Chapter 11: Ecology

Non-technical Summary

Chapter 11: 'Ecology' of the Proposed Development Environmental Impact Assessment Report has been prepared by Avian Ecology Ltd. and provides an assessment of potential effects of the proposed development upon ecological (excluding ornithology) features in accordance with the Chartered Institute for Ecology and Environmental Management (CIEEM) guidelines (2018). The assessment has been informed through desk study, field surveys and consultation with relevant stakeholders. Where relevant, information from the operational Lochluichart Wind Farm, Lochluichart Wind Farm Extension and Corriemoillie Wind Farm has been referred. Field surveys undertaken have included:

- Extended Phase 1 habitat survey;
- National Vegetation Classification (NVC) survey;
- Bat Activity Surveys; and,
- Protected Mammal Surveys.

The Proposed Development does not form part of any statutory or non-statutory designated site for nature conservation. Two such nationally and internationally designated sites are located within 5km; Beinn Daerg Special Area of Conservation (SAC) and Site of Special Scientific Interest (SSSI), and Fannich Hills Sac and SSSI. By virtue of spatial separation, absence of hydrological connectivity and embedded 'good practice' construction techniques, no direct or indirect upon any designated site for nature conservation will occur.

The Proposed Development is upland in character and dominated by habitats typical of the region. The majority of habitats comprise large areas of blanket bog and wet heath communities, developing on peat of variable depth. Blanket bog is the most prominent habitat type on the northern slopes where the ground is much wetter and north facing. Centrally and towards the south the bog becomes more heath-like, with wet dwarf shrub heath dominating.

Resultant habitat losses and disturbance and the potential for pollution events has been minimised through sensitive scheme design and the implementation of good practice construction techniques, to be detailed within a Construction Environmental Management Plan (CEMP). The Proposed Development will result in very small permanent losses of the total area of habitat, which is not considered to be significant or affect the integrity of such habitats at a local scale. Temporary habitat losses, whilst larger, will be reversible following the completion of construction activities.

Bat surveys recorded very low levels of bat activity within the study area, comprising that of common pipistrelle and soprano pipistrelle only. The Proposed Development has, in large, avoided the placement of turbines within this part of the Site and where possible adopted a 50m stand-off distance from typical bat habitat features following recommendations in statutory guidance. The majority of habitats to be affected by the development are of low suitability for commuting and foraging bats. As such, habitat losses are not considered to be significant, or likely to affect the conservation status of bat species. Mitigation measures to ensure legislative compliance during any tree works are proposed to protect individual bats and their roost sites. As with all wind farms, operational impacts upon bat species are difficult to characterise; however the

risk of operational mortality is generally acknowledged to be minimal at locations with low bat activity such as the Proposed Development. Subsequently the mortality risk to bats is considered to be very low.

Water voles were identified around the Proposed Development and a single pine marten scat was found. No other evidence of protected mammals was found and the habitats were considered unlikely to support wildcat or badgers. Any potential impacts upon terrestrial mammals are unlikely to be significant. Impacts on water voles have been largely avoided by the minimisation of water crossings and sensitive design of crossings and culverts. Mitigation measures are proposed to ensure legislative compliance during the construction and decommissioning phases.

Incidental observations of common lizard were made during habitat surveys and adders are likely to be present. Significant adverse impacts upon reptile species are not anticipated. As individual reptiles are protected against intentional or reckless killing and injuring, measures are proposed to ensure legislative compliance during the construction and decommissioning phases.

The Proposed Development is known to fall within a sub-catchment area where salmon are absent, although brown trout are present year-round. The two watercourse crossings required for the development follow current SEPA guidance and will maintain existing bed substrate, hydraulic connectivity and passage for fish and additional wildlife such as water vole. No significant adverse impacts upon fisheries are therefore predicted.

Subsequently the Proposed Development is not anticipated to lead to significant adverse effects for any protected or notable species and habitats.

Introduction

11.1. is Chapter of the Environmental Impact Assessment Report (EIA Report) has been prepared by Avian Ecology Ltd. and provides an assessment of potential effects on ecological features in relation to the construction, operation and decommissioning of the proposed Lochluichart Wind Farm Extension II (hereafter referred to as 'the Proposed Development').

11.2. The objectives of this Chapter are to:

- establish and describe the baseline ecology conditions;
- identify key ecological features and any potentially significant effects upon them; and
- identify and describe any mitigation measures required to address any potentially significant effects.

11.3. The Chapter is supported by the following technical appendices presented in **Volume Three** and **Figures 11.0** to **11.5**:

- **Appendix 11.A**: Habitats and Vegetation
- **Appendix 11.B**: Desk Study and Protected Species
- **Appendix 11.C**: Consultation

- **Figure 11.0**: Statutory Designated Sites
- **Figure 11.1**: Phase 1 Habitat Plan
- **Figure 11.2**: National Vegetation Classification Plan
- **Figure 11.3**: Bat Surveys
- **Figure 11.4**: Protected Mammals Survey Methodologies
- **Figure 11.5**: Protected Mammals Survey Results

Project Description

11.4. A detailed description of the Proposed Development is provided in Chapter 3 'Project Description'.

11.5. In summary the Proposed Development will comprise the installation of nine wind turbines with a proposed maximum tip height of 133m, maximum hub height of 79m and a maximum rotor diameter of 114m together with associated hardstanding, access tracks, substation, borrow pit, permanent meteorological mast and additional wind farm infrastructure.

11.6. The candidate turbine specification is based upon a Senvion 3.6M 114 NES.

Proposed Development Overview

11.7. The Proposed Development comprises all lands within the red line application boundary as shown in **Figure 11.0**.

11.8. The Proposed Development covers an area of 596ha and is located on open moorland between Loch Glascarnoch and the A835 road to the north, and Lochluichart and the A832 to the south. The Operational Schemes are located directly to the south, and the Corriemoillie Wind Farm (hereafter referred to as 'Corriemoillie') is located to the southeast. Further expanses of open moorland lie to the north and west of the Proposed Development.

11.9. Upland habitats predominate across the Proposed Development, comprising blanket bog, heathland and pockets of plantation woodland. Several watercourses drain the Proposed Development.

Key Legislation and, Policy and Guidance

11.10. In the preparation of this chapter, reference has been made to the following key pieces of planning policy, legislation and guidance:

European

- Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (the Habitats Directive);

National

- The Conservation of Habitats and Species Regulations 2010, as amended in Scotland (the Habitat Regulations);
- The Wildlife and Countryside Act 1981 (as amended in Scotland);
- The Wildlife and Natural Environment (Scotland) Act 2011;
- The Nature Conservation (Scotland) Act 2004;
- The Protection of Badgers Act 1992[i];
- The National Planning Policy Framework 3 (2014);
- Scottish Planning Policy (2014);
- Scottish Biodiversity List (SBL) 2013; and
- The United Kingdom Biodiversity Action Plan (UK BAP) Priority Species and Habitats (2007).

Local

- The Highland Council (THC) Onshore Wind Energy Supplementary Guidance (2016);
- Highland's Statutorily Protected Species. Supplementary Guidance (2013[ii]).
- The Ross and Cromarty (East) Biodiversity Action Plan (LBAP); and
- The Ross and Cromarty East Local Plan 2007.

Scope of Assessment

11.11. The assessment presented herein has been undertaken with reference to CIEEM guidance (2018)[iii], and focuses on those activities that could impact and potentially generate significant effects on ecological features.

11.12. Desk study and field survey information has been used to inform the valuation of ecological features and the selection of important ecological features 'scoped-in' to a detailed assessment.

11.13. The desk study has been undertaken to identify potentially sensitive ecological features within at least 2km of the Proposed Development boundary, extended out to 10km for statutorily designated sites for nature conservation.

11.14. The scope of field surveys undertaken has guided by consultation and existing relevant survey information gathered for the adjacent Lochluichart Wind Farm and Lochluichart Wind Farm Extension (hereafter referred to as the 'Operational Schemes') and Corriemoillie, which provide an extensive existing baseline dataset for the Proposed Development and immediate surrounding area.

