

EARBA STORAGE

A GILKES ENERGY COMPANY

Earba Pumped Storage Hydro Scheme EIA Report

Appendix 8.3: Habitat Survey Report (2023)

February 2024



Quality Information

Prepared by

SLR Consulting

Checked by

Chris Pasteur

Approved by

Gavin McGill

Revision History

Revision

01

Revision Date

February 2024

Details

Issue to ECU

Authorised

Gavin McGill

© 2024 Gilkes Energy Ltd. All Rights Reserved



TRACKS ECOLOGY
ECO - GIS - UAV

23/022/CAI/R01

VERSION 1.3

21 JANUARY 2024

EARBA STORAGE
A GILKES ENERGY COMPANY

Loch Earba Pump Storage Hydro

Earba Ltd



Habitat Survey

TRACKS ECOLOGY LTD.

Director: James Bunyan, BSc.(Hons), MSc., MCIEEM

Registered in Scotland: Company Registration Number: SC690225

Ardvreck, Rosehaugh High Drive, Avoch, IV9 8RF

www.tracksecology.com - info@tracksecology.com

CLIENT

Earba Ltd
Gigha
Cairneyhill Road
Bankfoot
Perth
PH1 4AG

DOCUMENT DETAILS

Site:	Loch Earba Pump Storage Hydro
Survey:	Habitat Survey
Report Ref:	23/022/CAI/R01
Site Grid Ref:	NN470819
Lead Surveyor(s):	James Bunyan
Author(s):	James Bunyan
Survey Date(s):	July 2023
Client:	Earba Ltd
Agent:	N/A

DOCUMENT HISTORY

Version	Date	Issue Notes
Version 1.3	21 January 2024	Additions and revisions
Version 1.2	18 September 2023	Minor revisions
Version 1.1	27 August 2023	Draft for Client review

This report has been prepared by Tracks Ecology Ltd. for Earba Ltd.

Tracks Ecology Ltd. accepts no responsibility or liability for any use that is made of this document other than by Earba Ltd for the purposes for which it was originally commissioned and prepared. It should be noted that, whilst every effort is made to meet the client's brief, no site investigation can ensure complete assessment or prediction of the natural environment and temporal change must be taken into account.

The evidence presented and interpretation provided is true and has been prepared and provided in accordance with the guidance of The Chartered Institute of Ecology and Environmental Management's Code of Professional Conduct.

All content © Tracks Ecology Ltd. 2024

TRACKS ECOLOGY
ECO - GIS - UAV



07528 865557



info@tracksecology.com



www.tracksecology.com



/in/jamesbunyan



@TracksEcology

CONTENTS

Executive Summary	1
1 Introduction	2
1.1 Terms of Reference	2
1.2 Objectives of Study	2
1.3 Survey Area Description	2
1.4 Desktop Study	3
1.5 Habitat Survey	3
1.6 Limitations	4
2 Results	4
2.1 Desktop Study	4
2.1.1 Designated Sites	4
2.1.2 Non-Statutory Designated Sites	6
2.2 Habitat Descriptions	6
2.2.1 A1.1.1 Broadleaved woodland – semi-natural	6
2.2.2 A1.1.2 Broadleaved woodland – plantation	8
2.2.3 A1.2.1 Coniferous woodland – semi-natural	9
2.2.4 A1.2.2 Coniferous woodland – plantation	9
2.2.5 A2.2 Scrub – scattered	9
2.2.6 A3 Parkland and scattered trees	10
2.2.7 B1.1 Acid grassland – unimproved	10
2.2.8 B1.2 Acid grassland – semi-improved	11
2.2.9 B2.1 Neutral grassland – unimproved	12
2.2.10 B2.2 Neutral grassland – semi-improved	12
2.2.11 B3.1 Calcareous grassland – unimproved	12
2.2.12 B5 Marsh/marshy grassland	13
2.2.13 C1.1 Bracken – continuous	15
2.2.14 C2 Upland species-rich ledges	15
2.2.15 C3.2 Other tall herb and fern – non-ruderal	16
2.2.16 D1.1 Dry dwarf shrub heath – acid	16
2.2.17 D1.2 Dry dwarf shrub heath – basic	18
2.2.18 D2 Wet dwarf shrub heath	18
2.2.19 D4 Montane heath/dwarf herb	19
2.2.20 E1.6.1 Blanket bog	20
2.2.21 E1.7 Wet modified bog	22
2.2.22 E1.8 Dry modified bog	22
2.2.23 E2.1 Flush and spring – acid/neutral flush	22
2.2.24 E2.2 Flush and spring – basic flush	23
2.2.25 E2.3 Flush and spring – bryophyte-dominated spring	24
2.2.26 E3.2 Fen – basin mire	25
2.2.27 F1 Swamp	25
2.2.28 F2.1 Marginal/inundation – marginal	25
2.2.29 G1 Standing water	25
2.2.30 G2 Running water	25
2.2.31 I1.2 Scree	25
2.2.32 I1.4 Other exposure	26
2.2.33 I2.1 Quarry	26
2.2.34 Groundwater Dependent Terrestrial Ecosystems (GWDTE)	27
2.2.35 Invasive Non-Native Species	32
3 Summary	32

4	References.....	33
	Appendix A - Target Notes	35
	Appendix B - Habitats Conservation Importance.....	65
	Appendix C - Species Conservation Importance	78
	Appendix D - Surveyor CVs.....	80
	Appendix E - Figures.....	85

EXECUTIVE SUMMARY

- Tracks Ecology Ltd. was commissioned by Earba Ltd to undertake habitat surveys following the Phase I habitat survey system with additional National Vegetation Classification (NVC) 'by eye' across the proposed Loch Earba Pump Storage Hydro site, located approximately 30km southwest of Kingussie, Highlands.
- The Survey Area is located south west of Kingussie, south of Loch Laggan. Access to the Survey Area is from the A86 public road close to Moy Bridge. The Survey Area comprises 1,650ha with an altitudinal range from 250m to 750m with a range of largely upland habitats dominating.
- Habitat surveys were undertaken by Robert Potter. Robert is a self-employed ecologist specializing in botanical and ornithological surveys with extensive experience working in Scotland. Final reporting and GIS mapping was undertaken by James Bunyan of Tracks Ecology Ltd.
- A number of nationally important habitats were identified as present within the Survey Area including expanses of blanket bog and montane scrub. Further habitats of conservation importance include montane heath, species rich calcareous grasslands, montane acid grasslands, base rich rush pastures, upland species rich ledges and base rich flushes.
- A number of notable species were also identified within the Survey Area, including juniper, petty whin, dwarf birch, aspen, downy willow and dwarf cornel.
- A number of habitats are identified as being highly dependent on groundwater where the base rich influence has heavily influenced the floral assemblages present. This is especially true on the southern slopes of Binnein Shuas, on the upper slopes through the pass at Bealch Leamhain and to a lesser extent on the northern slopes of Loch a' Bhealaich Leamhain.
- The proposed development will need to take a careful approach to site design and implantation to ensure features of conservation value are not significantly impacted upon. All proposals must adhere to the mitigation hierarchy principles; avoid, minimise, restore and offset. Further enhancements of existing habitats through restoration of degraded areas and where relevant creation of new and strengthening networks should be undertaken.

1 INTRODUCTION

1.1 TERMS OF REFERENCE

Tracks Ecology Ltd. was commissioned by Earba Ltd to undertake habitat surveys following the Phase I habitat survey system with additional National Vegetation Classification (NVC) 'by eye' across the proposed Loch Earba Pump Storage Hydro site, located approximately 30km southwest of Kingussie, Highlands. The proposal is to use Loch a' Bhealaich Leamhain as the upper reservoir and Lochan na h-Earba as the lower reservoir with interconnecting tunnels and associated infrastructure.

These surveys were requested to provide an initial baseline assessment of the habitats present across the area of proposed infrastructure and a buffer of 250m, hereafter referred to as the 'Survey Area'. The Survey Area was dominated by a mix of upland habitats and had a significant altitudinal range from 250m at the proposed entrance off the A86 public road to the upper slopes of the local peaks including Creag Pitridh and Binnein Shuas of 850m above sea level. A number of alterations to the design during the surveys resulted in additional areas being covered with a total surveyed area of over 1,650ha (Figure 1).

1.2 OBJECTIVES OF STUDY

This ecological survey aims to establish the baseline distribution of habitats within the Survey Area by classifying areas into Phase I habitats (Joint Nature Conservation Committee 2016) along with assessing each habitat area under the NVC system, attempting to identify habitats to community level. The survey aims to identify potential constraints to the proposed development in order to avoid impacts on habitats of conservation value or those afforded legislative protection.

This report details the following:

- desk study information;
- field survey methodology;
- field survey results;
- comments on the nature conservation importance of receptors; and
- recommendations for further survey work where appropriate.

1.3 SURVEY AREA DESCRIPTION

The Survey Area is located south west of Kingussie, south of Loch Laggan. Access to the Survey Area is from the A86 public road close to Moy Bridge. Existing estate access tracks are present, which allowed access to the two lochs of Lochan na h-Earba which combined, extend for a distance of almost 6km. Lochan na h-Earba is located between the high peaks of Binnean Shuas to the north and Creag Pitridh, Creag a' Mhaigh and Creag a' Chur to the south. Lochan na h-Earba is proposed to act as the lower loch for the pump storage project with the higher loch, Loch a' Bhealaich Leamhain, located in a corrie 3km south east.

The lowland sections of the Survey Area support areas of blanket bog, heath and grassland with scattered dwellings. Areas of semi-natural woodland are present along watercourses and sections of commercial and non-commercial planted conifer woodland cover small areas of land. The landscape rapidly develops into an upland environment to the south along the proposed access route with extensive open moorland including patches of blanket bog and significant sections of wet heath with smaller pockets of acid grassland.

The landscape adjacent to Lochan na h-Earba is steep and rugged with the valley sides rising quickly supporting wet heath and rocky outcrops. On the upper slopes the soils are

thin and the vegetation was, in places, heavily influenced by the basic nature of the geology. In the northern end of Lochan na h-Earba the slopes are somewhat gentler and increased semi-natural woodland, in the form of birch and Scot's pine dominated woodland, was present. Outwith the contiguous sections of woodland scattered trees remained, but many of these were in significant decline and regeneration was sparse in most areas.

The Survey Area extended further southeast up to an altitude of approximately 750m through a narrow pass at Bealach Leamhain, before dropping down to Loch a' Bhealaich Leamhain which forms the upper loch of the pump storage project, located at around 640m. The habitats located through the pass, and higher up on the adjacent peaks, supported montane heath habitats, with wet heath and blanket bog further southeast on the lower slopes.

1.4 DESKTOP STUDY

To provide additional contextual information, a number of information sources were used to obtain ecological background information for the Survey Area. Information on nature conservation designations was obtained from the website of the statutory agency NatureScot (formerly Scottish Natural Heritage (SNH)) via the "Site Link Portal" (<https://sitelink.nature.scot/home>).

Aerial photography, both publically available (e.g. www.bingmaps.co.uk) and through Emapsite (www.emapsite.com) of the Survey Area was also used to guide field surveys.

Further information on hydrogeology was obtained from publically available sources including British Geological Society (British Geological Survey 2022), Scottish Government (Scottish Government 2021) and Scottish Environment Protection Agency (SEPA) (Scottish Environment Protection Agency 2021).

At the time of writing European Union legislation remained applicable to the assessment although it should be recognised that changes due to the withdrawal of the United Kingdom from the European Union may become relevant in the future.

1.5 HABITAT SURVEY

The Phase I and NVC survey was used to assess the character and value of the vegetation, classifying it into defined habitat communities and sub-communities (where possible). This was then used to identify habitats of conservation concern such as Annex 1 (Habitats Directive) and Scottish Biodiversity List habitats. Also, identifying the habitat community allows the habitat to be given a score appropriate to its potential dependency on groundwater as listed in the Scottish Environment Protection Agency (SEPA) document Land Use Planning System (LUPS) Guidance Note 31 (Scottish Environment Protection Agency 2014). Where relevant this potential dependency was adjusted based on the local setting of the habitat. The survey was undertaken in broad accordance with the National Vegetation Classification – user's handbook (Rodwell 2006) however, NVC habitats were delineated and classified 'by eye' with no quadrats undertaken.

The Survey Area was highly complex in terms of topography and habitats. As a result, complex associations of NVC communities were present across much of the Survey Area with mosaics of different NVC communities detailed. Where mosaics are present these are detailed in order of dominance with respective percentage coverage provided. For simplicity, colour coding of habitats within figures utilises the Phase 1 colour scheme.

Peat depth surveys across the Survey Area were not undertaken as part of this survey, however, ad hoc peat depth probing was undertaken at key locations to aid the categorisation of Phase 1 habitats.

Target notes were taken to record the habitats and any specific features too small to map, along with a full species list available at the time of survey, and notes and identification of any groundwater dependent terrestrial ecosystem communities.

Floral nomenclature followed New Flora of the British Isles (Stace 2010) and Mosses and Liverworts of Britain and Ireland a field guide (Atherton, Bosanquet & Lawley 2010).

Habitat surveys were undertaken by Robert Potter. Robert is a self-employed ecologist specializing in botanical and ornithological surveys with extensive experience working in Scotland. Final reporting and GIS mapping was undertaken by James Bunyan of Tracks Ecology Ltd. Tracks Ecology Ltd has been providing high quality ecological services for a variety of clients for almost ten years, across a wide range of projects including large scale renewable energy schemes across Scotland.

1.6 LIMITATIONS

The surveys were undertaken at an appropriate time of year by a surveyor with extensive upland botanical knowledge and experience of working within habitats of northern Scotland. The Survey Area is large and distributed across rugged terrain, with in some cases, very steep ground which was not always safely accessible. As a result, small areas of steep rock faces and small patches of isolated inaccessible ledges could not be surveyed with detail. Such areas were assessed in the context of surrounding accessible areas along with the use of binoculars and aerial imagery.

It should be noted that a habitat survey such as that undertaken, is not a comprehensive species focused survey and although the distribution of habitats is mapped in a comprehensive nature, distribution of individual species, including those of conservation concern, are not individually mapped during the process. Furthermore, surveys were undertaken during July 2023 and species which are more apparent outwith this time period may have been overlooked due to very early or late flowering times.

Despite these factors the limitations are not assessed to be significant, and the habitat survey results are an accurate assessment of the Survey Area at the time of the survey to the best ability of the surveyors and fit for purpose of assessment.

2 RESULTS

2.1 DESKTOP STUDY

2.1.1 DESIGNATED SITES

Although the Survey Area does not include any designated sites, within 5km, several sites designated for nature conservation are present. These include Special Protection Areas (SPA), Special Area of Conservation (SAC), National Nature Reserves (NNR), Sites of Special Scientific Interest (SSSI) and sections of woodland listed on the Ancient Woodland Inventory (AWI). A summary of each of the designated sites within 5km of the Survey Area is provided with the location of the sites detailed in Figure 2.

Creag Meagaidh SAC

Creag Meagaidh is located to the north-west of Loch Laggan between Laggan and Spean Bridge in the Central Highlands. This is an outstanding upland site with a wide range of characteristic plant communities and some notable montane plants. The designated site supports the following qualifying features:

- Clear-water lakes or lochs with aquatic vegetation and poor to moderate nutrient levels

- Wet heathland with cross-leaved heath
- Dry heaths
- Alpine and subalpine heaths
- Mountain willow scrub
- Montane acid grasslands
- Tall herb communities
- Blanket bog
- Acidic scree
- Plants in crevices on acid rocks
- Plants in crevices on base-rich rocks

The SAC is located to the north of the Survey Area with the southern boundary of the SAC extending to within approximately 1km.

Creag Meagaidh SPA

The Creag Meagaidh SPA is located wholly within the Creag Meagaidh SAC but covers less than half of the area with a focus on the upper slopes of the mountains with the boundary generally following the 750m contour. This altitude is recognised as the lower limit of that used by breeding dotterel *Charadrius morinellus*, for which the site is designated. The SPA boundary extends down to within 2km of the Survey Area.

Creag Meagaidh NNR

Creag Meagaidh NNR covers nearly 4,000 hectares and is a complex massif, with numerous mountain tops. An extensive high summit plateau is edged by a series of ice-carved corries and gullies. A mosaic of habitats stretches from loch-side to the summit plateau. The corries are home to arctic-alpine plants – such as alpine speedwell and tufted saxifrage with the steep slopes supporting patches of woolly willow with remnants of ancient woodland rich in woodland flowers on the lower slopes. The NNR boundary extends down to within approximately 200m of the Survey Area.

Creag Meagaidh SSSI

The SSSI encompasses all of the SPA, SAC and NNR, extending to over 7,000 hectares. The SSSI is notified for the following biological features:

- Upland habitats: Rocky slopes (including inland cliff, rocky outcrops, chasmophytic vegetation)
- Upland habitats: Upland assemblage
- Woodlands: Upland birch woodland
- Vascular plants: Vascular plant assemblage
- Birds: Breeding bird assemblage

The SSSI boundary extends down to within approximately 200m of the Survey Area.

Ben Alder and Aonach Beag SAC

Ben Alder and Aonach Beag both rise to more than 1100m in elevation and lie in a remote area between Lochs Eirich and Laggan approximately 11km southwest of Dalwhinnie. They are considered geographically and ecologically intermediate between the mountains of the western and eastern Highlands. The site supports a wide range of habitats which together comprise the upland assemblage, including plant communities such as upland heath, montane heath, montane snowbed, flushes, mires and calcareous grassland.

The designated site supports the following qualifying features:

- Alpine and subalpine heaths

- Alpine and subalpine calcareous grasslands
- High-altitude plant communities associated with areas of water seepage
- Blanket bog
- Plants in crevices on base-rich rocks
- Dry heaths
- Tall herb communities
- Wet heathland with cross-leaved heath
- Montane acid grasslands
- Plants in crevices on acid rocks
- Acidic scree
- Mountain willow scrub

The SAC is located to the south of the Survey Area with the southern boundary of the SAC extending to within approximately 0.5km.

Ben Alder SPA

Ben Alder SPA is a remote massif in the central Highlands of Scotland supporting montane, heath and mire vegetation with an important and characteristic avifauna. Like that of Creag Meagaidh SPA, the boundary generally follows the 750m contour within the Ben Alder & Aonach Beag SAC. The SPA is again designated for the presence of breeding dotterel. The SPA boundary extends down to within 2km of the Survey Area.

Ben Alder and Aonach Beag SSSI

The large summit plateau supports a range of high level plant communities including alpine heaths with widespread areas of woolly-fringe moss-stiff sedge *Racomitrium lanuginosum* – *Carex bigelowii* heath and montane acid grasslands. The high altitude metamorphosed limestone supports alpine and subalpine calcareous grasslands. This area is particularly rich in plant species which include the mountain avens *Dryas octopetala*, cyphel *Minuartia sedoides*, sabbaldia *Sibbaldia procumbens* and starwort mouse-ear *Cerastium cerastoides*. The summit of Aonach Beag also has a variety of late snow bed communities including the three-leaved rush *Juncus trifidus* heath which has developed in the hummocky hollows.

The SSSI follows the same boundary as the SAC and is located to the south of the Survey Area within approximately 0.5km.

2.1.2 NON-STATUTORY DESIGNATED SITES

It is understood that no Scottish Wildlife Trust reserves or Sites of Local Nature Conservation Sites were located within the Survey Area or within a 5km buffer.

A narrow strip of woodland identified as being of semi-natural origin is present along the northeastern bank of Lochan na h-Earba extending for approximately 1.3km, but only 30m wide forming an area of 5.35ha. Prior to survey, aerial imagery of this area indicated that the woodland has been reduced to a small number of scattered broadleaved trees and a small copse of coniferous woodland.

Further small areas of ancient woodland of semi-natural origin are located in the northern edge of the Survey Area.

2.2 HABITAT DESCRIPTIONS

2.2.1 A1.1.1 BROADLEAVED WOODLAND – SEMI-NATURAL

There are stands of broadleaved woodland in the west and north-east of the Survey Area. Most of this woodland has a canopy dominated by birch *Betula spp.*, with lesser amounts of rowan *Sorbus aucuparia*, and the shrub layer consists mainly of a scrubby cover of willow

Salix spp. The field and ground layers are variable, with grasses, rushes, sedges, dwarf shrubs or bryophytes dominating in different stands, and this is reflected in the presence of a number of different NVC communities, described below.

These woodlands are accessible to deer, which limits regeneration and means most of the trees are mature.

W4 *Betula pubescens*-*Molinia caerulea* woodland

The downy birch *Betula pubescens*-purple moor-grass *Molinia caerulea* community is present as small stands of wet woodland, usually marking out wetter areas within larger woodland blocks in mosaics with other woodland types. It has a canopy of downy birch with, in some places, a shrub layer consisting mainly of eared willow *Salix aurita*. The field layer is dominated by purple moor-grass and the ground layer by the bog-moss *Sphagnum fallax*. Two sub-communities are present:

- W4b *Juncus effusus* sub-community. The soft rush *Juncus effusus* sub-community is the more species-rich type, with frequent to occasional soft rush, tormentil *Potentilla erecta*, tufted hair-grass *Deschampsia cespitosa*, marsh violet *Viola palustris*, marsh thistle *Cirsium palustre*, bog-myrtle *Myrica gale*, wild angelica *Angelica sylvestris* and common valerian *Valeriana officinalis*. In addition, a small number of species associated with less acidic conditions are found here, including occasional meadow buttercup *Ranunculus acris* and yellow pimpernel *Lysimachia nemorum*.
- W4c *Sphagnum* sub-community. The bog-moss *Sphagnum* sub-community has a more or less continuous carpet of *Sphagnum fallax*, with correspondingly less vascular plants in the field layer apart from abundant purple moor-grass. Bottle sedge *Carex rostrata* is occasional but there are no other distinguishing species.

W7 *Alnus glutinosa*-*Fraxinus excelsior*-*Lysimachia nemorum* woodland

There are small occurrences of alder *Alnus glutinosa*-ash *Fraxinus excelsior*-yellow pimpernel wet woodland within larger stands of semi-natural woodland. The canopy is of downy birch rather than alder and ash, with an understorey of eared willow. The field layer has frequent meadowsweet *Filipendula ulmaria*. Two sub-communities are present:

- W7a *Urtica dioica* sub-community. Common nettle *Urtica dioica* is absent here, but the sub-community is identified by the presence of frequent creeping buttercup *Ranunculus repens* and wild angelica.
- W7c *Deschampsia cespitosa* sub-community. Here, tufted hair-grass is dominant in the field layer, with few other species apart from occasional wood-sorrel *Oxalis acetosella*.

