

Technical Appendix 7.1: National Vegetation Classification & Habitats Survey Report

Revised Larbrax Wind Farm
EIA Report
National Vegetation
Classification & Habitats Survey

Technical Appendix 7.1

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1 INTRODUCTION

MacArthur Green was commissioned by the Applicant to carry out a National Vegetation Classification (NVC) and habitats survey at the Revised Larbrax Wind Farm, hereafter referred to as the ‘Proposed Development’.

The aim of the NVC survey is to identify and map the vegetation communities present within the Site in order to identify those areas of greatest ecological interest (i.e., Annex I habitats¹; potential Groundwater Dependent Terrestrial Ecosystems (GWDTE); and Scottish Biodiversity List (SBL) priority habitats). This information is used to inform the wind farm design process and the ecological assessment for the Proposed Development’s Environmental Impact Assessment Report (EIA Report).

This report details the findings of the NVC surveys together with an evaluation of those communities described.

2 THE SITE AND SURVEY AREA

2.1 Overview

The Proposed Development is located 9 km west of Stranraer and lies wholly within the Dumfries and Galloway administrative area.

The Site is located within the north-west of the North Rhins Peninsula. The Site slopes gently from east to west towards the coast and is therefore relatively low-lying. The eastern section of the Site lies inland and is mostly flat. This part of the Site undulates gently and is characterised by a pattern of smooth hills and valleys. This section of the Site includes various relative high points such as Hind Hill on Galdenoch Moor of 82 m Above Ordnance Datum (AOD)) as well as an unnamed hill of 83 m AOD on Larbrax Moor. The northern and southern parts of the Site are characterised by steeper slopes. The western part of the Site lies on the coast and is characterised by sloping hills towards the coast with some steeper slopes present at Salt Pans Bay as well as steep cliffs of varying height.

Land cover within the Site primarily consists of improved and semi-improved pasture with some areas of mire and marshland, woodland planting and shelterbelts and some areas of exposed rock/cliff on the western part of the Site. Woodland coverage is generally limited to small plantations used as shelterbelts. A number of minor watercourses and field ditches drain the Site, generally flowing west out to the North Channel. The Site is primarily used for agriculture and livestock grazing. The Proposed Development is fully described within **Chapter 4: Development Description** of the EIA Report.

The survey area in which NVC surveys were undertaken equated to the entirety of the Site boundary, covering approximately 345 hectares (ha).

¹ As defined by the Council Directive 92/43/EEC on the Conservation of natural habitats and of wild fauna and flora – the ‘Habitats Directive’.

2.2 Designated Sites

There is one designated site containing habitat related, or botanical, qualifying features within 5 km of the Site. The details of, and relevant qualifying features for, the designation relevant to this Appendix is detailed in **Table 2-1**; see also **Figure 7.1**.

Table 2-1 Designated sites with botanical qualifying features within 5 km of the Site

Designated Site	Distance from Site boundary & nearest new infrastructure (m)	Qualifying Feature	Last Assessed Condition & Date
Salt Pans Bay Site of Special Scientific Interest (SSSI)	Within the Site; 70 m from access track to T1	Maritime cliff	Favourable Maintained 28/08/2002

2.3 Ancient Woodland

There are no areas of ancient woodland (as present on the Ancient Woodland Inventory (AWI)) within the Site; however, there are areas of ancient woodland within 5 km of the Site, the closest being an unnamed stand of long-established woodland of plantation origin approximately 787 m east of the Site and located north of Topmalloch Hill (**Figure 7.1**). Further east of this there are several other ancient woodland stands; see **Figure 7.1**.

The definition of ancient woodland is land that is currently wooded and has been continually wooded at least since 1750. It is not related to the age of the trees that are currently growing there, and they do not have to be ancient or elderly, as it is the historical continuity of the woodland habitat that makes a woodland ancient. The AWI holds information on the location and extent of ancient woodland within Scotland, and categorises each stand as follows:

- **Ancient Woodland (1a and 2a)** - Interpreted as semi-natural woodland from maps of 1750 (1a) or 1860 (2a) and continuously wooded to the present day. If planted with non-native species during the 20th century they are referred to as Plantations on Ancient Woodland Sites (PAWS);
- **Long-established woodlands of plantation origin (LEPO) (1b and 2b)** - Interpreted as plantation from maps of 1750 (1b) or 1860 (2b) and continuously wooded since. Many of these sites have developed semi-natural characteristics, especially the oldest stands, which may be as rich as ancient woodland; and
- **Other woodlands on Roy maps (3)** - Shown as un-wooded on the 1st Edition of the Ordnance Survey maps (produced in circa 1850) but as woodland on the Roy maps (produced in circa 1750). Such sites have, at most, had only a short break in continuity of woodland cover and may still retain features of ancient woodland.

The majority of the ancient woodland to the east of the Site is categorised as 2b with a single smaller area of category 1a and several smaller areas of category 3 woodland.

2.4 Carbon and Peatland Map 2016

The Carbon and Peatland Map 2016² was consulted to determine likely peatland classes present within the Site. The map is a predictive tool that provides an indication of the likely presence of peat at a coarse scale. The Carbon and Peatland map has been developed as a high-level planning tool and identifies areas of nationally important carbon-rich soils, deep peat and priority peatland habitat³ as Class 1 and Class 2 peatlands.

Figure 7.2 indicates that, according to this predictive tool and map, there are three areas of Class 1 peatland in the east and south of the Site, extending across Galdenoch Moor, Larbrax Moor, and Drumwhisley. There is no Class 2 peatland within the Site or within 5 km of the Site. Much of the Site and surrounding area is underlain by Class 0⁴ (mineral) soils. The remainder of the Site comprises scattered and fragmented patches of Class 3⁵ and Class 5⁶ soils (see **Figure 7.2**).

3 METHODOLOGY

3.1 National Vegetation Classification (NVC)

The vegetation was surveyed by a suitably qualified and experienced botanical surveyor using the NVC scheme (Rodwell, 1991-2000; 5 volumes) and in accordance with NVC survey guidelines (Rodwell, 2006). The NVC scheme provides a standardised system for classifying and mapping semi-natural habitats and ensures that surveys are carried out to a consistent level of detail and accuracy.

Homogeneous stands and mosaics of vegetation were identified and mapped by eye and drawn as polygons on high resolution aerial imagery field maps. These polygons were surveyed qualitatively to record dominant and constant species, sub-dominant species and other notable species present. The surveyor worked progressively across the survey area to ensure that no areas were missed, and that mapping was accurate. NVC communities were attributed to the mapped polygons using surveyor experience and matching field data against published floristic tables (Rodwell, 1991-2000). Stands were classified to sub-community level where possible, although in many cases the vegetation was mapped to community level only because the vegetation was too species-poor or patches were too small to allow meaningful sub-community determination; or because some areas exhibited features or fine-scale patterns of two or more sub-communities.

Quadrat sampling was not used in this survey because experienced NVC surveyors do not necessarily need to record quadrats in order to reliably identify NVC communities, and sub-communities (Rodwell, 2006). Notes were made about the structure and flora of larger areas of vegetation in many places (such as the abundance and frequency of species, and in some cases

² SNH. (2016) Carbon and Peatland 2016 map. Available at: <https://www.nature.scot/professional-advice/planning-and-development/planning-and-development-advice/soils/carbon-and-peatland-2016-map>

³ Priority peatland habitat is land covered by peat-forming vegetation or vegetation associated with peat formation.

⁴ Class 0 - Mineral soil - Peatland habitats are not typically found on such soils. No peatland vegetation.

⁵ Class 3 - Dominant vegetation cover is not priority peatland habitat but is associated with wet and acidic type. Occasional peatland habitats can be found. Most soils are carbon-rich soils, with some areas of deep peat. Indicative soil = Predominantly peaty soil with some peat soil. Indicative vegetation = Peatland with some heath.

⁶ Class 5 - Soil information takes precedence over vegetation data. No peatland habitat recorded. May also include areas of bare soil. Soils are carbon-rich and deep peat. Indicative soil = Peat soil. Indicative vegetation = No peatland vegetation.

condition and evident anthropogenic impacts). It can be better to record several larger scale qualitative samples than one or two smaller quantitative samples; furthermore, qualitative information from several sample locations can be vital for understanding the dynamics and trends in local (survey area) vegetation patterns (Rodwell, 2006).

Due to small scale vegetation and habitat variability and numerous zones of habitat transitional between similar NVC communities, many polygons can represent complex mosaics of two or more NVC communities. Where polygons have been mapped as mosaics an approximate percentage cover of each NVC community within the polygon is given so that the dominant community and character of the vegetation could still be ascertained.

3.2 Phase 1 Habitat Characterisation

The NVC and mapping data was also correlated to their equivalent habitats according to the Phase 1 habitat classification (JNCC, 2010), considering the species composition and habitat quality. The Phase 1 characterisation has been utilised to allow a broader visual representation of the habitats within the survey area. Polygons or areas where there are mosaic NVC communities have generally been assigned a single Phase 1 classification based on the dominant NVC type (despite some polygons containing multiple Phase 1 types, often in low percentages). Therefore, the Phase 1 characterisation is generally a broader overview, and the NVC data should be referred to for further detail in any specific area.

Botanical nomenclature in this report follows that of Stace (2019) for vascular plants, Atherton *et al.* (2010) for bryophytes and Smith *et al.* (2009) for lichens.

4 SURVEY DETAILS & LIMITATIONS

Surveys were undertaken from 27 to 29 June 2023, inclusive, and were therefore carried out during the optimal season for habitat surveys. The weather conditions were amenable to survey; bright, with broken cloud and relatively light to moderate winds, and with infrequent light showers. Some minor parts of the survey area were inaccessible (e.g., due to dense impenetrable rhododendron within woodland areas, or the steep cliffs along the coastline) and could not be surveyed in detail. Where possible these were surveyed from a suitable vantage point; however, these constraints are not considered to affect the validity of the survey results, or the robustness of any assessments made from these data, as detailed below.

The NVC system does not cover all possible semi-natural vegetation or habitat types that may be found. Since the NVC was adopted for use in Britain in the 1980s further survey work and an increased knowledge of vegetation communities has led to additional communities being described that do not fall within the NVC system (e.g., see Rodwell *et al.*, 2000; Averis *et al.*, 2004; Mountford, 2011; and Averis and Averis, 2020). Where such communities are found and recorded, they are given a non-NVC community code and are described.

It should be noted that the results from this survey, and the matches made in describing communities, represent a current community evaluation at the time of survey (as opposed to one seeking to describe what the community was before any human interference, or what it might become in the future). In light of this, a clear constraint of the vegetation survey and evaluation

process as used in this, and other surveys is that it offers only a snapshot of the vegetation communities present and should not be interpreted as a static long-term reference.

Ecological surveys are limited by factors which affect the presence of plants such as the time of year and weather. The ecological surveys undertaken to inform this project have not therefore produced a complete list of plants and the absence of evidence of any particular species should not be taken as conclusive proof that the species is not present or that it will not be present in the future. However, the results of these surveys have been reviewed and are considered to be sufficient to undertake the assessment.

5 RESULTS

5.1 Summary of Habitat Types & NVC Communities

21 NVC communities and 12 non-NVC communities were recorded within the survey area, and these corresponded to 25 Phase 1 habitat types. These communities and habitat types, and their respective Site-specific correlations are summarised below in **Table 5-1**.

Table 5-1 Phase 1 habitat type equivalents of NVC communities and other habitats recorded

Phase 1 Habitats	NVC Communities & Other Non-NVC Habitats/Features Recorded
A1.1.1 Broadleaved Semi-Natural Woodland	W4 <i>Betula pubescens</i> – <i>Molinia caerulea</i> woodland W10 <i>Quercus robur</i> – <i>Pteridium aquilinum</i> - <i>Rubus fruticosus</i> woodland
A1.2.2 Coniferous Plantation Woodland	CP Coniferous Plantation (non-NVC type)
A2.1 Scrub – Dense/Continuous	W23 <i>Ulex europaeus</i> – <i>Rubus fruticosus</i> scrub
B1.1 Unimproved Acid Grassland	U2 <i>Deschampsia flexuosa</i> grassland U4 <i>Festuca ovina</i> – <i>Agrostis capillaris</i> – <i>Galium saxatile</i> grassland U6 <i>Juncus squarrosus</i> – <i>Festuca ovina</i> grassland
B1.2 Semi-Improved Acid Grassland	U4b <i>Festuca ovina</i> – <i>Agrostis capillaris</i> – <i>Galium saxatile</i> grassland <i>Holcus lanatus</i> – <i>Trifolium repens</i> sub-community
B2.2 Semi-Improved Neutral Grassland	H1 <i>Holcus lanatus</i> dominated neutral grassland (non-NVC type) Hm <i>Holcus mollis</i> dominated neutral grassland (non-NVC type)
B4 Improved Grassland	MG6 <i>Lolium perenne</i> – <i>Cynosurus cristatus</i> grassland
B5 Marsh/Marshy Grassland	M23 <i>Juncus effusus/acuteiflorus</i> – <i>Galium palustre</i> rush-pasture M25 <i>Molinia caerulea</i> – <i>Potentilla erecta</i> mire M27 <i>Filipendula ulmaria</i> – <i>Angelica sylvestris</i> mire MG10 <i>Holcus lanatus</i> – <i>Juncus effusus</i> rush-pasture Je <i>Juncus effusus</i> acid grassland community (non-NVC type)
C1.1/C1.2 Bracken – Continuous/Scattered	U20 <i>Pteridium aquilinum</i> – <i>Galium saxatile</i> community
D1.1 Dry Dwarf Shrub Heath - Acid	H9 <i>Calluna vulgaris</i> – <i>Deschampsia flexuosa</i> heath

Phase 1 Habitats	NVC Communities & Other Non-NVC Habitats/Features Recorded
D2 Wet Dwarf Shrub Heath	M15 <i>Trichophorum germanicum</i> – <i>Erica tetralix</i> wet heath
D6 Wet Heath/Acid Grassland Mosaic	Mosaics of D2 and B1 communities
E1.6.1 Blanket Bog	M17 <i>Trichophorum germanicum</i> – <i>Eriophorum vaginatum</i> blanket mire M19 <i>Calluna vulgaris</i> – <i>Eriophorum vaginatum</i> blanket mire
E1.7 Wet Modified Bog	M20 <i>Eriophorum vaginatum</i> blanket mire M25a^ <i>Molinia caerulea</i> – <i>Potentilla erecta</i> mire <i>Erica tetralix</i> sub-community
E2.1 Acid/Neutral Flush/Spring	M6 <i>Carex echinata</i> - <i>Sphagnum fallax/denticulatum</i> mire
G1 Standing Water	SW Standing Water (non-NVC type)
G2 Running Water	RW Running Water (non-NVC type)
H8.1 Maritime Hard Cliff	RK Rock (relating to cliff and associated boulders and exposed rock/shore)
H8.4 Coastal Grassland	MC8 <i>Festuca rubra</i> – <i>Armeria maritima</i> maritime grassland MC10 <i>Festuca rubra</i> – <i>Plantago</i> Spp. maritime grassland
H8.5 Coastal Heathland	H7 <i>Calluna vulgaris</i> – <i>Scilla verna</i> heath
I2.1 Quarry	QY Quarry (non-NVC type)
J1.1 Arable	AR Arable (non-NVC type)
J1.4 Introduced Shrub	RP <i>Rhododendron ponticum</i> (non-NVC type)
J3.6 Buildings	BD Buildings (non-NVC type)
J4 Bare Ground	BG Bare Ground, Tracks, Hardstandings etc (non-NVC type)

The following sections describe each of these Phase 1 habitat types and the communities underpinning these within the survey area. Habitats are described in the order they appear within the Phase 1 classification. The survey results are displayed in **Figure 7.3** which combines Phase 1 symbology with NVC data.

A number of target notes (TNs) were also made during surveys, often to pinpoint areas or species of special interest. These target notes are shown in **Figure 7.3** and detailed within Annex A; target note photographs are included within Annex B. Further photographs of several of the typical habitat types found within the survey area is provided within Annex C.

5.2 Woodland & Scrub

5.2.1 A1.1.1 Broadleaved Semi-Natural Woodland

Semi-natural broadleaved woodland is uncommon within the survey area being restricted to two areas, the larger of which follows a section of the eastern Site boundary, following a minor road (B738). The second much smaller stand is found along the edge of Loch More within the more central part of the survey area.

The larger of the two stands within the survey area is recorded as W10 *Quercus robur* – *Pteridium aquilinum* - *Rubus fruticosus* woodland and the smaller stand is recorded as W4 *Betula pubescens* – *Molinia caerulea* woodland.

The W10 is recorded at community level only and is composed of a mixed canopy dominated by *Acer pseudoplatanus* with varying but lesser amounts of *Betula pendula*, *Fagus sylvatica*, *Populus tremula*, *Alnus glutinosa*, and occasional *Pinus sylvestris*. In this instance, the field layer is completely dominated by *Rhododendron ponticum* (see TN3 in **Annex A**). The stand of W4 is recorded as the W4b *Juncus effusus* sub-community where the canopy species were not always the typical community species of *Betula*, and the community was assigned based on the understorey flora. The tree canopy is dominated by *Acer pseudoplatanus*, interspersed with *Salix* spp. and *Alnus glutinosa* with a field layer co-dominated by *Molinia caerulea* and *Juncus effusus*. Within the wetter areas *Sphagnum* is present with *Sphagnum capillifolium* and *S. fallax* being most dominant.

5.2.2 A1.2.2 Coniferous Plantation Woodland

The survey area includes a small number of blocks of densely planted coniferous plantation woodland (CP) to the west of Galdenoch Moor and around Drumwhisley to the south. These plantation woodlands are mostly dominated by *Picea sitchensis*. These types of plantation woodlands are generally of negligible botanical value due to over-shading and loss of the field flora.

5.2.3 A2.1 Dense/Continuous Scrub

Some small areas of W23 *Ulex europaeus* – *Rubus fruticosus* scrub were recorded most commonly within the northern half of the survey area. As expected, these stands are completely dominated by *Ulex europaeus* and in places appear within mosaics alongside other mire, grassland, heath and maritime communities.

5.3 Grasslands & Marsh

5.3.1 B1.1 Unimproved Acid Grassland

Unimproved acid grassland is uncommon within the Site and appears mostly within the north of the survey area. It is generally present on the thin mineral soils which predominate these areas (c.f. Section **Error! Reference source not found.**) and is grazed by livestock (sheep and cattle).

The majority of unimproved acid grassland in the survey area is U4 *Festuca ovina* – *Agrostis capillaris* – *Galium saxatile* grassland, recorded at community level only. In several places the U2a *Avenella flexuosa* grassland, *Festuca ovina* – *Agrostis capillaris* sub-community and U6a *Juncus squarrosus* - *Festuca ovina* grassland, *Sphagnum* sub-community is recorded, both within mosaics with mire and scrub communities.

The U4 community often contained a variable mix of *Agrostis capillaris*, *Festuca ovina* and *Anthoxanthum odoratum*. The herbs *Potentilla erecta* and *Galium saxatile* are common and in some stands, there can also be smaller quantities of other vascular species such as *Holcus lanatus*, *Nardus stricta*, *Avenella flexuosa*, *Cynosurus cristatus*, *Juncus squarrosus*, *Prunella vulgaris*, *Ranunculus repens*, *Cerastium fontanum*, *Achillea millefolium*, *Trifolium repens*, *Luzula* spp., and *Cirsium* sp. Mosses are frequent, especially *Pleurozium schreberi* and *Rhytidiadelphus squarrosus*.

The U6a sub community replicates many of the species found within U4 as described above, but with *Juncus squarrosus* obviously the most dominant species. This sub-community appears as the smaller component of a mosaic dominated by M15 *Trichophorum germanicum* – *Erica tetralix* wet heath. There is an abundance of *Sphagnum capillifolium* and *S. fallax* within this area of U6a.

The U2a recorded was most likely derived from severely degraded wet heath and bog which has transitioned to a poor acid grassland across the drier ground, being found within a mosaic co-dominant with M15 *Trichophorum germanicum* – *Erica tetralix* wet heath and M19 *Calluna vulgaris* – *Eriophorum vaginatum* blanket mire. The U2a was dominated by *Avenella flexuosa* with a scattering of occasional *Nardus stricta*, *Agrostis* spp., *Juncus squarrosus*, *Galium saxatile*, *Potentilla erecta*, and small patches of *Calluna vulgaris*. The mosses *Dicranum scoparium* and *Pleurozium schreberi* are common.

5.3.2 B1.2 Semi-Improved Acid Grassland

Areas of semi-improved acid grassland are common within the Site and are characterised by the U4b *Festuca ovina* – *Agrostis capillaris* – *Galium saxatile* grassland, *Holcus lanatus* - *Trifolium repens* sub-community only, both as homogenous stands and within mosaics with other mire, grassland, and maritime communities. This grassland appears widely across the survey area, being most commonly found to the south-west, where there has been more agricultural improvement over time.

The areas of U4b are generally intensively grazed with a very short sward and only occasional and more sparse acid indicator species. The sward is mainly comprised of *Holcus lanatus*, *Agrostis* spp., *Festuca* spp., *Cynosurus cristatus* and *Trifolium repens* with the more occasional to rare species including *Anthoxanthum odoratum*, *Juncus effusus*, *Nardus stricta*, *Molinia caerulea*, *Euphrasia officinalis*, *Plantago lanceolata*, *Cirsium* sp., *Campanula rotundifolia*, *Potentilla erecta* and *Galium saxatile*. The moss *Rhytidiadelphus squarrosus* is scattered in patches.

5.3.3 B2.2 Semi-Improved Neutral Grassland

Semi-improved neutral grassland is rare within the Site, only being found as a small component within some complex mosaics. These areas are identified as the non-NVC *Holcus lanatus* dominated neutral grassland (H1) and non-NVC *Holcus mollis* dominated neutral grassland (Hm). Within these areas, *Holcus lanatus* or *Holcus mollis* respectively dominates entirely.

5.3.4 B4 Improved Grassland

Improved grasslands are found widespread across the Site and survey area, particularly within the central areas, with many of the enclosed and improved fields used for silage as well as cattle and sheep grazing. These areas are characterised by MG6 *Lolium perenne* – *Cynosurus cristatus* grassland and recorded as the MG6a Typical sub-community.

These fields and communities are all dominated by *Lolium perenne*. Where other species appear scattered through the *Lolium perenne* sward these typically include *Cynosurus cristatus*, *Holcus lanatus*, *Poa annua*, *Ranunculus repens*, *Trifolium repens*, *Plantago lanceolata* and *Cerastium fontanum*.

5.3.5 B5 Marsh/Marshy Grassland

Marshy grassland is habitat that includes several different sward types in which *Molinia caerulea*, *Juncus* spp. and *Filipendula ulmaria* can be prominent. This habitat type is common and in places extensive within the survey area.

Within the survey area, the M23a, M23b, M25a, M25b, M27a, M27b and MG10a NVC communities are included within its limits along with the non-NVC community 'Je'. These communities also commonly form mosaics and transitional areas with each other, in particular the rushy areas, and also with adjoining grassland and mire communities. In the Phase 1 methodology MG10 can fall within either marshy grassland or neutral grassland classifications; here, due to the density of the *Juncus* spp., MG10 is better placed within this habitat.

The rush dominated communities present are mostly the non-NVC type *Juncus effusus* acid grassland (Je), the MG10a *Holcus lanatus* – *Juncus effusus* rush-pasture, Typical sub-community, M23a *Juncus effusus/acutiflorus* – *Galium palustre* rush-pasture, *Juncus acutiflorus* sub-community and M23b *Juncus effusus/acutiflorus* – *Galium palustre* rush-pasture, *Juncus effusus* sub-community. Where *Filipendula ulmaria* is dominant the community is the M27a *Filipendula ulmaria* – *Angelica sylvestris* mire, *Valeriana officinalis* – *Rumex acetosa* sub-community or the M27b *Filipendula ulmaria* – *Angelica sylvestris* mire, *Urtica dioica* – *Vicia cracca* sub-community.

The 'Je' non-NVC acid grassland community is present here as patches of a *Juncus* spp. dominated calcifuge grassland and forms the largest rush dominated community within the survey area. This is vegetation in which dominant and tall *Juncus effusus* grows abundant among a few shorter 'acid grassland' swards including frequent to occasional *Agrostis capillaris*, *Holcus lanatus*, *Rumex acetosa*, *Potentilla erecta* and *Galium saxatile*. Other occasional species include *Carex nigra*, *Molinia caerulea* and *Ranunculus repens*. Mosses typical of acid communities are also abundant, the most common mosses are *Hylocomium splendens*, *Pleurozium schreberi*, *Polytrichum commune*, *Pseudoscleropodium purum* and *Rhytidiadelphus squarrosus*. This vegetation does not fit into any NVC community as it lacks the wetland element and key indicators of M6 and M23 *Juncus* spp. mires and has a more acidophilous flora than MG10 *Juncus effusus* rush-pasture; it is therefore classed separately.

In all cases the MG10 community was recorded as the MG10a Typical sub-community, and often found within mosaics with acid grassland and mire communities. This community has much in common with the Je non-NVC community (referred to above) containing many of the same species but with *Juncus effusus* dominant, and the communities often differentiated by the respective proportions of *Holcus lanatus*, *Deschampsia cespitosa* and *Juncus effusus* in order to dictate the NVC classification.

The areas of M23 are often species poor with *Juncus* spp. being the dominant species, and it regularly grades in and out of the other communities, including the non-NVC community Je (see above). Generally, areas of M23 are dominated by mixtures of *Juncus acutiflorus* and/or *Juncus effusus* with patches of a low diversity of grasses such as *Holcus lanatus*, *Anthoxanthum odoratum*, *Poa* sp., and *Agrostis* spp. Within the sward, a variety of other graminoids and herbs are more occasional to rare and include *Juncus articulatus*, *Rumex obtusifolius*, *Molinia caerulea*, *Cirsium palustre*, *Rumex acetosa*, *Epilobium palustre*, *Galium palustre*, *Lotus corniculatus*, *Filipendula ulmaria*

and *Angelica sylvestris*. Wefts of mosses are also common in M23 between these species, including *Calliergonella cuspidata*, *Kindbergia praelonga* and *Rhytidiadelphus squarrosus*.

The M25 NVC community was classified as marsh/marshy grassland where it was present as the M25b *Anthoxanthum odoratum* sub-community and as the M25a *Erica tetralix* sub-community when found on peaty or peaty-soils less than 0.5 m deep (see Section 5.6.2 below for species composition). These are areas wholly dominated by *Molinia caerulea* accompanied by a mixture of grasses. The M25b within the survey area is very limited, appearing once as a homogenous stand. Within the *Molinia* dominated grassland other species included variable abundances of *Potentilla erecta*, *Galium saxatile*, *Anthoxanthum odoratum*, *Avenella flexuosa*, *Festuca* spp. and *Agrostis capillaris*.

