

Appendix 8.2: Habitats and Vegetation Survey Report



Car Duibh Wind Farm Limited

An Càrr Dubh Wind Farm EIA

Appendix 8.2: Habitats & Vegetation

Final report
Prepared by LUC
March 2023



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Project Number

11260

Version	Status	Prepared	Checked	Approved	Date
1.	First draft	S. Miller	A. Dennis	S. Jackson-Matthews	21.10.2022

Chapter 1

Habitats and Vegetation Survey Report

Appendix 8.2 Habitats and Vegetation Survey Report

Introduction

1.1 This Appendix details the methods and results of the habitats and vegetation surveys undertaken to inform an Ecological Impact Assessment (EiA) of the proposed An Càrr Dubh Wind Farm (hereafter referred to as the 'Proposed Development').

1.2 This Appendix has been written to support **Chapter 8: Ecology** of the Environmental Impact Assessment Report (EIA Report) and should be read in conjunction with this chapter and **Chapter 7: Geology, Hydrology, Hydrogeology and Peat**.

Supporting Documents

1.3 This Appendix supports the EiA in addition to the following Appendices:

- **Appendix 8.1: Desk Study and Legal Context;**
- **Appendix 8.3: Protected Species Survey Report;**
- **Appendix 8.4: Bat Survey Report;** and
- **Appendix 8.5: Outline Restoration and Enhancement Plan (OREP).**

1.4 This Appendix is supported by the following figures which can be found in **Volume 2** of the EIA Report:

- **Figure 8.1: Ecology Survey Area;**
- **Figure 8.3.1 to 8.3.7: Phase 1 Habitat Survey Results;**
- **Figure 8.4.1 to 8.4.7: National Vegetation Classification Survey Results;** and
- **Figure 8.5: Areas of Guidance-stated Potential Groundwater Dependency (GWDTE).**

1.5 Representative site photography is provided in **Annex A**, and information regarding peatland condition is provided in **Annex B**, of this Appendix.

Terminology

1.6 The following terminology will be used throughout this Appendix:

- **Site**
 - All land within the red-line boundary
- **Proposed Development**
 - The whole physical process involved in the development of the land at An Càrr Dubh Wind Farm including construction, operation and decommission (not associated with a particular piece of land).
 - Encompasses the construction of an up to 13 turbine wind farm and associated infrastructure including access tracks, crane hardstandings, substation compound and underground cabling (described in detail in **Chapter 4** of the EIA Report).

- **Ecology Survey Area (ESA)**

- The area within the red-line boundary in which all ecology surveys were undertaken in line with good practice guidelines for all ecological features surveyed. For habitats and vegetation this comprised a 500m buffer of the Developable Area and a 250m buffer along the proposed access route (as shown in **Figure 8.1**).

Methods

Nomenclature

1.7 Standardised vernacular names followed by the scientific name upon first use (italicised within the text) are used for vascular plants (graminoids, herbs and shrubs). Scientific names only are used for the moss, liverwort, and lichen species because although vernacular names are now in existence, they are not in general usage.

Competency

1.8 All habitat and vegetation surveys were undertaken within the appropriate seasonal windows in 2021 and 2022, by academically and professionally qualified LUC ecologists who are members of CIEEM. The data has been assessed by ecologists with extensive experience in interpreting habitat datasets.

Baseline Data Collection

Desk Study

1.9 A desk study was undertaken to obtain historical ecological information relating to the ESA and the surrounding habitats to identify any known sensitive habitats. An account of the method adopted, and findings, and the legislative provisions afforded to protected habitats is provided in **Appendix 8.1: Desk Study and Legal Context** of the EIA Report.

Field Survey

1.10 There were two components to the field surveys comprising the Phase 1 Habitat Survey and the more detailed National Vegetation Classification (NVC), which also included identification of potential Ground Water Dependant Terrestrial Ecosystems (GWDTEs). The methods are outlined below and follow best practice guidance produced by the Chartered Institute of Ecology and Environmental Management (CIEEM)¹ and the British Standards Institute².

1.11 NVC was used to identify habitats which can be indicative of groundwater dependency (GWDTE)³ and the NatureScot Peatland Condition Assessment⁴ was used in the field to determine the condition of the peatland habitat.

1.12 The data collected from the surveys was recorded and mapped using ArcGIS software (notably the Field Maps app), using GPS-enabled Samsung tablets.

1.13 The survey was based on the turbine layout at the time of surveys which extended up to 26 turbines (the EIA Scoping layout). The survey was based on the footprint, oversail and anticipated land take of the 26 turbine layout.

¹ CIEEM (2018). *Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal and Marine*. Winchester: Chartered Institute for Ecology and Environmental Management and CIEEM (2017). *Guidelines for Preliminary Ecological Appraisal*. 2nd Edition. Winchester: Chartered Institute for Ecology and Environmental Management.

² British Standards Institute (2013). BS42020: 2013 Biodiversity – Code of Practice for Planning and Development.

³ SEPA (2017) Land Use Planning System SEPA Guidance Note 31. Guidance on Assessing the Impacts of Development Proposals on Groundwater Abstractions and Groundwater Dependent Terrestrial Ecosystems.

⁴ NatureScot (2017) Peatland Condition Assessment. [online] Available at: <https://www.nature.scot/sites/default/files/2017-10/Guidance-Peatland-Action-Peatland-Condition-Assessment-Guide-A1916874.pdf> [Accessed September 2022].

Phase 1 Habitat Survey

1.14 A Phase 1 Habitat Survey was undertaken, following standard methods⁵, in spring and summer of 2021 and 2022 by experienced ecologists. The Phase 1 Habitat Survey method provides a means of rapidly classifying broad habitat types in any given terrestrial survey area. The output of the survey comprises habitat accounts, field maps and associated photography, and target notes (where required). The extent of the ESA is presented on **Figure 8.1**.

1.15 During the survey, field surveyors walked all accessible parts of the ESA to map broad habitat types and their boundaries. Sufficient species identification was undertaken to accurately classify habitat types, using the DAFOR scale⁶ where necessary. Field notes were taken to identify key areas of interest.

National Vegetation Classification (NVC)

1.16 NVC surveys were undertaken in spring and summer of 2021 of all habitats identified as being of conservation interest⁷ during the Phase 1 Habitat Survey. NVC survey was completed following best practice guidelines⁸ to map habitats based on the characteristics of the vegetation. Structure, condition and species composition were recorded including detailed notes on the species present and abundance within stands of vegetation.

1.17 The Domin scale of cover/abundance (**Table 8.2.1**) was used in compliance with best practice guidelines. Data collected in the field was assessed and NVC communities (and, where possible, sub-communities) were assigned to each assemblage. Results of the NVC survey are presented in **Figure 8.4.1 to 8.4.7**.

Table 8.2.1: Domin scale of cover/abundance

Cover	Domin
91-100%	10
76-90%	9
51-75%	8
34-50%	7
26-33%	6
11-25%	5
4-10%	4
<4% (many individuals)	3
<4% (several individuals)	2
<4% (few individuals)	1

Ground Water Dependent Terrestrial Ecosystems (GWDTEs)

1.18 GWDTEs are defined by SEPA³ and are considered important indicators of sensitive groundwater movement. NVC communities listed in the SEPA guidance are those which, if present, are considered to indicate that a wetland is likely to be either highly or moderately groundwater dependent depending on the hydrogeological setting.

1.19 Where these communities were identified, and they were not obviously surface or rainwater fed (e.g. marshy grassland on watershed and ombrogenous bog systems), they were subject to detailed botanical survey. **Table 8.2.2** sets out a decision-making tool that was used to establish the level of groundwater dependency of each community.

1.20 Assessment of potential effects on GWDTEs are discussed in **Chapter 7** of the EIA Report.

Table 8.2.2: GWDTE Decision Tool⁹

Criteria	Yes	No
A. Is the GWDTE vegetation evidently influenced by groundwater? (i.e. base-enriched (M10, M11, M37 and/or M38) and/or discharging from an evident point source such as a spring head (M31, M32, M33).		
If the answer to A is 'Yes' then field assessment ends at this stage and the GWDTE is treated as 'high', as per the guidance. If 'No', continue to B.		
B. Is the GWDTE polygon associated with an evident surface water feature? i.e. is the vegetation located within one of the following topographic locations:		
Watershed/ridge		
Watercourse		
Floodplain		
Ponding location, pond, loch etc (localised depression)		
Surface water conveyance (drain, gully, rill, etc.)		
If the answer to B is 'Yes' then the GWDTE polygon is no more than 'moderate' and very likely to be 'low'. Additional floristic and environmental data should be collected, including photographs to allow for further, desk-based determination of the groundwater dependency. If 'No', continue to C.		
C. Is the GWDTE polygon associated with an ombrogenous system? i.e. with blanket bog or wet heath habitat. This is especially relevant to M6 and M25:		
Presence/persistence of distinctive bog habitat, species and/or associations.		
Deep peat not confined to depressions/valleys (>0.5 m visible in drains or hagged areas).		
If the answer to C is 'Yes' then the GWDTE is no more than 'moderate' and very likely to be 'low'. Additional floristic and environmental data should be collected, including photographs to allow for further, desk-based determination of the groundwater dependency.		

