transition fen, which is the notified feature. Cobbinshaw Reservoir SSSI is located over 2 km from the proposed wind farm and is buffered by the remaining plantation woodland both within the development and in the wider landscape. Due to its relatively distant proximity from the Site, there is a no likely notable environmental connection between the SSSI and the Site which could potentially affect the open water transition fen component of the SSSI. 	National	No. Scoped out of assessment.
Skolie Burn SSSI	<ul style="list-style-type: none"> Skolie Burn SSSI covers an area of 8.99 ha and is designated due to the presence of lowland neutral grassland, which is the notified feature along with geological features. Skolie Burn SSSI is located over 2 km from the proposed wind farm and is buffered by the remaining plantation woodland both within the development and in the wider landscape. Due to its relatively distant proximity from the Site, there is a no likely notable environmental connection between the SSSI and the Site which could potentially affect the lowland neutral grassland component of the SSSI. 	National	No. Scoped out of assessment.
Braehead Moss SAC & SSSI	<ul style="list-style-type: none"> Braehead Moss SAC & SSSI covers an area of 122.6 ha and is designated for raised bog habitats. It is located over 3km north of the proposed wind farm and is buffered by plantation woodland, both within the Site and in the wider landscape. As the prevailing wind blows from the west/south west, it is considered unlikely to be negatively affected by air borne pollution. Due to its relatively distant proximity from the Site, Braehead Moss SAC & SSSI lies outwith the Zone of Influence of the Development, so no significant effects are predicted and no appropriate assessment is required. 	International	No. Scoped out of assessment.
Cobbinshaw Moss SSSI	<ul style="list-style-type: none"> Cobbinshaw Moss SSSI covers an area of 490.66 ha and is designated due to the presence of intermediate blanket bog, which is the notified feature. Cobbinshaw Moss SSSI is located over 2 km from the proposed wind farm and is buffered by the remaining plantation woodland both within the development and in the wider landscape. Due to its relatively distant proximity from the Site, there is a no likely notable environmental connection between the SSSI and the Site which could potentially affect the intermediate blanket bog component of the SSSI. 	National	No. Scoped out of assessment.

Ecological Feature	Evaluation Rationale	Scale of Importance	IEF/Action
Hardwood Water – Woodmuir Plantation to Baad’s Mill LBS (Proposed)	<ul style="list-style-type: none"> No information was available on the ecological features of this proposed LBS. As a locally designated site, it is considered of Local importance and this is not an IEF. 	Local	No. Scoped out of assessment.
Nether Longford Moss LBS (Proposed)	<ul style="list-style-type: none"> No information was available on the ecological features of this proposed LBS. As a locally designated site, it is considered of Local importance and this is not an IEF. 	Local	No. Scoped out of assessment.
Breich Water – Breich Bridge (A706) to Bents LBS	<ul style="list-style-type: none"> Little information was available on the ecological features of this LBS. However, goldilocks buttercup, monk’s-rhubarb and bulrush were noted as present. It is located 1.6 km north of the Site and is environmentally connected to the Site via minor watercourses that flow from the Site to the Breich Water via the Longford Burn. As a locally designated site, it is considered of Local importance and this is not an IEF. 	Local	No. Scoped out of assessment.
Breich Water – Fauldhouse to Breich Bridge and Stoneyburn LBS (Proposed)	<ul style="list-style-type: none"> No information was available on the ecological features of this proposed LBS. 	Local	No. Scoped out of assessment.
Phase 1 Habitats within the Site			
A1.1.1 Broadleaved woodland – semi-natural	<ul style="list-style-type: none"> Widespread habitat regionally to Internationally. Distinctive forms (not recorded in Survey) are included within the SBL, however only a relatively small area of species poor habitat was recorded. No loss of this habitat predicted from the Development. In light of the above, the habitat is considered of Less than Local Importance. 	Less than Local	No. Scoped out of assessment.
A1.1.2 Broadleaved woodland – plantation	<ul style="list-style-type: none"> Common and widespread habitat internationally to locally. Very small area predicted to be lost to Development (see Table 8.9). In light of the above, the habitat is considered of Less than Local Importance. 	Less than Local	No. Scoped out of assessment.
A1.2.2 Coniferous woodland – plantation	<ul style="list-style-type: none"> Widespread, extensive, temporary and non-natural habitat across Scotland Typically, of low ecological value compared to other woodland types Dominated by commercial, non-native Sitka spruce Relatively large area predicted to be lost (see Table 8.9). In light of the above, the habitat is considered of Less than Local Importance. 	Less than Local	No. Scoped out of assessment.
A1.3.2 Mixed woodland – plantation	<ul style="list-style-type: none"> Widespread, extensive, temporary and non-natural habitat across Scotland Very small area predicted to be lost (see Table 8.9). In light of the above, the habitat is considered of Less than Local Importance. 	Less than Local	No. Scoped out of assessment.

Ecological Feature	Evaluation Rationale	Scale of Importance	IEF/Action
A2.1 Scrub – dense/continuous	<ul style="list-style-type: none"> Common and widespread habitat internationally to locally. Typically, of low ecological value. Very small area of scattered scrub predicted to be lost (see Table 8.9). In light of the above, the habitat is considered of Less than Local Importance. 	Less than Local	No. Scoped out of assessment.
A2.2 Scrub – scattered		Less than Local	No. Scoped out of assessment.
A3.1 Scattered trees – broadleaved	<ul style="list-style-type: none"> Common and widespread habitat internationally to locally. Typically, of low ecological value. No habitat loss predicted from the Development. In light of the above, the habitat is considered of Less than Local Importance. 	Less than Local	No. Scoped out of assessment.
A3.2 Scattered trees – coniferous		Less than Local	No. Scoped out of assessment.
A3.3 Scattered trees – mixed		Less than Local	No. Scoped out of assessment.
A4.2 Recently felled woodland – coniferous	<ul style="list-style-type: none"> Common and widespread habitat internationally to locally. Typically, of low ecological value. 5.64 ha predicted to be lost. In light of the above, the habitat is considered of Less than Local Importance. 	Less than Local	No. Scoped out of assessment.
B1.1 Acid grassland – unimproved	<ul style="list-style-type: none"> Common and widespread habitat across Scotland. Very small area predicted to be lost (see Table 8.9). In light of the above, the habitat is considered of Less than Local Importance. 	Less than Local	No. Scoped out of assessment.
B1.2 Acid grassland – semi-improved		Less than Local	No. Scoped out of assessment.
B2.1 Neutral grassland – unimproved	<ul style="list-style-type: none"> Common and widespread habitat nationally and regionally. Very small area predicted to be lost (see Table 8.9). In light of the above, the habitat is considered of Less than Local Importance. 	Less than Local	No. Scoped out of assessment.
B2.2 Neutral grassland – semi-improved		Less than Local	No. Scoped out of assessment.
B4 Improved grassland	<ul style="list-style-type: none"> Common and widespread habitat internationally to locally. Typically, of low ecological value. No habitat loss predicted from the Development. In light of the above, the habitat is considered of Less than Local Importance. 	Less than Local	No. Scoped out of assessment.