The M27a sub-community was recorded only once within a mosaic dominated by dry heath. The M27b sub-community is the more common of the two sub-communities, often present within the coastal habitat along the west side of the survey area, usually within mosaics with other heath and maritime communities. The community as a whole contains *Filipendula ulmaria* in abundant form with variable patches of *Epilobium palustre*, *Succisa pratensis*, *Rumex acetosa*, *Holcus lanatus*, occasional *Deschampsia cespitosa* and *Galium aparine*. The M27a becomes more prominent with the stronger presence of *Phragmites australis* along with *Angelica sylvestris* and *Rumex acetosa*. The M27b becomes more distinctive with *Urtica dioica* becoming abundant throughout and with some *Arrhenatherum elatius*.

5.4 Tall Herb & Fern

5.4.1 C1.1/C1.2 Bracken: Continuous/Scattered

Several small areas of *Pteridium aquilinum* (bracken) are present within the survey area, forming dense patches on sloping thin soils, with the most extensive stands present around Hind Hill to the east and north-west of Barny's Leap to the west.

The habitat was recorded as the U20 *Pteridium aquilinum* – *Galium saxatile* NVC community and where a sub-community was assigned this was generally the more grassy form identified by the U20a *Anthoxanthum odoratum* sub-community, with a close affinity to the U4 grassland (see Section 5.3.2) and, to a lesser extent, the more heath dominated form identified by the U20b *Vaccinium myrtillus* – *Dicranum scoparium* sub-community, with a close affinity to the M15 wet heath community (see Section 5.5.1).

5.5 Heathland

5.5.1 D1.1 Dry Dwarf Shrub Heath – Acid

Acid dry dwarf shrub heath was recorded within a single mosaic north of Larbrax Moor towards the east of the survey area. It appears in the form of the H9c *Calluna vulgaris* – *Avenella flexuosa* heath, Species-poor sub-community. These swards are species poor being heavily dominated by *Calluna vulgaris* with occasional *Deschampsia flexuosa*, and the mosses *Hylocomium splendens* and *Plagiothecium undulatum*.

5.5.2 D2 Wet Dwarf Shrub Heath

Wet heath within the survey area is all the M15 *Trichophorum germanicum* – *Erica tetralix* wet heath community. Much of the wet heath present is of the M15b Typical sub-community and, to a much lesser extent, the M15a *Carex panicea* sub-community. It appears both as homogenous stands and within mosaics with other mire, grassland, and maritime communities.

The wet heath within the survey area is predominantly concentrated in the area west of Galdenoch Moor although there are a number of smaller patches scattered throughout. The M15b wet heath present is generally at the drier end of the spectrum, has a very short sward created and maintained by intensive grazing, and is considered to be in a poor and degraded condition. The areas of M15b were generally a co-dominant mixture of *Calluna vulgaris* and *Molinia caerulea*, *Potentilla erecta*, *Galium saxatile*, with occasional *Vaccinium myrtillus*. The mosses *Hypnum* sp., *Pleurozium schreberi* dominate with *Sphagnum capillifolium* appearing within the wetter patches of ground. The M15a assemblage is generally wetter with a more flushed appearance with *Carex panicea* becoming more common amongst the *C. vulgaris*, *Erica tetralix*, *Trichophorum germanicum*, *V. myrtillus*, *Eriophorum angustifolium*, *Agrostis capillaris*, *Nardus stricta*, *Anthoxanthum odoratum*, *Festuca ovina* and *Juncus squarrosus*. The *Sphagna* also becomes more of a feature.

5.5.3 D6 Wet Heath/Acid Grassland Mosaic

Mapped mosaics of D2 (Section 5.5.1), B1.1 (Section 5.3.1) and B1.2 (Section 5.3.2) communities.

5.6 Mire

5.6.1 E1.6.1 Blanket Bog

Blanket bog is fairly extensive along the eastern side of the survey area in the areas around Galdenoch Moor and Larbrax Moor, showing close correlation to the deeper areas of peat (see Section 2.4 above and **Chapter 9: Hydrology, Hydrogeology, Geology and Peat** of the EIA Report).

Much of the blanket bog present is the M17 *Trichophorum germanicum* – *Eriophorum vaginatum* blanket mire, appearing in the form of the M17a *Drosera rotundifolia* – *Sphagnum* spp. sub-community and the M17b *Cladonia* spp. sub-community. To a lesser extent, the M19 *Calluna vulgaris* – *Eriophorum vaginatum* blanket mire is also present in the form of the M19a *Erica tetralix* sub-community and the M19b *Empetrum nigrum* ssp. *nigrum* sub-community. The M17 community often represents areas of relatively better-quality, albeit still modified/degraded, bog, with *Sphagna* in patches in the basal layer. Both communities appear within mosaics with other mire communities as well as in the form of homogenous stands, including areas where M17 and M19 transition between each other.

The M17a sub-community retains a relatively high *Sphagnum* cover and high water table and represents the best quality mire within the survey area. Overall, there is a mix of *Trichophorum germanicum* and *Eriophorum vaginatum*, although the densities can be variable in places. The sward also contains a mix of other species ranging from frequent and occasional, to locally abundant, species present included *Erica tetralix*, *Eriophorum angustifolium*, *Vaccinium myrtillus*, *Drosera rotundifolia*, *Molinia caerulea*, *Calluna vulgaris*, *Narthecium ossifragum*, *Avenella flexuosa*, *Juncus squarrosus*, *Potentilla erecta*, *Galium saxatile* and *Vaccinium oxycoccos*. The basal layer includes *Sphagnum papillosum*, *S. medium*, *S. fallax*, *S. palustre*, *S. cuspidatum*, *S. capillifolium*, *Aulacomnium*

palustre, *Hylocomium splendens* and *Pleurozium schreberi*. The M17b sub-community contains similar species to that described for M17a above but with more *Racomitrium lanuginosum* and *Cladonia* lichens, and less *Sphagnum papillosum*.

The M19 community occurs on peat-covered level to gently sloping ground. The M19a contains a mixture of *Calluna vulgaris* and *Eriophorum vaginatum*. There is commonly at least a frequent to occasional *Erica tetralix*, *Eriophorum angustifolium*, *Narthecium ossifragum*, *Trichophorum germanicum*, *Vaccinium myrtillus*, *Potentilla erecta* and *Deschampsia flexuosa*. The mosses *Hylocomium splendens*, *Aulacomnium palustre*, *Polytrichum commune*, *Pleurozium schreberi*, *Hypnum jutlandicum*, *Sphagnum fallax* and *Sphagnum capillifolium* are collectively very abundant, with *Sphagnum papillosum* occasional, these mosses forming deep and extensive carpets. *Cladonia* spp. (lichens) are also present. The M19b sub-community contains a similar range of species except for the abundance of *Rubus chamaemorus* that can flourish within this sub-community.

The blanket bog within the survey area would not be classified as near-natural⁷ as it lacks many of the features and characteristics typical of such a peatland and it would generally instead be classified as modified/degraded due to the long history of grazing, evidence of artificial drainage, and the invasion of *Rhododendron ponticum* in many stands (see also **Annex A**). It was noted that there was a lack of bog pools, and *Calluna vulgaris* dominated within the drier parts of the blanket bog limiting the species diversity, along with areas of blanket bog showing signs of transition towards a more wet heath composition.

5.6.2 E1.7 Wet Modified Bog

Wet modified bog is of low total cover within the survey area, being localised to the south-east of Hind Hill along the eastern Site boundary and adjoining areas of blanket bog (Section 5.6.1). It is represented by the M25a *Molinia caerulea* – *Potentilla erecta* mire *Erica tetralix* sub-community⁸ and M20 *Eriophorum vaginatum* blanket mire. M25a being classified as wet modified bog and not marshy grassland here due to generally appearing on peat of greater than 0.5 m in depth (c.f. Section 5.3.5). In these circumstances, the M25a is denoted with a caret (i.e., M25a^). The M20a *Eriophorum vaginatum* blanket mire, Species poor sub-community also appears within a single mosaic dominated by M6d (see Section 5.6.3 below).

The M25a^ areas were identified due to *Molinia* overwhelmingly dominating the sward but with an associated flora containing some mire species. The majority of the subordinate and associate species found within this M25a^ assemblage were occasional *Calluna vulgaris*, *Vaccinium myrtillus*, *Erica tetralix*, *Trichophorum germanicum*, *Juncus squarrosus*, *Anthoxanthum odoratum*, *Potentilla erecta* and *Avenella flexuosa*. Mosses such as *Hylocomium splendens*, *Pleurozium schreberi*, *Hypnum jutlandicum*, *Rhytidiadelphus squarrosus*, *Polytrichum commune* are the most common but there are occasional patches of *Sphagnum capillifolium*, *S. fallax* and *S. palustre*.

⁷ As per definitions within NatureScots Peatland Condition Assessment Guidance (<https://www.nature.scot/sites/default/files/2023-02/Guidance-Peatland-Action-Peatland-Condition-Assessment-Guide-A1916874.pdf>) and the Peatland Code (https://www.iucn-uk-peatlandprogramme.org/sites/default/files/2023-03/FieldProtocol_%20v2_clean.pdf).

⁸ M25b has been classified as marshy grassland; see Section 5.3.5.

The M20 community contains tussocks of *Eriophorum vaginatum* which are abundant to dominant but with little or no *Calluna vulgaris*, the scarcity or absence of *Calluna vulgaris* precludes its classification as M19 – a community that in other respects much of which the M20 can at times resemble. The M20a sub-community identifies the areas where the main vascular component of the sward is dominated by *E. vaginatum* and is otherwise species poor apart from a little *Avenella flexuosa*.

5.6.3 E2.1 Acid/Neutral Flush/Spring

Acid/neutral flushes appear in several places to the north-east of Larbrax Moor within the survey area, but overall, their extent is very low.

This habitat is represented by M6c *Carex echinata* – *Sphagnum fallax/denticulatum* mire, *Juncus effusus* sub-community, appearing as a homogenous stand, and the M6d *Juncus acutiflorus* sub-community, appearing within a mosaic with other mire communities.

The M6c and M6d communities are rush mires on wet ground, often following the lines of watercourses, and whose soils appear to be acidic, as judged by the abundance of *Sphagnum* mosses (especially *Sphagnum fallax* and *S. palustre*) and the moss *Polytrichum commune*. A tall sward of *J. effusus* over a species-poor lawn of *Sphagnum fallax*, *S. palustre* and *Polytrichum commune* indicates the M6c sub-community; *J. acutiflorus* dominates in M6d. In these stands its extent encompasses little more than these species listed. Where other species were recorded, they tended to be of very low cover, and included typical species such as *Molinia caerulea* and *Rumex acetosa*. Occasionally species such as *Ranunculus repens*, *Cirsium palustre* and *Carex* spp. were noted.

5.7 Open Water

5.7.1 G1 Standing Water

There are a number of waterbodies within the survey area with the larger of which being Loch More west of Hind Hill and the waterbody to the east of Larbrax Moor.

5.7.2 G2 Running Water

There are a number of small burns and drainage channels that run across the survey area.

5.8 Maritime Cliff and Slope

5.8.1 H8.1 Maritime Hard Cliff

There are a number of areas along the coastline, extending in sections along the western boundary of the Site, that are identified as hard cliff or exposed rock with no plant cover. Some of these areas form mosaics with some maritime communities.

5.8.2 H8.4 Coastal Grassland

This coastal grassland habitat has much in common with the acid grassland communities (see Section 5.3.1 and Section 5.3.2 above) and differs due to the inclusion of more maritime species and being situated in coastal areas. These areas naturally follow the shoreline down the western boundary of the Site where there is a noticeable transition from acid and improved grassland

communities into maritime grassland as the survey area extends towards the shoreline. It is represented by the maritime communities MC8 *Festuca rubra* – *Armeria maritima* maritime grassland, at community level, the MC8d *Holcus lanatus* sub-community, the MC10 *Festuca rubra* – *Plantago* spp. maritime grassland, at community level, MC10b *Carex panicea* sub-community, and MC10c the *Schoenus nigricans* sub-community. Both communities were often found in mosaics together along with other mire, grassland, and heath communities.

The MC8 maritime grassland appears along the coastal cliffs in small patches and across the more level ground above where the semi-improved acid grassland transitions into a more coastal assemblage as it extends closer to the shoreline. This community contains a varying abundance of *Armeria maritima*, *Festuca rubra*, *Agrostis stolonifera* and *Trifolium repens*, *Dactylis glomerata*, *Potentilla erecta*, *Plantago lanceolata*. The MC8d sub-community was recorded in places where there was a much greater abundance of *Holcus lanatus*, *Rumex acetosa* and *Lotus corniculatus* within the sward.

The MC10 maritime grassland is similar to that of the MC8 community in species composition but also including *Erica tetralix*, *Luzula campestris*, and *Carex nigra*. The MC10b sub-community becomes more prominent with the presence of *C. panicea* and *Thymus praecox* along with the occasional appearance of *Nardus stricta* and *Calluna vulgaris*. The more frequent MC10c sub-community is dominated by *Schoenus nigricans* and *Molinia caerulea*, at times being co-dominant. Where the sward becomes more open, *Succisa pratensis* and *Hydrocotyle vulgaris* appear occasionally.

5.8.3 H8.5 Coastal Heathland

This coastal heathland has much in common with the dry heath community (see Section 5.5.1 above) and differs due to the inclusion of more maritime species and being situated in coastal areas. This habitat appears along the rocky coastline following the western boundary of the Site where this dry heath dominates the rocky slopes and ledges above the shoreline. It is represented by the H7 *Calluna vulgaris* – *Scilla verna* heath community, at community level, and as the H7a *Armeria maritima* sub-community, the H7b *Viola riviniana* sub-community, and the H7d *Empetrum nigrum* ssp. *nigrum* sub-community. This community also forms a significant feature of the Salt Pans Bay SSSI (see Section 2.2 above).

Within the H7 community *Calluna vulgaris* remains persistently dominant with *Scilla verna* being more variable in abundance. Other associates include *Lotus corniculatus*, *Erica cinerea*, *Potentilla erecta*, and *Thymus praecox*. The H7a sub-community was found in smaller scattered patches in exposed positions, dominated by *Festuca rubra*, *Holcus lanatus* and occasional *Dactylis glomerata*. Being the least abundant of the three sub-communities, H7b contains an abundance of *Galium verum*, *Carex flacca*, and *Viola riviniana*. Within the H7d sub-community *C. vulgaris* and *Empetrum nigrum* become a dominant feature within this assemblage.

5.9 Rock Exposure & Waste

5.9.1 I2.1 – Artificial - Quarry

There is a small borrow pit/quarry (QY) located on the west side of Galdenoch Moor.

5.10 Miscellaneous

5.10.1 J1.1 Cultivated/Disturbed Land – Arable

A single small area of arable land was recorded to the east of Larbrax Moor along the eastern boundary of the survey area.

5.10.2 J1.4 Cultivated/Disturbed Land – Introduced Shrub

A number of areas, generally localised within the south-east of the survey area, are dominated by *Rhododendron ponticum* (RP), being also recorded as an Invasive Non-Native Species (INNS) (see Section 5.11 and **Annex A**).

5.10.3 J3.6 Buildings

Buildings is a non-NVC community (BD) to identify buildings or built-up structures within the survey area, both inhabited and vacant, such as private dwelling houses and outbuildings/sheds.

5.10.4 J4 Bare Ground

Bare ground is a non-NVC community (BG) within the survey area and includes existing tracks, hardstandings and public roads. Any areas that were devoid of vegetation and that could not be classified as any other habitat are also included here.

5.11 Invasive Non-Native Species

Rhododendron ponticum (RP), an INNS, was recorded in a number of locations, both as homogenous stands and forming part of mosaics, or forming the understorey within broadleaved woodland areas (see **Annex A**).

5.12 Notable Species

No notable or rare species were incidentally recorded during the habitat surveys; however, this does not preclude their presence from the survey area.

6 EVALUATION OF BOTANICAL INTEREST

6.1 Overview

NVC communities can be compared with a number of habitat classifications in order to help in the assessment of the sensitivity and conservation interest of certain areas. The following sections compare the survey results and the NVC communities identified against three classifications:

- SEPA guidance on Groundwater Dependent Terrestrial Ecosystems (GWDTes);
- Habitats Directive (92/43/EEC) Annex I habitats; and
- Scottish Biodiversity List (SBL) priority habitats.

6.2 Groundwater Dependent Terrestrial Ecosystems (GWDTE)

SEPA has classified a number of NVC communities as potentially dependent on groundwater (SEPA, 2017a & 2017b). Wetlands or habitats containing these particular NVC communities are to be considered GWDTE unless further information can be provided to demonstrate this is not the case. Many of the NVC communities on the list are very common habitat types across Scotland, and some are otherwise generally of low ecological value. Furthermore, some of the NVC communities may be considered GWDTE only in certain hydrogeological settings.

Designation as a potential GWDTE does not therefore infer an intrinsic biodiversity value, and GWDTE status has not been used as criteria to determine a habitats respective conservation importance. There is however a statutory requirement to consider GWDTEs and the data gathered during the NVC surveys has been used to inform this assessment (see **Chapter 9: Hydrology, Hydrogeology, Geology and Peat** and **Appendix 9.3: GWDTE Assessment**).

Using SEPA's guidance, **Table 6-1** shows which communities recorded within the survey area may be considered potential GWDTE. Those communities which may have limited (moderate) dependency on groundwater in certain settings are marked in yellow and NVC communities recorded that are likely to be considered high, or sensitive GWDTE in certain hydrogeological settings are highlighted in red.

Table 6-1 Communities within the survey area which may potentially be classified as GWDTE

NVC Code	NVC Community Name
U6	<i>Juncus squarrosus</i> – <i>Festuca ovina</i> grassland
M15	<i>Trichophorum germanicum</i> – <i>Erica tetralix</i> wet heath
M25	<i>Molinia caerulea</i> – <i>Potentilla erecta</i> mire
M27	<i>Filipendula ulmaria</i> – <i>Angelica sylvestris</i> mire
MG10	<i>Holcus lanatus</i> – <i>Juncus effusus</i> rush-pasture
Je ⁹	<i>Juncus effusus</i> acid grassland
M6	<i>Carex echinata</i> – <i>Sphagnum fallax/denticulatum</i> mire
W4	<i>Betula pubescens</i> – <i>Molinia caerulea</i> woodland
M23	<i>Juncus effusus/acutiflorus</i> – <i>Galium palustre</i> rush pasture

The location and extent of all identified potential GWDTE are provided on an appropriate NVC map; see **Figure 7.4**.

Within **Figure 7.4** the potential GWDTE sensitivity of each polygon containing a potential GWDTE is classified on a four-tier approach as follows:

⁹ In light of the SEPA classification on potential GWDTEs the non NVC type 'Je' should also qualify for potential GWDTE status. The classification of moderate sensitivity is keeping in line with other similar *Juncus* spp. dominated grassland communities (e.g. MG10).

- ‘Highly – dominant’ where potential high GWDTE(s) dominate the polygon
- ‘Highly - sub-dominant’ where potential high GWDTE(s) make up a sub-dominant percentage cover of the polygon
- ‘Moderately – dominant’ where potential moderate GWDTE(s) dominate the polygon and no potential high GWDTEs are present
- ‘Moderately - sub-dominant’ where potential moderate GWDTE(s) make up a sub-dominant percentage cover of the polygon and no potential high GWDTEs are present.

Where a potential high GWDTE exists in a polygon it outranks any potential moderate GWDTE communities within that same polygon in order to adopt a conservative approach.

GWDTE sensitivity has been assigned solely on the SEPA listings (SEPA, 2017a & 2017b). However, depending on a number of factors such as geology, superficial geology, presence of peat and topography, many of the potential GWDTE communities recorded may in fact be only partially groundwater fed or not dependant on groundwater. Determining the actual groundwater dependency of particular areas or habitat requires further assessment (see **Chapter 9: Hydrology, Hydrogeology, Geology and Peat**).

6.3 Annex I Habitats

6.3.1 Overview

A number of NVC communities can also correlate to various Annex I habitat types. However, the fact that an NVC community can be attributed to an Annex I type does not necessarily mean all instances of that NVC community constitute Annex I habitat. Its Annex I status can depend on various factors such as quality, extent, species assemblages, geographical setting and substrates.

Using Joint Nature Conservation Committee (JNCC) Annex I habitat listings and descriptions¹⁰, which have then been compared with survey results and field observations, the following NVC communities within the survey area which constitute Annex I habitat are shown in **Table 6-2**.

Table 6-2 Annex I Habitats and Corresponding NVC Communities

Annex I Habitat	Corresponding NVC Communities & Other Non-NVC Habitats/Features Recorded
4010 North Atlantic wet heaths with <i>Erica tetralix</i>	M15 <i>Trichophorum germanicum</i> – <i>Erica tetralix</i> wet heath
4030 European dry heaths	H9 <i>Calluna vulgaris</i> – <i>Deschampsia flexuosa</i> heath
7130 Blanket bog	M17 <i>Trichophorum germanicum</i> – <i>Eriophorum vaginatum</i> blanket mire M19 <i>Calluna vulgaris</i> – <i>Eriophorum vaginatum</i> blanket mire M20 <i>Eriophorum vaginatum</i> blanket mire M25a^ <i>Molinia caerulea</i> – <i>Potentilla erecta</i> mire
1230 Vegetated sea cliffs of the Atlantic and Baltic coasts	H7 <i>Calluna vulgaris</i> – <i>Scilla verna</i> heath MC8 <i>Festuca rubra</i> – <i>Armeria maritima</i> maritime grassland MC10 <i>Festuca rubra</i> – <i>Plantago</i> Spp. maritime grassland

¹⁰ <https://sac.jncc.gov.uk/habitat/>

Further details on the inclusion or omission of certain NVC communities/sub-communities and/or Annex I types are also provided below.

6.3.2 7130 Blanket bog

The blanketing of the ground with a variable depth of peat gives the habitat type its name and results in the various morphological types according to their topographical position. Blanket bogs show a complex pattern of variation related to climatic factors, particularly illustrated by the variety of patterning of the bog surface in different parts of the UK. Such climatic factors also influence the floristic composition of bog vegetation.

‘Active’ bogs are defined as supporting a significant area of vegetation that is normally peat-forming. Typical species include the important peat-forming species, such as *Sphagnum* spp. and *Eriophorum* spp., or *Molinia caerulea* in certain circumstances, together with *Calluna vulgaris* and other ericaceous species. The most abundant NVC blanket bog types are M17, M18, M19, M20 and M25.

Annex I type 7130 Blanket bog therefore correlates directly with a number of NVC communities within the survey area such as the M17, M19 and M20 mires.

M25 mire can also fall within the 7130 blanket bog Annex I type where the underlying peat depth is greater than 0.5 m and the associated flora includes typical bog vegetation. These areas (denoted here as M25a[^]) have also been classified as potential Annex I blanket bog, to represent a worst-case scenario.

6.3.3 4010 Northern Atlantic wet heaths with *Erica tetralix*

Wet heath usually occurs on acidic, nutrient-poor substrates, such as shallow peats or sandy soils with impeded drainage. The vegetation is typically dominated by mixtures *Erica tetralix*, *Calluna vulgaris*, grasses, sedges and *Sphagnum* bog-mosses. All examples of M15 wet heath were included within the 4010 Northern Atlantic wet heaths category.

6.3.4 4030 European dry heaths

European dry heaths typically occur on freely-draining, acidic to circumneutral soils with generally low nutrient content. Ericaceous dwarf shrubs dominate the vegetation. The most common dwarf shrub is *Calluna vulgaris*.

The dry heath community recorded – H9 – falls within this Annex I type. This NVC type can also be included within the Annex I type H4060 Alpine and Boreal heaths, but only when at higher altitudes and including arctic-alpine floristic elements. The H9 within the survey area is a lower altitudinal examples so falls under the 4030 European dry heaths Annex I type.

The dry heath in the survey area, as noted in the community descriptions above, is species-poor, relatively botanically impoverished form of *Calluna* dominated heath.

6.3.5 1230 Vegetated sea cliffs of the Atlantic and Baltic coasts

Vegetated sea cliffs of the Atlantic and Baltic coasts are steep coastal slopes which support a diverse range of vegetation types that are subject to a maritime influence. Exposure to the sea is a key determinant of this type of sea cliff vegetation. This includes both grassland and cliff-top heath vegetation.

The most common forms of maritime grassland and heath within the survey area are H7, MC8, and MC10, all of which are directly subject to a maritime influence and support certain maritime species; however, only the stands on cliff faces and tops would likely form part of this Annex I habitat type, with the maritime grasslands further inland and transitional with improved and semi-improved grasslands unlikely to be considered part of this Annex I habitat type.

6.4 Scottish Biodiversity List Priority Habitats

The SBL is a list of animals, plants and habitats that Scottish Ministers consider to be of principal importance for biodiversity conservation in Scotland. The SBL was published in 2005 to satisfy the requirement under Section 2(4) of The Nature Conservation (Scotland) Act 2004.

The SBL identifies habitats which are the highest priority for biodiversity conservation in Scotland: these are termed ‘priority habitats’. Some of these priority habitats are quite broad and can correlate to many NVC types.

The relevant SBL priority habitat types (full descriptions of which can be found on the NatureScot website¹¹), and associated NVC types recorded within the survey area are as follows:

- Wet woodland: W4b;
- Lowland mixed deciduous woodland: W10 (where the canopy is not primarily coniferous);
- Blanket bog: M17, M19, M20, and M25a^ where peat depth is greater than 0.5 m;
- Upland flushes, fens and swamps: M6, and M23a;
- Upland heathland: H9 and M15;
- Lowland fens: M27; and
- Maritime cliff and slopes: H7, MC8, and MC10.

These SBL priority habitats correspond with UK Biodiversity Action Plan (BAP) Priority Habitats¹².

6.5 Sensitivity Summary

Table 6-3 provides a summary of all the NVC communities and non-NVC types recorded within the Site and survey area and any associated habitat sensitivities as described in the sections above.