Peatland Condition Assessment

1.21 The NatureScot Peatland Condition Assessment⁴ was employed in the field to determine the condition of the peatland habitat. This classifies the peatland into four classes:

1. Near-Natural;
2. Modified;
3. Drained; and
4. Actively Eroding.

1.22 Field-based assessment of a series of key indicators facilitates assignment of one of these classes to an area of peatland. These indicators include features such as the Sphagnum cover and vegetation condition; evidence of fire (frequency & intensity); bare peat; and scrub/tree invasion. These indicators were noted in the field, to determine the condition class.

⁵ Joint Nature Conservation Committee (2010). *Handbook for Phase 1 Habitat Survey – A Technique for Environmental Audit*. Peterborough: JNCC..

⁶ DAFOR scale: D=Dominant, A=Abundant, F=Frequent, O=Occasional, R=Rare.

⁷ Defined as Annex 1 habitats, Scottish Biodiversity List habitats, habitats included in the Argyll and Bute Biodiversity Action Plan, and habitats considered to indicate potential GWDTE.

⁸ Rodwell, J.S. (2006). *NVC Users' Handbook*. Peterborough: JNCC.

⁹ Botanaeco (2018) GWDTE Decision Tool. Available at: <https://botanaeco.co.uk/gwdte> [Accessed August 2022]

Constraints and Limitations

1.23 There is a gap in the survey data in the west of the ESA; this is due to the re-location of a met mast to this location. As such, the survey data extends to a small watercourse approximately 200m north-west from the infrastructure footprint around the met mast. The habitats within the vicinity of the met mast largely comprise bog and acid grassland. The habitats beyond the watercourse are therefore unlikely to be impacted by the met mast, and so this is not considered a significant limitation to the assessment.

1.24 All ecological surveys represent a snap-shot in time. Habitats and species assemblages are dynamic and change over time in response to a range of variables. Data presented in this Appendix should not be considered a long-term interpretation of ecological data and should not be relied upon as such.

1.25 Surveys were completed during the optimal survey season for habitat and vegetation studies (April to September), and as such, the data gathered is considered robust for the purposes of informing the EIA Report.

1.26 Some areas of the ESA were not fully accessible due to the boggy or steep terrain encountered. Where this was the case, areas were viewed from vantage points and binoculars were used to identify habitat types. This was sufficient for identification of the habitat and therefore, is not seen as a constraint to the robustness of the surveys.

1.27 Due to the complex topography and scale of the Site, it is not possible to record all habitats that occur as small extents or isolated features. However, particular attention was paid around proposed turbine locations to ensure the most detailed and robust data was gathered for the infrastructure locations.

1.28 Some habitat areas were small in extent and not easily mapped (< 0.1ha). Where these were considered to be potential habitats of conservation interest⁷, for example springs and flushes, point features were recorded to capture the notable habitat or feature.

1.29 Given the large and topographically challenging nature of the Site, local small-scale variation in vegetation communities, and time constraints, detailed mapping of NVC sub-communities would be particularly challenging and time-consuming. As such, NVC data was often mapped to community level only unless there was a specific reason to record the sub-community. This is not considered to be a significant constraint to the assessment because habitats of conservation concern⁷ are commonly identified on the basis of their NVC communities and are unchanged by additional information on sub-communities.

1.30 While care has been taken to collect and review habitat data, it is not possible to account for any changes that may occur in the intervening period between data collection and submission of the EIA Report.

Baseline

Desk Study

1.31 A desk study was undertaken to inform habitat and vegetation surveys. An account of the method adopted, and findings, is provided in **Appendix 8.1** which also sets out the legislative provisions afforded to habitats, notably habitats of conservation concern⁷.

1.32 There are no statutory designated sites within the ESA.

1.33 There are areas of woodland listed on the Ancient Woodland Inventory (AWI)¹⁰ within the east of the ESA. These are along the route of the proposed access track through the woodland west of Inveraray and include the following:

- Category 1a (ancient woodland of semi-natural origin on maps from 1750): 37ha
- Category 2a (ancient woodland of semi-natural origin on maps from 1860): 19ha
- Category 1b (long-established woodland of plantation origin (LEPO) on maps from 1750): 13ha
- Category 2b (LEPO on maps from 1860): 132ha

¹⁰ NatureScot (no date) A guide to understanding the Scottish Ancient Woodland Inventory (AWI). Available at: <https://www.nature.scot/doc/guide-understanding-scottish-ancient-woodland-inventory-awi> [Accessed September 2022]

Field Study

Site Overview

1.34 The Site is located on a plateau between Loch Awe (to the north-west) and Loch Fyne (to the south-east). The Developable Area comprises an undulating moorland plateau with rocky outcrops, orientated north-east to south-west, with frequent lochans in lower lying areas and a complex network of watercourses, many of which flow through deeply eroded peat channels. Large areas of forestry are found adjacent to the Site, extending down the lower slopes to the east, south and west, with forested areas also located within the eastern extent of the Site boundary to the west of Inveraray. An Suidhe Wind Farm is present beyond the south of the Site.

1.35 The ESA covers approximately 1360ha and is located within the Ardchnnell Estate and Argyll Estate. Turbine 1 (T1) of the Proposed Development is the closest to Inveraray, located approximately 6km to the north-west, and T13 is the closest to Dalavich, approximately 4.5km to the east. The whole Site is within the Argyll & Bute Council administrative area. The undulating upland topography of the ESA and climatic conditions give rise to a complex habitat assemblage and as result of this, extensive areas were recorded as mosaics of habitats of conservation⁷. Ombrogenous¹¹ blanket bog habitat was widespread across the ESA, particularly on relatively level areas. Wet heath habitat was abundant and commonly recorded at the margins of the blanket bog habitat. Areas of dry heath and acid grassland were recorded on well-drained slopes, ridges, and hill crests within the blanket bog and wet heath habitats. Additionally, flushes, and sedge and rush mires, were identified throughout the ESA.

1.36 The majority of the habitats within the ESA have been influenced to some extent by grazing pressure and/or previous management and so are in 'modified' condition; this is particularly evident to the west of the ESA. However, there are areas of near-natural condition peatlands across the ESA, supporting a variety of priority habitats and species.

Survey Area

1.37 A total of 29 Phase 1 Habitats were recorded within the ESA and within these a total of 21 NVC communities were identified. Phase 1 habitats and associated NVC communities are described in detail below. Phase 1 habitats and NVC communities are described separately due to the complexity of the Site. A summary of the Phase 1 habitats and their associated NVC communities is provided in **Table 8.2.3**.

1.38 The Phase 1 habitat and NVC community descriptions below are supported by, and should be read in conjunction with, **Figures 8.3.1 - 8.3.7** and **Figures 8.4.1 – 8.4.7**.

Phase 1 Habitats

A1.1.1 Broadleaved woodland (semi-natural)

1.39 Broadleaved woodland was restricted to the southern extent of the access route to the west of Inveraray, on the edge of larger blocks of coniferous woodland plantation (see below) and along watercourses within plantation stands. Species present included frequent silver birch *Betula pendula*, sycamore *Acer pseudoplatanus*, and beech *Fagus sylvatica*, and occasional hazel *Corylus avellana*, and oak *Quercus* spp. Downy birch *Betula pubescens* was locally dominant in small extents to the east of Steallaire Bàn Loch. The habitat beneath the canopy variously comprised scrub, bracken and marshy grassland (see below).

A1.2.2 Coniferous woodland (plantation)

1.40 Coniferous woodland plantation was dominant along the southern extent of the access route which follows the route of an existing Argyll Estate track through the forest. The dominant species was Sitka spruce *Picea sitchensis* which were generally semi-mature to mature in age. Other species that were locally frequent included larch *Larix* sp. and rhododendron *Rhododendron ponticum*, with occasional yew *Taxus baccata*. Beneath the canopy there was abundant *Hylocomium splendens* with frequent *Pleurozium schreberi*, *Rhytidiadelphus loreus*, and occasional bilberry *Vaccinium myrtillus* and purple moor grass *Molinia caerulea*. The edge of the plantation was colonised with birch and yew, with the field layer largely comprising marshy grassland including soft rush *Juncus effusus*, hard fern *Blechnum spicant*, *Sphagnum palustre* and common heather *Calluna vulgaris*.

¹¹ Of a bog or peat dependent on rain for its formation.

