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Lochluichart East BESS

NVC Survey Report

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Contents

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1. Introduction

1.1 Terms of Reference

In December 2024, Atmos Consulting Ltd. (Atmos) was commissioned to undertake a National Vegetation Classification (NVC) Survey on behalf of Boralex Ltd, on land at Lochluichart Estate, west of Garve, Highlands (hereafter referred to as the "Site").

1.2 Site Location and Description

The proposed development site at Lochluichart Estate is located just north of the A832, west of Garve in the Highland region. The Site is located within an area of coniferous forestry plantation combined with natural woodland, which is in the process of being felled. The area proposed for development is centred on grid reference NH 34399 63640. The access track to the Site from the A832 begins at NH 33602 63480. Lochluichart lies to the south of the Site along with the Dingwall – Kyle of Lochalsh railway line. The surrounding landscape consists of both planted forestry and semi-natural woodland in addition to the remote upland landscape typical of the Highlands.

Close to the Site access track are two warehouse buildings used by the nearby shooting estate, and some of the land close by is used for game shooting, target practice and the rearing of pheasants.

1.3 Proposed Development

The proposed development on the Site consists of a battery storage facility, access track and a proposed underground cable between the battery storage facility and Corriemoillie substation.

1.4 Objectives

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

This report provides details of the following:

- field survey methods;
- field survey results;
- description of the plant communities present within the site boundaries;
- discussion of potential Ground Water Dependent Terrestrial Ecosystems (GWDTEs).

2. Methodology

2.1 Desktop Study

A desk study was undertaken to establish baseline information for the Site and to gather information about the presence of protected plant species. Various data sources were utilised including the website of the statutory agency, NatureScot via the 'Site Link Portal', publicly available datasets held on the National Biodiversity Network (NBN) website and aerial photography for the Site.

The desk study identified statutory designations such as Special Areas of Conservation (SACs), Sites of Special Scientific Interest (SSSIs) and National Nature Reserves (NNRs) within 2km of the Site. In addition, Local Nature Reserves (LNRs) and relevant non-statutory designations within a 2km radius of the Site were searched for. A search for protected plant records was carried out within 2km of the Site utilising datasets freely available for commercial use held on the National Biodiversity Network (NBN) Atlas website.

2.2 NVC Survey

The vegetation survey was undertaken on 9th and 10th April 2025 by a suitably qualified and experienced botanical surveyor using the NVC (Rodwell, 1991 – 2000, 5 volumes) and in accordance with NVC survey guidelines (Rodwell, 2006). The NVC scheme provides a standardised system for classifying and mapping semi-natural habitats and ensures that surveys are carried out to a consistent level of detail and accuracy.

Homogenous stands and mosaics of vegetation were identified and mapped by eye, drawn as polygons on field maps; these polygons were surveyed qualitatively to record dominant and constant species, sub-dominant species and other species present. In practice the vegetation was mapped progressively across the site to ensure that no areas were missed and that mapping was accurate. An aerial photograph of the site was also used to aid accurate mapping of vegetation boundaries. NVC communities were attributed to the mapped polygons using surveyor experience and matching field data against published floristic tables (Rodwell, 1991 – 2000). Stands were classified to sub-community where possible.

Although the dominant NVC community has been attributed to each polygon, due to vegetation and habitat variability across the site, and the numerous transitional zones between similar NVC communities, some polygons may include mosaics of the NVC communities rather than pure stands.

2.3 Groundwater Dependent Terrestrial Ecosystems

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

GWDTE are defined by the UKTAG (2003) as:

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

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

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

2.4 Limitations

The survey was conducted in good weather conditions. However, the survey was undertaken in what is considered to be a sub-optimal time of year for Northern Scotland (early April), when the majority of plant species have died back and new shoots have not yet emerged. This is considered a limitation to the assessment, as especially herbaceous plants (graminoids, forbs, ferns) are difficult to identify and can be easily overlooked, resulting in incomplete botanical lists and difficulty in classifying NVC vegetation types. The survey was however within the recommended seasonal window and was undertaken by a very experienced surveyor and the limitation are not considered to be significant.

3. Results

3.1 Desktop Study

3.1.1 Designated Sites

The Site lies approximately 1.7km away from the Glen Affric to Strathconon Special Protection Area (SPA). The SPA is described as a predominantly upland area of Scotland which contains a diverse range of montane habitats and species including acid grasslands, wet and dry heath, nutrient poor lochs, blaket bog and boog woodlands, and Caledonian forests (NatureScot, 2010). This SPA supports a breeding population of Annex 1 species Golden eagle *Aquila chrysaetos*.

There are no other statutory designated sites within 2km of the proposed development site.

Table 1: Glen Affric to Strathconon SPA Qualifying Species

Species	Scientific Name	Criteria for Inclusion	Population Estimate	Current Condition Overview
Golden Eagle	*Aquila chrysaetos*	EU Directive 2009/147/EC Article 4.1	10 active territories in 2003, 2.2% of the GB population.	Favourable

3.1.2 Species Records

A search of the NBN Atlas for the last 10 years within a 2km radius of the proposed development site showed no records of any plant species listed under Annex IV of the EC Habitats Directive (92/43/EEC), and/or Schedule 8 of the Wildlife and Countryside Act 1981 (as amended) (undertaken under licence CC-BY and CCO).

3.2 NVC Survey

The habitats identified during the NVC survey are presented in Appendix A, Figure 1. Target notes and photographs are presented in Appendix B, and Botanical Species Lists are included in Appendix C. Quadrat data for those communities identified is presented in Appendix D.

3.2.1 Overview

The majority of the Site consists of conifer plantations of various age classes and with different management interventions, leading to a contrast between dense plantations dominated by spruce *Picea* and more open woodland structures. Some of the thinned plantations are broadleaved dominated, mainly by silver birch *Betula pendula*, and others are conifer dominated. Habitats on Site are frequently mixed with invasive, non-native rhododendron *Rhododendron ponticum*. Habitats within the site boundary also include degraded M17 *Trichophorum germanicum – Eriophorum vaginatum* and M19 *Calluna vulgaris – Eriophorum vaginatum* blanket mires and M15 *Trichophorum germanicum – Erica tetralix* wet heath.

Within the 50m survey buffer, there are areas of conifer plantation, Scots pine *Pinus sylvestris* woodland, upland birch woodland, and other broadleaved woodland. The grasslands along the access track are heavily grazed and predominantly made up of U4 *Festuca ovina – Agrostis capillaris – Galium saxatile* acid grassland with smaller areas of U20 *Pteridium aquilinum – Galium saxatile* community and improved grassland.