¹¹ <https://www.nature.scot/scotlands-biodiversity/habitat-definitions>

¹² <http://jncc.defra.gov.uk/page-5718>

Table 6-3 Summary of study area communities and sensitivities

NVC/Non-NVC Codes Recorded	Potential GWDTE Status	Annex I Habitat	SBL Priority Habitat Type
Mires & Wet Heath			
M6c, M6d	High	-	Upland flushes, fens and swamps
M15a, M15b	Moderate	4010 Northern Atlantic wet heaths with <i>Erica tetralix</i>	Upland heathland
M17a, M17b	-	7130 Blanket bogs	Blanket bog
M19a, M19b	-	7130 Blanket bogs	Blanket bog
M20a	-	7130 Blanket bogs	Blanket bog
M23a, M23b	High	-	Upland flushes, fens and swamps (applies to M23a only)
M25a, M25b, M25a^	Moderate	7130 Blanket bogs (applies to M25a^ where peat depth >0.5 m)	Blanket bogs (applies to M25a^ where peat depth >0.5 m)
M27a, M27b	Moderate	-	Lowland fens
Dry Heaths			
H9c	-	4030 European dry heaths	Upland heathland
Calcifugous Grasslands			
U2a	-	-	-
U4, U4b	-	-	-
U6a	Moderate	-	-
U20, U20a, U20b	-	-	-
Mesotrophic Grasslands			
MG6a	-	-	-
MG10a	Moderate	-	-
Woodland & Scrub			
W4b	High	-	Wet woodland
W10	-	-	Lowland mixed deciduous woodland
W23	-	-	-
Vegetation of Maritime Communities			
H7, H7a, H7b, H7d	-	1230 Vegetated Atlantic/Baltic Sea cliffs ¹³	Maritime cliff and slopes ¹³
MC8, MC8d	-	1230 Vegetated Atlantic/Baltic Sea cliffs ¹³	Maritime cliff and slopes ¹³

¹³ When present on cliff faces/tops.

NVC/Non-NVC Codes Recorded	Potential GWDTE Status	Annex I Habitat	SBL Priority Habitat Type
MC10, MC10b, MC10c	-	1230 Vegetated Atlantic/Baltic Sea cliffs ¹³	Maritime cliff and slopes ¹³
Non-NVC Types			
AR	-	-	-
BD	-	-	-
BG	-	-	-
CP	-	-	-
HI	-	-	-
Hm	-	-	-
Je	Moderate	-	-
QY	-	-	-
RK	-	-	-
RP	-	-	-
RW	-	-	-
SW	-	-	-

7 SUMMARY

MacArthur Green carried out NVC and habitat surveys within the Site and survey area from 27 to 29 June 2023, inclusive, in order to identify those areas of vegetation communities with the greatest ecological or conservation interest.

In total 21 NVC communities were recorded within the respective survey area along with various associated sub-communities; a number of non-NVC habitat types are also present (**Table 5-1**). A relatively small number of communities, or habitat types, account for the majority of the survey area.

The survey area is mainly open habitats, the most common and widespread making up the bulk of the landscape are improved grassland, marshy grassland, maritime heath and grassland, and acid grassland. Interwoven throughout these are patches and pockets of other habitat types including heaths and blanket mires.

Although some large relatively homogeneous stands of vegetation occur, most of the communities often form complex mosaics and transitional areas across the survey area.

The survey results have also been compared to a number of sensitivity classifications, indicating the presence of Annex I, SBL and potential GWDTE habitats, as summarised in **Table 6-3**.

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ANNEX A. NVC TARGET NOTES

A number of target notes were also made during surveys, often to pinpoint an area or species of interest. These target notes are shown on **Figure 7.3** and detailed within **Table A.1** below. A representative sample of corresponding target note photographs is provided in Annex B.

Table A-1 Survey Area Target Notes

Target Note ID	Easting	Northing	NVC Community	Description	Photo Reference
1	197148	562349	N/A	<i>Rhododendron ponticum</i> .	B-1
2	197100	562250	M17a	This is an area of bog with lower grazing levels with no clear recent evidence of being grazed by livestock. The area does contain some drainage channels but they are narrow and many are occluded with <i>Sphagnum</i> moss. At the time of the survey, they looked to be semi-active although there had been a considerable amount of rainfall over the preceding days.	B-2
3	197986	561863	W10	Picture shows extent of <i>Rhododendron ponticum</i> and the coverage it has across the field layer of the woodland.	B-3

ANNEX B. TARGET NOTE PHOTOGRAPHS

The following photographs correlate to the target notes described within Annex A, Table A-1.

Photo B-1 Target Note 1 – *Rhododendron ponticum*



Photo B-2 Target Note 2 – M17 Blanket bog



Photo B-3 Target Note 3 – W10 woodland with extensive *Rhododendron ponticum* field layer



ANNEX C. GENERAL COMMUNITY PHOTOGRAPHS

The following selected photographs are provided to give a visual representation to a number of the community types present within the survey area.

Photo C-1 M17 Blanket bog, degraded/modified and heavily grazed and poached by livestock



Photo C-2 Mosaic of H7a and MC8d along the coastline



Photo C-3 Coastal heathland habitat dominated by H7 *Calluna vulgaris* – *Scilla verna* heath



Photo C-4 Severe *Rhododendron ponticum* encroachment and invasion of M19 blanket bog



Photo C-5 Marshy grassland habitat mosaic dominated by M27 *Filipendula ulmaria* – *Angelica sylvestris* mire



Photo C-6 M19 blanket mire



Photo C-7 *Rhododendron ponticum* dominated understorey within broadleaved woodland



Technical Appendix 7.2 : Protected Species Survey Report

Revised Larbrax Wind Farm EIA Report

Protected Species Survey Report

Technical Appendix 7.2

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Figure 7.5 Protected Species Survey Area & Survey Results: 2021 & 2023

Figure 7.5C Confidential Protected Species Survey Results

1 INTRODUCTION

MacArthur Green was commissioned by the Applicant to carry out protected species surveys at the Revised Larbrax Wind Farm, hereafter referred to as the ‘Proposed Development’. The Proposed Development is located approximately 9 km west of Stranraer within the Dumfries and Galloway Council local authority area.

These surveys primarily focussed on otter (*Lutra lutra*), water vole (*Arvicola amphibius*), badger (*Meles meles*), red squirrel (*Sciurus vulgaris*), and pine marten (*Martes martes*).

A watching brief was also kept throughout these surveys, and during all ecological surveys at the Site, and signs recorded for other protected species potentially inhabiting the Site and respective survey areas such as adder (*Vipera berus*), common or viviparous lizard (*Zootoca vivipara*), and slow worm (*Anguis fragilis*).

Surveys for bats were carried out and are reported separately in **Technical Appendix 7.3**.

These protected species surveys were undertaken to update and build upon previous protected species surveys undertaken for the Consented Larbrax Wind Farm and to aid and inform the design and ecological assessment for the Revised Larbrax Wind Farm Environmental Impact Assessment Report (EIA Report).

2 THE SITE & SURVEY AREA

The Site is located in the north-west of the North Rhins Peninsula, is relatively low-lying, and slopes to the west towards the sea. The land within the Site is formed predominately of various improved and semi-improved grassland types, with some marshy areas, woodland shelterbelts, and relatively isolated patches of bog (see **Technical Appendix 7.1** for a full description of the habitats present). Some minor watercourses drain the Site, which generally flow west towards the sea. The Site is primarily used for agriculture and livestock grazing.

The ‘survey area’ in which protected species surveys were undertaken for the Proposed Development in 2023 was the Site boundary, with earlier protected species surveys at the Site, in 2021, being undertaken over a smaller area. The respective protected species survey areas are shown in **Figure 7.5**.

3 LEGAL PROTECTION

Details of the legal protection of the protected species surveyed for are given in **ANNEX A** of this report.

4 METHODS

4.1 Desk Study

A desk-based study was undertaken to inform the field surveys and assessment with regards the presence of designated sites and species of interest within the Site.

This study consisted of the consultation of various online resources such as the NBN Atlas¹, NatureScot Sitelink², Saving Scotland's Red Squirrels³, and the Deer Distribution Survey⁴. The desk-based study also reviewed the Environmental Statement (ES) and associated documents for the Consented Larbrax Wind Farm⁵, a previously consented development occupying the same area⁶.

4.2 Field Surveys

Surveys to record the presence or likely absence of otter, water vole, badger, red squirrel and pine marten have been undertaken, with all habitats suitable for protected species surveyed within the survey area. The respective survey areas for all species are shown in **Figure 7.5**.

A watching brief for any protected species signs was also undertaken during other survey visits (e.g. ornithology/vegetation/other ecology surveys) throughout the baseline survey period.

The signs found indicate type and intensity of activity and consequently help in the assessment of the importance of a particular area for the protected species. The survey methods used are described below and are in line with NatureScot guidance⁷.

4.2.1 Otter

All accessible watercourses within the survey area were surveyed for otter field signs. Otter field signs and survey methods are described in Bang & Dahlstrøm (2001)⁸, Sargent & Morris (2003)⁹, and Chanin (2003)¹⁰, and include:

- **Holts:** underground features where otters live. They can be tunnels within bank sides, underneath root-plates or boulder piles, and even man-made structures such as disused drains. Holts are used by otters to rest up during the day and are the usual location of natal or breeding sites. Otters may use holts permanently or temporarily.
- **Couches:** these are above ground resting-up sites. They may be partially sheltered, or fully exposed. Couches may be regularly used, especially in reed beds and on in-stream islands. They have been known to be used as natal and breeding sites. Couches can be very difficult to identify and may consist of an area of flattened grass or earth. Where rocks or rock

¹ National Biodiversity Network Atlas Scotland (2023). Available online: <https://scotland.nbnatlas.org/>. Accessed July 2023.

² NatureScot (2023). SiteLink. Available online: <https://sitelink.nature.scot/home>. Accessed July 2023.

³ Saving Scotland's Red Squirrels (2023). Available online: <https://scottishsquirrels.org.uk/>. Accessed August 2023.

⁴ The British Deer Society (2023). Deer Distribution Survey. Available online: <https://bds.org.uk/science-research/deer-surveys/deer-distribution-survey/>. Accessed February 2024.

⁵ PNE Wind UK (2015). Larbrax Wind Farm Environmental Statement Volume 2 Main Report.

⁶ Larbrax Wind Farm is a 20MW development consented by Scottish Ministers in 2016. Project details are available online: <https://larbraxwindfarm.co.uk/>.

⁷ NatureScot (2023). Standing Advice for Planning Consultations. Available online: <https://www.nature.scot/professional-advice/planning-and-development/planning-and-development-advice/planning-and-development-standing-advice-and-guidance-documents>. Accessed July 2023.

⁸ Bang, P., and Dahlstrøm, P. (2001). *Animal Tracks and Signs*. Oxford University Press, Oxford.

⁹ Sargent, G., and Morris, P. (2003). *How to Find and Identify Mammals*. The Mammal Society, London.

¹⁰ Chanin, P. (2003). *Monitoring the Otter (Lutra lutra)*. Conserving Natura 2000 Rivers Monitoring Series No.10 English Nature, Peterborough.

armour are used as couches, these can be almost impossible to identify without observing the otter *in situ*.

- **Prints:** otters have characteristic footprints that can be found in soft ground and muddy areas.
- **Spraints:** otter faeces may be used to mark territories, often on in-stream boulders. They can be present within or outside the entrances of holts and couches. Spraints have a characteristic smell and often contain fish remains.
- **Feeding signs:** the remains of prey items may be found at preferred feeding stations. Remains of fish, crabs or skinned amphibians can indicate the presence of otter.
- **Paths:** these are terrestrial routes that otters take when moving between resting-up sites and watercourses, or at high flow conditions when they will travel along bank sides in preference to swimming.
- **Slides and play areas:** slides are typically worn areas on steep slopes where otters slide on their bellies, often found between holts or couches and watercourses. Play areas are used by juvenile otters in play and are often evident by trampled vegetation and the presence of slides. These are often positioned in sheltered areas adjacent to the natal holt.

Any of the above signs (apart from paths) are indicative of the presence of otter. However, it is often not possible to identify couches with confidence unless other field signs are also present. Spraints are the most reliably identifiable evidence of the presence of this species.

4.2.2 Water Vole

All watercourses within the survey area were surveyed for water vole field signs following the methodology prescribed in Dean *et al.* (2016)¹¹. This involved searching for the following field signs:

- **Faeces:** recognisable by their size, shape, and content. If not too dried-out these are also distinguishable from rat droppings by their smell.
- **Latrines:** faeces, often deposited at discrete locations.
- **Feeding stations:** food items are often brought to feeding stations along pathways and hauled onto platforms. Recognisable as neat piles of chewed vegetation up to 10 cm long.
- **Burrows:** appear as a series of holes along the water's edge distinguishable from rat burrows by size and position.
- **Lawns:** may appear as grazed areas around land holes.
- **Nests:** where the water table is high above ground woven nests may be found.
- **Footprints:** tracks may occur at the water's edge and lead into bank side vegetation. May be distinguishable from rat footprints by size.
- **Runways in vegetation:** low tunnels pushed through vegetation near the water's edge; these are less obvious than rat runs.

¹¹ Dean, M., Strachan, R., Gow, D. and Andrews, R. (2016). The Water Vole Mitigation Handbook (The Mammal Society Mitigation Guidance Series). Eds. Fiona Mathews and Paul Chanin. The Mammal Society, London.

Dean *et al.*¹¹ states that water vole droppings are the only field sign that can be used to determine water vole presence reliably on their own. Experience is required to distinguish feeding signs, burrows and footprints of water voles from those of other species. A collection of these field signs found in close proximity can indicate water vole presence.

4.2.3 Badger

Land with the potential to support badger within the survey area was searched for field signs with particular attention given to areas around woodland and areas underlain by mineral soils. Field signs of badger are described in Neal & Cheeseman (1996)¹², Bang & Dahlstrøm (2001)⁸, and Scottish Badgers (2018)¹³. Field evidence searched for included:

- **Setts:** single and/or groups of holes (refer to **Table 4-2** for categories).
- **Prints:** badgers have characteristic footprints that can be found in soft ground and muddy areas.
- **Latrines and dung pits:** these are small, excavated pits in which droppings are deposited. Latrines are a collection of dung pits used as territorial markers.
- **Hairs:** tufts of hair can often be found on fences, or in the entrances to setts.
- **Feeding signs:** small scrapes, also known as snuffle holes, where badgers have searched for insects and plant tubers. Feeding signs can also include dug up wasp or bee nests and ripped up dung of other species including cattle.
- **Scratching posts:** marks on trees (including fallen trees) where badgers have scratched leaving claw marks or ripped at areas of rotten bark to search for food.
- **Paths:** these are routes that badgers take when moving between setts and foraging areas.

Where setts were recorded their sett entrance classification and sett type were noted, in line with the definitions outlined in Scottish Badgers (2018)¹³, which are reproduced below in **Table 4-1** and

Table 4-2 below.

Table 4-1 Sett Entrance Classifications and Associated Descriptions¹³

Classification	Description
Well Used	Are clear of debris and vegetation, sides worn smooth but not necessarily excavated recently.
Partially Used	Are not in regular use and have debris e.g. twigs and leaves in the entrance. They could be used after only a minimal amount of clearance.
Disused	Not in use for some time, are partially blocked and could not be used without considerable effort. Rabbits and foxes may take over part of a sett and keep disused entrances open.
Collapses	Where a tunnel has collapsed.
Air Holes	Where badgers have made a small hole in a tunnel roof from below.

¹² Neal, E., and Cheeseman, C.L. (1996). Badgers. Poyser Natural History, London.

¹³ Scottish Badgers (2018). Surveying for Badgers: Good Practice Guidelines. Version 1.

Table 4-2 Categories of Sett and Associated Descriptions¹³

Category	Description
Main	Main setts usually have several holes with large spoil heaps, and the sett generally looks well used. There are obvious paths to and from the sett and between sett entrances. In the British National Badger Survey the average number of holes for a main sett was twelve, although main setts may be much smaller, even a single hole in exceptional circumstances. Although normally the breeding sett and in continuous use, it is possible to find a main sett that has some disused or dormant entrances.
Annexe	These are often close to a main sett, normally less than 150m away, and are connected to the main sett by one or more well-worn paths. Usually there are several holes but the sett may not be in use all the time, even if the main sett is very active. The average number of holes per annexe sett in the British survey was eight.
Subsidiary	These are usually at least 50m from a main sett, and do not have an obvious path connecting with another sett. They are not continuously active. The average number of holes per subsidiary sett in the British survey was four.
Outlier	These often have little spoil outside the holes, have no obvious path connecting them with another sett, and are only used sporadically. When not in use by badgers, they are often taken over by foxes or even rabbits. However, they can still be recognised as badger setts by the shape of the tunnel (not the actual entrance hole), which is at least 25 cm in diameter, and rounded or a flattened oval shape (i.e. broader than high). Fox and rabbit tunnels are smaller and often taller than they are broad. The average number of holes per outlying sett in the British survey was two.
Other	In some cases, it can be difficult to assess the status of a sett, and it is open to interpretation. It is therefore recommended that if there is uncertainty as to the type of sett present, setts should be referred to as 'Other'.

4.2.4 Pine Marten

Signs of pine marten were searched for within the survey area following guidance from O'Mahony *et al.* (2006)¹⁴. Survey methods included:

- **Scats:** searches for pine marten scats were made along linear features such as fence lines, stone walls or forestry tracks/rides. Also searches for scats on prominent features such as tree stumps, dead logs or stones, and around rock piles and dense scrub where the species could establish a den.
- **Dens:** identification of features which could be used as a den. Dens can include the utilisation of upturned trees, tree cavities, rocks or manmade structures such as log piles or large bird boxes.

4.2.5 Red squirrel

Areas of woodland that have the potential to support red squirrel were surveyed for squirrels, following guidance from Gurnell *et al.* (2009)¹⁵. Survey methods included:

¹⁴ O'Mahony D., O'Reilly, C. & Turner, P. (2006). National Pine Marten Survey of Ireland 2005. COFORD, Dublin.

¹⁵ Gurnell, J., Lurz, P. McDonald, R. & Pepper, H. (2009). Practical Techniques for Surveying and Monitoring Squirrels. Forestry Commission Practice Note.

- **Sightings:** visual sightings of red squirrels.
- **Dreys:** dreys are usually built close to the main stem of a tree, over 3 m from ground level and over 50 x 30 cm in size.
- **Feeding signs:** predated cone (cone cores) searches in areas of woodland.

4.2.6 Reptiles

Targeted reptile surveys were not undertaken, however, incidental records of reptile sightings, or signs such as shed skins, and features of particular importance (i.e. potential hibernacula) were recorded.

4.2.7 Other Species

A watching brief was maintained for all other protected, notable, and/or invasive species during surveys and presence or field signs recorded as appropriate (e.g. smooth newt (*Lissotriton vulgaris*), palmate newt (*Lissotriton helveticus*), hares (*Lepus* spp.), and American mink (*Neovision vison*)).

4.2.8 Species Scoped Out

Surveys for beaver (*Castor fiber*), wildcat (*Felis silvestris*), and great crested newt (GCN) were scoped out of field surveys due to the absence of suitable habitat, the survey area being located outwith the known range or distribution of these species, or previous survey results indicating the absence or low likelihood of presence (in the case of GCN – see Section 6.1.3 below).

5 SURVEY DETAILS & LIMITATIONS/CONSTRAINTS

Surveys for protected species were undertaken on 13 – 15 July 2021 and on 11 – 12 July 2023. Further targeted surveys of the proposed access track junction with the B738 road were undertaken on 27 March 2024 and 04 June 2024. The weather conditions during the 2021 surveys were warm and overcast, with light winds and no precipitation. In 2023, the weather conditions were warm and overcast with periodic rainfall throughout the surveys. The 2024 surveys were generally calm and dry.

In 2023, full access to some fields was prevented by the presence of herds of cows with calves. Areas of dense rhododendron were also present within the woodland at the south-east of the Site adjacent to the B738 road which prevented a full search being carried out at certain points.

Given the number of times the survey area has been surveyed for protected species (i.e., in 2013 (for the 2015 ES), 2017 (to inform a Section 42 planning application), 2021 and 2023/2024), it is considered that the baseline characterisation of protected species is representative of their presence within and around the Site.

Due to protected species' mobile natures, it is possible that new features may be created in the period between surveys and the commencement of construction. It is therefore recommended

that refresh surveys are undertaken in advance of construction activities progressing across the Site.

6 RESULTS

6.1 Desk Study Results

6.1.1 Designated Sites

There are no designated sites within the Site or within 5 km of the Site which have protected species as a qualifying feature.

6.1.2 Online Resources/Data Searches

6.1.2.1 NBN Atlas Scotland

A search of the NBN Atlas Scotland¹ within 5 km of the Site returned records of the following protected or notable species in the last 15 years (i.e., from 2009 onwards) (excluding bats, which are discussed in **Technical Appendix 7.3**):

- grey squirrel (*Sciurus carolinensis*);
- palmate newt; and
- red squirrel.

Details regarding licences and data providers for the above records are included in **ANNEX B**.

6.1.2.2 Saving Scotland's Red Squirrels

Sightings of red and grey squirrels have been recorded on Saving Scotland's Red Squirrels' sightings map³ within 5 km of the Site in the past 14 years (i.e., from 2010 onwards), with sightings most prevalent within the woodlands adjacent to Lochnaw Loch, north-east of the Site. None of the sightings recorded were within the Site.

6.1.2.3 Deer Distribution Survey

The Deer Distribution Survey⁴ results suggest that the following deer species are likely to be present in the wider local area of the Site:

- red deer (*Cervus elaphus*);
- roe deer (*Capreolus capreolus*); and
- sika deer (*Cervus nippon*).

6.1.3 Consented Larbrax Wind Farm ES (2015)

The Consented Larbrax Wind Farm ES 2015 (the '2015 ES')⁵ noted presence of otter, including two resting areas and numerous signs recorded in the north of the Site. Badger setts were also recorded¹⁶. There were incidental sightings of adder and common lizard.

As part of the assessment for the 2015 ES, a Habitat Suitability Index (HSI) assessment was carried out to determine the suitability of any waterbodies for great crested newt (GCN). The waterbodies

¹⁶ Note that information on the location and activity of badgers is redacted from the 2015 ES.

were assessed as ranging from ‘poor’ to ‘below average’, with one assessed as ‘average’. Further surveys did not record any signs of GCN.

A subsequent Section 42 application relating to the Consented Larbrax Wind Farm involved a protected species survey refresh of the Site on 19 July 2017. The surveys found evidence of badger (including two setts, a single holed outlier and a disused larger sett, as well as some other field signs) and otter (a single spraint) using the Site with similar distribution as recorded during earlier 2013 surveys. One potential mink scat was also recorded.

6.2 Field Survey Results

The survey results from 2021 and 2023/2024 are summarised in **Table 6-1** below, with full detailed results provided within **ANNEX C** and confidential records in **Confidential ANNEX D**. Survey results are displayed on **Figure 7.5**.

Table 6-1 Protected Species Survey Results Summary

Species	Survey Results Summary	General Habitat Suitability
Otter	No signs of otter were recorded within the Site during the 2021 or 2023 surveys.	Although the coastline adjacent to the Site is likely to support otter, the watercourses within the Site offer very limited suitability for otter, with watercourses subject to drying and having very little riparian shelter and limited foraging potential.
Water vole	No signs of water vole were recorded within the Site during the 2021 or 2023 surveys.	Habitat suitability within the Site was considered to be low, with watercourses generally poached by cattle.
Badger	Several badger setts were identified during the 2021 surveys; a number of these were subsequently found to be disused in 2023 and were therefore reclassified as ‘mammal holes’. One previously unrecorded badger sett was identified in 2023. Full details are contained within Confidential ANNEX D .	There are numerous areas of suitable habitat for badger within the Site, with stands of vegetation, areas of mineral soil and shelterbelt woodland providing suitability for sett building, and the pastures and marshy areas providing good foraging opportunities.
Pine marten	No signs of pine marten were recorded within the Site during the 2021 or 2023 surveys.	Although some woodland in the form of shelterbelts is present within the Site, the areas of habitat which might support pine marten are small and fragmented, and therefore offer low suitability.
Red squirrel	No signs of red squirrel were recorded within the Site during the 2021 or 2023 surveys.	Although some woodland in the form of shelterbelts is present within the Site, the areas of habitat which might support red squirrel are small and fragmented, and therefore offer low suitability.
Reptiles	A common lizard sighting was recorded during the 2021 surveys.	Several features with the potential for use as hibernacula by reptiles were identified throughout the Site, including rock piles and dry-stone walls. The heath, bog and marshy habitats found throughout the Site offer suitable habitat for reptile species.

Species	Survey Results Summary	General Habitat Suitability
Other species	Brown hare sightings were noted during the 2021 and 2023 surveys.	n/a
General	A number of mammal holes which could not be reliably attributed to any protected species were recorded throughout the Site. Some had been recorded in 2021 as in use by badgers, but were reclassified in 2023, as no signs of current use were noted. These holes may be in use by a variety of species, including red fox (<i>Vulpes vulpes</i>) and rabbit (<i>Oryctolagus cuniculus</i>).	n/a

ANNEX A. LEGAL PROTECTION

A full list of protected species and the associated legislation can be found on the NatureScot website¹⁷. The following provides a summary of legal protection; the actual legislation should be consulted for the definitive list of offences.

Bats, Otter and Great Crested Newt (GCN)

Bats, otter and **GCN** receive protection in Scotland under the Conservation (Natural Habitats, &c.) Regulations (1994) (as amended) (the “Habitats Regulations”), being classified as European protected species of animals¹⁸.

For European protected species, NatureScot guidance¹⁹ sets out that it is an offence to deliberately or recklessly:

- capture, injure or kill an animal;
- harass an animal or group of animals;
- disturb an animal while it is occupying a structure or place used for shelter or protection;
- disturb an animal while it is rearing or otherwise caring for its young;
- obstruct access to a breeding site or resting place, or otherwise deny an animal use of a breeding site or resting place;
- disturb an animal in a manner or in circumstances likely to significantly affect the local distribution or abundance of the species;
- disturb an animal in a manner or in circumstances likely to impair its ability to survive, breed or reproduce, or rear or otherwise care for its young;
- disturb an animal while it is migrating or hibernating;
- take or destroy an animal’s eggs; or
- damage or destroy a breeding site or resting place of such an animal (these sites and places are protected even when the animal is not present)²⁰.

Regulation 44(2)(e) of the Habitats Regulations allows a licence to be granted for activities ordinarily prohibited, where that purpose is:

“Preserving public health or public safety or other imperative reasons of overriding public interest including those of a social or economic nature and beneficial consequences of primary importance for the environment.”

¹⁷ NatureScot (2022). Table of all of Scotland’s Protected Species. Available online: <https://www.nature.scot/doc/table-all-scotlands-protected-species>. Accessed July 2023.

¹⁸ Schedule 2.

¹⁹ NatureScot. (2023). European protected species. Available online: <https://www.nature.scot/professional-advice/protected-areas-and-species/protected-species/legal-framework/habitats-directive-and-habitats-regulations/european-protected>. Accessed July 2023.