W9 *Fraxinus excelsior*-*Sorbus aucuparia*-*Mercurialis perennis* woodland

A single, small area of the ash-rowan-dog's mercury *Mercurialis perennis* woodland occurs in a discrete flushed location within a birch woodland mosaic in the north-east of the Survey Area. Although the canopy is of downy birch, the field layer is herb-rich and it is this feature that identifies the community. Species present include occasional yellow pimpernel, selfheal *Prunella vulgaris*, heath bedstraw *Galium saxatile*, foxglove *Digitalis purpurea*, wood anemone *Anemone nemorosa* and marsh thistle. But the most distinctive species are those that characterise the sub-community present, as described below:

- W9b *Crepis paludosa* sub-community. In the marsh hawk's-beard *Crepis paludosa* sub-community there is found occasional marsh hawk's-beard, tufted hair-grass, wood avens *Geum rivale*, melancholy thistle *Cirsium heterophyllum*, sweet vernal-grass *Anthoxanthum odoratum*, meadow buttercup, tormentil, pale sedge *Carex pallescens* and smooth lady's-mantle *Alchemilla glabra*.

W11 *Quercus petraea*-*Betula pubescens*-*Oxalis acetosella* woodland

The sessile oak *Quercus petraea*-downy birch-wood-sorrel woodland occurs mainly on level ground and gentle slopes, and is here characterised by a canopy of downy birch rather than oak, with occasional rowan and an understorey of eared willow and, in some stands, grey willow *Salix cinerea*. The field layer is grassy, with species such as sweet vernal-grass and creeping soft-grass *Holcus mollis* frequent to abundant. Forbs comprise frequent to occasional wood-sorrel, heath bedstraw, common dog-violet *Viola riviniana* and tormentil with, rarely, patches of bluebell *Hyacinthoides non-scripta*. The mosses *Rhytidiadelphus squarrosus* and *Hylocomium splendens* are frequent to abundant. Three sub-communities can be identified here:

- W11b *Blechnum spicant* sub-community. In the hard-fern *Blechnum spicant* sub-community, as well as the species listed above hard-fern is frequent to abundant.
- W11c *Anemone nemorosa* sub-community. The wood anemone sub-community has occasional to frequent wood anemone, hairy wood-rush *Luzula pilosa*, chickweed-wintergreen *Lysimachia europaea*, common cow-wheat *Melampyrum pratense* and the moss *Rhytidiadelphus triquetrus*. In one stand this is present under a canopy of planted Scots pine *Pinus sylvestris* and larch *Larix spp.* In another there are occasional mature Aspen *Populus tremula* and suckers with the birch.
- W11d *Stellaria holostea*-*Hypericum pulchrum* sub-community. A discrete patch within one of these woodlands has a carpet of greater stitchwort *Stellaria holostea* as well as frequent Yorkshire-fog *Holcus lanatus*. This belongs to the greater stitchwort-slender St John's-wort *Hypericum pulchrum* sub-community.

W17 *Quercus petraea*-*Betula pubescens*-*Dicranum majus* woodland

Sessile oak-downy birch-*Dicranum majus* (moss) woodland occupies steeper, more rocky slopes than the W11 community, with which it is found in mosaics. The canopy is the familiar downy birch but the field layer is distinctly heathy and the ground layer very mossy. Bilberry *Vaccinium myrtillus* is frequent to abundant and heather *Calluna vulgaris* occasional. Wavy hair-grass *Avenella flexuosa* and wood-sorrel are also occasional. The bryophytes *Rhytidiadelphus loreus* and *Hylocomium splendens* are frequent to abundant. Three sub-communities are present, plus another type not recognised in the NVC:

- W17b Typical sub-community. Here, bilberry is abundant together with the species listed above but there are no other distinguishing species.
- W17c *Anthoxanthum odoratum*-*Agrostis capillaris* sub-community. The sweet vernal-grass-common bent *Agrostis capillaris* sub-community is grassier than the others with, amongst the dwarf shrubs, occasional to frequent sweet vernal-grass and common bent.
- W17d *Rhytidiadelphus triquetrus* sub-community. The moss *Rhytidiadelphus triquetrus* is frequent to abundant in this sub-community, and in addition there is occasional chickweed-wintergreen.
- W17 *Molinia caerulea*. On steep slopes at the north-east of the Survey Area there are stands of open birch woodland not described in the NVC. They are dry, rocky and, in places, heathy as above, but the field layer has frequent to abundant purple moor-grass. Sometimes this species becomes overwhelmingly dominant, to the exclusion of just about everything else. These stands may be a result of overgrazing, preventing regeneration of dwarf shrubs.

2.2.2 A1.1.2 BROADLEAVED WOODLAND – PLANTATION

There is a small area of recently-planted broadleaved woodland at the west of the Survey Area. Species include birch, rowan, alder and hawthorn *Crataegus monogyna*. The field

layer is species-poor grassland dominated by purple moor-grass. This woodland is too recently established to have developed into a recognisable NVC community.

2.2.3 A1.2.1 CONIFEROUS WOODLAND – SEMI-NATURAL

There are numerous stands of woodland in the west and north-east of the Survey Area with a canopy of Scots pine rather than birch. Although many, most, perhaps all, of these stands may originally be of planted origin, their maturity and the semi-natural composition of their ground flora means they are best classified to the Phase 1 semi-natural rather than plantation type. One NVC community is represented.

W18 *Pinus sylvestris*-*Hylocomium splendens* woodland

The Scots pine-*Hylocomium splendens* (moss) has a canopy of Scots pine with, here and there, occasional downy birch in the understorey and rowan saplings. The field layer is mainly heathy, with frequent to abundant heather, bilberry and cowberry *Vaccinium vitis-idaea*. The moss *Hylocomium splendens* is also frequent to abundant. Two recognised sub-communities are present, as well as another type not described in the NVC:

- W18b *Vaccinium myrtillus*-*Vaccinium vitis-idaea* sub-community. The bilberry-cowberry sub-community is the typical dry pinewood and most stands have little other than the species listed above, along with the moss *Pseudoscleropodium purum*. In a few stands, however, the characteristic pinewood moss *Ptilium crista-castrensis* is patchily abundant.
- W18d *Sphagnum capillifolium*/*quinquefarium*-*Erica tetralix* sub-community. The *Sphagnum capillifolium*/*quinquefarium* (bog-moss)-cross-leaved heath *Erica tetralix* sub-community is a damper form of pinewood of level ground that has affinities with the floristics of wet heaths and bogs. It occurs in a single location and here the pines are stunted in growth because of the wetter conditions. Species associated with these conditions include frequent to occasional cross-leaved heath, purple moor-grass and even hare's-tail cottongrass *Eriophorum vaginatum*, as well as the bog-moss *Sphagnum capillifolium*.
- W18 *Molinia caerulea*. Like the equivalent under birch, there is a form of dry Scots pine woodland from level ground up to steep slopes that is common and widespread in the Survey Area which has little more than abundant to completely dominant purple moor-grass in the field layer. This does not fit any of the published NVC sub-communities for W18 but this type is acknowledged in a later review of the NVC (Rodwell, JS, Dring, JC, Averis, ABG, Proctor, MCF, Malloch, AJC, Schaminée, JNJ, & Dargie TCD, 2000 Review of coverage of the National Vegetation Classification *JNCC Report*, No. 302).

2.2.4 A1.2.2 CONIFEROUS WOODLAND – PLANTATION

There are blocks of non-native conifer plantation in the west and north-east of the Survey Area, mostly of mature sitka spruce *Picea sitchensis* with some larch. These have a very impoverished ground flora because of the dark conditions that prevail and are not covered in the NVC.

2.2.5 A2.2 SCRUB – SCATTERED

Scrub takes two very different forms in the Survey Area. One is a common vegetation type that is here found at the lowest part of the Survey Area in the west, and consists of an area of scattered broom *Cytisus scoparius* that is intricately mixed with and an intrinsic part of other vegetation, such as wet heath. The other is a rare community of montane willow at high altitudes on crags and ledges inaccessible to browsing deer. These two NVC communities are described below.

W20 *Salix lapponum*-*Luzula sylvatica* scrub

On inaccessible cliffs and ledges high above both the north and south sides of Loch a' Bhealaich Leamhain there are numerous examples of downy willow *Salix lapponum*-great wood-rush *Luzula sylvatica* scrub. These are too small to map and therefore some of the better and larger examples are target-noted, but there are numerous other locations and simply not enough time to record them all. Downy willow is one of the suite of rare montane willow species, but here it is locally abundant. The community comprises a low canopy of the willow up to one metre high over a variable flora of dwarf shrubs, grasses and forbs. Some examples are acidic, with bilberry, bog bilberry *Vaccinium uliginosum*, the montane form of crowberry and tufted hair-grass below and around the willows. Others are herb-rich and resemble the U17 tall-herb community but with a canopy of willow (indeed, the U17 community occurs here too in close proximity). Here, the associates include water avens *Geum rivale*, wild angelica, roseroot *Sedum rosea*, goldenrod *Solidago virgaurea*, wood crane's-bill *Geranium sylvaticum* and alpine lady's-mantle *Alchemilla alpina*.

W23 *Ulex europaeus*-*Rubus fruticosus* scrub

In the gorse *Ulex europaeus*-bramble *Rubus fruticosus* scrub, gorse is here replaced by broom which is dominant, in some places forming a dense canopy whilst in others occurring as more scattered clumps. Beneath this most other species are shaded out resulting in few associates. One sub-community can be identified:

- W23a *Anthoxanthum odoratum* sub-community. In the sweet vernal-grass sub-community, there is occasional tormentil and mat-grass *Nardus stricta* beneath the broom, but little else.

2.2.6 A3 PARKLAND AND SCATTERED TREES

Around wooded areas in the north-east of the Survey Area there are locations showing a gradual transition from woodland to open habitats that have a scattering of trees. These are placed within the corresponding open habitat but do not contribute to the area of that habitat as they effectively sit 'on top'. They are coded A3.1 for broadleaves, A3.2 for conifers and A3.3 for mixed.

2.2.7 B1.1 ACID GRASSLAND – UNIMPROVED

This is the most common type of grassland in the Survey Area and is dominated by mixtures of a range of grass species. Three NVC communities are associated with this habitat.

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

The sheep's-fescue *Festuca ovina*-common bent-heath bedstraw grassland is widely distributed across the Survey Area, both as discrete stands and in mosaics with other habitats such as marshy grassland where it marks out areas of well-drained mineral soils rather than wet peaty ones. There is frequent to abundant sweet vernal-grass and sheep's-fescue, and the forbs tormentil and heath bedstraw, and moss *Hylocomium splendens* are also frequent to abundant. Three sub-communities are found here:

- U4a Typical sub-community. The typical sub-community is the more common and widespread and is dominated by combinations of the species listed above. In addition there is frequent red fescue *Festuca rubra* and ribwort plantain *Plantago lanceolata*, and occasional mat-grass *Nardus stricta*, common sorrel *Rumex acetosa*, meadow buttercup, pill sedge *Carex pilulifera*, spring sedge *C. caryophyllea*, pignut *Conopodium majus*, common bird's-foot-trefoil *Lotus corniculatus*, mountain pansy *Viola lutea*, marsh violet and the moss *Rhytidiadelphus squarrosus*.

- U4d *Luzula multiflora*-*Rhytidiadelphus loreus* sub-community. The heath wood-rush *Luzula multiflora*-*Rhytidiadelphus loreus* (moss) sub-community occurs on damper ground below steep banks beside watercourses and the species preferentials found here reflect this. They include additionally frequent to occasional tufted hair-grass, velvet bent *Agrostis canina*, viviparous sheep's-fescue *Festuca vivipara*, heath wood-rush, marsh violet and the moss *Rhytidiadelphus loreus*.
- U4e *Vaccinium myrtillus*-*Avenella flexuosa* sub-community. The bilberry-wavy hair-grass sub-community is found on well-drained slopes at higher altitudes, where it approaches the flora of a dry heath. As well as the species typical of the community as a whole, there is frequent to abundant bilberry, wavy hair-grass and the moss *Pleurozium schreberi*. In addition, there is occasional heath speedwell *Veronica officinalis* and green-ribbed sedge *Carex binervis*.

U5 *Nardus stricta*-*Galium saxatile* grassland

The mat-grass-heath bedstraw grassland is found on steep, well-drained slopes at higher altitude. It has frequent to abundant mat-grass and sweet vernal-grass, and occasional heath bedstraw, tormentil, bilberry, pill sedge, carnation sedge *Carex panicea*, hard-fern and alpine lady's-mantle. One sub-community can be identified:

- U5e *Racomitrium lanuginosum* sub-community. The vegetation of the *Racomitrium lanuginosum* (moss) sub-community has similarities with that of a wet heath, with occasional to frequent deergrass *Trichophorum germanicum*, purple moor-grass and heather, though the moss itself is absent here.

U6 *Juncus squarrosus*-*Festuca ovina* grassland

The heath rush *Juncus squarrosus*-sheep's-fescue grassland is found at higher altitudes, and on damper, more peaty soils than the previous two communities. It is also less grassy, being dominated by abundant heath rush, with grasses subordinate and including frequent to occasional velvet bent, viviparous sheep's-fescue and wavy hair-grass. Common sedge *Carex nigra* is occasional, and tormentil is the most conspicuous forb, being frequent to abundant. The moss *Pleurozium schreberi* is frequent to occasional. A single sub-community is present, plus another type not described in the current NVC:

- U6d *Agrostis capillaris*-*Luzula multiflora* sub-community. The common bent-heath wood-rush sub-community is the grassiest type, with frequent to occasional common bent, sweet vernal-grass and mat-grass in addition to the species listed above. There is also frequent heath bedstraw and occasional heath wood-rush, and the moss *Hylocomium splendens* is common here.
- U6 base-rich. A single stand of heath rush-dominated vegetation is enriched with a variety of mesotrophic forbs not normally associated with this community, and which indicates that moderate flushing with base-enriched water is taking place here. The list includes occasional meadow buttercup, smooth lady's-mantle, alpine meadow-rue *Thalictrum alpinum*, water avens, alpine bistort *Bistorta vivipara*, marsh hawk's-beard, wild thyme and harebell *Campanula rotundifolia*. This type is not recognised in the current classification, but is described in a later publication (Averis, A., Averis, B., Birks, J., Horsfield, D., Thompson, D. & Yeo, M. (2004) An Illustrated Guide to British Upland Vegetation, JNCC, Peterborough, ISBN 1 86107 553 7).

2.2.8 B1.2 ACID GRASSLAND – SEMI-IMPROVED

In areas of more heavily-modified, fertile soils in lower altitude parts of the Survey Area, acid grassland has more species associated with higher levels of improvement. This is U4 grassland with the community constants as listed above, but represents a different sub-community:

- U4b *Holcus lanatus-Trifolium repens* sub-community. In the Yorkshire-fog-white clover *Trifolium repens* sub-community, there is abundant Yorkshire-fog and red fescue, frequent yarrow *Achillea millefolium*, and occasional white clover, smooth meadow-grass *Poa pratensis*, germander speedwell *Veronica chamaedrys*, ribwort plantain, common sorrel, meadow buttercup, pill sedge, heath speedwell, pignut, bitter-vetch *Lathyrus linifolius*, common bird's-foot-trefoil and devil's-bit scabious *Succisa pratensis*.

2.2.9 B2.1 NEUTRAL GRASSLAND – UNIMPROVED

Unimproved neutral grassland is represented by moderately species-rich swards dominated by tufted hair-grass on level ground adjacent to the river in the north-west of the Survey Area. One NVC community can be identified.

MG9 *Holcus lanatus-Deschampsia cespitosa* grassland

Yorkshire-fog-tufted hair-grass grassland has abundant tufted hair-grass and frequent Yorkshire-fog. Forbs are represented by occasional to frequent tormentil, wild angelica, sneezewort *Achillea ptarmica* and common knapweed *Centaurea nigra*. Additionally there are a variety of other species present that are not normally found in vegetation of this type, including melancholy thistle, common valerian *Valeriana officinalis*, marsh-marigold *Caltha palustris* and marsh violet. One sub-community is represented here:

- MG9a *Poa trivialis* sub-community. Rough meadow-grass *Poa trivialis* itself is absent here, but the sub-community is identified by the frequent to occasional occurrence of meadowsweet alongside the species mentioned above.

2.2.10 B2.2 NEUTRAL GRASSLAND – SEMI-IMPROVED

There is one instance of semi-improved neutral grassland in the Survey Area, adjacent to the river at the north-west, where a sward rich in forbs appears to be originally of sewn origin and may be grown for pasturing livestock. This relates to a single NVC community, though the match is somewhat unsatisfactory as many of these stands do not conform well to the published accounts of this type of vegetation.

MG6 *Lolium perenne-Cynosurus cristatus* grassland

Neither perennial rye-grass *Lolium perenne* nor crested dog's-tail *Cynosurus cristatus* are present here, but nevertheless the stand has definite affinities with this type of semi-improved agricultural grassland. Yorkshire-fog is abundant, and there is frequent to occasional red fescue, smooth meadow-grass, white clover, common mouse-ear *Cerastium fontanum*, daisy *Bellis perennis*, germander speedwell, yellow-rattle *Rhinanthus minor* and creeping buttercup. A number of other species identify the sub-community present:

- MG6b *Anthoxanthum odoratum* sub-community. The sweet vernal-grass sub-community additionally features occasional sweet vernal-grass, meadow buttercup, common sorrel and field wood-rush *Luzula campestris*.

2.2.11 B3.1 CALCAREOUS GRASSLAND – UNIMPROVED

Calcareous grassland is common and widespread, revealing the presence of more base-rich surface geology or flushing with base-enriched water in certain parts of the site. It is especially common around watercourses where loose geology is exposed, but is also found as more extensive stands on slopes in mosaics with other habitats. Two NVC communities are present.

CG10 *Festuca ovina-Agrostis capillaris-Thymus drucei* grassland

The sheep's-fescue-common bent-wild thyme *Thymus drucei* grassland has frequent sheep's-fescue, red fescue and mat-grass, and is distinguished by frequent wild thyme. There is also frequent to occasional tormentil, ribwort plantain, selfheal, common bird's-foot-trefoil, heath wood-rush, cat's ear *Hypochaeris radicata*, bitter-vetch and common ragwort *Jacobaea vulgaris*, as well as the moss *Hylocomium splendens*. Two sub-communities are identified:

- CG10a *Trifolium repens-Luzula campestris* sub-community. The white clover-field wood-rush sub-community is the drier of the two, and has frequent to occasional sweet vernal-grass, heath bedstraw, yarrow, heath milkwort *Polygala serpyllifolia* and mouse-ear-hawkweed *Pilosella officinarum*.
- CG10b *Carex pulicaris-Carex panicea* sub-community. The flea sedge *Carex pulicaris*-carnation sedge sub-community is characteristic of slightly flushed soils, and includes damp-loving plants such as frequent to occasional flea sedge, carnation sedge, glaucous sedge *Carex flacca*, pale sedge *C. pallescens*, slender St John's-wort and meadowsweet.

CG11 *Festuca ovina-Agrostis capillaris-Alchemilla alpina* grass-heath

The sheep's-fescue-common bent-alpine lady's-mantle grass-heath occurs at higher altitudes than the preceding community, and is here a damp habitat associated with steep slopes that are flushed with base-enriched water from above. There is frequent sweet vernal-grass, common bent, sheep's-fescue, mat-grass, viviparous sheep's-fescue and meadow oat-grass *Helictochloa pratensis*, and frequent to occasional alpine lady's-mantle, wild thyme, bilberry, tormentil, pill sedge, alpine meadow-rue, water avens, devil's-bit scabious, mountain everlasting *Antennaria dioica* and the mosses *Hylocomium splendens*, *Racomitrium lanuginosum* and *Breutelia chrysocoma*. Both sub-communities are represented:

- CG11a Typical sub-community. This is the drier of the two sub-communities, with few additional species but notably occasional globeflower *Trollius europaeus*, as well as cowberry.
- CG11b *Carex pulicaris-Carex panicea* sub-community. This is wetter, and includes damp-loving plants such as occasional flea sedge, carnation sedge, common butterwort *Pinguicula vulgaris* and deergrass, as well as frequent ribwort plantain.

2.2.12 B5 MARSH/MARSHY GRASSLAND

Marshy grassland in the form of dry to damp mire grassland dominated by purple moor-grass is one of the most common and widespread habitats in the Survey Area. It is found on all aspects, on moderately steep slopes as well as level ground, at a range of altitudes, and on substrates ranging from shallow peaty mineral soils to deep peat in a variety of habitats from the edges of watercourses to blanket bog. It occurs in mosaics with wet and dry heaths, blanket bogs and other grassland types. One NVC community represents this variation, though all three of its sub-communities plus two other types not described in the current classification are present.

(NB: where it occurs on peat over 0.5m deep, it is arbitrarily defined in Phase 1 classification terms as E1.7 Wet Modified Bog, even though the floristics may be the same as on shallower substrates. For ease, it is described here and mapped as marshy grassland, but it should be borne in mind that some stands will occur on deep peat, and that there will be variation in peat depth even within stands.)

Another, very different, type of vegetation is found as a small stand within wet heath and blanket bog at higher altitude in the south-east of the Survey Area. This is herb-rich vegetation with a canopy of small sedges and is not recognised in the current classification

but is described by Averis *et al.* (2004). It is best classified within the marshy grassland category as it has affinities with other communities that belong to this habitat. It is described after the purple moor-grass mire.

