Technical Appendix 8.2A: National Vegetation Classification, Peatland Condition Assessment and Groundwater Dependent Terrestrial Ecosystems Report for Achany Extension, Sutherland



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Summary

Alba Ecology Ltd. was commissioned by Wood plc to conduct a National Vegetation Classification (NVC) survey, Peatland Condition Assessment (PCA) and to report on potential groundwater dependent terrestrial ecosystems (GWDTE) for Achany Extension Wind Farm ('the Proposed Development'), a proposed wind farm development in Sutherland.

The Application Boundary is situated at OS grid references NC41, between the River Cassley and the west shore of Loch Shin, near Lairg, Sutherland. The Study Area included the Application Boundary plus a 250m buffer where access allowed (Figure 8.2.1). The 250m buffer is in accordance with SEPA guidance for GWDTE assessment.

Field survey work was undertaken in September 2020 and included a NVC survey and assessment of potential GWDTEs. As much of the vegetation was peatland, a PCA was also undertaken as part of the study.

The Study Area was characterised by wet heath, mostly NVC community M15c, on the upland hillslopes of Càrn nam Bò Maola and Beinn Sgeireach and blanket bog including NVC communities M17, M18, M19 and a little M20. There were many watercourse pathways of M25a or more occasionally M6 communities. Dry heath on steep slopes was usually H10a, but a small patch of H22 was located on the steep slopes of Càrn nam Bò Maola. The dry heath was often accompanied by acid grassland (U4a or U5b). Montane heath H14 characterised the wind-clipped peaks of Càrn nam Bò Maola and Beinn Sgeireach.

The peatland condition was described using standard Peatland Condition Assessment terminology (which is capitalised within the text). There were small, isolated areas of blanket bog that were considered to be Near-Natural. However, most of the blanket bog was considered to be Modified through grazing and possibly other historic management practices such as burning, this included parts of the M17a, and the M17b, M19 and M20. Smaller areas of blanket bog were considered to be Drained and Actively Eroding.

Some of the communities within the Study Area were defined as wetlands and potential GWDTE. M6, M10 and M23 are considered to be potentially highly groundwater dependent, depending on the hydrological setting (SEPA, 2017a; SEPA, 2017b). The M15 and M25 communities are considered potentially moderately groundwater dependent, depending on the hydrological setting (SEPA, 2017a; SEPA, 2017b).

When assessing the potential impact of the Proposed Development, the presence and importance of the habitats present should be considered.

Introduction

Alba Ecology Ltd. was commissioned by Wood plc to conduct a National Vegetation Classification (NVC) survey, to report on potential groundwater dependent terrestrial ecosystems (GWDTE) and to consider the peatland condition for Achany Extension, a proposed wind farm development in Sutherland.

A previous NVC survey was completed for much (but not all) of the Study Area in 2012 by Alba Ecology (Massey, 2012). The 2012 survey reported wet heath and blanket bog over much of the Study Area. A comparison is made between the previous survey and the 2020 survey within the discussion section of this document.

This document reports the findings of the NVC survey, Peatland Condition Assessment (PCA), and potential GWDTE assessment undertaken by Alba Ecology Ltd. in September 2020.

Aims and Objectives

The objectives for this survey and report are:

To identify, map and describe NVC communities in the Study Area;

To consider the condition of the peatland habitats; and

To identify if the wetland habitats are potential GWDTEs.

Study Area

The Application Boundary for the Proposed Development ('the Site') is situated at OS grid references NC41, between the River Cassley and the west shore of Loch Shin, near Lairg, Sutherland. The Study Area is the Site plus a 250m buffer area (where access allowed) (Figure 8.2.1). The 250m buffer is in accordance with SEPA guidance for GWDTE assessment.

The Study Area is part of Glencassley and Glenrossal Estates in the Scottish Highlands and is comprised of undulating hill terrain within the River Cassley catchment and watershed. There are two distinct summits within the Study Area, which are Beinn Sgeireach, reaching to 476m above sea level (a.s.l), in the north-east of the Study Area and Càrn nam Bò Maola (424 a.s.l) in the west. There are two lochs on the edge of the Study Area, Loch Sgeireach and Loch an Rasàil (both of which are on the eastern edge of the Study Area). There are many burns, most notably Allt an Leacach at the northern boundary of the Study, Allt Bad na t-sagairt to the north and Allt an Rasail in the south.

Glencassley and Glenrossal Estates are primarily managed for salmon fishing with some deer stalking. Additional management activities include forestry and historic drainage (presumably to improve grazing conditions for deer). Just outside the Study Area there are recently erected deer-fenced enclosures, which have contained recently planted new native woodland.

Soil and Geology

Soil and geological information can provide insight into the vegetation expected in the Study Areas and can inform decisions regarding GWDTEs (Botanæco, 2020). Therefore, the British Geological Society's (BGS) hydrogeological and geological mapping and the Scotland's Soils (2017) carbon and peatlands maps have been consulted to inform this survey report and is presented in Table 8.2.1.

Source	Study Area Details
Carbon and	Mixture of Class 1 (peat soils) and Class 2 (Peat soil with occasional peaty soil).
peatland maps	
BGS –	Mixture of peat and till recorded.
superficial	Peat. Superficial Deposits formed up to 3 million years ago in the Quaternary
deposits	Period. Local environment previously dominated by organic accumulations.
	Till - Diamicton. Superficial Deposits formed up to 3 million years ago in the
	Quaternary Period. Local environment previously dominated by ice age
	conditions.
BGS – bedrock	Morar Group - Psammite. Metamorphic Bedrock formed approximately 542 to
	1,000 million years ago in the Period. Originally sedimentary rocks formed in
	shallow seas. Later altered by low-grade metamorphism.
	Originally sedimentary rocks formed in shallow seas. These rocks were first
	deposited as mainly siliciclastic sediments in a shallow sea, and then later
	metamorphosed, though there is evidence of their sedimentary origin.
BGS -	Low productivity aquifer with small amounts of groundwater in near surface
hydrogeological	weathered zone and secondary fractures.
maps	

Table 8.2.1: Summary descriptions of the soils, bedrock, and hydrogeology for the Study Area (BGS,2020a; BGS, 2020b; Scotland's Soils, 2017)

Methods

Alba Ecology surveyed much of the Study Area previously in 2012. Therefore, the surveyors had a good understanding of the Site and the vegetation communities likely to be encountered. The survey report and maps from 2012 were consulted prior to field visits (Massey, 2012). The 2012 NVC mapping was also consulted during field surveying in September 2020.

National Vegetation Classification (NVC) Survey

The NVC is a detailed survey of plant communities using plant species presence and abundance. A NVC survey was conducted in September 2020 led by Dr Kate Massey (MCIEEM) with Mr Donald Shields (MCIEEM) of Alba Ecology Ltd. The vegetation was classified and mapped following the methods described in the JNCC National Vegetation Classification User's Handbook (JNCC, 2006). Reference was made to NVC field guides (e.g. Hall *et al.*, 2004; Elkington *et al.*, 2001; Cooper, 1997) the published NVC communities and the floristic tables (e.g. Rodwell, 1991a; Rodwell, 1991b; Rodwell, 1992; Averis *et al.*, 2004).

The NVC survey was conducted at a scale of 1:5,000 using the Ordnance Survey maps and recent aerial photographs.

The minimum size of vegetation mapped was approximately 20×20m. Smaller stands were described as target notes, located by GPS. Target notes were also made of any unusual features, rare species, management activities or other points of particular interest. A Habitat and NVC GIS attributes tool was used to aid data entry for the vegetation data into the GIS database (Botanæco, 2019a).

Groundwater Dependant Terrestrial Ecosystems (GWDTE)

Where wetlands were identified, following the Functional Wetland Typology (SNIFFER, 2009a and 2009b), an assessment was made as to whether they were likely to be potential GWDTEs as defined in SEPA Guidance Notes (SEPA, 2017a; SEPA, 2017b).

Peatland Condition Assessment (PCA)

As much of the Site is on peatland, the Peatland Condition Assessment (PCA) was consulted during the surveys and consideration given to the condition of the peatland based on this guide (Peatland Action, 2016).

PCA bases the condition of blanket bog on indicators such as bog-moss cover, extent of bare peat and evidence of grazing and burning (Peatland Action, 2016). The PCA recognises four categories of peatland condition:

Near-Natural - peat forming bog-mosses dominant, with no recent fires, little or no grazing pressure and little or no bare peat, heather is not dominant.

Modified – Bare peat is in small patches, fires may be recent, grazing impacts are evident, bog-mosses are absent or rare, extensive cover of heather or purple moor-grass.

Drained – within 30m either side of an artificial drain or a revegetated hagg or gully system.

Actively Eroding – actively eroding hagg/gully system, extensive continuous bare peat surfaces.

The PCA was undertaken alongside the NVC survey. At least one category from the PCA was assigned to each mapped peatland area. The PCA category was assigned based on the vegetation (e.g. the cover of species such as heather, cottongrasses, purple moor-grass and bog-mosses), extent of bare peat patches, hagging and gully systems, signs of grazing pressure (such as presence of dung, hoof prints and deer trails as well as the presence of drains. The extent of the drained catergory was completed as part of the desk based mapping exercise were drains were mapped and given a 30m buffer. However, the rest of the PCA was completed in the field from field based observations. The NVC community or sub-community often, but not always corresponded to the PCA category (e.g. it was possible for some NVC sub-communities to have different PCA categories depending on e.g. the amount of bog-mosses present).

The PCA Support Tool also gives descriptions of peatlands as being in good, intermediate or bad condition (Glenk *et al*, 2017). The criteria for these are shown in Table 8.2.2.

Signs	Good	Intermediate	Bad
Water	Plenty of water,	Surface water is rarely	Deep gullies have formed from
	visible on the	visible.	wind and water erosion.
	surface.		
Vegetation	Small grasses,	Taller plants, such as	Rarely any plants grow on the
	bog-mosses	cottongrasses (Eriophorum	areas that are exposed.
	(Sphagnum spp.)	<i>spp</i> .) and heather.	Patches of grasses or heather
	common and very		between exposed bare peat
	wet.		
Bare peat	Little to no bare	Bare peat patches are	Bare peat areas will continue
	peat patches.	occasional, burning may	to expand, leaving less plant
		occur.	cover as protection on the
			surface. Peat will continue to
			be lost until the solid rock is
			exposed.
Water	Water flowing	Water flowing from	Bad water quality, it can be
quality	from good quality	peatland likely to be slightly	dark brown from the peat
	peatland is clear.	brown, especially after	content.
		heavy rainfall.	
Wildlife	Good for wildlife.	Wildlife less abundant than	Home to little wildlife.
		in good condition.	
Resultant	Active.	Stopped growing, inactive.	Inactive.
activity level			

 Table 8.2.2: Peatland Condition Assessment Support Tool categories of good, intermediate and bad peatland (Glenk et al, 2017).

Nomenclature

Both common and binomial scientific names are given the first time a species is mentioned within this report. Thereafter, common names only are used. Nomenclature follows Streeter (2016) for higher plant species, and Atherton *et al.* (2010) for bryophyte species. Plant groups comprising many micro-species (such as dandelions *Taraxacum*) are treated as aggregates. These micro-species are not important for defining NVC communities.