11.15. Existing information obtained to inform the Lochluichart Wind Farm Extension Environmental Statement (ES) included baseline surveys undertaken between 2009 and 2010 which covered the Proposed Development. With existing information obtained to inform Corriemoillie including a series of baseline and post construction surveys undertaken 2009 and 2016, providing partial coverage of the Proposed Development and immediate surrounding area.

11.16. The assessment presented within this Chapter considers the following main potential effects upon ecological features associated with wind farm developments, which include:

- Designated Sites – potential indirect effects upon designated sites for nature conservation;
- Habitat Loss / Deterioration – direct and indirect loss and deterioration of habitats;
- Mortality / loss of life – incidental loss of life or injury through construction activities to species.
- Disturbance / Displacement of Species –disturbance and displacement of faunal species; loss, damage or disturbance to their breeding and/or resting places; and

11.17. The potential for effects are considered as a result of the Proposed Development alone and cumulatively, in-combination with the Operational Schemes and Corriemoillie.

Consultation

11.18. **Table 11.1** below details a summary of consultations undertaken as part of the assessment process. A summary of responses obtained is provided along with how these have been addressed.

11.19. Full copies of consultation documentation are provided in **Appendix 11.C**.

Table 11.1 Consultation

Consultee	Date	Stage	Summary of Response	How Response has been addressed
SNH	13/12/2016	Pre-application Advice Service	Undertake protected species surveys – otter, wildcat, bats, water vole, badger, pine marten. Undertake NVC survey. Provide a deer management plan.	Protected species surveys undertaken in accordance with best practice guidance, as appropriate to the species. A NVC survey has been undertaken within the proposed development.

Consultee	Date	Stage	Summary of Response	How Response has been addressed
	11/05/2017	Scoping Response	Agreement on scope for protected mammals surveys. Recommended surveys are completed within 12 months submission. Confirmed impacts on freshwater pearl mussel can be scoped out of assessment. Recommended an NVC survey is undertaken to identify Annex I habitats.	Protected species surveys undertaken in accordance with best practice guidance, as appropriate to the species. Protected species surveys undertaken in spring and summer 2017, results are still considered adequate to inform the assessment and any avoidance mitigation required would be supported by pre-construction surveys. A NVC survey has been undertaken within the proposed development.
Royal Society for the Protection of Birds	Undated, received through scoping.	Scoping response	Recommended full survey and assessment of important habitats and the provision of a Habitat Management Plan which includes enhancement for blanket bog habitats.	Phase 1 and NVC habitat surveys undertaken including a full assessment of effects.
The Highland Council	05/06/2017	Scoping	No relevant matters to Ecology.	Not applicable.
Cromarty Firth Fisheries Trust	No response received through scoping.			
Scottish Wildlife Trust	No response received through scoping.			
Marine Scotland	10/07/2017	Scoping	Consider impacts on fish populations.	Potential presence of fisheries and effects of the Proposed Development considered within the ES.

Baseline Methodology

Desk Study

11.20. A desk study was undertaken to collate existing information on the presence of designated sites for nature conservation and existing records of protected and notable habitats and faunal species, within the Proposed Development and surrounding area.

11.21. The following key sources were consulted:

- Scottish Natural Heritage (SNH) Sitelink (http://gateway.snh.gov.ul/sitelink/);
- National Biodiversity Network (NBN) Database; and,
- Highland Biological Recording Group (HBRG).

11.22. The following documents in relation to the adjacent Lochluichart Wind Farm Extension and Corriemoillie were also reviewed:

- Corriemoillie Wind Farm 'Revised' ES and Post Consent Reports 2016:
  - Terrestrial Mammal Surveys (badger, bats, otter, pine marten, red squirrel, water vole, wildcat) 2014[iv];
  - Phase 1 Habitat Survey Report 2016[v];
- Lochluichart Wind Farm Extension ES 2011 and appendices which include the following baseline surveys:
  - Extended Phase 1 Habitat Survey 2010;
  - National Vegetation Classification Survey 2010;
  - Terrestrial mammal surveys including otter, water vole, red squirrel, badger, pine marten, wildcat and bats 2010;
  - Freshwater pearl mussel surveys 2010;
- Corriemoillie Wind Farm ES 2010 and appendices which include the following baseline surveys:
  - Extended Phase 1 Habitat Survey 2008, 2009 and 2010; and
  - Terrestrial mammal surveys including bats, otters, water voles, red squirrel and badger 2009.

Field Surveys

11.23. The following section- provides a summary of field surveys undertaken to inform the Proposed Development and surveys undertaken for Operational Schemes and Corriemoillie which are relevant to the Proposed Development application.

11.24. Detailed field survey methodologies are provided in **Appendix 11.A** and **Appendix 11.B** or within the corresponding documents for the Operational Schemes and Corriemoillie.

Habitats

11.25. An Extended Phase 1 habitat survey and National Vegetation Classification (NVC) survey was undertaken within the Proposed Development in 2010 to inform the Lochluichart Wind Farm Extension development. An updated habitat walkover survey was completed on 1st July 2015 to identify any material changes in baseline habitats recorded within the Proposed Development since 2010.

11.26. A further Extended Phase 1 habitat survey and NVC survey was also undertaken in 2017 to accommodate changes in the Proposed Development layout and focused on areas within 250m of development infrastructure.

11.27. All surveys were undertaken in accordance with industry guidance applicable at the time:

- JNCC - Handbook for Phase I Habitat Survey – a Technique for Environmental Audit 2010[vi];
- Scotland and Northern Ireland Forum for Environmental Research (SNIFFER) 2009[vii]; and,
- National Vegetation Community Users' Handbook – 2006[viii].

11.28. Habitat survey methods were extended to include the additional recording of specific features indicating the presence, or likely presence, of protected or notable species.

Bats

11.29. A survey to identify trees with bat roost potential was undertaken within the Proposed Development in 2010 as part of baseline surveys to inform the Lochluichart Wind Farm Extension. The survey was undertaken in accordance with BCT guidance applicable at the time of survey (2007[ix]).

11.30. Bat activity surveys were undertaken within the Proposed Development in 2015 with reference to BCT guidance (Hundt, 2012[x]), comprising a manual and automated monitoring sampling surveys during the summer and autumn periods. Survey effort is presented on **Figure 11.3**.

Terrestrial Mammals

11.31. A survey for other terrestrial mammals including otter, water vole, red squirrel, pine marten, wildcat and badger was undertaken within the proposed development in 2010 to inform the Lochluichart Wind Farm Extension. Updated surveys were undertaken in 2017 adopting new guidance methodologies:

- SNH Protected Species Advice for Developers;
  - Pine Marten (SNH, 2017a[xi]);
  - Wildcat (SNH, 2017b[xii]);
  - Badger (SNH, 2017c[xiii]);
  - Otter (SNH, 2017d[xiv]);
  - Water vole (SNH, 2017e[xv]);
  - Red squirrel (SNH, 2017f[xvi]);
- UK BAP Mammals – Interim Guidance for Survey Methodologies, Impact Assessment and Mitigation 2012[xvii];
- Water Vole Conservation Handbook (Strachan *et al.*, 2011[xviii]); and

- Water Vole Mitigation Handbook (Dean *et al*., 2016[xix]).

11.32. Full details for 2017 surveys are provided within **Appendix 11.B**.

Freshwater Pearl Mussel

11.33. A survey for fresh water pearl mussel was carried out in the Proposed Development in 2010 to inform the Lochluichart Wind Farm Extension. The survey aimed to identify specific sites that were most likely to harbour mussels using information on their habitat preferences. Once apparently suitable areas were identified, target species searches were undertaken in accordance with guidance applicable at the time (Cosgrove and Young, 1998[xx]; Young *et al*., 2001b[xxi]).

