

Technical Appendix 7.1

Clune Wind Farm

Extended Phase 1 Habitat and NVC Surveys

RES Group



September 2024



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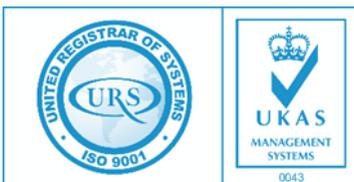
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1 Introduction

1.1 Terms of Reference

Atmos Consulting Ltd was commissioned by Renewable Energy Systems Ltd (RES) to undertake Phase 1 habitat and National Vegetation Classification (NVC) surveys for the proposed Clune Wind Farm (the Proposed Development). The location of the Proposed Development is detailed on **Figure 7.1.1** with the red line boundary defining 'the Site'.

This Technical Appendix describes the methods followed and habitats and NVC communities identified. The conservation status and potential groundwater dependency of the habitats present on site are also provided.

1.2 Site Location and Description

The Site (Figure 7.1.1, Appendix A refers) is located approximately 27km south-east of Inverness, and approximately 5.5km south of the village of Tomatin. The Site is predominately managed upland grouse moorland with agricultural fields and mixed woodland in lower altitude areas. Clune Burn and Allt Lathach traverse the Site along with other smaller tributaries running into the River Findhorn that lies to the north-west, out with the Site boundary.

The Site inclines generally in a north-east to south-west direction, reaching the highest point of the Site, 750m, at Carn Dubh'Ic an Deoir. The northern edge is bounded by the River Findhorn and the eastern boundary by the A9. The Site can be approximately divided by four main watercourses that flow north into the River Findhorn: Allt Phris, Clune Burn, Allt Lathach, and Wester Strathnoon Burn.

The Site is mainly used as a grouse moor, managed by grazing livestock such as sheep, and regular burning of mature heather to provide new growth. The Site also consists of small patches of grassland along the northern boundary used by grazing livestock, a block of conifer plantation in the north-east, and an area of ancient deciduous woodland on the banks of the Allt Phris. There is some evidence of grazing pressure from deer. The survey area contains a variety of plant communities including blanket bog, wet heath, acid grassland, scrub and deciduous woodland.

The proposed access track will be situated on the north-eastern boundary of the Site, connecting to the A9 just north of Slochd summit, using an existing minor junction. The plant communities within the access track boundary are a mix of heath, blanket bog, scrub, and birch *Betula* sp. woodland.

1.3 Objectives

The objective of the study was to undertake a survey to document the Phase 1 habitat and NVC communities present within the Site and appropriate buffers in order to evaluate their potential nature conservation interest and to assess the potential for Groundwater Dependent Terrestrial Ecosystems (GWDTEs) to be present.

This report provides details of the following:

- field survey methods;
- field survey results;

- description of the plant communities present within the site boundaries;
- initial peatland habitat condition assessment; and
- discussion of potential Ground Water Dependent Terrestrial Ecosystems (GWDTEs).

2 Methodology

2.1 Desktop Study

A desk study was undertaken in order to establish baseline information for the Site. Various data sources were utilised including the website of the statutory agency, NatureScot via the 'Site Link Portal', and aerial photography for the Site.

Desk study identified statutory designations such as Special Areas of Conservation (SACs), Ramsar wetlands, Sites of Special Scientific Interest (SSSIs) and National Nature Reserves (NNRs) within 10km of the Site. In addition, Local Nature Reserves (LNRs) and relevant non-statutory designations within a 5km radius of the Site were searched for.

2.2 Extended Phase 1 Habitat Survey

An extended Phase 1 habitat survey was undertaken on the 3-10th September 2022. Extended Phase 1 habitat survey is a standardised method of recording habitat types and characteristic vegetation, as set out in the *Handbook for Phase 1 Habitat Survey – a Technique for Environmental Audit* (JNCC, 2010). The habitat survey area covered the Site and a buffer zone of 250m to identify any potential GWDEs in accordance with Scottish Environment Protection Agency (SEPA) guidance. Species nomenclature follows standard guidance (Stace, 2010; Atherton *et al.*, 2010).

Habitats were mapped and field notes describing the composition and structure of the sward taken in order to describe characteristic habitats, features of ecological interest, or any features which require ecologically sensitive design or mitigation.

The survey method was 'extended' through the additional recording of specific features indicating the presence, or likely presence, of protected species or other species of nature conservation significance and any habitats which would be suitable for them. Overall, the main features of the survey were to:

- describe and map the habitats within the survey area;
- record evidence of protected species and other ecologically significant features; and
- assess the potential of the habitats as suitable for protected species.

Any incidental observations of bird species and any other notable species were made

2.3 NVC Survey

The vegetation surveys were undertaken on the 18 – 24th August, 16th September, and 10 – 11th October 2023 by suitably qualified and experienced botanical surveyors using the NVC (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.

Homogenous stands and mosaics of vegetation were identified and mapped by eye, drawn as polygons on field maps; these polygons were surveyed qualitatively to record dominant and constant species, sub-dominant species and other species present. In practice the vegetation was mapped progressively across the Site to ensure that no

areas were missed and that mapping was accurate. An aerial photograph of the Site was also used to aid accurate mapping of vegetation boundaries. 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 where possible.

2.3.1 Groundwater Dependent Terrestrial Ecosystems

As part of the NVC exercise, any wetland habitats identified with the survey buffers stated earlier were evaluated in terms of their potential to be GWDTE, making reference to SEPA guidance (SEPA, 2017), modified from the United Kingdom Technical Advisory Group (UKTAG) list of NVC communities and associated groundwater dependency scores.

GWDTE are defined by the UKTAG (2003) as:

“A terrestrial ecosystem of importance at Member State level that is directly dependent on the water level in or flow of water from a groundwater body (that is, in or from the saturated zone). Such an ecosystem may also be dependent on the concentrations of substances (and potential pollutants) within that groundwater body, but there must be a direct hydraulic connection with the groundwater body.”