Limitations

Standard sampling methods were followed, and any biases or limitations associated with these methods could potentially affect the results collected. Furthermore, while every effort was made to provide a full assessment and comprehensive description of the Study Area, it is unlikely that one survey can achieve full characterisation due to temporal variations. Limitations to NVC, GWDTE and PCA surveys include:

Maps are only indicative of the boundaries as there was often no clear boundary between vegetation types, there being instead a gradual change.

Some NVC communities are made up of similar assemblage of species, which can be at a transitional stage between two community types.

The fit of NVC communities to the published communities is often imperfect and the closest approximation of the communities are described. Surveying in Scotland has the added limitation that many of the NVC community descriptions were derived in England and so the published descriptions may not match well with those found in Sutherland.

NVC surveys are not floristic surveys not intended to create full species inventories or count all individuals of any species but to map and describe the communities. Species were recorded when they were encountered, but it is likely that additional species, not listed, are present within the Study Areas, particular as species presence and visibility vary throughout the growing season.

Plant species occurrence and visibility change both temporally and spatially. This is particularly true for colonising and invasive species. The data provided by habitat surveys is a snapshot in time (September 2020 for this survey), and cannot account for changes that occur outwith this time period. Non-native invasive species can be prolific colonisers. For example, Japanese knotweed (*Fallopia japonica*) spreads from rhizomes, rhizome fragments, as well as stem and crown fragments. Spread is usually a result of human intervention, such as spreading fragments in tyre treads (Fennell *et al.*, 2018). Additionally, at different times of year (e.g. winter) or life-stage (e.g. early colonisation) the identification of non-native invasive species can be challenging. Therefore, although non-native invasive species were considered during field surveys and field surveys were conducted at the optimal time of year, it is possible for non-native invasive species to be present within the Study Areas. The limitations were minimised by conducting the field survey within the optimal survey period (between April and October).

It is important to note that measuring peat depth was outside the scope of these surveys. Apparent peat depth as discussed in this report is estimated based on visual vegetation assessments and through estimating peat depth from available features such as haggs and ditches. A separate assessment of peat depth has been undertaken for the EIA Report and is described in Chapter 11 (Geology and Carbon Balance).

Results

The NVC survey map is shown in Figure 8.2.2a,b and a list of communities recorded in the Study Area are displayed in Table 8.2.3.

The PCA is shown in Figure 8.2.3a,b.

Potential GWDTE are shown Figure 8.2.4a,b.

These figures are supported with a list of target notes and photographs (Annex 1, Figure 8.2.5).

Overview

The Study Area was characterised by wet heath, mostly NVC community M15c, on the upland hillslopes of Càrn nam Bò Maola and Beinn Sgeireach and blanket bog including NVC communities M17, M18, M19 and a little M20. There were many watercourse pathways made up of M25a or more occasionally M6 communities. Dry heath on steep slopes was usually H10a, but a small patch of H22 was located on the steep slopes of Càrn nam Bò Maola. The dry heath was often accompanied by acid grassland (U4a or U5b). Montane heath H14 characterised the wind-clipped peaks of Càrn nam Bò Maola and Beinn Sgeireach.

The wet heath NVC community M15c was dominated by deergrass (*Trichophorum germanicum*), with heather (*Calluna vulgaris*), common cottongrass (*Eriophorum angustifolium*), lichens (*Cladonia spp.*) and woolly fringe moss (*Racomitrium lanuginosum*). The M15c on the hillslopes was often rocky and bare peat was clearly visible through the open vegetation. The blanket bog formed over large areas in the centre and east of the Study Area and small amounts elsewhere. The blanket bog was made up of heather, deergrass and cottongrasses (*Eriophorum spp.*) and was in varying condition. Impacts of deer grazing were evident across the Study Area with much of the blanket bog (and wet heath) modified through grazing and likely historic burning. Drainage was common in south of the Study Area. Erosion gullies were common in the blanket bog in the central and eastern part of the Study Area and were Actively Eroding. There were small, isolated patches of M18 and parts of the M17a showing a natural surface pattern of hummocks and hollows.

		% of Main
NVC community	Area (ha)	Study Area
M15c	614.6	45
M17b	180.1	13
M25a	158.9	12
M17a	134.4	10
M19	68.0	5
M15/M17	64.7	5
M15b	32.9	2
H10a	23.1	2
H14	21.7	2
M15d	10.4	1
H10a:U4	8.7	1
M17b:M3	7.5	1
M25b	6.9	1
M17b:M19	5.9	0.4
M15c:M19	5.7	0.4
H10a:U5	4.2	0.3
M15c:H10a	3.7	0.3
M18	3.2	0.2
U4a	3.1	0.2
U5b	2.7	0.2
M6a	2.7	0.2
Open water	1.9	0.1
U5b:M6c	1.8	0.1
M20	1.5	0.1
H10a:U5:M6c	1.2	0.1
Development	0.9	0.1
M23b	0.9	0.1
M17c	0.8	0.1
M17a:M25a	0.5	<0.1
M15a	0.3	<0.1
H10a:U4:M6a	0.2	<0.1
M2a	0.2	<0.1
H22	0.1	<0.1
M3	<0.1	<0.1
Total	1,373	100

Table 8.2.3: The total area of each of the NVC community found in the Study Area

Habitat and Community Descriptions

Blanket bog

M17a *Trichophorum germanicum – Eriophorum vaginatum* blanket mire *Drosera rotundifolia – Sphagnum* species sub-community

The M17a community had a fairly even mix of deergrass, heather, cross-leaved heath (*Erica tetralix*), hare's-tail cottongrass (*Eriophorum vaginatum*) and common cottongrass. Purple moor-grass (*Molinia caerulea*) and bog myrtle (*Myrica gale*) were less frequently represented but, when present were conspicuous. There was a variety of forbs within the vegetation but bog asphodel (*Narthecium ossifragum*) was the most abundant and was constant. Tormentil (*Potentilla erecta*) and round-leaved sundew (*Drosera rotundifolia*) were frequently present and other species, such as common butterwort (*Pinguicula vulgaris*) and lousewort (*Pedicularis sylvatica*) were less frequent, Dwarf birch (*Betula nana*) was recorded in this community.



Photo 8.2.1: An example of M17a within the Study Area

In some stands the M17a sub-community had a rich ground-flora of bog-mosses which formed a partial carpet under the vascular plants. The bog-mosses included red bog-moss (*Sphagnum cappifolium*), papillose bog-moss (*Sphagnum papillosum*) and more occasionally soft bog-moss (*Sphagnum tenellum*) and flat-topped bog-moss (*Sphagnum fallax*). In many stands the bog-moss carpet was not thick and complete, but formed a network of patches with exposed peat between. Purple spoonwort (*Pleurozia purpurea*) was occasional and there was often a little lichen present.

M17a was found on flat areas which were generally water-logged. Some stands of this community had many M2a and M3 bog pools present with damp patches of feathery bog-moss (*Sphagnum cuspidatum*). The bog-moss layer was generally most completed around the M2a bog pools where hummocks of red bog-moss occasionally formed.

This community usually showed signs of modification though grazing impacts with hoof marks, dung and micro erosion patches common. There were occasionally drains in the east of the Study Area. Some were wet and flowing and were clearly draining the bog, but some appeared

ineffectual as bog pools were nearby. There were some isolated patches of M17a, associated with the pools and hummocks, which were considered to be Near-Natural.

M17b *Trichophorum germanicum – Eriophorum vaginatum* blanket mire *Cladonia* species sub-community

The M17b community had an even mix of heather, common cottongrass, hare's-tail cottongrass and deergrass, although deergrass became very abundant in some stands whilst hare's-tail cottongrass became depleted in some areas. Bog asphodel was particularly common with tormentil only occasional. Red bog-moss was the only bog-moss species regularly present. It did not form a carpet within the blanket bog, but was impoverished and patchy in extent. There were occasional, poorly developed, hummocks of red bog-moss with a very patchy distribution. Woolly fringe moss was common, particularly on the drying edge of haggs were it could be in the form of hummocks. Lichens, particularly *Cladonia arbuscula* were common.



Photo 8.2.2: An example of M17b within the Study Area

The M17b community was often found on flat areas, and blanketing across hillslopes. Bare peat was a common feature of this community type in small and large erosion gullies and as micro-erosion within the vegetation. The sides and base of the erosion gullies were often of bare peat, although some were well vegetated at the base. The larger erosion gullies varied between ca. 0.5-2m high.

The pools in this community were usually M3 which could be large and extensive. There were occasionally M2a pools, but generally lacking a bog-moss carpet around them.

This community usually showed signs of modification though grazing impacts, through drainage from the erosion gullies and often had areas that were considered to be Actively Eroding.

M17c *Trichophorum germanicum – Eriophorum vaginatum* blanket mire *Juncus squarrosus – Rhytidiadelphus loreus* sub-community

This community was only recorded in a single stand in the south of the Study Area. It was superficially similar to M17b, though enough identifiable differences were recorded to result in classification as a separate sub-community.

It was co-dominated by heather and deergrass, with a fairly extensive (though not complete) carpet of bog-mosses. This was dominated by papillose bog-moss, though red bog-moss was also occasional. Other mosses recorded included both little shaggy-moss and common haircap. Heath rush (*Juncus squarrosus*) was frequently present. Grasses such as sweet vernal-grass (*Anthoxanthum odoratum*) and wavy hair-grass (*Deschampsia flexuosa*) were the most frequently recorded in this sub-community, though both common bent (*Agrostis capillaris*) and velvet bent (*Agrostis canina*) were also present in smaller amounts. While tormentil was frequent and constant in the vegetation, bog asphodel and lichens were occasional, while round-leaved sundew was rarely recorded.

M17/M15 transition

In some areas, where M15 and M17 were indistinguishable, a M15/M17 transition was mapped.

The M17 blanket bog community and M15 wet heath community have a similar assemblage of species. The most distinguishing features to separate the M17 and M15 communities within the Study Area was the presence of hare's-tail cottongrass and the greater portion of bog-moss in the M17 community. Otherwise the two communities could be very similar as they have the similar arrangement of species, (heather, deergrass, common cottongrass, cross-leaved heath and purple moor-grass). There was also a similar assemblage of forbs, particularly tormentil and bog asphodel. Therefore, the transition between the M17 and M15 communities could be very gradual, without a distinct boundary. This is a well-known characteristic of M15 and M17 communities and is particularly noticeable for the M17b and M15c sub-communities.

M18 Erica tetralix – Sphagnum papillosum raised and blanket mire

The M18b blanket bog was very wet and included M2a bog pool systems. The vegetation was open over a near complete carpet of bog-mosses. Papillose bog-moss and red bog-moss were the most abundant species with other bog-mosses also present to varying degrees including magellanic bog-moss (*Sphagnum magellanicum*), feathery bog-moss and flat-topped bog-moss. Hummocks were not well developed, but small examples could be present. Lichens and woolly fringe moss were presence with low abundance.



Photo 8.2.3: An example of M18 within the Study Area

The open vegetation was patchy within the bog-moss carpet. It was made up of heather, hare's-tail cottongrass, with common cottongrass, deergrass and occasionally purple moorgrass and cross-leaved heath. The heather was in scattered patches across the bog surface. Bog asphodel was abundant and there was both round-leaved sundew and great sundew (*Drosera anglica*) present.

There was some evidence of modification through grazing pressure with deer hoof prints and small patches of bare peat present.