3.2.2 Habitat Descriptions

M15 *Trichophorum germanicum – Erica tetralix* wet heath

Wet heathland within the woodland ride through which the underground cable passes (NH 34538 63891) aligned most closely with M15d *Trichophorum germanicum – Erica tetralix* wet heath *Vaccinium myrtillus* sub-community, but with a poor degree of fit. The vegetation here appeared degraded and the underlying peat was exposed in places. Heather *Calluna vulgaris* and acute-leaved bog-moss *Sphagnum capillifolium* were the most common components of the vegetation here. Purple moor-grass *Molinia caerulea*, soft rush *Juncus effusus*, common hair-cap *Polytrichum commune*, red-stemmed feather-moss *Pleurozium schreberi* also occurred and to a lesser extent cross-leaved heath *Erica tetralix*, hare's-tail cottongrass *Eriophorum vaginatum* and glittering wood-moss *Hylocomium splendens*.

The wet heathland within the fenced area to the east of the cable route and immediately to the north of the substation (NH 34663 63940, NH 34723 63927) also aligned most closely with M15d but with a fair to good degree of fit. The heather in this area was taller (up to 50cm) and more abundant covering 80 to 85% of the quadrats. Purple moor-grass, acute-leaved bog-moss and glittering wood-moss were frequent. Red-stemmed feather moss, cross-leaved heath, common haircap and reindeer lichen *Cladonia portentosa* also occurred. Small trees and shrubs such as Scot's pine, silver birch and broom *Cytisus scoparius* were encroaching with little evidence of deer grazing.

Wet heathland occurring to the west of the deer-fence (NH 34287 63880) aligned with M15 with a good degree of fit. The vegetation here comprised mostly heather and purple moor-grass, together with frequent cross-leaved heath, acute-leaved bog-moss and reindeer lichen. Hare's-tail cottongrass, common cottongrass *Eriophorum angustifolium* and deergrass also occurred. Feathery bog-moss *Sphagnum cuspidatum* appeared in wetter areas. There was evidence of scrub encroachment in the form of young spruce and in general the area appeared to be drying out. The vegetation was shorter (upto 30cm) and there was evidence of grazing by deer.

Most of the wet heaths in the north and west of Scotland are of this type and consist of mixtures of heather, cross-leaved heath, deergrass and purple moor-grass, together with tormentil *Potentilla erecta*, bog asphodel *Narthecium ossifragum* and common cottongrass.

M15 wet heath is a community of shallow, wet or intermittently waterlogged, acid peat or peaty mineral soils on hillsides, over moraines, and within tracts of blanket mire. It also extends on to deep peat where the original bog vegetation has been damaged or modified by burning, grazing, drainage and peat cutting. Most stands of M15 wet heath are at low to moderate altitudes within the altitudinal range of woodland.

There are four recognised sub-communities of which the *Vaccinium myrtillus* sub-community M15d is a drier and grassier assemblage, characterised by Mat-grass *Nardus stricta*, *Deschampsia flexuosa*, *Juncus squarrosus* and *Vaccinium myrtillus*. This is the driest type of *Trichophorum-Erica* wet heath, and has mosses such as broom fork-moss *Dicranum scoparium*, red-stemmed feather-moss and heath plait-moss *Hypnum jutlandicum*, rather than Sphagna.

Although very common in the west Highlands, M15 wet heath is important for nature conservation because there is very little elsewhere. Nowhere does it make such a contribution to the appearance and flora of the upland landscape as it does in Scotland. It is not an outstanding habitat for upland birds, but is hunted over by buzzard *Buteo buteo*, raven *Corvus corax*, short-eared owl *Asio flammeus* and, in Scotland, golden eagles *Aquila chrysaetos*. In northern Scotland, the community is an important nesting habitat for greenshank *Tringa nebularia*.

Very little of this type of wet heath is natural and wet heaths might always have occupied open, boggy glades even when the upland landscape was well wooded. There would once have been

woodlands on most of the ground that is now covered with this type of vegetation. When woodlands are cleared and there are no trees to take up water, the soils can become waterlogged and wet heaths may develop on shallow slopes. Some examples of wet heath have been derived directly from blanket mire in response to burning and grazing.

Most stands of this type of wet heath are grazed by deer and sheep and are sporadically managed by burning, usually in large patches. Without grazing and burning these heaths could potentially revert to woodland, although this might be a slow process on the impoverished acid soils, and without grazing the dwarf shrubs and purple moor-grass might in some places grow so tall and dense that tree seedlings would not easily compete. Planted trees will grow in this community, especially if the ground is first prepared by drainage, and many commercial forestry plantations are on slopes where there was once this community.

Grazing, especially by deer and cattle, seems to be necessary to maintain the structural and floristic diversity of the community by reducing competition from heather and purple moor-grass. However, too much grazing can reduce the vegetation to a species-poor sward of deergrass with few dwarf shrubs, especially if the heaths are also burned. Such treatments, especially if combined with drainage, can eventually convert this wet heath type to grassland dominated by mat-grass, heath-rush or purple moor-grass. If the vegetation is not grazed at all, or if it is drained, heather and purple moor-grass may come to dominate in a dense species-poor sward where little else has room to grow. Burning can help to maintain this wet heath, as long as it is not done too frequently. Severe burning on a short rotation can remove much of the peaty soil, producing a sparse sward of impoverished vegetation on dry, patchy peat interspersed with gravel and stones. If burning is carried out, the ideal method is to burn every 10–20 years with superficial fires, which burn away the old woody growth of the shrubs and the purple moor-grass litter but which do not destroy the bryophytes or scorch the soil.

However, some vegetation should be left unburnt to grow tall as nesting habitat for breeding birds. The diverse habitat that results from this kind of management is also valuable for invertebrates. Wet heaths should not be burned if the dwarf shrubs are wind-clipped, nor if they are on shallow rocky soils with a dense layer of mosses or lichens. Burning should also be avoided on the wetter areas as they are important breeding grounds for insects and feeding sites for upland birds.