Fisheries

11.34. A habitat survey carried out by the Galloway Fisheries Trust (2006)[xxii] identified a number of locations within the Proposed Development which possessed adequate substrate to support breeding populations of Salmonid fish in particular brown trout *Salmo trutta.* An electrofishing survey was subsequently undertaken in 2009[xxiii] within the Proposed Development to inform the Lochluichart Wind Farm Extension. Seven locations were surveyed using a multi-pass electro-fishing method.

11.35. Through consultation for Lochluichart Wind Farm Extension, the Cromarty Firth Fisheries Board confirmed the absence of migratory fish (salmon) within the Proposed Development. Subsequently further detailed surveys to inform the Proposed Development were not undertaken.

Assessment Methodology and Significance Criteria

11.36. Impact assessment has been undertaken in accordance CIEEM guidelines (2018).

11.37. Ecological Impact Assessment (EcIA) as defined within the Guidelines is 'a process of identifying, quantifying and evaluating the potential effects of development-related or other proposed actions on habitats, species and ecosystems'.

11.38. The process includes the following stages:

- determination and evaluation of important ecological features;
- identification and characterisation of impacts;
- identify significant effects of impacts in the absence of mitigation;
- outline of mitigating measures to avoid and reduce significant effects;
- assessment of the significance of any residual effects after such measures; and,
- identification of appropriate compensation measures to offset significant residual effects.

11.39. In line with CIEEM (2018) an 'Impact' is defined as an action resulting in changes to an ecological feature and 'Effect' is defined as an outcome to an ecological feature from an impact.

Determining Importance

11.40. In accordance with the CIEEM guidelines (2018), an EcIA need only assess in detail, impacts upon important ecological features i.e. those that are considered important and potentially significantly affected by a Proposed Development. It is not necessary to carry out detailed assessment of features that are sufficiently widespread, unthreatened and resilient to project impacts. Where ecological features are not considered important enough to warrant further consideration, or where they will not be significantly affected, these are scoped out of the assessment presented here, with justification for exclusion provided.

11.41. Relevant European, National and Local guidance from governments and specialist organisations has been referred to in order to determine the importance of ecological features. In addition, importance has also been determined using professional judgement and taking account of the results of baseline surveys and the importance of features within the context of the geographical area.

11.42. Importance does not necessarily relate solely to the level of legal protection that a feature receives and ecological features may be important for a variety of reasons, such as their connectivity to a designated site and the rarity of species or the geographical location of species relative to their known range.

11.43. For the purposes of this assessment the importance of an ecological feature is considered within a defined geographical context from Local to International, as outlined below in **Table 11.2**.

Table 11.2 Geographic scale of ecological feature importance.

Importance	Definition
International	An internationally designated site i.e. Special Area of Conservation (SAC) and/or Ramsar site or candidate site (or cSAC). Large areas of priority habitat listed under Annex I of the Habitats Directive, and smaller areas of such a habitat that are essential to maintain the viability of that ecological resource. A regularly occurring, nationally significant population of any internationally important species, listed under Annex II or Annex IV of the Habitats Directive.
National	A nationally designated site e.g. Site of Special Scientific Interest (SSSI), or area meeting criteria for national level designations. Significant extents of a priority habitat identified in the UKBAP / Scottish Biodiversity List, or smaller areas which are essential to maintain the viability of that ecological resource. A regularly occurring, regionally significant population of any nationally important species listed as a UK BAP / Scottish Biodiversity List priority species and Species listed under Schedule 1 or Schedule 5 of the Wildlife and Countryside Act or Annex II or Annex IV of the Habitats Directive.
Regional	Viable areas of key semi-natural habitat identified in the UKBAP. A regularly occurring, locally significant population of any nationally important species listed as a UK BAP / Scottish Biodiversity List priority species and Species listed under Schedule 5 of the Wildlife and Countryside Act or Annex

Importance	Definition
	II or Annex IV of the Habitats Directive. Sites which exceed the local authority-level designations but fall short of SSSI selection guidelines, including areas of semi-natural woodland exceeding 0.25ha.
Local	Sites of Importance for Nature Conservation or equivalent sites selected on local authority criteria. Local Nature Reserves. Other species of conservation concern, including species listed under the Local BAP (LBAP). Areas of habitat or species considered to appreciably enrich the ecological resource within the local context e.g. species-rich flushes or hedgerows. Areas of semi-natural ancient woodland smaller than 0.25ha. All other species and habitats that are widespread and common and which are not present in locally, regionally or nationally important numbers or habitats which are considered to be of poor ecological value (e.g. commercial forestry).

Characterising Impacts

11.44. Once identified, the potential impacts arising from the proposed scheme are described making reference to the following characteristics as appropriate:

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

11.45. The assessment only makes reference to those characteristics relevant to understanding the ecological effect and determining the significance.

11.46. The likelihood or probability that an impact will occur is also described as far as possible based on available information. The likelihood of an impact occurring is referred to throughout this Chapter using the following terms: certain, likely, unlikely or highly unlikely.

11.47. The criteria used to determine the magnitude of impact are set out in **Table 11.3**.

Table 11.3 Impact magnitude.

Magnitude	Description
High	The effect (either on its own or with other proposals) may adversely or positively affect the biodiversity conservation status of a site/population, in terms of the coherence of its ecological structure and function (integrity), across its whole area, that enables it to sustain the habitat, complex of habitats and/or the population levels of species of interest.
Medium	Biodiversity conservation status of a site or population would not be adversely or positively affected, but some element of the functioning might be affected and the effect on the site/population is likely to be significant in terms of its ability to sustain some part of itself in the long term.

Magnitude	Description
Minor	Neither of the above applies, but some minor adverse or beneficial effect is evident on a temporary basis or affects extent of habitat/species abundance in the local area.
Negligible	No observable effect in either direction.

Determining Significance

11.48. For the purposes of EcIA a 'significant effect' is an effect that either supports or undermines biodiversity conservation objectives for 'important ecological features' or for biodiversity in general.

11.49. CIEEM guidelines on ecological impact assessment note that "*A significant effect does not necessarily equate to an effect so severe that consent for the project should be refused planning permission. For example, many projects with significant negative ecological effects can be lawfully permitted following EIA procedures.*

11.50. In broad terms, significant effects encompass impacts on the structure and function of defined sites, habitats or ecosystems and the conservation status of habitats and species (including extent, abundance and distribution).

11.51. Significant effects are expressed with reference to an appropriate geographic scale. For example, a significant effect on a nationally designated site is likely to be of national significance. However, the scale of significance does not necessarily always relate to the importance of an ecological feature. For example, an effect on a species which is considered of national importance may not have a significant effect upon its national population.

11.52. For the purposes of this assessment, the significance of effects are primarily expressed with reference to the regional, national or international scale (as relevant) in line with SNHs interests of species status at wider spatial levels. The significance of effects at a local scale is also assessed where sufficient information allows a meaningful assessment.

11.53. In cases of reasonable doubt, where it is not possible to robustly justify a conclusion of no significant effect, a significant effect has been assumed as a precautionary approach. Where uncertainty exists, this is acknowledged.

11.54. Where the ecological assessment proposes measures to mitigate adverse effects on ecological features, a further assessment of residual ecological effects, taking into account any ecological mitigation recommended, has been undertaken.

11.55. CIEEM (2018) guidelines discourage the use a matrix table as commonly set out in EIA Report Chapters to determine 'significant' and 'non-significant' effects. For the purposes of the assessment presented herein, **Table 11.4** below sets out adapted CIEEM terminology, which also shows the equivalent EIA terms. The following assessment will summarise impacts in accordance with EIA significance terminology to allow consistency with other chapters.

Table 11.4: Significance.

Effect (EIA Significance)		Geographical scale at which residual effect is significant following CIEEM guidelines
Neutral	Negligible	No Significant Effect on ecological integrity or conservation status.
Non-significant	Minor Adverse	Local
Significant	Moderate Adverse	Regional or other local authority area
	Major Adverse	National or International

Assessment of Cumulative Effects

11.56. Potentially significant cumulative effects can result from individually insignificant but collectively significant actions taking place over a period of time or concentrated in a location.