M19 Calluna vulgaris – Eriophorum vaginatum blanket mire community

The M19 community was found as small patches throughout the M15 and M17 communities. Hare's-tail cottongrass and heather were co-dominant in tussocks (20-30cm tall) over a thick layer of red bog-moss and feather mosses, particularly glittering wood-moss (*Hylocomium splendens*). Bilberry (*Vaccinium myrtillus*) and crowberry (*Empetrum nigrum*) were common dwarf shrubs growing through the heather, but were not structurally important. There were occasional appearance of cross-leaved heath, and cloudberry (*Rubus chamaemorus*) but these were common enough for sub-communities to be distinguished.



Photo 8.2.4: An example of M19 within the Study Area

Round-leaved sundew, bog asphodel and tormentil were also occasionally recorded in this community, but mostly the M19 was made up of the typical species in this community.

This community did not usually have bog pools within it.

M20 Eriophorum vaginatum blanket mire

There were occasionally small patches of M20 in the Study Area. These patches were dominated by tussocks of hare's-tail cottongrass. Heather was depleted although bilberry could be was frequent and cross-leaved heath, red fescue (*Festuca rubra*) and tormentil were occasional. The moss layer carpeted the ground beneath, and in, the clumps of hare's-tail cottongrass. These included papillose bog-moss and flat-topped bog-moss, with glittering wood-moss and red-stemmed feather-moss (*Pleurozium schreberi*). This community was modified through grazing pressure.

Bog pools

M2a Sphagnum cuspidatum/fallax bog pool community Rhynchospora alba subcommunity

The M2a bog pools were usually small, often only 2×2m in size. Feathery bog-moss was within the pools often accompanied by common cottongrass. There were sometimes small lawns of bog-mosses, including red bog-moss, magellanic bog-moss and papillose bog-moss. These lawns were not extensive, being only a 10-50cm wide if present at all. Round-leaved sundew was occasionally seen in these small lawns.

The M2a pools were occasionally found in hollows in the blanket bog within the Study Area, and rarely in the M15c, although there were small isolated areas of M17a and M18 were the bog pools were more frequently represented.

The M2a pools were generally were too small to map but were but some were target noted.

M3 *Eriophorum angustifolium* bog pool community

The M3 bog pool community was very common within the Study Area, particularly in the M17b and M15c communities.

M3 occurred on wet, often exposed peat, between haggs and on disturbed areas of exposed peat. Sometimes the M3 was a pool with water over a bare peat surface, in other places the M3 was of bare peat which was drying out.



Photo 8.2.5: An example of M3 within the Study Area

Common cottongrass was usually the main colonising species sparsely growing on the exposed peat. Deergrass and heath rush were other occasional colonising species in this community.

These pools were generally too small to map but were target noted and sometimes mapped as part of a mosaic where there was much exposed peat.

Wet dwarf shrub heath

M15a *Trichophorum germanicum – Erica tetralix* wet dwarf shrub heath community *Carex panicea* sub-community

There was very little M15a within the Study Area. M15a is a very wet sub-community dominated by sedges. There was a mixture of carnation sedge (*Carex panicea*), star sedge (*Carex echinata*) and common yellow sedge (*Carex viridula ssp. oedocarpa*) with a little spiked sedge (*Carex spicata*). Heather and cross-leaved heath were frequent and constant in the vegetation. Deergrass and purple moor-grass were present but at low frequencies.

M15b *Trichophorum germanicum – Erica tetralix* wet dwarf shrub heath community typical sub-community

The M15b sub-community was found on gentle slopes to the west of the Study Area. The vegetation was wet underfoot with bog myrtle a conspicuous species which helped to distinguish it from the other M15 sub-communities.

There was generally an even mix of heather, cross-leaved heath, common cottongrass, deergrass, purple moor-grass, bog asphodel and bog myrtle. Although, deergrass and purple moor-grass could attain dominance in some stands.

Tormentil, lousewort, heath milkwort (*Polygala serpyllifolia*) and round-leaved sundew were all common forbs in this sub-community. The moss layer included red bog-moss, lichens and purple spoonwort.

This sub-community graded into M17 and M25 and the boundaries between the communities were indistinct.

M15c *Trichophorum germanicum – Erica tetralix* wet dwarf shrub heath community *Cladonia* species sub-community

The M15c *Cladonia* sub-community was the most common community found within the Study Area. It was found extensively across steep hillslopes. The vegetation was an open sward on shallow and relatively dry peat often with rocky outcrops.



Photo 8.2.6: An example of M15c within the Study Area

Heather and deergrass were the most abundant species in this M15c, with deergrass occasionally overwhelmingly dominant. Cross-leaved heath, common cottongrass and purple moor-grass were all constant but with lower abundance. Bog asphodel was constant, and could attain high abundance, tormentil was also constantly present but with only a very low abundance. There were occasional representations of round-leaved sundew, lousewort and common milkwort (*Polygala vulgaris*). Bell heather (*Erica cinerea*), heath rush and fir clubmoss (*Huperzia selago*) were occasional and more rarely there was dwarf birch and dwarf juniper (*Juniperus communis ssp. nana*).

Bare peat patches were very common below the vascular plants, but there was a partial ground-flora of lichens and woolly fringe moss and occasional purple spoonwort. There were occasionally patches of red bog-moss and soft bog-moss.

There were occasional pools in the M15c. M3 was most frequently represented, but there were some M2a bog pools.

The M15c wet heath community often transitioned in and out of the blanket bog M17, particularly M17b, and the boundaries between the two communities were indistinct. This is a well-known characteristic of M15 and M17 communities. It is likely that in some areas the M15c was on deep peat, but current and historic management practices modified the vegetation to the extent that it was wet heath vegetation rather than blanket bog vegetation on deep peat.

M15d *Trichophorum germanicum – Erica tetralix* wet dwarf-shrub heath, *Vaccinium myrtillus* sub-community

The M15d sub-community was rather drier than other wet heath communities, with a more uneven, patchy sward. Heather was the dominant species, and was usually tall (20-30cm) with some prominent patches of purple moor-grass. Wavy hair-grass, heath rush and bilberry were patchily distributed in this community with mat grass (*Nardus stricta*) and deergrass. Other, more evenly spread species included bog asphodel, bell heather and tormentil.

Dry and montane heath

H10a Calluna vulgaris – Erica cinerea heath, typical sub-community

The H10a community was found on dry ground, often on hillocks or steep-sided hillslopes. It was usually fairly short and species poor. It stood out clearly as patches of dark vegetation contrasting with the paler M15 and M17 communities.

The H10a community was dominated by heather which was often thick and deep. Bell heather was abundant and the most conspicuous other dwarf shrub. There was smaller amounts of tormentil with wavy hair-grass and mat grass constant at low abundance. There was occasional heath bedstraw (*Galium saxatile*) and common dog violet (*Viola riviniana*). Hard fern (*Blechnum spicant*) and bracken (*Pteridium aquilinum*) were present in some stands. There was a thick ground flora of glittering wood-moss, red-stemmed feather-moss and springy tuff-moss (*Rhytidiadelphus loreus*).

This community was often associated with more open U4a grassland where they formed mosaics on the steeper, free draining soils.

H14 Calluna vulgaris – Racomitrium lanuginosum heath community

The montane heath community H14 was located at the top of Beinn Sgeireach and extensively across Càrn nam Bò Maola. The H14 heath was predominantly made up of deergrass, prostrate heather and woolly fringe moss. The low, windswept dwarf shrub layer also included bell heather, dwarf juniper, alpine bearberry (*Arctostaphylos alpinus*) and mountain everlasting (*Antennaria dioica*). Woolly fringe moss was accompanied by many lichens.



Photo 8.2.7: An example of H14 within the Study Area

There was occasional lesser clubmoss (*Selaginella selaginoides*), alpine clubmoss (*Diphasiastrum alpinum*) and fir clubmoss. Hard fern was occasionally seen in rock crevices. Devil's-bit scabious (*Succisa pratensis*) was rare in this community.

H22 Vaccinium myrtillus – Rubus chamaemorus heath community

There was a single, small, patch of H22 mapped on the steep slopes of Càrn nam Bò Maola below some small rock cliffs. The H22 was rocky and characterized by deep heather with bilberry and cloudberry. There were small patches of hare's-tail cottongrass and wavy hairgrass, and a thick layer of red bog-moss and glittering wood-moss.

Flush

M6a Carex echinata – Sphagnum fallax/denticulatum mire, Carex echinata subcommunity

The M6a community was usually in wet stands that were too small to map. They were star sedge dominated patches besides flowing water associated with other communities such as M6c, M23 or M25a. The star sedge was over a carpet of the weedy flatted-topped bog-moss. Common sedge (*Carex nigra*), hare's-tail cottongrass, bog asphodel and purple moor-grass were frequently present, and black bog-rush (*Schoenus nigricans*) was occasional in some stands.

M6c Carex echinata – Sphagnum fallax/denticulatum mire, Juncus effusus subcommunity



Photo 8.2.8: An example of M6c within the Study Area

The M6c community was found in small patches along the edges of some burns across the Study Area. The M6c was dominated by soft rush over a ground layer of bog-mosses including the weedy flat-topped bog-moss and papillose bog-moss. Common haircap (*Polytrichum commune*) was also frequently in the ground layer of the M6c vegetation. Hare's-tail cottongrass, bog asphodel star sedge, common sedge and purple moor-grass were also

represented in this community with a scattering of other species in different stands including marsh horsetail (*Equisetum palustre*), marsh violet (*Viola palustris*) and round-leaved sundew.

M10a *Carex dioica – Pinguicula vulgaris* mire, *Carex viridula ssp. Oedocarpa – Juncus bulbosus* sub-community

Four small lines of M10a were recorded within the Study Area. These were too small to map. The grid locations are shown in the target notes. The M10a communities had a trickle of water, approximately 30-50cm wide, flowing over the ground surfaces. The ground was ca. 50% bare peat, with common yellow sedge and black mosses. Common butterwort was occasionally present. There was no spring head located from the M10a communities.



Photo 8.2.9: An example of M10a within the Study Area

The M10a community is a sign of base enrichment, often associated with groundwater discharging form a spring. These communities were too small to map, but have been target noted.

Marshy grassland

M23b *Juncus effusus/acutiflorus – Galium palustre* rush-pasture, *Juncus effuses* subcommunity



Photo 8.2.10: An example of M23b within the Study Area

There were several stands of M23b in the south of the Study Area. The M23b was dominated by soft rush (*Juncus effusus*) and was very wet underfoot. There was frequent marsh violet along with tormentil and marsh bedstraw (*Galium palustre*). Creeping bent (*Agrostis stolonifera*), star sedge, common sedge and common bent were all occasional. The moss layer was sparse, and lacked bog-mosses, but common haircap was occasional and locally abundant.

M25a Molina caerulea – Potentilla erecta mire community Erica tetralix sub-community

M25a was common across the Study Area. It was found on hillslopes and as a network of wet grassland adjacent to watercourses meeting the larger watercourses in the valley bases. On the hillslopes the M25a followed the movement of water down the hills and often had trickling water within it.



Photo 8.2.11: An example of M25a within the Study Area

The M25a was dominated by purple moor-grass with cross-leaved heath and heather as occasional sprigs. Other graminoids present included frequent common bent, red fescue, hare's-tail cottongrass and common cottongrass. There was also occasional bulbous rush (*Juncus bulbosus*), carnation sedge and deergrass. Tormentil and bog asphodel were constant and abundant in the M25a. There were occasional species such as heath bedstraw, devil's-bit scabious, marsh violet and heath milkwort.