²⁰ Note that this is a summary of offences. Refer to Regulations 39 and 40 of the Habitats Regulations for legislative context.

Otter is also listed on Appendix I of the Convention of International Trade in Endangered Species (CITES), Appendix II of the Bern Convention, and Annexes II and IV of the Habitats Directive.²¹ It is also listed as globally threatened on the IUCN/WCMC Red Data List.

Water Vole

Water vole is protected in Scotland under Sections 9(4) and 10 of the Wildlife and Countryside Act 1981²².

Under Section 9(4)(a) and (b) of the Wildlife and Countryside Act 1981, it is an offence to intentionally or recklessly:

- damage or destroy, or obstruct access to, any structure or place which any wild animal included in Schedule 5²³ uses for shelter or protection; or
- disturb any such animal while it is occupying a structure or place which it uses for that purpose.

Section 10(3)(c) provides for exceptions under Section 9, such that a person shall not be guilty of an offence where that person shows:

- that each of the conditions specified in subsection (3A) was satisfied in relation to the carrying out of the unlawful act; or
- that the unlawful act was carried out in relation to an animal bred and, at the time the act was carried out, lawfully held in captivity.

Subsection (3A) states those conditions referred to in Section 10(3)(c) are:

- a) That the unlawful act was the incidental result of a lawful operation or other activity;
- b) That the person who carried out the lawful operation or other activity:
 - i. took reasonable precautions for the purpose of avoiding carrying out the unlawful act; or
 - ii. did not foresee, and could not reasonably have foreseen, that the unlawful act would be an incidental result of the carrying out of the lawful operation or other activity; and
- c) That the person who carried out the unlawful act took, immediately upon the consequence of that act becoming apparent to the person, such steps as were reasonably practicable in the circumstances to minimise the damage or disturbance to the wild animal, or the damage or obstruction to the structure or place, in relation to which the unlawful act was carried out.

²¹ European Union Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora.

²² as amended by the Nature Conservation (Scotland) Act 2004.

²³ Animals which are protected under Section 9 of the Wildlife and Countryside Act 1981.

Badger

Badger is protected in Scotland under the Protection of Badgers Act 1992 (the “Badgers Act”)²⁴.

Under Section 1(1) of the Badgers Act, “a person is guilty of an offence if, except as permitted by or under this Act, he wilfully kills, injures or takes, or attempts to kill, injure or take, a badger.”

Where it can reasonably be concluded that a person had been attempting to kill, injure or take a badger, then it will be presumed that that person had been attempting to do so, unless it can be proven otherwise²⁵.

Under Section 1(3), unless authorised under the Badgers Act, a person is guilty of an offence where “he has in his possession or under his control any dead badger or any part of, or anything derived from, a dead badger.”

Under Section 3(1), unless authorised under the Badgers Act, it is an offence to interfere with a badger sett*. The following actions are described as interference:

- damaging a badger sett or any part of it;
- destroying a badger sett;
- obstructing access to, or any entrance of, a badger sett;
- causing a dog to enter a badger sett; or
- disturbing a badger when it is occupying a badger sett,

intending to do any of those things or being reckless as to whether his actions would have any of those consequences.

It is also an offence if a person knowingly causes or permits any of the above actions to be carried out²⁶.

*Note: A badger sett is defined under the Badgers Act as any structure or place which displays signs of current use by a badger²⁷.

Mountain Hare, Pine Marten and Red Squirrel

Mountain hare, pine marten and red squirrel and are protected in Scotland under the Wildlife and Countryside Act 1981²⁸.

Under Sections 9(1) and 9(2) of the 1981 Act, it is an offence to intentionally or recklessly kill, injure or take such an animal, or be in possession or control of such an animal (whether live or dead).²⁹

Under Section 9(4)(a) and (b), it is an offence to intentionally or recklessly:

²⁴ as amended by the Nature Conservation (Scotland) Act 2004 (as amended).

²⁵ Section 1(2) of the Badgers Act.

²⁶ Section 3(2).

²⁷ Section 14.

²⁸ Schedule 5.

²⁹ See exceptions under Section 9(3).

- damage or destroy, or obstruct access to, any structure or place which any wild animal included in Schedule 5³⁰ uses for shelter or protection; or
- disturb any such animal while it is occupying a structure or place which it uses for that purpose

Further, Section 9(5) sets out that it is an offence to:

- sell, offer or expose for sale, or possess or transport for the purpose of sale, any live or dead wild animal included in Schedule 5, or any part of, or anything derived from, such an animal; or
- publish or cause to be published any advertisement likely to be understood as conveying that he buys or sells, or intends to buy or sell, any of those things.

Reptiles

The three native species of **reptile** to Scotland, **adder**, **slow worm** and **viviparous lizard**, are protected under Section 9(1) (insofar as the action relates to killing or injuring the animal), and Section 9(5) of the Wildlife and Countryside Act 1981.

Under Section 9(5), it is an offence to:

- sell, offer or expose for sale, or possess or transport for the purpose of sale, any live or dead wild animal included in Schedule 5, or any part of, or anything derived from, such an animal.
- publish or cause to be published any advertisement likely to be understood as conveying that he buys or sells, or intends to buy or sell, any of those things.

Section 10(3)(c) provides for exceptions under Section 9, such that a person shall not be guilty of an offence where that person shows:

- that each of the conditions specified in subsection (3A) was satisfied in relation to the carrying out of the unlawful act; or
- that the unlawful act was carried out in relation to an animal bred and, at the time the act was carried out, lawfully held in captivity.

Subsection (3A) states those conditions referred to in Section 10(3)(c) are:

- a) That the unlawful act was the incidental result of a lawful operation or other activity;
- b) That the person who carried out the lawful operation or other activity:
 - i. took reasonable precautions for the purpose of avoiding carrying out the unlawful act; or;
 - ii. did not foresee, and could not reasonably have foreseen, that the unlawful act would be an incidental result of the carrying out of the lawful operation or other activity; and
- c) That the person who carried out the unlawful act took, immediately upon the consequence of that act becoming apparent to the person, such steps as were reasonably practicable in

³⁰ Animals which are protected under Section 9 of the Wildlife and Countryside Act 1981.

the circumstances to minimise the damage or disturbance to the wild animal, or the damage or obstruction to the structure or place, in relation to which the unlawful act was carried out.

ANNEX B. NBN ATLAS SCOTLAND DATA PROVIDERS AND LICENSES**Table B-1 Data Providers and Licence Details for NBN Atlas Scotland Records Used**

Species	Reason for Inclusion	Data Provider (Recorder)	Licence
Grey squirrel	Invasive species	Scottish Wildlife Trust	CC-BY ^{Error!} Bookmark not defined.
Palmate newt	Protected species (Wildlife and Countryside Act 1981)	Biological Records Centre	CC-BY ^{Error!} Bookmark not defined.
Red squirrel	Protected species (Wildlife and Countryside Act 1981, Nature Conservation (Scotland) Act 2004)	Scottish Wildlife Trust	CC-BY ^{Error!} Bookmark not defined.
Red deer	Welfare and impacts of deer on habitats and on neighbouring land and interests (inc. public roads)	South West Scotland Environmental Information Centre	CC-BY-NC ³¹
Roe deer	Welfare and impacts of deer on habitats and on neighbouring land and interests (inc. public roads)	The Mammal Society	CC-BY-NC ³¹

³¹ Creative Commons with Attribution 4.0 (CC-BY-NC). Available online at: <https://creativecommons.org/licenses/by/4.0/>. Accessed July 2023.

ANNEX C. FIELD SURVEY RESULTS

Table C- 1 Protected Species Survey Results (2021) **Table C- 1** and **Table C- 2** below details the relevant data collected for protected species during surveys for the Site in 2021 and 2023/2024, sorted by species, then survey date (see also **Figure 7.5**). Confidential information relating to badger setts is contained within **Confidential Annex D**.

Table C- 1 Protected Species Survey Results (2021)

Species	Sign	Easting	Northing	Survey date	Notes
General	Mammal Hole	197086	562661	13/07/2021	Mammal hole along fence line next to track. Remains of some bedding in entrance. No conclusive evidence of protected species usage.
General	Mammal Hole	196418	562674	13/07/2021	Too small for badger. Bedding in entrance. No conclusive evidence of protected species usage.
General	Mammal Hole	196763	561687	15/07/2021	Probably rabbit. Spoil at entrance. Cobwebs across entrance. Vegetation grown up around, located in patch of bracken. No conclusive evidence of protected species usage.
General	Mammal Hole	196768	561685	15/07/2021	Vegetation established around entrance. No conclusive evidence of protected species usage.
Hare	Brown Hare Sighting	196345	562437	13/07/2021	
Reptile	Common Lizard Sighting	196448	562677	13/07/2021	Common lizard sighting.
Reptile	Potential Hibernaculum	196345	562437	13/07/2021	Pile of boulders.
Reptile	Potential Hibernaculum	196334	562437	13/07/2021	Pile of stones.
Reptile	Potential Hibernaculum	196140	562279	14/07/2021	Rock pile.

Species	Sign	Easting	Northing	Survey date	Notes
Reptile	Potential Hibernaculum	196332	562286	14/07/2021	Rock pile. Potential hibernacula/basking area.
Reptile	Potential Hibernaculum	196986	562494	14/07/2021	Borrow pile. Some rock piles.
Reptile	Potential Hibernaculum	196647	562045	15/07/2021	Stone pile.
Reptile	Potential Hibernaculum	196580	561830	15/07/2021	Stone pile.

Table C- 2 Protected Species Survey Results (2023/2024)

Species	Sign	Easting	Northing	Survey date	Notes
Badger	Dung	197368	562470	11/07/2023	Beside the livestock (cattle) field, bordering bog habitat with dense clusters of rhododendron and bracken.
General	Mammal Hole	196804	562394	11/07/2023	At the edge of a small conifer plantation. One hole. D-shaped tunnel, old spoil heap with vegetation in the entrance. No signs of current use by badger.
General	Mammal Hole	196834	562298	11/07/2023	On an eroded bank by Loch More, to the edge of the access track. Disused, spoil heap, sandy substrate, near a stand of dense gorse, D shape. No signs of current use by badger.
General	Mammal Hole	196477	562529	11/07/2023	Disused single hole, full of vegetation, D-shape entrance within small conifer plantation. No signs of current use by badger.
General	Mammal Hole	196468	562570	11/07/2023	Previously recorded as Sett A in 2021 - reclassified as mammal hole as no signs of current use. Large, part-used entrance, spoil heap, well-worn edges, no other signs, D-shape. Although worn edges, the lack of other signs suggests no recent activity.
General	Mammal Hole	196422	562672	11/07/2023	Previously recorded as Sett C in 2021 - reclassified as mammal holes as no signs of current use. Two holes. Historical spoil, disused entrances, full of vegetation, in a small pocket of conifer plantation. No signs of current use.

Species	Sign	Easting	Northing	Survey date	Notes
General	Mammal Hole	196057	562621	11/07/2023	Potentially rabbit but no rabbit droppings noted within the area. No other field signs to suggest badger.
General	Mammal Hole	197871	561967	12/07/2023	Three disused entrances with historical spoil heaps, all D-shaped entrances, scratches on the one entrance walls, evidence of wearing from paths which looks to be used by deer. Within dense rhododendron.
General	Mammal Hole	196689	561429	12/07/2023	Single large D-shaped entrance, spoil heap and scratches on the wall of the entrance. In eroded bank near a sand martin colony. No fresh tracks, so potentially disused.
General	Mammal Hole	197850	562041	27/03/2024	Entrance with no distinguishable features. On slope between gap in rhododendrons. Smooth walls, no spoil heap, some bracken at mouth of entrance.
Hare	Brown Hare Sighting	196137	562706	11/07/2023	Individual flushed from rushes.
Hare	Brown Hare Sighting	197404	562219	11/07/2023	Individual flushed.
Reptile	Potential Hibernaculum	197297	561926	11/07/2023	Linear stone wall running south from the grid reference. Suitable habitat for reptiles and amphibians on either side of the wall.
Reptile	Potential Hibernaculum	196970	561620	12/07/2023	Linear stone wall running east from the grid reference. Suitable habitat for reptiles and amphibians on the northern side of the wall.

Revised Larbrax Wind Farm
EIA Report
Bat Survey Report
Technical Appendix 7.3

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1 INTRODUCTION

MacArthur Green was commissioned by the Applicant to carry out bat surveys at the Revised Larbrax Wind Farm, hereafter referred to as the 'Proposed Development'.

Bat surveys included:

- Desk-based assessment;
- A Preliminary Roost Assessment for Bats (PRA) (2021, 2023 and 2024); and
- Automated activity surveys (2017).

The aim of the surveys was to quantify the Proposed Development usage by bats and variation in bat activity levels within the Site, and to inform the ecological impact assessment for the Revised Larbrax Wind Farm Environmental Impact Assessment Report (EIA Report).

2 THE PROPOSED DEVELOPMENT AND SURVEY AREA

The Proposed Development is located approximately 9 km west of Stranraer and lies wholly within the Dumfries and Galloway administrative area.

The Site is located within the north-west of the North Rhins Peninsula. The Site slopes gently from east to west towards the coast and is therefore relatively low-lying. The eastern section of the Site lies inland and is mostly flat. This part of the Site undulates gently and is characterised by a pattern of smooth hills and valleys. This section of the Site includes various relative high points such as Hind Hill on Galdenoch Moor of 82 m Above Ordnance Datum (AOD)) as well as an unnamed hill of 83 m AOD on Larbrax Moor. The northern and southern parts of the Site are characterised by steeper slopes. The western part of the Site lies on the coast and is characterised by sloping hills towards the coast with some steeper slopes present at Salt Pans Bay as well as steep cliffs of varying height.

Land cover within the Site primarily consists of improved and semi-improved pasture with some areas of mire and marshland, woodland planting and shelterbelts and some areas of exposed rock/cliff on the western part of the Site. Woodland coverage is generally limited to small plantations used as shelterbelts. A number of minor watercourses and field ditches drain the Site generally flowing west out to the North Channel. The Site is primarily used for agriculture and livestock grazing. The Proposed Development is fully described within **Chapter 4: Development Description** of the EIA Report.

The Proposed Development does not overlap with any statutory designated sites containing bat related qualifying features and interests.

The temporal (Anabat) survey area covered the main turbine infrastructure area and consisted of eight Anabat deployment locations as shown in **Figure 7.6**.

The PRA survey area covered during the 2021 survey for the Proposed Development was a 250 m buffer from the proposed turbines at that time, and the 2023 PRA survey area covered a wider extent equating to the Site boundary, see **Figure 7.6**.

3 BATS AND WIND FARMS

3.1 Policy and Guidance

All bat species are protected under the following legislation:

- The Habitats Directive 92/43/EEC (as amended);
- The Wildlife and Countryside Act 1981 (as amended); and
- The Conservation (Natural Habitats, &c.) Regulations 1994 (as amended).

Details pertaining to the legal status of bats are included within **Annex A** and in **Table A-1**.

In the UK and Europe, guidelines have been produced with regards to assessing the ecological impact upon bats from wind farm developments. These guidelines help to inform survey and mitigation strategies.

The following guidance documents have been used in the preparation of this report:

- Collins, J. (ed) (2016). *Bat Surveys for Professional Ecologists: Good Practice Guidelines*. 3rd Edition. The Bat Conservation Trust, London¹;
- Collins, J. (ed.) (2023). *Bat Surveys for Professional Ecologists: Good Practice Guidelines*. 4th Edition. The Bat Conservation Trust, London;
- Andrews, H. (2018) *Bat Roosts in Trees: a guide for identification and assessment for tree-care and ecology professionals*. Pelagic Publishing, Exeter;
- Hundt, L. (2012). *Bat Surveys: Good Practice Guidelines*. 2nd Edition, Bat Conservation Trust, London;
- Reason, P.F. and Wray, S. (2023). *UK Bat Mitigation Guidelines: a guide to impact assessment, mitigation and compensation for developments affecting bats*. Chartered Institute of Ecology and Environmental Management, Ampfield;
- Russ, J. (2012) *British Bat Calls, A Guide to Species Identification*. Pelagic Publishing, Exeter; and
- NatureScot, Natural England, Natural Resources Wales, Renewable UK, Scottish Power Renewables, Ecotricity Ltd, the University of Exeter & the Bat Conservation Trust (BCT). (2021). *Bats and Onshore Wind Turbines: Survey Assessment and Mitigation*.

¹ Methods and analysis for surveys undertaken in 2021 and 2023 followed the 3rd edition of the Bat Conservation Trust survey guidelines as surveys were completed before the 4th edition guidelines were published in September 2023.

4 METHODS

4.1 Desk-Based Assessment

A desk-based assessment was undertaken with regards to the presence of bat species within the Site and its environs.

A National Biodiversity Network (NBN)² Atlas Scotland search was completed to obtain bat records from 2008 to 2023 within 10 km of the Proposed Development.

4.2 Field Survey Methods

4.2.1 Preliminary Bat Roost Assessment

The PRA followed the assessment methodology as set out in Collins (2016)¹, to identify any Potential Roost Features (PRFs) in trees, buildings and structures, which could support roosting bats and to search for evidence of roosting bats. Where PRFs were identified, they were assigned a value of low, moderate or high suitability which indicates the likelihood of bats being present and informs the requirement for further survey work, such as a climbing inspection and/or dusk and dawn bat activity surveys. Collins (2016), state the following descriptions for assessing PRFs:

- Negligible – Negligible habitat features on site to be used by roosting bats.
- Low – A structure with one or more potential roost sites that could be used by individual bats opportunistically. However, these potential roost sites do not provide enough space, shelter, protection, appropriate conditions³ and/or suitable surrounding habitat to be used on a regular basis or by larger numbers of bats (i.e., unlikely to be suitable for maternity or hibernation⁴).

A tree of sufficient size and age to contain PRFs but with none seen from the ground or features seen with only very limited roosting potential⁵.

- Moderate – A structure or tree with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions³ and surrounding habitat but unlikely to support a roost of high conservation status (with respect to roost type only – the assessments in this table are made irrespective of species conservation status, which is established after presence is confirmed).

² NBN Atlas occurrence download at <https://nbnatlas.org> accessed on 27 October 2023.

³ For example, in terms of temperature, humidity, height above ground level, light levels or levels of disturbance.

⁴ Evidence from the Netherlands shows mass swarming events of common pipistrelle bats in the autumn followed by mass hibernation in a diverse range of building types in urban environments (Korsten *et al.*, 2015). This phenomenon requires some research in the UK but ecologists should be aware of the potential for larger numbers of this species to be present during the autumn and winter in large buildings in highly urbanised environments.

⁵ This system of categorisation aligns with BS 8596:2015 Surveying for bats in trees and woodland (BSI, 2015).

- High – A structure or tree with one or more potential roost sites that are obviously suitable for use by larger numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions³ and surrounding habitat.

The PRA was carried out within the respective survey areas in 2021 and 2023 as shown in **Figure 7.6**, with additional detailed surveys in 2023 and 2024 undertaken in the woodland within the Site around the access junction with the B738 road.

4.2.2 Automated Activity Surveys

NatureScot et al. (2021) recommends that, “Where developments have more than ten turbines, detectors should be placed within the developable area at ten potential turbine locations plus a third of additional potential turbine sites up to a maximum of 40 detectors for the largest developments”.

Automated bat surveys for the Proposed Development were undertaken before the release of the NatureScot et al. (2021) guidance and were undertaken in line with the active and relevant guidance at that time, i.e., Hundt (2012). However, as is highlighted below, the surveys undertaken in 2017 are in exceedance of NatureScot et al. (2021) guidance requirements for the Proposed Development.

The Proposed Development layout at the time of survey in 2017 included eight proposed turbines. An eight-turbine development would therefore require eight locations to be sampled. Detectors were placed at the eight potential turbine locations across the Site, deployed seasonally (three deployment periods) from July to September (see also **Annex B**); this greatly exceeds the four sample locations that would be required for a four-turbine development such as the Proposed Development. NatureScot et al. (2021) also recommends a minimum of ten consecutive nights of sampling per seasonal deployment, surveys in 2017 were undertaken over 11-12 consecutive nights each deployment period. Detector locations are shown in **Figure 7.6**, and despite the change in turbine locations since surveys were undertaken, the spread of detectors in relation to the Proposed Development and typical habitats and features continues to provide an accurate and suitable representation of bat activity at the Site.

Anabat Express detectors recording zero-crossing files were deployed across the Site and were positioned at a height of 2 m above ground level. Each detector recorded bats from dusk to dawn with detectors starting 30 minutes before dusk and finishing 30 minutes after dawn. Detector operating times and a description of the habitat type at each location is shown in **Table B-1 of Annex B**.

Zero-crossing detectors were deployed across the Site. The Express detectors were deployed with a sensitivity value of 8 (High).

Data was analysed using Kaleidoscope 4 and Pro Auto ID classifier which assigns a species label to a sound file (Reason et al. 2016). To ensure that all bat calls (with the exception of common and soprano pipistrelle which were excluded) were identified correctly by the software, they were manually reviewed by an appropriately trained ecologist using Kaleidoscope Viewer and AnalookW software. This method of analysis is in line with current guidelines for data analysis which recommends the manual checking of all non-*Pipistrellus* calls (excluding *Nathusius*' pipistrelle)

when using automated methods (Collins, 2023). Sound files labelled as noise were also reviewed. Guidance on call parameters was taken from Russ (2012).

At the time of preparing this report (July 2024), the secure online tool Ecobat (Mammal Society, 2017) was not available and therefore alternative quantitative methods may be used to assess bat activity levels.

4.3 Methods for Analysing Bat Activity Levels and Risks

NatureScot *et al.* (2021) details the methodology for analysing bat activity levels. This method is summarised below and involves the following modified steps (due to Ecobat being offline at the time of reporting):

1. Calculating bat passes per hour (bpph) for Bat Activity Level;
2. Categorising collision risk of the relevant species;
3. Identifying population relevant abundance (size of the populations);
4. Categorising the potential vulnerability of bat populations by combining collision risk with population abundance;
5. Categorising the Site risk level; and
6. An assessment of significance and mitigation.

The following sections outline the methods used in each step.

4.3.1 Step 1: Calculating Bat Passes Per Hour

To generate a bat activity index value and allow a comparison between locations, species and seasons, the number of bpph was calculated. This method refers to the number of bat passes as opposed to the number of individual bats recorded, as it is not possible to definitively identify individual bats and the total number of individual bats present. The data analysis did not include any noise files. The bpph is used to provide a quantitative measure of bat activity across the Site.

4.3.2 Step 2: Vulnerability to Collision

Appendix 3 of NatureScot *et al.* (2021) presents a generic assessment of vulnerability to collision for UK species, based on species behaviour, flight characteristics and casualties in the UK and Europe. **Table 4-1** provides a summary of the vulnerability of each bat species to collision.

Table 4-1: Vulnerability of Bat Species to Turbine Impact in the UK

Risk of Turbine Impact (Collision Risk)		
Low Risk	Medium Risk	High Risk
Myotis spp.	Serotine	Common pipistrelle
Long-eared bats	Barbastelle	Soprano pipistrelle
Horseshoe bats		Noctule
		Leisler's bat
		Nathusius' pipistrelle

Habitat characteristics at the location of turbines can have an important influence on the vulnerability of bat species to collision. For example, proximity to key feeding sites and commuting routes such as water features and woodland edge habitats is known to increase the likelihood of bat collision (NatureScot et al. (2021)).

4.3.3 Step 3: Population Relative Abundance

NatureScot et al. (2021) details the sensitivity of a bat species to impact based on their population's relative abundance in Scotland as detailed in **Table 4-2**. Species with the rarest relative abundance are more susceptible to significant effects.

Table 4-2: Population Relative Abundance of Bats in Scotland

Relative Abundance	Species
Common	Common pipistrelle (<i>Pipistrellus pipistrellus</i>)
	Soprano pipistrelle (<i>Pipistrellus pygmaeus</i>)
Rarer	Brown long-eared bat (<i>Plecotus auritus</i>)
	Daubenton's bat (<i>Myotis daubentonii</i>)
	Natterer's bat (<i>Myotis nattereri</i>)
Rarest	Whiskered bat (<i>Myotis mystacinus</i>)
	Brandt's bat (<i>Myotis brandtii</i>)
	Nathusius' pipistrelle (<i>Pipistrellus nathusii</i>)
	Noctule bat (<i>Nyctalus noctule</i>)
	Leisler's bat (<i>Nyctalus leisleri</i>)

4.3.4 Step 4: Potential Vulnerability of Bat Populations

Table 4-3 below, sourced from NatureScot et al. (2021), uses the measure of collision risk, in combination with population relative abundance, to indicate the potential vulnerability of populations of British bat species. The overall potential vulnerability of bat populations is identified as: low (yellow), medium (orange), high (red).

Table 4-3: Level of Potential Vulnerability of Populations of British Bat Species

Relative Abundance of Bats in Scotland	Collision Risk		
	Low collision risk	Medium collision risk	High collision risk
	Common species		
			Common pipistrelle Soprano pipistrelle
	Rarer species		
	Brown long-eared bat Daubenton's bat Natterer's bat		
	Rarest species		
	Whiskered bat Brandt's bat		Nathusius' pipistrelle Noctule bat Leisler's bat

4.3.5 Step 5: Categorise the Site Risk Level

The Site risk level is categorised through a combination of habitat risk and project size which is then entered into the table matrix as shown below in

Table 4-4 to calculate the overall Site risk level. The full matrix table, as provided within NatureScot *et al.* (2021), is shown in **Annex C** of this report which includes descriptions on how to determine the habitat risk and project size for the Proposed Development.

Table 4-4: Initial Site Risk Level (1-5) Assessment

		Project Size		
Habitat Risk		Small	Medium	Large
	Low	1	2	3
	Moderate	2	3	4
	High	3	4	5
Key: Green (1-2) – low/lowest site risk; Amber (3) – medium site risk; Red (4-5) – high/highest site risk ⁶				

4.3.6 Step 6: Assessment of Significance and Mitigation

The outputs of the bpph analysis detailed in Step 1 above are then used to assess the significance of effect within the Ecological Impact Assessment (EclA). At this stage, other Site-specific factors should be considered such as habitat characteristics (and how they may change), behaviour of species at the Proposed Development, and location of the Proposed Development regarding the natural range of the species and how this could affect favourable conservation status.

Mitigation measures as detailed within Section 7.1 of NatureScot *et al.* (2021) are then considered where appropriate.