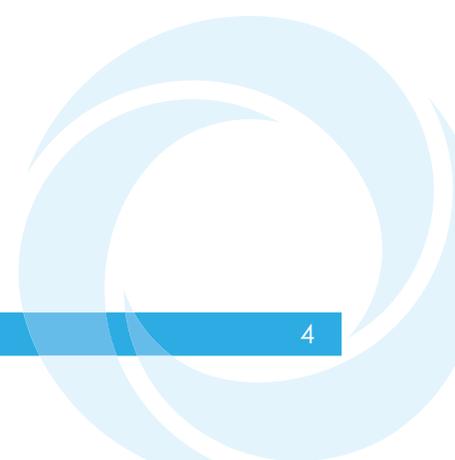
A detailed study of vegetation communities allows the potential level of groundwater dependency to be determined.

Determination of complete groundwater dependency is complicated by the ability of many vegetation communities to use whatever source of water is available. In some topographical and hydrogeological conditions, a particular community can be groundwater-dependent whereas in others the same community is surface water-dependent. Seasonal patterns of water use provide an additional level of complexity, with groundwater reliance typically being greater in the summer when rainfall and surface water are less available.

2.4 Limitations

All surveys were undertaken in suitable weather conditions (i.e. good visibility and no snow cover). While surveys were undertaken towards the end of the season, boundaries between vegetation community types were clearly identifiable and no significant limitations in terms of survey timing or weather conditions were identified.

Although every effort was made to identify all plants, habitats, and any ecologically sensitive features, the results of the surveys should not be considered exhaustive. It is recognised that ecological surveys of this nature are limited by factors such as the time of year and prevailing weather conditions.



3 Results

3.1 Desk Study

3.1.1 Designated Sites

Statutory Designations

There are nine sites designated for ecological (non-avian) interest in the vicinity (< 10km) of the Site (Table 1 and Appendix A, Figure 7.1.2 refers).

Table 1: Designated Sites

| Designated Site | Designated Feature | Distance from Site Boundary |
|---|---|---|
| SACs | | |
| Slochd (SNH, 2005a) | European dry heaths | 0.17km to the north-east (at its closest point) |
| Kinveachy Forest (SNH, 2005b) | Bog woodland Caledonian forest | 0.65km to the south-east (at its closest point) |
| River Spey SAC (SNH, 2005c) | Otter <i>Lutra lutra</i> Freshwater pearl mussel <i>Margaritifera margaritifera</i> Sea lamprey <i>Petromyzon marinus</i> Atlantic salmon <i>Salmo salar</i> | 1.66km to the south-east (at its closest point) |
| Carn nan Tri-tighearnan (SNH, 2005d) | Blanket bog | 7.15km to the north (at its closest point) |
| SSSIs | | |
| Kinveachy Forest (SNH, 2010) | Native pinewood assemblage including: <ul style="list-style-type: none"> Scots pine <i>Pinus sylvestris</i> Birch <i>Betula</i> sp. Alder <i>Alnus glutinosa</i> Breeding bird assemblage including: <ul style="list-style-type: none"> Capercaillie <i>Tetrao urogallus</i> Scottish crossbill <i>Loxia scotica</i> Crested tit <i>Lophophanes cristatus</i> | Partial overlap of the south-eastern edge of the Site boundary with no oversail by any proposed turbine |
| Carn nan Tri-tighearnan SSSI (SNH, 2009b) | Blanket bog Subalpine dry heath | 7.15km to the north (at its closest point) |
| Loch Vaa (SNH, 2009c) | Goldeneye <i>Bucephala clangula</i> Slavonian grebe <i>Podiceps auritus</i> Aquatic beetles including nationally scarce and notable species such as: <ul style="list-style-type: none"> <i>Berosus luridus</i> <i>Hydrochus brevis</i> <i>Cyphon punctipennis</i> <i>Agabus labiatus</i> | |
| Craigellachie SSSI | Upland birch woodland: | 8.93km to the south-east |

| Designated Site | Designated Feature | Distance from Site Boundary |
|-------------------------------|---|---|
| (SNH, 2009a) | <ul style="list-style-type: none"> Silver birch <i>Betula pendula</i> Aspen <i>Populus tremula</i> Hazel <i>Corylus avellana</i> Sessile oak <i>Quercus petraea</i> Wych elm <i>Ulmus glabra</i> Bird cherry <i>Prunus padus</i> Juniper <i>Juniperus communis</i> Moth assemblage: <ul style="list-style-type: none"> Kentish glory <i>Endromis versicolora</i> Rannoch sprawler <i>Brachionycha (Astroscopus) nubeculosa</i> Angle-striped willow <i>Enargia paleacea</i> | (at its closest point) |
| NNRs | | |
| Craigellachie NNR (SNH, 1988) | Birch woodland Open glades | 9.73km south-east (at its closest point). |

3.1.2 Aerial Photography

Review of aerial photography shows that the majority of the Site is moorland comprising of dry and wet heath, grassland and blanket bog. There are two blocks of commercial conifer plantation on the northern boundary and there are numerous patches of burned heather throughout the entire Site. The Site is roughly divided into four by streams that create altitudinal habitat zones that host a variety of floral and faunal communities.

3.2 Extended Phase 1 Habitat Survey

The results of the extended Phase 1 habitat survey are presented in Figure 7.1.3 (Appendix A refers).

3.2.1 Dominant Habitats

Dry modified bog (E1.8)

This habitat occupies the largest area of the Site, with wide expanses made up of deergrass *Trichophorum germanicum* to the south-west. The bogs centre around the upper reaches of the Wester Strathnoon Burn and Allt Lathach, and are dominated by heather *Calluna vulgaris*, cross-leaved heath *Erica tetralix* and hare's-tail cotton-grass *Eriophorum vaginatum*, on peat usually deeper than 0.5m.

A small variety of *Sphagnum* species were found, typical of modified bogs, including red bog-moss *S. capillifolium*, flat-topped bog-moss *S. fallax* and blunt-leaved bog-moss *S. palustre* in characteristic green and red hummocks.

Apart from heather, the most common dwarf shrub was cross-leaved heath as well as bog-myrtle *Myrica gale*. There was very little crowberry *Empetrum nigrum* and even less bilberry *Vaccinium myrtillus*. The bogs regularly recorded species such as common cotton-grass *Eriophorum angustifolium* and woolly fringe-moss *Racomitrium lanuginosum*, as well as various lichen species in the genus *Cladonia*. The abundance

of these species suggests bogs that are slightly drier than those with more *Sphagnum*, hence the dry modified bog classification (JNCC, 2016).