Ecological Feature	Evaluation Rationale	Scale of Importance	IEF/Action
B5 Marsh/marshy grassland	<ul style="list-style-type: none"> Common and widespread habitat internationally to locally. 2.13 ha predicted to be lost. In light of the above, the habitat is considered of Less than Local Importance. 	Less than Local	No. Scoped out of assessment.
C3.1 Tall herb and fern – tall ruderal	<ul style="list-style-type: none"> Common and widespread habitat internationally to locally. No habitat loss predicted from the Development. In light of the above, the habitat is considered of Less than Local Importance. 	Less than Local	No. Scoped out of assessment.
D1.1 Dry dwarf shrub heath – acid	<ul style="list-style-type: none"> Habitat included within the SBL & Habitats Directive. The habitat is widespread and common in Scotland, especially in the uplands where it dominates very large areas. No habitat loss predicted from the Development. In light of the above, the habitat is considered of Local Importance. 	Local	No. Scoped out of assessment
D2 Wet dwarf shrub heath	<ul style="list-style-type: none"> Habitat included within the SBL & Habitats Directive. The habitat is widespread and common in Scotland, especially in the uplands where it dominates very large areas especially in the west coast. Upland heathland habitat has been estimated to cover between 1,700,000 and 2,500,000 hectares in Scotland³⁸. No habitat loss predicted from the Development. In light of the above, the habitat is considered of Local Importance. 	Local	No. Scoped out of assessment
D5 Dry heath/acid grassland mosaic	<ul style="list-style-type: none"> Common and widespread habitat across Scotland. Typically, of low ecological value. No habitat loss predicted from the Development. In light of the above, the habitat is considered of Less than Local Importance. 	Less than Local	No. Scoped out of assessment
E1.6.1 Blanket bog	<ul style="list-style-type: none"> Habitat included within the SBL & Habitats Directive. Blanket bog is widespread and common habitat in Scotland, covering 1.8 million hectares in Scotland, accounting for 23% of the total land area³⁹. The Habitat is of notable value for biodiversity as well as carbon capture. Habitat was not extensively recorded within the Site Boundary. No habitat loss predicted from the Development. In light of the above, the habitat is considered of Local Importance. 	Local	No. Scoped out of assessment

³⁸ NatureScot. *Upland Heathland (UK BAP Priority Habitat)*. Available at: <https://www.nature.scot/sites/default/files/2018-02/Priority%20Habitat%20-%20Upland%20Heathland.pdf>. Accessed on 14th October 2020.

³⁹ NatureScot. *Blanket Bog Information Page*. Available at: <https://www.nature.scot/landscapes-and-habitats/habitat-types/mountains-heaths-and-bogs/blanket-bog#:~:text=Blanket%20bog%20is%20one%20of,North%20Highlands>. Accessed on 14th October 2020.

Ecological Feature	Evaluation Rationale	Scale of Importance	IEF/Action
E1.7 Wet modified bog	<ul style="list-style-type: none"> Habitat included within the SBL & Habitats Directive. Very small area predicted to be lost (see Table 8.9). In light of the above, the habitat is considered of Local Importance. 	Local	No. Scoped out of assessment
E1.8 Dry modified bog	<ul style="list-style-type: none"> Habitat included within the SBL & Habitats Directive. Very small area predicted to be lost (see Table 8.9). In light of the above, the habitat is considered of Less than Local Importance. 	Less than Local	No. Scoped out of assessment.
E2.1 Flush/spring – acid/neutral	<ul style="list-style-type: none"> Common and widespread habitat internationally to locally. Typically, of low ecological value. Very small area predicted to be lost (see Table 8.9). In light of the above, the habitat is considered of Less than Local Importance. 	Less than Local	No. Scoped out of assessment.
F1 Swamp	<ul style="list-style-type: none"> Common and widespread habitat internationally to locally. Typically, of low ecological value. No habitat loss predicted from the Development. In light of the above, the habitat is considered of Less than Local Importance. 	Less than Local	No. Scoped out of assessment.
F2.1 Marginal swamp		Less than Local	No. Scoped out of assessment.
F2.2 Inundation swamp		Less than Local	No. Scoped out of assessment.
G1 Standing water	<ul style="list-style-type: none"> Common and widespread habitat internationally to locally. Typically, of low ecological value. No habitat loss predicted from the Development. In light of the above, the habitat is considered of Less than Local Importance. 	Less than Local	No. Scoped out of assessment.
G2 Running water	<ul style="list-style-type: none"> Common and widespread habitat internationally to locally. Typically, of low ecological value. No habitat loss predicted from the Development. In light of the above, the habitat is considered of Less than Local Importance. 	Less than Local	No. Scoped out of assessment.
I2.1 Rock exposure and waste – quarry	<ul style="list-style-type: none"> Common and widespread habitat internationally to locally. Typically, of low ecological value. Very small area predicted to be lost (see Table 8.9). In light of the above, the habitat is considered of Less than Local Importance. 	Less than Local	No. Scoped out of assessment.
J1.2 Cultivated/disturbed land – amenity grassland	<ul style="list-style-type: none"> Common and widespread habitat internationally to locally. Typically, of low ecological value. No habitat loss predicted from the Development. In light of the above, the habitat is considered of Less than Local Importance. 	Less than Local	No. Scoped out of assessment.