5 BAT SURVEY LIMITATIONS

The NatureScot *et al.* (2021) guidance recommends the minimum level of pre-application survey required for ground level static detectors to be ten nights of recordings in each of spring (April - May), summer (June to mid-August) and autumn (mid-August - October). In Scotland, due to unfavourable weather conditions and low activity levels for bats in April, ground-level automated activity surveys commenced in July and were completed in October. Although two summer deployments were completed, not completing a spring deployment was not considered a limitation, due to better weather conditions from June onwards and bat activity would be considered to be higher in the summer than the spring.

Automated activity surveys should capture a sufficient number of nights (minimum of ten nights) with appropriate weather conditions for bat activity (i.e., temperatures at or above of 8°C in

⁶ Some sites could conceivably be assessed as being of no (0) risk to bats. This assessment is only likely to be valid in more extreme environments, such as above the known altitudinal range of bats, or outside the known geographical distribution of any resident British species.

Scotland at dusk, maximum ground level wind speed of 5 m/s and no, or only very light, rainfall) (NatureScot *et al*, 2021).

Some temporal calls were assigned an unknown value (NoID), due to the recording of a very faint call or an incomplete call that could not be identified to species level on the spectrogram. These were not considered further in the analysis.

For some *Nyctalus* spp. calls it was only possible to identify the call to genus level.

Anabat detectors are a commonly used bat detector for acoustic monitoring at wind farm sites, however all bat detectors have limitations and will only monitor bat activity within a limited area, which for Anabats is usually around 30 m, depending on a variety of environmental factors. Furthermore, due to passive monitoring methodologies depending on sound reaching the microphone, the detection rate of bat calls varies with a bias towards loud bat calls with quieter calls, namely brown long-eared bats (low collision risk species), potentially being under-recorded.

6 SURVEY RESULTS & ANALYSIS

6.1 Desk-Based Assessment

The NBN Atlas data search² returned records of the following bat species within 10 km of the Proposed Development between 2008 – 2023 inclusive:

- Daubenton's;
- Natterer's;
- *Myotis* spp.;
- Leisler's;
- Common pipistrelle;
- Soprano pipistrelle; and
- Brown long-eared bat.

Details regarding licences and data providers for these records are included in **Table 6-1** below.

Table 6-1 Data Providers for NBN Atlas Scotland Records Used

Species	Data Provider	Licence
Daubenton's	Scottish Natural Heritage (SNH)/British Trust for Ornithology (BTO) (Southern Scotland Bat Survey)	OGL ⁷
Natterer's	SNH/BTO (Southern Scotland Bat Survey)	OGL ⁷
<i>Myotis</i> spp.	SNH/BTO (Southern Scotland Bat Survey)	OGL ⁷
Leisler's	SNH/BTO (Southern Scotland Bat Survey)	OGL ⁷

⁷ Open Government Licence (OGL) <https://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/> [Accessed June 2024].

Species	Data Provider	Licence
Common pipistrelle	Biological Records Centre (Stebbing, R.E.) & SNH/BTO (Southern Scotland Bat Survey)	CC-YY ⁸ OGL ⁷
Soprano pipistrelle	SNH/BTO (Southern Scotland Bat Survey)	OGL ⁷
Brown long-eared bat	SNH/BTO (Southern Scotland Bat Survey)	OGL ⁷

6.2 Preliminary Bat Roost Assessment

The PRA survey for the Proposed Development was undertaken by MacArthur Green in July 2021 and July 2023. Additional surveys were conducted in March and June 2024 in the area around the access junction with the B738 road. Associated PRF records are shown in **Figure 7.6** with the detailed results (target notes) listed in **Annex D, Table D-1**.

In summary, there was one group of trees recorded in 2023 which contained low potential suitability for roosting bats (shown in **Figure 7.6**). In 2024, no PRFs were recorded in the survey area and a previously recorded area of interest was resurveyed in further detail and classified as negligible.

No features with moderate or high suitability for roosting bats were recorded within 200 m plus rotor radius of a proposed turbine locations and as such no further surveys were required.

6.3 Automated Activity Surveys

MacArthur Green deployed detectors at eight locations at the Site from July to September in 2017 over a total period of 35 days and collected 280 complete recording nights of data, see **Table B-1** of **Annex B** and **Figure 7.6**.

A total of seven bat species and one bat genus were recorded at these locations. The total number of bat passes recorded for each species across all the locations within the Site are shown below in **Table 6-2**.

Table 6-2 Total Number of Bat Passes for Each Species Across all Locations

Species/Species Group	No of Registrations	Percentage of total (%)
Soprano pipistrelle	1,486	64.92
Common pipistrelle	511	22.32
Daubenton's	59	2.58
Brown long-eared	96	4.19
Nyctalus spp.	1	0.04
Nathusius' pipistrelle	1	0.04
Noctule	90	3.93

⁸ Creative Commons with Attribution 4.0 (CC-BY) <https://creativecommons.org/licenses/by/4.0/> [Accessed June 2024]

Species/Species Group	No of Registrations	Percentage of total (%)
Leisler's	45	1.97
Total	2,289⁹	100

The summarised results and analysis are presented in Steps 1 – 6 below.

6.3.1 Step 1: Bat Activity Levels (using bpph)

Bat Activity Levels Across the Site and Through the Seasons

Data on the activity levels for all species across the Site and through the seasons is provided in **Table E-1 of Annex E**. Professional judgement was used to assess the Site risk.

The bpph for each bat species found at each location across the three visits¹⁰ are shown in **Table 6-3**; see also **Figures 7.7 - 7.9** in relation to high collision risk species. There are several bat species that were not recorded over the deployment period at several of the locations.

Table 6-3 Bat Passes per Hour for Each Species Across all Locations and Visits

Common pipistrelle			
	Visit 1 bpph	Visit 2 bpph	Visit 3 bpph
Location 1	0.038	0.093	0.006
Location 2	0.314	0.815	0.119
Location 3	0.381	0.380	0.289
Location 4	0.029	0.046	0.050
Location 5	0.019	0.046	0.019
Location 6	0.057	0.120	0.019
Location 7	0.057	0.139	0.000
Location 8	0.019	1.333	0.096
Soprano pipistrelle			
	Visit 1 bpph	Visit 2 bpph	Visit 3 bpph
Location 1	0.019	0.111	0.013
Location 2	0.543	2.398	0.277
Location 3	1.505	5.639	0.377
Location 4	0.048	0.176	0.025
Location 5	0.019	0.139	0.013
Location 6	0.181	0.231	0.006
Location 7	0.229	0.444	0.006
Location 8	0.095	0.944	0.041
Nyctalus spp.			

⁹ NoID call registrations were not considered for analysis.

¹⁰ Nathusius' pipistrelle has not been included in Table 6-3 as only one bat pass was recorded during Visit 2.

	Visit 1 bpph	Visit 2 bpph	Visit 3 bpph
Location 1	0.029	0.046	0.013
Location 2	0.029	0.120	0.006
Location 3	0.086	0.148	0.000
Location 4	0.019	0.037	0.000
Location 5	0.000	0.120	0.006
Location 6	0.124	0.056	0.006
Location 7	0.000	0.176	0.000
Location 8	0.019	0.213	0.000
Daubenton's			
	Visit 1 bpph	Visit 2 bpph	Visit 3 bpph
Location 1	0.000	0.000	0.000
Location 2	0.000	0.009	0.013
Location 3	0.076	0.028	0.000
Location 4	0.000	0.000	0.006
Location 5	0.000	0.028	0.006
Location 6	0.010	0.028	0.013
Location 7	0.095	0.046	0.000
Location 8	0.000	0.167	0.007
Brown long-eared			
	Visit 1 bpph	Visit 2 bpph	Visit 3 bpph
Location 1	0.000	0.037	0.000
Location 2	0.000	0.111	0.031
Location 3	0.038	0.148	0.025
Location 4	0.000	0.009	0.031
Location 5	0.000	0.056	0.006
Location 6	0.000	0.037	0.019
Location 7	0.000	0.185	0.000
Location 8	0.000	0.065	0.027

Site Activity Levels

Throughout the survey period, for all species, the 26/08/2017, 30/08/2017 and 22/08/2017 recorded the highest total bat passes across all eight detectors: 339, 327 and 305 respectively.

Overall, the highest total bpph (5.6 bpph) was recorded during visit 2 at Location 3 for soprano pipistrelle.

During Visit 1, the maximum bpph for all species was at Location 3 with 2.08 bpph, and the minimum was at Location 5 with 0.04 bpph (**Chart 6-1**). Location 3 was located along a plantation edge and within a short distance of Loch More. Bats are known to use woodland edges as commuting corridors and the Loch provides good foraging opportunities. Location 3 is over 610 m from the nearest proposed turbine (T2). Over all Locations during visit 1, the bat species with the maximum bpph was soprano pipistrelle which had the highest bpph at 1.51, again at Location 3 (**Table 6-3**). There was a total of 428 bat passes at Visit 1.

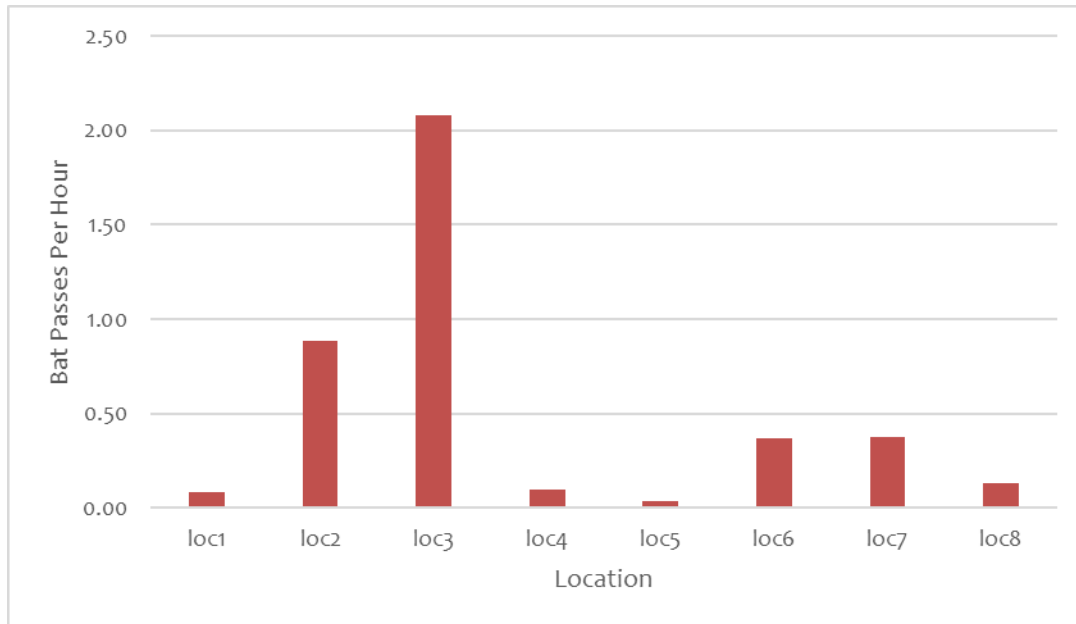


Chart 6-1: Visit 1 Bat Passes Per Hour at each Location

During Visit 2, the maximum bpph for all species was at Location 3 with 6.31 bpph, and the minimum was at Location 4 with 0.27 bpph (**Chart 6-2**). Over all Locations during visit 2, the bat species with the maximum bpph was soprano pipistrelle which had the highest bpph at 5.64, at Location 3 (**Table 6-3**). There was a total of 1,614 bat passes at Visit 2.

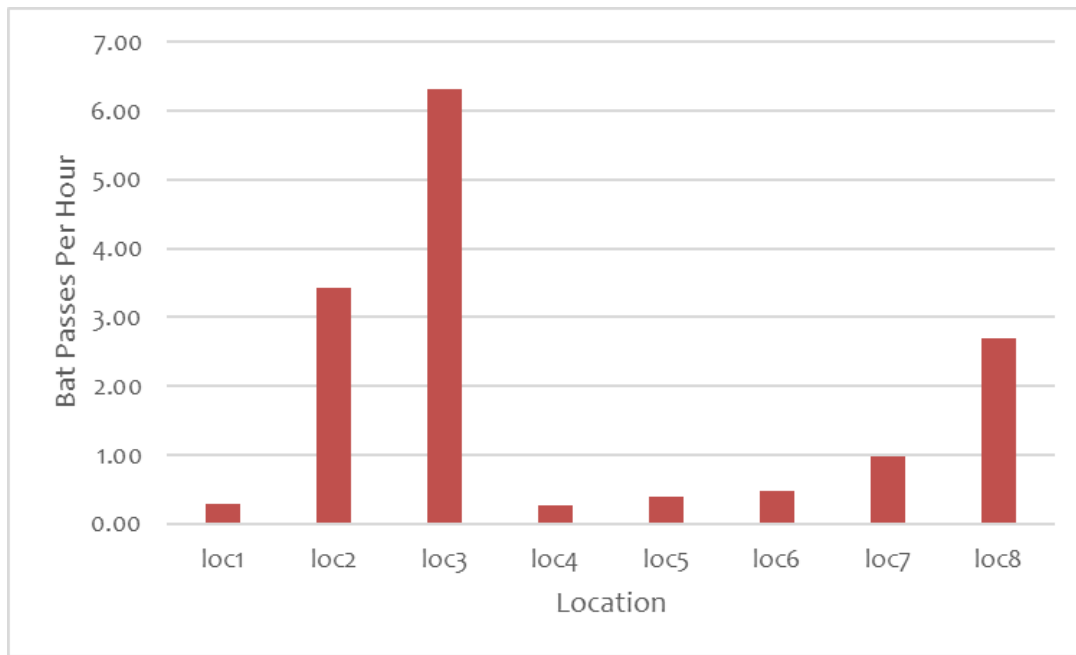


Chart 6-2: Visit 2 Bat Passes Per Hour at each Location

During Visit 3, the maximum bpph for all species was at Location 3 with 0.69 bpph, and the minimum was at Location 7 with 0.01 bpph (**Chart 6-3**). Over all Locations during visit 3, the bat species with the maximum bpph was soprano pipistrelle which had the highest bpph with 0.38, again at Location 3 (**Table 6-3**). There was a total of 259 bat passes at Visit 3.

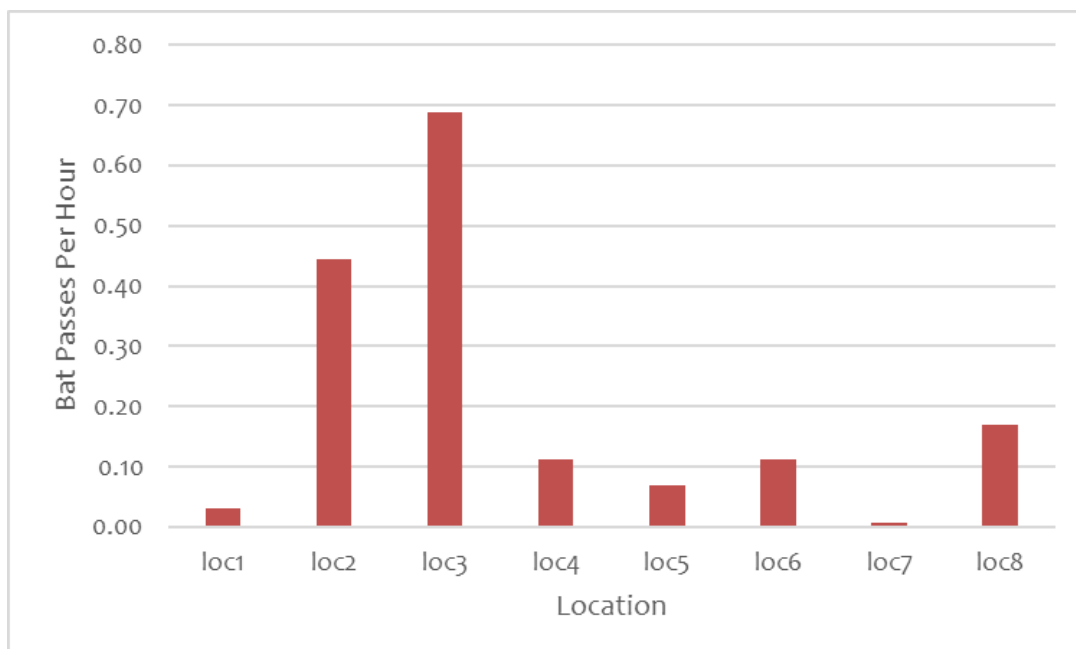


Chart 6-3: Visit 3 Bat Passes Per Hour at each Location

6.3.2 Step 2, 3 and 4: Collision Risk, Population Relative Abundance and Potential Vulnerability

Table 6-4 details the collision risk, population relative abundance and potential vulnerability of the bat species recorded at the Proposed Development.

Table 6-4: Collision Risk, Population Relative Abundance and Potential Vulnerability

Bat Species	Collision Risk	Population Relative Abundance	Potential Vulnerability
Soprano pipistrelle	High	Common	Medium
Common pipistrelle	High	Common	Medium
Daubenton's	Low	Rarer	Low
Brown long-eared	Low	Rarer	Low
<i>Nyctalus</i> spp.	High	Rarest	High
Nathusius' pipistrelle	High	Rarest	High
Noctule	High	Rarest	High
Leisler's	High	Rarest	High

6.3.3 Step 5: Categorising Site Risk Level

The Site risk level is determined by project size and habitat risk (see

Table 4-4). The Proposed Development consists of 4 turbines that are over 50 m in height, there are also few other turbines or wind farm developments within 10 km of the Site, and so the Proposed Development is considered to fall within the 'Small' project size, as shown in

Table 4-4 and **Table C-1** of **Annex C**.

In terms of habitat risk for bats, there are no buildings, structures, or trees with moderate and/or high bat roosting potential within 200 m plus the rotor radius of turbines. Foraging habitat quality and connectivity within this buffer area is low with a largely treeless environment and small open watercourses and a fairly homogenous area of open grazed grassland and moorland habitat present, resulting in a habitat risk classification of '**Low**' as shown in

Table 4-4 and **Table C-1** of **Annex C**.

According to

Table 4-4 above, the '**Small**' project size combined with a '**Low**' habitat risk level results in an overall Site risk assessment of '**Low/Lowest**' (1).

6.3.4 Step 6: Risk Assessment – High Collision Risk Species Only

In analysing bat activity levels, professional judgement has been used previously in the absence of any recognised standard measure to define levels as being high, medium or low. This took into consideration the geographical and site location and habitats present as well as professional experience. NatureScot *et al.* (2021) recommends the use of Ecobat as a measure of activity levels.

Ecobat analyses activity levels during nights where bat activity was recorded and assigns a value to the activity levels (low, low/moderate, moderate, moderate/high or high) for each location on each night. These values are based on a comparison with other surveys within the local area. While this provides an objective assessment of activity levels in a given area, the reliability of the results can be impacted by how many previous surveys within the comparison radius have been submitted to Ecobat. As noted above, at the time of preparation of this Technical Appendix the Ecobat tool was still offline and unavailable. Furthermore, as surveys for the Proposed Development were undertaken in 2017 and thus before the release and use of Ecobat, there is unlikely to be sufficient, if any, comparison data within the Ecobat database or tool to allow any meaningful comparison with the Site.

Therefore, Site specific details, knowledge of bat species behaviour, professional judgement and experience from other and similar projects has been used to assess the bat activity levels at the Proposed Development as high, medium or low. While the appraisal of activity levels was ascertained using professional judgement, the risk assessment has taken due consideration of the NatureScot *et al.* (2021) guidance, as shown in the preceding sections above to provide an assessment of risk.

The overall risk assessment is undertaken for high collision risk species which were identified at the Site. Low-risk species have a low risk of collision with a turbine blade, so the impact of the Proposed Development on the local bat population would likely be negligible, particularly also considering the low bpph recorded for these species at the Site (Section 6.3.1).

As per **Table 6-3**, bpph numbers are generally low/very low for the high collision risk species, with only one species at one location, in one Visit recorded as having more than 2 bpph - soprano pipistrelle at Location 3 on Visit 2. **Figures 7.7 - 7.9** also illustrate the results of the bpph seasonal bat activity for high collision risk bat species recorded at the Proposed Development¹¹ at each survey location, illustrating how bat activity varies within the Site across the year and by species. This data is also presented in **Table E-1** of **Annex E** which includes the bpph, bat passes per night and maximum bat activity (bat count per night). Based on the data collected, only Location 3 on Visit 2 was considered of potentially Moderate risk for soprano pipistrelle, with Location 3 being distant to proposed infrastructure, as discussed above. All other Locations across the season were determined as Low risk or had no bat activity.

Overall, as can be seen from **Table 6-3** and **Figures 7.7 – 7.9**, the bpph and general Site risk for all high collision risk species is deemed to be Low, and therefore the overall collision risk to all bat species at the Proposed Development is also considered to be Low.

¹¹ Note, no Figure is included for Nathusius' pipistrelle as only a single bat pass was recorded throughout the survey period for this species.

7 REFERENCES

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ANNEX A. BATS LEGAL STATUS

The information contained in this Annex is a summarised version of the legislation and should be read in conjunction with the appropriate legislation.

All bat species receive protection under the Conservation (Natural Habitats, &c.) Regulations 1994 (as amended)¹².

For any wild bat species, it is an offence to deliberately or recklessly:

- capture, injure or kill a bat;
- harass a bat or group of bats;
- disturb a bat in a roost (any structure or place it uses for shelter or protection);
- disturb a bat while it is rearing or otherwise caring for its young;
- obstruct access to a bat roost or otherwise deny an animal use of a roost;
- disturb a bat in a manner or in circumstances likely to significantly affect the local distribution or abundance of the species;
- disturb a bat in a manner or in circumstances likely to impair its ability to survive, breed or reproduce, or rear or otherwise care for its young; and
- disturb a bat while it is migrating or hibernating.

It's also an offence to:

- damage or destroy a breeding site or resting place of such an animal (whether or not deliberately or recklessly); and
- keep, transport, sell or exchange, or offer for sale or exchange any wild bat (or any part or derivative of one) obtained after 10 June 1994¹³.

¹² Sections 39(1) – (3).

¹³ Available online: <https://www.nature.scot/professional-advice/protected-areas-and-species/protected-species/protected-species-z-guide/protected-species-bats> [Accessed November 2023].

Table A-1 Legal and Conservation Status of all UK Bats¹⁴

Species	Legislation / Convention													
	Bern Convention Appendix II	Bonn Convention Appendix II	WCA	Habitats Directive Annex IV	Habitats Directive Annex II	Habs Regs 1994 (as amended) Scotland	Conservation of Habs & Species Regs 2010	Conservation Regs (N Ireland) 1995	CROW Act 2000	NERC Act 2006	Wild Mammals Protection Act	UK BAP Priority species	IUCN Red List*	EUROBATS Agreement
Greater horseshoe bat	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	LC	✓
Lesser horseshoe bat	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	LC	✓
Daubenton's bat	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓		LC	✓
Natterer's bat	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓		LC	✓
Whiskered bat	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓		LC	✓
Brandt's bat	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓		LC	✓
Bechstein's bat	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	NT	✓
Alcathoe bat	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓		DD	✓
Noctule	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	LC	✓
Leisler's bat	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓		LC	✓
Serotine	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓		LC	✓
Common pipistrelle	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓		LC	✓
Soprano pipistrelle	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	LC	✓
Nathusius' pipistrelle	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓		LC	✓
Brown long-eared bat	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	LC	✓
Grey long-eared bat	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓		LC	✓
Barbastelle	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	NT	✓
Greater mouse-eared bat	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓		LC	✓

*IUCN categories: LC is Least Concern, NT is Near Threatened, DD is Data deficient; see www.iucnredlist.org for more details.

¹⁴ Source: Bat Conservation Trust. Available online: http://www.bats.org.uk/pages/bats_and_the_law.html [Accessed November 2023].

ANNEX B. SURVEY TIMINGS & ANABAT LOCATIONS**Table B-1 Description of Anabat Locations and Summary of Temporal Survey Effort**

Location	Easting	Northing	Bearing	Habitat	Total Number of Complete Recording Nights		
					Visit 1 19/07/2017 – 31/07/2017	Visit 2 21/08/2017 – 31/08/2017	Visit 3 22/09/2017 – 04/10/2017
1	196184	562421	360	Open ground.	12	11	12
2	196539	562510	130	Plantation edge.	12	11	12
3	196829	562459	50	Plantation edge.	12	11	12
4	196308	562131	90	Open ground.	12	11	12
5	196633	562161	180	Within 250 m of Loch More.	12	11	12
6	196957	562055	230	Within 250 m of Loch More.	12	11	12
7	197356	562015	40	Open ground.	12	11	12
8	197148	561714	90	Open ground.	12	11	12
Total					280		

ANNEX C. INITIAL SITE RISK ASSESSMENT

Table C-1 Initial Site Risk Assessment¹⁵.

Site Risk Level (1-5) ¹⁶		Project Size		
Habitat Risk		Small	Medium	Large
	Low	1	2	3
	Moderate	2	3	4
	High	3	4	5
Key: Green (1-2) – low/lowest site risk; Amber (3) – medium site risk; Red (4-5) – high/highest site risk				
Habitat Risk	Description			
Low	Small number of potential roost features, of low quality. Low-quality foraging habitats that could be used by small numbers of foraging bats. Isolated site not connected to the wider landscape by prominent linear features.			
Moderate	Buildings, trees or other structures with moderate-high potential as roost sites on or near the site. Habitat could be used extensively by foraging bats. Site is connected to the wider landscape by linear features such as scrub, tree lines and streams.			
High	Numerous suitable buildings, trees (particularly mature ancient woodland) or other structures with moderate-high potential as roost sites on or near the site, and/or confirmed roosts present close to or on the site. Extensive and diverse habitat mosaic of high quality for foraging bats. Site is connected to the wider landscape by a network of strong linear features such as rivers, blocks of woodland and mature hedgerows. At/near edge of range and or an important flyway. Close to key roost and /or swarming.			
Project Size	Description			
Small	Small scale development (<10 turbines). No other wind energy developments within 10 km. Comprising turbines <50 m in height.			
Medium	Larger developments (between 10 and 40). May have some other wind development within 5 km. Comprising turbines 50 – 100 m in height.			
Large	Largest developments (>40 turbines) with other wind energy developments within 5 km. Comprising turbines >100 m in height.			

¹⁵ Sourced from: NatureScot, Natural England, Natural Resources Wales, Renewable UK, Scottish Power Renewables, Ecotricity Ltd, the University of Exeter & Bat Conservation Trust (BCT). (2021). *Bats and Onshore Wind Turbines: Survey Assessment and Mitigation*.