11.57. Cumulative effects have therefore been assessed for ecological features subject to a detailed assessment. The assessment is based on the consideration of residual effects i.e. assuming that proposed mitigation measures (where relevant) are implemented.

11.58. For the purposes of this assessment the potential for significant cumulative effects includes consideration of the Operational Schemes and Corriemoillie only.

11.59. This is considered to provide the most appropriate and informed approach to assessment for development at this locale.

Baseline Conditions

Designated Sites for Nature Conservation

11.60. This section should be read with reference to **Figure 11.0**.

11.61. **Table 11.5** provides a summary of statutory designated sites for nature conservation located within 5km of the Proposed Development boundary, extended to 10km for internationally designated sites.

11.62. Sites designated for ornithological features only are addressed separately in Chapter 12: Ornithology.

Table 11.5 Designated sites for nature conservation.

NNR: National Nature Reserve; SSSI: Site of Species Scientific Interest; SAC: Special Area for Conservation; SPA: Special Protection Area.

Site Name	Distance	Qualifying Features
Beinn Dearg SSSI, SAC, SPA	4.1km	• SSSI Features ○ Breeding bird assemblage ○ Native pinewood ○ Quaternary of Scotland

Site Name	Distance	Qualifying Features
		○ Upland assemblage ○ Vascular plant assemblage • SAC Features ○ Acidic scree ○ Alpine and subalpine calcareous grasslands ○ Alpine and subalpine heath ○ Blanket bog* ○ Caledonian forest* ○ Clear-water lakes or lochs with aquatic vegetation and poor to moderate nutrient levels ○ Dry heaths ○ High-altitude plant communities associated with areas of water seepage* ○ Montane acid grasslands ○ Mountain willow scrub ○ Plants in crevices on acid rocks ○ Plants in crevices on base-rich rocks ○ Species-rich grassland with mat-grass in upland areas* ○ Tall herb communities ○ Wet heathland with cross-leaved heath • SPA Features ○ Dotterel (*Charadrius morinellus*) [Breeding] *Denotes priority feature.
Achanalt Marshes SSSI, SPA	7.8km	• SSSI Features ○ Breeding bird assemblage ○ Flood-plain fen ○ Mesotrophic loch • SPA Features ○ Wood sandpiper (*Tringa glareola*)
Ben Wyvis NNR, SSSI, SAC	8.8km	• SSSI Features ○ Blanket bog ○ Dotterel [Breeding] ○ Dystrophic and olgliotrophic lochs ○ Quaternary geology and geomorphology ○ Upland mosaic ○ Vascular plants. • SAC Features ○ Acidic scree ○ Alpine and subalpine heaths ○ Blanket bog* ○ Clear-water lakes or lochs with aquatic vegetation and poor to moderate nutrient levels ○ Dry heaths ○ Montane acid grasslands ○ Plants in crevices on acid rocks ○ Tall herb communities *Denotes priority feature.
Fannich Hills SSSI, SAC	5km	• SSSI Features ○ Beetles

Site Name	Distance	Qualifying Features
		○ Flies ○ Moine ○ Quaternary of Scotland • SAC features ○ Acidic scree ○ Alpine and subalpine heaths ○ Blanket bog* ○ Clear-water lakes or lochs with aquatic vegetation and poor to moderate nutrient levels ○ Dry heaths ○ Montane acid grasslands ○ Plants in crevices on acid rocks ○ Wet heathland with cross-leaved heath *Denotes priority feature.

Habitats and Vegetation

11.63. A summary of habitats recorded within the Proposed Development is presented below and in Table 11.6. Habitats are discussed with both reference to the Extended Phase 1 habitat survey and NVC survey findings from 2017. Detailed survey results are presented in **Appendix 11.A** and illustrated on **Figures 11.1 and 11.2**.

11.64. The majority of habitats within the Proposed Development comprise large areas of blanket bog and wet heath communities, developing on peat of variable depth. The habitat types correspond to European wet heath and Active raised bog and blanket bog listed on Annex I of the Habitats Directive and also represent priority habitat types for the Ross and Cromarty (East) LBAP.

11.65. Heathland habitat communities present are dominated by varying combinations of deergrass, heather and hare's-tail cottongrass, with peat-forming *Sphagnum capillifolium* and *S.papillosum* present. Occasional small flushes and mires dominated by grasses, rushes and sedges are also present and the Proposed Development is drained by a number of small fast flowing upland streams with stony beds.

11.66. The northern extent of the Proposed Development also supports areas of Scots pine plantation atop areas of blanket bog and wet heath. Plantations remain at a relatively young stage, with some areas of planting appearing unsuccessful as there are remains of dead saplings. The underlying substrate supports a high cover of sphagnum species and other features which would suggest it comprises 'active' bog habitat, as recognised in the Habitats Directive'[1].

11.67. No protected species were found during surveys undertaken in 2015 or 2017; however notable species including Alpine bearberry *Arctostaphylos alpina* (nationally scarce), dwarf birch *Betula nana* (nationally scarce) and lesser twayblade *Neottia cordata* were recorded.

[1] The Habitats Directive only includes 'active' bogs that are typified by a high cover of *Sphagnum*.

Table 11.6 Key habitat summary.

Habitat	NVC Classification
Blanket Bog	The best community match for habitats within the Proposed Development is M17 *Trichophorum cespitosum-Eriophorum vaginatum* blanket mire. This community is typically dominated by *Trichophorum cespitosum*, *Eriophorum vaginatum* and *Eriophorum angustifolium* with *Callluna vulgaris* and *Erica tetralix*. *Sphagnum papillosum* and *S. capillifolium* are the commonest sphagnums whilst *Narthecium ossifragum* and the *Drosera* species are also present in good numbers. The sub-community present is likely to be the Cladonia sub-community M17b. The M17 *Trichophorum cespitosum-Eriophorum vaginatum* community is common and widespread throughout the North West Highlands of Scotland, but is recognised as globally rare (Averis *et.al*., 2004).
Wet Heath	The best community match for wet heath within the Proposed Development is M15 *Trichophorum cespitosum-Erica tetralix* wet heath. This is a ubiquitous community over much of the north and west of Scotland. The community type is dominated by *Calluna vulgaris*, *Erica tetralix*, *Trichophorum cespitosum* and *Molinia caerulea* and has much *Narthecium ossifragum* and *Eriophorum angustifolium* present. The sub-community present on site is M15b typical sub-community. Whilst some grazing is thought to be essential in maintaining the structural and floristic diversity of heathland communities (Averis et. al. 2004), the overabundance of *Trichophorum cespitosum* within the wet heath communities present within the Proposed Development would appear to indicate current overgrazing, particularly by deer.

Protected and Notable Species

Bats

11.68. Plantation woodland located within the Proposed Development comprises immature coniferous woodland that has generally failed to grow on the bog habitats. Trees are largely single stemmed, with narrow leaders and limbs and subsequently lack features which may be used by roosting bats. During surveys to inform the Lochluichart Wind Farm Extension in 2010, no trees with bat roost potential were recorded (assessed as Category 3 in accordance with BCT guidance (2009) applicable at the time). Extended phase 1 habitat surveys undertaken in 2015 and 2017 further confirmed the lack of suitable trees for roosting bats. In addition, studies undertaken for the Corriemoillie identified no structures suitable for bat roost potential within the vicinity of the Proposed Development.

11.69. Baseline activity surveys undertaken for the Corriemoillie recorded very low levels of activity attributable to common pipistrelle *Pipistrellus pipistrellus* and soprano pipistrelle bats *P.pygmaeus*. Desk study records for the wider surrounding area also identified the known presence of brown long-eared *Plecotus auritus* and Daubenton's *Myotis daubentonii* bat within the wider area.

11.70. Bat activity surveys undertaken within the Proposed Development in 2015 also recorded very low levels of activity attributed to common and soprano

pipistrelle. The majority was attributed to common pipistrelle and all activity was recorded in July/August (summer).