The modified bogs were all examples of the NVC community M19, floristically grading into M20 in localised areas.

Dry dwarf shrub heath – acid (D1.1)

This habitat occupies large swathes of the Site, with wide expanses made up of more than 25% ericoids or small gorse species in relatively dry conditions, usually constrained to the steeper slopes and higher areas of the Site, for example on the hillsides toward the north-west. This habitat is dominated by heather, bell heather *Erica cinerea*, bilberry and western gorse *Ulex gallii* (JNCC, 2016), with patches of common juniper *Juniperus communis* scrub along the hillsides (JNCC, 2016).

The dwarf shrub heath is an example of NVC communities H10 and H13.

Dry heath / acid grassland (D5)

This habitat is a mosaic of dry heath and acid grassland. The hillsides on Site are heavily grazed by sheep and deer and are quite species poor, and these regions usually intersect areas of bog and dry heath as a transition zone. These areas are abundant in the species wavy hair-grass *Deschampsia flexuosa*, heath-rush *Juncus squarrosus*, and sheep's sorrel *Rumex acetosella* (JNCC, 2016), with patches of soft-rush *Juncus effusus* and *Sphagnum* flush in amongst the streams (JNCC, 2016).

This habitat type is an example of NVC communities U5 and H10.

3.2.2 Minor Habitats

Broad-leaved woodland – semi-natural (A1.1.1)

There are two patches in the north-west corner and another on the lower reaches of the Allt Phris of ancient birch woodland, with both silver birch *Betula pendula* and downy birch *Betula pubescens* protected from grazing by fencing. These areas of woodland are considered ancient/climax series as they contain mature trees which host endemic species such as chaga *Inonotus obliquus*. Other tree and shrub species recorded include aspen *Populus tremula*, grey willow *Salix cinerea*, eared willow *Salix aurita*, and gorse *Ulex europaeus* (JNCC, 2016).

Broad-leaved woodland – plantation (A1.1.2)

Within the survey area there is a small patch of broad-leaved plantation woodland on the northern boundary which contains both silver and downy birch, and Scots pine *Pinus sylvestris* (JNCC, 2016).

Coniferous woodland – plantation (A1.2.2)

Within the buffer zone on the eastern boundary there is a strip of coniferous woodland plantation on the opposite side of the A9 comprising of Scots pine and European larch *Larix decidua*. Similarly, there is a patch in the buffer zone on the northern boundary (JNCC, 2016).

Mixed woodland – plantation (A1.3.2)

Mixed woodland plantation was recorded on the northern boundary of the Site, straddling the minor road. These areas are comprised mostly of silver birch and Scots pine (JNCC, 2016).

Scrub- dense/continuous (A2.1)

Toward the north-west of the Site there are numerous patches of dense scrub which includes species such as gorse and common juniper, with occasional silver birch (JNCC, 2016).

Scrub – scattered (A2.2)

In the north-west, along the river, these areas of scattered scrub consist of common juniper and silver birch bordered by semi-improved heath and grassland used by grazing sheep and cattle. The relatively steep banks of the lower to middle reaches of the Wester Strathnoon Burn are banked by mature scattered scrub consisting of common juniper and gorse (JNCC, 2016).

Parkland/coniferous scattered trees (A3.2)

Scattered examples of Scots pine and silver birch with less than 30% cover are present on grazing land for cattle and sheep (JNCC, 2016).

Acid grassland – unimproved (B1.1)

This habitat resides in the north-west of the Site, on the southern banks of the River Findhorn. They are relatively species rich areas found on acidic soils that grade into dry dwarf shrub heath. Dominant species include wavy hair-grass and heath bedstraw *Galium saxatile* (JNCC, 2016).

Acid grassland – semi-improved (B1.2)

These are largely areas dominated by wavy hair-grass with frequent heath bedstraw. Small patches can be found along the lower reaches of the Clune Burn, Western Strathnoon Burn and Caochan Seachdag, where cattle and sheep roam freely (JNCC, 2016).

Improved grassland (B4)

These areas of the Site are in the north-west toward the River Findhorn which are heavily grazed by sheep and cattle. The species richness is generally poor, and pastures have been heavily affected by drainage and/or the application of herbicides and/or slurry. Species found here were typical of this habitat and include white clover *Trifolium repens*, common sorrel *Rumex acetosa* and common dandelion *Taraxacum officinale* (JNCC, 2016).

Marsh/marshy grassland (B5)

These areas of the Site are relatively wet and contain large swathes of purple moor-grass *Molinia caerulea*, rushes *Juncus* sp., and sedges *Carex* sp., with only small patches of *Sphagnum* (JNCC, 2016).

Poor semi-improved grassland (B6)

These areas are characteristic of heavily grazed and managed grassland with very little biodiversity. The species present are indicative of neutral grassland with sheep's fescue *Festuca ovina*, false oat-grass *Arrhenatherum elatius* and meadow foxtail *Alopecurus pratensis* recorded (JNCC, 2016).

Lichen/bryophyte heath (D3)

This habitat is restricted to the south-west corner of the Site, at the summit and on the north face of the Carn Dubh'Ic an Deoir. This area of heathland is dominated by heather, together with a carpet of lichens and bryophytes such as *Cladonia* sp., *Lecanora* sp., fountain apple-moss *Philonotis fontana*, rusty feather-moss *Brachythecium plumosum*, yellow fringe-moss *Racomitrium aciculare*, on soils with little depth and on bare rock on places (JNCC, 2016).

Wet Modified Bog (E1.7)

There is a small area of wet modified bog between two tributaries in the upper reaches of the Allt Lathach. This habitat is largely composed of exposed peat of a depth greater than 0.5m, with patches of grass and sedge such as purple moor-grass and deergrass (JNCC, 2016).

Standing Water (G1)

Two examples are present: one in the north-east of the Site, and one in the north to the east of the Clune Burn.