¹⁶ Some sites could conceivably be assessed as being of no (0) risk to bats. This assessment is only likely to be valid in more extreme environments, such as above the known altitudinal range of bats, or outside the known geographical distribution of any resident British species.

ANNEX D. PRELIMINARY BAT ROOST ASSESSMENT

Table D-1 Preliminary Bat Roost Assessment Target Notes

PRF_ID	Feature	Survey Date	Notes	PRF Category	Grid Reference
PS30	Tree	12/07/2023	A cluster of eight dead Scots pine trees with peeling bark and branch breaks. Features are not big enough for roosting in large numbers. Features were noted on average of 8 m from the ground.	Low	NW 98035 61700

ANNEX E. SEASONAL LOCATION SPECIFIC DATA

Table E- 1 Seasonal Location Specific Data for all Species

Location ID	Species	Visit	Survey Date	Maximum bat count per night (during Visit) ¹⁷	bat passes per night	bat passes per hour
loc1	NYCLEI	v1	2017-07-20	1	0.08	0.01
loc1	NYCLEI	v1	2017-07-22	1	0.08	0.01
loc1	NYCNOC	v1	2017-07-23	1	0.08	0.01
loc1	PIPPIP	v1	2017-07-21	1	0.08	0.01
loc1	PIPPIP	v1	2017-07-27	1	0.08	0.01
loc1	PIPPIP	v1	2017-07-25	1	0.08	0.01
loc1	PIPPIP	v1	2017-07-26	1	0.08	0.01
loc1	PIPPYG	v1	2017-07-29	1	0.08	0.01
loc1	PIPPYG	v1	2017-07-22	1	0.08	0.01
loc2	NYCNOC	v1	2017-07-23	2	0.17	0.02
loc2	NYCNOC	v1	2017-07-25	2	0.08	0.01
loc2	PIPPIP	v1	2017-07-19	14	0.17	0.02
loc2	PIPPIP	v1	2017-07-20	14	0.17	0.02
loc2	PIPPIP	v1	2017-07-28	14	0.67	0.08
loc2	PIPPIP	v1	2017-07-25	14	0.08	0.01
loc2	PIPPIP	v1	2017-07-29	14	0.25	0.03

¹⁷ The maximum bat count per night is the maximum number of bat passes recorded at the respective Location on the respective seasonal survey visit, per species.

Location ID	Species	Visit	Survey Date	Maximum bat count per night (during Visit) ¹⁷	bat passes per night	bat passes per hour
loc2	PIPIIP	v1	2017-07-24	14	0.17	0.02
loc2	PIPIIP	v1	2017-07-30	14	0.08	0.01
loc2	PIPIIP	v1	2017-07-26	14	1.17	0.13
loc2	PIPPYG	v1	2017-07-28	20	0.75	0.09
loc2	PIPPYG	v1	2017-07-23	20	1.67	0.19
loc2	PIPPYG	v1	2017-07-20	20	1.25	0.14
loc2	PIPPYG	v1	2017-07-25	20	0.33	0.04
loc2	PIPPYG	v1	2017-07-29	20	0.75	0.09
loc3	MYODAU	v1	2017-07-20	4	0.17	0.02
loc3	MYODAU	v1	2017-07-27	4	0.08	0.01
loc3	MYODAU	v1	2017-07-28	4	0.08	0.01
loc3	MYODAU	v1	2017-07-22	4	0.33	0.04
loc3	NYCNOC	v1	2017-07-20	3	0.08	0.01
loc3	NYCNOC	v1	2017-07-22	3	0.25	0.03
loc3	NYCNOC	v1	2017-07-30	3	0.08	0.01
loc3	NYCNOC	v1	2017-07-23	3	0.08	0.01
loc3	NYCNOC	v1	2017-07-25	3	0.17	0.02
loc3	NYCNOC	v1	2017-07-26	3	0.08	0.01
loc3	PIPIIP	v1	2017-07-28	18	0.08	0.01
loc3	PIPIIP	v1	2017-07-22	18	0.33	0.04
loc3	PIPIIP	v1	2017-07-20	18	0.50	0.06

Location ID	Species	Visit	Survey Date	Maximum bat count per night (during Visit) ¹⁷	bat passes per night	bat passes per hour
loc3	PIPPIP	v1	2017-07-23	18	0.75	0.09
loc3	PIPPIP	v1	2017-07-25	18	1.50	0.17
loc3	PIPPIP	v1	2017-07-29	18	0.17	0.02
loc3	PIPPYG	v1	2017-07-20	50	4.17	0.47
loc3	PIPPYG	v1	2017-07-28	50	0.17	0.02
loc3	PIPPYG	v1	2017-07-23	50	1.92	0.22
loc3	PIPPYG	v1	2017-07-22	50	2.83	0.32
loc3	PIPPYG	v1	2017-07-25	50	2.92	0.33
loc3	PIPPYG	v1	2017-07-29	50	1.08	0.12
loc3	PIPPYG	v1	2017-07-30	50	0.08	0.01
loc3	PLEAUR	v1	2017-07-25	1	0.08	0.01
loc3	PLEAUR	v1	2017-07-22	1	0.08	0.01
loc3	PLEAUR	v1	2017-07-29	1	0.08	0.01
loc3	PLEAUR	v1	2017-07-23	1	0.08	0.01
loc4	NYCNOC	v1	2017-07-23	2	0.17	0.02
loc4	PIPPIP	v1	2017-07-25	2	0.08	0.01
loc4	PIPPIP	v1	2017-07-28	2	0.17	0.02
loc4	PIPPYG	v1	2017-07-20	2	0.17	0.02
loc4	PIPPYG	v1	2017-07-22	2	0.08	0.01
loc4	PIPPYG	v1	2017-07-23	2	0.08	0.01
loc4	PIPPYG	v1	2017-07-25	2	0.08	0.01

Location ID	Species	Visit	Survey Date	Maximum bat count per night (during Visit) ¹⁷	bat passes per night	bat passes per hour
loc5	PIPPIP	v1	2017-07-23	1	0.08	0.01
loc5	PIPPIP	v1	2017-07-25	1	0.08	0.01
loc5	PIPPYG	v1	2017-07-22	2	0.17	0.02
loc6	MYODAU	v1	2017-07-23	1	0.08	0.01
loc6	NYCLEI	v1	2017-07-23	7	0.17	0.02
loc6	NYCLEI	v1	2017-07-24	7	0.58	0.07
loc6	NYCLEI	v1	2017-07-25	7	0.08	0.01
loc6	NYCNOC	v1	2017-07-23	2	0.08	0.01
loc6	NYCNOC	v1	2017-07-24	2	0.17	0.02
loc6	PIPPIP	v1	2017-07-23	4	0.33	0.04
loc6	PIPPIP	v1	2017-07-28	4	0.08	0.01
loc6	PIPPIP	v1	2017-07-24	4	0.08	0.01
loc6	PIPPYG	v1	2017-07-20	13	0.17	0.02
loc6	PIPPYG	v1	2017-07-23	13	1.08	0.12
loc6	PIPPYG	v1	2017-07-28	13	0.08	0.01
loc6	PIPPYG	v1	2017-07-24	13	0.25	0.03
loc7	MYODAU	v1	2017-07-20	4	0.08	0.01
loc7	MYODAU	v1	2017-07-29	4	0.25	0.03
loc7	MYODAU	v1	2017-07-24	4	0.33	0.04
loc7	MYODAU	v1	2017-07-30	4	0.08	0.01
loc7	MYODAU	v1	2017-07-22	4	0.08	0.01

Location ID	Species	Visit	Survey Date	Maximum bat count per night (during Visit) ¹⁷	bat passes per night	bat passes per hour
loc7	PIPPIP	v1	2017-07-19	3	0.08	0.01
loc7	PIPPIP	v1	2017-07-29	3	0.08	0.01
loc7	PIPPIP	v1	2017-07-28	3	0.08	0.01
loc7	PIPPIP	v1	2017-07-25	3	0.25	0.03
loc7	PIPPYG	v1	2017-07-30	8	0.08	0.01
loc7	PIPPYG	v1	2017-07-19	8	0.08	0.01
loc7	PIPPYG	v1	2017-07-29	8	0.08	0.01
loc7	PIPPYG	v1	2017-07-24	8	0.33	0.04
loc7	PIPPYG	v1	2017-07-22	8	0.33	0.04
loc7	PIPPYG	v1	2017-07-23	8	0.67	0.08
loc7	PIPPYG	v1	2017-07-28	8	0.33	0.04
loc7	PIPPYG	v1	2017-07-25	8	0.08	0.01
loc8	NYCLEI	v1	2017-07-22	1	0.08	0.01
loc8	NYCLEI	v1	2017-07-25	1	0.08	0.01
loc8	PIPPIP	v1	2017-07-19	1	0.08	0.01
loc8	PIPPIP	v1	2017-07-26	1	0.08	0.01
loc8	PIPPYG	v1	2017-07-22	3	0.17	0.02
loc8	PIPPYG	v1	2017-07-24	3	0.08	0.01
loc8	PIPPYG	v1	2017-07-25	3	0.25	0.03
loc8	PIPPYG	v1	2017-07-23	3	0.17	0.02
loc8	PIPPYG	v1	2017-07-28	3	0.17	0.02

Location ID	Species	Visit	Survey Date	Maximum bat count per night (during Visit) ¹⁷	bat passes per night	bat passes per hour
loc1	NYCLEI	v2	2017-08-30	1	0.10	0.01
loc1	NYCNOC	v2	2017-08-30	2	0.20	0.02
loc1	NYCNOC	v2	2017-08-26	2	0.20	0.02
loc1	PIPIPI	v2	2017-08-23	4	0.40	0.04
loc1	PIPIPI	v2	2017-08-28	4	0.10	0.01
loc1	PIPIPI	v2	2017-08-26	4	0.20	0.02
loc1	PIPIPI	v2	2017-08-27	4	0.10	0.01
loc1	PIPIPI	v2	2017-08-30	4	0.20	0.02
loc1	PIPPYG	v2	2017-08-26	8	0.80	0.07
loc1	PIPPYG	v2	2017-08-23	8	0.30	0.03
loc1	PIPPYG	v2	2017-08-30	8	0.10	0.01
loc1	PLEAUR	v2	2017-08-21	1	0.10	0.01
loc1	PLEAUR	v2	2017-08-28	1	0.10	0.01
loc1	PLEAUR	v2	2017-08-23	1	0.10	0.01
loc1	PLEAUR	v2	2017-08-25	1	0.10	0.01
loc2	MYODAU	v2	2017-08-30	1	0.10	0.01
loc2	NYCLEI	v2	2017-08-23	3	0.20	0.02
loc2	NYCLEI	v2	2017-08-26	3	0.30	0.03
loc2	NYCLEI	v2	2017-08-27	3	0.10	0.01
loc2	NYCNOC	v2	2017-08-30	4	0.40	0.04
loc2	NYCNOC	v2	2017-08-23	4	0.20	0.02

Location ID	Species	Visit	Survey Date	Maximum bat count per night (during Visit) ¹⁷	bat passes per night	bat passes per hour
loc2	NYCNOC	v2	2017-08-27	4	0.10	0.01
loc2	PIPPIP	v2	2017-08-30	23	1.90	0.17
loc2	PIPPIP	v2	2017-08-23	23	2.30	0.21
loc2	PIPPIP	v2	2017-08-28	23	0.90	0.08
loc2	PIPPIP	v2	2017-08-26	23	1.40	0.13
loc2	PIPPIP	v2	2017-08-27	23	0.20	0.02
loc2	PIPPIP	v2	2017-08-29	23	2.10	0.19
loc2	PIPPYG	v2	2017-08-23	91	9.10	0.84
loc2	PIPPYG	v2	2017-08-26	91	6.50	0.60
loc2	PIPPYG	v2	2017-08-30	91	7.50	0.69
loc2	PIPPYG	v2	2017-08-28	91	0.20	0.02
loc2	PIPPYG	v2	2017-08-27	91	0.90	0.08
loc2	PIPPYG	v2	2017-08-29	91	1.70	0.16
loc2	PLEAUR	v2	2017-08-23	6	0.20	0.02
loc2	PLEAUR	v2	2017-08-30	6	0.60	0.06
loc2	PLEAUR	v2	2017-08-29	6	0.40	0.04
loc3	MYODAU	v2	2017-08-23	1	0.10	0.01
loc3	MYODAU	v2	2017-08-24	1	0.10	0.01
loc3	MYODAU	v2	2017-08-27	1	0.10	0.01
loc3	NoID	v2	2017-08-22	1	0.10	0.01
loc3	NYCNOC	v2	2017-08-21	10	0.40	0.04

Location ID	Species	Visit	Survey Date	Maximum bat count per night (during Visit) ¹⁷	bat passes per night	bat passes per hour
loc3	NYCNOC	v2	2017-08-24	10	0.10	0.01
loc3	NYCNOC	v2	2017-08-26	10	1.00	0.09
loc3	NYCNOC	v2	2017-08-23	10	0.10	0.01
loc3	PIP NAT	v2	2017-08-27	1	0.10	0.01
loc3	PIPPIP	v2	2017-08-26	21	2.10	0.19
loc3	PIPPIP	v2	2017-08-21	21	0.20	0.02
loc3	PIPPIP	v2	2017-08-30	21	0.30	0.03
loc3	PIPPIP	v2	2017-08-28	21	0.10	0.01
loc3	PIPPIP	v2	2017-08-22	21	0.20	0.02
loc3	PIPPIP	v2	2017-08-23	21	1.00	0.09
loc3	PIPPIP	v2	2017-08-27	21	0.20	0.02
loc3	PIPPYG	v2	2017-08-26	282	7.40	0.68
loc3	PIPPYG	v2	2017-08-22	282	28.20	2.59
loc3	PIPPYG	v2	2017-08-21	282	2.50	0.23
loc3	PIPPYG	v2	2017-08-28	282	0.90	0.08
loc3	PIPPYG	v2	2017-08-23	282	4.80	0.44
loc3	PIPPYG	v2	2017-08-30	282	9.30	0.85
loc3	PIPPYG	v2	2017-08-27	282	7.80	0.72
loc3	PLEAUR	v2	2017-08-27	5	0.10	0.01
loc3	PLEAUR	v2	2017-08-21	5	0.10	0.01
loc3	PLEAUR	v2	2017-08-24	5	0.10	0.01

Location ID	Species	Visit	Survey Date	Maximum bat count per night (during Visit) ¹⁷	bat passes per night	bat passes per hour
loc3	PLEAUR	v2	2017-08-23	5	0.40	0.04
loc3	PLEAUR	v2	2017-08-30	5	0.40	0.04
loc3	PLEAUR	v2	2017-08-26	5	0.50	0.05
loc4	NYC	v2	2017-08-26	1	0.10	0.01
loc4	NYCLEI	v2	2017-08-30	1	0.10	0.01
loc4	NYCLEI	v2	2017-08-27	1	0.10	0.01
loc4	NYCNOC	v2	2017-08-26	1	0.10	0.01
loc4	PIPPIP	v2	2017-08-30	2	0.10	0.01
loc4	PIPPIP	v2	2017-08-24	2	0.10	0.01
loc4	PIPPIP	v2	2017-08-28	2	0.10	0.01
loc4	PIPPIP	v2	2017-08-26	2	0.20	0.02
loc4	PIPPYG	v2	2017-08-23	7	0.70	0.06
loc4	PIPPYG	v2	2017-08-28	7	0.20	0.02
loc4	PIPPYG	v2	2017-08-25	7	0.10	0.01
loc4	PIPPYG	v2	2017-08-30	7	0.40	0.04
loc4	PIPPYG	v2	2017-08-26	7	0.50	0.05
loc4	PLEAUR	v2	2017-08-30	1	0.10	0.01
loc5	MYODAU	v2	2017-08-26	3	0.30	0.03
loc5	NYCLEI	v2	2017-08-26	4	0.40	0.04
loc5	NYCLEI	v2	2017-08-30	4	0.30	0.03
loc5	NYCNOC	v2	2017-08-21	1	0.10	0.01

Location ID	Species	Visit	Survey Date	Maximum bat count per night (during Visit) ¹⁷	bat passes per night	bat passes per hour
loc5	NYCNOC	v2	2017-08-22	1	0.10	0.01
loc5	NYCNOC	v2	2017-08-28	1	0.10	0.01
loc5	NYCNOC	v2	2017-08-30	1	0.10	0.01
loc5	NYCNOC	v2	2017-08-26	1	0.10	0.01
loc5	NYCNOC	v2	2017-08-29	1	0.10	0.01
loc5	PIPPIP	v2	2017-08-28	2	0.10	0.01
loc5	PIPPIP	v2	2017-08-27	2	0.10	0.01
loc5	PIPPIP	v2	2017-08-29	2	0.20	0.02
loc5	PIPPIP	v2	2017-08-26	2	0.10	0.01
loc5	PIPPYG	v2	2017-08-26	8	0.80	0.07
loc5	PIPPYG	v2	2017-08-28	8	0.40	0.04
loc5	PIPPYG	v2	2017-08-23	8	0.10	0.01
loc5	PIPPYG	v2	2017-08-30	8	0.20	0.02
loc5	PLEAUR	v2	2017-08-26	3	0.30	0.03
loc5	PLEAUR	v2	2017-08-28	3	0.10	0.01
loc5	PLEAUR	v2	2017-08-30	3	0.20	0.02
loc6	MYODAU	v2	2017-08-25	2	0.10	0.01
loc6	MYODAU	v2	2017-08-26	2	0.20	0.02
loc6	NYCLEI	v2	2017-08-21	1	0.10	0.01
loc6	NYCNOC	v2	2017-08-30	5	0.50	0.05
loc6	PIPPIP	v2	2017-08-23	3	0.20	0.02

Location ID	Species	Visit	Survey Date	Maximum bat count per night (during Visit) ¹⁷	bat passes per night	bat passes per hour
loc6	PIPIIP	v2	2017-08-28	3	0.20	0.02
loc6	PIPIIP	v2	2017-08-27	3	0.20	0.02
loc6	PIPIIP	v2	2017-08-25	3	0.20	0.02
loc6	PIPIIP	v2	2017-08-30	3	0.30	0.03
loc6	PIPIIP	v2	2017-08-26	3	0.20	0.02
loc6	PIPPYG	v2	2017-08-24	9	0.10	0.01
loc6	PIPPYG	v2	2017-08-28	9	0.20	0.02
loc6	PIPPYG	v2	2017-08-29	9	0.10	0.01
loc6	PIPPYG	v2	2017-08-23	9	0.20	0.02
loc6	PIPPYG	v2	2017-08-30	9	0.70	0.06
loc6	PIPPYG	v2	2017-08-27	9	0.20	0.02
loc6	PIPPYG	v2	2017-08-25	9	0.10	0.01
loc6	PIPPYG	v2	2017-08-26	9	0.90	0.08
loc6	PLEAUR	v2	2017-08-25	3	0.10	0.01
loc6	PLEAUR	v2	2017-08-26	3	0.30	0.03
loc7	MYODAU	v2	2017-08-26	2	0.20	0.02
loc7	MYODAU	v2	2017-08-23	2	0.10	0.01
loc7	MYODAU	v2	2017-08-25	2	0.10	0.01
loc7	MYODAU	v2	2017-08-27	2	0.10	0.01
loc7	NYCLEI	v2	2017-08-21	2	0.20	0.02
loc7	NYCLEI	v2	2017-08-30	2	0.20	0.02

Location ID	Species	Visit	Survey Date	Maximum bat count per night (during Visit) ¹⁷	bat passes per night	bat passes per hour
loc7	NYCLEI	v2	2017-08-23	2	0.20	0.02
loc7	NYCLEI	v2	2017-08-28	2	0.20	0.02
loc7	NYCLEI	v2	2017-08-27	2	0.10	0.01
loc7	NYCNOC	v2	2017-08-25	2	0.20	0.02
loc7	NYCNOC	v2	2017-08-21	2	0.10	0.01
loc7	NYCNOC	v2	2017-08-30	2	0.20	0.02
loc7	NYCNOC	v2	2017-08-23	2	0.20	0.02
loc7	NYCNOC	v2	2017-08-28	2	0.10	0.01
loc7	NYCNOC	v2	2017-08-24	2	0.10	0.01
loc7	NYCNOC	v2	2017-08-27	2	0.10	0.01
loc7	PIPPIP	v2	2017-08-21	6	0.10	0.01
loc7	PIPPIP	v2	2017-08-23	6	0.10	0.01
loc7	PIPPIP	v2	2017-08-27	6	0.40	0.04
loc7	PIPPIP	v2	2017-08-25	6	0.20	0.02
loc7	PIPPIP	v2	2017-08-26	6	0.60	0.06
loc7	PIPPIP	v2	2017-08-24	6	0.10	0.01
loc7	PIPPYG	v2	2017-08-27	13	0.50	0.05
loc7	PIPPYG	v2	2017-08-21	13	0.50	0.05
loc7	PIPPYG	v2	2017-08-25	13	0.20	0.02
loc7	PIPPYG	v2	2017-08-26	13	1.00	0.09
loc7	PIPPYG	v2	2017-08-29	13	0.10	0.01

Location ID	Species	Visit	Survey Date	Maximum bat count per night (during Visit) ¹⁷	bat passes per night	bat passes per hour
loc7	PIPPYG	v2	2017-08-23	13	1.30	0.12
loc7	PIPPYG	v2	2017-08-30	13	0.90	0.08
loc7	PIPPYG	v2	2017-08-24	13	0.30	0.03
loc7	PLEAUR	v2	2017-08-25	4	0.20	0.02
loc7	PLEAUR	v2	2017-08-23	4	0.20	0.02
loc7	PLEAUR	v2	2017-08-28	4	0.10	0.01
loc7	PLEAUR	v2	2017-08-27	4	0.20	0.02
loc7	PLEAUR	v2	2017-08-21	4	0.10	0.01
loc7	PLEAUR	v2	2017-08-24	4	0.10	0.01
loc7	PLEAUR	v2	2017-08-26	4	0.30	0.03
loc7	PLEAUR	v2	2017-08-29	4	0.40	0.04
loc7	PLEAUR	v2	2017-08-30	4	0.40	0.04
loc8	MYODAU	v2	2017-08-29	6	0.30	0.03
loc8	MYODAU	v2	2017-08-25	6	0.30	0.03
loc8	MYODAU	v2	2017-08-27	6	0.10	0.01
loc8	MYODAU	v2	2017-08-30	6	0.30	0.03
loc8	MYODAU	v2	2017-08-23	6	0.20	0.02
loc8	MYODAU	v2	2017-08-26	6	0.60	0.06
loc8	NYCNOC	v2	2017-08-21	18	0.20	0.02
loc8	NYCNOC	v2	2017-08-26	18	0.20	0.02
loc8	NYCNOC	v2	2017-08-30	18	1.80	0.17

Location ID	Species	Visit	Survey Date	Maximum bat count per night (during Visit) ¹⁷	bat passes per night	bat passes per hour
loc8	NYCNOC	v2	2017-08-23	18	0.10	0.01
loc8	PIPPIP	v2	2017-08-26	32	1.80	0.17
loc8	PIPPIP	v2	2017-08-30	32	2.00	0.18
loc8	PIPPIP	v2	2017-08-23	32	3.20	0.29
loc8	PIPPIP	v2	2017-08-25	32	1.20	0.11
loc8	PIPPIP	v2	2017-08-29	32	0.60	0.06
loc8	PIPPIP	v2	2017-08-24	32	1.90	0.17
loc8	PIPPIP	v2	2017-08-21	32	0.70	0.06
loc8	PIPPIP	v2	2017-08-27	32	0.80	0.07
loc8	PIPPIP	v2	2017-08-22	32	1.90	0.17
loc8	PIPPIP	v2	2017-08-28	32	0.30	0.03
loc8	PIPPYG	v2	2017-08-29	41	0.10	0.01
loc8	PIPPYG	v2	2017-08-23	41	1.30	0.12
loc8	PIPPYG	v2	2017-08-27	41	0.90	0.08
loc8	PIPPYG	v2	2017-08-25	41	0.40	0.04
loc8	PIPPYG	v2	2017-08-30	41	2.80	0.26
loc8	PIPPYG	v2	2017-08-21	41	0.60	0.06
loc8	PIPPYG	v2	2017-08-26	41	4.10	0.38
loc8	PLEAUR	v2	2017-08-28	2	0.10	0.01
loc8	PLEAUR	v2	2017-08-23	2	0.20	0.02
loc8	PLEAUR	v2	2017-08-27	2	0.10	0.01

Location ID	Species	Visit	Survey Date	Maximum bat count per night (during Visit) ¹⁷	bat passes per night	bat passes per hour
loc8	PLEAUR	v2	2017-08-26	2	0.20	0.02
loc8	PLEAUR	v2	2017-08-29	2	0.10	0.01
loc1	NYCLEI	v3	2017-09-22	2	0.17	0.01
loc1	PIPIPI	v3	2017-09-24	1	0.08	0.01
loc1	PIPPYG	v3	2017-09-22	1	0.08	0.01
loc1	PIPPYG	v3	2017-09-24	1	0.08	0.01
loc2	MYODAU	v3	2017-09-22	1	0.08	0.01
loc2	MYODAU	v3	2017-09-24	1	0.08	0.01
loc2	NYCLEI	v3	2017-09-22	1	0.08	0.01
loc2	PIPIPI	v3	2017-09-29	7	0.17	0.01
loc2	PIPIPI	v3	2017-09-24	7	0.58	0.04
loc2	PIPIPI	v3	2017-09-27	7	0.08	0.01
loc2	PIPIPI	v3	2017-10-03	7	0.58	0.04
loc2	PIPIPI	v3	2017-09-30	7	0.08	0.01
loc2	PIPIPI	v3	2017-09-26	7	0.08	0.01
loc2	PIPPYG	v3	2017-09-22	15	0.67	0.05
loc2	PIPPYG	v3	2017-09-30	15	0.67	0.05
loc2	PIPPYG	v3	2017-09-24	15	1.25	0.09
loc2	PIPPYG	v3	2017-09-25	15	1.08	0.08
loc2	PLEAUR	v3	2017-09-30	3	0.08	0.01
loc2	PLEAUR	v3	2017-09-24	3	0.25	0.02