The M25a usually had a patchy moss layer with common haircap and red bog-moss.

M25b *Molina caerulea – Potentilla erecta* mire community *Anthoxanthum odoratum* sub-community

On the lower slopes in the north of the Study Area the purple moor-grass dominated M25 had an increase in hare's-tail cottongrass and graminoids, particularly common bent and red fescue, but also sweet vernal-grass. Otherwise the species assemblage was similar to the M25a community.

Acid grassland

U4a *Festuca ovina – Agrostis capillaris – Galium saxatile* grassland community, typical sub-community

U4a grassland was recorded predominately, but not always, on drier hummocks and hillocks, often alongside areas of H10a dry heath community. It was noted for its short, tight sward and was usually very dry underfoot.

The U4a grassland had a mixture of grasses abundant grasses including common bent, red fescue, viviparous fescue (*Festuca vivipara*), sweet vernal-grass with more occasional velvet bent and wavy hair-grass. Purple moor-grass and mat grass were infrequent and had a low abundance. Wavy hair-grass was recorded frequently around the margins of the community.

Forbs in this community were fairly common, with devil's-bit scabious the most abundant, while heath bedstraw and tormentil were frequent, though not constant. Species occasionally recorded included common sorrel (*Rumex acetosa*), yarrow (*Achillea millefolium*), common milkwort, ribwort plantain (*Plantago lanceolata*) mouse ear (*Cerestium fontana*), autumn hawkweed (*Leontodon autumnalis*) and common dog-violet. Patches of heather were also present in most stands.

U5b Nardus stricta – Galium saxatile grassland, Agrostis canina - Polytrichum commune sub-community

There were several small patches of U5b grassland across the Study Area, generally on freely draining soil. Mat grass was dominant and there were usually swirls of heath rush within the mat grass sward. Velvet bent, common bent and wavy hair-grass were frequent to abundant. Sedges were occasionally present, including carnation sedge, stiff sedge (*Carex bigelowii*), common yellow sedge and star sedge. There were tussocks of heather, with occasional bell heather and bilberry. Soft rush tussocks were present in some stands and there was occasionally some bulbous rush. Notable forbs were tormentil, heath bedstraw, dog violet, heath milkwort, and devil's bit scabious.

The moss layer included glittering wood-moss, red-stemmed feather moss and common haircap with occasional flat-topped and red bog-moss.

Scattered trees

There were a few scattered trees along the steep side of the Allt Bad na t-Sagairt. These included downy birch (*Betula pubescens*), rowan (*Sorbus aucuparia*) and rarely aspen (*Populus tremula*). They were generally quite small, approximately 5-10m in height.



Photo 8.2.12: An example of scattered trees within the Study Area

Open water

There were several small lochans and open water pools within the Study Area, including Loch Sgeireach and Loch an Rasàil. These lochans had little to no emergent vegetation within them.



Photo 8.2.13: An example of open water within the Study Area (Loch Sgeireach)

Running water

There were many watercourses within the Study Area, most notably Allt an Leacach which was at the boundary of the Study in the north, Allt Bad na t-sagairt to the north and Allt an Rasail in the south. These watercourses were generally 2-3m wide with a rocky/peaty base and peat stained water flowing through them. These were generally un-vegetated.

There was a network of smaller (mostly unnamed) watercourses feeding into the larger ones. These were generally less than 1m wide, were peat stained and were through the M6 or M25 vegetation.

Development



Photo 8.2.14: The Achany Wind Farm development

At the far southern tip of the Study Area, there was a section of track, hardstanding and disturbed ground associated with the Achany Wind Farm. This included the track, hard standing and wind turbine with associated bare peat and building rubble surrounding them.

Peatland Condition Assessment

Table 8.2.4 gives the condition of the peatland within the Study Area according to the four PCA categories. The PCA is shown in Figure 8.2.3a,b.

The least modified blanket bog community, which was considered closest to 'Near-Natural', was the M18. The M18 community contained a complex of bog pools and some bog-moss hummocks, and although some grazing impacts were evident the bog-moss carpet was fairly intact. Some of the M17a was also placed within this Near-Natural category due to the hummock and hollow structure and the surface water present. The rest of the M17a was Modified to some extent with some areas also Drained, although it was generally less modified than areas of M17b. Some areas of M17a were placed in Modified, but it was noted that they were close to the Near-Natural category (Figure 8.2.3a,b).

Most of the blanket bog was considered to be Modified through grazing and possibly other historic management practices such a burning, this included much of the M17b, M19 and M20. This included some areas of M17a and M17c, but these were generally in better condition than the M17b as they usually had more bog-mosses present. The M15 wet heath (on deep or shallow peat) would also be considered Modified in the PCA.

There were multiple drainage ditches present in the south section of the Study Area. Some of the drainage ditches appeared to be effectively draining the bog, although some appeared to be less effective. Some of the blanket bog (particularly degraded areas of M17b and M3) was also considered likely to be Actively Eroding and Drained through erosion features.

Using the 'PCA support tool' the blanket bog in the Study Area was considered mostly to be of intermediate condition, with areas of 'bad quality' where the erosion was most pronounced (M3 and eroding areas of blanket bog, particularly M17b) and small areas of 'good quality' where there were multiple surface water pools, hummocks and a degree of natural surface pattern (Table 8.2.5).

Using the evidence provided here, and the 'PCA Support Tool', much of the blanket bog across the Study Area could be judged to have stopped being active and so is likely to be a carbon source, rather than a carbon sink. However, this is a broad-brush, subjective tool, and doesn't take into account subtleties and variation within the blanket bog. Certainly, the Actively Eroding blanket bog is thought to be a carbon source rather than a sink and unlikely to be active. But, given the northern location of the Study Area, and the reasonable quality of at least some of the blanket bog, there is a degree of uncertainty to the activity level. It is therefore considered that the blanket bog in the Study Area is likely to have areas that are active or partially active (e.g. the M18 ad some areas of M17a). Further detail for the specific turbine locations is provided in the Vegetation Survey of Turbine Locations (**Technical Appendix 8.2B**).

Peatland Condition Categories	Comment	NVC Communities	Example Photos	
Near-Natural - peat forming bog-mosses	Isolated patches of Near-Natural	M18 and some areas		
dominant, with no recent fires, little or no	vegetation within the Study Area with bog	of M17a.		
grazing pressure and little or no bare	pools common.			
peat, heather is not dominant.				and the second s
				and the second second second
				and the second s
				and the second second second
			A bog pools system	n in M18. Bog-mosses were ab
Modified – Bare peat is in small patches,	Fires were not a recent feature of the	M17b, M17c, M19,		
fires may be recent, grazing impacts are	Study Area, but historic burning is	M20 and some areas		
evident, bog-mosses are absent or rare,	possible/likely. Bare peat patches were	of M17a.		and states of the state of the
extensive cover of heather or purple	evident across the Study Area, bog-moss		Contraction of the State of the	
moor-grass.	cover was generally low, but not usually		Survey of the Second States	
	absent. The structure of the vegetation		and the second	The second second second
	demonstrated modification through		and the second sec	and a second of the
	grazing. For example, there were		A CONTRACT OF THE OWNER OF	
	extensive areas dominated by deergrass.			
			Grazing and possibly historic burning,	M17b blanket bog with evic
			impact evident from the species poor	modified through grazing pres
			sward dominated by deergrass.	prints, dung and micro-erosion
Drained – within 30m either side of an	Drainage ditches were common in the	Some areas of M3		
artificial drain or a revegetated hagg or	south of the Study Area. Drainage was	M17a, M17b and	and the second s	Shi wasan wasa
gully system.	also from the erosion feature within the	M19.		
	blanket bog.		and the second second	2 and the second
				The man and the second se
			and the second second second	
			and the second	the state of the second se
				and the second se
				Service and Servic
			This drain was ca. 75m wide and 1m of	deep, with water at
			the base. There was no evidence of re-	vegetation with bare There
			peat on the sides and b	ase.
Actively Eroding – actively eroding	Active erosion was most common in the	Usually in M17b and		
hagg/gully system, extensive continuous	centre of the Study Area. Erosion features	M3.		
bare peat surfaces.	could be large (up to ca. 2m in height)			
	and extensive. There was also smaller			
	erosion features (ca. 0.5m in height) and		and the second second	and the second second
	micro erosion was common within the			
	vegetation			
			Large erosion feature	Small progion feature
				Smail erosion reature

Table 8.2.4: Evaluation of the peatland condition within the Study Area, based on the PCA criteria.



undant and the vegetation was open.





ence of sure, with features.

Deer hoofprint in micro erosion feature within the blanket bog vegetation.



were some large erosion features that were considered likely to be draining the surrounding bog.



Signs	Good	Intermediate	Bad	Study Area	Photos
Water	Plenty of water, visible on the surface.	Surface water is rarely visible.	Deep gullies have formed from wind and water erosion.	There were isolated patches of M18 and some areas of M17a where surface water was plentiful with M2a bog pools (i.e. was 'good'). Much of the blanket bog only had occasional M2a bog pools with water present (i.e. was 'intermediate'). The M3 communities, common in the M17b blanket bog were usually in for the form of exposed peat, rather than as a surface water feature. There were also areas with extensive erosion ('bad').	A bog pools system in M18.
Vegetation	Small grasses, bog-mosses common and very wet.	Taller plants, such as cotton- grasses and heather.	Rarely any plants grow on the areas that are exposed. Patches of grasses or heather are still found on 'islands' in between exposed bare peat.	The majority of the Study Area had cotton- grasses, deergrass and heather, with some areas mapped as M3 community with bare peat evident. Intermediate, with some extensive erosion areas 'bad'.	Grazing and possibly historic burning, impact evident from the species poor sward dominated by deergrass.
Bare peat	Little to no bare peat patches.	Bare peat patches are occasional, burning may occur.	Bare peat areas will continue to expand, leaving less plant cover as protection on the surface. Peat will continue to be lost until the solid rock is exposed.	Bare peat patches were common across the Study Area as small micro-erosion patches or with large expanses of exposed bare peat to bedrock. 'Intermediate' – 'bad'.	Bare peat was evident in small patches of micro erosion throughout the Study Area.
Water quality	Water flowing from good quality peatland is clear.	Water flowing from peatland likely to be slightly brown, especially after heavy rainfall.	Bad quality, it can be dark brown from the peat content.	Water coming from the bog was brown in colour. 'Intermediate' – 'bad'.	The water in this stream is clearly neat stained

Table 8.2.5: Evaluation of the peatland quality within the Study Area, based on the PCA Support Tool criteria.



Bog pools were only occasional features in much of the blanket bog.



This photo shows a large area of M17b with heather, deergrass and cotton-grasses.



There were many examples of large erosion features in the Study Area.



The water in at the base of this drain was peat stained.

GWDTE evaluation

SEPA's Guidance Note (2017a) recommends that the listed NVC communities should be treated as GWDTE unless information can be provided to demonstrate they are not dependent on groundwater. SEPA (2017a) does recognise that some of these communities are common across Scotland and that these communities may be considered GWDTEs only in certain hydrogeological settings,or may have limited dependency on groundwater in certain hydrogeological settings.