A1.3.1 Mixed woodland (semi-natural)

1.41 At the very southern extent of the existing access track to the west of Inveraray there was a small extent of mature semi-natural mixed woodland habitat with abundant beech and birch, and frequent Sitka spruce. Oak was occasional and Scots pine *Pinus sylvestris* was rare. Beneath the canopy of trees there was abundant mosses including *Pleurozium schreberi*, *Rhytidiadelphus squarrosus* and *Hylocomium splendens*., with occasional hard fern.

A1.3.2 Mixed woodland (plantation)

1.42 At the southern end of the existing access track, adjacent to the bellmouth off the A819 road, there was an extent of mixed woodland plantation. The species here comprised abundant silver birch with frequent Sitka spruce. The majority of trees were mature in age.

A2.1 and A2.2 Scrub (dense and scattered)

1.43 At the southern extent of the existing access track, close to Inveraray there were small areas of scrub on edges of grassland and woodland with frequent birch *Betula* spp. and willow *Salix* spp. with tufted hair grass *Deschampsia cespitosa* also frequent within the field layer. Occasional species included bramble *Rubus fruticosus* agg., gorse *Ulex europaeus* and hawthorn *Crataegus monogyna*.

A3.1 Broadleaved scattered trees

1.44 Along the southern extent of the existing access track, west of Inveraray, there was a small extent of broadleaved scattered trees consisting of abundant birch and occasional oak. The field layer comprised marshy grassland (see below).

A3.3 Mixed scattered trees

1.45 At the north of Inveraray, close to the A819, there was an area of estate parkland with mature scattered trees including oak, ash *Fraxinus excelsior*, cherry *Prunus* spp. and Scots pine.

A4.2 and A4.3 Recently-felled woodland (coniferous and mixed)

1.46 Recently-felled woodland was present along the southern extent of the existing access track, adjacent to Inveraray. There were areas of recently-felled woodland with regeneration of tree species taking place. Sitka spruce and birch were abundant among areas of bracken and rhododendron.

B1.1 and B1.2 Acid grassland (unimproved and semi-improved)

1.47 Acid grasslands were identified across the ESA. Acid grasslands regularly occupied the tops of rocky ridges and hillocks and often in a mosaic with wet or dry heath (see below). These grasslands were observed to be grazed. Species which dominated these habitats included mat grass *Nardus stricta*, heath rush *Juncus squarrosus*, heath bedstraw *Galium saxatile*, and sheep's fescue *Festuca ovina*.

B2.2 Neutral grassland (semi-improved)

1.48 At the north of Inveraray, close to the A819, there was an area of estate parkland with mature scattered trees where the ground flora comprised managed neutral grassland.

B4 Improved grassland

1.49 Present to the very southern extent of the existing access track, adjacent to Inveraray were areas of rough grazing pasture with sheep present. There were patches of soft rush throughout.

B5 Marshy grassland

1.50 Overall, the extent of marshy grassland was limited across the ESA. In the west, this habitat was generally recorded in localised areas around small watercourses within the area where turbines are proposed and was often dominated by soft rush.

1.51 Marshy grassland was more common within the east of the ESA along the access route, often in areas too small to be mapped such as depressions alongside watercourses. The habitat was similar in composition to that found further west, being dominated by soft rush, but there were also areas of locally dominant purple moor grass and occasional Yorkshire fog *Holcus lanatus*.

C1.1 and C1.2 Bracken (continuous and scattered)

1.52 Bracken *Pteridium aquilinum* was only present along the access route where it was present on low to moderate slopes with an extensive patch noted within the east of the existing access track. The bracken was often found in mosaic with marshy grassland and acid grassland and less often wet heath (see above and below). Other species recorded within stands of bracken included sweet vernal grass *Anthoxanthum odoratum*, Yorkshire fog, common bent *Agrostis capillaris*, heath bedstraw and tormentil *Potentilla erecta*.

D1 Dry dwarf shrub heath

1.53 Dry heath was widespread across the ESA where turbines are proposed, on southern aspects of steeper, well-drained slopes, hillocks and rocky outcrops. Heather was the dominant ericoid species with abundant bilberry and bell heather *Erica cinerea*.

1.54 Dry heath was rare along the access route and was only present in small, localised areas in a mosaic with acid grassland within the west of the access route, on higher ground to the east of Garbh Achadh.

D2 Wet dwarf shrub heath

1.55 Similar to dry dwarf shrub heath, the dominant ericoid in this habitat was heather. The habitat was distinguished from dry heath by the presence associated species; this often included abundant purple moor grass and frequent cross-leaved heath *Erica tetralix* and deergrass *Trichophorum germanicum*.

1.56 This habitat was widespread across the ESA, particularly on moderate slopes where blanket bog transitions to dry heath on steeper slopes. Within the area where turbines are proposed there was a concentration of wet heath surrounding the three lochans in the south-west of the ESA.

1.57 Wet heath was also recorded along the access route where it was present to the north of Garbh Achadh and on steeper slopes to the east.

D5 Dry heath/acid grassland mosaic

1.58 This habitat comprised a mosaic of dry heath and acid grassland habitats (described above). This habitat was identified across the ESA, particularly on steeper, south-facing slopes of rocky ridges including to the west of Cruach Mhic Eoich and the slopes to the east of Lochan Allt an Sgadain.

D6 Wet heath/acid grassland mosaic

1.59 This habitat was recorded across the ESA. It comprised a mixture of wet heath and acid grassland habitat (described above). This habitat was frequently recorded where sheep had grazed on middle slopes, and on small hillocks within areas of blanket bog in the west of the Developable Area between Lochan Dubh Mhuilinn and Loch Sionnach.

1.60 Wet heath/acid grassland was more widespread along the access route where it was present throughout; it was more extensive within the north and east of the track where there were steeper slopes.

E1.6.1 Blanket bog

1.61 Blanket bog accounted for the majority of the habitat across the ESA, occurring on plateaus, wide depressions and gentle slopes across the Developable Area. It was often recorded as a mosaic with wet heath, dry heath and/or acid grassland; this is due to the complex topography with many knolls and hillocks forming 'islands' in the blanket bog.

1.62 Blanket bog habitat was often recorded on level and/or gently sloping ground. This habitat had frequent sphagnum including *Sphagnum medium* and *Sphagnum papillosum*. A variety of ericoids were recorded; heather was the most commonly recorded and was often locally dominant, but cross-leaved heath, bilberry, crowberry *Empetrum nigrum*, and cowberry *Vaccinium vitis-idaea* were all recorded as frequent within this habitat. Additionally, much of the blanket bog had an abundance of hare's tail cottongrass *Eriophorum vaginatum*, with frequent deergrass and common cottongrass *Eriophorum angustifolium*. The species composition of the blanket bog habitat recorded varied across the ESA, and this is captured in following sections (see **NVC Communities**).

1.63 Although less commonly recorded, blanket bog habitat was present along the access route, particularly to the west and where the topography levelled off between the two summits of Garbh Achadh and Sron Reithe.

E1.7 Wet modified bog

1.64 Wet modified bog was identified throughout the ESA and was widespread across the turbine area. Bog specialists, particularly sphagnum, had a lower coverage (occasional to rare) and diversity. Areas of bare peat and haggings were often recorded within this habitat, including occasional deeply eroded channels. Patches of vegetation were more likely to be dominated by deergrass or hare's-tail cottongrass, and in some areas purple moor grass was recorded as locally dominant.

1.65 Wet modified bog was recorded along the access route, particularly to the west of the coniferous woodland plantation, surrounding the Allt Bail' a' Ghobhainn watercourse.

E2.1 Acid/neutral flush

1.66 Acid/neutral flushes were small in extent and were only recorded in the turbine area within the west of the ESA, in areas adjacent to the watercourses that flow from Loch Sionnaich and Lochan Dubh Mhuilinn; these watercourses confluence to become the Eas an Amair watercourse. The habitats were acidic and were identified as narrow flushes and areas alongside watercourses. Species recorded included abundant *Sphagnum fallax* overlain by occasional star sedge *Carex echinata*, and rare sundew *Drosera* spp. and violets *Viola* spp.

E2.2 Basic flush

1.67 Basic flushes were recorded across the ESA; however, the habitats were small in their extent. They typically comprised narrow, stony flushes on steeper slopes. Species noted included a range of sedge *Carex* species, including common yellow sedge *Carex viridula* ssp. *oedocarpa*, dioecious sedge *Carex dioica*, and carnation sedge *Carex panicea*. Butterwort *Pinguicula vulgaris* and yellow saxifrage *Saxifraga aizodes* were also recorded in this habitat, albeit rarely.

1.68 There was a concentration of basic flushes along the access route at the steep sides sloping to the north-east of Garbh Achadh.

E2.3 Bryophyte-dominated spring

1.69 This habitat type was rare across the ESA. It was often associated with E2.2 Basic flush (see above) where it formed a spring head above the flush. Springs were identified in very small extents across the ESA, with each spring head only a few square metres in size. These springs were dominated by mosses, particularly *Philonotis fontana* and *Dicranella palustris*.