Location ID	Species	Visit	Survey Date	Maximum bat count per night (during Visit) ¹⁷	bat passes per night	bat passes per hour
loc2	PLEAUR	v3	2017-10-03	3	0.08	0.01
loc3	PIPPIP	v3	2017-09-22	20	0.33	0.03
loc3	PIPPIP	v3	2017-09-30	20	1.08	0.08
loc3	PIPPIP	v3	2017-09-24	20	0.08	0.01
loc3	PIPPIP	v3	2017-09-25	20	1.67	0.13
loc3	PIPPIP	v3	2017-09-26	20	0.67	0.05
loc3	PIPPYG	v3	2017-09-24	32	0.17	0.01
loc3	PIPPYG	v3	2017-09-22	32	1.17	0.09
loc3	PIPPYG	v3	2017-09-26	32	2.67	0.20
loc3	PIPPYG	v3	2017-09-25	32	0.75	0.06
loc3	PIPPYG	v3	2017-09-30	32	0.25	0.02
loc3	PLEAUR	v3	2017-09-26	2	0.17	0.01
loc3	PLEAUR	v3	2017-09-30	2	0.17	0.01
loc4	MYODAU	v3	2017-09-24	1	0.08	0.01
loc4	PIPPIP	v3	2017-09-22	3	0.25	0.02
loc4	PIPPIP	v3	2017-09-25	3	0.08	0.01
loc4	PIPPIP	v3	2017-09-24	3	0.08	0.01
loc4	PIPPIP	v3	2017-09-30	3	0.08	0.01
loc4	PIPPIP	v3	2017-09-27	3	0.08	0.01
loc4	PIPPIP	v3	2017-10-03	3	0.08	0.01
loc4	PIPPYG	v3	2017-09-25	3	0.08	0.01

Location ID	Species	Visit	Survey Date	Maximum bat count per night (during Visit) ¹⁷	bat passes per night	bat passes per hour
loc4	PIPPYG	v3	2017-09-22	3	0.25	0.02
loc4	PLEAUR	v3	2017-09-24	3	0.08	0.01
loc4	PLEAUR	v3	2017-09-27	3	0.08	0.01
loc4	PLEAUR	v3	2017-10-01	3	0.25	0.02
loc5	MYODAU	v3	2017-09-22	1	0.08	0.01
loc5	NoID	v3	2017-09-23	3	0.25	0.02
loc5	NYCLEI	v3	2017-09-22	1	0.08	0.01
loc5	PIPPIP	v3	2017-09-22	2	0.17	0.01
loc5	PIPPIP	v3	2017-09-30	2	0.08	0.01
loc5	PIPPYG	v3	2017-09-22	2	0.17	0.01
loc5	PLEAUR	v3	2017-09-22	1	0.08	0.01
loc6	MYODAU	v3	2017-09-22	1	0.08	0.01
loc6	MYODAU	v3	2017-09-25	1	0.08	0.01
loc6	NoID	v3	2017-10-03	8	0.67	0.05
loc6	NYCLEI	v3	2017-09-22	1	0.08	0.01
loc6	PIPPIP	v3	2017-09-22	1	0.08	0.01
loc6	PIPPIP	v3	2017-09-30	1	0.08	0.01
loc6	PIPPIP	v3	2017-09-26	1	0.08	0.01
loc6	PIPPYG	v3	2017-09-22	1	0.08	0.01
loc6	PLEAUR	v3	2017-09-29	2	0.08	0.01
loc6	PLEAUR	v3	2017-09-22	2	0.17	0.01

Location ID	Species	Visit	Survey Date	Maximum bat count per night (during Visit) ¹⁷	bat passes per night	bat passes per hour
loc7	PIPPYG	v3	2017-09-22	1	0.08	0.01
loc8	MYODAU	v3	2017-09-22	1	0.09	0.01
loc8	PIPPIP	v3	2017-09-22	5	0.45	0.03
loc8	PIPPIP	v3	2017-09-26	5	0.09	0.01
loc8	PIPPIP	v3	2017-09-27	5	0.36	0.03
loc8	PIPPIP	v3	2017-09-25	5	0.27	0.02
loc8	PIPPIP	v3	2017-09-29	5	0.09	0.01
loc8	PIPPYG	v3	2017-09-30	5	0.09	0.01
loc8	PIPPYG	v3	2017-09-22	5	0.45	0.03
loc8	PLEAUR	v3	2017-09-22	2	0.09	0.01
loc8	PLEAUR	v3	2017-09-25	2	0.09	0.01
loc8	PLEAUR	v3	2017-09-30	2	0.18	0.01

Revised Larbrax Wind Farm EIA Report

Outline Species Protection Plan

Technical Appendix 7.4

Date: 03 July 2024

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1 INTRODUCTION

MacArthur Green has prepared this outline Species Protection Plan (SPP) on behalf of the Applicant to ensure all reasonable protection measures are undertaken with regard to protected species present, or potentially present, at the Revised Larbrax Wind Farm (hereafter referred to as the 'Proposed Development').

The SPP is to be implemented during the construction and decommissioning phases of the Proposed Development, although it can also be used for guidance should the need arise for maintenance during the operational period. Its implementation will form a planning condition to the planning permission if granted.

The SPP will ensure the adequate preservation of protected species interests into all construction and decommissioning activities within the Site to safeguard the resident populations and ensure compliance with the relevant nature conservation legislation (see **ANNEX A**).

The SPP will be a live document subject to review and updating and will assist the relevant staff in the protection of species during construction and decommissioning, under the guidance of the Ecological Clerks of Works (ECoW).

2 BACKGROUND INFORMATION

Baseline habitats and protected species surveys, including associated desk studies, have been undertaken to inform the Environmental Impact Assessment Report (EIA Report) for the Proposed Development. Full details and results are reported within **Technical Appendices 7.1 – 7.3**. The SPP is designed to reflect the results of the surveys and the distinct ecology and distributions of protected species within the Site.

The baseline field surveys recorded the presence of the following protected or notable species within, or in the vicinity of, the Site:

- badger (*Meles meles*);
- brown hare (*Lepus europaeus*);
- common lizard (*Zootoca vivipara*);
- common pipistrelle (*Pipistrellus pipistrellus*);
- soprano pipistrelle (*Pipistrellus pygmaeus*);
- Nathusius' pipistrelle (*Pipistrellus nathusii*);
- Daubenton's bat (*Myotis daubentonii*);
- *Nyctalus* spp. (both Noctule (*Nyctalus noctula*) and Leisler's (*Nyctalus leisleri*)); and
- brown long-eared bat (*Plecotus auritus*).

No other protected species, or protected plant species, were recorded within the Site during baseline field surveys for the Proposed Development. Some habitats of limited suitability for otter (*Lutra lutra*) were recorded, but no signs were identified. Habitat within the Site was also considered unsuitable or of very limited suitability for pine marten (*Martes martes*), red squirrel

(*Sciurus vulgaris*), water vole (*Arvicola amphibius*) and great crested newt (*Triturus cristatus*) (GCN); see **Technical Appendix 7.2** for further details.

With respect to protected features, one single-holed active outlier badger sett was recorded within the Site during the July 2023 protected species surveys, and is situated 117 m from the nearest proposed infrastructure for the Proposed Development (i.e., an access track) (**Technical Appendix 7.2, Confidential Annex D**).

Earlier protected species surveys carried out in July 2021 identified three other badger setts (two singled-holed outliers and one three-holed subsidiary); however, these were found to no longer show signs of active use when revisited in 2023, and as such, these have been reclassified as mammal holes (see **Technical Appendix 7.2**).

With respect to potential roost features (PRFs) for bats, very few were recorded and no features with moderate or high suitability for roosting bats were recorded within 200 m plus rotor radius of a proposed turbine, or 30 m of any other infrastructure, and as such no further surveys were required; see **Technical Appendix 7.3** for full details.

3 AIMS & OBJECTIVES OF THE SPECIES PROTECTION PLAN

The Aim of the SPP is to ensure all reasonable precautions are taken by the Applicant and their contractors to safeguard protected species from disturbance, injury and death and to protect any structure or place, which any such protected species uses for growth, breeding, resting, shelter or protection during the construction and decommissioning of the Proposed Development.

The Aim of the SPP will be fulfilled by the Applicant adopting the following objectives throughout the construction and decommissioning of the Proposed Development:

- a) Objective A – Implement a monitoring and protection plan for protected species;
- b) Objective B – Follow an approved procedure if an active feature is found; and
- c) Objective C – Ensure adequate education and awareness of site personnel.

Objective A addresses the monitoring procedure to be followed to ensure that the Aim of this SPP is achieved. Objective B covers the detailed procedure in the event of a protected species feature being discovered. Objective C addresses the educational needs of appropriate personnel on the Site to further reduce the risk of an offence being committed. The procedures to be adopted that will fulfil these objectives are detailed in Section 6 below.

4 RESPONSIBILITIES

The overall responsibility for ensuring that the planning conditions and the conditions of any licence granted are adhered to, in particular those conditions relating to protected species, will lie with the Applicant. The personnel responsible for the day-to-day implementation of the SPP are detailed in **Table 4-1** below.

4.1 Role of the Ecological Clerks of Works (ECoW)

The ECoW will have the specific remit of monitoring compliance with the SPP during the construction and decommissioning phases and reporting any breaches to the Applicant's Construction Project Management Team. The ECoW's role shall involve direct monitoring of all activities on the Site to the extent the ECoW considers this to be required, and/or training of nominated personnel to carry these out in a manner likely to minimise the potential for impact on the protected species. The ECoW will also agree changes to construction operations to prevent breaches of the SPP.

Table 4-1: SPP Responsibilities

Task	Responsibility
Implementation of the SPP	The Applicant's Construction Project Management Team
Monitoring and review of the SPP	ECoW
Regular site monitoring for protected species and associated protected features, including, but not limited to; bats, reptiles, badger, red squirrel, otter, pine marten, water vole and plants listed on Annex II of (Council Directive 92/43/EEC) (the 'Habitats Directive')	ECoW or a suitably qualified ecological surveyor
Ongoing watching brief for the above	All site personnel

5 THE POTENTIAL IMPACTS OF DEVELOPMENT

Impacts on protected species can result from the physical effects of construction such as soil stripping, road laying, turbine foundation construction and noise disturbance. These operations can negatively affect protected species in a number of ways including:

- Abandonment of a holt/burrow/roost/den/sett/pond etc. due to disturbance;
- Abandonment of dependant young due to disturbance;
- Damage to or destruction of a protected feature or species;
- Damage to navigation/commuting routes (i.e. ditches, burns, fence lines etc.);
- Fragmentation of territories;
- Damage to foraging areas (e.g. areas containing amphibians or fish in the case of otter);
- Contamination of water;
- Disturbance to a protected species that results in behaviour that negatively impacts their life stage; and
- Accidental injury or death to species by machinery, tools or vehicles.

6 PROCEDURES FOR PROTECTING PROTECTED SPECIES

This section details the procedures to be followed to ensure all reasonable precautions have been adopted to protect species from disturbance, injury and death and to protect any structure or place that any such species uses for growth, breeding, resting, shelter or protection.

The level of disturbance free zones for each species is shown on Table 6-1 below. If other protected species are identified during pre-construction surveys or during construction, suitable buffer zones will be advised by the ECoW and agreed in consultation with NatureScot.

Table 6-1: Level of Protection and Recommended Disturbance Free Zones

Species Feature	Level of Protection	Disturbance Free Zone
Otter (holts, etc.)	European	30/200 metres ¹
Bat (roost)	European	30/200+ metres ²
Badger (sett)	National	30/100 metres ³
Water vole (burrow)	National	5-10 metres ⁴
Red squirrel (drey)	National	5/50 metres ⁵
Pine marten (den)	National	30/100 metres ⁶
Reptiles (hibernacula)	National	n/a ⁷

6.1 Objective A – Monitoring and Protection Plan

6.1.1 Monitoring Plan

It will be the duty of the ECoW to check the status of the protected species and any associated protected features immediately prior to construction activity progressing across Site, and to continue regular spot checks during construction for any new protected species features in the vicinity of the construction works. Where construction work is staggered across the Site, any watercourses within the vicinity of the works due to be carried out should be monitored and checked immediately prior to the commencement of works. This should occur during each phase of construction.

¹ The disturbance zone will be 30 m unless a breeding/natal holt is identified (or status of the holt is unknown), in such an instance the disturbance zone will be increased to 200 m.

² The disturbance zone will be 30 m; however, turbines must be positioned 200 m plus turbine rotor radius from known high importance roost sites (NatureScot *et al.*, 2021).

³ Disturbance is defined by NatureScot as any new procedure that approaches within a minimum of 30 m of a sett margin. For piling or blasting activities, this buffer zone is extended to 100 m.

⁴ Dependant on burrow location and bank profile.

⁵ The disturbance zone will be 5 m or one tree's distance (whichever is less) unless a breeding drey is identified, in such instances the disturbance zone will be increased to 50 m during the red squirrel breeding season (February to September inclusive) (SNH, 2020).

⁶ 100 m applied if breeding.

⁷ Due to the more limited nature of their protection and their ability to avoid machinery etc. during their active phase, no specified disturbance zone for reptiles is given; however, if a hibernaculum is discovered, an appropriate disturbance exclusion zone will be demarcated.

If it is not possible to determine the status of features during ECoW checks, further monitoring by use of camera traps may be required.

The results from the ecological baseline surveys highlighted one active outlier badger sett within the Site, although more setts have been recorded within the Site historically. A limited number of features that would potentially be suitable as reptile hibernacula (e.g., rock piles) were also recorded within the Site. No other active protected species' features were recorded within the Site; however, there is the potential for other protected species to move into the area.

Guidelines detailing the monitoring of protected species and associated protected features by the ECoW, or suitably qualified ecological surveyor, are described below.

Potential Features

- a) European Protected Species – fauna (otters and bats) and Nationally Protected Species (badger, red squirrel, mountain hare, pine marten, water vole and reptiles):

Further checks of the potential features will be completed during construction and all potential protection features will be clearly demarcated.

- i. If the status of the potential protected feature remains unoccupied, construction may occur in the area, but not damaging the potential feature under close supervision by the ECoW⁸; or
- ii. If the status of the feature changes to occupied, then the undernoted procedure for occupied sites will be followed. The ECoW will be responsible for this survey work as required.

Occupied Features

- a) European Protected Species – fauna (otters and bats):

Where an occupied feature exists within the Site or disturbance free zone, and the infrastructure cannot be micrositied away:

- i. A licence to disturb will be applied for to NatureScot; or
- ii. A licence to damage or destroy will be applied for to NatureScot if there are no reasonable alternatives.

- (b) National Protected Species (badger, red squirrel, mountain hare, pine marten, water vole and reptiles)

- i. Where an active badger sett exists within the Site or disturbance zone, and the infrastructure cannot be micrositied away, it may be necessary to undertake an exclusion or relocation exercise. This is a licensed activity which will require prior authorisation from

⁸ If the infrastructure cannot be micrositied away from the potential feature, the monitoring and checks by the ECoW will be used to assess the likelihood of current use, with appropriate species-specific monitoring undertaken as required. For badger, if it is proven the potential feature is not in use, or has not been in recent use, then it would not be considered a protected feature, and could be sensitively destroyed under supervision of the ECoW.

NatureScot. Guidance for this process has been produced by NatureScot, who should be consulted throughout.

- ii. Where a water vole burrow, red squirrel drey, pine marten den or mountain hare form exists within the Site or disturbance zone, and the infrastructure cannot be micrositied away, the Applicant will discuss any licensing requirements and appropriate mitigation with NatureScot.
- iii. Where reptiles are found to be occupying any proposed infrastructure locations during their hibernacula period and the infrastructure cannot be micrositied away, the Applicant will discuss appropriate mitigation with NatureScot. Reptiles are capable of actively avoiding disturbances during their active phase.

6.1.2 Protection Plan - General

In addition to the mitigation measures detailed above, further general steps should be implemented to increase the protection levels and reduce general disturbance from the Proposed Development:

- Pre-construction protected species surveys would be undertaken by the ECoW or suitably competent ecologist during finalisation of the SPP to obtain an up to date understanding of protected species presence and distribution within the Site. It is expected these surveys would be a requirement under the relevant planning condition to the planning permission if granted.
- Covering/securing all excavations and piping. If this is not possible then a means of escape must be provided for any animal that could fall in e.g. a ramp with a gradient of 45° or shallower.
- Any temporarily exposed open pipe system should be capped in such a way as to prevent mammals gaining access, as may happen when contractors are offsite. If such pipes are left for an extended time, periodic checks will be carried out to ensure that the pipe is inaccessible to animals.
- All excavations will be checked at the start of works and prior to the commencement of any works activities to ensure otters and badgers are not present or have become trapped overnight. A responsible individual will be tasked with carrying out these checks. Documentary evidence will be completed for each check.
- Nighttime working will be minimised to reduce disturbance to nocturnal and crepuscular fauna. Where this is not possible, security lighting used in the Site compound and those areas where lighting is absolutely necessary to ensure safe working conditions will be angled downwards to reduce light spillage into adjacent areas. Lighting outwith the Site compound will be switched off when no works are being undertaken. Other required lighting will be directed to where it is needed and away from features (including setts, treelines, watercourses/riparian habitats, mammal paths, etc.) to minimise light disturbance.
- All works undertaken in proximity to watercourses will be undertaken in line with pollution prevention measures outlined in a detailed Construction Environment Management Plan (CEMP).

- An appropriate speed limit (around 15 to 20 mph) for all vehicles on the Site, and vehicle movements will be kept to pre-determined routes wherever possible.
- Watercourse crossings will be designed as bottomless culverts to allow the passage of small mammals on the Site, where appropriate.
- Vegetation within 50 m of all watercourses should be left undisturbed except in areas of construction of watercourse crossings and access roads leading to crossings as well as construction associated activities (such as drainage and mitigation).
- Chemicals should not be stored within 100 m of a sett, holt, couch or den, or within 10 m of hibernacula, or other protected feature, or along mammal paths. All paints, chemicals and sealants used during the construction process will be removed from the working area at the end of each working day. Open tins or other containers will not be left at the works areas but will be stored in a suitable container at the Site compound.
- Any areas for location of wind turbines and other infrastructure will be subject to inspection by an experienced ecologist prior to any works on-site. The ECoW will monitor the Site so that *in-situ* materials associated with works will not incidentally create reptile refuges, e.g. piles of cut vegetation. Materials will be removed from site if advised by the ECoW.
- If mountain hare is known to be present onsite, any initial groundworks or vehicular activity over uncleared ground during mountain hares' breeding season (March to October, inclusive) must be preceded by a sweep survey for young hares in line with NatureScot guidance⁹. This pre-construction search must take place in all areas that will be affected by earth-moving/ground clearance operations and must be undertaken immediately ahead of the machinery coming on site. There must be no delay between the search and any subsequent works or vehicular activity.

6.2 Objective B – Procedure if Active Feature is Found

6.2.1 Procedure if previously unrecorded active feature or protected species found in advance of construction or decommissioning activity

If an active feature or protected species is found by the ECoW's monitoring in advance of construction activity progressing across the Site, the following text outlines the procedure to be followed.

If Obstruction, Damage or Destruction (ODD) to a protected species is likely, a location specific ODD risk assessment will be completed. This will consider all potential mitigation measures to avoid ODD. This may include micro-siting of infrastructure away from the location, where topography and other constraints allows, and outwith the disturbance zone and the demarcation of the protected site.

⁹ NatureScot (2023). Standing advice for planning consultations - Mountain Hare. Available online: <https://www.nature.scot/doc/standing-advice-planning-consultations-mountain-hare> [Accessed October 2023].

If Disturbance is likely, a location specific Disturbance Risk Assessment will be completed. This should firstly consider revision to the disturbance zone as a result of the site-specific topography and habitat quality (e.g. if a ridge lies between activity and a holt then the disturbance zone may be reduced). Also, other measures which could reduce disturbance to an acceptable level should be considered (including micrositeing and the demarcation of the protected site).

The Disturbance or ODD risk assessments will be submitted to NatureScot for consideration.

If it is not possible to microsite and, in consideration of the risk assessment, NatureScot determines that ODD and/or significant levels of Disturbance is likely to occur, the procedures described in Objective A will be adopted for unoccupied and occupied features. If there is uncertainty over whether the feature is occupied, a precautionary approach will be adopted, and occupancy will be assumed.

6.2.2 Procedure if previously unrecorded protected feature or species found during construction or decommissioning

In the event of any Site personnel discovering an unrecorded protected feature or protected species, the following procedure must be followed:

- Work should stop immediately within the specified disturbance zone;
- The ECoW should be contacted;
- The location should be checked by the ECoW to determine the nature of the new find; and
- If the protected species or feature is confirmed, then the procedure detailed in Objective A above should be followed.

6.3 Objective C – Education and Awareness

The Applicant will provide the necessary education and awareness as part of a Site induction to all Site personnel with regard to the protection of protected species that are or could be present on the Site, in particular the actions that should be taken if protected species are seen on the Site. All Site personnel (including contractors and sub-contractors) will be informed of the objectives of the SPP to ensure they are aware of any species present at the Site.

This information will include as a minimum:

- The requirements and use of the SPP;
- Identification of protected species and features;
- Key risk activities and sensitive areas; and
- Site personnel responsible for dealing with protected species.

The Applicant will undertake that any person found on the Site by them to be inadequately trained, or to be disregarding the terms of the SPP is immediately expelled from the Site until such time that it is appropriate for them to be allowed to return. In general, such persons will need to undertake retraining in the use and application of the SPP to ensure the impact on protected

species is minimised. Species-specific Toolbox Talk handouts will be provided by the ECoW as required.

7 REFERENCES AND RELEVANT LEGISLATION AND GUIDANCE

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ANNEX A. LEGAL PROTECTION

A full list of protected species and the associated legislation can be found on the NatureScot website¹⁰. The following provides a summary of legal protection; the actual legislation should be consulted for the definitive list of offences.

Bats, Otter and Great Crested Newt (GCN)

Bats, otter and **GCN** receive protection in Scotland under the Conservation (Natural Habitats, &c.) Regulations (1994) (as amended) (the ‘Habitats Regulations’), being classified as European protected species of animals¹¹.

For European protected species, NatureScot guidance¹² sets out that it is an offence to deliberately or recklessly:

- capture, injure or kill an animal;
- harass an animal or group of animals;
- disturb an animal while it is occupying a structure or place used for shelter or protection;
- disturb an animal while it is rearing or otherwise caring for its young;
- obstruct access to a breeding site or resting place, or otherwise deny an animal use of a breeding site or resting place;
- disturb an animal in a manner or in circumstances likely to significantly affect the local distribution or abundance of the species;
- disturb an animal in a manner or in circumstances likely to impair its ability to survive, breed or reproduce, or rear or otherwise care for its young;
- disturb an animal while it is migrating or hibernating;
- take or destroy an animal’s eggs; or
- damage or destroy a breeding site or resting place of such an animal (these sites and places are protected even when the animal is not present)¹³.

Regulation 44(2)(e) of the Habitats Regulations allows a licence to be granted for activities ordinarily prohibited, where that purpose is:

“Preserving public health or public safety or other imperative reasons of overriding public interest including those of a social or economic nature and beneficial consequences of primary importance for the environment.”

¹⁰ NatureScot (2022). Table of all of Scotland’s Protected Species. Available online: <https://www.nature.scot/doc/table-all-scotlands-protected-species> [Accessed September 2023].

¹¹ Schedule 2.

¹² NatureScot (2023). European protected species. Available online: <https://www.nature.scot/professional-advice/protected-areas-and-species/protected-species/legal-framework/habitats-directive-and-habitats-regulations/european-protected> [Accessed September 2023].

¹³ Note that this is a summary of offences. Refer to Regulations 39 and 40 of the Habitats Regulations for legislative context.

Otter is also listed on Appendix I of the Convention of International Trade in Endangered Species (CITES), Appendix II of the Bern Convention, and Annexes II and IV of the Habitats Directive.¹⁴ It is also listed as globally threatened on the IUCN/WCMC Red Data List.

Water Vole

Water vole is protected in Scotland under Sections 9(4) and 10 of the Wildlife and Countryside Act 1981¹⁵.

Under Section 9(4)(a) and (b) of the Wildlife and Countryside Act 1981, it is an offence to intentionally or recklessly:

- damage or destroy, or obstruct access to, any structure or place which any wild animal included in Schedule 5¹⁶ uses for shelter or protection; or
- disturb any such animal while it is occupying a structure or place which it uses for that purpose.

Section 10(3)(c) provides for exceptions under Section 9, such that a person shall not be guilty of an offence where that person shows:

- that each of the conditions specified in subsection (3A) was satisfied in relation to the carrying out of the unlawful act; or
- that the unlawful act was carried out in relation to an animal bred and, at the time the act was carried out, lawfully held in captivity.

Subsection (3A) states those conditions referred to in Section 10(3)(c) are:

- a) That the unlawful act was the incidental result of a lawful operation or other activity;
- b) That the person who carried out the lawful operation or other activity:
 - i. took reasonable precautions for the purpose of avoiding carrying out the unlawful act; or
 - ii. did not foresee, and could not reasonably have foreseen, that the unlawful act would be an incidental result of the carrying out of the lawful operation or other activity; and
- c) That the person who carried out the unlawful act took, immediately upon the consequence of that act becoming apparent to the person, such steps as were reasonably practicable in the circumstances to minimise the damage or disturbance to the wild animal, or the damage or obstruction to the structure or place, in relation to which the unlawful act was carried out.

¹⁴ European Union Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora.

¹⁵ as amended by the Nature Conservation (Scotland) Act 2004.

¹⁶ Animals which are protected under Section 9 of the Wildlife and Countryside Act 1981.

Badger

Badger is protected in Scotland under the Protection of Badgers Act 1992 (the ‘Badgers Act’)¹⁷.

Under Section 1(1) of the Badgers Act, “a person is guilty of an offence if, except as permitted by or under this Act, he wilfully kills, injures or takes, or attempts to kill, injure or take, a badger.”

Where it can reasonably be concluded that a person had been attempting to kill, injure or take a badger, then it will be presumed that that person had been attempting to do so, unless it can be proven otherwise¹⁸.

Under Section 1(3), unless authorised under the Badgers Act, a person is guilty of an offence where “he has in his possession or under his control any dead badger or any part of, or anything derived from, a dead badger.”

Under Section 3(1), unless authorised under the Badgers Act, it is an offence to interfere with a badger set*. The following actions are described as interference:

- damaging a badger sett or any part of it;
- destroying a badger sett;
- obstructing access to, or any entrance of, a badger sett;
- causing a dog to enter a badger sett; or
- disturbing a badger when it is occupying a badger sett,

intending to do any of those things or being reckless as to whether his actions would have any of those consequences.

It is also an offence if a person knowingly causes or permits any of the above actions to be carried out¹⁹.

*Note: A badger sett is defined under the Badgers Act as any structure or place which displays signs of current use by a badger.²⁰

Mountain Hare, Pine Marten and Red Squirrel

Mountain hare, pine marten and red squirrel and are protected in Scotland under the Wildlife and Countryside Act 1981²¹.