M25 *Molinia caerulea*-*Potentilla erecta* mire

Purple moor-grass-tormentil mire is dominated by purple moor-grass, with occasional tormentil between the tussocks. The sub-communities and other variations are as follows:

- M25a *Erica tetralix* sub-community. The cross-leaved heath sub-community is the heathy form and is commonly found in mosaics with wet heath, with which it shares a number of species. Frequent to occasional are cross-leaved heath, common cottongrass *Eriophorum angustifolium*, bog-myrtle and bog asphodel *Narthecium ossifragum*. There is also occasional devil's-bit scabious and star sedge *Carex echinata*.
- M25b *Anthoxanthum odoratum* sub-community. The sweet vernal-grass sub-community is grassier and is more usually found in combination with dry acid grasslands. Purple moor-grass is patchier, making room for frequent to occasional sweet vernal-grass, Yorkshire-fog, red fescue, velvet bent and mat-grass. Forbs are represented by frequent to occasional marsh violet, common sorrel and meadow buttercup, and heath wood-rush is similarly frequent to occasional.
- M25c *Angelica sylvestris* sub-community. The wild angelica sub-community is more herb-rich and has only one appearance in the Survey Area, on a flushed slope with evidence of irrigation with mildly base-rich water. Wild angelica itself is missing but other indicators present include occasional marsh thistle and meadowsweet, as well as meadow buttercup, slender St John's-wort and carnation sedge. Unusually, there are a number of other species found here that are not associated with the community, and reveal nutrient enrichment to be greater than normal. They include dog's mercury *Mercurialis perennis*, bitter-vetch, bush vetch *Vicia sepium*, water avens, ribwort plantain, selfheal and flea sedge.
- M25 species-poor. Large tracts of this community are overwhelmingly dominated by purple moor-grass with virtually no other species. This vegetation type does not fit any of the published sub-communities but is recognised in Averis *et al.* (2004).
- M25a base-rich. On south-east facing slopes above the west Lochan na h-Earba there is a variant of the M25a sub-community that is exceptionally diverse, containing species more normally associated with flushed calcareous grasslands or dripping herb-rich ledges fed by base-enriched waters. Whilst the heathy species associated with this sub-community are still present, the range of associates includes frequent to occasional globeflower, wood crane's-bill, melancholy thistle, alpine bistort, northern bedstraw *Galium boreale*, lady's bedstraw *G. verum*, creeping willow *Salix repens*, wild thyme, selfheal, flea sedge, tawny sedge *Carex hostiana* and meadow oat-grass, as well as occasional common twayblade *Neottia ovata*, lesser butterfly-orchid *Platanthera bifolia* and heath fragrant-orchid *Gymnadenia borealis*.

The vegetation has affinities with M26 *Molinia caerulea*-*Crepis paludosa* mire, which is a more flushed, base-rich *Molinia* grassland than M25, but that community has none of the heath species present here and still lacks many of the forbs listed above.

Small sedge mire

Small sedge mire is not described in the current NVC. It is a flushed, base-rich habitat, with frequent small sedges including star sedge, common sedge, carnation sedge, common yellow-sedge and glaucous sedge. Grasses fill in the rest of the canopy, with frequent to occasional sweet vernal-grass, common bent, red fescue, tufted hair-grass and mat-grass.

The stand is rich in mesotrophic forbs, with grass-of-Parnassus *Parnassia palustris*, marsh hawk's-beard, smooth lady's-mantle, meadowsweet, alpine meadow-rue, autumn hawkbit *Scorzoneroideis autumnalis*, marsh thistle and marsh violet.

2.2.13 C1.1 BRACKEN – CONTINUOUS

In lower altitude parts of the Survey Area there are dense stands of bracken *Pteridium aquilinum* clothing slopes on better quality soils. This vegetation is represented by one NVC community and all three of its sub-communities.

U20 *Pteridium aquilinum*-*Galium saxatile* community

The bracken-heath bedstraw community consists of tall stands of dense bracken with a variable understorey, depending on which sub-community is present:

- U20a *Anthoxanthum odoratum* sub-community. The sweet vernal-grass sub-community is the grassiest form, with frequent sweet vernal-grass and red fescue beneath the canopy of bracken. There is occasional heath wood-rush and foxglove *Digitalis purpurea*, whereas the moss *Hylocomium splendens* is abundant.
- U20b *Vaccinium myrtillus*-*Dicranum scoparium* sub-community. The bilberry-*Dicranum scoparium* (moss) sub-community is a heathier form, found at slightly higher altitudes. Here, the bracken canopy is more open and the understorey is made up of species of dry heaths, including abundant bilberry and frequent to occasional heather, wavy hair-grass, tormentil, bell heather *Erica cinerea* and green-ribbed sedge.
- U20c Species-poor sub-community. In the species-poor sub-community the canopy of bracken is so dense and the build up of litter from its dead fronds so deep that very few other species are able to grow. Some stands consist of literally nothing but bracken standing over a carpet of its own leaf litter. Others occur over a field layer of purple moor-grass. This latter type is not strictly recognised in the NVC but is described in Averis *et al.* (2004) as being present in the Highlands, and is best placed here as purple moor-grass can be a minor component of this vegetation and U20c is where it gains its greatest abundance, if not anything approaching the quantities seen here.

2.2.14 C2 UPLAND SPECIES-RICH LEDGES

Species-rich ledges are found in and around cliffs and crags on the steepest parts of the Survey Area, especially on those above west Lochan na h-Earba on its south-east side and on those above Loch a' Bhealaich Leamhain on its south-west side. They occur on ledges that are inaccessible to grazing animals and are therefore lush and tall, and are damp and very herb-rich due to flushing with base-enriched groundwater. They are too small to map and are therefore target-noted. One NVC community is present.

U17 *Luzula sylvatica*-*Geum rivale* tall-herb community

The great woodrush-water avens tall-herb community comprises frequent to occasional great woodrush *Luzula sylvatica*, wild angelica, roseroot, meadowsweet, devil's-bit scabious, tormentil, smooth lady's-mantle, alpine lady's-mantle, melancholy thistle, wild thyme, bilberry, heather and slender St John's-wort. A single sub-community is represented:

- U17b *Geranium sylvaticum* sub-community. The wood crane's-bill sub-community is identified by the presence of frequent wood crane's-bill, stone bramble *Rubus saxatilis* and globeflower, as well as occasional alpine saw-wort *Saussurea alpina*, flea sedge, goldenrod, hawkweed *Hieracium* spp. and common dog-violet.

2.2.15 C3.2 OTHER TALL HERB AND FERN – NON-RUDERAL

This habitat is represented by a single NVC community.

U21 *Cryptogramma crispera*-*Avenella flexuosa* community

The parsley fern *Cryptogramma crispera*-wavy hair-grass community is found on steep boulder fields on slopes above east Lochan na h-Earba. Parsley fern grows in crevices between boulders and in these micro-habitats it can be abundant. Here, it is accompanied only by a number of bryophyte species: occasional *Racomitrium lanuginosum*, *Pleurozium schreberi*, *Hypnum jutlandicum* and *Rhytidiadelphus loreus*.

2.2.16 D1.1 DRY DWARF SHRUB HEATH – ACID

There are areas of dry heath in the Survey Area, occurring both as self-contained stands and in mosaics with other habitats. They are dominated by dwarf shrubs, particularly heather and/or bilberry, and are found on more well-drained parts of the Survey Area such as steeper slopes, on thin acid soils and shallow peats. They occur at a wide range of altitudes, and this variation results in the presence of six different NVC communities.

H10 *Calluna vulgaris*-*Erica cinerea* heath

Heather-bell heather heath is the most common sub-montane type in the Survey Area. It has abundant heather and frequent to occasional bell heather and tormentil. There are a range of other associates that vary between stands, and can include frequent to occasional wavy hair-grass, velvet bent, mat-grass, viviparous sheep's-fescue, bilberry, cowberry and pill sedge. Two sub-communities can be identified:

- H10a Typical sub-community. The typical sub-community is the most common and widespread type at lower altitudes. It has little other than the species already listed, apart from frequent to occasional purple moor-grass, rare green-ribbed sedge, and occasional *Rhytidiadelphus loreus*.
- H10b *Racomitrium lanuginosum* sub-community. The *Racomitrium lanuginosum* (moss) sub-community occurs at higher elevations. It has frequent to occasional deergrass, crowberry *Empetrum nigrum* ssp. *nigrum*, carnation sedge and fir clubmoss *Huperzia selago*. Beneath the sward there is abundant *Racomitrium lanuginosum* and frequent *Cladonia* spp. (lichens).

H14 *Calluna vulgaris*-*Racomitrium lanuginosum* heath

Heather-*Racomitrium lanuginosum* (moss) heath is a montane heath found at high altitudes in the south-east of the Survey Area. Heather is abundant in wind-clipped, prostrate form, and there is a ground carpet made up of frequent to abundant *Racomitrium lanuginosum* and *Cladonia* spp. lichens. Deergrass is frequent to occasional, and wavy hair-grass, bilberry, heath bedstraw, tormentil, fir clubmoss, pill sedge, velvet bent and viviparous sheep's-fescue are all occasional. The presence of montane species help to identify this community, including frequent to occasional stiff sedge *Carex bigelowii* and alpine lady's-mantle. One sub-community is represented:

- H14b *Empetrum nigrum* ssp. *hermaphroditum* sub-community. The crowberry (montane form) *Empetrum nigrum* ssp. *hermaphroditum* sub-community has frequent to occasional crowberry, mat-grass and alpine clubmoss *Diphasiastrum alpinum*.

H18 *Vaccinium myrtillus*-*Avenella flexuosa* heath

Bilberry-wavy hair-grass heath is found on steep slopes at moderately high altitudes where conditions favour bilberry over heather. Bilberry itself is abundant to dominant, with all other vascular species only frequent to occasional. These include wavy hair-grass, mat-grass,

viviparous sheep's-fescue, heath bedstraw, crowberry, cowberry, heather and heath rush. Other species identify the two sub-communities present:

- H18a *Hylocomium splendens-Rhytidiadelphus loreus* sub-community. The *Hylocomium splendens-Rhytidiadelphus loreus* (mosses) sub-community is by far the most common and widespread type, with abundant *Hylocomium splendens* and *Rhytidiadelphus loreus* carpeting the ground beneath the dwarf shrubs. There are also patches of *Sphagnum capillifolium* (bog-moss). The only additional vascular species is common cow-wheat.
- H18b *Alchemilla alpina-Carex pilulifera* sub-community. The alpine lady's-mantle-pill sedge sub-community is a grassier type, with correspondingly less representation of bryophytes. In addition to the grass species which represent the community as a whole, there is frequent to occasional common bent, sweet vernal-grass and tufted hair-grass. Forbs also have increased frequency here, with occasional tormentil, alpine lady's-mantle, harebell and common sorrel. Pill sedge and stiff sedge are frequent to occasional.

H20 *Vaccinium myrtillus-Racomitrium lanuginosum* heath

The bilberry-*Racomitrium lanuginosum* (moss) community is a montane heath only occurring at high altitudes. In these exposed, wind-blown locations the sward is shorter and more prostrate than in sub-montane heaths. Bilberry and the montane form of crowberry are both abundant and stiff sedge is frequent. There is occasional wavy hair-grass and alpine lady's-mantle. A carpet of mosses grows between these plants, including frequent to occasional *Racomitrium lanuginosum* and *Pleurozium schreberi*, and there are occasional *Cladonia* spp. lichens dotted throughout this short turf. The abundance of two other bryophyte species identifies the sub-community present:

- H20d *Rhytidiadelphus loreus-Hylocomium splendens* sub-community. In this sub-community the mosses *Rhytidiadelphus loreus* and *Hylocomium splendens* are frequent to abundant, with a corresponding reduction in the amount of *Racomitrium lanuginosum*.

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

The heather-bilberry-*Sphagnum capillifolium* (bog-moss) community is a damp heath that occurs patchily in the Survey Area on slopes at low to moderate altitudes, usually in mosaics with other dry heaths. It has a similar array of species as other sub-montane heaths, with abundant heather and frequent to occasional bilberry, wavy hair-grass, hard-fern, tormentil, bell heather, heath bedstraw and green-ribbed sedge. However it has a more continuous bryophyte carpet, characterised particularly by frequent to abundant *Sphagnum capillifolium* along with *Rhytidiadelphus loreus* and *Hylocomium splendens*. One sub-community is present.

- H21a *Calluna vulgaris-Pteridium aquilinum* sub-community. The heather-bracken sub-community is indistinctive, with nothing more than the species listed above. Bracken is not found in stands of this vegetation here.

H22 *Vaccinium myrtillus-Rubus chamaemorus* heath

The bilberry-cloudberry *Rubus chamaemorus* community is a montane damp heath similar to the previous type but occurring at higher altitudes. It is often found in mosaics with montane forms of blanket bog, with which it also shares a number of species, but it is found on steeper slopes on shallow peat rather than on deep peat on level to gently sloping ground. Bilberry and heather are found in varying amounts, depending on the sub-community, and in different stands there are a range of associates including the montane

form of crowberry, plus cowberry, wavy hair-grass and deergrass. Bryophytes are conspicuous, particularly frequent to abundant *Sphagnum capillifolium*, *Pleurozium schreberi*, *Hylocomium splendens* and *Rhytidiadelphus loreus*. What sets this heath apart is the frequent presence of cloudberry and dwarf cornel *Cornus suecica*. Both sub-communities are represented in the Survey Area:

- H22a *Polytrichum commune*-*Galium saxatile* sub-community. The *Polytrichum commune* (moss)-heath bedstraw sub-community is found at higher altitudes and is dominated by bilberry. There is also occasional heath bedstraw, hard-fern and the moss *Polytrichum commune*.
- H22b *Plagiothecium undulatum*-*Anastrepta orcadensis* sub-community. The *Plagiothecium undulatum*-*Anastrepta orcadensis* (mosses) sub-community occurs at lower altitudes and has more heather than bilberry, along with frequent to occasional hare's-tail cottongrass.

2.2.17 D1.2 DRY DWARF SHRUB HEATH – BASIC

There is a type of H10 heather-bell heather heath that occurs in the Survey Area which is more species-rich than the others and occurs in slightly flushed situations. This is a variant on a different sub-community than those considered under acid heaths above:

- H10d *Thymus drucei*-*Carex pulicaris* sub-community, base-rich. The wild thyme-flea sedge sub-community is herb-rich and has wild thyme, selfheal and flea sedge in addition to the usual species. However, at Earba there are two locations where this is augmented by a range of species of base-rich habitats that are not normally found in this type of vegetation. The list includes wood crane's-bill, globeflower, stone bramble, alpine saw-wort, melancholy thistle, northern bedstraw, alpine meadow-rue and meadow oat-grass. These stands have close affinities to the U17 *Luzula-Geum* tall-herb community already described, but lack any of the constant species of that community and are essentially still *Calluna* heaths dominated by heather.

2.2.18 D2 WET DWARF SHRUB HEATH

Wet heath is one of the most common and widespread habitats in the Survey Area, especially on gentle slopes on shallow peat low down where it forms mosaics with blanket bog and marshy grassland. But it does extend on to deep peat where the original bog vegetation has become degraded, and in addition can be found at higher elevations and on steeper ground. Unsurprisingly then, it has a diverse flora and this variation is represented by a single NVC community and all four of its sub-communities, together with another type not included in the classification.

(NB: where it occurs on peat over 0.5m deep, it is arbitrarily defined in Phase 1 classification terms as E1.7 Wet Modified Bog, even though the floristics may be the same as on shallower substrates. For ease, it is described here and mapped as wet heath, but it should be borne in mind that some stands will occur on deep peat, and that there will be variation in peat depth even within stands.)

M15 *Trichophorum germanicum*-*Erica tetralix* wet heath

Deergrass-cross-leaved heath wet heath is a varied community with marked differences between sub-communities, and sometimes even between different stands of the same sub-community. The most common species overall are deergrass, cross-leaved heath, heather, purple moor-grass, tormentil and bog asphodel, though their relative quantities differ greatly across the range of variation within the community and they are not all present in all stands. Additional species identify the four sub-communities present, as well as the extra type:

- M15a *Carex panicea* sub-community. The carnation sedge sub-community is the wettest type, and indeed is more of a flush than a heath. The dominants here tend to be purple moor-grass, cross-leaved heath, heather and bog asphodel, and they are joined by a number of sedge species, including frequent to occasional carnation sedge, star sedge, flea sedge and common yellow-sedge *Carex demissa*, as well as round-leaved sundew *Drosera rotundifolia* and common butterwort.
- M15b Typical sub-community. This is the default and most common type, with all six of the most frequent species occurring in good quantity, and joined by frequent to occasional hare's-tail cottongrass, common cottongrass, bog-myrtle and the bog-moss *Sphagnum capillifolium*.
- M15c *Cladonia* sub-community. The *Cladonia* (lichen) sub-community is a drier type that occurs at slightly higher altitudes or on steeper, more rocky slopes with thinner soils. The community constants are here augmented by species more associated with dry heaths, including frequent to occasional bell heather and the moss *Racomitrium lanuginosum*. Despite the name, *Cladonia* lichens are still relatively uncommon here.
- M15d *Vaccinium myrtillus* sub-community. The bilberry sub-community is another dry type, this time characterised by species common in dry bilberry heaths, such as frequent bilberry and the moss *Hylocomium splendens*, as well as occasional wavy hair-grass.
- M15 montane. This is a high altitude form of wet heath that is not described in the NVC but is recognised by Averis *et al.* (2004). It is found here and there in the south-east of the Survey Area. Here, cross-leaved heath is absent and the usual species are joined by occasional *Racomitrium lanuginosum* and *Cladonia* spp. lichens, but also by species of montane habitats such as montane crowberry, bog bilberry and alpine clubmoss.

2.2.19 D4 MONTANE HEATH/DWARF HERB

Montane heath/dwarf herb habitats are found at high altitudes in the Survey Area. There are three quite different types: one is dry montane heath on exposed plateaux represented by two NVC communities, another is montane grassland on steep, high slopes that takes in another two NVC's, and the third is dripping, herb-rich mats of vegetation on wet rock faces, identified by a single NVC community.

U7 *Nardus stricta*-*Carex bigelowii* grass-heath

Mat-grass-stiff sedge grass-heath is confined to one small area of a steep north-east facing slope just below the plateau at high altitude at the south-east of the Survey Area, where it is too small to map and is target-noted. Mat-grass is abundant with all other species subordinate, including frequent to occasional stiff sedge, bilberry, heath bedstraw, wavy hair-grass, tufted hair-grass, deergrass, heath rush and heath wood-rush, with the mosses *Dicranum scoparium* and *Rhytidiadelphus loreus*. One sub-community is present:

- U7b Typical sub-community. The Typical sub-community is the default type and contains no distinguishing species in addition to those listed above.

U9 *Juncus trifidus*-*Racomitrium lanuginosum* rush-heath

Very small, discrete stands of three-leaved rush *Juncus trifidus*-*Racomitrium lanuginosum* (moss) heath are found within other montane heath on a stony plateau at the highest part of the Survey Area and are too small to map. They consist of low, exposed vegetation comprising clumps of three-leaved rush and occasional stiff sedge within a ground mat of *Racomitrium lanuginosum*. There is occasional wavy hair-grass, viviparous sheep's-fescue, alpine clubmoss, montane crowberry and *Cladonia* spp. lichens. One sub-community can be identified:

- U9b *Salix herbacea* sub-community. There is no dwarf willow *Salix herbacea* here, but the sub-community is identified by the frequent to occasional presence of bilberry, and by the dominance of *Racomitrium lanuginosum* over *Cladonia* spp. lichens.

U10 *Carex bigelowii*-*Racomitrium lanuginosum* moss-heath

The stiff sedge-*Racomitrium lanuginosum* (moss) moss-heath is the more common of the two montane heaths, forming larger, more continuous stands around the very limited examples of the U9 community. Here, three-leaved rush is entirely replaced by stiff sedge as the main vascular species, but the other associates are very similar to the previous community: frequent to occasional viviparous sheep's-fescue, wavy hair-grass, bilberry and *Cladonia* spp. lichens, all growing through a dense carpet of *Racomitrium lanuginosum*. One sub-community is present here:

- U10b Typical sub-community. The Typical sub-community is made up of the species above with the addition of frequent montane crowberry.

U13 *Deschampsia cespitosa*-*Galium saxatile* grassland.

The tufted hair-grass-heath bedstraw community occupies a similar habitat niche to the U7 grass-heath on steep slopes at high altitudes but tends to be wetter, and these conditions favour the dominance of tufted hair-grass over other grass species. It is abundant, along with frequent to occasional common bent, viviparous sheep's-fescue, mat-grass, wavy hair-grass, marsh violet, tormentil and cowberry, along with the mosses *Hylocomium splendens* and *Pleurozium schreberi*. Both sub-communities occur in the Survey Area:

- U13a *Anthoxanthum odoratum*-*Alchemilla alpina* sub-community. The sweet vernal-grass-alpine lady's-mantle sub-community is the grassy form, with additionally frequent to occasional sweet vernal-grass and velvet bent, as well as alpine lady's-mantle, hard-fern, harebell, great wood-rush and heath wood-rush.
- U13b *Rhytidiadelphus loreus* sub-community. The *Rhytidiadelphus loreus* (moss) sub-community is a mossier type, with *Rhytidiadelphus loreus* dominant in the ground layer and occasional stiff sedge and bilberry.

U15 *Saxifraga aizoides*-*Alchemilla glabra* banks

There is a single location recorded of the yellow saxifrage *Saxifraga aizoides*-smooth lady's-mantle community on a wet rock face dripping with base-rich water on crags above Loch a' Bhealaich Leamhain. Here, there is a dense mat of herb-rich vegetation clinging to the steep face of the cliff that is out of reach of grazing animals. Yellow saxifrage is abundant to dominant, and there is frequent to occasional smooth lady's-mantle, alpine lady's-mantle, meadow buttercup, alpine bistort, harebell, wild thyme, water avens, grass-of-Parnassus, red fescue, tufted hair-grass and viviparous sheep's-fescue.

2.2.20 E1.6.1 BLANKET BOG

Blanket bog is characterised as vegetation on deep (>0.5m) peat fed only by rainwater (ombrotrophic). It is abundant on level ground and shallow slopes, especially in lower areas of the Survey Area in mosaics with wet heath and marshy grassland, but does extend up to high altitudes in the south-east of the Survey Area. There are three NVC communities here.