Ecological Feature	Evaluation Rationale	Scale of Importance	IEF/Action
J1.3 Cultivated/disturbed land – ephemeral/short perennial	<ul style="list-style-type: none"> Common and widespread habitat internationally to locally. Typically, of low ecological value. Very small area predicted to be lost (see Table 8.9). In light of the above, the habitat is considered of Less than Local Importance. 	Less than Local	No. Scoped out of assessment.
J1.4 Cultivated/disturbed land – introduced shrub	<ul style="list-style-type: none"> Common and widespread habitat internationally to locally. Typically, of low ecological value. No habitat loss predicted from the Development. In light of the above, the habitat is considered of Less than Local Importance. 	Less than Local	No. Scoped out of assessment.
J2.4 Boundaries – fence	<ul style="list-style-type: none"> Common and widespread habitat internationally to locally. Typically, of low ecological value. No habitat loss predicted from the Development. In light of the above, the habitat is considered of Less than Local Importance. 	Less than Local	No. Scoped out of assessment.
J2.5 Boundaries – wall		Less than Local	No. Scoped out of assessment.
J3.6 Built-up areas – buildings	<ul style="list-style-type: none"> Common and widespread habitat internationally to locally. Located outside of Site Boundary. Typically, of low ecological value. In light of the above, the habitat is considered of Less than Local Importance. 	Less than Local	No. Scoped out of assessment.
J4 Bare ground	<ul style="list-style-type: none"> Common and widespread habitat internationally to locally. Typically, of low ecological value. In light of the above, the habitat is considered of Less than Local Importance. 	Less than Local	No. Scoped out of assessment.
GWDTEs	<ul style="list-style-type: none"> As designation as a potential GWDTE is related to groundwater dependency and not nature conservation value, GWDTE status has not been used as criteria to determine a habitat's nature conservation value. There is however a statutory requirement to consider GWDTEs and the data gathered during the NVC surveys has been used to inform this assessment. Several communities were identified with the potential to be GWDTEs: M6, M23 (both potentially highly groundwater dependent) and MG9, MG10 and M28 (all potentially moderately groundwater dependent). However, there were no floristic elements that suggested base-enrichment derived from groundwater and were all concluded to be fed by surface water. 	Less than Local	No. Scoped out of assessment.
Protected and Notable Species within the Site			

Ecological Feature	Evaluation Rationale	Scale of Importance	IEF/Action
Bats	<ul style="list-style-type: none"> Overall bat activity on Site was low to moderate, however, activity levels were highly variable depending on species, location and time of year. All Scottish bat species are listed in Annex II of the Habitats Directive and are listed as priority species on the Scottish Biodiversity List. Common pipistrelle, soprano pipistrelle and <i>Nyctalus</i> spp. are classified as at high risk of collision with wind turbines. <i>Myotis</i> spp. and brown long-eared bat are classified as at low risk of collision.²⁹ <i>Myotis</i> spp. and brown long-eared bat are classified as having low population vulnerability. Common pipistrelle and soprano pipistrelle are classified as having a medium population vulnerability. <i>Nyctalus</i> spp. are classified as having high population vulnerability.²⁹ 	Regional	Yes Scoped into assessment.
Badger	<ul style="list-style-type: none"> Badgers are present within the Site, as discussed in the Confidential Annex, Appendix A8.2. The badgers are not reliant on food resources or habitats associated with watercourses or other habitat deemed likely to experience the effects of pollution during construction. This species is protected under the Protection of Badgers Act 1992. In Scotland, this legislation was updated by the Nature Conservation (Scotland) Act 2004. The species is at risk of persecution but it not recognised as a high conservation priority. Badger are a widespread species throughout the UK with a stable and inclining estimated population of 562,000. In Scotland, the population has shown a similar rate of increase. The species is listed on the IUCN Red list as of 'Least Concern' in mainland UK. In light of the above, badger therefore is considered of Local Importance. 	Local	No. Scoped out of assessment.
Otter	<ul style="list-style-type: none"> Otter are active within the Site, along the Mouse Water and Wormlaw Burn. Although no resting sites were found for the species, they are known to forage and commute through the survey area. Otters are listed in Annex IV of the Habitats Directive and are on the Scottish Biodiversity List 	Regional	Yes Scoped into assessment.

Ecological Feature	Evaluation Rationale	Scale of Importance	IEF/Action
Pine marten	<ul style="list-style-type: none"> Pine marten is legally protected under the Wildlife and Countryside Act 1981 (as amended). Pine marten is also a priority species in the SBL. Although the status on the species in England and Wales is poor, in Scotland the species is favourable and can now be found in all regions of Scotland with the exception of the south east coast. The species is listed on the IUCN Red list and 'Least Concern' in Scotland, but 'Critically Endangered' elsewhere in the mainland UK. Scotland's population is estimated at 3,700 adult pine martens, which represent approximately 99% of the known UK population⁴⁰. No evidence of pine marten and limited suitable habitat for pine marten was recorded within the Site. The occasional presence of the species cannot be entirely ruled out, however, South Lanarkshire and West Lothian are not considered to be in the core range of the species and it is therefore deemed very unlikely that the Site is of any notable value to the pine marten. In light of the above, the species is considered of Less than Local Importance. 	Less than Local	No. Scoped out of assessment
Red squirrel	<ul style="list-style-type: none"> Red squirrel is protected under the Wildlife and Countryside Act 1981 (as amended) and is a priority species on the SBL. Although declining across the UK, the Scottish population is stable in most parts of Scotland⁴¹. The species is listed on the IUCN Red list as 'Near Threatened' in Scotland, but 'Endangered' elsewhere in the mainland UK. No evidence of red squirrel was recorded and no dreys were identified and the Site was considered to have low potential to support red squirrel. In light of the above, the species is considered of Less than Local Importance 	Less than Local	No. Scoped out of assessment
Water vole	<ul style="list-style-type: none"> Water vole is legally protected under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) and is a priority species in the SBL. Although the current UK population (132,000) is believed to have declined by 50% since 1998, and the species are in decline in both England and Wales, the Scottish population, which is largely genetically and phenotypically distinct, is in fact increasing in size with a stable range. The species is listed on the IUCN Red list and 'near threatened' in Scotland, but 'endangered' elsewhere in the UK. No water vole burrows or latrines were found within the Site, and riparian habitat largely provided limited opportunity for water vole burrow construction. In light of the above, the species is considered of Less than Local Importance. 	Less than Local	No. Scoped out of assessment

⁴⁰ Croose, E., Birks, J.D.S. & Schofield, H.W. 2013. Expansion zone survey of pine marten (*Martes martes*) distribution in Scotland. NatureScot Commissioned Report No. 520.