NVC communities recorded in the Study Area that are considered in the guidance (SEPA, 2017a; SEPA, 2017b) to be potentially groundwater dependent include:

M6 Carex echinata – Sphagnum fallax mire;
M10 Carex dioica – Pinguicula vulgaris mire;
M15 Trichophorum cespitosum – Erica tetralix wet dwarf-shrub heath;
M23 Juncus effusus/acutiflorus – Galium palustre rush-pasture;
M25 Molinia caerulea – Potentilla erecta mire.

Of these, M6, M10 and M23 are considered to be potentially highly groundwater dependent, depending on the hydrological setting (SEPA, 2017a; SEPA, 2017b). The M15 and M25 communities are considered potentially moderately groundwater dependent, depending on the hydrological setting (SEPA, 2017a; SEPA, 2017b). The M17/M15 transitional habitat was considered to be part of the ombrotrophic peatland bog system.

Much of the potential GWDTE habitat occurred as part of the ombrotrophic peatland bog system and their presence is considered to generally be related to the presence of waterlogged conditions sustaining the surrounding peatland bog system. As such, most of the communities were considered likely to be reliant on direct rainfall and limited drainage within the peatbog system, rather than groundwater, for their maintenance.

The M10 community is a sign of base enrichment, often associated with groundwater discharging from a spring. Therefore, this community may be highly groundwater dependent. The NVC community M15a, which was localized and contained small sedges may also be a community which is dependent on groundwater.

Table 6 displays the relationship between NVC communities, and the likelihood of groundwater dependency, with comments on the hydrological setting in the Study Area (Botanæco, 2019b). Hydrological surveys/analysis by a qualified hydrologist will be required to confirm whether or not these potential GWDTE are actual GWDTE (See **Chapter 10 - Hydrology and Hydrogeology**).

Habitat	NVC	FWT Category	Guidance	Setting	Comment on Setting	Comment on
	Community		potential			GWDTE
			GWDTE			
Acid grassland	U4, U5	Montane	Not a GWDTE			Not a GWDTE.
		grassland				
Blanket bog and	M1, M2, M3,	Peat bog	Not a GWDTE	Peat bog	Ombrotrophic	Not a GWDTE.
bog pools	M17, M18,					
	M17/M15,					
	M19, M20					
Dry dwarf-shrub	H10, H14,	Not a wetland	Not a GWDTE			Not a GWDTE.
heath	H22					
Flush	M6	Flush	Highly	Streamside	The M6 community was usually in	Potentially highly
					small patches beside watercourses	GWDTE, but likely
					and so surface water influences are	influenced by the
					likely.	ombrotrophic bog and
						surface water.
					T	
Flush	M10	Flush	Highly	Hillslope	There several small M10 communities	Potentially highly
					which indicates some base enrichment	GWDTE.
					often associated with groundwater	
					discharging form a spring.	
Marshy	M25	Marshy	Moderate	Associated with	The M25 formed part of a network of	Possibly some
grassland		grassland		water movement	water movement running down the	groundwater
				within the peat bog	slopes within the peat bog.	association but likely
						influenced from the
						ombrotrophic bog.
Marshy	M23	Marshy	Highly	Streamside	The MG23 community was associated	Potentially highly
grassland		grassland			with surface water movement.	GWDTE but likely
						influenced by the
						ombrotrophic bog and
						surface water.

Habitat	NVC	FWT Category	Guidance	Setting	Comment on Setting	Comment on
	Community		potential			GWDTE
			GWDTE			
Wet dwarf-shrub	M15a	Wet heath	Moderately	In isolated patches	The M15a community was located in	Potentially moderate
heath				on hillslopes	isolated patches on the hillslopes.	GWDTE.
Wet dwarf-shrub	M15b	Wet heath	Moderately	On lower slopes	The M15b community was located	Potentially moderate
heath				beside water	besides water courses and were very	GWDTE.
				courses.	wet.	
Wet dwarf-shrub	M15c and	Wet heath	Moderately	Hillslopes	The M15c and M15d communities	Possibly some
heath	M15d				were located on hillslopes with fairly	groundwater
					dry, shallow peat or on areas where	association but likely
					deep peat were eroded away.	influenced directly
						from rainfall.

Table 8.2.6: The relationship between NVC communities, FWT categories and potential GWDTE

Species of Note

The SBL is a list of animals, plants and habitats that Scottish Ministers consider to be of principal importance for biodiversity conservation in Scotland. Table 8.2.7 shows species recorded present in the Study Area that are on the SBL and are included in the Sutherland Local Biodiversity Action Plan (LBAP; Sutherland Biodiversity Group, 2003).

Species	LBAP	SBL Habitat
Dwarf juniper	\checkmark	\checkmark
Dwarf birch	√	
Alpine bearberry	\checkmark	

Table 8.2.7: LBAP and SBI	species recorded	in the Study Area
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No non-native invasive species of plant were identified within the extent of the Study Area However, this does not preclude them from being present in the future or their presence in an un-vegetative/unidentifiable state during surveys.

Habitats of Note

Habitats within the Study Area that are considered to be consistent with, or similar to, SBL habitat descriptions and Annex 1 habitats listed in the EU Habitats Directive are shown in Table 8.2.8.

NVC	Annex 1 Habitat	SBL Habitat
community	(*priority)	
H10	\checkmark	✓
H22	\checkmark	✓
H14	✓	✓
M15	✓	✓
M17	✓*(when active)	✓
M18	√*(when active)	✓
M19	√*(when active)	✓
M20	√*(when active)	\checkmark
M25	✓	✓
M2		\checkmark
M3		✓
M6		✓
M10		✓
U5		✓

Table 8.2.8: SBL and Annex 1 habitats recorded in the Study Area

Discussion

The Study Area was characterised by wet heath, mostly NVC community M15c, on the upland hillslopes of Càrn nam Bò Maola and Beinn Sgeireach and blanket bog including NVC communities M17, M18, M19 and a little M20. There were many watercourse pathways made up of M25a or more occasionally M6 communities. Dry heath on steep slopes was usually H10a, but a small patch of H22 was located on the steep slopes of Càrn nam Bò Maola. The dry heath was often accompanied by acid grassland (U4a or U5b). Montane heath H14 characterised the peaks of Càrn nam Bò Maola and Beinn Sgeireach. These habitats are listed on the SBL.

The Study Area was surveyed previously by Alba Ecology in 2012 (Massey, 2012). The results of both surveys are highly comparable, with a similar arrangement of communities. Both survey reports identified M15c as the most common community, with large areas of blanket bog including M17a, M17b and M19. The condition of the peatland habitats was considered to be similar between 2012 and 2020 with impacts from deer grazing evident, but generally unchanged. The areas of actively eroding peatland was also not noticeably changed between to the two field survey visits (2012 and 2020).

The 2012 and 2020 surveys are not identical, which would be expected both from the eight year time difference, and also from variation in professional judgement. Professional judgement varies not only between surveyors, but also from the same surveyor on different occasions. This is a well-known complexity of NVC surveying (e.g. Hearn *et al.* 2011).

The least modified area of blanket bog which was considered closest to 'Near-Natural' was the M18 which contained a complex of bog pools and some bog-moss hummocks. Some of the M17a was also placed within this Near-Natural category due to the hummock and hollow structure and the surface water present. However, most of the blanket bog was considered to be Modified through grazing and possibly other historic management practices such as burning, this included much of the M17a, and the M17b, M19 and M20. The M15 wet heath (on deep or shallow peat) would also be considered Modified in the PCA.

There were multiple drainage ditches present in the south part of the Study Area. Some of the drainage ditches appeared to be effectively draining the bog, although some appeared to be less effective. Some of the blanket bog (particularly degraded areas of M17b and M3) was also considered likely to be Actively Eroding and Drained from erosion features.

Some of the habitats in the Study Area were defined as wetland habitat and potential GWDTE. M6, M10 and M23 are considered to be potentially highly groundwater dependent, depending on the hydrological setting (SEPA, 2017a; SEPA, 2017b). The M15 and M25 communities are considered potentially moderately groundwater dependent, depending on the hydrological setting (SEPA, 2017a; SEPA, 2017b).

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Annex A

Target Notes

No.	Grid ref	Note	Photo
1	NC 46069 07330	A patch of M23 was located here. It was very wet underfoot. Soft rush was dominant with frequent marsh violet along with tormentil and marsh bedstraw and occasional creeping bent. There was also a small patch (too small to map) of M6a dominated by star sedge.	
2	NC 46084 07369	There was a drainage ditch as this location. It was ca. 50 cm wide, wet and flowing. The base of the ditch was peaty with some red bog-moss. The sides had common cottongrass and deergrass.	
3	NC 46124 07404	The M17a at this location was on a flat area and was fairly species poor, with no hummocks and hollows evident. Heather, deergrass, hare's- tail cottongrass were all co- dominant, with common cottongrass, bog myrtle and bog asphodel all abundant. Round-leaf sundew was occasional. There were patches of red bog-moss and soft bog-moss, but there was not a thick carpet of bog mosses at this location. Lichens were occasional. There were small bare peat patches within the vegetation.	
4	NC 46121 07407	There were a few bog pools in the M17a at this location. They were generally small, with poorly developed hummocks and hollows. There was a mixture of papillose bog-moss and feathery bog-moss with red bog-moss. There was a little purple spoonwort. The pools were ca. 2x2m in size. There was a little round-leaved sundew and bog asphodel was abundant.	
5	NC 46329 07508	An example of a small patch of M19. There were open tussocks of hare's- tail cottongrass with heather and a carpet of red bog-moss and glittering wood-moss below. Round- leaved sundew, bog asphodel and lichens were occasional. This held several drainage ditches.	
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6	NC 46588 07358	Turbine Location T17 An area of M15c, which appears to be on shallow peat.	
7	NC 46566 07472	Modified Turbine Location T17 M15c was open, with many small bare patches of peat within the vegetation.	
8	NC 46640 07445	There was a small M2a bog pool within M17a blanket bog. The pool was only ca 1×1m in size. It was filled with flat-topped bog-moss. The surrounding M17 was in poor condition. It was impacted by trampling and grazing resulting in many bare peat patches.	

9	NC 46718 07363	Drainage ditches were common in this area. They were approximately 50cm wide and were cut down to bedrock here at ca. 40cm depth. The base of the ditches were generally un-vegetated.	
10	NC 46787 07265	There was a small patch of M20 at this location. Hare's-tail cottongrass was in tussocks and heather was depleted and patchy. Bilberry was frequent and cross-leaved heath, red fescue and tormentil were occasional. Soft rush was present in small patches. There were some bog-mosses present including red bog-moss and papillose bog-moss. Other hypnosis feather mosses also present including glittering wood- moss.	
11	NC 46859 07296	M17b with lots of small patches of bare peat, with small sections of erosion features.	
12	NC 46888 07260	There was a small patch of M15c, with many exposed rocks through the vegetation.	

13	NC 46978 07212	There was a small elongated (ca. 1×6m) M2a bog pool with feathery bog-moss within it. Around the edge of the pool was a small bog-moss lawn including papillose and magellanic bog-moss.	
14	NC 47161 07281	There were large areas dominated by deergrass giving the area an orange hue. The vegetation was open with bare peat visible through the plants. There were small shoots of heather, cross-leaved heath. Woolly fringe moss and lichens were common, with occasional purple spoonwort. Bog asphodel was abundant.	
15	NC 47088 07270	Turbine Location T18 M15c vegetation, dominated by deergrass.	
16	NC 47028 07290	Modified Turbine Location T18 This location was M15c but it may have been over deep peat (>0.5m).	