M17 *Trichophorum germanicum – Eriophorum vaginatum* blanket mire

A small area of blanket bog habitat to the west of the deer fence (NH 34377 63881) aligned most closely with M17b *Trichophorum germanicum – Eriophorum vaginatum* blanket mire *Cladonia* spp. subcommunity with a very good degree of fit. Hare's-tail cotton-grass was the most abundant component of the vegetation here. Heather, deergrass and acute-leaved bog-moss were frequent. Cross-leaved heath and reindeer lichen also occurred, together with a small amount of purple moor-grass. Feathery bog-moss was noted in the wetter areas. The habitat appeared degraded and small spruce seedlings and rhododendron were encroaching. The vegetation was relatively short (10-20cm) and probably grazed by deer. There were small areas of bare ground.

This mire community type is characteristic of the mild and wet climate of the western uplands where rainfall exceeds evapotranspiration, the soils become waterlogged and anaerobic, and the dead remains of plants eventually form a thick layer of peat. This insulates the vegetation from the underlying rock and from groundwater, and almost all nutrients are received from mist, rain and snow. Whole landscapes can become enveloped in peat, and M17 *Trichorphorum germanicum – Eriophorum vaginatum* mire can be the prevailing type of vegetation over many square kilometres.

Most stands are on level ground or gentle slopes, but in the Outer Hebrides and in north-west Sutherland the community clothes surprisingly steep slopes, perhaps as a result of a predominantly

cool and wet climate resulting in the accumulation of deep, waterlogged peat even on sloping ground. The peat is acid, with a pH of about 4. In the western Highlands, M17 is most common below about 450m, but further east and south it occurs at slightly higher elevations.

The pale ochre-gold sheets of this mire are composed of hare's-tail and common cotton-grass, deergrass and purple moor-grass, dotted with darker clumps of heather and cross-leaved heath. Beneath the vascular plants there are shallow spongy mats of papillose bog-moss *Sphagnum papillosum* and acute-leaved bog-moss. Small vascular plants such as bog asphodel, sundew *Drosera spp*., tormentil and heath-spotted orchid *Dactylorhiza maculata* protrude through the layer of mosses. The mire surface is usually corrugated into a system of pools and hummocks, each with characteristic assemblages of *Sphagnum* and other plants.

There are three sub-communities corresponding to variation in the wetness of the peat. The M17b *Cladonia* spp. sub-community occurs on slightly drier peats than the M17a sub-community, for example where the surface has been dried out by burning. Its name is deceptive as it's woolly fringe-moss *Racomitrium lanuginosum* rather than *Cladonia* lichens, that define this sub-community.

Because it is so rare globally, M17 *Trichophorum-Eriophorum* mire is one of the most important types of British upland vegetation. Many *Trichophorum - Eriophorum* bogs in Scotland are the breeding grounds of internationally important populations of waders. Greenshank, dunlin *Calidris alpina* and golden plover *Pluvialis apricaria* nest in this community.

M19 *Calluna vulgaris – Eriophorum vaginatum* blanket mire

Some of the vegetation within the area of blanket bog to the west of the deer fence (NH 34334 63843, NH 34442 63813) aligned more closely with M19a *Calluna vulgaris – Eriophorum vaginatum* blanket mire *Erica tetralix* sub-community with a good degree of fit. Hare's-tail cottongrass and heather were the most abundant species here. Cross-leaved heath, acute-leaved bog-moss, purple moor-grass, red-stemmed feather-moss and reindeer lichen occurred frequently. Also present were deergrass, heath rush *Juncus squarrosus* and glittering wood-moss. The habitat appeared degraded with areas of bare ground. Young spruce and rhododendron were encroaching. The vegetation was short (10 to 30cm) and signs of deer (tracks and droppings) were noted.

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

These are mires with a dense, shaggy, purple-brown and dark-green, tussocky sward of heather and hare's-tail cotton-grass, together with common cotton-grass, bilberry, and crowberry. Bog-mosses can be prominent over wetter ground but typically this element is not so rich or luxuriant as in the M17 mire. Bog-mosses and other mosses usually exhibit abundant cover as opposed to dominant. In many places the vegetation is broken by hags, with great spreads of bare peat, especially in larger stands.

The *Erica tetralix* sub-community M19a, which descends to the lowest altitudes and is the most common form in the far west, has cross-leaved heath, deergrass and purple moor-grass, in some places with a sprinkling of bog asphodel or round-leaved sundew.

M19 *Calluna - Eriophorum* mires form part of Great Britain's blanket bog vegetation and are internationally important. This form of blanket mire can contain some uncommon plants and rare mosses. Merlin, hen harrier, dunlin, curlew *Numenius arquata* and golden plover nest in *Calluna* -

Eriophorum mire, and it is one of the more important habitats of red grouse. There are usually large populations of meadow pipits *Anthus pratensis.*

MG6 *Lolium perenne – Cynosurus cristatus* grassland

An area of semi-improved grassland to the east of the access track and close to the southern boundary of the site (NH 33636 63515) aligned most closely with MG6 *Lolium perenne – Cynosurus cristatus* grassland although the degree of fit was poor. The vegetation here comprised of crested dog's-tail *Cynosurus cristatus*, white clover *Trifolium repens*, ribwort plantain *Plantago lanceolata*, germander speedwell *Veronica chamaedrys*, creeping buttercup *Ranunculus repens* and field woodrush *Luzula campestris*.

MG6 is one of several such mesotrophic grassland communities associated with well-drained permanent pastures. In lowland Britain, *Lolium – Cynosurus* grassland is a major permanent pasture type on moist but freely draining or moderately impeded circumneutral, mesotrophic brown soils. Enclosed stands form the bulk of agricultural pasture in the country, and it is also found widespread on roadside verges and lawns. This grassland community is usually characterised by a short, tight sward which is dominated by grasses including perennial ryegrass *Lolium perenne* and varying levels of crested dog's-tail.

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

Much of the semi-improved grassland adjacent to the access track (NH 33810 63847, NH 33748 63746, NH 33755 63895) aligned most closely with U4 *Festuca ovina – Agrostis capillaris – Galium saxatile* grassland, although the degree of fit with this community was poor. Grasses such as common bent *Agrostis capillaris*, crested dog's-tail and sweet vernal grass *Anthoxanthum odoratum* were common in these areas. Glittering wood-moss covered as much as half of the ground in some areas. Springy turf-moss *Rhytidiadelphus squarrosus* and white clover frequently occurred. Also present were heath bedstraw, creeping buttercup, meadow buttercup *Ranunculus acris*, foxglove *Digitalis purpurea*, dandelion *Taraxacum* agg., common nettle *Urtica dioica*, common cat's ear *Hypochaeris radicata*, marsh thistle *Cirsium palustre*, soft rush *Juncus effusus*, and field woodrush. These grasslands were heavily sheep-grazed, making identification and estimation of cover problematic, particularly for grasses.