Under Sections 9(1) and 9(2) of the 1981 Act, it is an offence to intentionally or recklessly kill, injure or take such an animal, or be in possession or control of such an animal (whether live or dead).²²

Under Section 9(4)(a) and (b), it is an offence to intentionally or recklessly:

¹⁷ as amended by the Nature Conservation (Scotland) Act 2004 (as amended).

¹⁸ Section 1(2) of the Badgers Act.

¹⁹ Section 3(2).

²⁰ Section 14.

²¹ Schedule 5.

²² See exceptions under Section 9(3).

- damage or destroy, or obstruct access to, any structure or place which any wild animal included in Schedule 5²³ uses for shelter or protection; or
- disturb any such animal while it is occupying a structure or place which it uses for that purpose

Further, Section 9(5) sets out that it is an offence to:

- sell, offer or expose for sale, or possess or transport for the purpose of sale, any live or dead wild animal included in Schedule 5, or any part of, or anything derived from, such an animal; or
- publish or cause to be published any advertisement likely to be understood as conveying that he buys or sells, or intends to buy or sell, any of those things.

Reptiles

The three native species of **reptile** to Scotland, **adder**, **slow worm** and **viviparous lizard**, are protected under Section 9(1) (insofar as the action relates to killing or injuring the animal), and Section 9(5) of the Wildlife and Countryside Act 1981.

Under Section 9(5), it is an offence to:

- sell, offer or expose for sale, or possess or transport for the purpose of sale, any live or dead wild animal included in Schedule 5, or any part of, or anything derived from, such an animal.
- publish or cause to be published any advertisement likely to be understood as conveying that he buys or sells, or intends to buy or sell, any of those things.

Section 10(3)(c) provides for exceptions under Section 9, such that a person shall not be guilty of an offence where that person shows:

- that each of the conditions specified in subsection (3A) was satisfied in relation to the carrying out of the unlawful act; or
- that the unlawful act was carried out in relation to an animal bred and, at the time the act was carried out, lawfully held in captivity.

Subsection (3A) states those conditions referred to in Section 10(3)(c) are:

- a) That the unlawful act was the incidental result of a lawful operation or other activity;
- b) That the person who carried out the lawful operation or other activity:
 - i. took reasonable precautions for the purpose of avoiding carrying out the unlawful act; or;
 - ii. did not foresee, and could not reasonably have foreseen, that the unlawful act would be an incidental result of the carrying out of the lawful operation or other activity; and
- c) That the person who carried out the unlawful act took, immediately upon the consequence of that act becoming apparent to the person, such steps as were reasonably practicable in

²³ Animals which are protected under Section 9 of the Wildlife and Countryside Act 1981.

the circumstances to minimise the damage or disturbance to the wild animal, or the damage or obstruction to the structure or place, in relation to which the unlawful act was carried out.

Technical Appendix 7.5: Outline Biodiversity Enhancement Management Plan (OBEMP)



MacArthur
Green

Revised Larbrax Wind Farm EIA Report

Outline Biodiversity Enhancement Management Plan

Technical Appendix 7.5

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1 INTRODUCTION

This Outline Biodiversity Enhancement Management Plan (OBEMP) describes the proposed habitat and conservation management measures in relation to the Revised Larbrax Wind Farm (hereafter referred to as the 'Proposed Development').

This OBEMP is set out in the following sections:

- Existing Conditions & Summary of the Ecological Impact Assessment;
- Biodiversity Enhancement Area;
- Aims, Objectives and Management Prescriptions;
- Monitoring;
- Reporting and Biodiversity Enhancement Management Plan (BEMP) Review; and
- Management and Monitoring Timetable.

1.1 Target Habitats and Species

The management recommendations within this OBEMP are informed by baseline ecological surveys undertaken for the Proposed Development and the findings of **Chapter 7: Ecology** of the Environmental Impact Assessment Report (EIA Report). The main habitats considered in this OBEMP are moorland (generally comprising blanket bog/modified bog/wet heath) and broadleaved woodland. The habitat enhancements proposed within this OBEMP would also have beneficial effects for biodiversity in general, as well as the local bird assemblage (details of the bird assemblage are provided in **Chapter 8: Ornithology**).

The measures detailed within this OBEMP aim to achieve significant biodiversity enhancement at the Site, in line with objectives outlined in National Planning Framework 4 (NPF4) Policy 3¹.

1.2 Finalisation of the BEMP and Reporting

This OBEMP is based on several identified land parcels or areas for each respective habitat management and biodiversity enhancement proposal (**Figure 7.10**). These areas were identified through discussions with the Applicant, the landowner, and relevant technical specialists in order to restore and enhance habitats of biodiversity value. These areas may be refined following further specialist surveys and feedback from relevant consultees. All areas may not be taken forward for the final BEMP, and other areas and/or proposals may also be considered; however, the Applicant remains committed to delivering significant biodiversity enhancement at the Proposed Development.

The OBEMP will be refined and developed into a final BEMP post-consent. The final BEMP will confirm the overarching Biodiversity Enhancement Area (BEA) encompassing all habitat management proposals, and any finalised management units (i.e., the refined land parcels/areas

¹ Scottish Government (2023). National Planning Framework 4. Available at: <https://www.gov.scot/publications/national-planning-framework-4/> [Accessed June 2024].

for specific habitat management proposals) therein, where the aims, objectives and management prescriptions will apply. The final BEMP will be agreed with Dumfries and Galloway Council (DGC) in consultation with NatureScot prior to the commencement of construction of the Proposed Development.

A BEMP report (initially for operational Years 1, 3 and 5) will be submitted by the wind farm owner to DGC and NatureScot detailing the tasks (management and monitoring) completed over the last year(s) and those planned for the year(s) ahead.

Management prescriptions in the BEMP may be amended considering monitoring results to ensure progress towards the stated aims and objectives of the plan.

2 EXISTING CONDITIONS & SUMMARY OF ECOLOGICAL IMPACT ASSESSMENT

The Site is set within a mixed landscape of farmland, fragmented moorland, coastal fringe habitats and occasional stands of conifer and broadleaved woodland. The Site is agricultural, predominantly used for livestock farming. The most common and prevalent habitat types within the Site are improved grassland, semi-improved acid grassland, and marshy grassland. However, there are areas of a wide range of other habitat types, including moorland habitats which are subject to a long history of livestock grazing and which are being encroached upon by extensive rhododendron (*Rhododendron ponticum*) invasion (see **Appendix 7.1** and **Figure 7.3** of the EIA Report).

As per **Chapter 7**, important ecological features (IEFs) scoped-in to the ecological impact assessment comprise blanket bog/wet modified bog. The Proposed Development could potentially impact up to 0.64 hectares (ha) of blanket bog and wet modified bog (i.e., direct permanent loss 0.14 ha, direct temporary loss 0.07 ha, and potential indirect loss 0.43 ha). Due to the minor predicted habitat losses and the specific location of these, no significant effects are predicted.

The local bird assemblage is described in **Chapter 8**. Ornithological species scoped into the assessment comprise curlew (*Numenius arquata*) and lapwing (*Vanellus vanellus*); no significant effects are predicted. Measures contained within this OBEMP will have secondary benefits for the local bird assemblage, including curlew and lapwing, through increasing available habitat and its suitability.

3 BIODIVERSITY ENHANCEMENT AREA

3.1 Overview

This OBEMP proposes a BEA covering approximately 24.62 ha, comprising six identified land parcels (Areas A – F; see **Figure 7.10**) within which management and monitoring works would be implemented. Details of each area are provided in Sections 3.2 – 3.5 below.

The overall goal of the BEMP is to restore, enhance and create habitats of ecological value in these areas, which in turn will benefit existing flora and fauna as well as increase biodiversity in general. This OBEMP also proposes and includes moorland restoration and enhancement measures that

provides more than the suggested 1:10 compensation ratio plus 10% enhancement for priority peatland habitats as contained within NatureScot guidance².

As noted in Section 2, the Proposed Development could potentially impact up to 0.64 ha of blanket bog and wet modified bog. Using NatureScot guidance² the compensation and enhancement requirements for priority peatland at the Proposed Development would be 10.36 ha (i.e., 1:10 ratio = $0.64 \text{ ha} \times 10 = 6.4 \text{ ha}$, plus 10% enhancement on the priority peatland baseline extent within the Site, which is $39.59 \text{ ha} \times 10\% = 3.96 \text{ ha}$ (39.59 ha being the baseline extent of blanket bog and wet modified bog within the Site – see **Chapter 7, Table 7.12**)). Bog/peatland restoration and enhancement measures below that will be applied to priority peatland habitats cover up to approximately 13.01 ha³, with the potential to also reclaim up to approximately a further 2.31 ha of peatland habitats⁴.

The precise objectives and management prescriptions for the finalised BEA and management units therein will depend on the current state of the habitat and the factors acting upon it. In order to inform the objectives and detail appropriate management prescriptions, further specific surveys may be required to be undertaken in developing the final BEMP. These surveys may include, but are not limited to, the following:

- Relevant peatland condition assessments in line with NatureScot guidance² and/or Peatland Action guidance⁵;
- Joint Nature Conservation Committee (JNCC) Common Standards Monitoring of Upland Habitats⁶ or habitat condition assessments utilising the latest Biodiversity Metric⁷ condition assessment pro-forma and methodology;
- Hydrology/ecology walkover to identify opportunities for drain blocking, erosion feature restoration, and restoration of the peatland water table; and
- Herbivore Impact Assessment (HIA).

3.2 Area A – Blanket Bog Restoration/Enhancement

Area A is 12.35 ha in size and covers an enclosed area of Galdenoch Moor (**Figure 7.10**). This area is comprised of a mosaic of predominantly peatland habitats, including approximately 4.74 ha of M17 blanket bog, 0.24 ha of M25a^ wet modified bog, 4.51 ha of M15 wet heath and 0.18 ha of H9 dry heath. The wet and dry heath vegetation here lies on deep peat, generally over 2 metres (m) in depth (see **Figure 9.7**) and therefore despite the vegetation resembling wet or dry heath, this habitat is more appropriately considered modified bog, due to the depth of peat present. The history of grazing and agriculture at the Site has resulted in former blanket bog vegetation now appearing to resemble wet and dry heath. This can commonly occur in areas of such influences where typical bog vegetation has been lost over time. The remainder of Area A contains smaller

² <https://www.nature.scot/doc/advising-peatland-carbon-rich-soils-and-priority-peatland-habitats-development-management>

³ Comprising 9.68 ha in Area A, 2.14 ha in Area B, and 1.19 ha in Area C.

⁴ In Area C.

⁵ NatureScot (2021). Peatland Action: Peat Depth and Peatland Condition Survey. <https://www.nature.scot/doc/peatland-action-peat-depth-and-peat-condition-survey-guidance-and-recording-form-guidance>

⁶ <https://jncc.gov.uk/our-work/common-standards-monitoring>

⁷ <https://publications.naturalengland.org.uk/publication/6049804846366720>

amounts of scrub, acid and marshy grasslands, bracken, flush and invasive rhododendron. Currently the area at Galdenoch Moor is grazed by livestock, primarily sheep, all year round, and with numbers typically being in the region of 30-40 animals.

Within Area A, the aim is to restore and enhance the existing and degraded blanket bog habitat. This aim would likely be fulfilled through stock management, removal of rhododendron, drain blocking (if applicable) and restoration of any erosional features such as peat hags (if applicable).

Area A is centred on Galdenoch Moor and includes part of the Class 1 Peatland⁸ within the Site (compare with **Figure 7.2**). This area has been selected as a suitable candidate area for restoration and enhancement due to the presence of deep peat and the degraded peatland flora, as indicated by the presence of wet and dry heath type vegetation on deep peat, that should naturally exhibit blanket bog vegetation. Following further assessment, other management prescriptions in addition to those noted above would be incorporated as appropriate and as necessary.

Peatlands are important for preventing and mitigating the effects of climate change, preserving biodiversity and minimising flood risk. The improvement of these habitats will also be of benefit to local flora and fauna, including the local bird assemblage.

3.3 Areas B, C & D – Moorland Restoration/Enhancement via Rhododendron Removal

Areas B – D are areas which are located on moorland habitats and/or deep peat that collectively cover 6.43 ha; part of the area is also considered Class 1 peatland (see **Figure 7.2**). These areas have been grouped together as they are all subject to severe and extensive encroachment and invasion by rhododendron, and will all be managed for moorland restoration and increasing the extent and quality of the moorland habitats through a scheme of rhododendron removal and management.

It is estimated that the proposals in these areas would result in the reclamation of up to approximately 2.01 ha of moorland habitats from stands of dense rhododendron where the moorland habitats have been lost, and the enhancement of up to 4.42 ha of moorland habitats where there is extensive rhododendron encroachment.

3.4 Area E – Native Broadleaved Woodland Enhancement

Area E is a 3.70 ha area of existing broadleaved woodland; however, the understorey has been completely overtaken by invasive rhododendron, resulting in the loss and degradation of the native understorey and ground flora.

The aim within Area E is to undertake a scheme of rhododendron removal and management within this woodland which would be followed up with enhancement measures, such as enrichment planting with native species.

3.5 Area F – General Biodiversity Enhancement

Area F is a 2.14 ha area of mosaic habitat which contains scattered broadleaved woodland, marshy grassland, bracken and rhododendron. The aim within Area F is to undertake a scheme of rhododendron and bracken removal and management within this area. Bracken, although a native species, can become problematic, inhibiting grasslands and woodland regeneration and

⁸ <https://soils.environment.gov.scot/maps/thematic-maps/carbon-and-peatland-2016-map/>

expansion. The management of rhododendron and bracken would have general beneficial effects for biodiversity.

4 AIMS, OBJECTIVES AND MANAGEMENT PRESCRIPTIONS

The aims define the general BEMP goals, and the related objectives further define the aims into quantifiable targets. The prescriptions detail the indicative management works to be implemented to achieve these aims and objectives. **Annex A** provides an indicative timetable for the implementation of the associated prescriptions.

As discussed in Section 3.1, detailed appropriate objectives and prescriptions will be developed post-consent for the final BEMP based on additional survey findings and consultation. However, the experience gained from providing and delivering plans for similar sites and habitats would suggest that as an outline, the aims, objectives and prescriptions would likely include or be similar to the below.

4.1 Aim 1: Restore and enhance blanket bog habitat and improve bog habitat condition (Area A)

- | | |
|------------------|---|
| Objective 1.1 | Increase the abundance and distribution of major peat forming species, particularly <i>Sphagna</i> (particularly key blanket mire indicator species such as <i>Sphagnum papillosum</i> and <i>S. medium</i>). |
| Objective 1.2 | Increase the abundance and structural diversity of dwarf shrubs such as <i>Calluna vulgaris</i> , <i>Erica tetralix</i> and <i>Vaccinium</i> spp. in line with local reference blanket bog. |
| Objective 1.3 | Increase the abundance and distribution of <i>Eriophorum vaginatum</i> . |
| Objective 1.4 | Achieve 'Good' condition blanket bog within 15 ⁹ -20 ¹⁰ years. |
| Prescription 1.1 | Following a review of livestock numbers and impacts (via HIA) during the pre-construction phase, manage livestock numbers and grazing regime via livestock fencing, stocking density manipulation, and timing of grazing within Area A in agreement with the landowner to achieve Objectives 1.1 – 1.4. |
| Prescription 1.2 | Remove invasive rhododendron and any self-seeded conifer trees or saplings (of any species) in Area A annually, using appropriate removal techniques, until a time that monitoring shows that rhododendron or regeneration thereof, is no longer an issue, or the frequency of intervention can be reduced. |
| Prescription 1.3 | Dam active drains ¹¹ (even if vegetated) in order that the water level is raised sufficiently to create conditions suitable for a range of blanket bog species, including the species mentioned within Objective 1.1. This should be carried out under the supervision of a suitably qualified Ecological Clerk of Works |

⁹ For existing blanket bog.

¹⁰ For existing modified bog and heath.

¹¹ According to methodology detailed in: Peatland Action (2024) Technical Compendium. Available at: <https://www.nature.scot/doc/peatland-action-technical-compendium>

(ECoW). As detailed within relevant guidance^{11, 12, 13}, this technique requires donor peat turves to be excavated adjacent to the drain and then keyed into the drain itself. The divot formed by excavating the donor turve is then infilled by pulling and compressing the surrounding peat and peatland vegetation into this area – the donor turve is taken from alternate sides to avoid a line of restored divots forming along one side of the drain.

Prescription 1.4 If relevant, undertake peat hagg restoration and peat surface re-profiling with a low-pressure excavator and in line with relevant guidance^{11, 13}.

Prescription 1.5 The following activities would be prohibited within the Area:

- clearing out of existing ditches;
- supplementary feeding of livestock;
- application of any insecticides, fungicides or molluscicides;
- application of lime or any other substance to alter the soil acidity;
- cutting or topping of vegetation except to control injurious weed species or to improve the biodiversity of the habitat;
- burning of vegetation or other materials;
- use of roll or chain-harrow;
- planting trees;
- carrying out any earth moving activities;
- use of off-road vehicle activities with the exception of use of low scale agricultural vehicle movements (e.g., quad bike);
- construction of tracks, roads, yards, hardstandings or any new structures (other than those related to the Proposed Development); and
- storage of materials or machinery.

4.2 Aim 2: Reclaim, restore and enhance moorland habitat and other habitats for general biodiversity (Areas B – D and Area F)

Objective 2.1 Restore and enhance moorland habitats (mires and wet heath) through the removal of invasive rhododendron in Areas B – D.

Objective 2.2 Enhance other non-moorland habitats through the removal of invasive rhododendron and bracken in Area F.

Prescription 2.1 Remove and manage invasive rhododendron in Areas B – D and Area F annually, using appropriate removal techniques, until a time that monitoring shows that rhododendron or its regeneration is no longer an issue, or the frequency of intervention can be reduced.

¹² NatureScot (2019). Peatland Action - Guidance for land managers - installing peat and plastic dams (<https://www.nature.scot/doc/peatland-action-guidance-land-managers-installing-peat-and-plastic-dams>)

¹³ Thom, T., Hanlon, A., Lindsay, R., Richards, J., Stoneman, R. & Brooks, S. (2019). Conserving Bogs: The Management Handbook. (2nd Edition). (<https://www.iucn-uk-peatlandprogramme.org/resources/restoration-practice/conservation-handbook>)

- Prescription 2.2 Remove and manage bracken within Area F, with ongoing control where this is necessary¹⁴.
- Prescription 2.3 Prohibited activities noted in Prescription 1.5 above apply.

4.3 Aim 3: Native Broadleaved Woodland Enhancement (Area E)

- Objective 3.1 Enhance broadleaved woodland and associated tree diversity, seeking to achieve 'Moderate' condition broadleaved woodland 10 years after intervention.
- Prescription 3.1 Remove and manage invasive rhododendron in Area E annually, using appropriate removal techniques, until a time that monitoring shows that rhododendron or its regeneration is no longer an issue, or the frequency of intervention can be reduced.
- Prescription 3.2 Undertake enrichment planting of native broadleaved species appropriate to the location and soil conditions following rhododendron control. The enrichment planting will aim to assist woodland regeneration and increase species diversity. Locations for enrichment planting will be identified by a professional forester during finalisation of the BEMP. Enrichment planting would be initiated by the end of the operational Year 1 and may be staggered until Year 5 (dependent on success of rhododendron removal).
- Prescription 3.3 A number of trees to be felled for the Site entrance will be translocated to create deadwood habitats and to allow the transfer of woodland and soil biota to aid in the enhancement of existing woodland.
- Prescription 3.4 Prohibited activities noted in Prescription 1.5 above apply (with the exception of tree planting).

5 MONITORING

Monitoring will establish whether the proposed management prescriptions are achieving the various aims and objectives, and in turn, will inform adaptive management to ensure the aims and objectives are achieved through the life of the BEMP.

The Sections below outline the likely monitoring required for the proposals detailed above, however the detailed monitoring proposals will be provided in the final BEMP to be submitted post-consent and pre-construction when the BEA, management units based on the areas and associated proposed enhancement measures have been finalised. An indicative monitoring timetable is provided in **Annex A**.

5.1 Aim 1: Restore and enhance blanket bog habitat and improve bog habitat condition (Area A)

The following monitoring would be undertaken to evaluate the success of this aim:

¹⁴ [Bracken Control - A Guide to Best Practice | NatureScot \(webarchive.org.uk\)](https://www.nature.scot/webarchive.org.uk)

- Habitat/vegetation monitoring would evaluate the success of restoration and enhancement of peatland. This would be achieved by recording changes to the structure and composition of the vegetation and species abundance, evenness and diversity. Recording of impacts from livestock would also be included in the monitoring programme in order to inform any adjustments to the grazing regime.
- A representative sample of permanent quadrats would be established within Area A to gather sufficient data to inform future management and assess the trajectory of plant species and habitats. The respective monitoring surveys would be carried out at the most appropriate times of year (e.g., flora surveys versus browsing impact surveys). Baseline surveys would be carried out during the construction phase, and repeat surveys would be carried out in the same month in each operational phase monitoring year (Years 1, 3, 5, 10, 15) to gather comparable data. Photographs would also be taken of each sample quadrat, as well as overview photographs of the area.
- A blanket bog condition assessment utilising i) the latest Biodiversity Metric⁷ condition assessment pro-forma and methodology, and/or ii) a CSM⁶ blanket bog site condition survey, will be undertaken at representative locations within Area A.
- Any peat hagg or surface reprofiling works, and any installed peat dams, would be monitored to ensure works are successful over the first three years after construction works are completed. Remedial measures would be undertaken if restoration works have failed.
- The success of rhododendron removal measures and the presence of self-seeded conifer trees and new broadleaved seedlings would be monitored.

5.2 Aim 2: Reclaim, restore and enhance moorland habitat and other habitats for general biodiversity (Areas B – D and Area F)

Monitoring would be undertaken in Areas B, C, D and F to ensure the removal of rhododendron (all Areas) and bracken (Area F only). Monitoring will likely include:

- Mapping the extent and change over time of rhododendron and bracken.
- Habitat monitoring through the establishment of a representative sample of permanent quadrats to record changes to the composition of the vegetation and species abundance, evenness and diversity. The respective monitoring surveys would be carried out at the most appropriate times of year. Baseline surveys would be carried out during the construction phase and repeat surveys would be carried out in the same month in each operational phase monitoring year (Years 1, 3, 5, 10, 15) to gather comparable data. Photographs would also be taken of each sample quadrat, as well as overview photographs of the management unit.
- Walkover surveys collecting target notes on rhododendron regeneration etc.

5.3 Aim 3: Native Broadleaved Woodland Enhancement (Area E)

Monitoring would be undertaken in Area E to ensure the successful removal of rhododendron and the establishment newly planted broadleaved trees.

A professional forester would monitor the rhododendron removal and enrichment planting in Years 1-5 following planting to ensure successful removal and establishment, specifically looking for evidence of damage (e.g., browsing) or disease on newly planted trees. Failed specimens should be replaced in the consecutive winter (i.e., between November and March). The forester would also advise on whether any further management or maintenance is required to ensure the ongoing suppression of rhododendron and establishment of the trees. Any additional measures would be discussed and agreed within the wind farm owner and appointed ecological consultant and detailed in annual BEMP reports.

These areas would be monitored again by a professional forester in operational Year 10 to ensure that there are no issues with disease or invasive species and to determine if any further intervention or maintenance would benefit the woodland. Monitoring would be undertaken again in operational Year 20, further new enhancement/enrichment planting may also be considered at this stage, this would aid the process of creating and maintaining a mixed age structure.

Area E target condition category would also be assessed and monitored using the latest Biodiversity Metric⁷ condition assessment pro-forma and methodology in operational Year 5, and every 5 years thereafter.

6 REPORTING & BEMP REVIEW

A report would be submitted by the wind farm owner to NatureScot and DGC in Years 1, 3 and 5 of operation, the frequency of reporting after Year 5 would be agreed by the relevant parties. This report will detail:

- Management undertaken in the past year(s);
- Monitoring undertaken, results and discussion of results; and
- Management and monitoring proposed for the following year(s).

Where monitoring indicates any management objectives are not met, further management prescriptions or interventions would be agreed with relevant parties.

In addition, the BEMP would be reviewed every five years from its commencement. The purpose of the review will be to assess the effectiveness of the proposed management prescriptions at achieving the aims and objectives of the BEMP.

ANNEX A. MANAGEMENT AND MONITORING TIMETABLE

Table A-1 Indicative Management and Monitoring Timetable

Year	0*	1**	2	3	4	5	6	7	8	9	10	11	12	13	14	15...
Work Item	Year of Implementation															
Management Prescriptions																
Fence integrity check / repairs (as required), and HIA (Area A)	✓															
Livestock exclusion/management of grazing regime (Area A)		Throughout lifetime of BEMP, as necessary and informed by HIA and BEMP monitoring														
Rhododendron removal and management (Areas A – F)		✓	✓	✓	✓	✓	Throughout lifetime of BEMP, as necessary and informed by BEMP monitoring									
Conifer regeneration/broadleaved seedling removal (Area A)		✓	✓	✓	✓	✓	Throughout lifetime of BEMP, as necessary and informed by BEMP monitoring									
Peat hagg reprofiling and drain blocking (Area A)	✓	✓														
Enrichment planting (Area E)		✓	✓	✓	✓	✓										
Deadwood creation (Area E)	✓															
Bracken control & management (Area F)		✓	✓	Throughout lifetime of BEMP, as necessary and informed by BEMP monitoring												
Excluded activities as per Prescription 1.5 (Areas A – F)	Throughout lifetime of BEMP															
Monitoring																
Inspection of peat hagg reprofiling and drain blocking (Area A)		✓	✓	✓												
Vegetation monitoring and moorland condition assessments (Areas A – D, and F)		✓		✓		✓					✓					✓
Rhododendron removal/regeneration monitoring (Areas A – F)		✓	✓	✓	✓	✓	Throughout lifetime of BEMP, as necessary and informed by BEMP monitoring									
Enrichment planting monitoring (Area E)		✓	✓	✓	✓	✓					✓					
Woodland condition assessment (Area E)						✓					✓					✓
Bracken extent mapping/monitoring (Area F)		✓		✓		✓	Throughout lifetime of BEMP, as necessary and informed by BEMP monitoring									
Reporting / Reviews																

Year	0*	1**	2	3	4	5	6	7	8	9	10	11	12	13	14	15...
BEMP Report		✓		✓		✓	Reporting schedule after Year 5 to be agreed by relevant parties									
5-year review of BEMP						✓					✓					✓

* Construction Phase

**First year after final commissioning of the Proposed Development / Operational Year 1.

Figure 7.10: Outline Biodiversity Enhancement Management Plan Area