1.70 Along the access route, bryophyte-dominated springs were only recorded on the steep sides sloping to the north-east of Garbh Achadh.

E4 Peat (bare)

1.71 Bare peat was associated with E1.7 Wet modified bog (see above) where it was present in actively eroding and recovering peat hags of various sizes across the ESA.

G1 Standing water

1.72 Multiple freshwater lochans were recorded, with the majority recorded in the west within the turbine area. Notable named waterbodies include Lochan Eisge Mhòir, Lochan Dubh Mhuilinn, Lochan Allt an Sgadain, Loch Sionnaich, Loch an Eilein Duibh, Loch nan Car and Lochan Erallich. Many of these open water habitats contained submerged aquatic vegetation including waterlily *Nymphaea* spp. In addition, numerous small pools were present throughout associated with blanket bog habitats.

1.73 There is a man-made Fish Pond present on the route of the existing access track, and the Scottish Water reservoir Steallaire Bàn Loch is located within the ESA on the opposite side of an existing wayleave.

G2 Running water

1.74 The two largest watercourses within the turbine area are the Allt Blarghour, located within the north-east, and Eas an Amair, located within the west. There are many other, smaller watercourses within the Developable Area which flow into and out of the lochans. Some of the watercourse channels had aquatic vegetation including occasional pondweed *Potamogeton* spp. In more slow-flowing areas bog bean *Menyanthes trifoliata* was recorded, although rarely.

I2.1 Quarry

1.75 A former quarry was noted north of the access route within the east of the ESA, comprising elements of exposed rock walls and scree, with a small pool of standing water at the lowest point.

NVC Communities

1.76 The NVC communities described below are supported by, and should be read in conjunction with, **Figure 8.4** and photographs in **Annex A**.

U4 *Festuca ovina-Agrostis capillaris-Galium saxatile* grassland

1.77 This unimproved acid grassland community was well-drained, occasionally tightly-grazed, and stood out as green against the surrounding habitats. This community was often recorded in mosaic with wet and dry heath habitats and was widespread across the ESA.

1.78 Two sub-communities were identified:

- a. The U4a typical sub-community did not have any distinguishing features. Abundant species included sheep's fescue, common bent grass, sweet vernal-grass and tormentil. The moss *Rhytidiadelphus squarrosus* was frequent, sometimes forming a thick mat.
- e. The U4e *Vaccinium myrtillus-Deschampsia flexuosa* sub-community was distinguished from the typical sub-community by frequent bilberry, wavy hair-grass *Deschampsia flexuosa*, and a more extensive cover of mosses, particularly *Racomitrium lanuginosum* and *Pleurozium schreberi*. Mat grass *Nardus stricta* was recorded occasionally in the sward.

U5 *Nardus stricta-Galium saxatile* grassland

1.79 Similar to U4, this unimproved acid grassland community was often recorded in mosaic with wet and dry heath habitats. It was not common across the ESA, being only present within an area at the south of the Developable Area and on two steeper slopes of the access route.

1.80 The vegetation was very similar to U4, with frequent bilberry on moist acidic soil, but was paler in colour and mat grass (in short tufts) was the dominant graminoid. Sheep's fescue and common bent grass were recorded occasionally. The occasional yellow of tormentil flowers was visible in most stands, often over a carpet of frequent heath bedstraw. The typical mosses of acid grassland were abundant, including *Hypnum jutlandicum*, *Pleurozium schreberi*, *Rhytidiadelphus loreus*, *Rhytidiadelphus squarrosus* and *Hylocomium splendens*.

U6 *Juncus squarrosus-Festuca ovina* grassland

1.81 This acid grassland was the most commonly recorded grassland community across the ESA. It was often found in mosaic with wet or dry heath habitats, on grazed rocky ridges and knolls, although the level of grazing was variable. In general, the grassland was more heavily grazed in the west of the ESA. This community also appears to have replaced areas of heavily-grazed blanket bog habitat on level ground. Tussocky, deep-green heath rush was abundant and stood out against the surrounding habitats. Swards of wavy hair-grass and star sedge were dotted with occasional tormentil between the heath rush.

1.82 Three sub-communities were recorded within the ESA:

- a. The U6a *Sphagnum* spp. sub-community occurred on the most damp substrate with *Sphagnum fallax*, *Sphagnum papillosum* and *Sphagnum capillifolium* all recorded frequently.
- c. The U6c *Vaccinium myrtillus* sub-community comprised a mixture of heath rush and wavy hair-grass, with frequent bilberry. Moss cover was more abundant in this sub-community; the most commonly recorded species were the feather mosses *Rhytidiadelphus loreus* and *Pleurozium schreberi*.
- d. The U6d *Agrostis capillaris-Luzula multiflora* sub-community was identified by an abundance of graminoid species including mat grass, sweet vernal-grass, wavy hair-grass and viviparous sheep's fescue *Festuca vivipara*. Heath woodrush *Luzula multiflora* was recorded frequently, interspersed within the abundant heath rush.

U20 *Pteridium aquilinum-Galium saxatile* community

1.83 This bracken community was recorded along the access route where it was often in mosaic with the NVC communities U4, M23 and less often M15 (described above and below). Two sub-communities were recorded which often occurred adjacent to one another:

- a. The U20a *Anthoxanthum odoratum* sub-community had a grassy sward characterised by frequent sweet vernal grass, Yorkshire fog, common bent and heath bedstraw and occasional tormentil. The mosses *Rhytidiadelphus squarrosus* and *Pseudoscleropodium purum* were also recorded frequently.
- c. The U20c species poor sub-community had dense, tall bracken dominating and piercing through bracken leaf litter from the previous year; the dense canopy of the bracken limited the growth of any other species beneath.

H10 *Calluna vulgaris-Erica cinerea* heath

1.84 The H10 community was identified as a dry heath and was present across to the south of the turbine area. It was also in smaller extents along the access route where it was recorded on steep, rocky, south-facing slopes that were well-drained. This community was often recorded in mosaic with acid grassland (U4 and U5) and other dry heath communities (including H12, described below). The H10 community was notably found on steep, rocky outcrops up-slope of M15 wet heath (described below).

1.85 Three sub-communities were identified:

- a. The H10a typical sub-community was identified by the presence of a thick continuous canopy of dwarf shrub. There was no distinguishing species in this sub-community. Common heather was the dominant species with frequent bilberry, cowberry and bell heather. Green-ribbed sedge *Carex binervis* and tormentil were recorded occasionally.
- c. The H10c *Festuca ovina-Anthoxanthum odoratum* sub-community was identified by its 'grassier' composition (between the dwarf shrubs). Sheep's fescue and sweet vernal-grass were frequently recorded throughout the sward, giving this sub-community a paler appearance and making it easily distinguishable from the other H10 sub-communities.
- d. The H10d *Thymus polytrichus-Carex pulicaris* sub-community was identified by a noticeably sparse cover of dwarf shrubs which allows a more diverse assemblage of species to grow in the more open canopy. A range of herbs were rarely recorded growing, including wild thyme *Thymus polytrichus*, flea sedge *Carex pulicaris*, bird's-foot-trefoil *Lotus corniculatus*, self-heal *Prunella vulgaris*, common dog violet *Viola riviniana*, and mouse-ear-hawkweed *Pilosella officinarum*. H10d was rare across the ESA and was associated with rocky outcrops on steeper ground.

H12 *Calluna vulgaris-Vaccinium myrtillus* heath

1.86 This dry heath community was common on steeper slopes across the ESA it was dominated by a uniform layer of heather and bilberry and appeared red-brown in colour. There was only one sub-community recorded which was the H12a *Calluna vulgaris* sub-community which had no distinguishing features. Cowberry and crowberry were abundant, with frequent wavy hair-grass which was visible as it grew above the dwarf shrub canopy. Lesser twayblade *Neottia cordata* was recorded in this habitat but rarely. The ground layer comprised abundant pleurocarpous mosses including *Hylocomium splendens*, *Pleurozium schreberi* and *Rhytidiadelphus loreus*. The H12 community was not recorded along the access route.

H21 *Calluna vulgaris-Vaccinium myrtillus-Sphagnum capillifolium* heath

1.87 Found on steep, terraced slopes between gentler slopes of M15 wet heath (described below) across small extents of the ESA. This damp heath habitat consisted of a canopy dominated by heather with frequent bell heather. Bilberry and tormentil were abundant along with a frequent covering of the moss *Racomitrium lanuginosum*. This community was distinguished from the H10 and H12 dry heaths by the presence of occasional carpets of *Sphagnum capillifolium*. The vegetation did not clearly fall into either of the two sub-communities.