17	NC 47067 07010	There were frequent drainage ditches in this area. This one was ca. 75m wide and 1m deep, with water at the base. There was no evidence of re-vegetation within peat on the sides and base.	
18	NC 47156 06953	There were frequent drainage ditches in this area. This one was flowing. It was cut to the bedrock and was ca. 1m deep.	
19	NC 47202 06864	There were very occasionally bog pools such as this one which was 5x3m is size. There were some small, bog-moss lawns around the edge and poorly developed hummocks. There were large areas made up of poor M15c possibly on deeper peat. There were small patches of hare's-tail cottongrass and very occasional pools. There were limited amounts of feathery bog-moss, red bog-moss and very rarely magellanic bog-moss.	
20	NC 47369 06783	There were some patches of M15c which were clearly on shallower peat with rocky outcrops showing through the peat and vegetation. Pools were only very occasionally present.	

21	NC 47532 06838	Turbine Location T20 This area was M17a, but with a few M2a pools located nearby.	
22	NC 47593 06638	There were many drains going through the peatland here. The vegetation was both drained and modified through grazing.	
23	NC 47606 06603	Despite drains, some bog pools still evident in the M17a. There drains were somewhat ineffectual in areas, as evidenced by water-logging.	
24	NC 47622 06550	There was evidence of some hummock and hollow surface pattern in the M17a at this location. Pools were frequent, and bog-moss formed a non-continuous carpet.	

25	NC 47633 06410	There was a small trickling watercourse here. It was ca. 30cm wide, with vegetation growing over it, including M6c, M6a and U4a with bent grasses. There was a very small patch, 2m wide, where common sedge was abundant.	
26	NC 47633 06378	An example of M19 with tussocky hare's-tail cottongrass and heather. There was a little bilberry here.	
27	NC 47667 06212	There was an active drainage ditch at the transition between M19 and M17 at this location. The drainage ditch had water moving through. The drain had bare peat sides and a base. It was ca. 0.75m wide and 1m deep.	
28	NC 47899 05961	In the M15/M17 there were small green patches of hare's-tail cottongrass, but it was mostly the orange hue of deergrass. It appeared to be on deep peat. There were few pools and little bog-moss.	

29	NC 48100 05913	There was a patch of M17a here with bog pools and a good carpet of bog-moss.	
30	NC 48192 05941	There was species poor M15c along this ridgeline with bare peat patches very common.	7
31	NC 48661 05587	Drainage ditches were very common in this area.	
32	NC 48947 05538	There was a patch of M17a at this location. There were no bog pools present but it was wet underfoot.	

33	NC 48973 05552	There was actively eroding M17b at this location with little sign of re- vegetation.	
34	NC 45820 07564	There was a little bog myrtle within the M15c wet heath at this location.	
35	NC 45737 07785	There was some erosion along the fence line at this location. It was at a transition between M25a and M15c.	
36	NC 45644 07941	There was a small line of M10a at this location. It was ca. 50cm wide, with black mosses and common yellow-sedge occasionally present. Common butterwort was also present. The M10a started at this location and ran down the hillslope. There was no clear spring head but is considered to be a potential GWDTE.	

37	NC 45647 07957	There was a small line of M10a at this location. It was ca. 50cm wide, with black mosses, common yellow- sedge and common butterwort. There was no clear spring head but was considered to be a potential GWDTE.	
38	NC 45612 08337	There were occasional small watercourses, ca. 50cm wide flowing over the surface of the vegetation. The water was generally peat stained. Pondweed species (<i>Potamogeton</i> spp.) were occasionally seen within them.	
39	NC 45753 08286	Turbine Location 16 There was a patch of M17a which extended in a small band to this location.	
40	NC 45672 08932	This area was M15c but there may be small pockets of deeper peat. The vegetation was open, mostly lacking in bog-mosses. One pool was present at this location with bog-mosses. Grazing pressure was evident with hoof prints and dung.	

41	NC 45602 08960	There was a small patch of M19 on a slopes at this location. The peat seemed deeper than 0.5m, but may have been shallow. There was a clear affinity to the H22 community, with hare's-tail cottongrass, heather, red bog-moss, glittering wood-moss and wavy hair-grass.	
42	NC 45500 09066	There was a very steep slope at this location with H22 and some small rock cliffs with occasional great wood rush and soft rush.	
43	NC 45425 09052	There was montane H14 heath at top of the hill. There was a mixture of dwarf juniper, bearberry, alpine bearberry, mountain everlasting, and many lichens.	
44	NC 45369 09011	Between the H14 montane heath there were patches of M17b blanket bog, with lichens and some hummocks of bog-moss. There were several M2a bog pools.	

45	NC 45340 09391	There was an M3 pool at this location, with a very small patch of M17b.	
46	NC 45324 09474	There was an un-vegetated open water pool at this location. The water was brown in colour, peat stained.	
47	NC 45359 09553	There was H14 montane heath at this location.	
48	NC 45563 09700	Turbine Location T9 This area was M17b blanket bog with many M3 pools on flat ground between areas of M15c.	

49	NC 45865 09701	M17b blanket bog with some areas actively eroding. Evidence of habitat modified through grazing pressure, with hoof prints, dung and micro- erosion features.	
50	NC 45769 09782	Erosion feature within M17a blanket bog. It was ca. 1.2m deep and 1m wide with bare peat exposed along the sides. Water was flowing down it, i.e. it was actively eroding.	
51	NC 45481 10136	Turbine Location T7 This location was characterised by M17a blanket bog. It was beside and M6c flush with moving water. The flush was within a patch of M19 blanket bog.	
52	NC 45484 10144	An example of M6c vegetation.	

53	NC 45269 10008	There was a large area of M17b blanket bog along a hillside, with many small patches of M19. The M17b appeared to be shallow peat further up the hill, getting deeper towards the valley bottom. There was a long transition into M15c up the slope.	
54	NC 44546 09321	An example of M15c.	
55	NC 44616 09529	A hillslope of M15c. There were occasional patches of M25a or M19 but just small and occasional. There was a vast hillside of deergrass, heather, purple moor-grass, with lichens and bog asphodel. Tormentil and cross-leaved heath were less common, but present.	
56	NC 44564 09023	There was a small patch of U5b at this location.	

57	NC 44675	There was a small line of M10a flush	
	08898	at this location with black mosses	and the second sec
		and sedges present.	
			Friday of the second seco
			and the second
			The second s
58	NC 44762	There was some M25a around a	
	08790	small (ca. 30cm wide) watercourse.	
		The water that was flowing was peat	and the second sec
		stained.	
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			and the second se
			and the second
59	NC 44893	There were several small patches of	
59	NC 44893 08632	There were several small patches of H10a dry heath within the M15c wet	
59	NC 44893 08632	There were several small patches of H10a dry heath within the M15c wet heath at this location. They were ca.	
59	NC 44893 08632	There were several small patches of H10a dry heath within the M15c wet heath at this location. They were ca. 5×5m in size.	
59	NC 44893 08632	There were several small patches of H10a dry heath within the M15c wet heath at this location. They were ca. 5x5m in size.	
59	NC 44893 08632	There were several small patches of H10a dry heath within the M15c wet heath at this location. They were ca. 5x5m in size.	
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59	NC 44893 08632	There were several small patches of H10a dry heath within the M15c wet heath at this location. They were ca. 5x5m in size.	
59	NC 44893 08632	There were several small patches of H10a dry heath within the M15c wet heath at this location. They were ca. 5x5m in size.	
59	NC 44893 08632	There were several small patches of H10a dry heath within the M15c wet heath at this location. They were ca. 5x5m in size.	
59	NC 44893 08632	There were several small patches of H10a dry heath within the M15c wet heath at this location. They were ca. 5×5m in size.	
60	NC 44893 08632 NC 44149	There were several small patches of H10a dry heath within the M15c wet heath at this location. They were ca. 5×5m in size.	
60	NC 44893 08632 NC 44149 10295	There were several small patches of H10a dry heath within the M15c wet heath at this location. They were ca. 5×5m in size.	
60	NC 44893 08632 NC 44149 10295	There were several small patches of H10a dry heath within the M15c wet heath at this location. They were ca. 5×5m in size. There were recently planted native tree seedlings in the M15c on the lower slopes within a deer-fenced	
60	NC 44893 08632 NC 44149 10295	There were several small patches of H10a dry heath within the M15c wet heath at this location. They were ca. 5x5m in size. There were recently planted native tree seedlings in the M15c on the lower slopes within a deer-fenced area. Tree species included willow,	
60	NC 44893 08632 NC 44149 10295	There were several small patches of H10a dry heath within the M15c wet heath at this location. They were ca. 5x5m in size. There were recently planted native tree seedlings in the M15c on the lower slopes within a deer-fenced area. Tree species included willow, alder and birch.	
60	NC 44893 08632 NC 44149 10295	There were several small patches of H10a dry heath within the M15c wet heath at this location. They were ca. 5x5m in size. There were recently planted native tree seedlings in the M15c on the lower slopes within a deer-fenced area. Tree species included willow, alder and birch.	
60	NC 44893 08632 NC 44149 10295	There were several small patches of H10a dry heath within the M15c wet heath at this location. They were ca. 5×5m in size. There were recently planted native tree seedlings in the M15c on the lower slopes within a deer-fenced area. Tree species included willow, alder and birch.	
60	NC 44893 08632 NC 44149 10295	There were several small patches of H10a dry heath within the M15c wet heath at this location. They were ca. 5×5m in size. There were recently planted native tree seedlings in the M15c on the lower slopes within a deer-fenced area. Tree species included willow, alder and birch.	
60	NC 44893 08632 NC 44149 10295	There were several small patches of H10a dry heath within the M15c wet heath at this location. They were ca. 5×5m in size. There were recently planted native tree seedlings in the M15c on the lower slopes within a deer-fenced area. Tree species included willow, alder and birch.	
60	NC 44893 08632 NC 44149 10295	There were several small patches of H10a dry heath within the M15c wet heath at this location. They were ca. 5×5m in size. There were recently planted native tree seedlings in the M15c on the lower slopes within a deer-fenced area. Tree species included willow, alder and birch.	
60	NC 44893 08632 NC 44149 10295	There were several small patches of H10a dry heath within the M15c wet heath at this location. They were ca. 5x5m in size. There were recently planted native tree seedlings in the M15c on the lower slopes within a deer-fenced area. Tree species included willow, alder and birch.	

61	NC 44195 10387	There was a patch of U4a grassland. Common bent and red rescue were dominant with heath bedstraw and tormentil abundant. There were patches of heather and a carpet of feather mosses. There was occasional dog violet and devil's-bit scabious.	
62	NC 44193 10349	There was a little dwarf juniper at this location.	
63	NC 44193 10349	There was a steep sided river valley with some cliff edges at this location. There were scattered downy birch, rowan and occasionally aspen. The valley sides had dry heath, H10a vegetation with ferns evident. These were not identified to species level due to their inaccessibility and for health and safety reasons.	
64	NC 44626 10111	The M15c on this low slope was species poor, open with bare peat and sometimes rocks showed through.	