⁴¹ Tipple, N., & Tonkin, M., 2019. Evaluation of Spring 2019 Squirrel Surveys. Saving Scotland's Red Squirrels, Scottish Wildlife Trust.

Ecological Feature	Evaluation Rationale	Scale of Importance	IEF/Action
Amphibians	<ul style="list-style-type: none"> Great crested newt, a European Protected Species, was not found during the baseline surveys and no recent records were identified during the Desk Study. Common amphibian species are protected under the Wildlife and Countryside Act 1981 (as amended) against intentional or reckless killing and injuring. Common frog and palmate newt were recorded during the baseline surveys and wet conditions throughout the Site provides ample aquatic and terrestrial habitat for common amphibian species. In light of the above, amphibians are considered of Less than Local Importance. 	Less than Local	No. Scoped out of assessment
Reptiles	<ul style="list-style-type: none"> Only common and widespread species are found on mainland Scotland. Common reptiles' species; the common lizard, slow-worm (<i>Anguis fragilis</i>), and adder are protected under the Wildlife and Countryside Act 1981 (as amended) against intentional or reckless killing and injuring. The aforementioned reptile species are all included on the SBL and adder is included on the LBAP. No reptiles were recorded within the Site, although habitats offering foraging, refuge and hibernation were identified within the Site. In light of the above, amphibians are considered of Less than Local Importance. 	Less than Local	No. Scoped out of assessment
Brown Trout	<ul style="list-style-type: none"> Brown trout does not receive much protection within conservation legislation, however some protection in the form of exploitation controls exist within fisheries legislation, and the species is listed on the SBL. Brown trout are a common, widespread and adaptable species found across a wide variety of watercourses, either as part as a resident population, or the migratory anadromous forms, however the species have been in decline across Scotland for many decades as result of numerous pressures such as changes in land use, and more recently climate change. Spawning habitat for this species was identified during the fish survey along with a typical population density of the species at the electrofishing sampling sites on Mouse Water. 	Local	No. Scoped out of assessment

8.8.1 Scoped Out of the Assessment of Potential Effect

100. Following the systematic evaluation of importance outlined in Table 8.8, the following ecological features are considered of Local Importance or below, and thus not considered to be IEFs, and have therefore have been scoped out of inclusion with Section 8.9: Assessment of Potential Effects:

- Braehead Moss SAC and SSSI;
- Cobbinshaw Reservoir SSSI;
- Skolie Burn SSSI;
- Cobbinshaw Moss SSSI;
- Hardwood Water – Woodmuir Plantation to Baad’s Mill LBS (Proposed);
- Nether Longford Moss LBS (Proposed);
- Breich Water – Breich Bridge (A706) to Bents LBS;
- Breich Water – Fauldhouse to Breich Bridge and Stoneyburn LBS (Proposed);
- Habitats;
- GWDTEs;
- Badger;
- Pine marten;
- Red squirrel;
- Water vole;
- Amphibians;
- Reptiles; and
- Brown trout.

101. Although the above IEFs have been scoped out of further assessment within this Chapter, measures to mitigate or avoid potential effects on these IEFs have been included within Embedded Mitigation to help ensure legislative compliance of works as well as adherence to accept industry good practise (see Section 8.7).

8.8.2 Scoped into the Assessment of Potential Effect

102. Following the systematic evaluation of importance outlined in Table 8.8, the following ecological features are considered of Regional Importance or above, and thus are considered to be IEFs, and have therefore have been scoped in to Section 8.9: Assessment of Potential Effects:

- Bats; and
- Otter.

8.9 ASSESSMENT OF POTENTIAL EFFECTS

8.9.1 Habitats

103. The construction of the Development will cause the loss of and disturbance to habitats during construction and the effects may be both permanent and temporary. Permanent losses are calculated based on the Development layout but estimates of temporary losses, such as those caused by construction activities (e.g. vehicle movements and stockpiling) in the areas surrounding built infrastructure, are more difficult to quantify. However, temporary losses will be relatively limited in extent, based on experience of the construction of similar developments, and so are assumed, on a precautionary principle, to equate to approximately 20% of the areas permanently lost.

104. In total, an estimated 74.38 ha of habitats will be lost, equating to 8.94 % of the Site. Of this loss, the majority (67%) will consist of conifer plantation woodland. The next greatest habitat type to be lost will be recently felled conifer woodland (14%). Further detail on habitat loss is presented in Table 8.9 below. No IEF habitats will be impacted by habitat loss and so habitats are scoped out of further assessment.

Table 8.9: Summary of Phase 1 Habitat Loss

Phase 1 Habitat Type recorded in Survey Area	Area Lost within Site (Ha)	% of Habitat Type Lost within Site	% of Site Lost
A1.1.2 Broadleaved woodland – plantation	0.83	7.90	0.10
A1.2.2 Coniferous woodland – plantation	49.81	8.19	5.99
A1.3.2 Mixed woodland – plantation	0.56	6.19	0.07
A2.2 Scrub – scattered	0.23	28.62	0.03
A4.2 Recently felled woodland – coniferous	10.65	9.96	1.28
B1.1 Acid grassland – unimproved	0.72	10.12	0.09
B2.1 Neutral grassland – unimproved	0.38	5.56	0.05
B5 Marsh/marshy grassland	2.93	14.56	0.35
E1.7 Wet modified bog	1.52	6.03	0.18
E1.8 Dry modified bog	0.13	5.23	0.02
E2.1 Flush/spring – acid/neutral	0.08	1.23	0.01
I2.1 Rock exposure and waste – quarry	0.36	15.33	0.04
J1.3 Disturbed land – ephemeral/short perennial	0.11	40.43	0.01
J4 Bare ground	6.07	37.02	0.72
Total	74.38		8.94

8.9.2 Bats

8.9.2.1 Construction Phase Impacts

105. There is potential for displacement and/or disturbance to foraging and commuting bats during the construction of wind farm infrastructure and the forest felling required to accommodate the infrastructure.
106. Most turbines and infrastructure will be located within forested areas and will be in proximity to edge habitats such as forest rides. Felling for this infrastructure will take place. Despite the felling that will be undertaken, displacement or disturbance to foraging and commuting bats during construction is considered negligible given the abundance of edge habitats available within the Site that will remain unaffected. Linear watercourse features are also largely avoided due to the 50 m watercourse buffer for any infrastructure or construction activity, except where a minimal number of watercourse crossings are required.
107. Felling and the loss of habitat to the Development may marginally reduce the foraging and roosting opportunities within the Site; however, due to the abundance of these habitat types in the surrounding area and the small extent of their loss, it is not considered to be significant. Additionally, felling for infrastructure will create new edge habitats that may be utilised by bats within otherwise solid blocks of conifer forest, and thus overall the abundance of edge habitat will increase. Forestry restocking will also create new habitats and edge features in the longer term.
108. Although some bat foraging, commuting and roosting behaviour may be altered as a result of construction and forestry restructuring, this is likely to be of negligible spatial magnitude and short-term temporal magnitude.
109. As a result, construction effects are considered to be negligible and therefore 'not significant' in terms of the EIA Regulations.