11.71. Habitat structure within the Proposed Development was considered to be generally poor for bats, with the open nature lacking suitable foraging and commuting features. Moorland and heathland habitats are typically poor for bats (JNCC, 2001[xxiv]) but wetter areas and particularly under the shelter of plantation forestry can provide some foraging opportunities. Nearby forestry and more sheltered valleys are likely to provide habitat features for bats of the highest value in the local landscape.

11.72. Overall, the Proposed Development is considered to be of low value and risk for bats in accordance with BCT guidance (Hundt, 2012), being relatively open, unsheltered and lacking potential roost sites.

Otter

11.73. Baseline surveys conducted within the Proposed Development to inform the Lochluichart Wind Farm Extension in 2010, and subsequent baseline surveys in 2017, did not identify any evidence indicative of otter presence.

11.74. The species is known to be present locally, as identified during field baseline surveys to inform Corriemoillie, which included spraints at Lochan Dubh Mor and along the Allt a Bheith Oig and its tributaries, which flow alongside and intersect the Proposed Development.

11.75. Whilst, watercourses intersecting the Proposed Development are considered to provide some opportunities for commuting and foraging otters, the absence of potential resting locations and limited existing records for the species locally suggests that the Proposed Development and immediate surrounding area is of little importance for the species.

Pine Marten

11.76. Desk study records reviewed to inform the Lochluichart Wind Farm Extension and Corriemoillie identify the historical presence of pine marten locally within Corriemoillie Forest and along the wooded banks of Loch Luichart. Baseline surveys to inform the consented did however, not record evidence of the species within the Proposed Development or immediate surrounding area.

11.77. A single pine marten scat was recorded within the north of the Proposed Development during survey in October 2017 (Figure 11.5). No further evidence of the species was recorded.

11.78. The Proposed Development is not considered to provide suitable opportunities for den creation, with an absence of favourable features such as rocky outcrops and tree hollows. The most suitable habitats for pine marten locally are located within mature forestry stands beyond the Proposed Development boundary however, the species does occur in a wide range of habitats and some use of the open moorland habitats within the Proposed Development for foraging and commuting is also possible.

Water Vole

11.79. Watercourses within the Proposed Development are considered to provide suitable opportunities for water vole and the species presence has previously been established within the Proposed Development and immediate surrounding area through baseline surveys to inform the Lochluichart Wind Farm Extension and Corriemoillie.

11.80. The species presence was reconfirmed within the Proposed Development during surveys in 2017.

11.81. Evidence of water vole including droppings and burrows has collectively been recorded on the following watercourses within the Proposed Development as shown in **Figure 11.5**:

- Allt Giubhais Mor;
- Unnamed tributary to the Allt na Beinne Leithe Bige;
- Allt na Beinne Leithe Bige;
- Caochan Ban; and
- Eag Odhar.

11.82. It is also assumed that water voles are established to varying degrees on all watercourses throughout the Proposed Development and the species is also likely to utilise minor issues and burns to disperse throughout the Proposed Development and surrounding area.

Badger

11.83. Baseline surveys to inform the Lochluichart Wind Farm Extension and Corriemoillie did not record evidence of badger within the Proposed Development or immediate surrounding area. Desk study records reviewed to inform Corriemoillie do however, identify the historical presence of the species locally.

11.84. No field signs indicating the presence of badgers were identified within the Proposed Development or wider study area. Habitats within the Proposed Development, predominantly comprising open wet moorland heath, provide sub-optimal conditions for sett building.

Red Squirrel

11.85. No evidence of red squirrel was recorded within the Proposed Development or immediate surrounding areas during field surveys to inform Lochluichart Wind Farm Extension and Corriemoillie. Historical records reviewed to inform Corriemoillie do however suggest the presence of the species within the surrounding wider area.

11.86. No signs indicative of squirrel presence were subsequently recorded within the Proposed Development during baseline surveys in 2017. The habitats within the Proposed Development, predominantly comprising open moorland habitats are largely unsuitable for red squirrel. Establishing coniferous woodland plantations within the Proposed Development are currently also considered to provide low habitat suitability for red squirrel; supporting poor drey building opportunities

(typically provided by taller and more mature woodland tracts) and being relatively isolated from more extensive and mature woodland habitats beyond the Proposed Development.

Wildcat

11.87. Desk study records reviewed to inform the Lochluichart Wind Farm Extension and Corriemoillie do not identify the historical presence of wildcat locally. Baseline surveys to inform the Operational Schemes and Corriemoillie also did not record evidence of the species.

11.88. The Strathpeffer Wildcat Priority Area is located approximately 5 km to the south east of the project area. The priority areas were established to identify key target areas for the species, to focus effort on research where they are known to be found.

11.89. No evidence suggesting the presence or potential presence of wildcat was recorded within the Proposed Development during baseline surveys in 2017 and the Proposed Development is not considered to provide suitable opportunities for den creation, such as rocky outcrops, existing mammal holes, tree hollows.

11.90. The predominantly wet nature of habitats within the Proposed Development is also considered to lower the suitability of habitats for the species; wildcats prefer varied habitats on the edge of moorland, forestry plantation, scrub and pasture. The moorland may offer a seasonal food resource of ground nesting birds, amphibians, reptiles and insects; although these items constitute only a small part of a wildcat diet. The forestry plantation in the northern part of the site is likely to offer a source of small mammals such as field vole *Microtus agrestis* which can form a key component of a wildcat diet.

11.91. The species may be present in the surrounding locale and the Proposed Developments habitats may provide some limited foraging as part of a wider territory.

Fresh Water Pearl Mussel

11.92. No evidence of freshwater pearl mussel was recorded during baseline surveys within the Proposed Development in 2010, with the majority of watercourses present considered to provide unsuitable conditions for the species, comprising of mobile cobble or pebble substrate, torrential flows with exposed bedrock sections, or slow flowing peat or silt dominated substrate.

11.93. SNH also hold historic records for the species within the local area (Lochluichart Wind Farm Extension ES) but their presence within the Proposed Development is considered to be unlikely following the erection of the Glascarnoch Dam, which prevents salmonid species passage[2] to the water courses within the Proposed Development.

[2] Presence of salmonid fish and freshwater pearl mussel are synonymous as the species rely on salmonid fish during their larval stage.

Fisheries

11.94. The known distribution of fish in the study area is summarised in the Cromarty Firth Fisheries, Fishery Management Plan (2008[xxv]), which shows the Proposed Development to fall within the Bran sub-catchment area where salmon are known to be absent.

11.95. During consultation for the Operational Schemes, the Cromarty Firth Fisheries Board confirmed the absence of migratory fish (salmon) within the Proposed Development.

11.96. The electrofishing survey identified the presence of brown trout at 6 of the 7 sample points. The survey confirmed all streams within the Proposed Development were subject to major obstacles for fish migration (i.e. hydroelectric dams) and therefore brown trout populations are year-round residents.

Additional Species

11.97. The habitats on Proposed Development, particularly within the north eastern extent, provide a suitable mosaic of habitats for herptiles. The presence of common lizard *Zootoca vivipara* has been confirmed from incidental observations of the species during baseline surveys detailed herein and it is possible that adder *Vipera berus* may also be present.

11.98. No further species are considered likely to be significantly impacted by the Proposed Development.

Embedded Mitigation and Scheme Design Evolution

11.99. Full details of the scheme design evolution and embedded mitigation measures are detailed in Chapter 3 'Project Description'.

11.100. The adoption of embedded mitigation measures to avoid or minimise adverse effects upon ecological features resulting from the proposed scheme has been part of the iterative design process.

11.101. Design consideration and measures to avoid and minimise effects have included:

Land-take

11.102. Existing access tracks will be upgraded where possible to minimise habitat loss.

11.103. Proposed turbine locations, proposed access tracks and infrastructure have been designed to minimise the requirement for land-take and the number of water crossings, reducing the loss of semi-natural and potentially sensitive habitats.

11.104. The scheme design has also sought to avoid sensitive bog habitat, in so far as is possible. Cable connections on the Proposed Development between proposed turbines have also been routed alongside access tracks to minimise any further habitat losses and fragmentation.