Running Water (G2)

There are 4 main watercourses on Site; Allt Phris, Clune Burn, Wester Strathnoon Burn, and Allt Lathach.

The Allt Phris drains into the River Findhorn from the eastern side of the Site along a relatively shallow gradient from 520m to 310m AOD, a gradient similarly followed by the Clune Burn slightly further to the west. The Allt Lathach flows through the centre of the Site, draining the hills of Carn Ruighe Shamraich, Carn Phris Mhor and Carn Coire na Cluanaich which have relatively steep banks covered by scattered scrub in the middle and lower reaches. The Wester Strathnoon Burn drains the higher regions of the Site in the West, including Carn Dubh'Ic an Deoir and Carn Leachter Beag from a height of 750m to 330m AOD.

Inland cliff – acid/neutral (I1.1.1)

There is a small patch of inland cliff on Site, classified as exposed rock surface over 2m in height at an angle of more than 60° (JNCC, 2016).

Other exposure – acid/neutral (I1.4.1)

An area in the lower reaches of the Clune Burn consisting of natural exposed rock in the riverbed (JNCC, 2016).

Cultivated/disturbed land – ephemeral/short perennial (J1.3)

There is one patch of land in the buffer zone, located on the southern bank of the River Findhorn that hosts a property with mown grass and a managed garden (JNCC, 2016).

Other habitat (J6)

These areas highlight paved roads such as the A9 in the east and the minor road that runs along the south of the River Findhorn, forming a large section of the northern boundary. There is a circuit of tracks throughout the Site that is regularly used by gamekeepers to monitor livestock, grouse, and deer populations (JNCC, 2016).

3.3 NVC Survey

The findings of the NVC survey are presented in Figure 7.1.4 (Appendix A refers).

The majority of the vegetation within the Site is dominated by blanket mire habitat, NVC community M19 *Calluna vulgaris* – *Eriophorum vaginatum*, and dry heath, NVC community H10 *Calluna vulgaris* – *Erica cinerea*. The Site is also characterised by H13 *Calluna vulgaris* – *Cladonia arbuscula* heath at higher altitudes, U5 *Nardus stricta* – *Galium saxatile* grassland, W4 *Betula pubescens* – *Molinia caerulea* woodland along the banks of the River Findhorn and W19 *Juniperus communis* ssp. – *Deschampsia flexuosa* woodland situated on the steep banks of some of the watercourses on Site.

3.3.1 Community Descriptions

H10 *Calluna vulgaris* – *Erica cinerea* heath

Analysis of the quadrat data from the steeper, drier slopes of the Site indicate that the recorded vegetation most closely correlates NVC community H10 *Calluna vulgaris* – *Erica cinerea* heath. Generally, this community can be found along the middle to lower reaches of the Western Strathnoon Burn, the Allt Lathach, the Clune Burn and the Allt Phris. There are also regions toward the south of the Site around the summits of the Carn Dubh'Ic an Deoir and the Carn Phris Mhòir and it is dominant along the access track. This community is also present in a mosaic with U5 *Nardus stricta* – *Galium saxatile* grassland.

The H10 vegetation community is a heath of well-drained mineral, usually acidic soils, and is common on steep, stony slopes. Many patches of H10 heath stand out clearly as patches of dark vegetation on steeper ground, contrasting with the paler tones of the surrounding bogs and wet heaths or the varied greens of upland grasslands. This community type rarely occurs above about 400m except in the mild, oceanic climate of the western Highlands and the Hebrides where it can ascend to almost 600m. Further north and east it is usually associated with warm south-facing or west-facing slopes at low altitudes.

These are dry heaths with a low, dark-coloured canopy of heather and bell heather. The dwarf shrubs are typically overtopped by the long, deep-green leaves and drooping brownish flowers of green-ribbed sedge *Carex binervis*; tormentil *Potentilla erecta* and heath bedstraw scramble over the ground below the shrubs. There is usually a thick carpet of mosses such as red-stemmed feather-moss *Pleurozium schreberi*, little shaggy-moss *Rhytidiadelphus loreus*, glittering wood-moss *Hylocomium splendens* and heath plait-moss *Hypnum jutlandicum*.

These heaths comprise part of the range of variation within the internationally important heather moors of Great Britain. They are a good habitat for upland birds, including twite *Carduelis flavirostris*, merlin *Falco columbarius*, short-eared owl *Asio flammeus*, hen harrier *Circus cyaneus* and ring ouzel *Turdus torquatus*. Red grouse *Lagopus lagopus* also occur, although they are generally rather scarce in the west where these heaths are so common. Most forms of the community are not noted for rare plants, but the herb-rich H10d *Thymus polytrichus* – *Carex pulicaris* sub-community can include a few uncommon species.

There is one sub-community relative to the Site, *Calluna vulgaris* – *Erica cinerea* heath *Racomitrium lanuginosum* sub-community H10b, which is typically dominated by heather and is often overwhelmingly abundant in pioneer or building regrowth after burning. Crowberry is very frequent and it can show some local prominence among or beneath the heather amongst scattered tufts of wavy hair-grass. Bilberry occurs occasionally, though hardly ever as more than scattered shoots and crowberry and cross-leaved heath are scarce and usually found in stands that are obviously transitional to the woolly fringe-moss sub-community H10b (Rodwell, 1991) (JNCC, 2006).

H13 *Calluna vulgaris* – *Cladonia arbuscula* heath

Analysis of the quadrat data from some areas of higher altitude (typically above 560m AOD) displays vegetation characteristics closely associated with the NVC community H13 *Calluna vulgaris* – *Cladonia arbuscula* heath. This habitat is particularly dominant in the south-east of the Site, around the summit of the Carn Dubh'Ic an Deoir which aligns with the Phase 1 habitat classification D3 (bryophyte and lichen heath), as well as small patches slightly to the north and to the east at the Carn Phris Mhòir.

H13 heaths are thin, tightly woven mats of vegetation in which the creeping, prostrate shoots of heather spread out over dry stony soils, usually with a thick white frosting of lichens. Other typical species include montane plants that can endure frost and biting winds, such as stiff sedge *Carex bigelowii*, crowberry, bog bilberry *Vaccinium uliginosum* and the clubmosses *Diphasiastrum alpinum* and *Huperzia selago*. There can be a sprinkling of mat-grass *Nardus stricta*, velvet bent *Agrostis canina* and other grasses.