8.9.2.2 Operational Impacts

110. During the operational phase, there is potential for collision risk upon commuting and foraging bat species, together with the risk that bats may be affected by barotrauma when flying in close proximity of the turbine blades. For the purposes of this assessment, the potential effects from barotrauma are assumed to be the same as for collision risk. This is due to the lack of published empirical evidence in causes of bat fatalities around wind farms and the difficulties in determining whether bat fatalities are due to collisions with turbine blades or barotrauma.
111. Further details on the Conservation Status of the high collision risk bat species recorded within the Site are provided below. Data for both noctule and Leisler's bats are provided, however these bats were only recorded to genus level (i.e. *Nyctalus* spp.). The low population estimates for *Nyctalus* spp. in Scotland are likely due to under-recording and an underestimate of the population occurring here⁴². Both common and soprano pipistrelle are widespread in southern Scotland, with Leisler's bat distributed mainly in the south and west of the region and noctule mainly to the south and east of the region, with some scattered predicted occurrence to the west⁴².
112. Population estimates of common pipistrelle in 2013 were 1,390,000 in the UK and 352,000 in Scotland⁴³. In 2019, Article 17 of the UK Habitats Directive Report UK estimates the population range to be from 1,100,600 to 7,843,000⁴⁴, however a best single value has not been provided due to the uncertainty around the population estimate. Matthews *et al* (2018)⁴⁵ provided a UK estimate of 3,040,000 for common pipistrelle; population estimates for Scotland were not provided.
113. Population estimates of soprano pipistrelle in 2013 were 774,000 in the UK and 198,000 in Scotland⁴³. In 2019, Article 17 of the UK Habitats Directive Report UK estimates the population range to be from 2,024,000 to 8,563,000⁴⁴, however, a best single value has not been provided due to the uncertainty around the population estimate. Matthews *et al* (2018)⁴⁵ provided a UK estimate of 4,670,000 for soprano pipistrelle; population estimates for Scotland were not provided.
114. Population estimates of Leisler's bat in 2013 were 28,000 in the UK and 250 in Scotland⁴³. There is no recent population estimate available for this species in the UK^{44,45}, and there is limited accurate data on trends, and population changes, meaning that the population status of this species in the UK and Scotland is currently unknown.
115. Population estimates of noctule in 2013 were 50,000 in the UK and 250 in Scotland⁴³. Current UK estimates for this species are unknown, but countrywide estimates provided by Matthews *et al* (2018)⁴⁵, and referred to in Article 17 of the UK Habitats Directive Report⁴⁴, with 565,000 individuals reported in England and 91,900 in Wales; there is no current estimate for Scotland.
116. Evaluating the overall site risk of a bat population to wind farms is based on two factors: ecobat activity level recorded and initial site risk level. These factors are multiplied to generate an overall risk assessment score per species of either Low (0-4), Moderate (5-12) or High (15 – 25)²⁹. Appendix A8.3 presents the results of this risk assessment for each high collision risk species and provides detailed results of the Ecobat analysis. A summary is provided below to inform the assessment.

⁴² Newson, S.E., Evans, H.E., Gillings, S., Jarrett, D. & Wilson, M.W. 2017. A survey of high risk bat species across southern Scotland. NatureScot Commissioned Report No. 1008.

⁴³ JNCC (2013). Individual Species Reports - 3rd UK Habitats Directive Reporting 2013.

⁴⁴ <https://jncc.gov.uk/our-work/article-17-habitats-directive-report-2019-species/#regularly-occurring-species-vertebrate-species-mammals-terrestrial>

⁴⁵ Mathews F, Kubasiewicz LM, Gurnell J, Harrower CA, McDonald RA, Shore RF. (2018) A Review of the Population and Conservation Status of British Mammals: Technical Summary. A report by the Mammal Society under contract to Natural England, Natural Resources Wales and NatureScot. Natural England, Peterborough.

117. The following average site activity levels (median and maximum percentiles) were recorded for the following high collision risk bat species:
- Common pipistrelle: Moderate to High;
 - Soprano pipistrelle: Moderate to High; and
 - *Nyctalus* spp: Low to Moderate.
118. Due to having a 'high' collision risk and a 'common' population abundance rating, common and soprano pipistrelle are classified as having 'medium' population vulnerability.
119. *Nyctalus* spp. have a 'high' collision risk and the 'rarest' population abundance resulting in this species having a 'high' population vulnerability. The Site has been categorised as a 'Low' (level 2)²⁹ site risk to bats due to its 'Medium' project size and 'Low' habitat risk (see Appendix A8.3).
120. The following risk assessment score for 'Median' and 'Maximum' percentiles was obtained for the follow bat species.
- Common pipistrelle: Medium (6) to Medium (10);
 - Soprano pipistrelle: Medium (6) to Medium (10); and
 - *Nyctalus* spp: Low (2) to Medium (6).
121. The risk level varied between June and October with June being the month with the greatest bat activity across the Site (Appendix A8.3). Further context on each high collision risk species is provided below.

Common pipistrelle

122. 'Moderate' or 'Moderate to High' levels of activity of common pipistrelle were recorded at four locations within the Site during the surveys, all of which were associated with forest edge habitats. Conifer plantation edges are known to offer suitable commuting and foraging habitat. The remaining seven locations recorded 'Low' and 'Low to Moderate' levels of activity. The highest levels of activity at these locations were recorded in June, with activity levels dropping considerably in July, September and October. An effect of magnitude of low spatial and long-term temporal is considered appropriate for common pipistrelle.