This is a grassland of acid brown earths and brown podsolic soils that drain freely but can be moist. U4 grasslands have a vast altitudinal range: the various sub-communities cover the whole spread of the uplands from near sea level to over 1000m. The community is most common in upland regions where the rocks are acid to at least moderately base-rich and where there has been a long history of grazing.

These grasslands are usually short and tightly grazed. The dense turfs of sheep's-fescue *Festuca ovina*, common bent and sweet vernal-grass contain heath bedstraw *Galium saxatile* and tormentil. There is usually a thick carpet of bryophytes around the vascular plants, in which springy turf-moss is one of the most common species.

Most forms of U4 grassland have less interest for nature conservation than the heaths and woodlands with which they are typically associated. However, the herb-rich, flushed forms can be very species-rich and only develop where there is little or no grazing. Other forms of the community generally lack notable plants but the habitat does provide valuable nesting habitat for skylark *Alauda arvensis* and wheatear *Oenanthe oenanthe*. Where they occur over deep soils they can be an important habitat for moles in otherwise rocky or peat-covered uplands where there are few worms.

U20 *Pteridium aquilinum – Galium saxatile* community

An area of acid grassland to the north of the access track (NH 33835 63940) aligned most closely with U20 Pteridium aquilinum – *Galium saxatile* with a poor to fair degree of fit. Although no new bracken growth was visible here, a layer of dead bracken litter, the remnants of last year's growth, indicated that bracken is likely a dominant component of the vegetation. Glittering wood-moss was an important part of the vegetation covering up to two thirds of the area of the quadrats. Heather, heath bedstraw, purple moor-grass, bent *Agrostis* sp. heath woodrush *Luzula multiflora*, red-stemmed feather-moss, springy turf-moss and common haircap were generally common although cover of these species varied from quadrat to quadrat.

The U20 community is identified by the dominance of bracken and is typical of the zone where the farmed lowlands adjoin the unenclosed uplands. It is most common on lower hill slopes and on marginal ground, including abandoned fields, where it forms mosaics with heaths, grasslands and woodlands. The community covers fairly deep, well-drained but moist, base-poor and infertile soils. It is absent from wet ground and strongly flushed slopes. Bracken is intolerant of frost and its altitudinal range is therefore limited by exposure. Soils at higher altitudes also tend to be too shallow, rocky or peaty, although the community can develop on dry peat where bogs have been cut-over or drained. The upper altitudinal limit of the U20 community appears broadly to correspond with that of native woodland at around 600m and is most extensive below 450m. Stands can cover huge areas of hillside, but it is also common to see small discrete patches.

Stands of bracken contribute to the diversity of vegetation on lower hill slopes, and are not completely devoid of wildlife interest. Whinchat *Saxicola rubetra* is one of the few birds strongly associated with bracken, but other birds also use the habitat for breeding.

Improved grassland

Areas of intensively-grazed improved grassland close to the access track towards the southern end of the Site (NH 33655 63597, NH 33655 63662) were excluded from the NVC sampling, however a range of common species typical of improved grassland, such as white clover, creeping thistle *Cirsium arvense*, spear thistle *C. vulgare*, dandelion, daisy *Bellis perennis*, creeping buttercup, broadleaved dock *Rumex obtusifolius*, soft rush and crested dog's tail were noted.

W16 *Quercus – Betula – Deschampsia flexuosa* woodland

A small area of birch woodland to the east of the site entrance and adjacent to the A832 (NH 33690 63454) aligned most closely with W16a *Quercus – Betula – Deschampsia flexuosa* woodland *Quercus robur* sub-community with a 'fair' degree of fit. The canopy was dominated by silver birch. The ground vegetation included bracken, heath bedstraw, wood sorrel *Oxalis acetosella*, Yorkshire fog, sheep's fescue *Festuca ovina*, red-stemmed feather-moss and sycamore *Acer pseudoplatanus* seedlings. A few metres to the west of the quadrat sampling location was a dense stand of rhododendron *Rhododendron ponticum* and a few larch *Larix* sp. and spruce trees.

This community is confined to very acidic, oligotrophic soils (pH rarely above 4) in the lowlands and upland fringes. Soils are typically very free-draining, usually sandy and podzolic. Long-established stands occur as high-forest oak-coppice or in wood-pasture, but many stands are recent developments on heathland.

Both species of oak may be present, as may the hybrid. Pedunculate oak *Quercus robur* tends to be prominent in the south and sessile oak *Quercus petraea* in the north. Birch can be very abundant, and may dominate, especially in recently formed stands on old heathland, where self-sown pine may also be abundant. The shrub layer is generally poor. Alder buckthorn *Frangula alnus*, elder *Sambucus nigra* and rhododendron may occur, the last sometimes forming dense thickets. The field layer is generally species-poor. Wavy hair-grass and bracken are the most consistent species.

Heather, bell heather *Erica cinerea* and bilberry may be frequent in ungrazed stands, particularly in the north-west, and common bent and sweet vernal-grass are more common in grazed situations.

In the W16a *Quercus robur* sub-community, pedunculate oak is the typical oak, and often the dominant tree, although birch (or locally pine, holly *Ilex aquifolium* or rowan *Sorbus aucuparia*) is more prominent in secondary woodland on heathland. The field and ground layers show few distinctive features. Wavy hairgrass and bracken are the most abundant species, with some heather and bell heather in open areas and bilberry where rainfall is high. There are few bryophytes.

Other Woodland

Quadrat sampling was carried out in each of the other woodland types identified in the earlier UK Hab survey. The results of the Tablefit analyses showed that none of these quadrats fitted with recognised NVC communities. Descriptions of the quadrats are included as Target Notes in Appendix B, Table 3. All species recorded are listed in Appendix C, Table 4.

4. Evaluation of NVC, GWTEs and Conservation Status

Table 2 evaluates each of the NVC communities in the survey area in terms of nature conservation interest and potential groundwater dependence (Appendix A, Figure 3) with respect to the most recent version of the *Land Use Planning System SEPA Guide* (SEPA, 2017).