M2 *Sphagnum cuspidatum/fallax* bog pool community

1.88 This bog pool community was identified in wet depressions among bog on deep waterlogged peat. It was identified by the presence of *Sphagnum cuspidatum* and *Sphagnum fallax* as the dominant sphagnum species which grew in shallow water with occasional cross-leaved heath. This type of bog pool was noted within the M17 bog community (described below) and was not widely recorded across the ESA; however, these bog pools were often small in size and therefore not all were mapped (see **Constraints and Limitations**). The M2 community was absent along the access route.

M3 *Eriophorum angustifolium* bog pool community

1.89 This bog pool community was common across the area where turbines are proposed, and was also present in smaller extents along the access route. It was noted in wet depressions within peat hags found in the M19 and M20 blanket bog and wet modified bog communities (described below). The flora was noted to be impoverished, and mainly consisted of occasional common cottongrass growing sparsely within considerable areas of bare peat. *Sphagnum papillosum*, *Sphagnum fallax* and *Polytrichum commune* were occasional, with cross-leaved heath rarely recorded.

M4 *Carex rostrata-Sphagnum fallax* mire

1.90 Localised areas of bottle sedge *Carex rostrata* were noted within an area of blanket bog in the west of the Developable Area. Bottle sedge was accompanied by abundant *Sphagnum fallax*, and frequent bog asphodel, purple moor grass and *Sphagnum capillifolium*. This community was not recorded elsewhere in the wider ESA.

M6 *Carex echinata-Sphagnum fallax/denticulatum* mire

1.91 This acid flush community was identified within the main turbine area, particularly alongside the Eas an Amair watercourse and had a small extent. The habitat comprised a sedge mire with star sedge dominating over a carpet of dominant *Sphagnum fallax*. This habitat occurred in small, narrow patches marking out acid flushes, wet hollows and seepage lines in shallow depressions among wet heath and blanket bog. Other species noted here but rare included purple moor grass, sundew and violets. No M6 was recorded along the existing access track.

M10a *Carex dioica-Pinguicula vulgaris* mire

1.92 This basic flush community was identified on narrow and stony, basic flushes on slopes to the west of Cruach Mhic Eoich within the ESA and on slopes north-east of Garbh Achadh. The species present included occasional dioecious sedge *Carex dioica*, carnation sedge and rare butterwort *Pinguicula vulgaris*. There were several examples of this habitat which were hard to distinguish from the M11 flush (described below), and many examples were assessed to belong to the M10a *Carex viridula* ssp. *oedocarpa*-*Juncus bulbosus* sub-community which has some overlap in species composition with M11.

M11a *Carex viridula* ssp. *oedocarpa*-*Saxifraga aizoides* basic spring and flush

1.93 This basic flush community was identified on narrow stony flushes on hill slopes and had a small extent within the main turbine area but was common along the access, notably north-east of Garbh Achadh. Species present included a sparse cover of common yellow sedge *Carex viridula* ssp. *oedocarpa* and carnation sedge, with rare yellow saxifrage *Saxifraga aizoides* and alpine meadow rue *Thalictrum alpinum*.

M15 *Trichophorum germanicum-Erica tetralix* wet heath

1.94 This wet heath community was recorded within the turbine area but was more widespread along the access route where it was recorded on gentle to moderate slopes. This community was often recorded on moderate slopes at the transition between blanket bog on flatter ground below and drier heaths on steeper slopes above. Species recorded consisted of an abundant mixture of heather, cross-leaved heath, deergrass and purple moor grass, with frequent occurrences of tormentil and common cottongrass and occasional bog asphodel *Narthecium ossifragum*.

1.95 Three sub-communities were recorded:

- a. The M15a *Carex panicea* sub-community was recorded in depressions in bog where the ground was relatively saturated. Species present here included abundant carnation sedge, heath rush, deergrass and mat grass, and rare sundew. There was also a patchy carpet of moss including frequent *Racomitrium lanuginosum*, *Sphagnum papillosum* and *Sphagnum capillifolium*.
- b. The M15b typical sub-community consisted of dominant heather with an abundance of cross-leaved heath and deergrass. Under the dense canopy of the heather there was occasional purple moor grass and patches of *Sphagnum capillifolium*.
- d. The M15d *Vaccinium myrtillus* sub-community was a drier and grassier species assemblage which included frequent mat grass, wavy hair-grass, heath rush and bilberry. This was the driest of the M15 communities with pleurocarpous mosses including *Pleurozium schreberi* frequently recorded, and more limited sphagnum.

M17 *Trichophorum germanicum-Eriophorum vaginatum* blanket mire

1.96 This blanket bog community was found in isolated pockets where the most waterlogged peat was recorded in the flattest areas of the area where turbines are located. The vegetation was dominated by deergrass and common cottongrass with cross-leaved heath and hare's-tail cottongrass frequently distributed throughout the habitat. There was a continuous carpet of sphagnum including abundant *Sphagnum papillosum* and *Sphagnum capillifolium*. Throughout the community there were also many small wet depressions in this habitat containing the M2 bog pool community (described above). The M17 community was not recorded along the existing access track.

1.97 One sub-community was recorded:

- a. The M17a *Drosera rotundifolia-Sphagnum* species sub-community which was identified owing to the frequent presence of sundew, *Sphagnum papillosum* and *Sphagnum capillifolium* covering most of the peat layer.

M19 *Calluna vulgaris-Eriophorum vaginatum* blanket mire

1.98 This blanket bog community was widespread and recorded across the area where turbines are proposed including on gentle slopes. Heather and hare's-tail cottongrass were equally dominant, with other species present including occasional common cottongrass, *Sphagnum capillifolium* and *Sphagnum papillosum*. There was varying quantities of bilberry and low-growing crowberry. Pleurocarpous mosses were frequently recorded and included *Hylocomium splendens*, *Pleurozium schreberi* and *Rhytidiadelphus loreus*. Areas of hagged peat were frequently noted, in which M3 bog pools were recorded in the wet depressions.

1.99 The M19 vegetation recorded did not fit clearly into any of the three sub-communities. No M19 was recorded along the existing access track.

M20 *Eriophorum vaginatum* blanket and raised mire

1.100 This bog community was dominated by hare's tail cottongrass. There was variation in the frequency of deergrass and heather, which were locally abundant in some areas and occasional in other areas. The community was widespread across the ESA. It was recorded in wide depressions, between hillocks and on gentle slopes. In places, there was little or no sphagnum species where the mire was actively eroding or had been drained, and at these locations the community was classified as modified bog. Two sub-communities for the community were recorded:

- a. The M20a species-poor sub-community was distinguished as having a low species diversity with little more than common cottongrass with occasional wavy hair-grass in places.
- b. The M20b *Calluna vulgaris-Cladonia* species sub-community was distinguished by the presence of heather which was recorded as frequent or occasional, with the shrub being grazed in many places. Other distinguishing features included occasional patches of *Cladonia arbuscula* with occasional bilberry, crowberry and wavy hair-grass, and rare mat grass. This sub-community was relatively more species diverse compared to M20a.

M23 *Juncus effusus/acutiflorus - Galium palustre* rush-pasture

1.101 This marshy grassland community was recorded as small extents alongside watercourses across the turbine area, often in areas too small to be included in mapping (see **Constraints and Limitations**). The vegetation was dominated by soft rush; also recorded were occasional purple moor grass and rare Yorkshire fog. This community was more common along the access route where it was recorded growing in mosaic with wet heath, acid grassland and bracken communities.

M25a *Molinia caerulea-Potentilla erecta* mire, *Erica tetralix* sub-community

1.102 M25 was recorded in a small extent adjacent to Loch an Eilein Dubh within the turbine area, and along the access route adjacent to and within the coniferous woodland plantation south-east of Sròn Rèithe. M25a was most commonly identified as wet modified bog. The habitat was dominated by purple moor grass on wet ground. It lacked diversity and abundance of sphagnum species. The vegetation fitted the M25a *Erica tetralix* sub-community which is the most heathy sub-community, and included frequent cross-leaved heath, common cottongrass, deergrass, tormentil, hare's-tail cottongrass and heather, and rare heath milkwort *Polygala serpyllifolia*.

M32 *Philonotis fontana-Saxifraga stellaris* spring

1.103 This small bryophyte-dominated spring community was recorded within the ESA, often at spring-heads on steeper slopes among heaths and acid grasslands, and upslope from M10 and M11 communities (described above). Within the turbine area the spring was recorded at the edges of Loch nan Car, and along the access route on the slopes north-east of Garbh Achadh. The community was distinctive with bright green mosses including abundant *Philonotis fontana* and *Dicranella palustris* appearing in spongy patches. Rarely recorded in some of these springs was marsh willowherb *Epilobium palustre*. The vegetation community only covered an area a few square metres in size, and was occasionally noted to occur in a linear habit.

