

## Technical Appendix

# Drummarnock Wind Farm

## Technical Appendix 6-1: Extended Phase 1

Drummarnock Wind Farm Limited

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## Glossary of Terms

Term	Definition
Baseline Condition	The ecological status of the environment at the time of survey, prior to any works taking place.
Designated sites	Nature sites and areas of countryside can be 'designated', which means they have special status as protected areas because of their natural and cultural importance.
Habitats Directive	Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (as amended)
Local Nature Conservation Sites	Locally important natural heritage that could be damaged by development.
Potential Local Nature Conservation Sites	Areas being identified as having important natural heritage but have not received official designation.
Protected Area	A clearly defined geographical space, recognized, dedicated, and managed through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values.
Ramsar	Ramsar sites are designated under the Ramsar Convention on Wetlands (Ramsar 1971), which requires signatories to maintain the ecological character of their internationally important wetlands.
Sites of Special Scientific Interest (SSSI)	Sites designated by Statutory Nature Conservation Organisation (SNCO) under the Wildlife and Countryside Act 1981 (as amended) as areas of land of special interest by reason of any of their flora, fauna, or geological or physiographical features.
Special Area of Conservation (SAC)	An area selected to protect one or more special habitats and / or species – terrestrial or marine – listed in the Habitats Directive.
Special Protection Area (SPA)	An area selected to protect one or more rare, threatened, or vulnerable bird species listed in Annex I of the Birds Directive, or for certain regularly occurring migratory species.

## List of Abbreviations

Acronym	Full Term
CIEEM	Chartered Institute of Ecology and Environmental Management
EIA	Environmental Impact Assessment
EIA	Environmental Impact Assessment
GWDTE	Ground Water Dependant Terrestrial Ecosystems
JNCC	Joint Nature Conservation Committee

Km	Kilometres
LERC	Local Environmental Records Centre
LERC	Local Environmental Records Centre
LNCS	Local Nature Conservation Site
LNR	Local Nature Reserve
Ltd	Limited
M	Metres
NGR	National Grid Reference
NNR	National Nature Reserve
NVC	National Vegetation Classification
pLNCS	Potential Local Conservation Site
SAC	Special Area of Conservation
SBL	Scottish Biodiversity List
SSSI	Site of Special Scientific Interest
TN	Target Note
TWIC	The Wildlife Information Centre

# 1 Introduction

## 1.1 Terms of Reference

This report presents the findings of an Extended Phase 1 survey to establish the non-avian ecological baseline condition at a Site located at Drummarnock, Stirlingshire located at National Grid Reference (NGR) NS 75471 87114, circa 10km southwest of Stirling, in the Fintry, Gargunnock and Touch Hills (as shown in Figure 1-1).

The site is associated with a proposed windfarm consisting of four turbines at up to 180m to tip height along with associated infrastructure and access tracks (the Proposed Development).

The survey was conducted in February 2023 following previous surveys in May 2020 and the report updated in April 2024 to reflect design freeze of the Proposed Development.

This report is presented as a Technical Appendix to Chapter 6: Ecology of the Environmental Impact Assessment (EIA) Report. It should be read in conjunction with that Chapter and the following technical appendices:

- Appendix 6-2: NVC Survey;
- Appendix 6-3: Bat Surveys; and
- Appendix 6-4: Protected Species Survey.

## 1.2 Objectives

The principal objectives of this report are:

- To report on the results of an Extended Phase 1 habitat survey undertaken to describe the baseline ecological status of the Proposed Development, including an appropriate buffer; and
- To report on the results of an ecological desk study.

## 2 Methodology

### 2.1 Desk Study

A review of online data was undertaken 22<sup>nd</sup> March 2023, following a previous review in May 2020, to gather details of statutory nature conservation designations up to 10km of the site, e.g., Special Protection Areas (SPAs), Special Areas of Conservation (SACs), Ramsar sites, Sites of Special Scientific Interest (SSSIs), National Nature Reserves (NNRs) and Local Nature Reserves (LNRs).