Soprano pipistrelle

123. 'Moderate' levels of activity were recorded for soprano pipistrelle at six locations within the Site during the surveys, all of which were associated with conifer plantation edge habitats, known to offer suitable commuting and foraging habitat. The remaining five locations recorded 'Low' or 'Low to Moderate' levels of activity. The lowest levels of activity at these locations were recorded in June, rising into July, with September and October providing the highest activity levels. An effect of magnitude of low spatial and long-term temporal is considered appropriate for soprano pipistrelle.

Nyctalus spp.

124. 'Low to Moderate' levels of activity were recorded for *Nyctalus* spp. at two locations within the Site during the surveys, both of which were associated with conifer plantation edge habitats, known to offer suitable commuting and foraging habitat. Six other locations recorded 'Low' levels of activity with the remaining three locations recording no activity. All activity was recorded during the July with no *Nyctalus* spp. recorded during the surveys in June, September or October. An effect of magnitude of low spatial and long-term temporal is considered appropriate for *Nyctalus* spp.

Embedded Mitigation

125. In accordance with the recent guidance²⁹, embedded mitigation (see Section 8.7) will ensure that a 50 m separation distance between high-value bat habitats (such as woodland edges) and blade tips is established. If micro-siting of turbines is required during

construction, the 50 m separation distance would be maintained accordingly. Furthermore, this off set buffer would also be sustained throughout operation via routine maintenance, if required.

126. To calculate the necessary stand-off distance between the centre of the turbine (the turbine location) guidance advises the use of the following equation:

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

127. Based on turbine parameters detailed in Chapter 3 - The Development, the calculation uses blade length (bl) and hub height (hh) alongside feature height (fh) to calculate a stand-off distance (b) from the base of the turbine within which no habitats that could encourage bat activity should be allowed to develop (i.e. trees). The equation assumed to represent a 'worst case' scenario of 17 m for the tree heights within the Site. Table 8.9 provides the values and stand-off distances required for each turbine model.

Table 8.9: Stand-off buffer required for bats

Turbine Model	Hub Height (m)	Blade Length (m)	Equation	Stand-off Distance Required (m)
Nordex 133	83.5	66.5	$b = \sqrt{(50+66.5)^2 - (83.5-17)^2}$	96
GE 158	101	79	$b = \sqrt{(50+79)^2 - (101-17)^2}$	98

128. Therefore, based on the above equation the minimum turbine stand-off distance to be implemented during construction and maintained through operation for the Nordex 133 and GE 158 turbines is 96 m and 98 m, respectively.

129. Further to the above, the typical flight height for common pipistrelle and soprano pipistrelle (the dominant species recorded on site) is 2-10 m above the ground⁴⁶. Therefore, with a minimum rotor sweep height of 17 m, the majority of bats continuing to utilise the Site are unlikely to fly at rotor height, and are therefore at less risk from turbine collision.

130. Bat activity was generally low across the Site with moderate levels of activity localised to four locations. Where the risk of bat interaction with turbines currently exists, the risk of collision will be notably reduced through the implementation of embedded mitigation to ensure turbines are located outwith areas likely to be used by bats.

131. Due to the overall low to moderate levels of bat activity recorded, and the benefits of embedded mitigation recommendations, the magnitude of effects of turbine collision on the local bat population is likely to be minor. Despite this, due to the lack of data regarding bat interactions with turbines, impacts on low numbers of bats cannot be ruled out. As a result, operational effects are considered to be of low magnitude, and therefore not significant in terms of the EIA Regulations.

8.9.23 Decommissioning Phase Effects

132. Decommissioning activities are considered to be of a similar nature to those of Development construction; however, as no habitats used by bats are likely to be impacted, the potential for detrimental impact to bats is considered likely to be on a significantly notably smaller scale, and therefore effect are likely to be not significant in terms of the EIA Regulations.

⁴⁶ Bat Conservation Trust: Species Factsheets. Available at: <https://www.bats.org.uk/about-bats/what-are-bats/uk-bats>. Accessed on 24 August 2020.

8.9.3 Otter

133. Although otter was confirmed as being present within the Site, the level of activity was considered to be low with only two areas with spraints located during surveys. Due to this, the watercourses and ponds on Site are likely to be of relatively low value to otter, likely used occasionally or seasonally. This was also suggested by the fisheries survey results which found a relatively small population of brown trout within the Mouse Water.

8.9.3.1 Construction Phase Effects

Habitat Loss, Disturbance and Degradation.

134. During the construction phase there are potential impacts that may result from the occurrence of ground works in close proximity to watercourses and ponds used by otters. These include the detrimental impacts of habitats loss and disturbance, siltation, sedimentation and accidental pollution. These impacts could detrimentally affect the local otter population indirectly by reducing habitat suitability for prey species, thus reducing prey availability, or by directly damaging habitats used to otters for resting and commuting. Both effects could result in the displacement of otters from the Site, reduction of connectivity to the wider local area, and a minor reduction of fitness in members of the otter population, due to decreased resources and the subsequent increase in competition for resources.
135. The overwhelming majority of construction will take place in woodland habitats of limited to no value to otter, and outwith close proximity to watercourses and ponds. However, there will be several watercourse crossings constructed as part of the Development. All watercourses and ditches are likely to be suitable for commuting otters.
136. Following the application of Embedded Mitigation measure outlined in Section 8.7, and construction phase pollution prevention measures (as detailed in Chapter 10 - Hydrology and Hydrogeology) which will form part of Pollution Prevention Plan (PPP), it is anticipated the current low value of watercourses to otter will not be notably detrimentally impacted by construction activities and will be short-term, and so effects to critical prey resources and general habitat quality are unlikely.
137. The construction phase effects of habitat loss, disturbance and degradation are considered to be adverse and temporary, and thus of low magnitude, and therefore are considered to be not significant in terms of the EIA Regulations.