W4 *Betula pubescens-Molinia caerulea* woodland

1.104 This wet broadleaved semi-natural woodland community was recorded to the south of the existing access track on the edge of coniferous woodland plantation, adjacent to the existing track. It had a small extent and was present in poorly drained areas in small patches alongside coniferous woodland plantation. Abundant species forming the canopy included downy birch with yew recorded rarely. The field layer was formed of abundant purple moor grass and *Hylocomium splendens*. Frequent mosses including *Sphagnum palustre* and *Pleurozium schreberi* formed a dense carpet and covered the trunks of many of the trees. Occasional species recorded were bracken, bog myrtle, rhododendron and *Polytrichum commune*. Rare species included a range of dwarf shrubs such as heather, cross-leaved heath and bilberry, and hard fern.

Summary

1.105 Table 8.2.3 summarises the Phase 1 habitats and associated NVC communities.

Table 8.2.3: Broad Habitat Types¹²

Phase 1 Habitat	Associated NVC Communities	Area within Study Area (ha)	Proportion of Ecology Study Area (%)	Mechanism for Habitat Conservation Interest
A1.1.1 Broadleaved woodland (semi-natural)	W4	27.2	2.1	High potential GWDTE (W4) Scottish Biodiversity List (Wet Woodland) Argyll & Bute Local Biodiversity List (LBAP) ¹³
A1.2.2 Coniferous woodland (plantation)	-	187.6	14.4	-
A1.3.1 and A1.3.2 Mixed woodland (semi-natural and plantation)	-	24.8	1.9	-
A2.1 and A2.2 Scrub (dense and scattered)	-	4.0	0.3	-
A3.1 and A3.3 Scattered trees (broadleaved and mixed)	-	11.5	0.9	-
A4.2 and A4.3 Coniferous woodland (recently felled) and Mixed woodland (recently felled)	-	42.8	3.3	-

¹² Calculations have not been undertaken for those habitats that were recorded as point features, for example bryophyte-dominated springs.

¹³ The Argyll and Bute Local Biodiversity Action Plan 2010-2015

Phase 1 Habitat	Associated NVC Communities	Area within Study Area (ha)	Proportion of Ecology Study Area (%)	Mechanism for Habitat Conservation Interest
B1.1 and B1.2 Acid grassland (unimproved and semi-improved)	U4, U5, U6	74.9	5.7	Moderate potential GWDTE (U6)
B2.2 Neutral grassland (semi-improved)	-	2.0	0.2	-
B4 Improved grassland	-	11.0	0.8	-
B5 Marshy grassland	M23, M25	64.7	5.0	High potential GWDTE (M23) Moderate potential GWDTE (M25) Scottish Biodiversity List (M23: Upland Flushes, Fens and Swamps) LBAP
C1.1 and C1.2 Bracken (continuous and scattered)	U20	31.8	2.4	-
D1 Dry dwarf shrub heath	H10, H12, H21	26.9	2.1	Annex 1 Habitat (H4030 European dry heaths) Scottish Biodiversity List (Upland Heathland) LBAP
D2 Wet dwarf shrub heath	M15	31.7	2.4	Annex 1 Habitat (H4010 Northern Atlantic wet heaths with <i>Erica tetralix</i>) Moderate potential GWDTE (M15) Scottish Biodiversity List (Upland Heathland) LBAP
D5 Dry heath/acid grassland	H10, H12, H21 U4, U5, U6	26.2	2.0	Annex 1 Habitat (H4030 European dry heaths) Scottish Biodiversity List (Upland Heathland) LBAP
D6 Wet heath/acid grassland	M15 U4, U5, U6	75.1	5.8	Annex 1 Habitat (H4010 Northern Atlantic wet heaths with <i>Erica tetralix</i>)

Phase 1 Habitat	Associated NVC Communities	Area within Study Area (ha)	Proportion of Ecology Study Area (%)	Mechanism for Habitat Conservation Interest
				Scottish Biodiversity List (Upland Heathland) LBAP
E1.6.1 Blanket bog	M2, M3, M4, M17, M19, M20	567.6	43.5	Annex 1 Habitat (H7130 Blanket bogs) Scottish Biodiversity List (Blanket Bog) LBAP
E1.7 Wet modified bog	M3, M20, M25	35.0	2.7	Annex 1 Habitat (H7130 Blanket bogs) Moderate potential GWDTE (M25) Scottish Biodiversity List (Blanket Bog) LBAP
E2.1 Acid/neutral flush	M6	-	-	High potential GWDTE (M6) Scottish Biodiversity List (Upland Flushes, Fens and Swamps) LBAP
E2.2 Basic flush	M10, M11	-	-	Annex 1 Habitat (H7230 Alkaline fens: M10) High potential GWDTE (M10, M11) Scottish Biodiversity List (Upland Flushes, Fens and Swamps) LBAP
E2.3 Bryophyte-dominated spring	M32	-	-	High potential GWDTE (M32) Scottish Biodiversity List (Upland Flushes, Fens and Swamps) LBAP
E4 Bare peat	-	21.7	1.7	-
G1 Standing water	-	25.8	2.0	Scottish Biodiversity List (Oligotrophic and Dystrophic Lakes; Blanket Bog) LBAP

Phase 1 Habitat	Associated NVC Communities	Area within Study Area (ha)	Proportion of Ecology Study Area (%)	Mechanism for Habitat Conservation Interest
G2 Running water	-	0.7ha / approximately 54km	0.1	Scottish Biodiversity List (Rivers) LBAP
I2.1 Quarry	-	0.7	0.1	-
J4 Bare ground / Hardstanding	-	0.2	<0.1	-

Groundwater Dependant Terrestrial Ecosystems (GWDTE)

1.106 Nine NVC communities were recorded within the ESA which, according to SEPA guidance³, indicate potential groundwater dependency.

1.107 Table 8.2.4 presents the NVC communities recorded which potentially indicate groundwater dependency and the standard SEPA guidance interpretation of potential groundwater dependency based on the vegetation alone¹⁴.

Table 8.2.4: Potential GWDTEs

Potential GWDTE NVC Code	Groundwater Dependency as per SEPA (2017) ³
M6	High
M10	High
M11	High
M15	Moderate
M23	High
M25	Moderate
M32	High
W4	High
U6	Moderate

Peatland Condition

1.108 The open range area of the ESA (i.e. outwith the afforested east of the Site) is depicted on the Carbon and Peatland 2016 Map¹⁵ as being Class 2. Class 2 is described as 'nationally important carbon-rich soils, deep peat and priority peatland habitat; areas of potentially high conservation value and restoration potential' as shown on Figure 7.6.

1.109 Peat has been confirmed to be present across the majority of the Site at depths measuring between 0.5m – 4.9m (see Figure 7.7). The geological structure of the Site has resulted in areas of deeper peat between crags and ridges, and thinner peat or organic soils on the steeper slopes around rocky outcrops. Numerous lochans are present in the topographic lows where the deeper peat is found, and some areas of natural erosion (e.g. gullying) are visible around watercourses. Peat is assessed in detail in Chapter 7.

1.110 Peatland condition was assessed following NatureScot guidance⁴. The peatland condition varied across the ESA, with pockets of 'near natural' occurring among large extents of 'modified' peatland. Artificial drains were apparent in many locations, leading to

areas classified as 'drained', and these often coincided with extents of exposed peat that were classified as 'actively eroding'. There was evidence of grazing noted but no evidence of burning across the ESA. The condition of peatlands at the proposed turbine locations is presented in Annex B.

Invasive Species

1.111 The only invasive species recorded within the ESA was rhododendron *Rhododendron ponticum*. This was present along and within various types of woodland adjacent to the existing access track in the south of the ESA, to the west of Inveraray.

Interpretation

Habitats of Conservation Concern

1.112 A desk study was undertaken to inform habitat and vegetation surveys. An account of the method adopted, and findings, is provided in Appendix 8.1 which also sets out the legislative provisions afforded to habitats, notably habitats of conservation concern.

1.113 Habitats of conservation interest recorded within the ESA are detailed in Table 8.2.3 above and included the following:

- Four Annex I habitats: H4010 Northern Atlantic wet heaths with *Erica tetralix*; H4030 European dry heaths; H7130 Blanket bogs; H7230 Alkaline fens.
- Six Scottish Biodiversity List habitats: Wet Woodland; Upland Heathland; Blanket Bogs; Upland Flushes, Fens and Swamps; Oligotrophic and Dystrophic Lakes; and Rivers.
- Nine potential GWDTE communities: M6, M10, M11, M15, M23, M25, M32, W4, and U6.

1.114 Blanket bog is the most common Annex 1 habitat type within the ESA, comprising approximately 46% when Phase 1 habitat types are combined (E1.6.1 and E1.7). This habitat type is found on level and gently-sloping ground throughout, and is commonly associated with deeper deposits of peat (>0.5m).

1.115 This is followed by northern Atlantic wet heaths (approximately 5%) and European dry heaths (approximately 3%). Wet heath is commonly located at the transition from blanket bog onto areas of slightly increased gradient and/or thinner peat. As the depth of peat reflects the underlying topography, these two habitat types often occur in mosaic over a short distance. The dry heaths are associated with the steeper slopes where the substrate is shallow, and this often corresponds to the steeper, higher knolls. The Upland Heathland and Blanket Bog SBL habitats are superseded by the Annex 1 habitats.