The Proposed Development is located within an area covered by The Wildlife Information Centre, a local environmental records centres (LERC), which was contacted for the following information from the approximate centre of the Proposed Development;

- Non-statutory designated sites up to 3km;
- Protected species records/records of high conservation significance (Scottish Biodiversity List, Schedule species from the Wildlife and Countryside Act 1981, local Biodiversity Action Plan species for up to from the centre of the Proposed Development); and
- Records of mobile species (bats – 10km).

### 2.2 Extended Phase 1 Habitat Survey

An extended phase 1 survey was carried out in May 2020 and refreshed in February 2023 within the Proposed Development Site as shown on Figure 6-1-1. This area comprises the Site Boundary for the Proposed Development.

The survey involved mapping areas of habitat greater than 0.1ha and listing target notes to describe significant features as per JNCC (2010). These included features with the potential to support protected or otherwise notable species that may require further survey.

- Provides a preliminary evaluation of the nature conservation significance of the site and assesses the potential for impacts on habitats/species likely to represent a material consideration in planning terms; and
- Determines the scope of further specialised surveys that may be required to inform an ecological impact assessment.

All field signs were geo-referenced with a handheld global positioning system (GPS) device and notes were taken regarding findings. Signs of potential interest were bat roost potential, otter, water vole, and badger.

#### 2.2.1 Limitations

There are not considered to be any limitations to the 2020 or 2023 surveys as they were carried out in good weather, in the optimal growing period, and access was fully available within the Proposed Development Site.

## 3 Baseline

### 3.1 Desk-top Study

The MAGIC website (Defra, 2023) and Sitelink (NatureScot, 2023) were used to search for Statutory designated sites for ecological features within 10km of the site (Figure 6-1-1). In total 12 sites were identified, 10 Sites of Special Scientific Interest (SSSI) and two Special Areas of Conservation (SACs). These are shown in Table 6-1-1 below.

**Table 6-1-1: Statutory Designated Sites**

Designated Sites	Designated Feature	Distance from Proposed Development Site
Carron Glen SSSI	Lowland neutral grassland Upland mixed ash woodland Upland oak woodland	2km
Denny Muir SSSI	Basin fen Blanket bog Subalpine acid grassland	4km
Balquhiddelock Wood SSSI	Wet woodland	5km
Endrick Water SSSI	Brook lamprey <i>Lampetra planeri</i> River lamprey <i>Lampetra fluviatilis</i> Scottish dock <i>Rumex aquaticus</i>	6km
Endrick Water SAC	Atlantic salmon <i>Salmo salar</i> Brook lamprey <i>Lampetra planeri</i> River lamprey <i>Lampetra fluviatilis</i>	6km
Double Craigs SSSI	Subalpine calcareous grassland	8km
River Teith SAC	Atlantic salmon <i>Salmo salar</i> Brook lamprey <i>Lampetra planeri</i> River lamprey <i>Lampetra fluviatilis</i> Sea lamprey <i>Petromyzon marinus</i>	8km
Wester Moss SSSI	Raised bog	8km
Abbey Craig SSSI	Beetle assemblage Upland mixed ash woodland	9km
Dullatur Marsh SSSI	Hydromorphological mire range	9km
Ochertyre Moss SSSI	Raised Bog Spider <i>Heliophanus dampfi</i>	9km
Firth of Forth SSSI (ecological receptors are listed only)	Beetle assemblage Lowland neutral grassland Maritime cliff Mudflats Northern brown argus <i>Arcicia Artaxerxes</i> Saline lagoon	10km

Designated Sites	Designated Feature	Distance from Proposed Development Site
	Saltmarsh Sand dunes Transition grassland Vascular plant assemblage	

A review of non-statutory designated sites was undertaken within 3km from data received from the LERC. No sites were identified but twelve potential Local Nature Conservation Sites (pLNCS) were found, as per Figure 6-1-2. No information was provided by TWIC for these.

Distances are from the closest part of the Proposed Development to the pLNCS as shown on Table 6-1-2.