65	NC 44869	Turbine Location T8	
U -	10012	A patch of blanket bog that was at a	
		transitional point between M15c and	
		M17.	
			the first of the second s
			and the second
66	NC 44025	An example of M25a, Purple moor	
00	10123	areas was dominant with red rescue	
	10133	and creening bent occasional There	
		were patches of heather and a little	the second se
		cross-leaved heath.	and the second s
			and the second
67	NC 44926	There was a very small amount of	
	40004		
	10304	M6c and U4a beside a small stream	
	10304	M6c and U4a beside a small stream within the M25a at this location.	
	10304	M6c and U4a beside a small stream within the M25a at this location.	
	10304	M6c and U4a beside a small stream within the M25a at this location.	
	10304	M6c and U4a beside a small stream within the M25a at this location.	
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	10304	M6c and U4a beside a small stream within the M25a at this location.	
	10304	M6c and U4a beside a small stream within the M25a at this location.	
	10304	M6c and U4a beside a small stream within the M25a at this location.	
68	10304 NC 44849	M6c and U4a beside a small stream within the M25a at this location.	
68	10304 NC 44849 10380	M6c and U4a beside a small stream within the M25a at this location.	
68	10304 NC 44849 10380	M6c and U4a beside a small stream within the M25a at this location.	
68	10304 NC 44849 10380	M6c and U4a beside a small stream within the M25a at this location. There were small patches of H10a and U4a along the stream sides at this location. The water in the stream was peat stained. The	
68	10304 NC 44849 10380	M6c and U4a beside a small stream within the M25a at this location. There were small patches of H10a and U4a along the stream sides at this location. The water in the stream was peat stained. The stream was ca. 1-2m wide.	
68	10304 NC 44849 10380	M6c and U4a beside a small stream within the M25a at this location. There were small patches of H10a and U4a along the stream sides at this location. The water in the stream was peat stained. The stream was ca. 1-2m wide.	
68	10304 NC 44849 10380	M6c and U4a beside a small stream within the M25a at this location. There were small patches of H10a and U4a along the stream sides at this location. The water in the stream was peat stained. The stream was ca. 1-2m wide.	
68	10304 NC 44849 10380	M6c and U4a beside a small stream within the M25a at this location. There were small patches of H10a and U4a along the stream sides at this location. The water in the stream was peat stained. The stream was ca. 1-2m wide.	
68	10304 NC 44849 10380	M6c and U4a beside a small stream within the M25a at this location. There were small patches of H10a and U4a along the stream sides at this location. The water in the stream was peat stained. The stream was ca. 1-2m wide.	
68	10304 NC 44849 10380	M6c and U4a beside a small stream within the M25a at this location. There were small patches of H10a and U4a along the stream sides at this location. The water in the stream was peat stained. The stream was ca. 1-2m wide.	

69	NC 44785 10482	Turbine Location T5. A rocky open area of M15c. There were several peaty pools of water.	
70	NC 45018 10598	There were two large, shallow, M3 pool within some M17a blanket bog at this location. The pools were ca. 10x5m in size. There was a little bog pondweed and common cottongrass. There was an oily surface to the water.	
71	NC 45158 10661	There was a small patch of H10a at this location.	
72	NC 45222 10663	The H10a was depleted and was in a mosaic with M15c at this location.	No photo.
73	NC 45337 10727	There were several M2a pools and hummocks of red bog-moss and woolly fringe moss in M17a blanket bog at this location. This patch was limited in its extent and rapidly transitioned into M15c and M17b.	

74	NC 45390 10744	There was a large (20x20m) and shallow M3 pool within the blanket bog at this location. Rocks and peat were visible with some surface water. Common cottongrass was most abundant with a little feather bog-moss. Heath rush, bulbous rush and bog pondweed was also present.	
75	NC 45653 10891	Turbine Location T3 The grid reference was on a patch of M25a. To one side there was M15c, the other side was M17b but likely on shallow peat, (ca. <1m) as some rocks were evident at the surface.	
76	NC 45660 10881	There were several pools in the bog adjacent to the Turbine Location 3. There were some elongated pools with bottle sedge (<i>Carex rostrata</i>) in them. Bulbous rush was also present.	
77	NC 45895 10850	There was some patches of H10a along the hill slope at this location.	

78	NC 46135 10678	Turbine Location T4 M17a blanket bog with M2a pools.	
79	NC 46146 10701	Several dwarf birch were seen at this location in M17a blanket bog.	
80	NC 46180 10847	Actively eroding area of M17b. There was little or no vegetation re- colonisation of the bare peat patches.	
81	NC 46127 11174	There was a mixture of H10a and U4a communities at the side of Loch Sgeireach. There was clear water within the loch which had a rocky base and was un-vegetated.	

82	NC 46080 11184	There was a sedge rich patch of ground with bog pondweed present at this location. The patch was small ca. 5m x 5m.	
83	NC 45192 11122	There was a small patch of M15d, within the M15c at this location. The M15d had tall heather and wavy hair-grass present. Woolly fringe moss, cross-leaved heath, deergrass and tormentil were all frequently present. Purple moor- grass was only occasionally present.	
84	NC 45111 11116	Turbine Location 1 An area of M15c wet heath.	
85	NC 44931 11018	There was a tiny patch of M6a within the H10a at this location. The M6a was star sedge dominated, with common sedge, black bog-rush and purple moor-grass occasional.	

86	NC 44613	Turbine Location T2	
	10841	An area of M15c wet heath.	
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			and the second sec
87	NC 44556	There was a small patch of M17a in	
	10635	iust a few meters wide and there	
		was a strip of M25a going downhill	
		through the centre of the valley.	
88	NC 44549	Modified Turbine Location T2	
00	10836	This was on a slope. In a tiny patch	
		of M19 blanket bog adjacent to an	
		area of M15c on higher ground.	
		area of M15c on higher ground.	
		area of M15c on higher ground.	
		area of M15c on higher ground.	
		area of M15c on higher ground.	
		area of M15c on higher ground.	
		area of M15c on higher ground.	
89	NC 44534	area of M15c on higher ground. An area of M15c wet heath.	
89	NC 44534 10832	area of M15c on higher ground. An area of M15c wet heath.	
89	NC 44534 10832	area of M15c on higher ground. An area of M15c wet heath.	
89	NC 44534 10832	area of M15c on higher ground. An area of M15c wet heath.	
89	NC 44534 10832	area of M15c on higher ground. An area of M15c wet heath.	
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89	NC 44534 10832	area of M15c on higher ground. An area of M15c wet heath.	
89	NC 44534 10832	area of M15c on higher ground. An area of M15c wet heath.	

90	NC 44253 10857	Dwarf juniper was located here.	
91	NC 44350 10200	A degraded area of M17b. It was modified through grazing and trampling with many bare peat patches and hoof prints evident. There was ca. 20% to 30% bare peat.	
92	NC 45604 10180	There was an M6a flush at this location. There was a carpet of flat- topped bog-moss with hare's-tail cottongrass, bog asphodel and star sedge. The area was very wet with slow moving water.	
93	NC 45625 10171	There was an old erosion gully at this location which held some M6a vegetation. The erosion gully was ca. 1m deep. The sides were bare peat and the M6a was at the base.	

94	NC 45834 10207	There were several patches of M19 on slightly raised ground on the hill slope at this location. There was occasional cloudberry. There was also a re-vegetated erosion gully.	
95	NC 45855 10208	There was a 2m high erosion gully at this location with some recently fallen peat exposing the substrate. The erosion gully was re-vegetated at the base.	
96	NC 46019 10242	Turbine Location T6 A patch of M19 in a wider hill slope of M17b.	
97	NC 46096 10211	This area of poor M17b had many micro erosion features of sparsely colonised bare peat (M3). This area showed a strong affinity to the M15c community over deep peat as hare's-tail cottongrass was depleted and only found in small patches. Bog-moss were also depleted.	

98	NC 46183 10003	An example of an M2a bog pool.	
99	NC 46144 09785	Area where the peat layer had been lost to the base rock. M15c and M3 on a rocky/peaty surface between the bog and deeper peat areas.	
100	NC 46176 09826	This was an area of actively eroding M17b and many eroded areas with rocks and sparsely colonised peat. It was mapped at M17b:M3. There were occasional M2a pools. It had some variable colonisation at the base of M3 and occasional M2a pools.	
101	NC 46179 09676	There were many areas of exposed bare peat in the M17b blanket bog at this location as it transitioned to M15c. It included small, micro erosion patches, and larger areas of haggs. The sides and bases were often of bare peat. Water filled some, but generally on sparely vegetated peat surface. Bog- mosses were not a feature of this area.	

102	NC 46198 09523	Turbine Location T10 This area was M15c with many micro erosion patches within it.	
103	NC 46381 09606	There was a large erosion feature at this location. It was considered to be actively eroding. It was ca. 1-2m deep and ca. 5m wide with exposed peat. There was M17b coming down the hill slope which was surrounded by M25a.	
104	NC 46535 09611	A golden eagle was seen at this location.	
105	NC 46713 09427	Turbine Location T11 This location was a slope of M15c which appeared to be on shallow peat.	

106	NC 46592 10174	There was an abundance of woolly fringe moss hummocks and lichens in the M17b blanket bog. There were occasional, poorly developed hummocks of red bog-moss which was patchily distributed. Bare peat was a common feature of this community in small and large erosion gullies and as micro erosion. The pools were mostly M3, but there were occasionally M2a pools.	
107	NC 46589 10335	An area of M18b which was very wet and had an abundance of M2a bog pools. The bog moss layer was well developed with papillose bog-moss abundant, although it was not a full carpet and there were few bog-moss hummocks. The vegetation was open, with small amounts of heather. Bog asphodel was abundant. There was some evidence of modification through grazing pressure with hoof marks and small patches of bare peat present.	
108	NC 46599 10352	An open water pool. The water was brown in colour (peat stained) with a peaty base.	
109	NC 46484 10427	A bog pool system in the M18b blanket bog.	

110	NC 46046 10962	I here was a thin line of M10a at this location. It was ca. 50cm wide with	
		common yellow-sedge present.	
			A THE REAL PROPERTY OF
			A State And
111	NC 45383	There was some H14 heath on top	18 18 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
	11763	included dwarf juniper, alpine	- El la Salves
		bearberry and mountain everlasting.	
			- A WAR SALARY
			A CONTRACTOR
112	NC 45376	Lassar clubmoss in the montane	
112	NC 45570		
	11793	heath. Dwarf juniper was abundant	and the second second
	11793	heath. Dwarf juniper was abundant there was occasional fir club moss. Hard fern was seen in rock crevices.	
	11793	heath. Dwarf juniper was abundant there was occasional fir club moss. Hard fern was seen in rock crevices. Devils bit scabious was rare in this community	
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113	11793 NC 45359	heath. Dwarf juniper was abundant there was occasional fir club moss. Hard fern was seen in rock crevices. Devils bit scabious was rare in this community.	
113	11793 NC 45359 11817	heath. Dwarf juniper was abundant there was occasional fir club moss. Hard fern was seen in rock crevices. Devils bit scabious was rare in this community.	
113	11793 NC 45359 11817	heath. Dwarf juniper was abundant there was occasional fir club moss. Hard fern was seen in rock crevices. Devils bit scabious was rare in this community.	
113	11793 NC 45359 11817	heath. Dwarf juniper was abundant there was occasional fir club moss. Hard fern was seen in rock crevices. Devils bit scabious was rare in this community. A small eared willow within the rocks at this location.	
113	11793 NC 45359 11817	heath. Dwarf juniper was abundant there was occasional fir club moss. Hard fern was seen in rock crevices. Devils bit scabious was rare in this community.	
113	11793 NC 45359 11817	heath. Dwarf juniper was abundant there was occasional fir club moss. Hard fern was seen in rock crevices. Devils bit scabious was rare in this community.	
113	11793 NC 45359 11817	heath. Dwarf juniper was abundant there was occasional fir club moss. Hard fern was seen in rock crevices. Devils bit scabious was rare in this community. A small eared willow within the rocks at this location.	