Bat Habitat Features

11.105. An 80m keyhole for forestry clearance has been adopted around each turbine. Chapter 16 'Forestry' provides further details of removal. It is not proposed that areas will be re-stocked within the Proposed Development.

11.106. A minimum 50m buffer (from blade tip) was applied to watercourses, woodland edges, and mature trees in so far as possible, to protect potential bat flight lines and areas of higher foraging and commuting interest for bats typically associated with such habitats.

Watercourses

11.107. A minimum 50m buffer between scheme infrastructure was applied around all watercourses so far as possible. The design process reduced the number of watercourse crossings to two.

11.108. Existing knowledge of water voles within the Proposed Development influenced the design of proposed water crossings (see Figure 3.10).

Construction Environmental Management Plan

11.109. A Construction Environmental Management Plan (CEMP) will be in place during the construction, operational and decommissioning phases of the development. The CEMP will include all good practice construction measures, pollution prevention controls and monitoring to be implemented over the course of the development in line with current guidance (SNH, 2015) and as detailed within Chapter 13 "Hydrology and Hydrogeology" of the ES.

11.110. The CEMP will be submitted to THC for approval prior to the commencement of construction works, in consultation with the Scottish Environmental Protection Agency (SEPA) and SNH.

11.111. The CEMP will serve to negate any potentially significant effects upon ecological features as a result of the escape of sediments and pollutants beyond the footprint of the Proposed Development.

11.112.

Fisheries

11.113. Proposed watercourse crossings will comprise bottomless arched culverts in accordance with current SEPA guidance (2010[xxvi]). This will maintain the existing bed substrate, hydraulic connectivity and passage for fish and additional wildlife such as water vole and otter (see Figure 3.9).

11.114. The proposed water crossings will also be of sufficient size so as not to restrict or concentrate flows downstream and to convey flows during periods of heavy rainfall (e.g. 1 in 200 year event plus climate change allowance).

11.115. In addition, as detailed above, the CEMP prepared for the Proposed Development will include all good practice construction measures and pollution prevention controls, to negate potentially significant effects upon the aquatic

environment over the construction phase and operational lifetime of the development.

11.116. A monitoring plan will also be established and incorporated into the CEMP in consultation and agreement with SEPA and local fisheries interest groups. The aim of the monitoring plan would be to characterise baseline conditions prior to construction works commencing and to continue throughout the construction and operational phase to confirm that the mitigation measures with respect to water quality and maintenance of potential fish passages are performing.

11.117. The monitoring plan would also include details of response and remediation measures in the event mitigation measures are found not to be performing.

Important Ecological Features

11.118. A summary of important ecological features is provided in **Table 11.7** below. The level of importance assigned to each species is based upon baseline survey results and, for the purpose of consistency for wind farm development at this locale with reference to EIA documentation for the adjacent Lochluichart Wind Farm Extension and Corriemoillie.

11.119. Features which are unlikely to be affected by the Proposed Development or which are considered sufficiently widespread, unthreatened or resilient to impacts from the Proposed Development, and hence will remain viable and sustainable, have not been subject to a detailed assessment and have been "scoped-out".

11.120. Mitigation measures have however been outlined subsequently for some "scoped-out" features, to ensure legislative compliance.

Table 11.7 Summary of important ecological features.

Ecological Feature	Importance	Scoped in/out detailed assessment
Designated Sites	International/National	The Proposed Development does not form part of any statutory designated site for nature conservation. By virtue of spatial separation and embedded mitigation measures in relation to good practice construction measures and pollution prevention controls (as detailed within Chapter 13 "Hydrology and Hydrogeology") no direct or indirect effects upon ecological qualifying interests of any nationally or internationally designated site for nature conservation will occur. **Scoped out of detailed assessment.**
Habitats	Blanket bog and Wet Heath– Regional Other habitats - Local	Habitat loss within the Proposed Development is minimised through the use of existing access tracks for Lochluichart Wind Farm Extension and Corriemoillie. Direct land-take resulting in some loss of Annex 1 habitat types will be unavoidable

Ecological Feature	Importance	Scoped in/out detailed assessment
		given their widespread nature throughout the Proposed Development. Additional temporary habitat losses are also anticipated to occur during the constructions phase. The potential for indirect effects on adjoining/nearby habitats for example through local changes to hydrology is also considered. **Scoped in to detailed assessment**.
Bats	Local	Bat species likely to be present are considered to be at low risk from wind turbines in accordance with Hundt (2012) guidance. Bat activity recorded during baseline survey in 2015 was very low and attributed to common and widespread species. Overall habitats within the Proposed Development provide low habitat suitability for foraging and commuting bats and provide no roosting opportunities. On the basis of very low bat activity levels recorded (including the absence of Noctule bat), the geographical location, the availability of high value foraging habitat beyond the Proposed Development and the mortality risk to bats arising from the proposed development is considered to be low. Over the long-term, operational effects are unlikely to adversely affect the conservation status of any bat species, and as such are not considered to be significant at any population level. **Scoped out of detailed assessment.**
Otter	Local	Watercourses on Proposed Development are considered to provide suitable opportunities for otters and the species presence has been established within the surrounding areas. Baseline surveys have however, not identified the presence of the species within the Proposed Development and as such no impacts upon the species are predicted. **Scoped out of detailed assessment.** Precautionary mitigation measures are outlined to ensure legislative compliance during the construction phase.
Pine Marten	Local	Habitats with the Proposed Development are largely unsuitable for pine marten and no potential den sites locations have been recorded within the Proposed Development during baseline surveys.

Ecological Feature	Importance	Scoped in/out detailed assessment
		Some occasional use of the open moorland habitats by individual pine martens is likely however, overall habitat losses are Negligible. **Scoped out of detailed assessment.** Precautionary mitigation measures are outlined to ensure legislative compliance during the construction phase.
Water Vole	Regional	Water vole presence has been established within several water courses within and intersecting the Proposed Development. It is also assumed that the species will utilise minor burns and issues to disperse across and beyond the Proposed Development. The proposed development therefore has the potential to result in habitat loss for the species together with destruction of or preventing access to burrows and killing of injuring individuals. **Scoped into detailed assessment.**
Badger	Local	No evidence of the badger presence within the Proposed Development has been recorded during baseline surveys. Habitats present within the Proposed Development are also considered largely unsuitable for sett building. **Scoped out of detailed assessment.** Precautionary mitigation measures are outlined to ensure legislative compliance during the operational phase.
Red Squirrel	Local	No evidence of the red squirrel presence within the Proposed Development has been recorded during baseline surveys and woodland habitats within the Proposed Development are currently considered suboptimal for the species. **Scoped out of detailed assessment.** Precautionary mitigation measures are outlined to ensure legislative compliance during the operational phase.
Wildcat	Local	No evidence of wildcat identified within the Proposed Development and the habitats are largely unsuitable; however habitats may support the species as part of a wider foraging territory. **Scoped out of detailed assessment.** Precautionary mitigation measures are outlined to ensure legislative compliance during the construction and operational phase.

Ecological Feature	Importance	Scoped in/out detailed assessment
Freshwater Pearl Mussel	Regional	Surveys in 2009 did not identify the species within the Proposed Development and the species is considered to be absent. SNH consultation (11/05/2017) agreed that the species can be scoped out of the assessment. **Scoped out of detailed assessment.**
Fisheries	Regional	Brown trout have been established as present within the Proposed Development and Atlantic salmon are considered unlikely to be present due to major migration barriers downstream. The Proposed Development has the potential to directly impact on fish habitats at watercourse crossings. In addition, there may potentially be indirect effects on fish, including downstream from the Proposed Development, where unmitigated works could result in sedimentation or other pollution. Embedded mitigation including the adoption of bottomless culverts for watercourse crossings together with good practice construction measures and pollution prevention controls (as detailed within Chapter 13 "Hydrology and Hydrogeology") are however considered adequate to avoid any potentially significant adverse effects upon local fish populations. **Scoped out of detailed assessment.**
Additional Species	Local	Habitats within the Proposed Development do provide some suitability for reptile species, with common lizard recorded during baseline surveys. The presence of adder is also likely. Overall the predominant habitats within the Proposed Development to be impacted by the proposed scheme, comprising open heathland, provide sub-optimal habitats for reptiles and are extensive within the surrounding wider area. Significant adverse effects upon reptile species are not predicted. **Scoped out of detailed assessment.** Given the protection afforded to individual reptiles against international or reckless killing and injuring reptiles are considered for mitigation, to ensure legislative compliance during the construction and decommissioning phases.