Lichens are important structurally. *Cladonia arbuscula* is especially common and, where there is some shelter, may be abundant. It is usually mixed with *C. rangiferina* which locally may be co-dominant; also present are *C. uncialis* and *Cetraria islandica*. Among these, bryophytes are generally few and rarely of any abundance. Woolly fringe-moss is constant and can form locally conspicuous patches.

This heath is a montane community of high, exposed, windswept spurs, shoulders and summits: places that catch the bitter winds of winter, are blown clear of snow, and are afflicted by frosts. It usually occupies convex slopes with acid, podsolised, free-draining, stony soils. Most stands lie above the altitudinal limit of woodland and so are truly montane, but some small stands occur on the exposed tops of moraines below 600m.

H13 heath is one of a series of near-natural, high-altitude heath communities that comprise an internationally important element of the British uplands. The effects of a severe montane climate on the vegetation can be clearly seen in this community, and it forms a valuable link with the lichen-rich montane heaths of Scandinavia. The rare montane lichens *Alectoria ochroleuca*, *A. sarmentosa* ssp. *vexillifera* and *Pertusaria xanthostoma* are almost confined to this type of vegetation, and it is one of the main

British habitats of *Cetraria nivalis* (Fryday 1997). Heaths of this type are used as nesting habitat by dotterel *Charadrius morinellus* and ptarmigan *Lagopus mutus*.

Virtually all stands of H13 heath above the tree-line are evidently climax vegetation and are not maintained by management. This is a fragile vegetation type, which can be damaged by heavy or even moderate grazing in the montane zone. The trampling feet of sheep and deer break up the carpet of lichens in dry weather, and nutrients in animal dung and urine enrich the soils and change the species composition. The lichens can also be damaged by vehicle tracks, notably where vehicles rather than ponies are used for carrying deer carcasses down from the hills. Localised damage may also be caused by human trampling on hills that are popular with walkers, not least because people like to ascend the higher parts of hills by way of their spurs and outlying ridges. Some heaths have been damaged or even destroyed by fires that have run out of control and swept up into the montane zone.

M19 *Calluna vulgaris* – *Eriophorum vaginatum* blanket mire

The vegetation sampled across much of the Site, particularly in the development area, most closely aligns with NVC community M19 *Calluna vulgaris* – *Eriophorum vaginatum* blanket mire. The habitat is prevalent in the upper reaches of the Allt Lathach and Western Strathnoon Burn and generally in areas of higher altitude and shallower gradient where water retention is slightly higher. It is recognised that there has been historic burning, drainage, grazing and on-going management of the area resulting in localised patches of this community floristically grading towards M20 *Eriophorum vaginatum* raised and blanket mire.

M19 mire covers watersheds and gentle slopes where a deep layer of peat has been able to accumulate. It occurs on drier peats than either M17 or M18 communities. Although the mire surface can be ragged with hags and wet peaty channels containing common cotton-grass, there are rarely the pools and hollows characteristic of wetter mires, nor is there often water lying over the peat surface. The peat itself is generally firm, moist, and fibrous rather than wet and slimy.

M19 mire is a more northern, boreal, and montane type of vegetation than M17 mire. Although it occurs locally below 100m in north-west Scotland, most stands are at higher altitudes. In the west of Great Britain, it generally replaces M17 mire above about 350m. The more montane forms of the *Vaccinium vitis-idaea* – *Hylocomium splendens* sub-community M19c extend the altitudinal range of the community to over 900m on the high plateaux of the Cairngorms, Lochnagar and Caenlochan.

These are mires with a dense, shaggy, purple-brown and dark-green, tussocky sward of heather and hare's-tail cotton-grass, speckled with the long, shining, deep-green leaves of common cotton-grass, straggling shoots of bilberry, and low clumps of crowberry. *Sphagnum* can be prominent over wetter ground but typically this element is not so rich or luxuriant as in the M17 or M18 mires. There is usually a deep rich-red-gold quilt of acute-leaved bog-moss *Sphagnum capillifolium* subsp. *capillifolium*, woolly fringe moss, and large mosses such as glittering wood-moss, red-stemmed feather-moss, flat topped bog-moss, and little shaggy-moss. In many places the vegetation is broken by hags, with great spreads of bare peat, especially in larger stands.

The hummock / hollow relief that is commonly found in M17 and M18 communities is only rarely developed here, though the surface of the ground is often uneven because of the marked tussocks of hare's-tail cotton-grass, a structural feature of some

importance for the strong contingent of hypnoid mosses, which constitute a further distinctive component over drier surfaces.

The proportion of hare's-tail cotton-grass to the ericoid sub-shrubs is variable and, though it shows some consistency in the different sub-communities, it is very much affected by certain kinds of treatment, particularly by burning and grazing which can help convert the vegetation into M20 *Eriophorum vaginatum* blanket and raised mire, where the cotton-grass is overwhelmingly dominant and the sub-shrubs of much patchier occurrence. Variation between the two communities is continuous and replacement of the richer M19 by the more impoverished M20 can be temporary, so transitions are common.

In general, however, the two can be separated by the very frequent occurrence here of heather, bilberry and crowberry and, at higher altitudes, of cowberry *Vaccinium vitis-idaea* and bog bilberry. Overall, heather is the most common co-dominant of hare's-tail cotton-grass, but diverse mixtures of these species occur very frequently and typically the sub-shrubs are so abundant and so vigorous, especially over the drier ground, as to give the vegetation the appearance of a heathy moorland.

Compared with the strongly oceanic blanket bog vegetation of the M17 mire, deergrass often plays a subordinate role here, purple moor-grass is strikingly scarce and herbs such as tormentil, heath milkwort *Polygala serpyllifolia*, and lousewort *Pedicularis sylvatica* are very infrequent.

Few other features of the vascular flora are distinctive, though wavy hair-grass and heath-rush occur occasionally throughout and each can be locally abundant and, at higher altitudes, common sedge *Carex nigra* becomes frequent. Mat-grass and heath bedstraw can be found at low frequencies. By and large, herbs here are few in number and occur as scattered individuals.