M17 *Trichophorum germanicum*-*Eriophorum vaginatum* blanket mire

Deergrass-hare's-tail cottongrass blanket mire is the most common type of bog in lower parts of the Survey Area. This community has an even mix of graminoids, dwarf shrubs and *Sphagnum* spp. (bog-mosses), with frequent deergrass, heather, cross-leaved heath, hare's-tail cottongrass and purple moor-grass, along with frequent to abundant *Sphagnum*

papillosum and *S. capillifolium*. Occasional bog asphodel and tormentil are usually present. The frequency of all these constants varies according to the sub-community, two of which are present here:

- M17a *Drosera rotundifolia*-*Sphagnum* sub-community. The round-leaved sundew-*Sphagnum* (bog-moss) sub-community is the wettest type, with frequent bog-myrtle and occasional round-leaved sundew in addition to the species listed above. Some small, discrete stands occur in soligenous situations with obvious water movement such as around peaty channels. These are marked out by the addition of frequent to abundant common reed *Phragmites australis*, making these areas a distinct variant of this sub-community that is not recognised in the current NVC. They have affinities with the M21 valley mire, but that is a community of the southern lowlands of Great Britain.
- M17c *Juncus squarrosus*-*Rhytidiadelphus loreus* sub-community. This is another drier type, found at higher altitudes. Heather is absent from these stands and is replaced by frequent bilberry. There is a little wavy hair-grass and *Sphagnum* species are again reduced in cover, to be partially replaced by pleurocarpus mosses such as *Pleurozium schreberi* instead.

M18 *Erica tetralix*-*Sphagnum papillosum* raised and blanket mire

Cross-leaved heath-*Sphagnum papillosum* (bog-moss) raised and blanket mire is the most consistently wet type of bog, with a more or less continuous carpet of *Sphagnum* species below an open sward of dwarf shrubs and graminoids. This is the least common form of blanket bog in the Survey Area and is only found on very level ground. *Sphagnum papillosum* and *S. capillifolium* are both abundant, and hare's-tail cottongrass, cross-leaved heath and heather are very common. On the other hand purple moor-grass and tormentil are absent, and deergrass has reduced cover compared to the M17 community. One sub-community is represented:

- M18a *Sphagnum magellanicum*-*Andromeda polifolia* sub-community. Neither *Sphagnum magellanicum* (bog-moss) nor bog-rosemary *Andromeda polifolia* occur here, but the sub-community is nevertheless identified by occasional bog asphodel and round-leaved sundew.

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

Heather-hare's-tail cottongrass blanket mire is the driest of the three types and is the form of bog that occurs at high altitudes in the Survey Area. Cross-leaved heath is absent here and deergrass, purple moor-grass and *Sphagnum papillosum* much reduced. Both heather and hare's-tail cottongrass are frequent to abundant, common cottongrass, tormentil and heath bedstraw are occasional and *Sphagnum capillifolium* has increased cover here, where it is the most common bog-moss species. Pleurocarpus mosses have greater representation in this community, with frequent *Pleurozium schreberi* and *Rhytidiadelphus loreus*. But the most striking difference here and what makes the community easy to identify is the presence of two species not found in other blanket mires: frequent cloudberry and dwarf cornel. Further species identify the single sub-community present:

- M19c *Vaccinium vitis-idaea*-*Hylocomium splendens* sub-community. The cowberry-*Hylocomium splendens* (moss) sub-community is the most montane form of this bog. There is occasional cowberry, as well as other high altitude species such as montane crowberry and bog bilberry. The moss *Hylocomium splendens* is frequent to abundant and both *Racomitrium lanuginosum* and *Sphagnum papillosum* are occasional, as are *Cladonia* spp. lichens. (NB: some of these stands are eroded and are referable to the E1.8 Dry modified bog category.)

2.2.21 E1.7 WET MODIFIED BOG

Wet modified bog occurs in two very different situations in the Survey Area. The first is where blanket bog has been eroded into peat hags. The process of erosion and partial drying out changes the composition of the vegetation, giving rise to a different sub-community of M17 blanket mire. The second is found on a very small part of the Survey Area adjacent to a cut channel, effectively subjecting a localised stand to draining within a wider area of eroded peat. A different NVC community can be identified here. Bog pool communities are also found in these habitats, identifiable as two further NVC types. (NB: stands of M25 Marsh/marshy grassland and M15 Wet dwarf shrub heath on deep (>0.5m) peat are also referable to this Phase 1 category.)

M2 *Sphagnum cuspidatum/fallax* bog pool community

Sphagnum cuspidatum/fallax (bog-mosses) bog pool is found within M19 blanket mire at higher altitudes. It occupies what appears to be an artificially cut channel that has filled in with bog-moss species. *Sphagnum cuspidatum* is frequent and other species identify the sub-community present:

- M2b *Sphagnum fallax* sub-community. The *Sphagnum fallax* sub-community has frequent *Sphagnum fallax* and *S. papillosum*, along with occasional *Polytrichum commune*. Vascular plants include occasional hare's-tail cottongrass and velvet bent.

M3 *Eriophorum angustifolium* bog pool community

Common cottongrass bog pools occupy the base of peat hags within eroded M17 blanket mire. They comprise nothing more than abundant common cottongrass growing through the bog-moss *Sphagnum cuspidatum*.

M17b *Trichophorum germanicum-Eriophorum vaginatum* blanket mire, *Cladonia* sub-community.

This is a drier type of the M17 blanket bog, and is mostly associated with hagged (eroded) peat bog at low altitude. Here, purple moor-grass and *Sphagnum papillosum* are absent and the other community constants have reduced cover in a more open sward. Common cottongrass is frequent in these stands and there is occasional fir clubmoss. *Sphagnum* species in the ground layer are partially replaced by frequent *Racomitrium lanuginosum* and *Cladonia* lichens. There is also a significant amount of bare peat due to the erosion that has taken place.

M20 *Eriophorum vaginatum* blanket and raised mire

The hare's-tail cottongrass community here is similar to the surrounding M19c vegetation, but wetter and without any heather. Instead, hare's-tail cottongrass is dominant, along with frequent montane crowberry. These are rooted in a blanket of *Sphagnum capillifolium*, *S. papillosum* and the moss *Polytrichum commune*. This stand does not fit the description of either sub-community but is recognised as a distinct type in Averis *et al.* (2004).

2.2.22 E1.8 DRY MODIFIED BOG

This category includes those stands of M19c Blanket bog that occur on hagged (eroded) peat.

2.2.23 E2.1 FLUSH AND SPRING – ACID/NEUTRAL FLUSH

Acid flushes are characterised by a carpet of *Sphagnum* bog-mosses overlain by rushes or sedges. They are usually located in shallow channels and depressions, conducting surface water run-off from the surrounding vegetation. The habitat is localised at the Survey Area,

and appears in mosaics with blanket bog, wet heath, marshy grassland and damp acid grassland. A single NVC community characterises this habitat.

M6 *Carex echinata-Sphagnum fallax/denticulatum* mire

Star sedge-*Sphagnum fallax/denticulatum* (bog-moss) mire comprises a sward of either sedges or rushes rooted in a deep layer of mosses, most commonly *Sphagnum fallax* and *Polytrichum commune*. The remainder of the species composition varies between stands but there is usually some tormentil and purple moor-grass, and occasionally velvet bent and marsh violet. Two sub-communities are identified, based on whether sedge or rush species predominate:

- M6b *Carex nigra-Nardus stricta* sub-community. The common sedge-mat-grass sub-community is most common at higher altitudes amongst bog and wet heath, but does occur low down beside sluggish streams and on the edges of pools as well. The sward is dominated by common sedge, with occasional common cottongrass, mat-grass, heath rush and sweet vernal-grass. *Sphagnum papillosum* joins *S. fallax* and *Polytrichum commune* in the ground carpet. Richer stands lower down associated with slow-moving watercourses where there is more water movement through the sward have occasional lesser spearwort, cuckooflower *Cardamine pratensis* and devil's-bit scabious.
- M6c *Juncus effusus* sub-community. The soft rush sub-community occurs in two discrete locations low down in the western part of the Survey Area in mosaics with wet heath, marshy grassland and blanket bog. Here, soft rush dominates in the sward and there is occasional hare's-tail cottongrass. The usual bryophytes are again joined by frequent *Sphagnum papillosum*.

2.2.24 E2.2 FLUSH AND SPRING – BASIC FLUSH

asic flush habitat has a higher pH than its acid/neutral counterpart, and arises where calcium-rich groundwater emerges through bedrock and flows through the substrate and along the ground. There are many locations across the Survey Area, particularly on steep, wet, rocky ground above the three large lochs. These habitats are very limited in extent due to the nature of their formation, usually occurring as small linear features along the direction of water flow. Therefore they are target-noted rather than mapped, but there will be numerous other examples with simply not enough time to check every possible location. Therefore the ones included are a representation of the habitat and its broad distribution rather than a definitive count.

These flushes are more species-rich than acid/neutral types, and two NVC communities can be identified.

M10 *Carex dioica-Pinguicula vulgaris* mire

Dioecious sedge *Carex dioica*-common butterwort mire is the least common of the two types of basic flush. It consists of an open sward of sedges and forbs. There is frequent to occasional carnation sedge, dioecious sedge, tawny sedge and flea sedge, with frequent common butterwort and occasional jointed rush *Juncus articulatus*, common cottongrass, tormentil, purple moor-grass and meadow buttercup. One sub-community is present here:

- M10a *Carex demissa-Juncus bulbosus/kochii* sub-community. The common yellow-sedge-bulbous rush *Juncus bulbosus/kochii* sub-community contains, as well as the species listed above, frequent common yellow-sedge and star sedge, and occasional cross-leaved heath, round-leaved sundew, yellow saxifrage and deergrass.

M11 *Carex demissa-Saxifraga aizoides* mire

The common yellow-sedge-yellow saxifrage mire is more montane than M10 and is much the commoner type in the Survey Area. In this vegetation yellow saxifrage is the most common species, with lesser quantities of common yellow-sedge, flea sedge, carnation sedge, common butterwort and jointed rush. The moss *Bryum pseudotriquetrum* is abundant. The uncommon forb Scottish asphodel *Tofieldia pusilla* is present in at least one of these stands. Both sub-communities are found at the Survey Area:

- M11a *Thalictrum alpinum*-*Juncus triglumis* sub-community. The alpine meadow-rue-three-flowered rush *Juncus triglumis* sub-community is the most common type. Alpine meadow-rue can be very frequent here and, depending on the stand, there can also be frequent to occasional starry saxifrage *Micranthes stellaris*, alpine lady's-mantle, star sedge and tufted hair-grass.
- M11b *Palustriella commutata*-*Eleocharis quinqueflora* sub-community. The *Palustriella commutata* (moss)-few-flowered spike-rush *Eleocharis quinqueflora* sub-community has frequent tawny sedge and *Palustriella commutata*.

2.2.25 E2.3 FLUSH AND SPRING – BRYOPHYTE-DOMINATED SPRING

Bryophyte-dominated springs are wet habitats that occur where groundwater emerges through the substrate and are dominated by mosses rather than vascular plants. They are too small to map and are therefore target-noted. Like base-rich flushes, these features are too small and too numerous to have the ability to locate every one in the course of mapping the Survey Area; therefore the recorded examples represent the better examples of the ones that were encountered.

Springs are associated with flushes, the latter usually occurring immediately downhill of the former as the water disperses. The irrigating water can be acidic or base-enriched and this gives rise to different NVC communities, of which three are present at the Survey Area.

M31 *Anthelia julacea*-*Sphagnum denticulatum* spring

Anthelia julacea (moss)-*Sphagnum denticulatum* (bog-moss) springs occur in the montane zone where there is irrigation with acidic water. They occur on slopes below cliffs and montane grasslands and are usually more diffuse than other types of spring. They may be maintained as much by surface water from melting snow as by groundwater. They are dominated by cushions of *Anthelia julacea* with a scattering of vascular species including occasional mat-grass, common butterwort, bog asphodel, common yellow-sedge, common sedge, star sedge, common cottongrass, bulbous rush and heath rush.

M32 *Philonotis fontana*-*Micranthes stellaris* spring

Philonotis fontana (moss)-starry saxifrage springs are also acidic and sometimes occur together with the M31 type. They usually represent points of groundwater emergence rather than larger areas where surface water flows may be contributing to the wet conditions. They can have abundant *Philonotis fontana* but just as often are dominated by the moss *Dichodontium palustre*. Starry saxifrage is usually present as an occasional. Both sub-communities are recorded here:

- M32a *Sphagnum denticulatum* sub-community. There is abundant *Sphagnum denticulatum* in this sub-community, with little else to distinguish it.
- M32b *Montia fontana*-*Chrysosplenium oppositifolium* sub-community. The blinks *Montia fontana*-opposite-leaved golden-saxifrage *Chrysosplenium oppositifolium* sub-community has a few more vascular species than M32a, with occasional to abundant opposite-leaved golden-saxifrage, as well as occasional sweet vernal-grass and marsh willowherb *Epilobium palustre*. The moss *Palustriella commutata* is also occasional.

M37 *Palustriella commutata*-*Festuca rubra* spring

Palustriella commutata (moss)-red fescue springs are the commonest type in the Survey Area and often occur upstream of the M11 flush community. They mark points where base-rich groundwater rises to the surface. They are dominated by large mounds of *Palustriella commutata*, with occasional *Bryum pseudotriquetrum*. The vascular flora includes occasional yellow saxifrage, common butterwort and common yellow-sedge.

2.2.26 E3.2 FEN – BASIN MIRE

Basin mire develops in waterlogged depressions. There is one very small example at the Survey Area, representing a single NVC community.

M4 *Carex rostrata*-*Sphagnum fallax* mire

Bottle sedge-*Sphagnum fallax* (bog-moss) mire is found at a single location at the west of the Survey Area in an area of wet woodland and marshy grassland. It is too small to map and is therefore target-noted. The canopy is dominated by bottle sedge, with occasional common sedge, common marsh-bedstraw *Galium palustre* and lesser spearwort *Ranunculus flammula*. These are rooted in an almost continuous blanket of *Sphagnum fallax* with occasional bog pondweed *Potamogeton polygonifolius*.

2.2.27 F1 SWAMP

Swamp habitat consists of emergent vegetation in standing water and is limited to three small (c.100m²), species-poor stands. These are too small to map and are target-noted. One NVC community is associated with this habitat here.

S9 *Carex rostrata* swamp

Bottle sedge swamp has a canopy of bottle sedge with its roots in water. One sub-community is present:

- S9a *Carex rostrata* sub-community. The bottle sedge sub-community is species-poor, with very little, if anything, apart from bottle sedge.

2.2.28 F2.1 MARGINAL/INUNDATION – MARGINAL

Marginal habitat forms a narrow band of emergent vegetation at the edge of watercourses. It has a single recorded location at the Survey Area, consisting of one NVC community. It is too small to map, being no more than c.50m², and is therefore target-noted.

S10 *Equisetum fluviatile* swamp

Water horsetail *Equisetum fluviatile* swamp comprises a sward of water horsetail in a discrete stand at the edge of a sluggish stream. This identifies a single sub-community:

- S10a *Equisetum fluviatile* sub-community. The water horsetail sub-community has no other species present.

2.2.29 G1 STANDING WATER

Standing water occurs in the Survey Area in the form of three lochs and a reservoir.

2.2.30 G2 RUNNING WATER

Running water is present as a number of watercourses (rivers and streams).

2.2.31 I1.2 SCREE

Scree is present in the north-east and south-east of the Survey Area as boulder fields on steep slopes.

2.2.32 I1.4 OTHER EXPOSURE

This refers to exposed bedrock on mountain tops in the south-east of the Survey Area and exposed stones and boulders in a dry river bed in the north-east.

2.2.33 I2.1 QUARRY

There is a small sand and gravel quarry in the west of the Survey Area.

Table 1: Habitat areas based on Phase 1 habitats.

Phase 1 Habitats	Area (ha)	% of Survey Area
A1.1.1 - Broadleaved woodland - semi-natural	27.77	1.68
A1.1.2 - Broadleaved woodland - plantation	1.53	0.09
A1.2.1 - Coniferous woodland - semi-natural	55.58	3.36
A1.2.2 - Coniferous woodland - plantation	25.82	1.56
A1.3.1 - Mixed woodland - semi-natural	0.32	0.02
A2.1 - Scrub - dense/continuous	12.76	0.77
B1.1 - Acid grassland - unimproved	29.78	1.80
B1.2 - Acid grassland - semi-improved	1.99	0.12
B2.1 - Neutral grassland - unimproved	2.84	0.17
B2.2 - Neutral grassland - semi-improved	1.34	0.08
B3.1 - Calcareous grassland - unimproved	4.04	0.24
B5 - Marsh/marshy grassland	279.79	16.93
B5 - Marsh/marshy grassland/Scattered Trees	3.46	0.21
C1.1 - Bracken	5.15	0.31
C1.1/A3.1 - Bracken/Scattered broadleaved trees	0.68	0.04
D1.1 - Dry dwarf shrub heath - acid	29.89	1.81
D1.1/B3.1 - Broadleaved woodland - semi-natural	0.57	0.03
D1.1/B3.1 - Dry dwarf shrub heath/calcareous grassland mosaic	61.41	3.72
D2 - Exposed rock	0.01	0.00
D2 - Wet dwarf shrub heath	624.51	37.80
D4 - Montane heath/dwarf herb	6.63	0.40
D5 - Dry heath/acid grassland mosaic	2.55	0.15
E1.6.1 - Blanket bog	147.91	8.95
E1.7 - Wet modified bog	12.56	0.76
E1.8 - Dry modified bog	45.28	2.74
E2.1 - Acid/neutral flush	1.37	0.08
E2.3 - Basic Flush	0.19	0.01
G1 - Standing water	204.11	12.35
G2 - Running water	9.79	0.59
I1.2 - Scree	10.12	0.61
I1.2 - Tall herb over scree	0.54	0.03
I1.4 - Exposed rock	6.95	0.42
I1.4/B3.1 - Calcareous grassland/rock mosaic	0.92	0.06
I1.4/D1.1 - Dry dwarf shrub heath/exposed rock mosaic	10.61	0.64
I1.4/D2 - Wet dwarf shrub heath/exposed rock mosaic	9.41	0.57
I2.1 - Quarry	0.92	0.06
J3.6 - Buildings	0.04	0.00

J3.6 - Built environment	6.12	0.37
Bare peat	7.00	0.42
Total	1,652.25	100.00

Figure 3 details the NVC habitats for the Survey Area with Figure 4 displaying the assessed conservation value of the habitat areas (Appendix B). For ease, the habitat figures have used Phase I colouring for each polygon with NVC communities labelled.

2.2.34 GROUNDWATER DEPENDENT TERRESTRIAL ECOSYSTEMS (GWDTE)

The NVC habitat survey identified a number of habitats which are considered to support habitats which are assessed as potentially dependent on groundwater to some degree.

GWDTEs are protected from disturbance under the Water Framework Directive, which is transposed into Scottish Law, through the Water Environment and Water Services (Scotland) Act (WEWS) 2003. Table 2 presents both the potential ground water dependency based on the guidance but also an adjusted value, based on the site specific setting of the community. As many of the communities are found in mosaic, the potential dependence of each individually mapped polygon may vary from that of the dominant community, based on the percentages of sensitive communities and the site specific setting.

For example, where the dominant NVC community of a habitat is not groundwater dependent, but the wider mosaic supports a sub-dominant NVC community identified as being potentially dependent on groundwater, then this may be classified as 'Low-Moderate'. Similarly, where the dominant NVC community of a habitat is identified as being of moderate groundwater dependency but supports a sub-dominant NVC community identified as being potentially highly dependent on groundwater, then this may be classified as 'Moderate-High'.

Table 2: Summary of habitats present within the Survey Area which are potentially dependent on groundwater with classification based on SEPA guidance and site-specific adjustments.