Table 2 : Evaluation of Recorded NVC Communities

NVC Community	Potential Groundwater Dependence	Nature Conservation Status
M15 *Trichophorum germanicum – Erica tetralix* wet heath	Moderate (dependent on the hydrogeological setting)	Northern Atlantic wet heaths with *Erica tetralix* (Annex 1) Alpine and Boreal heaths (Annex 1) Degraded raised bogs still capable of natural regeneration (Annex 1) Blanket bogs (Annex 1) Blanket bog (SBL) Upland flushes, fens and swamps (SBL) Upland heathland (SBL)
M17 *Trichophorum germanicum – Eriophorum vaginatum* blanket mire	None	Blanket bogs (Annex 1) Depressions on peat substrates of the *Rhynchosporion* (Annex 1) Blanket bog (SBL) Upland heathland (SBL)
M19 *Calluna vulgaris – Eriophorum vaginatum* blanket mire	None	Active raised bogs (Annex 1) Blanket bogs (Annex 1) Depressions on peat substrates of the *Rhynchosporion* (Annex 1) Blanket bog (SBL) Upland heathland (SBL)
MG6 *Lolium perenne – Cynosurus cristatus* grassland	None	Lowland meadows (SBL)
U4 *Festuca ovina – Agrostis capillaris – Galium saxatile* grassland	None	Species-rich *Nardus* grassland on siliceous substrates in mountain areas (Annex 1) Upland heathland (SBL) *Juncus squarrosus – Festuca ovina* grassland (SBL) *Nardus stricta – Galium saxatile* grassland (SBL)
U20 *Pteridium aquilinum – Galium saxatile community*	None	None
W16 *Quercus – Betula – Deschampsia flexuosa* woodland	None	Old sessile oakwoods (Annex 1) Caledonian forest (Annex 1) Upland birchwoods (SBL)

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

5. Discussion

The Site (within the redline boundary) comprises predominantly a mix of conifer and broadleaved woodland plantations with small areas of degraded blanket mire (M17b and M19a) and wet heath (M15/M15d) in the eastern corner. The area around the proposed access track comprises mostly, heavily-grazed acid grassland (U4), improved grassland and bare ground. Other habitats noted within the 50m survey buffer include broadleaved woodlands, mesotrophic grassland (MG6a), acid grassland (U20), and standing water.

The proposed development of a battery storage unit is to take place predominantly in a habitat which is already considered to be heavily managed i.e. forestry plantation; this would not constitute a significant loss in terms of woodland as the majority of these trees are projected to be felled in any case.

The development will result in some loss of wet heath (M15) and blanket mire habitats (M17 and M19) that are included on Annex 1 of the European Union Habitats Directive (92/43/EEC) and the Scottish Biodiversity List (SBL). Regardless of condition, any potential impact on habitats listed on Annex 1 or SBL should be minimised. Any loss will need to be mitigated by the provision of enhancement measures ideally delivered in close proximity of the proposed development Site. The Highland Council have adopted Biological Net Gain and the statutory metric that dictates a mandatory 10% net gain of biodiversity. The necessary biodiversity uplift could be delivered through a combination of onsite and offsite enhancement measures. It should be noted that an accompanying habitat management plan should be established to best direct the successful implementation and monitoring of the necessary operational works.

It is considered unlikely that other ecologically valuable habitats, such as upland birch woods, broadleaved woodlands, Scots pine woodlands and ponds will be impacted by the development, as they are located mostly within the buffer zone. However, this also depends on the final layout.

Although none of the land within the survey area falls under any statutory conservation designation, a small area of the Site near the site entrance overlaps with an area classed under the Ancient Woodland Inventory as ancient (of semi-natural origin). If any work is to take place to improve access at the Site entrance, disturbance to this area, including tree felling, should be avoided or at east kept to a minimum.

The results of the NVC survey should be incorporated into the Construction Environmental Management Plan (CEMP) for the Site. Construction methods should also consider the risk of spreading INNS Rhododendron off-site and appropriate biosecurity measures included to prevent this.

Of the NVC communities recorded in the survey, only M15 is considered to be a Groundwater Dependent Terrestrial Ecosystems (GWDTE) (SEPA 2017), although this can depend on the hydrological setting. GWDTEs are specifically protected under the Water Framework Directive and are sensitive receptors to the pressures that are potentially caused by development.

It is recommended that environmental best practice measures are followed during construction, including those detailed in Guidelines for Pollution Prevention (GPPs) (SEPA, NIEA, EA, 2000-2019). Particular attention should be paid to *PPG 6: Working at construction and demolition sites*, *GPP 21: Pollution incident response planning* and *GPP 22: Dealing with spills*.

Areas of deep peat (of depth greater than 0.5m) were recorded in several locations. Appropriate peat management, including mitigation measures, is addressed separately in the Peat Management Plan (PMP).

The woodland habitats support a range of breeding birds and the mire and heathland habitats may provide opportunities for ground-nesting birds such as waders, skylark and meadow pipit. Disturbance of these areas should be avoided during the breeding season (considered to be March to August inclusive).

An independent ecological clerk of works should be on site during the construction process to advise on micro-siting, and to ensure sensitive habitats are not unduly impacted. With the measures in place, the impact on habitats is predicted to be minimal. There is no impact predicted on protected plant species.