Disturbance and Displacement of Breeding otters

138. Under the Habitat Regulations (the Conservation (Natural Habitats, &c.) Regulations 1994) otter resting sites are protected from deliberate or reckless disturbance. Potential development related disturbance and displacement may result from an increase in noise, vibration, traffic and the presence of people, in close proximity to areas used by otter. In accordance with NatureScot guidance⁴⁷, disturbance is likely to constitute any construction activity taking place within 30 m of holts and shelters where otters are not breeding, but up to 200 m for breeding holts. Aquatic otters typically establish resting areas in close proximity to the riparian corridor, and therefore watercourses represent the areas of greatest risk to disturbance.
139. Otters typically breed in areas where there is access to an abundant food supply, where disturbance is minimal and where more than one resting area suitable to be used as a natal holt is already available⁴⁸. As established above, no resting areas have been recorded within the Site, habitats within the Site are largely of limited value to the species, and otter has only been recorded on one ditch, therefore the Site is considered to be

⁴⁷ <https://www.nature.scot/sites/default/files/2019-10/Species%20Planning%20Advice%20-%20otter.pdf>

⁴⁸ Liles G (2003). Otter Breeding Sites. Conservation and Management. Conserving Natura 2000 Rivers Conservation Techniques Series No. 5. English Nature, Peterborough

unlikely to support a breeding holt. Although the presence of other future non-breeding holt or shelter cannot be ruled out, with the exception of the water crossings, the vast majority of Development is located no closer than 50 m to watercourses (and in many areas considerably further away), out with the likely range of disturbance.

140. Based on the existing baseline, Development-related construction work will not impact any known resting area for otter. Although the likelihood of a resting area becoming established in the future ahead of construction within 30 m of the water crossing works is considered low, with adherence to embedded mitigation such as pre-construction surveys and ECoW supervision of works, the risk is considered to be negligible. As discussed, habitats within the Site are largely of limited value to the species, and the vast majority of works are outwith proximity of watercourses.
141. Through the implementation of embedded mitigation measures, including pre-works ECoW monitoring and surveys, the implementation of 50 m riparian buffers from working areas, and the adoption of good practise working practises and emergency procedures, the risk of detrimental effects of disturbance and displacement on both the existing and future baseline is negligible. Therefore, the effects of disturbance and displacement impacts are considered to be of low magnitude, and are therefore not significant in terms of the EIA Regulations.

Interaction with Construction Traffic and Plant

142. In addition to construction phase disturbance, the direct increase of traffic and plant movements and operation from Development construction have the potential to result in a temporary increase in the risk of accidental collisions and otter injury and fatality.
143. As otter are largely crepuscular and nocturnal, the risk is largely limited to periods when construction is taking place at night, or during low light levels during the winter months. Additionally, as habitats are largely of low value to otter, no otter resting places were identified within the Site, activity is limited to one watercourse within the Site and works will largely take place outwith proximity to watercourses, the risk is considered to be low.
144. This risk is likely to be further reduced through the implementation of embedded mitigation measures, such as pre-construction surveys, the implementation of good practise working measures, and monitoring of works by the ECoW. As a result, it is considered that a potential impact is of negligible risk. Therefore, the effect of this impact is considered to be of low magnitude, and is therefore not significant in terms of the EIA Regulations.

Entrapment in Construction Excavations.

145. Construction phase excavations if left uncovered and unattended have the potential to injure or entrap wildlife including otters which could result in injury or mortality. As habitats are largely of low value to otter, activity is limited to one watercourse within the Site and works will largely take place outwith proximity to watercourses, the risk is considered to be very low.
146. Through the implementation of embedded mitigation measures, such as the implementation of good practise working measures such as covering excavation or leaving a suitable means of escape when unattended, as well as monitoring of works by the ECoW, the potential impact is of negligible risk. Therefore, the effect of this impact is considered to be of low magnitude, and is therefore not significant in terms of the EIA Regulations.

8.9.3.2 Operation Phase Impacts

Interaction with Operational Traffic and Personnel Presence

147. Development maintenance is likely to result in occasional vehicle movements and personnel presence throughout the operation of the Development; however, this activity

will be limited to the Development infrastructure, with no disturbance of the surrounding environment (including riparian habitats) expected. Due to the infrequency and localised nature of operational activities, and the low value and use of the Site by otters, the potential detrimental effect is considered to be of negligible magnitude, and is therefore **not significant** in terms of the EIA Regulations.

8.9.3.3 Decommissioning

148. Decommissioning activities are considered to be of a similar nature to those of Development construction, therefore potential exists for direct and indirect effects to otters, where decommissioning works may take place in close proximity to riparian habitats. Decommissioning activities may result in a localised increase in noise, vibration, traffic and presence of people, potentially causing disturbance to commuting and foraging otters. However, this effect is considered to be of low magnitude and is therefore not significant in terms of the EIA Regulations.

8.10 RESIDUAL EFFECTS

149. No significant residual effects are predicted following the implementation of embedded mitigation, as detailed in Section 8.7 of this Chapter.

8.11 CUMULATIVE EFFECT ASSESSMENT

150. The EIA Regulations require the cumulative effects of the Development with other relevant projects or plans to be assessed. In considering cumulative effects, it is necessary to identify any effects that may be not significant in isolation but that may be significant in combination with other developments.

151. This assessment considers that cumulative effects can result from effects that were individually assessed as non-significant, but in combination with effects or actions taking place over time, or across a wider spatial range (such as where the zone of influence of other developments or actions may overlap the with Development) non-significant effects may cumulatively be considered significant.

152. Cumulative effects are particularly important in EcIA as ecological features may be already exposed to background levels of threat or pressure and may be close to critical thresholds where further impact could cause irreversible decline.

153. The main projects likely to cause similar effects to those associated with the proposed Development are other operational wind farms, those under construction or those consented. In total, 11 other wind farms are present within 10 km of the proposed Development, which are either operational, approved or at the application stage.

154. Wind farm projects at scoping stage have been scoped out of the cumulative assessment because they generally do not have sufficient information on potential effects to be included, as the baseline survey period is ongoing, or results have not been published. Projects that have been refused or withdrawn have also been scoped out.

155. Small projects with three or fewer turbines (with the exception of Tormywheel Extension) have also been excluded from the cumulative assessment as often these projects are not subject to the same level of detail of assessment, and so there are no directly comparable data. Due to the small scale of such projects, effects are likely to be negligible on the IEFs assessed here.

156. A total of 11 developments have been included in the cumulative impact assessment which include:

- **Tormywheel (Operational):** 15 turbines situated immediately north-west of the Site. Providing mitigation is implemented, no significant effects on bats or otter were predicted.