The bryophyte flora is rich and often extensive, frequently covering more than 50% of the ground, a further difference between this community and M20 mire. However, varied and luxuriant carpets of *Sphagnum* are not the rule in this community. Red bog-moss is sufficiently frequent throughout to qualify as a constant and it can be locally abundant, but even this species is somewhat patchy.

Typically, however, it is hypnaceous mosses which provide the constancy to the bryophyte layer in this community. Among these, red-stemmed feather-moss, little shaggy-moss, flat-topped bog-moss and blunt-leaved bog-moss are all very frequent throughout, with glittering wood-moss becoming common at higher altitudes. Mixtures of these can form extensive mats over drier areas of the ground, particularly over the tops of old hare's-tail cotton-grass hummocks and among the stools of sub-shrubs where the bushes have opened up somewhat (JNCC, 2002) (Rodwell, 1991) (JNCC, 2006).

Three sub-communities are described in the NVC, but they do not represent the most obvious patterns of floristic and ecological variation among the M19 community displayed on Site. In broad terms, the sub-communities form a series from oceanic, southern, or western vegetation to northern, boreal and montane vegetation. The *Vaccinium vitis-idaea* - *Hylocomium splendens* sub-community M19c is most relevant to the Site; it takes in an assortment of more northern or montane mires, generally with cowberry, bilberry, crowberry and *Cladonia portentosa*. Papillose bog-moss *Sphagnum papillosum* can be common here, and there can also be a few upland mire species such as common sedge, bilberry, ribbed bog-moss *Aulacomnium palustre* and

cloudberry *Rubus chamaemorus*. In some stands in the northern and eastern Highlands, *Cladonia* lichens grow thickly enough to make the ground under the vascular plants look as if it is dusted with snow (McVean and Ratcliffe, 1962) (JNCC, 2004).

U5 *Nardus stricta* – *Galium saxatile* grassland

Analysis of quadrat data from riverbanks and adjacent to tracks indicated that the vegetation most closely relates to the NVC community U5 *Nardus stricta* – *Galium saxatile* grassland. This habitat is dominant in the middle reaches of the aforementioned streams as well as the Caochan Seachdag and the Caochan a' Phuill in the west of the Site. The *Nardus* grassland is commonly present in a mosaic with H10 *Calluna vulgaris* – *Eriophorum vaginatum* blanket mire, grading between the two regularly.

Pale swards of the dense, wiry clumps of mat-grass clothe many upland slopes, and can form vast stands. Several other grasses are relatively frequent, including sweet vernal-grass *Anthoxanthum odoratum* and viviparous fescue *Festuca vivipara*. The short turf is starred with tormentil, white clover and heath bedstraw, their flowers bright in summer. There is usually some cowberry, its short, bright-green shoots pushing up through the mat of grasses. Sedges such as star sedge *Carex echinata* are commonly found within the habitat and rushes such as heath-rush, soft-rush, compact rush *Juncus conglomeratus* and jointed rush *Juncus articulatus*. At the feet of the vascular plants there are the usual mosses of acid grassland: heath plait-moss, red-stemmed feather-moss, springy turf-moss *Rhytidiadelphus squarrosus*, and glittering wood-moss.

There are two sub-communities present on Site, however, neither strongly represent the floristic characteristics of the U5 habitats. The species-poor sub-community U5a takes in the most impoverished *Nardus* grasslands and has no distinguishing species of its own. The *Carex panicea* - *Viola riviniana* subcommunity U5c extends the range of the community onto flushed, mildly base-rich soils where there can be an array of mesotrophic species such as meadow buttercup *Ranunculus acris*, smooth lady's-mantle *Alchemilla glabra*, alpine meadow-rue *Thalictrum alpinum*, water avens *Geum rivale*, meadowsweet *Filipendula ulmaria*, globeflower *Trollius europaeus* and alpine bistort *Persicaria vivipara* (JNCC, 2004) (Rodwell, 1991) (JNCC, 2006).

W4 *Betula pubescens* – *Molinia caerulea* woodland

Two small patches of semi-natural broad-leaved woodland on the north-western boundary of the Site present vegetation characteristics that most closely align with NVC community W4 *Betula pubescens* – *Molinia caerulea* woodland. These are both found in the patches of ancient woodland on the southern edge of the River Findhorn, surrounded by fencing to prevent the degradation of the habitat by grazing of livestock and wild herbivores.

This vegetation community type is common on flushed slopes, in poorly drained gullies and valley bottoms, and in hollows with impeded drainage. It commonly forms small patches among other types of woodland, especially W11 *Quercus petraea* – *Betula pubescens* – *Oxalis acetosella* and W17 *Quercus petraea* – *Betula pubescens* – *Dicranum majus* woodlands. W4 woodland is the counterpart of W7 *Alnus glutinosa* – *Fraxinus excelsior* – *Lysimachia nemorum* woodland on acid soils, and the soils are wet, moderately acid peaty soils. On adjacent open ground it can grade into mires, heaths and grasslands, especially M25 *Molinia caerulea* – *Potentilla erecta* mire and M15 *Trichophorum germanicum* – *Erica tetralix* wet heath.

W4 woodland is a wet woodland with a green, grassy, ground flora. Downy birch, alder *Alnus glutinosa*, eared willow, and grey willow, some of them old, distorted and covered with lichens and bryophytes, stand over a lush field layer of purple moor-grass. The bryophytes big shaggy-moss *Rhytidiadelphus triquetrus*, neat feather-moss *Pseudoscleropodium purum*, little shaggy-moss, common Tamarisk-moss *Thuidium tamariscinum* and common haircap *Polytrichum commune* grow in rich-green carpets over the soft, wet ground.

Few rare vascular species have been recorded in this woodland type, but the epiphytic flora of bryophytes and lichens can be rich and, in the west, can include some important oceanic species.