Potential Effects in the Absence of Mitigation

11.121. This section identifies the potential effects upon habitats and water vole in the absence of non-embedded design mitigation in relation to the construction and operational phases of the Proposed Development.

11.122. Impacts arising from the decommissioning phase of the wind farm have not been presented in detail because they are considered to be of a similar nature to the construction issues identified but of a smaller scale and shorter duration. Therefore, effects arising from decommissioning are anticipated to be broadly similar in nature to, but of a lower level effect than, those arising during construction phase.

Habitats

11.123. There are three main ways by which habitat features may be affected during the construction phase:

- Direct loss – to accommodate the Proposed Development infrastructure. These losses are considered permanent in the context of this assessment;
- Disturbance – the effects of disturbance are variable in their extent, depending on the nature of the disturbance and sensitivity of the habitat feature. Some disturbance types (for example, creation of temporary hard standing areas at the contractor's compound) result in medium - to long-term disturbance which require extended recovery periods. In other cases (for example, installation of cables at the sides of access tracks, traversing of machinery) disturbance is short-term, and certain habitat types are able to recover quickly; and
- Indirect effects – these primarily relate to changes in hydrology of wetlands in the context of a wind farm development, the potential for runoff, erosion and sedimentation, along with pollution which may result in the event of contaminant spillage.

11.124. The potential for effects upon the hydrological supporting conditions of bog, water quality, soils and peat as a result of surface and groundwater flows, sediment and contaminant discharges, soil loss, erosion and compaction are detailed within Chapter 13 "Hydrology and Hydrogeology". Overall potential effects upon the aquatic environment are considered to be highly localised and mitigated through sensitive scheme design, standard best practice construction methods and pollution prevention controls in accordance with current guidance. As such habitat deterioration effects are not discussed further within this assessment.

11.125. The areas of plantation forestry are considered synonymous with the bog and wet heath habitats due to their poor nature. The plantation itself is considered to be of negligible value.

Construction Effects

11.126. The total footprint of the Proposed Development i.e. the area to be permanently lost under the surface footprint of the proposed turbine hardstandings, access track and associated infrastructure is approximately 8.37ha. This constitutes approximately 1.4% of the total Proposed Development (596ha).

11.127. An additional 15.8ha will be affected during the construction phase to facilitate construction working areas.

11.128. A summary of habitats to be lost permanently under the built footprint of the Proposed Development is provided in **Table 11.8**.

Table 11.8: Permanent habitat losses.

Phase 1 Habitat Type	Area Lost	Corresponding NVC Community
Blanket bog	2.45ha	**M17**
Wet heath	5.82ha	**M15**

11.129. A total of 8.27 ha of Annex 1 habitats, comprising blanket bog (M17) and wet heath (M15) habitats, will be lost permanently during construction (**Figure 11.1 and 11.2**). This represents a very small loss in the total area of these habitats remaining both within the Proposed Development and the surrounding area. Thus, the impact will be minor and unlikely result in a significant effect in a local context.

11.130. Habitats of local importance would also not be considered significant in the context of their availability within the Proposed Development and local area.

11.131. The notable plant species (alpine bearberry, dwarf birch and lesser twayblade) are all located within blanket bog habitat and the loss of this habitat may also result in the reduction of these species in the Locale, albeit at a low level.

11.132. Indirect physical effects arising from the development (such as alterations to drainage patterns) will be limited by the adoption of proven construction techniques that minimise environmental damage and maintain the integrity of the peatland system. This will include the use of floating roads where the tracks cross hydrologically sensitive areas of deeper peat. Full details are presented in Chapter 13.

11.133. During the construction phase an additional 15.8ha of onsite habitat disturbance will also occur. This area is based on a 30m corridor around the permanent footprint of the development, required for construction working areas, construction compounds, temporary laydown areas, drainage and cabling. Habitats primarily affected will be blanket bog (M17) and wet heath (M15).

11.134. These habitats will be reinstated following the completion of construction works in accordance with HSPPs, and as such losses would be considered short-term and reversible. Subsequently the impact will be of negligible/minor magnitude and therefore not significant.

11.135. The on-site habitats to be lost both permanently and temporarily as a result of the Proposed Development are considered to be widespread habitats throughout the Northern Highlands.

Operational Effects

11.136. During the operational phase there will be a small increased risk of runoff and pollution however, this considered to be mitigated through scheme design and

the implementation of pollution prevention measures during any maintenance works.

11.137. Any impact is considered to be of negligible magnitude and effects would be not significant at any geographical scale.

Decommissioning Effects

11.138. The potential decommissioning effects are considered to be of a similar nature as temporary habitat losses incurred during the construction phase, and as such will not be significant.

Water Vole

11.139. The presence or potential presence of water vole has been established at several locations along watercourses within intersecting the Proposed Development. It is also assumed that the species will utilise minor burns and issues to disperse across the Proposed Development and into the wider area.

Construction Effects

11.140. The construction of the Proposed Development has the potential to impact upon water voles and lead to a population level effect at a local level as a result of:

- Habitat loss and deterioration;
- Habitat fragmentation;
- Incidental mortality and disturbance; and,
- Pollution.

11.141. The spatial extent over which works will be occurring is considered to be highly localised and is only likely to impact upon a small number of individual water vole territories.

11.142. The construction of 2No. water course crossings as shown in **Figure 11.1 and 11.2** will require the permanent loss of approximately 10m of ditch bank habitat (10m assumed either side of the ditch) available for potential use by the established water vole population within the Proposed Development.

11.143. In the context of remaining available and suitable habitat for water voles within the Proposed Development and locally, the effects of the Proposed Development are not anticipated to be significant and will not affect the favourable conservation status of the species.

11.144. The design and number of crossings can result in the severance of habitats and restriction of movement for water voles from these territories along watercourses within the Proposed Development. Two unavoidable crossings are required on burns supporting water voles. Without mitigation, habitat fragmentation is considered certain, permanent and largely irreversible and an impact of medium magnitude and significant on local water vole populations.

11.145. The construction of water course crossings has the potential to result in the damage or destruction of water vole burrows and/or killing or injuring of

individual water voles. The mobility of the species allows for escape and as such loss of life is considered to be unlikely and comprise no more than a minor/medium magnitude impact and significant effect on local water vole populations.

11.146. Noise and visual disturbances are generally considered unlikely to have any significant impacts upon water voles (Dean *et al*., 2016) however, should disturbances occur to the point at which a water vole may potentially abandon its burrow, this would constitute a breach of the provisions of the Wildlife and Countryside Act 1981 (as amended in Scotland).

11.147. The potential for effects upon water voles as a result of the escape of sediments and pollutants into the surrounding aquatic and terrestrial environment is considered to be adequately mitigated through embedded sensitive scheme design, standard best practice construction methods and pollution prevention controls in accordance with current guidance, as detailed within Chapter 13 "Hydrology and Hydrogeology".

11.148. Mitigation measures are required and are outlined to ensure legislative compliance during the construction phase.

Operational Effects

11.149. No potentially significant effects to water voles during the operational phase are anticipated.

Decommissioning Effects

11.150. Decommissioning phase effects upon water vole as a result of habitat loss, deterioration, incidental mortality and disturbance are considered to be largely consistent with construction phase impacts and would not be Significant.

11.151. Mitigation measures are however required and are outlined to ensure legislative compliance.

Mitigation

Ecological Clerk of Works

11.152. A suitably qualified and experienced Ecological Clerk of Works (ECoW) will be appointed prior to the commencement of construction activities and through whom appropriate ecological advice will be provided throughout the construction phase.