**Table 6-1-2: Potential Local Nature Conservation Sites**

pLNCS	Distance from Proposed Development Site
Bannoch Burn pLNCS	Intersects north of site
North Cliffs pLNCS	Intersects northeast of site
North Third Reservoir pLNCS	0.3km north
Loch Coulter Burn pLNCS	0.03km east
Loch Coulter pLNCS	0.1km southeast
Sauchieburn Woods pLNCS	1.9km northeast
Old Sauchiemill pLNCS	2km northeast
North Third woods pLNCS	1.8km north
Touch Moor pLNCS	2km north
Touch Hills pLNCS	2.2km north
Bard wood pLNCS	2.4km east
Carron Valley pLNCS	3km south

Table 6-1-3 comprises European protected species and species of conservation interest within 3km of the centre of the Proposed Development Site and up to 10km for bat species from the last ten years. Species of conservation interest are defined as those on the Scottish Biodiversity List. Each species may be associated with multiple records within the data as provided by the Local Record Centre.

Target species were identified as those that are either afforded specific legislative protection (i.e., of high conservation interest) or represent qualifying interests in designated sites in the immediate wider area.

**Table 6-1-3: Protected Species Historical Records**

Species	Summary or Records
Eurasian Otter <i>Lutra lutra</i>	1 record 2.31km south in 2015
Eurasian Badger <i>Meles meles</i>	2 records 1.5km north in 2020
Red Squirrel <i>Sciurus vulgaris</i>	2 records 1.6km north in 2013
Brown long-eared Bat, <i>Plecotus auritus</i>	1 record 8.3 km south-east in 2016
Myotis Bat Species <i>Myotis</i>	2 records 2.9km south in 2016
Natterer's Bat <i>Myotis nattereri</i>	1 record 7 km south-east in 2016 1 record 7.7 km south-east in 2016 2 records 2.9 km south-east in 2016



Species	Summary or Records
Daubenton's Bat, <i>Myotis daubentonii</i>	4 records 7km south-east in 2016 1 record 8.3km north-east in 2019 2 records 6.8km south-east in 2016 1 record 7.7km south-east in 2016 1 record 8km south-east in 2016
Common Pipistrelle <i>Pipistrellus pipistrellus</i>	3 record 7km south-east in 2016 4 records 8.3km north-east in 2015 6 records 8.3km south-east in 2016 2 records 5.2km south-east in 2014 4 records 7.3km south-east in 2016 4 records 8.1km south-east in 2016 2 records 7.2km south-east in 2016 2 records 6.8km south-east in 2016 2 records 7.7km south-east in 2016 2 records 8km south-east in 2016 1 record 5.5km north-east in 2016 3 records 2.9km south-east in 2016
Pipistrelle <i>Pipistrellus pipistrellus sensu lato</i>	4 records 7km south-east in 2016 5 record 8.3km south-east in 2016 3 records 7.3km south-east in 2016 1 record 8.1km south-east in 2016 1 record 6.8km south-east in 2016 1 record 7.7km south-east in 2016 1 record 8km south-east in 2016 1 record 5.5km north-east in 2016 2 records 2.9km south-east in 2016
Soprano Pipistrelle <i>Pipistrellus pygmaeus</i>	6 records 7km south-east in 2016 4 records 8.3km north-east in 2015 6 records 8.3km south-east in 2016 2 records 5.2km south-east in 2014 1 record 9.8km west in 2016 4 records 7.3km south-east in 2016 4 records 8.1km south-east in 2016 2 records 7.2km south-east in 2016 2 records 6.8km south-east in 2016 2 records 7.7km south-east in 2016 1 record 8km south-east in 2016 1 record 5.5km north-east in 2016 2 records 2.9km south-east in 2016

Considering the habitats which appear to be present from aerial photos and previous records identified, the capacity for protected species seems to be limited. The absence of any forestry on or near infrastructure within the Proposed Development Site further limits the potential for presence of protected species.

As a result, otter *Lutra lutra*, water voles *Arvicola amphibious* and bats are likely to be the protected species requiring consideration. Reptiles are likely to be present but can generally be managed through mitigation.

There is a small chance pine marten *Martes martes* could use the woodland to the northeast of the Proposed Development Site and badger *Meles meles* could forage onto it, however no signs were found during surveys.

The desk top search identified an impassable waterfall downstream of the Proposed Development Site; as such, effects on migratory fish is scoped out of the assessment.