Phase 1 habitat	NVC community notes	Groundwater dependency	
		Guidance	Site-specific
A1.1.1 Broadleaved woodland – semi-natural	W4b <i>Betula pubescens-Molinia caerulea</i> woodland, <i>Juncus effusus</i> sub-community - Topographical setting on moderate slopes away from any obvious surface water features suggests possible groundwater influence, though slight easing of gradient may be resulting in ponding of surface water collected from further upslope. - Presence of small number of species of less acidic character than would normally be associated with this community may indicate some groundwater influence on the habitat.	High	Low to Moderate
	W4c <i>Betula pubescens-Molinia caerulea</i> woodland, <i>Sphagnum</i> sub-community - Location on gentle slopes or level ground close to watercourses in valley bottoms indicates surface water influence. - Species-poor, with no species indicating influence of base-rich groundwater.	High	Low
	W7a <i>Alnus glutinosa-Fraxinus excelsior-Lysimachia</i>	High	Low

	<i>nemorum</i> woodland, <i>Urtica dioica</i> sub-community - Location on gentle slope adjacent to watercourse in valley bottom indicates surface water influence.		
	W7c <i>Alnus glutinosa</i>-<i>Fraxinus excelsior</i>-<i>Lysimachia nemorum</i> woodland, <i>Deschampsia cespitosa</i> sub-community - Setting in slight depression on otherwise moderate slopes indicates possible ponding location for surface water collected from surrounding slopes.	High	Low
	W9b <i>Fraxinus excelsior</i>-<i>Sorbus aucuparia</i>-<i>Mercurialis perennis</i> woodland, <i>Crepis paludosa</i> sub-community - Location on otherwise dry slopes away from any obvious surface water features suggests possible groundwater influence. - Moderately species-rich, with base-rich indicators. - NB: not regarded as a GWDTE community in the guidance, but W9b in particular can be associated with flushing, as here.	n.a.	High
A2.2 Scrub – scattered	W20 <i>Salix lapponum</i>-<i>Luzula sylvatica</i> scrub - Strongly associated with wet crags and ledges where water appears despite no obvious surface flows. - Many stands are species-rich, with species of base-rich habitats.	High	High
B1.1 Acid grassland – unimproved	U6d <i>Juncus squarrosus</i>-<i>Festuca ovina</i> grassland, <i>Agrostis capillaris</i>-<i>Luzula multiflora</i> sub-community - Species-poor, with no species indicating influence of base-rich groundwater. - Located in depressions adjacent to blanket bog at higher altitudes, indicating water received through mist, rain and surface run-off rather than groundwater.	Moderate	Low
	U6 base-rich <i>Juncus squarrosus</i>-<i>Festuca ovina</i> grassland - Species-rich, including species indicative of base-enrichment. - Location on moderate slopes suggests diffuse flushing with base-rich water.	Moderate	High
B2.1 Neutral grassland – unimproved	MG9a <i>Holcus lanatus</i>-<i>Deschampsia cespitosa</i> grassland, <i>Poa trivialis</i> sub-community - Moderately species-rich, but no floristic indicators of base-rich groundwater emergence. - Location adjacent to watercourse indicates surface water influence.	Moderate	Low
B3.1 Calcareous grassland –	CG10a <i>Festuca ovina</i>-<i>Agrostis capillaris</i>-<i>Thymus drucei</i> grassland, <i>Trifolium repens</i>-<i>Luzula campestris</i> sub-community - Located adjacent to surface water features where erosion by watercourses has exposed loose calcareous bedrock/till at or close to the surface. Indicates direct	High	Low

unimproved	influence of geology rather than groundwater.		
	CG10b <i>Festuca ovina</i>-<i>Agrostis capillaris</i>-<i>Thymus drucei</i> grassland, <i>Carex pulicaris</i>-<i>Carex panicea</i> sub-community - Moderately basic species assemblage on damp ground in the absence of obvious surface water features or exposed calcareous bedrock, indicating flushing with moderately base-rich water.	High	High
	CG11a <i>Festuca ovina</i>-<i>Agrostis capillaris</i>-<i>Alchemilla alpina</i> grass-heath, Typical sub-community and CG11b <i>Festuca ovina</i>-<i>Agrostis capillaris</i>-<i>Alchemilla alpina</i> grass-heath, <i>Carex pulicaris</i>-<i>Carex panicea</i> sub-community - Species-rich swards, including floristic indicators of base-enrichment in the absence of basic geology. - Damp ground on steep slopes with water movement in the absence of any obvious surface water sources, suggesting groundwater emergence directly above.	High	High
B5 Marsh/ marshy grassland	M25a <i>Molinia caerulea</i>-<i>Potentilla erecta</i> mire, <i>Erica tetralix</i> sub-community, M25b <i>Molinia caerulea</i>-<i>Potentilla erecta</i> mire, <i>Anthoxanthum odoratum</i> subcommunity and M25 species-poor <i>Molinia caerulea</i>-<i>Potentilla erecta</i> mire - Species-poor or low species-richness, with no species indicating influence of base-rich groundwater. - Situations in mosaics with wet heath and blanket bog over extensive areas suggests rain and surface water fed, rather than groundwater.	Moderate	Low
	M25b <i>Molinia caerulea</i> - <i>Potentilla erecta</i> mire, <i>Anthoxanthum odoratum</i> subcommunity		
	M25c <i>Molinia caerulea</i>-<i>Potentilla erecta</i> mire, <i>Angelica sylvestris</i> sub-community - Moderately species-rich, and with species indicative of base-richness - Damp ground on gentle slope, suggesting movement of base-enriched water through the substrate, probably mixed with rain and surface water run-off.	Moderate	Moderate
	M25a base-rich <i>Molinia caerulea</i>-<i>Potentilla erecta</i> mire - Very species-rich, including many indicators of base-enrichment - Well-drained upper slopes, with no obvious sources of base-rich water except from groundwater.	Moderate	High
	Small sedge mire - Not recognised in the NVC - Species-rich, and containing species indicating base-rich groundwater emergence.	n.a.	High
C2 Upland species-rich ledges	U17b <i>Luzula sylvatica</i>-<i>Geum rivale</i> tall-herb community, <i>Geranium sylvaticum</i> subcommunity - Very species-rich, including species indicative of base-enrichment. - Situated on damp ledges on wet rock, with no obvious source of	High	High

	surface water flows, suggesting emergence of base-rich groundwater.		
D2 Wet dwarf shrub heath	M15a <i>Trichophorum germanicum-Erica tetralix</i> wet heath, <i>Carex panicea</i> sub-community - Located in wet situations with evidence of water movement through the vegetation. - Includes species of base-rich flushes, such as carnation sedge, flea sedge, common yellow-sedge and common butterwort.	Moderate	Moderate
	M15b <i>Trichophorum germanicum-Erica tetralix</i> wet heath, Typical sub-community; M15c <i>Trichophorum germanicum-Erica tetralix</i> wet heath, <i>Cladonia</i> sub-community; M15d <i>Trichophorum germanicum-Erica tetralix</i> wet heath, <i>Vaccinium myrtillus</i> sub-community and M15 montane <i>Trichophorum germanicum-Erica tetralix</i> wet heath - Low species-richness, with no species indicating influence of base-rich groundwater. - Situations in mosaics with marshy grassland and blanket bog over extensive areas, or in drier situations on steeper slopes, suggests rain and surface water fed, rather than groundwater.	Moderate	Low
D4 Montane heath/dwarf herb	U15 <i>Saxifraga aizoides-Alchemilla glabra</i> banks - Species-rich, including species indicating base-enrichment. - Situated on wet, dripping rock faces with no obvious source of surface water flows, suggesting emergence of base-rich groundwater.	High	High
E2.1 Flush and spring – acid/neutral flush	M6b <i>Carex echinata-Sphagnum fallax/denticulatum</i> mire, <i>Carex nigra-Nardus stricta</i> sub-community - Species-poor and lacking base-rich indicators. - Located in depressions below blanket bog or along the edges of streams, indicating surface water rather than groundwater fed.	High	Low
	M6c <i>Carex echinata-Sphagnum fallax/denticulatum</i> mire, <i>Juncus effusus</i> sub-community - Species-poor and lacking indicators of base-rich groundwater emergence. - Located adjacent to wet heath, suggesting surface water run-off responsible for wet conditions, rather than groundwater.	High	Low
E2.2 Flush and spring – basic flush	M10a <i>Carex dioica-Pinguicula vulgaris</i> mire, <i>Carex demissa-Juncus bulbosus/kochii</i> subcommunity - Moderately species-rich, and containing species indicating base-rich groundwater emergence. - Found in wet situations with no obvious source of water apart from groundwater.	High	High

	M11a <i>Carex demissa-Saxifraga aizoides</i> mire, <i>Thalictrum alpinum-Juncus triglumis</i> sub-community, and M11b <i>Carex demissa-Saxifraga aizoides</i> mire, <i>Palustriella commutata-Eleocharis quinqueflora</i> sub-community - Moderately species-rich and containing species indicating base-rich groundwater emergence. -Found in wet situations with no obvious source of water apart from groundwater.	High	High
E2.3 Flush and spring – bryophyte-dominated spring	M31 <i>Anthelia julacea-Sphagnum denticulatum</i> spring - Small to larger diffuse areas of low species-richness, in situations of irrigation with groundwater and/or flushing with snow melt.	High	High
	M32a <i>Philonotis fontana-Micranthes stellaris</i> spring, <i>Sphagnum denticulatum</i> sub-community and M32b <i>Philonotis fontana-Micranthes stellaris</i> spring, <i>Montia fontana-Chrysosplenium oppositifolium</i> subcommunity - Small, species-poor features located in obvious points of groundwater emergence such as point sources with no other obvious source of water available.	High	High
	M37 <i>Palustriella commutata-Festuca rubra</i> spring - Small, species-poor features located in obvious points of groundwater emergence such as point sources with no other obvious source of water available. - Includes species indicating base-enrichment.	High	High

Figure 5 displays the GWDTE score for the habitats across the Survey Area. The vast majority of habitats are assessed as having relatively low dependency on groundwater. In some instances, habitats such as M15 *Trichophorum germanicum-Erica tetralix* wet heath which are identified as being of moderate dependency on groundwater within SEPA guidance have been assessed to be only of low dependency due to their landscape setting. In other cases, habitats which are identified as being of moderate dependency have been upgraded to high dependency due to significant influence on habitats from basic rock exposures or springs.

In summary, areas of habitat with significant dependency on groundwater are located on the southern slopes of Binnein Shuas, on the upper slopes through the pass at Bealch Leamhain and to a lesser extent on the northern slopes of Loch a' Bhealaich Leamhain. Table 3 details the total areas of habitats based on their potential dependencies on groundwater.

Habitat surveys alone cannot confirm the dependency on groundwater of these habitats but in the absence of further hydrogeological investigations the classification system outlined in SEPA guidance (Scottish Environment Protection Agency 2014) has been utilised.

Table 3: Summary of GWDTE communities across the Survey Areas. Actual groundwater dependency will depend on the hydrogeological setting.

pGWDTE Category	Area (ha)	% of Survey Area
High	81.78	4.95
Moderate-High	32.61	1.97
Moderate	120.94	7.32
Low-Moderate	26.50	1.60
Low	972.50	58.86

Peatland	180.02	10.90
N/A	237.90	14.40
Total	1,652.25	100.00

2.2.35 INVASIVE NON-NATIVE SPECIES

Although not the focus of the survey, invasive non-native species in the form of rhododendron *Rhododendron ponticum* are present at a number of locations. The distribution is predominantly at the northern end of Lochan na h-Earba on the shores of the loch although a small number of bushes are also found in the north of the Survey Area within patchy scrub. Evidence of past treatment of the bushes around Lochan na h-Earba was apparent but both large and small bushes remains. Rhododendron is classified as an invasive non-native species under the Wildlife and Countryside Act 1981 (as amended by the Wildlife and Natural Environment (Scotland) Act 2012) and is the subject to extensive control efforts across Scotland and the UK.

3 SUMMARY

The Survey Area supports a wide range of habitats from the lowland fringes in the south to the montane steep slopes in the south. Many of these habitats are common and widespread across Scotland and represent unremarkable habitat communities.

However, in some locations, especially those at montane altitudes or where significant influence from the basic geology, habitats of county or national importance are present. Montane habitats are found in areas above the natural tree level which varies depending on location but is generally around 600m above sea level. Such alpine and sub-alpine areas represent some of the most natural and undisturbed habitats in the UK. Within the Survey Area important montane habitats include small pockets of mountain willow scrub, which is very scarce within Scotland and identified as an Annex 1 habitat of the 'Habitats Directive'.

In addition, the Survey Area supports large sections of blanket bog, which is identified as a priority habitat in the UK BAP, Scottish Biodiversity List and Annex 1 habitat. In general, active peat forming bog habitats and associated communities are recognised as being of high value to biodiversity and carbon sequestration. As a result, habitats including M1 *Sphagnum denticulatum*, M2 *Sphagnum fallax*/*S. cuspidatum* and M3 *Eriophorum angustifolium* bog pools; M17 *Trichophorum-Eriophorum*, M18 *Erica-Sphagnum* and M19 *Calluna-Eriophorum* bog mire communities are all likely to be considered as priority habitats. More degraded peatland communities such as M20 *Eriophorum vaginatum*, M15 *Trichophorum-Erica*, M16 *Erica-Sphagnum* and M25 *Molinia-Potentilla* communities are unlikely to be classed as priority peatland. Any montane variety of these peatland habitats occurring above 600m are also likely to qualify as priority peatland habitats unless in a significantly degraded condition and beyond restoration. Within the Survey Area sections of peatland habitat are present, but this is often in a mosaic with wet and dry heath communities and some degree of degradation is present. This is especially true southwest of Lochan na h-Earba where heavily degraded peatland is present with large areas of haggling and bare peat. On the steeper slopes around Loch a' Bhealaich, peatland habitats are found in mosaic with wet and dry heath communities and although peat depths on these slopes is not known, it is likely that significant depths of peat are present over much of the area. Where the slopes decrease on higher flatter ground to the south of Loch a' Bhealaich Leamhain, the habitats become degraded with areas of haggling and bare peat. Many of these areas have, therefore, been assessed not to meet all the criteria to be of Annex 1 quality, although in the context of the proposed development, these areas are still of significant value.

The areas of blanket bog in the north of the Survey Area on lower ground form larger areas of contiguous good quality blanket bog habitats and have been recognised as being of National importance. Many of these areas support scattered bog pools and it is likely that peat depths are significant.

There are a number of smaller features, which although support significant conservation value is very limited in coverage, either by the nature of the habitat, such as U17 *Luzula sylvatica*-*Geum rivale* tall-herb community or due to land use practices, primarily the effects of deer browsing, for example W20 *Salix lapponum*-*Luzula sylvatica* scrub. Impacts on such habitats, despite their limited distribution, should also be avoided.

Individual species of notable conservation value were also identified within the Survey Area. These included the red list species of petty whin *Genista anglica*, downy willow *Salix lapponum*, dwarf cornel *Cornus suecica*, field gentian *Gentianella campestris*, lesser butterfly-orchid *Platanthera bifolia* and small-white orchid *Pseudorchis albida*. Additional species present which are listed on either the UK BAP, Highland BAP or Scottish Biodiversity List include juniper *Juniperus communis* and aspen *Populus tremula*.

GWDTEs are specifically protected under the WFD/WEWS and are sensitive receptors to the pressures that are potentially caused by land use change. From the information obtained during the survey and desktop study it is assessed that a number of key locations support habitats with a likely high dependency on groundwater. These are concentrated on the southern slopes of Binnein Shuas, on the upper slopes through the pass at Bealch Leamhain and to a lesser extent on the northern slopes of Loch a' Bhealaich Leamhain. These areas should be taken into consideration when designing the proposed scheme and input from hydrogeologists should be sought to ensure any impacts are avoided and where not possible, minimised. Recreation and or restoration of such delicate habitats is, in most cases not possible, at least in the short to medium term.

4 REFERENCES

- Atherton, I., Bosanquet, S. & Lawley, M. (2010) *Mosses and Liverworts of Britain and Ireland a Field Guide*. British Bryological Society.
- British Geological Survey. (2022) Geology of Britain map viewer. URL <https://mapapps.bgs.ac.uk/geologyofbritain/home.html> [accessed 7 February 2022]
- Elkington, T., Dayton, N., Jackson, D.L. & Strachan, I.M. (2002) *National Vegetation Classification: Field Guide to Mires and Heaths*.
- Joint Nature Conservation Committee. (2016) *Handbook for Phase 1 Habitat Survey - a Technique for Environmental Audit*. JNCC.
- Rodwell, J.S. (ed). (1991) *British Plant Communities. Volume 2. Mires and Heaths*. Cambridge University Press.
- Rodwell, J.S. (2006) *NVC Users' Handbook*.
- Scottish Environment Protection Agency. (2014) *Land Use Planning System SEPA Guidance Note 31: Guidance on Assessing the Impacts of Development Proposals on Groundwater Abstractions and Groundwater Dependent Terrestrial Ecosystems*.
- Scottish Environment Protection Agency. (2021) River Basin Management Plan. URL <https://www.sepa.org.uk/data-visualisation/water-environment-hub/> [accessed 9 March 2021]
- Scottish Government. (2021) Scotlands Soils. URL <https://soils.environment.gov.scot/> [accessed 9 March 2021]

Stace, C.A. (2010) *New Flora of the British Isles*. Cambridge University Press.

APPENDIX A - TARGET NOTES

Target note no. and co-ordinates	Description	Photograph
1 249492 785322	W4b Broadleaved woodland – semi-natural Wet woodland with a canopy of downy birch, field layer with abundant purple moor-grass and ground layer dominated by <i>Sphagnum fallax</i> . Soft rush, tormentil, marsh violet, marsh thistle, meadow buttercup and yellow pimpernel are frequent to occasional.	
2 243514 783126	W4c Broadleaved woodland – semi-natural Wet woodland with a canopy of downy birch, field layer with abundant purple moor-grass and ground layer dominated by <i>Sphagnum fallax</i> . Bottle sedge is occasional.	
3 243703 783149	W7a Broadleaved woodland – semi-natural Wet woodland with a canopy of downy birch, shrub layer of eared willow and frequent meadowsweet, creeping buttercup and wild angelica in the field layer.	
4 249915 786115	W7c Broadleaved woodland – semi-natural Wet woodland with a canopy of downy birch and a field layer dominated by tufted hair-grass, with occasional wood-sorrel.	
5 250099 785081	W9b Broadleaved woodland – semi-natural Flushed, herb-rich woodland with a canopy of downy birch and a field layer including occasional marsh hawk's-beard, wood avens, melancholy thistle, meadow buttercup, smooth lady's-mantle, yellow pimpernel, selfheal, marsh thistle and pale sedge.	

6 249959 784804	W11b Broadleaved woodland – semi-natural Dry birchwood with a canopy of downy birch and occasional rowan. Grassy field layer includes frequent to abundant sweet vernal-grass, and forbs include frequent to occasional heath bedstraw and tormentil. The moss <i>Hylocomium splendens</i> is frequent to abundant.	
7 243432 783092	W11c Broadleaved woodland – semi-natural Dry birchwood with a canopy of downy birch with occasional aspen and shrub layer comprising rowan and eared willow. Grassy field layer with creeping soft-grass and sweet vernal-grass, and forbs including frequent to occasional wood anemone, chickweed-wintergreen, common cow-wheat, wood-sorrel, common dog-violet and tormentil. Hairy wood-rush also present.	
8 243669 783195	W11d Broadleaved woodland – semi-natural Dry birchwood with a carpet of greater stitchwort and frequent Yorkshire-fog beneath a canopy of downy birch.	
9 250448 786141	W17b Broadleaved woodland – semi-natural Heathy and mossy woodland with a canopy of downy birch and field layer with abundant bilberry and occasional heather, with wavy hair-grass and wood-sorrel. Bryophytes include frequent to abundant <i>Rhytidiadelphus loreus</i> and <i>Hylocomium splendens</i>.	

10 243811 782149	W17d Broadleaved woodland – semi-natural Heathy and mossy woodland on steep slopes beside a watercourse, with downy birch in the canopy and rowan in the understorey. Abundant bilberry and occasional chickweed-wintergreen and wavy hair-grass. The mosses <i>Hylocomium splendens</i> and <i>Rhytidiadelphus triquetrus</i> are patchily abundant.	
11 249770 785811	W17 <i>Molinia caerulea</i> Broadleaved woodland – semi-natural Open downy birch woodland on dry, rocky slopes with patchily frequent dwarf shrubs but abundant to completely dominant purple moor-grass.	
12 244387 782385	Broadleaved woodland – plantation (no NVC) Recent woodland planting on species-poor purple moor-grass grassland. Species include birch, rowan, alder and hawthorn.	
13 250382 786001	W18b Coniferous woodland – semi-natural The typical form of dry pinewood, with a canopy of Scots pine and occasional downy birch, with scattered rowan saplings in the understorey. The heathy field layer has frequent to abundant bilberry, cowberry and heather, and the mossy ground layer has abundant <i>Hylocomium splendens</i> .	
14 250348 786228	W18d Coniferous woodland – semi-natural Damp, open pinewood with stunted Scots pine over a field layer of heather, bilberry, cross-leaved heath, purple moor-grass and hare's-tail cottongrass, with <i>Hylocomium splendens</i> and <i>Sphagnum capillifolium</i> in the mossy ground layer.	
15 250368 785969	W18 <i>Molinia caerulea</i> Coniferous woodland – semi-natural Dry pinewood with Scots pine and occasional downy birch in the canopy, and scattered rowan saplings below. Field layer dominated by purple moor-grass.	

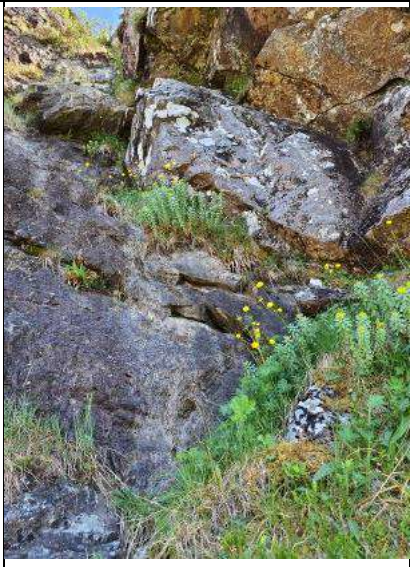
16 243276 783045	Coniferous woodland – plantation (no NVC) Mature sitka spruce plantation with fringe of birch, alder and goat willow by road.	
17 249642 779343	W20 Scrub – scattered Montane willow scrub with a low canopy of downy willow over and around herb-rich vegetation comprising wild angelica, goldenrod, wood crane's-bill and alpine lady's-mantle.	
18 243543 782885	W23a Scrub – scattered Scattered broom scrub with species-poor field and ground layers.	
19 246303 781009	U4a Acid grassland – unimproved Moderately species-rich dry acid grassland with a mixture of sweet vernal-grass, sheep's-fescue, red fescue and mat-grass, and a variety of forbs including tormentil, heath bedstraw, ribwort plantain, common sorrel, meadow buttercup, pignut, common bird's-foot-trefoil, mountain pansy and marsh violet, as well as the sedges pill sedge and spring sedge.	

20 247368 780402	U4d Acid grassland – unimproved Damp grassland next to watercourses below steep banks. Mixtures of common bent, velvet bent, sweet vernal-grass, tufted hair-grass and viviparous sheep’s-fescue, with heath wood-rush, tormentil, heath bedstraw and the mosses <i>Hylocomium splendens</i> and <i>Rhytidiadelphus loreus</i>.	
21 248668 784358	U4e Acid grassland – unimproved Mossy and heathy acid grassland of low species-richness on well-drained slopes. Dominated by mixtures of sheep’s-fescue, wavy hair-grass, bilberry and the mosses <i>Hylocomium splendens</i> and <i>Pleurozium schreberi</i>, with occasional green-ribbed sedge and heath speedwell.	
22 247879 782032	U5e Acid grassland – unimproved Tussocky grassland on steep slopes, dominated by mixtures of mat-grass and sweet vernal-grass, with occasional heath bedstraw, tormentil, bilberry, pill sedge, carnation sedge and alpine lady’s-mantle, and wet heath associates such as deergrass, purple moor-grass and heather.	
23 250730 779197	U6d Acid grassland – unimproved Damp grassland at high altitude on peaty soils adjacent to blanket bog, with abundant heath rush. Grasses subordinate and including velvet bent, viviparous sheep’s-fescue, wavy hair-grass, sweet vernal-grass and mat-grass. Heath wood-rush occasional and forbs mostly limited to tormentil and heath bedstraw, with the most common mosses <i>Hylocomium splendens</i> and <i>Pleurozium schreberi</i>.	