114	NC 45148 11674	There were several dwarf birch in a patch of acid grassland at this location.	
115	NC 44987 11521	A common lizard was seen in the H10a dry heath at this location.	
116	NC 44814 11514	There was a large erosion feature in the M17b blanket bog at this location. It was considered likely to be actively eroding. It was ca. 1m high and 2m wide with a mostly bare peat base. Some rocks were showing through the vegetation.	
117	NC 43636 11417	The M25a had some tussocks of hare's-tail cottongrass on the lower slopes. There was an increase in other grasses e.g. common bent and red fescue giving some affinity to the M25b community.	No photo.
118	NC 43994 11626	There was a patch of star sedge dominated M6a beside the M25a. There was also a patch of U4 nearby.	

119	NC 44091 11780	There was a steep, but small, stream valley with H10a and U4 on the valley sides. M6a was abundant along the base of the stream valley. Dwarf juniper was located here.	
120	NC 44324 11997	There were several dwarf birch beside the burn at this location.	
121	NC 44582 11742	There was a large, wide erosion gully at this location. It was considered to be actively eroding. Common cottongrass was sparsely colonising the bare peat. The gully was ca. 2m high and up to ca. 8m wide.	
122	NC 44572 11575	There was a series of erosion gullies in the M17b blanket bog at this location. The erosion features were ca. 1.5m deep and up to 4m wide. In the 2012 survey a small patch of M18 had been mapped nearby. There was little evidence of this remaining, with only a few M2 bog pools.	

123	NC 44431 11255	This area, mapped as M17b, was considered likely to be mostly on deep peat, but there were a few rocks near the surface in some areas. Hare's-tail cottongrass was common and there were some low hummocks of red bog-moss and woolly fringe moss with some M3 pools. There was evidence of modification through grazing (hoof prints and dung). There was some micro erosion evident with small erosion features ca. 40cm high.	
124	NC 44189 11157	Red bog-moss was well represented in the M19 blanket bog at this location. Heather was less abundant than in many M19 areas.	
125	NC 43089 10957	Creeping willow (Salix repens) located in M15c on a hill slope.	
126	NC 45977 07431	There was a drainage ditch in the M15b at this location. The M15b had a mixture of abundant heather, bog myrtle, purple moor-grass and bog asphodel.	

127	NC 46466	There was a surface water drainage	
	06996	feature at this location.	the second states of the
			a share the second second
			with marking and with the
			States of the second second
128	NC 46503	M17a with reasonable coverage of	
120	07135	moss, though thin in places. Some	Will The Constant Marks Willing
		evidence of drainage.	The second s
			The same the second
			A STATE OF STREET, MARINE STREET, STREE
129	NC 46540	M19 on sloping ground. Thick moss	
_	07038		a second and the second s
	07030	coverage, very wet undertoot. Some	and the first of the second state of the secon
	07000	small transition areas with M25a.	Station and the state
	01000	small transition areas with M25a.	and the second second second
	01000	small transition areas with M25a.	
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		small transition areas with M25a.	
		small transition areas with M25a.	
		small transition areas with M25a.	
130	NC 47108	M17a with lush moss coverage,	
130	NC 47108 06878	M17a with lush moss coverage, though some drainage.	
130	NC 47108 06878	M17a with lush moss coverage, though some drainage.	
130	NC 47108 06878	M17a with lush moss coverage, though some drainage.	
130	NC 47108 06878	M17a with lush moss coverage, though some drainage.	
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130	NC 47108 06878	M17a with lush moss coverage, though some drainage.	
130	NC 47108 06878	M17a with lush moss coverage, though some drainage.	
130	NC 47108 06878	M17a with lush moss coverage, though some drainage.	

131	NC 46785 06730	Small pool with bulbous rush and Scots pine (<i>Pinus sylvestris</i>) sapling.	
132	NC 47444 06197	Pooling area below bare hagg. With feathery bog moss and common cottongrass.	No photo.
133	NC 47496 06120	Flush. Dominated by Cypress- leaved plaitmoss (<i>Hypnum</i> <i>cuppresiforme</i>), with bottle sedge and bulbous rush also present.	
134	NC 48635 05643	M2a pool. Vegetation within pool dominated by common cottongrass and feathery bog-moss.	
135	NC 47336 06215	Step of around 1.2m down from M17a and M20a communities. Straight line and overgrown nature suggests this may be an example of an old peat cutting.	

136	NC 47209 06387	Actively eroding area.	
137	NC 47277 06275	Actively eroding area.	
138	NC 47442 06200	Actively eroding area with some surface water retained.	No photo.
139	NC 48125 05592	M2a pools with feathery bog-moss in areas of M15d.	
140	NC 48665 05616	Actively eroding hagged bare peat and pools.	

141	NC 46084 07602	Eroded gully, part of which is actively eroding, though some re- vegetation has occurred.	
142	NC 46126 07643	M17b. Mixed of bog-moss species present. Some areas of pooling with feathery bog-moss. Modified.	
143	NC 45911 07791	Several dwarf birch in M25a. Mostly growing through hummocks of glittering wood-moss.	
144	NC 45933 07796	M17a fairly extensive bog-moss coverage, though thin in patches. Lots of bog myrtle. Some pools. Near natural.	
145	NC 45933 07806	Stunted silver birch (<i>Betula</i> pendula).	No photo.

146	NC 45984 07794	Wet, hagged area, with small patches actively eroding.	
147	NC 46646 08164	M17a, thick bog-moss coverage, with surface water pooling.	
148	NC 46722 08253	Good M17a, thick bog-moss coverage, pooling water.	
149	NC 46756 08278	M17b, poorer coverage of bog- mosses. Modified.	

150	NC 46872	M19 with abundant red bog-moss	
	08431	and feather mosses.	
			· La salar
			A STATE OF A
			T SUBTRIC THE
151	NC 46929	M17b, though modified with erosion	
	08284	features.	
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			Second Parts And Parts
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152	NC 47193 08171	and feather mosses.	
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152	08171	and feather mosses.	
152	NC 47193 08171	and feather mosses.	
152	NC 47193 08171 NC 47091	M19 with abundant red bog-moss and feather mosses. M17c. Thick, spongy bog-moss	
152	NC 47193 08171 NC 47091 08590	M19 with abundant red bog-moss and feather mosses. M17c. Thick, spongy bog-moss carpet. Some evidence of grazing. A	
152	NC 47193 08171 NC 47091 08590	M19 with abundant red bog-moss and feather mosses. M17c. Thick, spongy bog-moss carpet. Some evidence of grazing. A low proportion of ericoid sub-shrubs and purple moor grass was	
152	NC 47193 08171 NC 47091 08590	M19 with abundant red bog-moss and feather mosses. M17c. Thick, spongy bog-moss carpet. Some evidence of grazing. A low proportion of ericoid sub-shrubs and purple moor grass was recorded. With frequent heath rush,	
152	NC 47193 08171 NC 47091 08590	M19 with abundant red bog-moss and feather mosses. M17c. Thick, spongy bog-moss carpet. Some evidence of grazing. A low proportion of ericoid sub-shrubs and purple moor grass was recorded. With frequent heath rush, little shaggy-moss and wavy hair	
152	NC 47193 08171 NC 47091 08590	M19 with abundant red bog-moss and feather mosses. M17c. Thick, spongy bog-moss carpet. Some evidence of grazing. A low proportion of ericoid sub-shrubs and purple moor grass was recorded. With frequent heath rush, little shaggy-moss and wavy hair grass separated this from the other M17 sub communities	
152	NC 47193 08171 NC 47091 08590	M19 with abundant red bog-moss and feather mosses. M17c. Thick, spongy bog-moss carpet. Some evidence of grazing. A low proportion of ericoid sub-shrubs and purple moor grass was recorded. With frequent heath rush, little shaggy-moss and wavy hair grass separated this from the other M17 sub-communities.	
152	NC 47193 08171 NC 47091 08590	M19 with abundant red bog-moss and feather mosses. M17c. Thick, spongy bog-moss carpet. Some evidence of grazing. A low proportion of ericoid sub-shrubs and purple moor grass was recorded. With frequent heath rush, little shaggy-moss and wavy hair grass separated this from the other M17 sub-communities.	
152	NC 47193 08171 NC 47091 08590	M19 with abundant red bog-moss and feather mosses. M17c. Thick, spongy bog-moss carpet. Some evidence of grazing. A low proportion of ericoid sub-shrubs and purple moor grass was recorded. With frequent heath rush, little shaggy-moss and wavy hair grass separated this from the other M17 sub-communities.	
154	NC 47286 08625	M17b with extensive bog-moss coverage. Some drainage recorded.	
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155	NC 47021 09353	M17b. Reasonable moss coverage with some surface water and hollows.	
156	NC 46936 09345	Patch dominated by cross-leaved heath and common cottongrass. Hare's-tail cottongrass was abundant along with bog asphodel. Some patches of heather were present. Some pooling in this community.	
157	NC 46904 08935	M17a, impoverished moss coverage. Lots of evidence of grazing effects.	

158	NC 46945 08701	M17a area. Patchy covering of mosses, with some thick carpets, and some thinner and bare areas. Where good, some hummock and hollow relief, with lots of <i>Cladonia</i> lichens in these areas.	
159	NC 46880 08662	M19. Poor example with impoverished moss layers.	
160	NC 46730 08560	M25a area. Some areas of this patch were likely on deep peat.	
161	NC 46725 08506	M17b. Very mixed, some areas very modified and some areas with bog- moss cover.	

162	NC 46585 08657	Area of pooling with black mosses.	
163	NC 46374 09023	M17a. Very wet, with lush moss layer.	
164	NC 46057 08107	M17a. Good area with little evidence of modification. Frequent bog myrtle.	
165	NC 45957 08002	M17a. Good area with little evidence of modification. Frequent bog myrtle.	No photo.





Key











Modified (Near Natural)

- Modified/Drainage
 - Modified/Drainage/Actively Eroding
- Near Natural

Scale 1:15,000 @ A3 250

N

Figure 8.2.3a **Peat Condition Assessment - North**

500





Figure 8.2.3b Peat Condition Assessment - South





Substation, Welfare Facility and Store

Temporary Construction Compound, Security and Storage

Potential Groundwater <u>Dependence</u>

High

Moderate

Low

Scale 1:15,000 @ A3

0

250

N

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Figure 8.2.4a Potential GWDTE - North

500





Figure 8.2.4b **Potential GWDTE - South**

m

500

Scale 1:15,000 @ A3

0

250

N

 \wedge





Figure 8.2.5 **Target Notes**

1,000

Scale 1:26,000 @ A3

0

500

N

 \wedge