6. References

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Appendices

Appendix A. Figures

Figure 1 NVC survey results

Lochluichart East

BORALEX

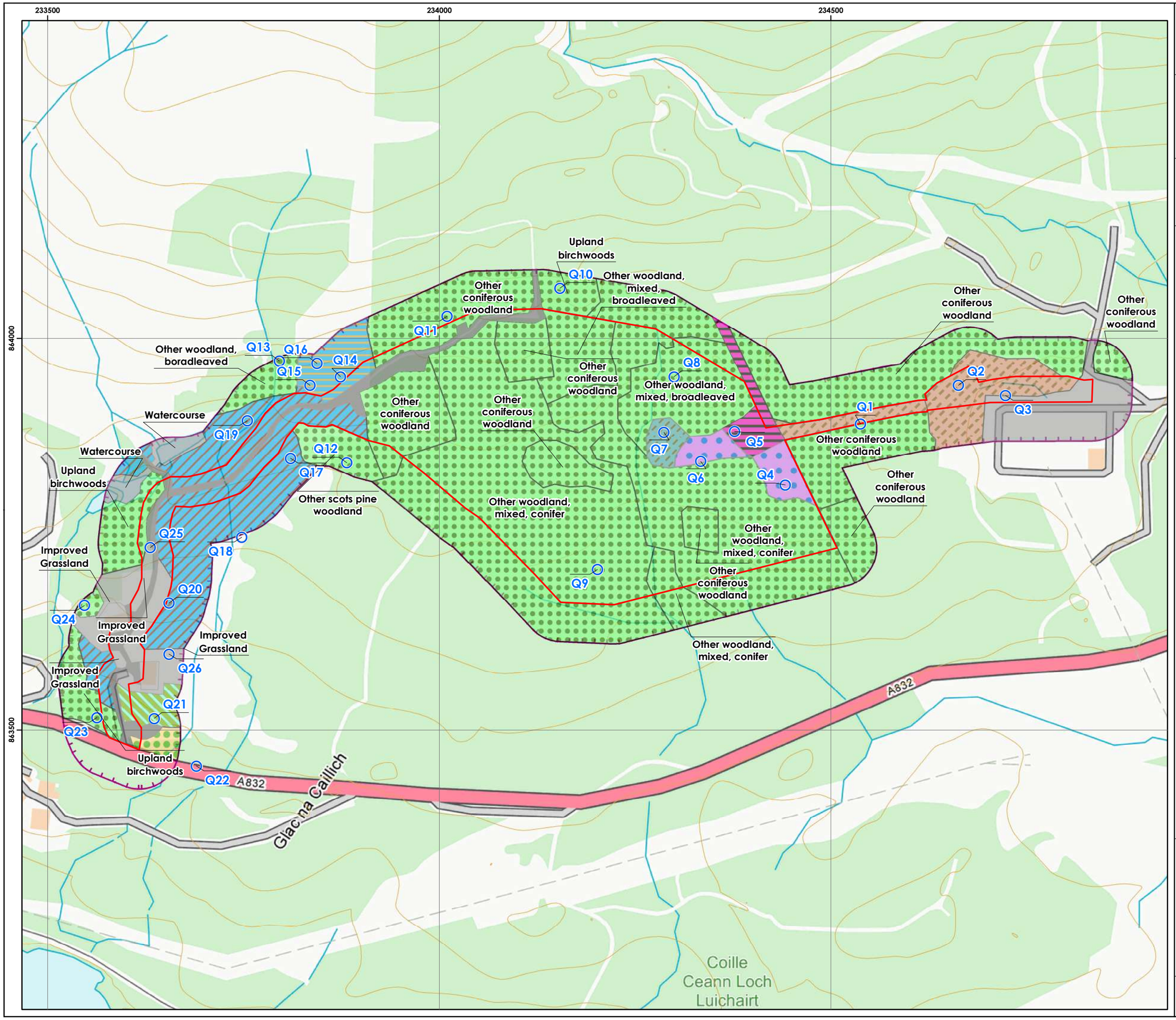
NVC Survey Results

Key

- Site boundary
- Survey Area
- NVC Quadrat

NVC Habitat

- MG6
- M15
- M15d
- M17b
- M19a
- U4
- U20
- W16a
- Forestry
- Non-NVC
- Track



atmos CONSULTING

Draft

0 50 100 200

Meters

N

Scale @ A3: 1:4,500

07/05/2025 90150/HB/008a

Drawn by: LB Checked by: Approved by:

Appendix B. Target Notes

Table 3: UKHab Target Notes and Photos

Target Note and Description	Photograph
Target Note 1 **Grid Ref:** NH 34538 63891 **Description:** M15d *Trichophorum germanicum – Erica tetralix* wet heath *Vaccinium myrtillus* sub-community. The vegetation included frequent heather and acute-leaved bog-moss as well as cross-leaved heath, soft rush, hare's-tail cottongrass, common haircap, red-stemmed feather-moss, glittering wood-moss and purple moor-grass.	 View of vegetation at quadrat location  View of vegetation looking west

Target Note and Description	Photograph
	 View of vegetation looking east
Target Note 2 **Grid Ref:** NH 34663 63940 **Description:** M15d *Trichophorum germanicum – Erica tetralix* wet heath *Vaccinium myrtillus* sub-community. The vegetation was dominated by tall heather and also included cross-leaved heath, purple moor-grass, red-stemmed feather-moss and acute-leaved bog-moss.	 View of vegetation at quadrat location

Target Note and Description	Photograph
	 View of vegetation looking east
Target Note 3 **Grid Ref:** NH 34723 63927 **Description:** M15d *Trichophorum germanicum – Erica tetralix* wet heath *Vaccinium myrtillus* sub-community. The vegetation was dominated by tall heather and also included purple moor-grass, red-stemmed feather-moss, acute-leaved bog-moss, common hair-cap and glittering wood-moss.	 View of vegetation at quadrat location

Target Note and Description	Photograph
Target Note 4 **Grid Ref:** NH 34442 63813 **Description:** M19a *Calluna vulgaris - Eriophorum vaginatum* blanket mire *Erica tetralix* sub-community. The vegetation included abundant hare's-tail cotton-grass as well as heather, cross-leaved heath, acute-leaved bog-moss, red-stemmed feather-moss and reindeer lichen.	 View of vegetation at quadrat location
Target Note 5 **Grid Ref:** NH 34377 63881 **Description:** M17b *Calluna vulgaris – Eriophorum vaginatum* blanket mire *Cladonia* species sub-community The vegetation included abundant hare's-tail cotton-grass and also heather, cross-leaved heath, deer-grass, reindeer lichen, acute-leaved bog-moss, feathery bog-moss.	 View of vegetation at quadrat location

Target Note and Description	Photograph
	 View of vegetation looking east
	 View of vegetation looking west

Target Note and Description	Photograph
Target Note 6 **Grid Ref:** NH 34334 63843 **Description:** M19a *Calluna vulgaris - Eriophorum vaginatum* blanket mire *Erica tetralix* sub-community. The vegetation included abundant heather, purple moor-grass, and hare's-tail cotton-grass as well as cross-leaved heath, deer-grass, red-stemmed feather-moss, acute-leaved bog-moss and reindeer lichen.	 View of vegetation at quadrat location
Target Note 7 **Grid Ref:** NH 34287 63880 **Description:** M15 *Trichophorum germanicum – Erica tetralix* wet heath. The vegetation included abundant heather and purple moor-grass as well as cross-leaved heath, hare's-tail cotton-grass, deer-grass, feathery bog-moss, acute-leaved bog-moss and reindeer lichen.	 View of vegetation at quadrat location