24 249193 780075	U6 base-rich Acid grassland – unimproved Species-rich form of heath rush grassland with numerous mesotrophic forbs including meadow buttercup, smooth lady's-mantle, alpine meadow-rue, water avens, alpine bistort, marsh hawk's-beard, wild thyme and harebell.	
25 243896 783232	U4b Acid grassland – semi-improved Moderately species-rich acid grassland in more improved and enclosed situations, with abundant red fescue and Yorkshire-fog, and a wide variety of mesotrophic forbs including yarrow, white clover, germander speedwell, ribwort plantain, common sorrel, meadow buttercup, pignut, bitter-vetch and common bird's-foot-trefoil.	
26 243484 782688	MG9a Neutral grassland – unimproved Moderately species-rich grassland adjacent to watercourse, dominated by tufted hair-grass. Forbs include meadowsweet, tormentil, wild angelica, sneezewort, common knapweed, melancholy thistle, common valerian and marsh-marigold.	
27 243596 782575	MG6b Neutral grassland – semi-improved Forb-rich neutral grassland in agricultural setting, with the grasses Yorkshire-fog, red fescue, smooth meadow-grass and sweet vernal-grass, and a variety of forbs including creeping buttercup, meadow buttercup, yellow-rattle, white clover, common mouse-ear, daisy, germander speedwell and common sorrel.	

28 246242 781001	CG10a Calcareous grassland – unimproved Moderately species-rich, stony calcareous grassland adjacent to watercourse, with mixtures of sheep’s-fescue, red fescue, mat-grass and sweet vernal-grass. Characterised by the frequent presence of wild thyme, and a variety of other forbs including common bird’s-foot-trefoil, yarrow, heath milkwort, mouse-ear-hawkweed, tormentil and heath bedstraw.	
29 249041 784549	CG10b Calcareous grassland – unimproved Flushed, moderately species-rich calcareous grassland, with sheep’s-fescue, red fescue, mat-grass and Yorkshire-fog, and with sedges common in the sward, including frequent to occasional flea sedge, carnation sedge, glaucous sedge and pale sedge. Forbs present include ribwort plantain, selfheal, common bird’s-foot-trefoil, cat’s-ear, bitter-vetch, slender St John’s-wort and meadowsweet.	
30 247210 781130	CG11a Calcareous grassland – unimproved Species-rich calcareous grassland on steep slopes, with sweet vernal-grass, viviparous sheep’s-fescue, meadow oat-grass, alpine lady’s-mantle, wild thyme, globeflower, bilberry, tormentil, pill sedge, water avens and devil's-bit scabious, as well as the mosses <i>Racomitrium lanuginosum</i> and <i>Breutelia chrysocoma</i>.	
31 247157 781044	CG11b Calcareous grassland – unimproved Flushed, species-rich calcareous grassland below wet, herb-rich rock ledges. Mixtures of grasses including sweet vernal-grass, common bent, sheep’s-fescue, mat-grass, viviparous sheep’s-fescue and meadow oat-grass, and forbs such as alpine lady’s-mantle, wild thyme, tormentil, ribwort plantain, alpine meadow-rue and mountain everlasting. Damp, sedgy sward, with flea sedge and carnation sedge, as well as common butterwort and deergrass.	

32 244532 781512	M25a Marsh/marshy grassland Damp heathy grassland dominated by purple moor-grass, with cross-leaved heath, common cottongrass, bog asphodel and bog-myrtle.	
33 248508 783668	M25b Marsh/marshy grassland Purple moor-grass grassland with a more diverse sward of grasses including sweet vernal-grass, Yorkshire-fog, red fescue, velvet bent and mat-grass, and with marsh violet, common sorrel, meadow buttercup and heath wood-rush.	
34 249686 785542	M25c Marsh/marshy grassland Herb-rich purple moor-grass grassland with a variety of forbs including marsh thistle, meadowsweet, meadow buttercup, slender St John's-wort, carnation sedge, flea sedge, dog's mercury, bitter-vetch, bush vetch, water avens, ribwort plantain and selfheal.	
35 246161 781526	M25a base-rich Marsh/marshy grassland Species-rich base-enriched purple moor-grass grassland with globeflower, wood crane's-bill, melancholy thistle, alpine bistort, northern bedstraw, lady's bedstraw, common twayblade, lesser butterfly-orchid, heath fragrant-orchid, creeping willow, wild thyme, selfheal, flea sedge, tawny sedge and meadow oat-grass.	
36 248758 780539	Small sedge mire Herb-rich sedge mire, with star sedge, common sedge, carnation sedge, common yellow-sedge and glaucous sedge. Mesotrophic forbs include grass-of-Parnassus, marsh hawk's-beard, smooth lady's-mantle, meadowsweet, alpine meadow-rue, autumn hawkbit, marsh thistle and marsh violet.	
37 243671 782722	U20a Bracken – continuous Bracken with underlay of sweet vernal-grass and red fescue, plus occasional heath wood-rush and foxglove. The moss <i>Hylocomium splendens</i> is abundant.	

38 249189 784785	U20b Bracken – continuous Open bracken canopy with heathy appearance due to presence of abundant bilberry, along with heather, wavy hair-grass, tormentil, bell heather and green-ribbed sedge.	
39 243880 783284	U20c Bracken – continuous Dense, species-poor bracken vegetation, with only a thick layer of dead leaf litter below the current year's growth.	
40 247540 781442	U17b Upland species-rich ledges Species-rich tall-herb community on inaccessible crags irrigated with base-rich water and with very diverse swards including great woodrush, wild angelica, roseroot, meadowsweet, wood crane's-bill, stone bramble, globeflower, alpine saw-wort, goldenrod, hawkweed spp., smooth lady's-mantle, alpine lady's-mantle, flea sedge and common dog-violet.	
41 249573 785627	U21 Other tall herb and fern – non-ruderal Pioneer vegetation amongst rocks on steep boulder fields, consisting of parsley fern accompanied by the mosses <i>Racomitrium lanuginosum</i>, <i>Pleurozium schreberi</i>, <i>Hypnum jutlandicum</i> and <i>Rhytidiadelphus loreus</i>.	

42 246175 781785	H10a Dry dwarf shrub heath – acid Dry heath on steep slopes at low to moderate altitudes, with abundant heather, frequent bell heather and occasional tormentil, purple moor-grass, wavy hair-grass, velvet bent and viviparous sheep's-fescue.	
43 247717 781248	H10b Dry dwarf shrub heath – acid Higher altitude dry heath with shorter heather, accompanied by deergrass, crowberry, carnation sedge and fir clubmoss above a ground layer of <i>Racomitrium lanuginosum</i> and <i>Cladonia</i> lichens.	
44 248377 781446	H14b Dry dwarf shrub heath – acid Montane heath with heather, crowberry, alpine clubmoss, stiff sedge, alpine lady's-mantle, heath bedstraw and mat-grass over a carpet of <i>Racomitrium lanuginosum</i> and <i>Cladonia</i> lichens.	
45 247157 780962	H18a Dry dwarf shrub heath – acid Dry heath on steep, rocky slopes at moderately high altitudes, dominated by bilberry and with a more or less continuous carpet of the mosses <i>Hylocomium splendens</i> and <i>Rhytidiadelphus loreus</i> . Other dwarf shrubs no more than occasional, with crowberry, cowberry and heather, and grasses represented by wavy hair-grass, mat-grass and viviparous sheep's-fescue. The forbs tormentil and common cow-wheat are occasional.	
46 249457 780286	H18b Dry dwarf shrub heath – acid Grassy bilberry heath, with abundant bilberry accompanied by wavy hair-grass, common bent, sweet vernal-grass, tufted hair-grass and viviparous sheep's-fescue. Forbs include heath bedstraw, tormentil, alpine lady's-mantle, harebell and common sorrel, with pill sedge and stiff sedge frequent to occasional.	

47 249068 779674	H20d Dry dwarf shrub heath – acid Prostrate, high altitude bilberry heath, with abundant short bilberry and montane crowberry in association with stiff sedge, wavy hair-grass and alpine lady’s-mantle in a thick layer of the mosses <i>Rhytidiadelphus loreus</i>, <i>Hylocomium splendens</i>, <i>Racomitrium lanuginosum</i> and <i>Pleurozium schreberi</i>, with occasional <i>Cladonia</i> lichens.	
48 247876 782054	H21a Dry dwarf shrub heath – acid Damp heath on steep slopes with abundant heather accompanied by bilberry, bell heather, wavy hair-grass, hard-fern and tormentil, and with a mossy understorey characterised by <i>Sphagnum capillifolium</i>, <i>Rhytidiadelphus loreus</i> and <i>Hylocomium splendens</i>.	
49 249235 779388	H22a Dry dwarf shrub heath – acid Damp montane heath dominated by bilberry, with frequent cloudberry and dwarf cornel, and occasional wavy hair-grass, heath bedstraw and hard-fern. Blanket of mosses with <i>Sphagnum capillifolium</i>, <i>Pleurozium schreberi</i>, <i>Hylocomium splendens</i> and <i>Rhytidiadelphus loreus</i>.	
50 248045 781468	H22b Dry dwarf shrub heath – acid Heather-dominated montane damp heath, with frequent cloudberry, montane crowberry and deergrass, and occasional bilberry, cowberry and hare’s-tail cottongrass. Bryophytes abundant with <i>Hylocomium splendens</i>, <i>Sphagnum capillifolium</i> and <i>Rhytidiadelphus loreus</i>.	

51 246463 781987	H10d base-rich Dry dwarf shrub heath – basic Species-rich dry heath, with heather and associated species of base-rich habitats, including wood crane’s-bill, melancholy thistle, stone bramble, globeflower, meadow oat-grass, wild thyme and selfheal.	
52 249692 785546	M15a Wet dwarf shrub heath Flushed, sedgy wet heath, with purple moor-grass, heather, cross-leaved heath and bog asphodel joined by carnation sedge, star sedge, flea sedge, common yellow-sedge, round-leaved sundew and common butterwort.	
53 244087 781970	M15b Wet dwarf shrub heath Typical wet heath, with deergrass, purple moor-grass, cross-leaved heath, heather, tormentil and bog asphodel, with additionally hare’s-tail cottongrass, common cottongrass, bog-myrtle and <i>Sphagnum capillifolium</i>.	
54 247632 782995	M15c Wet dwarf shrub heath Drier heath with deergrass, heather, purple moor-grass, cross-leaved heath, bog asphodel and tormentil, plus frequent bell heather and <i>Racomitrium lanuginosum</i>.	
55 244718 781288	M15d Wet dwarf shrub heath Drier form of wet heath on steeper slopes with purple moor-grass, deergrass, heather, cross-leaved heath and tormentil, along with abundant bilberry and <i>Hylocomium splendens</i>, and occasional wavy hair-grass.	
56 249179 779664	M15 montane Wet dwarf shrub heath High altitude wet heath with abundant deergrass and occasional heather, purple moor-grass, tormentil and bog asphodel, augmented by montane species such as montane crowberry and bog bilberry.	

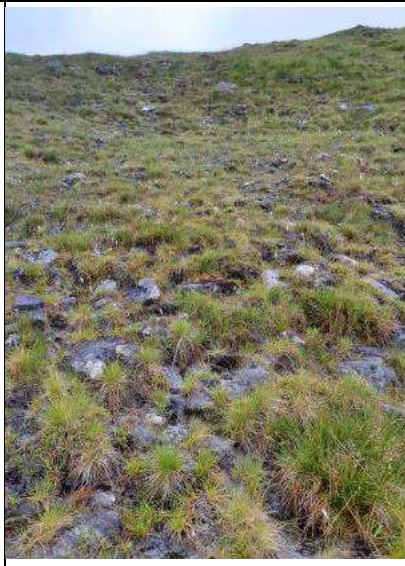
57 249158 779422	U7b Montane heath/dwarf herb High altitude grassland on steep slopes, with abundant mat-grass and frequent to occasional stiff sedge, bilberry, heath bedstraw, wavy hair-grass, tufted hair-grass, deergrass, heath rush and heath wood-rush, with the mosses <i>Dicranum scoparium</i> and <i>Rhytidiadelphus loreus</i>.	
58 249012 779462	U9b Montane heath/dwarf herb Patches of montane heath dominated by three-leaved rush, with stiff sedge, bilberry, montane crowberry, wavy hair-grass, viviparous sheep's-fescue and alpine clubmoss growing through a carpet of <i>Racomitrium lanuginosum</i> with occasional <i>Cladonia</i> lichens.	
59 249003 779465	U10b Montane heath/dwarf herb Larger areas of montane heath with abundant stiff sedge accompanied by viviparous sheep's-fescue, wavy hair-grass, bilberry and montane crowberry, surrounded by a dense turf of <i>Racomitrium lanuginosum</i> with occasional <i>Cladonia</i> lichens.	
60 249036 779687	U13a Montane heath/dwarf herb Montane damp grassland dominated by tufted hair-grass, with smaller amounts of sweet vernal-grass, velvet bent and viviparous sheep's-fescue, accompanied by heath bedstraw, alpine lady's-mantle, tormentil, marsh violet, harebell and hard-fern, and the moss <i>Hylocomium splendens</i>.	

61 249185 779413	U13b Montane heath/dwarf herb Mossy montane grassland with abundant tufted hair-grass accompanied by stiff sedge, bilberry, heath bedstraw, tormentil, wavy hair-grass and mat-grass, over a continuous carpet of <i>Rhytidiadelphus loreus</i>.	
62 249517 779351	U15 Montane heath/dwarf herb Dripping mats of herb-rich vegetation on wet rock faces irrigated by base-rich water, dominated by yellow saxifrage with smooth lady's-mantle, alpine lady's-mantle, meadow buttercup, alpine bistort, harebell, wild thyme, water avens, grass-of-Parnassus, red fescue, tufted hair-grass and viviparous sheep's-s-fescue.	
63 243797 782432	M17a Blanket bog Blanket mire at lower elevation with an even mix of deergrass, heather, cross-leaved heath, hare's-tail cottongrass, purple moor-grass and bog-myrtle, occasional tormentil, bog asphodel and round-leaved sundew, and abundant <i>Sphagnum papillosum</i> and <i>S. capillifolium</i>.	
64 244711 781627	M17a Blanket bog, <i>Phragmites</i> variant Variant of M17a in and around wet, peaty channels with moving water that has abundant common reed along with the species above.	

65 246288 780828	M17c Blanket bog Drier bog with hare's-tail cottongrass, purple moor-grass, deergrass and cross-leaved heath, and with bilberry replacing heather. <i>Sphagnum papillosum</i> and <i>S. capillifolium</i> reduced in cover, with <i>Pleurozium schreberi</i> partially replacing them.	
66 243798 782909	M18a Blanket bog Blanket bog with a continuous carpet of <i>Sphagnum papillosum</i> and <i>S. capillifolium</i>, above which is an even mix of hare's-tail cottongrass, cross-leaved heath, heather and deergrass with occasional bog asphodel and round-leaved sundew.	
67 248070 780700	M19c Blanket bog Montane form of bog, with abundant heather and hare's-tail cottongrass, frequent cloudberry and dwarf cornel, and occasional cowberry and montane crowberry, with a low cover of <i>Sphagnum capillifolium</i> joined by <i>Pleurozium schreberi</i>, <i>Rhytidiadelphus loreus</i>, <i>Hylocomium splendens</i>, <i>Racomitrium lanuginosum</i> and <i>Cladonia</i> lichens.	
68 249777 778906	M2b Wet modified bog Bog pool occupying artificial channel, with <i>Sphagnum cuspidatum</i>, <i>S. fallax</i>, <i>S. papillosum</i> and <i>Polytrichum commune</i>, along with hare's-tail cottongrass and velvet bent.	

69 244072 782511	M3 Wet modified bog Bog pool with abundant common cottongrass and <i>Sphagnum cuspidatum</i>.	
70 245763 780842	M17b Wet modified bog Eroded bog with a more open sward of heather, hare's-tail cottongrass, common cottongrass, deergrass, cross-leaved heath and bog asphodel, with areas of bare peat and a crust of <i>Sphagnum capillifolium</i>, <i>Racomitrium lanuginosum</i> and <i>Cladonia</i> lichens.	
71 249795 778896	M20 Wet modified bog Blanket bog dominated by hare's-tail cottongrass with montane crowberry over a carpet of <i>Sphagnum capillifolium</i>, <i>S. papillosum</i> and <i>Polytrichum commune</i>.	
72 250785 779204	M6b Flush and spring – acid/neutral flush Acidic sedge mire in depression below blanket bog adjacent to watercourse at high altitude. Consists of common sedge with frequent tormentil and occasional common cottongrass, mat-grass, heath rush and sweet vernal-grass over a carpet of <i>Sphagnum papillosum</i>, <i>S. fallax</i> and <i>Polytrichum commune</i>.	

73 243568 782956	M6c Flush and spring – acid/neutral flush Rush-dominated acid flush at low altitude with a canopy of soft rush and occasional hare’s-tail cottongrass, purple moor-grass and tormentil over a ground layer of <i>Sphagnum fallax</i>, <i>S. papillosum</i> and <i>Polytrichum commune</i>.	
74 247809 782057	M10a Flush and spring – basic flush Open, stony flush with carnation sedge, flea sedge, common yellow-sedge, star sedge and tawny sedge. Frequent common butterwort and occasional meadow buttercup, tormentil, cross-leaved heath, common cottongrass, purple moor-grass and deergrass.	
75 249495 779333	M11a Flush and spring – basic flush Stony, base-rich flush dominated by yellow saxifrage with frequent common yellow-sedge.	

76 251146 779521	M11b Flush and spring – basic flush Stony flush with yellow saxifrage and tawny sedge.	
77 249454 779294	M31 Flush and spring – bryophyte-dominated spring Acid spring/flush dominated by <i>Anthelia julacea</i>, with occasional mat-grass, common butterwort, bog asphodel, common yellow-sedge, common sedge, star sedge, common cottongrass, bulbous rush and heath rush.	
78 249057 780049	M32a Flush and spring – bryophyte-dominated spring Acid spring with abundant <i>Dichodontium palustre</i> and <i>Sphagnum denticulatum</i>, dotted with starry saxifrage.	

79 246752 782432	M32b Flush and spring – bryophyte-dominated spring Acid spring with abundant <i>Dichodontium palustre</i>, and occasional <i>Philonotis fontana</i> and <i>Palustriella commutata</i>. Occasional plants of marsh willowherb and sweet vernal-grass.	
80 249501 779316	M37 Flush and spring – bryophyte-dominated spring Basic flush dominated by <i>Palustriella commutata</i>, with occasional yellow saxifrage, common butterwort and common yellow-sedge.	
81 243482 782800	M4 Fen – basin mire Acid sedge mire on pool edge dominated by bottle sedge, with occasional common sedge, common marsh-bedstraw and lesser spearwort. Ground layer a carpet of <i>Sphagnum fallax</i> with occasional bog pondweed.	
82 248803 784151	S9a Swamp Small area of swamp dominated by bottle sedge with no other species.	

83 246278 781281	S10a Marginal/inundation – marginal Vegetation fringing watercourse, consisting solely of water horsetail.	
---	--	--

Further habitat target notes for additional examples of habitats too small to map

Target note no.	NVC community
84-89	W20 <i>Salix lapponum</i> - <i>Luzula sylvatica</i> scrub
90	U6 base-rich <i>Juncus squarrosus</i> - <i>Festuca ovina</i> grassland
91-96	U17b <i>Luzula sylvatica</i> - <i>Geum rivale</i> tall-herb community - <i>Geranium sylvaticum</i> sub-community
97	U21 <i>Cryptogramma crispa</i> - <i>Avenella flexuosa</i> community
98	H10d <i>Thymus drucei</i> - <i>Carex pulicaris</i> sub-community, base-rich.
99	U15 <i>Saxifraga aizoides</i> - <i>Alchemilla glabra</i> banks
100	M6b <i>Carex echinata</i> - <i>Sphagnum fallax/denticulatum</i> mire - <i>Carex nigra</i> - <i>Nardus stricta</i> sub-community
101-103	M10a <i>Carex dioica</i> - <i>Pinguicula vulgaris</i> mire - <i>Carex demissa</i> - <i>Juncus bulbosus/kochii</i> sub-community
104-121	M11a <i>Carex demissa</i> - <i>Saxifraga aizoides</i> mire - <i>Thalictrum alpinum</i> - <i>Juncus triglumis</i> sub-community
122	M11b <i>Carex demissa</i> - <i>Saxifraga aizoides</i> mire - <i>Palustriella commutata</i> - <i>Eleocharis quinqueflora</i> sub-community
123	M31 <i>Anthelia julacea</i> - <i>Sphagnum denticulatum</i> spring and M32a <i>Philonotis fontana</i> - <i>Micranthes stellaris</i> spring - <i>Sphagnum denticulatum</i> sub-community
124-126	M32a <i>Philonotis fontana</i> - <i>Micranthes stellaris</i> spring - <i>Sphagnum denticulatum</i> sub-community
127-128	M32b <i>Philonotis fontana</i> - <i>Micranthes stellaris</i> spring - <i>Montia fontana</i> - <i>Chrysosplenium oppositifolium</i> sub-community
129-131	M37 <i>Palustriella commutata</i> - <i>Festuca rubra</i> spring
132-133	S9a <i>Carex rostrata</i> swamp - <i>Carex rostrata</i> sub-community

Species

Species target notes comprise notable species of conservation importance and other species of interest.

Species of conservation importance

Target note no. and co-ordinates	Species	Photograph
134 246721 782411	Common Juniper <i>Juniperus communis</i> In steep dry heath and rock face crevices inaccessible to deer.	
135 246012 781197	Petty Whin <i>Genista anglica</i> Beside track.	
136 245728 780902	Dwarf Birch <i>Betula nana</i> In blanket bog.	