1.116 Alkaline fens are the final Annex 1 habitat, and are represented by the M10 community which is present on slopes scattered in the west of the ESA and north-east of Garbh Achadh. As these are small, flush features, the habitat is mapped as point features only; as such, it comprises less than 1% of the ESA.

1.117 SBL Wet Woodland (W4) is found in a small area along the existing access track and makes up less than 0.1% of the ESA.

1.118 Upland Flushes, Fens and Swamps are represented by three communities (M6, M23 and M32) and makes up approximately 3% of the ESA, the majority of which is M23 rush pasture along the proposed access route where it emerges from the forest onto the open ground.

1.119 The network of lochs and lochans largely belongs to the Oligotrophic and Dystrophic Lakes SBL habitat (approximately 2% of the ESA), while many of the approximately 54km of watercourses within the ESA qualify as the Rivers SBL habitat as they are headwaters¹⁶.

GWDTE

1.120 A detailed assessment of GWDTE is provided in Appendix 7.5: Groundwater Dependent Terrestrial Ecosystem Assessment. A summary of actual groundwater dependency is provided below.

¹⁴ The identified GWDTEs have been assessed and are further discussed in Chapter 7: Hydrology, Hydrogeology, Geology and Peat.

¹⁵ Scottish Natural Heritage (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>

¹⁶ Defined as a watercourse within 2.5km of its furthest source as marked as a blue line on 1:50,000 Ordnance Survey Landranger maps.

1.121 Most of the Moderate potential habitats within the ESA are M15 wet heath. Based on their hydrogeological setting – an upland blanket peat bog – the M15 communities are generally reflective of wet, peaty conditions. Where it coincided with a confirmed GWDTE feature, such as a spring or flush, the M15 community was assessed to have some groundwater influence. Where it occurred over large extents in mosaic with bog communities, the M15 community is considered to have, at-most, Low groundwater dependency.

1.122 U6 acid grassland, with Moderate potential, was also noted throughout the ESA. It often occurred on drier, grazed areas in mosaic with wet or dry heath communities, or appearing to have replaced blanket bog habitats where grazing levels were high. Floristically, it did not exhibit signs of nutrient input. In the context of the ESA this community is generally reflective of wet, peaty conditions, and is created and maintained by grazing. The U6 community is considered to have, at-most, Low groundwater dependency.

1.123 There are several small areas of M23 rush-pasture within the ESA, located either close to watercourses (indicating a surface water influence) or on hillsides in the east of the ESA, as small patches of rushes within shallow peat on the damp hillside. The sub-community found in the ESA is M23b, which is dominated by soft rush and generally reflects damp and peaty conditions, with nothing of note floristically to indicate an input of nutrients. The M23 communities within the ESA are considered to have, at-most, Low groundwater dependency.

1.124 Areas of M25 within the ESA are associated with wet heath and modified bog, or with surface water features. This community is therefore considered to have, at-most, Low groundwater dependency.

1.125 The W4 woodland community is within the afforested area in the east of the ESA, adjacent to an extent of M25 grassland and a small, mapped watercourse. It comprises self-seeded birch trees along a wayleave on the edge of a block of conifer forestry. As such, it is considered to reflect the damp and peaty conditions. Based on the hydrogeological setting, this community is not considered to be groundwater dependent.

1.126 Two areas of M6 mire were subject to hydrogeological assessment. One of these was located adjacent to a watercourse, although a small seep was noted to be present higher than the watercourse. The second was located within a low-lying area of bog on gentle slopes. The groundwater dependency of these was therefore assessed to be Moderate and Low to Moderate respectively.

1.127 The remaining communities – M10, M11, M32 – were confirmed to have High groundwater dependency.

Peatland Condition

1.128 Sphagnum cover varied substantially across the peatland habitats within the ESA from abundant to rare, indicating different levels of peatland condition across the ESA. There were areas with a diversity and abundance of sphagnum; on the other hand, extensive areas were noted to be in 'modified' condition due to grazing, and some extents are in 'drained' condition, both as a result of artificial drains and of vegetated gullies.

1.129 Areas of bare peat were recorded across the ESA in hags and gullies of varying extents, indicating 'actively eroding' peatland condition. Across some areas of the ESA, particularly in the west, sheep and deer grazing was evident with these animals also trampling and rubbing on hags which was accelerating actively eroding peatland and preventing re-vegetation.

1.130 As described, the peatland condition within the ESA comprises a mosaic of peatland conditions, with large extents showing a significant degree of modification and erosion. As such, there are significant opportunities to enhance the overall condition of the peatland within the ESA.

1.131 Further interpretation of the peat resource within the ESA is provided in **Appendix 7.2: Peat Survey Report**.

Annex A Site Photography

A1.1.1 Broadleaved woodland (semi-natural) showing a view of W4 *Betula pubescens*-*Molinia caerulea* woodland to the south of the access track



A1.2.2 Coniferous woodland plantation adjacent to the existing access track



A1.3.1 Mixed woodland (semi-natural) at the south of the access track, west of Inveraray



A4.2 Coniferous Woodland (recently felled) alongside the existing access track



C1.2 Bracken – scattered with B5 marshy grassland along the access track



C1.2 Bracken – scattered showing U20 *Pteridium aquilinum-Galium saxatile* community with a mosaic of H12 *Calluna vulgaris-Vaccinium myrtillus* heath and M15 *Trichophorum germanicum-Erica tetralix* wet heath along the access track



B1.1 Acid grassland (unimproved) and example of U4 *Festuca ovina-Agrostis capillaris-Galium saxatile* grassland



B1.1 Acid grassland (unimproved) and example of U5a *Nardus stricta-Galium saxatile* grassland



B1.1 Acid grassland (unimproved) and example of U6 *Juncus squarrosus-Festuca ovina* grassland



B1.2 Acid grassland (semi-improved) and example of U6 *Juncus squarrosus-Festuca ovina* grassland on a hillock amongst blanket bog in the north-west of the ESA



B5 Marshy grassland, showing an example of M23 *Juncus effusus/acutiflorus - Galium palustre* rush-pasture on the banks of the Eas an Amair watercourse



D1 Dry dwarf shrub heath and an example of H10 *Calluna vulgaris-Erica cinerea* heath



D1 Dry dwarf shrub heath and an example of H12 *Calluna vulgaris-Vaccinium myrtillus* heath common on the steep slopes within the east of the ESA



D1 Dry dwarf shrub heath and an example of H21 *Calluna vulgaris-Vaccinium myrtillus-Sphagnum capillifolium* heath in the west of the ESA



D2 Wet dwarf shrub heath and an example of M15 *Trichophorum germanicum-Erica tetralix* wet heath in the central ESA



D5 Dry heath/acid grassland mosaic across the landscape with areas of bog in depressions and on moderate slopes within the ESA



A view of D6 Wet heath/acid grassland mosaic which was noted throughout the ESA



E1.6.1 Blanket bog, showing an example of M2 *Sphagnum cuspidatum/fallax* bog pool community



E1.6.1 Blanket bog, showing an example of a M3 *Eriophorum angustifolium* bog pool community growing in an area of peat haggling in the north-west of the ESA



E1.6.1 Blanket bog, showing an example of M17 *Trichophorum germanicum-Eriophorum vaginatum* blanket mire



E1.6.1 Blanket bog, showing an example of M19 *Calluna vulgaris-Eriophorum vaginatum* blanket mire



E1.6.1 Blanket bog showing an example of M20 *Eriophorum vaginatum* blanket and raised mire



E1.7 Wet modified bog, showing an example of M19 *Calluna vulgaris-Eriophorum vaginatum* blanket mire and M3 *Eriophorum angustifolium* bog pool community growing within peat haggings in the north of the ESA



E1.7 Wet modified bog M20 *Eriophorum vaginatum* blanket and raised mire in an area of haggings which was trampled by deer and sheep, in the north-west of the ESA



E1.7 Wet modified bog, showing an example of M25a *Molinia caerulea-Potentilla erecta* mire *Erica tetralix* sub-community to the south-west of Loch an Eilein Duibh, in the north-west of the ESA



E2.1 Acid/neutral flush, showing an example of M6a *Carex echinata-Sphagnum fallax/denticulatum* mire



E2.1 Acid/neutral flush, showing a close up of M6a *Carex echinata-Sphagnum fallax/denticulatum* mire vegetation



E2.2 Basic Flush, showing an example of M10 *Carex diocia-Pinguicula vulgaris* mire



E2.2 Basic Flush, showing a close up of M10 *Carex diocia-Pinguicula vulgaris* mire



E2.2 Basic Flush, showing an example of M11a *Carex viridula* spp. *oedocarpa-Saxifraga aizodes* basic spring and flush



E2.2 Basic Flush, showing a close up of M11a *Carex viridula* spp. *oedocarpa-Saxifraga aizodes* basic spring and flush



E2.3 Bryophyte-dominated spring, showing an example of M32 *Philonotis fontana-Saxifraga stellaris* spring



E4 – Bare peat (no NVC code) with evidence of trampling by sheep and deer



G1 Standing water (no NVC code) with *Nymphaea* spp.