11.153. The ECoW will be responsible for undertaking and/or co-ordinating checks for protected species before construction activities commence. The ECoW (or appointed 'clerks' on behalf of the ECoW) will also maintain a watching brief as necessary throughout the construction phase to ensure compliance with relevant legislation.

11.154. The detailed scope of the role and responsibilities of the ECoW will be agreed in consultation with THC and SNH.

Protected Species

11.155. Pre-construction surveys for protected species will be undertaken no more than 6 months before commencement of construction. Surveys will be undertaken in accordance with current survey guidance within the working areas and appropriate buffers.

11.156. Updated ecological information obtained from the pre-construction protected species' surveys will be used to inform and guide the implementation of Species Protection Plans (SPPs) or species-specific mitigation plans, identification of any licencing requirements and appropriate mitigation (including micro-siting) if required.

11.157. SPPs will be designed to provide the contractor and ECoW with approved methodologies and mitigation measures for carrying out certain activities and will be agreed through consultation with THC and SNH.

Water Vole

11.158. Water voles are protected in Scotland under the provisions of the Wildlife and Countryside Act 1981 (as amended). The species is listed on Schedule 5 of the Act and is protected under Section 9, which makes it an offence to:

- Damage, destroy or obstruct access to a water vole burrow; or
- Disturb a water vole whilst it is using its burrow.

11.159. The layout of the Proposed Development has been optimised in so far as has been possible to avoid construction activities occurring in close proximity to the watercourse network within the Proposed Development and the requirement for watercourse crossings.

11.160. Two watercourse crossings are however unavoidable to permit an operational development and will therefore likely result in the damage or destruction of burrows and/or disturbance of water voles within their burrows.

11.161. A Water Vole SPP will be prepared for the development in accordance with Dean *et al*. (2016) and SNH (2017e) guidance. Mitigation measures will include a 10m exclusion zone around active water vole burrows, informed by the pre-construction survey. If this cannot be achieved, a licence from SNH may be required.

11.162. Water vole populations are highly dynamic with the potential for individual water voles to establish or abandon territories in relatively short spaces of time. As such, the SPP will be finalised in consultation with THC and SNH following a pre-construction water vole survey undertaken (as above) in accordance with current guidance.

11.163. Water vole monitoring will be undertaken in the first three years of operation to establish if water vole colonies have been affected by the wind farm extension development. Remedial measures and/or habitat enhancement measures can be proposed based on monitoring results.

Reptiles (and Amphibians)

11.164. Common reptiles are afforded partial protection under Schedule 5 of the Wildlife and Countryside Act 1981(as amended). This makes it an offence to "intentionally or recklessly kill or injure" a reptile.

11.165. Common lizard and adder are the only reptile species likely to be found during construction works associated with the scheme, with only incidental observation of common lizard recorded during baseline surveys.

11.166. A SPP will be prepared for reptiles (and amphibians) prior to the commencement of construction activities. The SPP will detail measures to be implemented during construction activities to protect reptiles (and amphibians encountered) from harm during the construction of the scheme. This will be agreed in consultation with SNH and THC.

11.167. The SPP will also detail emergency procedures to be implemented by site workers in the event reptiles are encountered during works.

General construction-related mitigation

11.168. The following actions are recommended to mitigate the ecological impacts associated with the development:

1. Works directly affecting watercourses, where a pre-construction survey indicates there is good quality water vole breeding habitat will be undertaken outwith the water vole breeding season (March to September; in upland habitat and depending on weather conditions the breeding season may be shorter).

2. Site staff will be provided with information regarding the site's ecological sensitivities. This will be implemented as part of the health and safety induction and appropriate text can be prepared by the ECoW to be read by the induction manager.

3. Site compounds/material storage areas will be located as far as possible from the watercourses and all watercourses will be out of bounds to construction personnel (refer to guidelines in point 4 below).

4. SEPA Guidance for Pollution Prevention (GPP)[xxvii] will be applied during works to prevent watercourse pollution.

5. Temporary lights, if used during construction, will be properly directed and fitted with shades to prevent light spillage outwith the working area. Temporary lights should not illuminate watercourses or the woodland edge on the eastern boundary or in the north part of the site.

6. Holes (e.g. that may be present to lay infrastructure) will be covered at the end of each working day or a wooden plank placed inside to allow a mammal (e.g. otter) to escape, should it enter the hole. Any temporarily exposed open pipe system should be capped in such a way as to prevent animals gaining access.

7. In the event that a protected species is discovered on site all work in that area will stop immediately and the ECoW contacted. Details of the local police Wildlife Crime Officer, SNH Area Officer and Scottish Society for the Prevention of Cruelty to Animals (SSPCA) officer will be included in site emergency procedure documents.

8. The loss of blanket bog habitat is an unavoidable consequence of the development. Further, incidental losses of habitat will be avoided by minimising the footprint of the construction activity. This will be achieved by operating machinery and storing materials within the footprint of permanent construction features wherever practicable, such as the access tracks and crane pads, for example. This will also be reinforced through appropriate training of the site staff and by ensuring that vehicles and their operators do not inadvertently stray onto adjacent habitat areas.

Residual Effects

11.169. Providing the implementation of mitigation measures is carried out, including those measures embedded into the scheme design, no significant residual effects are anticipated.

Cumulative Effects

11.170. In accordance with SNH guidance (2012), a cumulative impact assessment need only be sought where it is considered that a proposal could result in significant cumulative impacts.

11.171. Notwithstanding, the nearby Corriemoillie Wind Farm is located within a different catchment to the Proposed Development and predicted effects of the other Operational Schemes were determined to be of low (minor) significance. Likely impacts of the Proposed Development will not extend beyond the boundaries of the Proposed Development and subsequently no potentially significant cumulative effects upon ecological features are reasonably predicted to occur.

Summary of Effects

11.172. No potentially significant effects upon ecological features resulting from the Proposed Development alone or in-combination are identified.

11.173. Mitigation measures are included for the construction phase of the development for habitats and water voles and to ensure legislative compliance for other protected species. Providing implementation, no breach of the provisions of the relevant legislation will occur.

Table 11.9 Summary table of effects upon the recorded ecological features.

Feature	Proposed Activity	Characterisation of unmitigated impact upon feature	Significance without mitigation and confidence level	Mitigation and Enhancement	Residual significance of effect and confidence level (following mitigation)
Habitats	Construction and operation of the site infrastructure and construction-related mobilisation or release of contaminants.	Loss of 8.37ha or 1.4% and reduction in habitat quality.	Negative, permanent. Minor magnitude. Non-Significant effect.	CEMP and Pollution Prevention Measures.	Not significant
Water Vole	Construction related earthworks	Habitat loss	Negative, permanent, minor/negligible magnitude impact. Non-significant effect.	Install arched culverts instead of piped culverts. Micro-siting to avoid water vole burrows.	Not significant
		Habitat severance	Negative, permanent, medium magnitude impact. Significant effect.	Install arched culverts instead of piped culverts. Micro-siting to avoid water vole burrows.	Not significant

Feature	Proposed Activity	Characterisation of unmitigated impact upon feature	Significance without mitigation and confidence level	Mitigation and Enhancement	Residual significance of effect and confidence level (following mitigation)
		Pollution of aquatic habitats	Negligible magnitude impact and non-significant effect.	Apply SEPA GPP. Place compounds as far as possible from watercourses.	Not Significant.
		Loss of life	Permanent, medium magnitude impact. Significant effect.	Mitigation licence may be required from SNH. All works to be completed in full accordance with any licence issued. Stop works if a water vole is observed and seek advice from EcoW. Place ramps in open trenches and cap pipes to stop fauna entering and becoming trapped.	Not significant.
	Construction-related noise, vibration and lighting.	Physical disturbance	Negligible magnitude impact and non-significant effect.	Use of shades to prevent illumination of watercourses or woodland edges. Stop works if a protected species is observed and seek advice of ECoW.	Not significant.

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