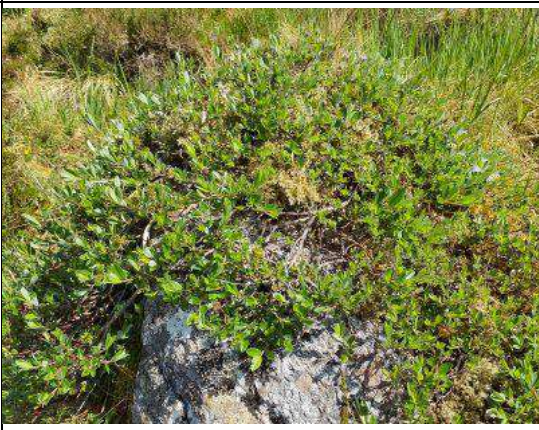
137 246556 782134	Aspen <i>Populus tremula</i> On rocky outcrops.	
138 249383 779449	Downy Willow <i>Salix lapponum</i> On crags and ledges. Photo shows W20 <i>Salix-Luzula</i> scrub with U17b <i>Luzula-Geum</i> tall-herb community.	
139 248542 780382	Dwarf Cornel <i>Cornus suecica</i> In blanket bog. Photo also shows Bog Bilberry <i>Vaccinium uliginosum</i>, another scarce species of damp heath and blanket bog.	

140 246382 780999	Field Gentian <i>Gentianella campestris</i> In acid grassland.	 A photograph showing a dense patch of Field Gentians (Gentianella campestris) in an acid grassland. The plants are small with purple flowers, growing among tall green grasses.
141 247225 781139	Hawkweed <i>Hieracium</i> sp. No attempt made to identify micro-species.	 A photograph of a Hawkweed (Hieracium sp.) growing on a rocky, mossy outcrop. The plant has a single bright yellow flower on a long stem. In the background, a blue lake and distant hills are visible under a clear sky.
142 246131 781699	Lesser Butterfly-orchid <i>Platanthera bifolia</i> In base-rich marshy grassland.	 A photograph of a Lesser Butterfly-orchid (Platanthera bifolia) in a marshy grassland. The plant has small, pale greenish-yellow flowers and is growing in a dense patch of tall green grass.

143 246914 780779	Small-white Orchid <i>Pseudorchis albida</i> In wet heath/marshy grassland.	
---	---	--

Other species

144 246445 781940	Bearberry <i>Arctostaphylos uva-ursi</i> No conservation designations but a rare species in the Survey Area. Only recorded on this rocky outcrop.	
---	---	--

145 247167 781031	Globeflower <i>Trollius europaeus</i> Locally common on species-rich tall-herb ledges and in base-rich marshy grassland.	
146 248765 780538	Grass-of-Parnassus <i>Parnassia palustris</i> Only recorded in a single location in basic forb-rich small sedge mire.	
147 247409 781397	Creeping Willow <i>Salix repens</i> Scarce in calcareous grassland and dry heath.	

148 248915 779981	Dwarf Willow <i>Salix herbacea</i> Locally common in dry montane heath.	
149 249624 779346	Mountain Sorrel <i>Oxyria digyna</i> Seen in a single location in herb-rich mountain ledge vegetation.	
150 250272 785927	Common Wintergreen <i>Pyrola minor</i> One location at the edge of mixed Scots pine and birch woodland.	

151 246146 781711	Northern Bedstraw <i>Galium boreale</i> Locally common in base-rich marshy grassland and dry heath.	
152 249380 779450	Alpine Saw-wort <i>Saussurea alpina</i> Scarce in base-rich tall-herb ledges, sometimes with Downy Willow.	

153 250053 785034	Melancholy Thistle <i>Cirsium heterophyllum</i> Locally common in base-rich open woodland, marshy grassland, dry heath and tall-herb ledges.	
154 246305 781314	Mountain Everlasting <i>Antennaria dioica</i> Seen in one location in dry area at edge of track.	
155 249108 779385	Goldenrod <i>Solidago virgaurea</i> In montane heath at over 900m. Also found in montane willow scrub and tall-herb ledge vegetation.	

156 249222 780016	Scottish Asphodel <i>Tofieldia pusilla</i> Rare in base-rich flushes.	
157 246151 781734	Common Twayblade <i>Neottia ovata</i> Rare in base-rich marshy grassland.	

158 246004 781129	Slender Sedge <i>Carex lasiocarpa</i> One location as a small, pure stand within blanket bog. No NVC.	
-------------------------	---	--

Additional species target notes

Target note no.	Species
159-162	Common Juniper
163	Petty Whin
164-165	Dwarf Birch
166-168	Downy Willow
169	Creeping Willow
170	Goldenrod

APPENDIX B - HABITATS CONSERVATION IMPORTANCE

Phase 1 habitat	NVC community	EU Habitats Directive Annex 1	UK BAP Priority Habitat	Scottish Biodiversity List	Highland Nature Biodiversity Action Plan 2021-2026	Notes	Importance
A1.1.1 Broadleaved woodland – semi-natural	W4b	n.a.	Wet Woodland	Wet Woodland	Wet woodland	- Small stands of low species-richness in wetter areas within larger woodlands. - There is c.11,700 ha of wet woodland in Highland.	Local
	W4c						
	W7a	91E0: Alder woodland on floodplains	Upland Birchwoods	Upland Birchwoods	Upland birchwoods	- Small, relatively species-poor stands within larger woodlands. - There is c.44,200 ha of upland birchwood in Highland. - NB: small wet areas within larger birch woodlands, as here, are considered to be part of the PH Upland Birchwoods rather than Wet Woodland.	Local
	W7c						
	W9b	9180: Mixed woodland on base-rich soils associated with rocky slopes	Upland Birchwoods	Upland Birchwoods	Upland birchwoods	- Small, moderately species-rich stand within larger woodland. - There is c.44,200 ha of upland birchwood in Highland. - NB: small base-rich patches within larger birch	Local

						woodlands, as here, are considered to be part of the PH Upland Birchwoods rather than Upland Mixed Ashwoods.	
	W11b	n.a.	Upland Birchwoods	Upland Birchwoods	Upland birchwoods	- Small to medium sized stands ranging from species-poor to moderately species-rich. - There is c.44,200 ha of upland birchwood in Highland.	Local
	W11c						
	W11d						
	W17b	n.a.	Upland Birchwoods	Upland Birchwoods	Upland birchwoods	- Small to medium sized stands of low species-richness. - There is c.44,200 ha of upland birchwood in Highland.	Local
	W17c						
	W17d						
	W17 <i>Molinia</i>						
A1.1.2 Broadleaved woodland – plantation	n.a.	n.a.	n.a.	n.a.	Woodland and forest	- Small stand of recently-planted broadleaves.	Site
A1.2.1 Coniferous woodland – semi-natural	W18b	n.a.	n.a.	n.a.	Native pinewood	- Small to medium sized stands of low species-richness. - NB: Does not match the description of the Annex 1	Local

	W18d					Caledonian forest or PH Native Pinewood (these are relict, self-sown stands on ancient sites), of which there are only c.25,000 ha and c.16,000 ha respectively remaining in the UK. The Highland BAP habitat must be a looser definition that includes planted stands, as the area in Highland is c.55,900 ha.	
	W18 <i>Molinia</i>						
A1.2.2 Coniferous woodland – plantation	n.a.	n.a.	n.a.	n.a.	n.a.	- Medium-sized sections of large, species-poor forestry blocks, dominated by mature sitka spruce.	Site
A2.2 Scrub – scattered	W20	4080: Mountain willow scrub	Mountain Heaths and Willow Scrub	Mountain Heaths and Willow Scrub	Upland and moorland	- Numerous, very small stands of downy willow on high crags and ledges, over a variable flora from acidic to basic and species-poor to herb-rich. - Extent in Highland unknown. - There is c.22.5 ha of the Annex 1 habitat in Scotland.	National
	W23a	n.a.	n.a.	n.a.	n.a.	- Small, species-poor stand. - Extent in Highland unknown.	Site
B1.1 Acid grassland – unimproved	U4a	n.a.	n.a.	n.a.	Upland and moorland	- Small, moderately species-rich stands. - Extent in Highland unknown.	Local

	U4d	n.a.	n.a.	n.a.	Upland and moorland	- Small stands of low species-richness. - Extent in Highland unknown.	Site
	U4e	n.a.	n.a.	n.a.	Upland and moorland	- Small stands of low species-richness. - Extent in Highland unknown.	Site
	U5e	n.a.	n.a.	<i>Nardus stricta-Galium saxatile</i> grassland	Upland and moorland	- Small stands of low species-richness. - Extent in Highland unknown.	Site
	U6d	n.a.	n.a.	<i>Juncus squarrosus-Festuca ovina</i> grassland	Upland and moorland	- Small stands of low species-richness. - Extent in Highland unknown.	Site
	U6 base-rich	n.a.	n.a.	<i>Juncus squarrosus-Festuca ovina</i> grassland	Upland and moorland	- Small, species-rich stand. - Not described in the NVC and extent in Highland unknown.	Local
B1.2 Acid grassland – semi-improved	U4b	n.a.	n.a.	n.a.	Upland and moorland	- Small, moderately species-rich stands. - Extent in Highland unknown.	Local
B2.1 Neutral grassland – unimproved	MG9a	n.a.	n.a.	n.a.	n.a.	- Small, moderately species-rich stands alongside watercourses. - Extent in Highland unknown.	Local
B2.2 Neutral grassland – semi-improved	MG6b	n.a.	n.a.	n.a.	Agricultural land	- Small, moderately species-rich stand in agricultural setting. - Extent in Highland unknown.	Site
B3.1 Calcareous	CG10a	6230: Species-rich grassland with mat-	Upland Calcareous Grassland	Upland Calcareous Grassland	Upland and moorland	- Small, moderately species-rich stands.	Local

grassland – unimproved	CG10b	grass in upland areas				- Extent in Highland unknown. - There is c.4600 ha of the Annex 1 habitat in Scotland.	
	CG11a	6230: Species-rich grassland with mat-grass in upland areas	Upland Calcareous Grassland	Upland Calcareous Grassland	Upland and moorland	- Small to medium-sized, species-rich stands, including some uncommon species. - Extent in Highland unknown. - There is c.4600 ha of the Annex 1 habitat in Scotland.	County
	CG11b						
B5 Marsh/ marshy grassland	M25a	n.a.	n.a.	n.a.	Upland and moorland	- Medium to large stands of low species-richness. - Extent in Highland unknown but certainly very common and widespread. - Can occur on deep peat (see E1.7 Wet modified bog)	Site
	M25b						
	M25 species-poor						
	M25c	n.a.	n.a.	n.a.	Upland and moorland	- Very small, moderately species-rich stand. - Extent in Highland unknown.	Local
	M25a base-rich	n.a.	Purple Moor-grass and Rush Pastures	Purple Moor-grass and Rush Pastures	Upland and moorland	- Small to medium-large, species-rich stands, including species of calcareous habitats not normally associated with this community. - Extent in Highland unknown.	County
	Small sedge mire	n.a.	n.a.	n.a.	n.a.	- Very small species-rich stand. - Extent in Highland unknown but likely scarce.	Local

						- Unrecognised in the NVC and does not match any Annex 1, Priority Habitat or Scottish Biodiversity List habitat.	
C1.1 Bracken – continuous	U20a	n.a.	n.a.	n.a.	Upland and moorland	- Small to medium-sized, species-poor stands. - Extent in Highland unknown but certainly common and widespread.	Site
	U20b						
	U20c						
C2 Upland species-rich ledges	U17b	6430: Tall herb communities	Inland Rock Outcrop and Scree Habitats	Inland Rock Outcrop and Scree Habitats	Upland and moorland	- Small, species-rich stands. - There is c.370 ha of the Annex 1 habitat in the UK, and c.200 ha in Scotland.	County
C3.2 Other tall herb and fern – non-ruderal	U21	8110: Acidic scree	Inland Rock Outcrop and Scree Habitats	Inland Rock Outcrop and Scree Habitats	n.a.	- Micro-habitats of pioneer vegetation in the crevices of rocks on boulder slopes. - There is c.60,000 ha of the Annex 1 habitat in Scotland.	Local
D1.1 Dry dwarf shrub heath – acid	H10a	4030: Dry heaths	Upland Heathland	Upland heathland	Upland and moorland	- Medium to large stands of low to moderate species-richness. - Extent in Highland unknown but certainly common and widespread. - There is c.479,000 ha of the Annex 1 habitat in Scotland.	Local
	H10b						
	H14b	4060: Alpine and subalpine heaths	Mountain Heaths and Willow Scrub	Mountain Heaths and Willow Scrub	Upland and moorland	- Small to medium-sized stands of fragile vegetation at high altitudes.	County

					- Extent in Highland unknown. - There is c.41,000 ha of the Annex 1 habitat in Scotland.	
H18a	4030: Dry heaths	Upland Heathland	Upland heathland	Upland and moorland	- Medium to large stands of low to moderate species-richness. - Extent in Highland unknown but certainly common and widespread. - There is c.479,000 ha of the Annex 1 habitat in Scotland.	Local
H18b						
H20d	4060: Alpine and subalpine heaths	Mountain Heaths and Willow Scrub	Mountain Heaths and Willow Scrub	Upland and moorland	- Small stands of fragile vegetation at high altitudes. - Extent in Highland unknown. - There is c.41,000 ha of the Annex 1 habitat in Scotland.	Local
H21a	4030: Dry heaths	Upland Heathland	Upland heathland	Upland and moorland	- Small stands of low to moderate species-richness. - Extent in Highland unknown. Widespread but localised. - There is c.479,000 ha of the Annex 1 habitat in Scotland, most of which will be more common types of dry heath.	Local

	H22a					- Small to medium-sized stands of montane vegetation of moderate species-richness, including the uncommon species cloudberry and dwarf cornel. - Extent in Highland unknown. Widespread but localised. - There is c.41,000 ha of the Annex 1 habitat in Scotland, which includes other montane heath types.	County
	H22b	4060: Alpine and subalpine heaths	Mountain Heaths and Willow Scrub	Mountain Heaths and Willow Scrub	Upland and moorland		
D1.2 Dry dwarf shrub heath – basic	H10d base-rich	4030: Dry heaths	Upland Heathland	Upland heathland	Upland and moorland	- Small, species-rich stands, including species indicative of base-enrichment. - Extent in Highland unknown but probably very small and localised.	County
D2 Wet dwarf shrub heath	M15a	4010: Wet heathland with cross-leaved heath	Upland heathland	Upland heathland	Upland and moorland	- Small to very large stands of low to moderate species-richness. - Extent in Highland unknown but certainly abundant and ubiquitous. - There is c.370,000 ha of the Annex 1 habitat in Scotland. - Can occur on deep peat (see E1.7 Wet modified bog)	Local
	M15b						
	M15c						
	M15d						
	M15 montane						
	U7b	6150: Montane acid grasslands	Mountain Heaths and Willow Scrub	Mountain Heaths and Willow Scrub	Upland and moorland	- Very small stand of montane grassland of low species-richness.	County

D4 Montane heath/dwarf herb						- Extent in Highland unknown. - There is c.70,000 ha of the Annex 1 habitat in Scotland.	
	U9b	6150: Montane acid grasslands	Mountain Heaths and Willow Scrub	Mountain Heaths and Willow Scrub	Upland and moorland	- Very small stands of fragile mountain plateau vegetation dominated by three-leaved rush and <i>Racomitrium lanuginosum</i>. - Extent in Highland unknown. - There is c.70,000 ha of the Annex 1 habitat in Scotland.	County
	U10b	6150: Montane acid grasslands	Mountain Heaths and Willow Scrub	Mountain Heaths and Willow Scrub	Upland and moorland	- Small stands of fragile mountain plateau vegetation dominated by stiff sedge and <i>Racomitrium lanuginosum</i>. - Extent in Highland unknown. - There is c.70,000 ha of the Annex 1 habitat in Scotland.	County
	U13a	n.a.	Mountain Heaths and Willow Scrub	Mountain Heaths and Willow Scrub	Upland and moorland	- Small to medium-sized stands of montane grassland of moderate species-richness. - Extent in Highland unknown. - There is c.60,000 ha of the Priority Habitat in Scotland, but only a small proportion of this will relate to this NVC community.	County
	U13b						
						- Very small, dripping mats of	

	U15	n.a.	Mountain Heaths and Willow Scrub	Mountain Heaths and Willow Scrub	Upland and moorland	herb-rich vegetation on wet rock faces irrigated by base-rich water. - Extent in Highland unknown. - There is c.60,000 ha of the Priority Habitat in Scotland, but only a tiny proportion of this will relate to this NVC community.	County
E1.6.1 Blanket bog	M17a	7130: Blanket bog	Blanket Bog	Blanket Bog	Peatland and wetland	- Small to very large stands of low to moderate species-richness on deep peat. - Extent in Highland unknown but certainly common and widespread. - There is c.175,900 ha of the Annex 1 habitat in Scotland.	County - National
	M17c						
	M18a	7130: Blanket bog	Blanket Bog	Blanket Bog	Peatland and wetland	- Small stands of low to moderate species-richness on deep peat. - Extent in Highland unknown. - There is c.175,900 ha of the Annex 1 habitat in Scotland.	County - National
	M19c	7130: Blanket bog	Blanket Bog	Blanket Bog	Peatland and wetland	- Medium to large stands of moderate species-richness, including some uncommon species of montane habitats, on deep peat. - Some stands are eroded. - Extent in Highland	National

						unknown. - There is c.175,900 ha of the Annex 1 habitat in Scotland.	
E1.7 Wet modified bog	M2b	7130: Blanket bog	Blanket Bog	Blanket Bog	Peatland and wetland	- Channel cut in blanket bog, filled with <i>Sphagnum</i> spp.	County
	M3	7130: Blanket bog	Blanket Bog	Blanket Bog	Peatland and wetland	- Channels within degraded bog, dominated by common cottongrass. - Potential for restoration.	County
	M15	7130: Blanket bog	Blanket Bog	Blanket Bog	Peatland and wetland	- Examples on peat over 0.5m deep.	Local
	M17b	7130: Blanket bog	Blanket Bog	Blanket Bog	Peatland and wetland	- Small to medium-sized stands of eroded peat bog with restoration potential. - Extent in Highland unknown. - There is c.175,900 ha of the Annex 1 habitat in Scotland.	County
	M20	7130: Blanket bog	Blanket Bog	Blanket Bog	Peatland and wetland	- Small stand of wet hare's-tail cottongrass blanket mire. - Extent in Highland unknown. - There is c.175,900 ha of the Annex 1 habitat in Scotland.	Local
	M25	7130: Blanket bog	Blanket Bog	Blanket Bog	Peatland and wetland	- Examples on peat over 0.5m deep.	Local
E1.8 Dry modified bog	M19c	7130: Blanket bog	Blanket Bog	Blanket Bog	Peatland and wetland	- Examples that are hagged (eroded).	County

E2.1 Flush and spring – acid/neutral flush	M6b	n.a.	Upland flushes, fens and swamps	Upland flushes, fens and swamps	Peatland and wetland	- Small, species-poor stands. - Extent in Highland unknown. - Extent of the Priority Habitat unknown.	Local
	M6c						
E2.2 Flush and spring – basic flush	M10a	7230: Calcium-rich springwater-fed fens	Upland flushes, fens and swamps	Upland flushes, fens and swamps	Peatland and wetland	- Small, moderately species-rich stands. - Extent in Highland unknown. - There is c.370 ha of the Annex 1 habitat in Scotland.	County
	M11a	7240: High-altitude plant communities associated with areas of water seepage	Upland flushes, fens and swamps	Upland flushes, fens and swamps	Peatland and wetland	- Small, numerous, moderately species-rich stands. - Extent in Highland unknown. - There is c.70 ha of the Annex 1 habitat in Scotland.	County
	M11b						
E2.3 Flush and spring – bryophyte-dominated spring	M31	n.a.	Upland flushes, fens and swamps	Upland flushes, fens and swamps	Peatland and wetland	- Small stands of low species-richness which are groundwater and/or surface water-dependent. - Extent in Highland unknown. - Extent of the Priority Habitat unknown.	Local
	M32a	n.a.	Upland flushes, fens and swamps	Upland flushes, fens and swamps	Peatland and wetland	- Very small stands of low species-richness which are groundwater-dependent. - Extent in Highland unknown. - Extent of the Priority Habitat unknown.	Local
	M32b						

	M37	7220: Hard-water springs depositing lime	Upland flushes, fens and swamps	Upland flushes, fens and swamps	Peatland and wetland	- Very small, numerous stands of low species-richness associated with base-rich groundwater. - Extent in Highland unknown. - There is c.57 ha of the Annex 1 habitat in Scotland.	County
E3.2 Fen – basin mire	M4	7140: Very wet mires often identified by an unstable ‘quaking’ surface	Upland flushes, fens and swamps	Upland flushes, fens and swamps	Peatland and wetland	- Very small, species-poor stands. - Extent in Highland unknown. - There is c.1420 ha of the Annex 1 habitat in Scotland.	Local
E4 Bare peat	n.a.	n.a.	n.a.	n.a.	n.a	- Areas of degraded bog support significant sections of bare peat. - Offers some potential for restoration	Local
F1 Swamp	S9a	n.a.	Upland flushes, fens and swamps	Upland flushes, fens and swamps	Peatland and wetland	- Very small, species-poor stands. - Extent in Highland unknown. - Extent of the Priority Habitat unknown.	Local
F2.1 Marginal/ inundation – marginal	S10a	n.a.	Rivers	Rivers	Freshwater: rivers, burns and lochs	- Very small, species-poor stands. - Extent in Highland unknown. - Extent of the Priority Habitat unknown.	Local

APPENDIX C - SPECIES CONSERVATION IMPORTANCE

Notable species are encountered by chance during a habitat survey, which is not primarily species-focused. Other notable species will undoubtedly occur in the Survey Area that are not seen during the course of the survey. Finding them would entail much more intensive searching over an extended period to take account of flowering times throughout the growing season, and would be very time-consuming. The table below shows the importance of species that were encountered. Only those that are at least one of the following are listed:

- EU Habitats Directive Annex 2
- GB Red Listed above the category of Least Concern
- Nationally Rare or Scarce
- UK Biodiversity Action Plan Priority Species
- Scottish Biodiversity List
- Wildlife & Countryside Act Schedule 8
- Highland Biodiversity Action Plan priority species

Species	EU Habitats Directive Annex 2	GB Red List	Nationally Rare or Scarce	UK Biodiversity Action Plan Priority Species	Scottish Biodiversity List	Wildlife & Countryside Act Schedule 8	Highland Biodiversity Action Plan priority species	Notes	Importance
Common Juniper <i>Juniperus communis</i>				✓	✓		✓	- Locally common on inaccessible rock ledges.	Local
Petty Whin <i>Genista anglica</i>		Near Threatened						- Scarce in dry areas beside tracks and in dry heaths.	Local
Dwarf Birch <i>Betula nana</i>			NS					- Scarce in bogs and wet heaths.	County
Aspen <i>Populus tremula</i>							✓	- Rare on rocky outcrops.	Local
Downy Willow		Vulnerable	NS	✓	✓		✓	- Locally abundant on	National

<i>Salix lapponum</i>								inaccessible cliffs, crags and ledges.	
Dwarf Cornel <i>Cornus suecica</i>		Near Threatened						- Locally abundant in bogs and damp heaths	Local
Field Gentian <i>Gentianella campestris</i>		Vulnerable		✓	✓			- Rare in dry acid grassland.	County
Hawkweeds <i>Hieracium spp.</i>								- Locally common on base-enriched herb-rich ledges. - No attempt made to identify micro-species. Many are Red List Threatened and Nationally Rare.	Site to National
Lesser Butterfly-orchid <i>Platanthera bifolia</i>		Vulnerable		✓	✓			- Rare in marshy grassland.	County
Small-white Orchid <i>Pseudorchis albida</i>		Vulnerable		✓	✓			- Rare in wet heath/marshy grassland.	County

APPENDIX D - SURVEYOR CVS

JAMES BUNYAN

DIRECTOR – TRACKS ECOLOGY LTD



TRACKS ECOLOGY
ECO - GIS - UAV

 **PHONE**
07528 865557

 **EMAIL**
info@tracksecology.com

 **LINKEDIN**
/in/jamesbunyan

 **TWITTER**
@TracksEcology



PROFILE

I have over 20 years' experience working in the ecological sector, both in academia and commercial consultancies. In 2014 I set up Tracks Ecology Ltd to enable me to focus on a number of interests around the integration of technology in ecological consultancy and research. Today I provide a bespoke consultancy service incorporating a wide array of surveys for developments, forestry and nature recovery projects with a focus on using GIS, UAVs and wider technological applications.