G1 Standing water (no NVC code), showing a view of Lochan Eisge Mhoir, Lochan Dubh Mhuilinn and Lochan Allt an Spadain within the ESA



G2.3 Running Water (no NVC code) with *Potamogeton* spp. Showing the Eas an Amair watercourse within the ESA



Annex B Peatland Condition

Turbine	Peat Depth Range (cm)	NVC Communities	Notable Features	Peatland Activity and Condition	Quality	Comments	Photo
T1	30-250	M20/U6	<ul style="list-style-type: none"> ■ Continuous unit >25ha ■ Drains noted ■ Woodland/scrub absent 	<ul style="list-style-type: none"> ■ Inactive ■ Drained 	Low	Approximately 380m elevation on north-facing slope. Handful of deeper probes, but largely up to 0.5 or 1m. Mosaic of acid grassland and M20 bog, with limited sphagnum species noted. Drains apparent. No rare species.	
T2	0-40	M20/U6	<ul style="list-style-type: none"> ■ Few drains/hags noted ■ Woodland/scrub absent 	<ul style="list-style-type: none"> ■ Not peatland 	n/a	On generally shallow peat near forestry edge. Mosaic of blanket bog and acid grassland. Hillocks are drier and grazed, with rocky tops. Small areas of bog are found on the plateau.	

Turbine	Peat Depth Range (cm)	NVC Communities	Notable Features	Peatland Activity and Condition	Quality	Comments	Photo
T3	0-210	M19/M15/U5	<ul style="list-style-type: none"> ■ Continuous unit >25ha ■ Hags noted ■ Woodland/scrub absent 	<ul style="list-style-type: none"> ■ Not peatland 	n/a	Small pockets of deeper deposits around the turbine. Areas of erosion apparent to north and south. A slightly wider range of sphagnum species noted nearby, although bog habitats are in mosaic with extents of drier habitat types. Turbine itself is on a drier hillock.	
T4	0-280	M19/M20	<ul style="list-style-type: none"> ■ Continuous unit >25ha ■ Drains and hags noted ■ Woodland/scrub absent 	<ul style="list-style-type: none"> ■ Inactive ■ Actively eroding / drained 	Low	Pockets of deep peat, with areas of hags and drains. A slightly wider range of sphagnum species noted nearby, but generally drier and grazed communities.	No photo
T5	5-110	H12/M20	<ul style="list-style-type: none"> ■ Drains and hags noted ■ Woodland/scrub absent 	<ul style="list-style-type: none"> ■ Not peatland 	n/a	Turbine located on a higher, drier knoll of heath, surrounded by grazed bog. Hagged peat recorded nearby.	

Turbine	Peat Depth Range (cm)	NVC Communities	Notable Features	Peatland Activity and Condition	Quality	Comments	Photo
T6	30-100	M19/U6	<ul style="list-style-type: none"> ■ Continuous unit >25ha surrounding ■ Haggs noted ■ Woodland/scrub absent 	<ul style="list-style-type: none"> ■ Not peatland 	n/a	Turbine located on drier knoll of acid grassland with dry, grazed bog around, surrounded by further extents of M19/M20. Erosion noted nearby although not at turbine itself.	
T7	10-1401	M19/M20	<ul style="list-style-type: none"> ■ Continuous unit >25ha ■ Extensive drains and haggs ■ Woodland/scrub absent 	<ul style="list-style-type: none"> ■ Not peatland 	n/a	Ridge of shallower deposits within dry M19/M20 grazed bog. Extensive drains and haggging noted surrounding the location.	No photo
T8	30-180	U4/M19/M20/M3	<ul style="list-style-type: none"> ■ Continuous unit >25ha ■ Extensive drains and haggs ■ Woodland/scrub absent 	<ul style="list-style-type: none"> ■ Inactive ■ Actively eroding / drained 	Low	Transition zone, with mosaic of acid grassland and bog communities. Turbine itself located in area of shallow deposits, but deeper deposits in wider footprint. Extensive drains and haggging noted surrounding the location.	

Turbine	Peat Depth Range (cm)	NVC Communities	Notable Features	Peatland Activity and Condition	Quality	Comments	Photo
T9	55-130	M19	<ul style="list-style-type: none"> ■ Continuous unit >25ha ■ Extensive drains and hagsgs ■ Woodland/scrub absent ■ Variable sphagnum in vegetation 	<ul style="list-style-type: none"> ■ Inactive ■ Actively eroding / drained 	Low	Turbine located in area of dry, grazed bog communities. Some more variable sphagnum on deeper deposits nearby, but large extents of hagsgs and drains surrounding.	
T10	20-190	M19/M20	<ul style="list-style-type: none"> ■ Continuous unit >25ha ■ Drains noted ■ Woodland/scrub absent 	<ul style="list-style-type: none"> ■ Inactive ■ Drained 	Low	Location is surrounded by drains. A slightly wider range of sphagnum species noted nearby, but communities are grazed and drained.	

Turbine	Peat Depth Range (cm)	NVC Communities	Notable Features	Peatland Activity and Condition	Quality	Comments	Photo
T11	0-185	M19	<ul style="list-style-type: none"> ■ Continuous unit >25ha ■ Drains noted ■ Woodland/scrub absent 	<ul style="list-style-type: none"> ■ Inactive ■ Drained 	Low	Turbine on relatively shallow deposits, with drains surrounding. Also some hagsgs to the north. Vegetated gully runs through area of turbine. Grazed bog communities dominate.	
T12	0-100	H12/M15/M20	<ul style="list-style-type: none"> ■ Continuous unit >25ha ■ Hagsgs noted ■ Woodland/scrub absent 	<ul style="list-style-type: none"> ■ Not peatland 	n/a	Turbine located in area of relatively shallow deposits. Hagsgs in surrounding area although not at turbine itself. Communities dry and grazed.	

Turbine	Peat Depth Range (cm)	NVC Communities	Notable Features	Peatland Activity and Condition	Quality	Comments	Photo
T13	10-320	M20	<ul style="list-style-type: none"> ■ Continuous unit >25ha ■ Haggs noted ■ Woodland/scrub absent 	<ul style="list-style-type: none"> ■ Inactive ■ Drained 	Low	Wide low-lying area with dry channels, although relatively vegetated with limited exposed peat at turbine location, but haggs of exposed peat noted nearby. Heather suppressed by grazing.	
Met mast	160-210	M20/U6	<ul style="list-style-type: none"> ■ Continuous unit >25ha ■ Drains noted ■ Woodland/scrub absent 	<ul style="list-style-type: none"> ■ Inactive ■ Drained 	Low	Drains noted on aerial imagery. NVC communities indicative of modification. No notable diversity or rare features.	No photo
Permanent compound including substation	10-200	M19/M20	<ul style="list-style-type: none"> ■ Continuous unit >25ha ■ Drains and haggs noted ■ Woodland/scrub absent 	<ul style="list-style-type: none"> ■ Inactive ■ Drained 	Low	Drains are present adjacent, and an extent of hagged peat is present nearby to the north-east (proposed for infill). No rare features or diversity noted. Communities are generally indicative of modified and relatively dry conditions.	No photo
Temporary construction compound	0-210	M20/M3/U6	<ul style="list-style-type: none"> ■ Continuous unit >25ha ■ Drains and haggs noted ■ Woodland/scrub absent 	<ul style="list-style-type: none"> ■ Inactive ■ Actively eroding 	Low	Largely shallow peat on a gentle slope; however some deeper deposits present. Area of hagged peat in centre of location (proposed for reprofile) with drains adjacent to east. Communities are indicative of drier, modified conditions.	

Turbine	Peat Depth Range (cm)	NVC Communities	Notable Features	Peatland Activity and Condition	Quality	Comments	Photo
BP1	0	n/a	n/a	<ul style="list-style-type: none"> Not peatland 	n/a	Existing former quarry within commercial forestry. No peatland vegetation or peat deposits present.	
BP2	0	n/a	n/a	<ul style="list-style-type: none"> Not peatland 	n/a	Existing former quarry within commercial forestry. No peatland vegetation or peat deposits present.	No photo
BP3	10-80	U6/M15	<ul style="list-style-type: none"> Drains noted Woodland/scrub absent 	<ul style="list-style-type: none"> Not peatland 	n/a	Higher ground with largely shallow deposits, supporting acid grassland and wet heath communities, with peatland surrounding. Not peatland at the location of the borrow pit. Network of drains within the north of the location.	