Target Note and Description	Photograph
Target Note 8 **Grid Ref:** NH 34300 63951 **Description:** Mixed woodland consisting mainly of Scots pine and silver birch. The ground flora was dominated by tussocky purple moor-grass and also included heather, bilberry, hare's-tail cotton-grass, glittering wood-moss, red-stemmed feather-moss and acute-leaved bog-moss.	 View of vegetation at quadrat location  View of surrounding vegetation

Target Note and Description	Photograph
Target Note 9 **Grid Ref:** NH 34202 63705 **Description:** Mixed woodland consisting mainly of spruce with some silver birch. The ground flora was dominated by glittering wood-moss with abundant purple moor-grass. Springy turf-moss, red-stemmed feather-moss and acute-leaved bog-moss also occurred. Old tree stumps and brash suggested past management of the area as plantation.	 View of vegetation at quadrat location  View of surrounding vegetation

Target Note and Description	Photograph
Target Note 10 **Grid Ref:** NH 34154 64064 **Description:** Birch woodland consisting mostly of silver birch. The ground flora was covered by a layer purple moor-grass litter. Glittering wood-moss was abundant. Red-stemmed feather-moss and bilberry also occurred. The old stumps of former plantation trees were visible amongst the vegetation.	 View of vegetation at quadrat location  View of surrounding vegetation

Target Note and Description	Photograph
Target Note 11 **Grid Ref:** NH 34010 64028 **Description:** Coniferous woodland dominated by larch with some silver birch. Poorly developed ground flora with abundant glittering wood-moss. Purple moor-grass was frequent and red-stemmed feather-moss and tormentil also occurred.	 View of vegetation at quadrat location  View of surrounding vegetation

Target Note and Description	Photograph
Target Note 12 **Grid Ref:** NH 33882 63841 **Description:** Coniferous woodland dominated by Scots pine. Ground flora included heath bedstraw, glittering wood-moss, sweet vernal-grass, wavy hair-grass, common bent and rowan seedlings.	 View of vegetation at quadrat location  View of surrounding vegetation

Target Note and Description	Photograph
Target Note 13 **Grid Ref:** NH 33796 63971 **Description:** Birch-dominated woodland with sessile oak, goat willow, yew and spruce. The ground flora included glittering wood-moss, common sorrel, broad-leaved dock, devil's-bit scabious and marsh thistle.	 View of vegetation at quadrat location  View of woodland from access track looking north-west

Target Note and Description	Photograph
Target Note 14 **Grid Ref:** NH 33874 63951 **Description:** U20 *Pteridium aquilinum – Galium saxatile* community The vegetation included abundant glittering wood-moss as well as heath bedstraw, bracken, bent, sweet vernal-grass, purple moor-grass, common haircap and sheep's fescue.	 View of vegetation at quadrat location  View of surrounding vegetation

Target Note and Description	Photograph
Target Note 15 **Grid Ref:** NH 33835 63940 **Description:** U20 *Pteridium aquilinum – Galium saxatile* community. The vegetation included abundant glittering wood-moss as well as heath bedstraw, bracken, bent, sweet vernal-grass, purple moor-grass, common haircap and heath wood-rush, red-stemmed feather-moss and springy turf-moss.	 View of vegetation at quadrat location
Target Note 16 **Grid Ref:** NH 33844 63968 **Description:** U20 *Pteridium aquilinum – Galium saxatile* community. The vegetation included frequent glittering wood-moss and purple moor-grass as well as heather, heath bedstraw, bracken, bent, sweet vernal-grass, common haircap and heath wood-rush, red-stemmed feather-moss and springy turf-moss.	 View of vegetation at quadrat location

Target Note and Description	Photograph
Target Note 17 **Grid Ref:** NH 33810 63847 **Description:** U4 *Festuca ovina – Agrostis capillaris – Galium saxatile grassland* The vegetation included abundant glittering wood-moss as well as white clover, common bent, springy turf-moss and field wood-rush.	 View of vegetation at quadrat location  View of surrounding vegetation

Target Note and Description	Photograph
Target Note 18 **Grid Ref:** NH 33748 63746 **Description:** U4 *Festuca ovina – Agrostis capillaris – Galium saxatile grassland* The vegetation included frequent crested dog's-tail, springy turf-moss, common bent and glittering wood-moss as well as white clover, heath bedstraw, creeping buttercup, and field woodrush.	 View of vegetation at quadrat location
Target Note 19 **Grid Ref:** NH 33755 63895 **Description:** U4 *Festuca ovina – Agrostis capillaris – Galium saxatile grassland* The vegetation included frequent common bent, springy turf-moss as well as white clover, crested dog's-tail and sweet vernal-grass.	 View of vegetation at quadrat location

Target Note and Description	Photograph
Target Note 20 **Grid Ref:** NH 33655 63662 **Description:** Improved grassland near estate buildings, heavily grazed by sheep. The vegetation included white clover, creeping thistle, dandelion, daisy, spear thistle, creeping buttercup, crested dog's-tail and soft rush.	 View of vegetation at quadrat location
Target Note 21 **Grid Ref:** NH 33636 63515 **Description:** MG6 *Lolium perrenne – Cynosurus cristatus* grassland The vegetation included frequent crested dog's-tail, white clover and ribwort plantain, as well as dandelion, germander speedwell and creeping buttercup.	 View of vegetation at quadrat location

Target Note and Description	Photograph
Target Note 22 **Grid Ref:** NH 33690 63454 **Description:** Birch woodland (NVC community: W16a *Quercus – Betula – Deschampsia flexuosa* woodand) adjacent to A832. Ground flora included wood sorrel, heath bedstraw, Yorkshire fog, sheep's fescue, bracken, glittering wood-moss, red-stemmed feather-moss and sycamore seedlings. Leaf litter covered around two-thirds of the ground.	n  View of vegetation at quadrat location  View of vegetation looking east

Target Note and Description	Photograph
	 View of vegetation looking west towards site entrance
Target Note 23 **Grid Ref:** NH 33563 63516 **Description:** Open birch woodland with a ground flora made up mostly of grasses including Yorkshire fog. Foxglove, glittering wood-moss and soft rush were also present. Leaf-litter covered around 50% of the ground surface.	 View of vegetation at quadrat location

Target Note and Description	Photograph
	 View of vegetation looking west
Target Note 24 **Grid Ref:** NH 33547 63659 **Description:** Small stand of sessile oak trees on sloping, stoney ground. Ground flora included foxglove, broad-leaved willowherb, rosebay willowherb, heath bedstraw, common bent, soft rush and small birch seedlings. Leaf litter covered around half of the ground surface.	 View of vegetation at quadrat location

Target Note and Description	Photograph
Target Note 25 **Grid Ref:** NH 33631 63733 **Description:** Silver birch woodland within a pheasant pen. The trees were mostly young and of similar size. The ground flora included bracken, nettle and rosebay willowherb.	 View of woodland from access track
Target Note 26 **Grid Ref:** NH 33655 63597 **Description:** Improved grassland within a small field grazed by sheep.	 View of vegetation looking east from field margin.