- **Tormywheel Extension (Proposed):** 3 turbines proposed immediately north-west of the Site. Baseline surveys undertaken to inform the Environmental Statement identified soprano pipistrelle and common pipistrelle, Daubenton's bat, Natterer's bat, *Myotis* sp. and noctule. Post-mitigation, the residual effect on bats was predicted to be not significant. Additionally, no significant effects on otter were predicted.
- **Longhill Burn (Approved):** up to eight turbines situated immediately east of the Site. Baseline surveys identified common pipistrelle, soprano pipistrelle, Nathusius' pipistrelle, *Myotis* sp., and *Nyctalus* sp. It was concluded that the proposed development would have adverse effects of minor or negligible significance on habitats and species and therefore not significant.
- **Harburnhead (Operational):** 22 turbines situated 7km east of the Site. Baseline surveys identified common pipistrelle, soprano pipistrelle, *Myotis* sp. and brown long-eared bat. It was concluded that the proposed development would have adverse effects of minor or negligible significance on habitats and species and therefore not significant.
- **Pates Hill (Operational):** 7 turbines situated 3 km east of the Site. No information regarding the impacts or effects of the proposed development on habitats or species is currently available.
- **Black Law (Operational):** 54 turbines situated 6 km south-west of the Site. No information regarding the impacts or effects of the proposed development on habitats or species is currently available.
- **Black Law – Phase 1 (Operational):** 23 turbines situated 6 km south-west of the Site. It was concluded that the proposed development would have adverse effects of minor or negligible significance on habitats and species.
- **Black Law – Phase 2 (Operational):** 13 turbines situated 6 km south-west of the Site. Following mitigation, it was considered that as a result of benefits provided by the development, the residual effect on bats would be minor beneficial. No significant effects on watercourses were predicted.
- **Camilty (Approved):** up to 6 turbines will be situated 9 km east of the Site. By applying effective mitigation measures, the Environmental Statement concluded that there will be no significant residual effects on habitats of ecological importance or protected species resulting from the proposed wind farm.
- **Pearie Law (Operational):** 6 turbines situated 5 km east of the Site. It was predicted that the wind farm would not have significant effects on any habitats or species.

8.11.1 Bats

157. Bats are most likely to be affected by cumulative wind farm development because of the foraging distances travelled by some species of bat and the cumulative risks to bat populations as a result of collision with wind turbines during operation.
158. The implementation of standard good practice measures regarding buffer distances of turbines from forestry edges to minimise effects on commuting and foraging bats reduces the extent of cumulative effects (Section 8.9.2.2).

8.11.1.1 Common Pipistrelle and Soprano Pipistrelle

159. Both common pipistrelle and soprano pipistrelle are widespread in southern Scotland, with distributions of these species reaching into northern parts of Scotland. They are also common species with large population sizes and lower population sensitivity or population risk.
160. Taking into account the low risk assessment score at the proposed Development for both species and considering their distribution, population size and sensitivity, whilst applying the precautionary principle, cumulative effects on common pipistrelle and soprano

pipistrelle are considered to be of low magnitude and not significant in the context of the EIA Regulations.

8.11.1.2 *Nyctalus* spp.

161. With limited information available on the activity levels of *Nyctalus* spp. at wind farms within the vicinity of the proposed Development, and the lack of species population data in the UK and Scotland, information from the published report on high risk bat species across southern Scotland⁴² has been taken into account to provide additional data and context for a cumulative assessment.
162. The study examines the likelihood of *Nyctalus* species being present at wind farms in the region, using spatial modelling. The ranges occupied by these species in southern Scotland were found to be restricted with little overlap. For both noctule and Leisler's bat, occupancy and activity patterns were found to be particularly aggregated, indicating that smaller areas where the species are found may be of particular importance for the overall population. It was estimated that 16% to 24% of the populations of *Nyctalus* spp. are exposed to existing and approved wind farms. An analysis of spatial patterns of distribution and activity was undertaken to produce a map of core areas for these species, where they are likely to be at highest risk from wind farm development, with the proposed Development falling outwith the core areas.
163. The study⁴² suggests that the cumulative effects on *Nyctalus* spp. could be high, due to the apparent aggregated distribution of the *Nyctalus* spp. within an area with numerous wind farm developments. Furthermore, the populations of the two species (within Scotland) are likely confined to southern Scotland, therefore the area of the proposed Development represents the northern population distribution edge within the UK.
164. Taking into account the low to moderate risk assessment score at the proposed Development for *Nyctalus* spp. and the currently available data on these species as detailed above, cumulative effects on *Nyctalus* spp. are considered to be of low magnitude and not significant in the context of the EIA Regulations.

8.11.2 Otter

165. The presence of otter within the ESA was limited to one drainage ditch within the Site and one pond in the survey buffer of the ESA. Extensive local habitat suitability outwith the Site exists for the species which is abundant and in an inclining status in Scotland. Therefore, despite the proximity to a number of other existing or future windfarms, due to the low magnitude of predicted non-significant effects, no significant cumulative effects in terms of the EIA Regulations are predicted.

8.12 SUMMARY OF EFFECTS

166. Table 8.10 provides a summary of the effects detailed within this chapter.

Table 8.10: Summary of Effects

Receptor	Potential Effect	Significance of Effect	Mitigation Proposed	Significance of Residual Effect
Construction Phase				
Bats	Habitat change.	Not Significant.	Embedded Mitigation only.	Not Significant.
	Roost loss.	Not Significant.	Embedded Mitigation only.	Not Significant.
Otter	Habitat loss, disturbance and degradation.	Not Significant.	Embedded Mitigation only.	Not Significant.

Receptor	Potential Effect	Significance of Effect	Mitigation Proposed	Significance of Residual Effect
	Disturbance and displacement of breeding otters.	Not Significant.	Embedded Mitigation only.	Not Significant.
	Interaction with traffic, plant and personnel.	Not Significant.	Embedded Mitigation only.	Not Significant.
	Otter entrapment in excavations.	Not Significant.	Embedded Mitigation only.	Not Significant.
Operational Phase				
Bats	Turbine related mortality.	Not Significant.	Embedded Mitigation only.	Not Significant
Otter	Otter interaction with traffic, plant and personnel.	Not Significant.	Embedded Mitigation only.	Not Significant
Decommissioning Phase				
Otter	Otter interaction with traffic, plant and personnel.	Not Significant.	Embedded Mitigation only.	Not Significant

8.13 STATEMENT OF SIGNIFICANCE

167. No significant ecological effects have been identified for the construction and operation of the Development, either alone or in combination with other developments, and therefore these are not significant in relation to the EIA Regulations. Embedded Mitigation has been proposed to ensure the low magnitude of effects during the construction phase and to reduce the likelihood of legal offences and comply with good practice.