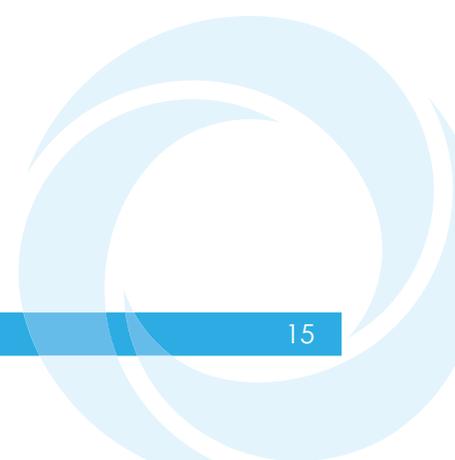
Grazing pressure can reduce, and in certain stands remove, the coverage of young trees. This may eventually lead to a failure to regenerate and ultimately to the loss of the trees altogether. M25 mire and M15 wet heath can be grazed derivatives of W4 woodland. Draining can dry out the soils and eventually lead to a drier type of woodland, such as W11 *Quercus petraea* – *Betula pubescens* – *Oxalis acetosella* or W17 *Quercus petraea* – *Betula pubescens* – *Dicranum majus* woodlands.

W19 *Juniperus communis* ssp. *Communis* – *Oxalis acetosella* woodland

Analysis of the quadrat data from the lowland scrub habitat along stream banks, most notably on the Wester Strathnoon Burn, indicates that the vegetation most closely aligns to W19 *Juniperus communis* ssp. *communis* – *Oxalis acetosella* woodland.

These shaggy, uneven, dark-glaucous-green stands of scrub are dominated by common juniper with its twisting spires of branches and its astonishing diversity of form, ranging from flat, spreading bushes to tall, columnar specimens. Accompanying the juniper there can be scattered trees of silver and downy birch or rowan *Sorbus aucuparia*. Dog-rose *Rosa canina*, elder *Sambucus nigra*, and other shrubs can make a small contribution to the canopy. Underneath this canopy is a selection of sprawling wildflowers such as wood-sorrel *Oxalis acetosella*, heath bedstraw and creeping buttercup *Ranunculus repens*.

There are two sub-communities: one with a heathy ground flora and one with a grassy, herb-rich ground flora. The most relevant *Viola riviniana* – *Anemone nemorosa* sub-community W19b includes bilberry, cowberry, Yorkshire-fog *Holcus lanatus*, and germander speedwell *Veronica chamaedrys*, as well as common dog-violet *Viola riviniana* and wood anemone *Anemone nemorosa*. There can be lush patches of ferns, which most commonly include oak fern *Gymnocarpium dryopteris*. Under these plants is a loose weft of mosses including big and little shaggy-mosses (JNCC, 2004) (Rodwell, 1991) (JNCC, 2006) (UKNC, 1992).



4 Evaluation

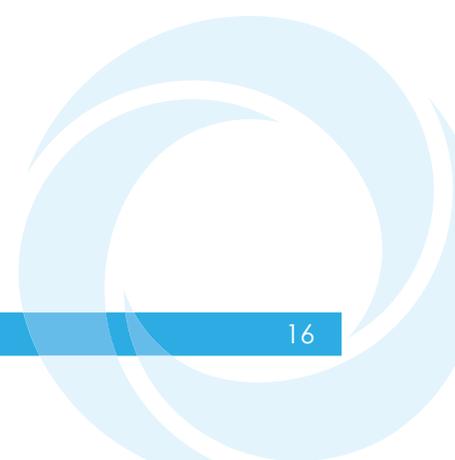
Table 2 evaluates each of the NVC communities and remaining Phase 1 habitat descriptions in the survey area in terms of nature conservation interest and potential groundwater dependence with respect to the most recent version of the *Land Use Planning System SEPA Guide* (SEPA, 2017).

Table 2: Evaluation of Recorded NVC Communities

| Phase 1 habitat / NVC Community | Potential Groundwater Dependence (SEPA, 2017) | Nature Conservation Status |
|--|---|--|
| H10 <i>Calluna vulgaris</i> – <i>Erica cinerea</i> heath | None | European dry heaths (Annex 1) Alpine and Boreal heaths (Annex 1) Upland heathland (SBL) |
| H13 <i>Calluna vulgaris</i> – <i>Cladonia arbuscula</i> heath | None | European dry heaths (Annex 1) Upland heathland (SBL) |
| M19 <i>Calluna vulgaris</i> – <i>Eriophorum vaginatum</i> blanket mire | None | Active raised bogs (Annex 1) Blanket bogs (Annex 1) Depressions on peat substrates of the <i>Rhynchosporion</i> (Annex 1) Blanket bog (SBL) Upland heathland (SBL) |
| U5 <i>Nardus stricta</i> – <i>Galium saxatile</i> grassland | None | Species-rich <i>Nardus</i> grassland, on siliceous substrates in mountain areas (and submountain areas in continental Europe) (Annex 1) Upland heathland (SBL) <i>Juncus squarrosus</i> – <i>Festuca ovina</i> grassland (SBL) <i>Nardus stricta</i> – <i>Galium saxatile</i> grassland (SBL) |
| W4 <i>Betula pubescens</i> – <i>Molinia caerulea</i> woodland | High | Caledonian forest (Annex 1) Bog woodland (Annex 1) Upland birchwood (SBL) Wet woodland (SBL) |
| W19 <i>Juniperus communis</i> ssp. <i>communis</i> – <i>Oxalis acetosella</i> woodland | None | <i>Juniperus communis</i> formations on heaths or calcareous grasslands (Annex 1) |

Definitions:

- Annex 1 - Annex 1 of the European Union Habitats Directive (92/43/EEC)
- SBL - Scottish Biodiversity List



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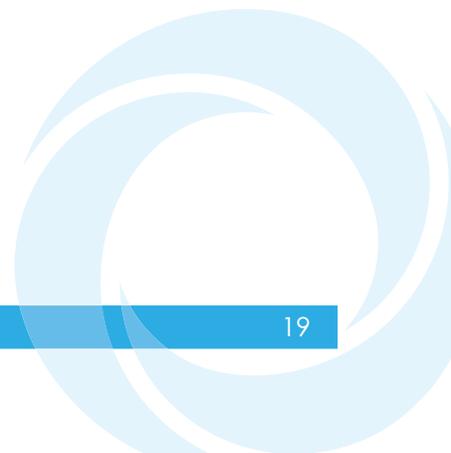
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Appendices