Appendix C. Botanical Species List

Table 4: Botanical Species List

Common Name	Scientific Name
Trees and shrubs	
Broom	*Cytisus scoparius*
Larch	*Larix sp*
Cherry laurel	*Prunus laurocerasus*
Goat willow	*Salix caprea*
Rhododendron	*Rhododendron ponticum*
Rowan	*Sorbus aucuparia*
Scots pine	*Pinus sylvestris*
Sessile oak	*Quercus petraea*
Silver birch	*Betula pendula*
Spruce	*Picea sp*
Sycamore	*Acer pseudoplatanus*
Yew	*Taxus baccata*
Flowering plants	
Bilberry	*Vaccinium myrtillus*
Bog asphodel	*Narthecium ossifragum*
Broad-leaved dock	*Rumex obtusifolius*
Cat's ear	*Hypochaeris radicata*
Common sorrel	*Rumex acetosa*
Creeping buttercup	*Ranunculus repens*
Creeping thistle	*Cirsium arvense*
Cross-leaved heath	*Erica tetralix*
Daisy	*Bellis perrenis*
Dandelion	*Taraxacum* agg
Devil's-bit scabious	*Succisa pratensis*
Foxglove	*Digitalis purpurea*
Germander speedwell	*Veronica chamaedrys*
Greater plantain	*Plantago major*
Heather	*Calluna vulgaris*
Heath bedstraw	*Galium saxatile*
Meadow buttercup	*Ranunculus acris*
Nettle	*Urtica dioica*
Ribwort plantain	*Plantago lanceolata*
Marsh thistle	*Cirsium palustre*
Rosebay willowherb	*Chamerion angustifolium*
Spear thistle	*Cirsium vulgare*
Tormentil	*Potentilla erecta*
White clover	*Trifolium repens*
Wood sorrel	*Oxalis acetosella*
Grasses, sedges, rushes, woodrushes	
Common bent	*Agrostis capillaris*
Velvet bent	*Agrostis canina*
Common cotton-grass	*Eriophorum angustifolium*
Crested dog's-tail	*Cynosurus cristatus*

Common Name	Scientific Name
Deer-grass	*Trichophorum germanicum*
Field wood-rush	*Luzula campestris*
Hare's-tail cotton-grass	*Eriophorum vaginatum*
Heath wood-rush	*Luzula multiflora*
Heath rush	*Juncus squarrosus*
Mat-grass	*Nadus stricta*
Purple moor grass	*Molinia caerulea*
Sheep's fescue	*Festuca ovina*
Soft rush	*Juncus effusus*
Sweet vernal-grass	*Anthoxanthum odoratum*
Tufted hair-grass	*Deschampsia cespitosa*
Wavy hair-grass	*Avenella flexuosa*
Yorkshire fog	*Holcus lanatus*
Ferns	
Bracken	*Pteridium aquilinum*
Hard fern	*Blechnum spicant*
Mosses	
Bog-moss	*Sphagnum* sp.
Acute-leaved bog-moss	*Sphagnum capillifolium*
Common haircap	*Polytrichum commune*
Feathery bog-moss	*Sphagnum cuspidatum*
Glittering wood-moss	*Hylocomium splendens*
Papillose bog-moss	*Sphagnum papillosum*
Red-stemmed feather-moss	*Pleurozium schreberi*
Springy turf-moss	*Rhytidiadelphus squarrosus*
Lichens	
Reindeer Lichen	*Cladonia portentosa*
-	*Cladonia floerkiana*

Appendix D. Quadrat Data for NVC Communities

Table 5: NVC Quadrat Data

	Percentage cover of species in quadrat														
Quadrat/Target note number	1	2	3	4	5	6	7	14	15	16	17	18	19	21	22
NVC community	M15d	M15d	M15d	M19a	M17b	M19a	M15	U20	U20	U20	U4	U4	U4	MG6a	W16a
Betula pendula															80
Narthecium ossifragum				1	1	1									
Rumex obtusifolius														1	
Hypochaeris radicata											3		2		
Ranunculus repens												5		5	
Erica tetralix	5	5	1	15	10	10	10			<1					
Taraxacum agg														5	
Succisa pratensis									3	3					
Digitalis purpurea													1		
Veronica chamaedrys														5	
Plantago major														1	
Calluna vulgaris	20	85	80	20	20	40	50			10					
Galium saxatile								10	15	10		5			1
Ranunculus acris												1			
Plantago lanceolata														15	
Cirsium palustre	1									1	1		1		
Potentilla erecta	1					1		1	3	3	1				
Trifolium repens											10	10	20	20	
Oxalis acetosella															<1
Agrostis capillaris								15	10	5	20	20	35	1	
Agrostis canina	1?														
Eriophorum angustifolium					1		3								
Cynosurus cristatus												20	10	30	
Trichophorum germanicum				3	25	5	5								
Luzula campestris											5	5	1	3	
Eriophorum vaginatum	5			50	40	40	5								
Luzula multiflora								2	10	5	1				
Molinia caerulea	10	25	25	1	3	35	40	35	5	30					
Festuca ovina	2?							5		1					2
Juncus effusus	10										3	1	3		
Juncus squarrosus				3											
Anthoxanthum odoratum								5	5		1		5		
Holcus lanatus															5
Pteridium aquilinum								15	15	25					25
Sphagnum sp.															

Sphagnum capillifolium	20	40	25	25	25	10	10								
Polytrichum commune	10	2	10			1		30	5						
Sphagnum cuspidatum					10		5								
Hylocomium splendens	5	3	35			3		65	60	30	50	20			20
Pleurozium schreberi	10	10	10	15		25			10						5
Rhytidiadelphus squarrosus		1	1						15	5	10	20	40		
Cladonia portentosa	1	3		25	10	5	20								
Cladonia floerkiana						1									