### 3.2 Extended Phase 1 Survey Results

The Proposed Development Site is bounded by New Line Road to the east and an unnamed track south of Earl's Hill in the west. The eastern side is dominated by fields forming part of a working farm, which is upon the Proposed Development Site. The ground rises to the west to a peak of 373m from c.206m on the eastern side.

The marshy grassland which dominates in the east appears to be former grazing land which has been out of use for some time and has therefore reverted to this habitat. In the eastern fields and along the north-eastern section of the farm, young conifer plantation has been established (Figure 6-1-3, TN14 and 15) however it is young and not yet the dominating habitat.

Poor semi-improved acid grassland and improved grassland is also present, the latter focused near the farm buildings. Soft rush *Juncus effusus*, red fescue *Festuca rubra* and Yorkshire fog *Holcus lanatus* dominate the marshy grassland.

Tufted hair-grass *Deschampsia caespitosa* and crested dogtail *Cynosuros cristatus* occurring occasionally. Artificial drainage channels occur on the lower ground, many of which have a peaty substrate. The west is dominated by a mosaic of blanket bog, dry dwarf shrub heath, unimproved acid grassland and acid flushes.

Wetter habitats are concentrated around the Buckie and Bannock burns which flow within and adjacent the site (respectively) and in an easterly direction. Wet modified bog, wet dwarf shrub heath and small swamps are also present though to a lesser extent.

Blanket bog is dominated by heather *Calluna vulgaris*, hairs-tail cottongrass *Eriophorum vaginatum* and mosses including *Sphagnum capillifolium*, *S.fallax* and *Polytrichum* and *Rhytidialephus* spp.

Transitions to dwarf heath habitats contain a greater density of purple-moor grass *Molinia caespitosa* and non-sphagnum mosses. On the exposed drier elevations unimproved acid grassland is dominated by mat grass *Nardus stricta*, bent grasses *Agrostis* spp. with occasional heath bedstraw *Galium saxatile*.

Acid flushes are herb poor and dominated by soft rush, *S.capillifolium*, *S.fallax* with occasional *S.papillosum* and *Polytrichum* spp.

Additionally, there is a small patch of bracken *Pteridium aquilinum* scrub in the southern border of Proposed Development Site.

## 4 References

Defra, (2020) (<https://magic.defra.gov.uk/MagicMap.aspx> accessed 28/07/2023).

JNCC, (2010), Handbook for Phase 1 habitat survey – a technique for environmental audit, JNCC, Peterborough.

NatureScot, (2023) (<https://sitelink.nature.scot/home> accessed 28/07/2023)

Scottish Government. (2017). The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017. [Online] Available at:  
<http://www.legislation.gov.uk/ssi/2017/102/contents/made> [Accessed 26/02/19].

## 5 Appendices

### Appendix A. Target Notes

**Table 6-1-3: Protected Species Historical Records**

Number	Description	Eastings	Northin g	Grid Reference
1	Open water pool	275744	686735	NS75744867 35
2	Open water pool	275133	687350	NS75133873 50
3	Moderate BRP ash tree	273870	686662	NS73870866 62
4	Group of four moderate BRP ash trees	273835	686665	NS73835866 65
5	Bridge with fissures within gabion supports, suitable for small numbers of roosting bats	273811	686684	NS73811866 84
6	Moderate BRP ash tree	273600	686739	NS73600867 39
7	One high BRP ash tree. Main stem snapped in half, large cavity	273635	686726	NS73635867 26
8	Assumed high BRP given age and design. Close inspection not possible.	275554	687121	NS75554871 21
9	Low/mod BRP based on pitched roof visible from aerals. Close inspection not possible.	275539	687119	NS75539871 19
10	Flush	272114	687211	NS72114872 11
11	Dry modified bog, no sphagnum, polytrichum sp. Dominates.	272315	687716	NS72315877 16
12	Flush	272914	687956	NS72914879 56
13	Open water pool	274599	687124	NS74599871 24
14	Mosaic B5/A1.2.2	275826	687518	NS75826875 18
15	Mosaic B5/A1.2.2	275881	686856	NS75881868 56
16	Pond	275367	687546	NS75367875 46
17	Low potential bat features in tree	275408	687171	NS75408871 71