Appendix A. Figures

- Figure 7.1.1 - Site Location
- Figure 7.1.2 - Designated Sites
- Figure 7.1.3 - Phase 1 Habitat Survey Results
- Figure 7.1.4 - NVC Survey Results



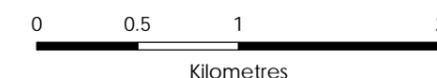
Clune Wind Farm



Figure 7.1.1
Site location Plan

Key

 Site boundary



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04/09/2024

64600/BP/074f

Drawn by: LB Checked by: TH Approved by: JW

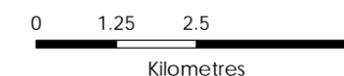
Clune Wind Farm



Figure 7.1.2
Designated Sites within 10 km

Key

- Site boundary
- 5km and 10km site buffers
- ▲ Proposed turbine
- Ancient Woodland Inventory
- Special Area of Conservation
- Special Protection Area
- National Nature Reserve
- Site of Special Scientific Interest
- RSPB Reserve
- Ramsar wetland
- RSPB Important Bird Areas

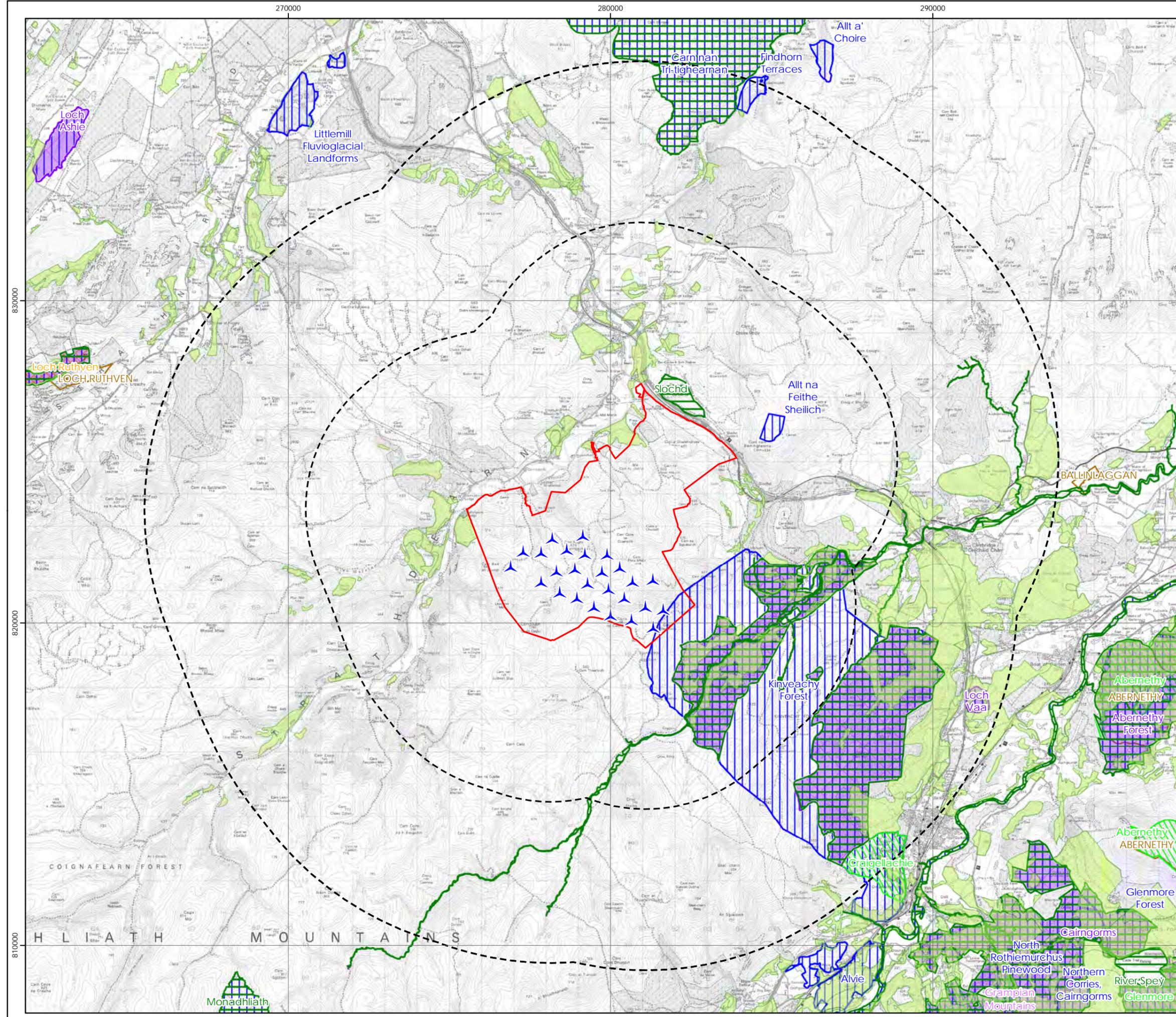


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Clune Wind Farm



Figure 7.1.3
Phase 1 Habitat Survey
Results - Overview

Key

- Site boundary
- Proposed turbine
- Proposed Infrastructure
- Habitat areas**
- Broadleaved woodland - semi-natural
- Broadleaved woodland - plantation
- Coniferous woodland - plantation
- Mixed woodland - plantation
- Scrub - dense/continuous
- Scrub - scattered
- Coniferous Parkland/scattered trees
- Acid grassland - unimproved
- Acid grassland - semi-improved
- Improved grassland
- Marsh/marshy grassland
- Poor semi-improved grassland
- Dry dwarf shrub heath
- Lichen/bryophyte heath
- Dry heath/acid grassland
- Wet heath/acid grassland
- Wet modified bog
- Dry modified bog
- Fen
- Standing water
- Running water
- Other exposure - acid/neutral
- Cultivated/disturbed land - ephemeral/short perennial
- Inland cliff - acid/neutral
- Other habitat
- Not surveyed
- Running water - oligotrophic



0 250 500
Meters



Scale @ A3:
1:40,000



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