EDUCATION

Biodiversity and Conservation, M.Sc.

University of Leeds, UK
Grade: Distinction. 2001 - 2002

Environmental Science B.Sc (Hons)

University of Birmingham, UK
Grade: 2:1 Hons. 1995 - 1998

EXPERTISE

- Ecological Survey & Assessment
- QGIS – data analytics & cartography
- UAVs for ecological applications
- Environmental applications of AI
- Integration of remote sensing data
- Harnessing emerging technology
- Clear and concise reporting

WORK EXPERIENCE

DIRECTOR

Tracks Ecology Ltd

2014
–
Present

Provision of high quality bespoke ecological and GIS services for projects of all sizes. Tracks Ecology Ltd offers pragmatic and ecologically responsible solutions to a range of sectors including construction, forestry and rewilding. Harnessing technological advances and novel approaches combined with traditional field techniques Tracks Ecology Ltd aims to provide a comprehensive range of services efficiently and effectively.

SENIOR CONSULTANT

Atmos Consulting Ltd

2010
–
2014

Management of ecological inputs for planning applications in relation to a large number of renewable energy schemes (wind and hydro) both large (Section 36) and small (FIT) across Scotland. Projects included ecological input to screening, scoping, EclA, Habitat Regulations Appraisal and Environmental Appraisal documents. Development of habitat and post construction management plans, peat restoration plans and licensed mitigation strategies.

SENIOR ECOLOGIST

Worcestershire Wildlife Consultancy

2008
–
2010

All aspects of ecological survey work were undertaken with the preparation, submission and implementation of numerous EPS licence applications (bats, great crested newts) along with a number of badger development licences. Production of tenders, client liaison, project management, marketing and administration along with providing training and support for colleagues.

KEY SKILLS _____

- Protected Species Surveys
- Ecological Impact Assessments
- CAA Approved UAV Pilot
- NatureScot EPS Licenses – Bats
- NatureScot EPS Licenses – GCN
- Skilled in QGIS
- Proficient in MS Office applications
- Qualified and insured UAV pilot
- Budget management (> £100K)
- Client liaison and management

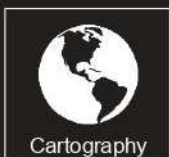
INTERESTS _____



Rewilding



Photography



Cartography



Running

MEMBERSHIPS _____

**Chartered Institute of Ecology
and Environmental
Management (Full membership)**

ARPAS-UK

**The Association for
Geographic Information**

WORK EXPERIENCE _____ (CONTINUED)

POSTGRADUATE RESEARCH

University of Bristol

2007

2008

Research project focusing on predator-prey interactions within wildlife corridors in north eastern Belize. Project involved various tropical field research techniques including camera trapping, scat collection, surveys for signs of prey and carnivore species and small mammal trapping. All work was carried out within the remote tropical forests of NE Belize.

ECOLOGICAL CONSULTANT

Land Care Associates, Birmingham

2006

2007

Ecological surveys across both urban and rural landscapes involving Phase 1 and protected species surveys. Involvement in large-scale urban development focusing on regeneration and urban biodiversity improvement schemes across the UK.

RESEARCH ASSISTANT

Wildlife Conservation Research Unit, Oxford University

2004

2006

Research assistant working on a number of projects including behavioural ecology of badgers and population monitoring of small mammals. Position also involved extensive administrative and project management work.

PROJECTS _____

- **WILDCAT SURVEYS** – Survey design and implementation using over 80 camera traps within the Cairngorm Connect landscape to assess baseline populations of the Scottish Wildcat. (Client: Saving Wildcats partnership)
- **UAV MAPPING** – Acquisition and processing of over 5000 high resolution images for production of detailed 3D model as baseline model for seabird research, Orkney. (Client: School of Biological Sciences, University of Aberdeen)
- **DETAILED HABITAT MAPPING** – Use of UAV acquired aerial imagery and ground based habitat surveys to provide detailed 3D models of habitats. Outputs guided native woodland creation plans. (Client: Bidwells)
- **BAT SURVEYS, WIND FARM** – Survey design and data collection of bat activity with the use of 12 static detectors at proposed wind farm site in remote location in Scottish Highlands. (Client: ITP Energised)

MORE PROJECT EXAMPLES CAN BE PROVIDED ON REQUEST

REFERENCES



Stephanie Kiel

Team Leader Affric Highlands / Trees For Life

Phone : 07498 534 218

Email : stephanie@treesforlife.org.uk



Matthew Hopkins

Director / Gavia Environmental

Phone : 07498 534 218

Email : matt.hopkins@gavia-environmental.co.uk



Denis Torley

Associate, Forestry / Bidwells

Phone : 07827 256907

Email : denis.torley@bidwells.co.uk

Robert Potter ACIEEM

Elgin, Moray, United Kingdom

PROFILE

- Ecologist with extensive field experience.
- Varied professional experience, encompassing habitats, ornithology and protected species.
- Academic foundation in species identification and countryside management.
- GIS and report-writing experience.
- Schedule 1 Bird Licence holder.
- Committed to updating/expanding skills through attending training courses, webinars and conferences.

PROFESSIONAL ACTIVITY

Self-employed ecologist (2011 to present), working as a contractor, or sub-contracted to larger companies. Current and past work includes:

- **Habitat/vegetation surveys:** Phase 1 and National Vegetation Classification surveys. Phase 1 surveys include an urban industrial site in Aberdeenshire. NVC surveys include part of RSPB Insh Marshes NNR; Gaick Estate, Highland; and Ormsary Estate, Argyll.
- **Ornithological surveys:** a wide range of field surveys for a variety of infrastructure projects, using standard methods (Breeding Birds, Wintering Geese, Vantage Point, Woodland Point Count, Raptor, Diver). Developments worked on include Strathy, Gordonbush, Fairburn, Rothes and Paul's Hill wind farms; Moray Offshore Renewables Ltd. (MORL) terrestrial cable route; Kilfinichen pier development, Isle of Mull.
- **Protected species surveys:** recent surveys of two proposed industrial developments in Aberdeenshire for EPS and other protected species.
- **Herbivore Impact Assessment/montane woodland surveys:** to assess the impact of herbivores on the condition of SSSI's or on woodland regeneration schemes. Sites worked on include Mar Lodge Estate (National Trust for Scotland), Balmoral Estates, Beinn Dearg SAC, Inverpolly SSSI and Glen Feshie Estate.
- **National Forest Inventory (NFI):** large-scale Forest Research programme to gather information on the size, distribution, composition and condition of woodlands across Great Britain. Field survey involved collecting data on habitat types, woodland ecology, tree health, social and cultural factors, and management practice.
- **Native Woodland Survey of Scotland (NWSS):** Forestry Commission Scotland project to survey and map the location, type, extent, composition and condition of all of Scotland's native woodland.

PREVIOUS POSTS

Field Ecologist (part-time) for Alba Ecology Ltd. (2015-2018). Work undertaken included:

- Phase 1 and National Vegetation Classification surveys;
- Ornithological surveys for wind farms;
- Ornithological research into Golden and White-tailed Eagles (see Research and Publications below);
- Ornithological and lepidoptera surveys for the Scottish Government's Basic Payment Scheme;
- Protected species surveys;
- Freshwater pearl mussel surveys;
- Collection of Aspen clones for propagation by Forest Research;
- Peatland condition and peat depth surveys;
- Data input on GIS;
- Report-writing.

Contract ornithologist for RSPB (2008-2011). Contracts held were:

- **Montane Bird Survey Research Assistant (2011):** Surveyed montane breeding birds (principally Dotterel and Snow Bunting) and associated habitats in the Cairngorms as part of a joint SNH/RSPB national survey.
- **Upland Fieldworker (2010):** Conducted moorland breeding bird surveys, Phase 1 habitat surveys and vegetation/herbivore impact assessment on estates in the Scottish Highlands.
- **Lapwing Project Assistant (2010):** Surveyed upland farms in the North Pennines for breeding lapwings and other waders as part of the RSPB's national Lapwing Recovery Project.
- **Hen Harrier Protection Assistant (2008 and 2009):** Prevented disturbance/destruction of nesting hen harriers within the RSPB Geltsdale reserve. Also carried out moorland breeding bird surveys.
- **Reserves HLS Assistant (2008-9):** Produced Farm Environment Plans (FEP's) and Higher Level Stewardship (HLS) applications for the suite of RSPB reserves in the Dearne Valley, South Yorkshire, and submitted these to Natural England. Involved desk study, fieldwork and writing applications.

QUALIFICATIONS

- Higher National Diploma with Distinction in Countryside Management (Scottish Agricultural College 2007)
- University Certificate in Biological Recording & Species Identification (University of Birmingham 2009)
- Master of Arts (Social Sciences) (University of Glasgow 1995)

SELECTED TRAINING

- Introduction to Nature Conservation Legislation (Scotland), CIEEM (2021)
- Introduction to Bat Ecology and Bat Surveys, CIEEM (2021)
- UK Habitat Classification (UKHab) for Practitioners, CIEEM (2021)
- Preliminary Ecological Appraisal, CIEEM (2021)
- Protected Mammals Survey, Impacts and Mitigation, CIEEM (2019)

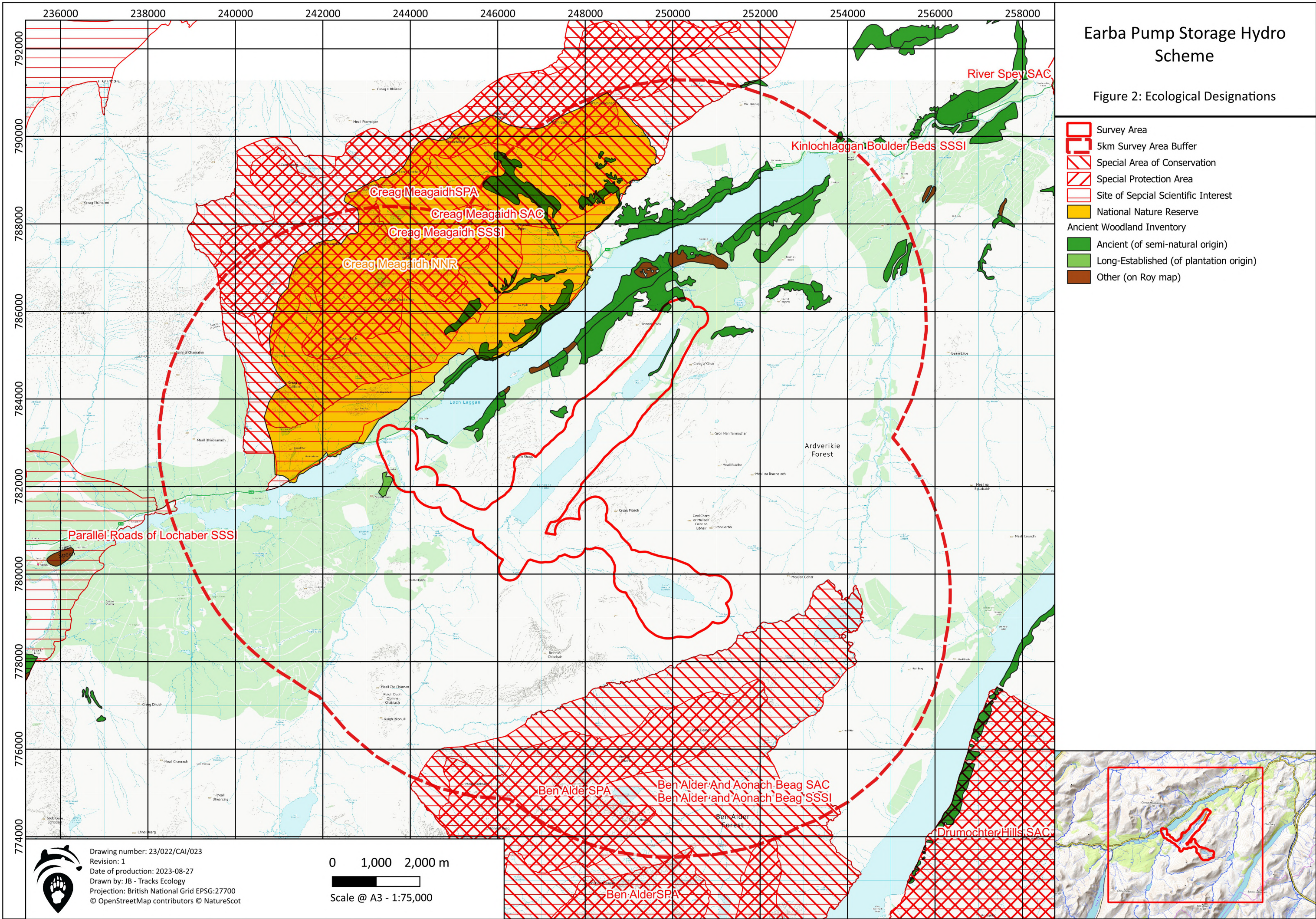
SELECTED WEBINARS AND CONFERENCES

- Ecological Assessment of New Woodland Creation: Opportunities and Guidance for Consultants, CIEEM (2022)
- Woodland Creation: Planning, Approaches, Implementation and Case Studies, CIEEM (2021)
- Land Use in Scotland: Changes, Challenges and Solutions, CIEEM (2020)

RESEARCH AND PUBLICATIONS

- **"Response of incubating Golden and White-tailed Eagles to forest road traffic: results of a pilot study"**
P. Cosgrove, K. Kortland, D. Shields, R. Potter, J. Murray & C. Cosgrove *Scottish Birds* 37:1 (2017)
A pilot study undertaken on the national forest estate in mainland Argyll and Lochaber which investigated the impact of routine forest road traffic on 13 incubating Golden Eagles and White-tailed Eagles.

APPENDIX E - FIGURES



Earba Pump Storage Hydro Scheme

Figure 2: Ecological Designations

- Survey Area
- 5km Survey Area Buffer
- Special Area of Conservation
- Special Protection Area
- Site of Special Scientific Interest
- National Nature Reserve
- Ancient Woodland Inventory
 - Ancient (of semi-natural origin)
 - Long-Established (of plantation origin)
 - Other (on Roy map)



Drawing number: 23/022/CAI/023
Revision: 1
Date of production: 2023-08-27
Drawn by: JB - Tracks Ecology
Projection: British National Grid EPSG:27700
© OpenStreetMap contributors © NatureScot

0 1,000 2,000 m
Scale @ A3 - 1:75,000

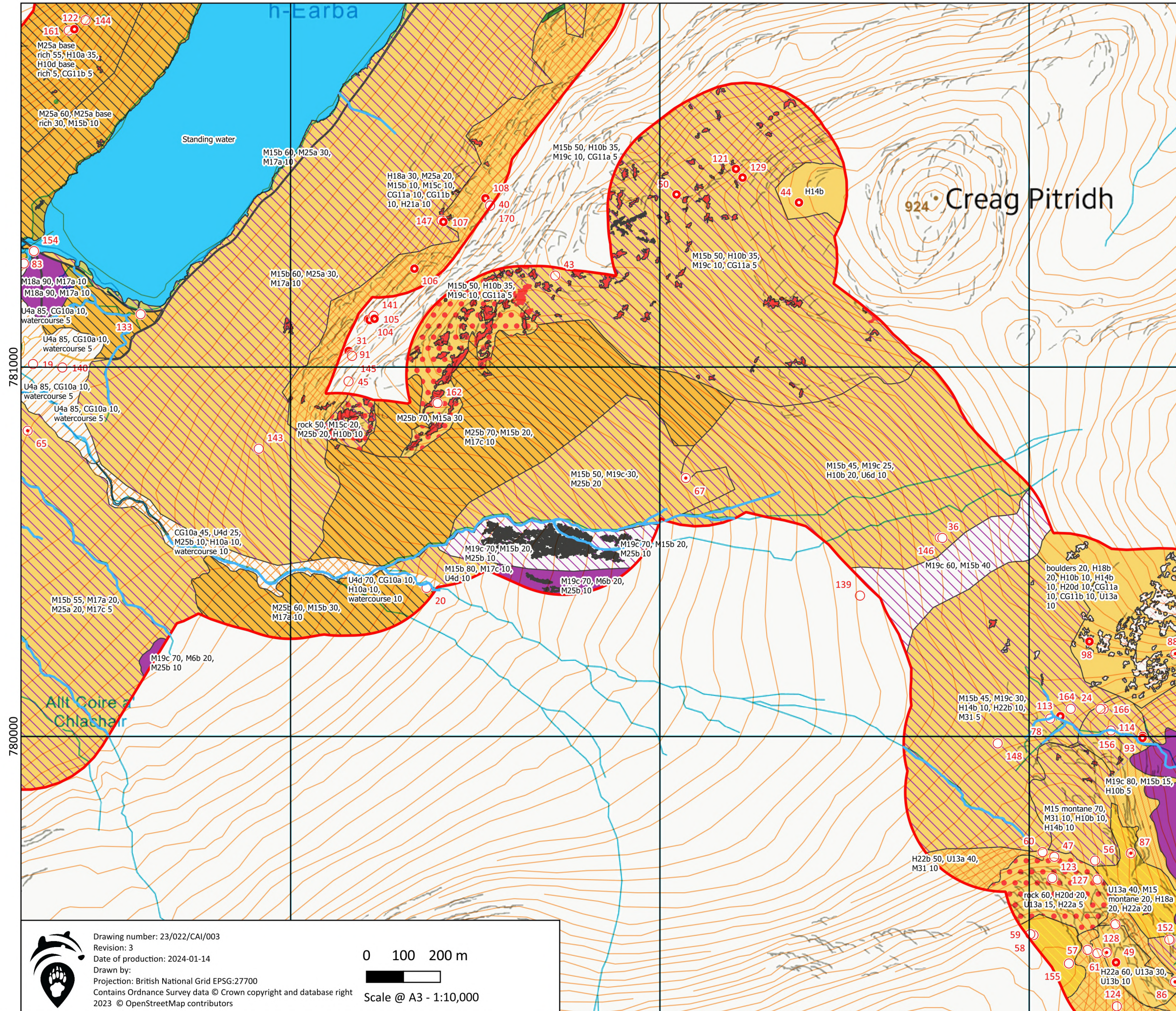
247000 248000 249000

Loch Earba Pump Storage Hydro

Figure 3c: Habitat Survey Results (3/7)

EARBA STORAGE
A GILKES ENERGY COMPANY

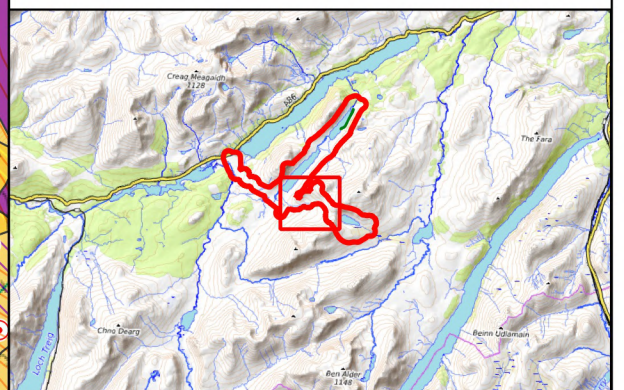
- Legend**
- Survey Area
 - Acid grassland - unimproved
 - Bare peat
 - Blanket bog
 - Broadleaved woodland - semi-natural
 - Built environment
 - Dry dwarf shrub heath - acid
 - Dry heath/acid grassland mosaic
 - Dry modified bog
 - Marsh/marshy grassland
 - Running water
 - Standing water
 - Wet dwarf shrub heath
 - Calcareous grassland - unimproved
 - Dry dwarf shrub heath/calcareous grassland mosaic
 - Dry dwarf shrub heath/exposed rock mosaic
 - Exposed rock
 - Montane heath/dwarf herb
 - Scree
 - Wet dwarf shrub heath/exposed rock mosaic
 - Watercourses
 - OS Contours 10m
 - Scattered trees
- Target Notes**
- County Importance
 - National Importance
 - Standard



Drawing number: 23/022/CAI/003
Revision: 3
Date of production: 2024-01-14
Drawn by:
Projection: British National Grid EPSG:27700
Contains Ordnance Survey data © Crown copyright and database right
2023 © OpenStreetMap contributors

0 100 200 m

Scale @ A3 - 1:10,000

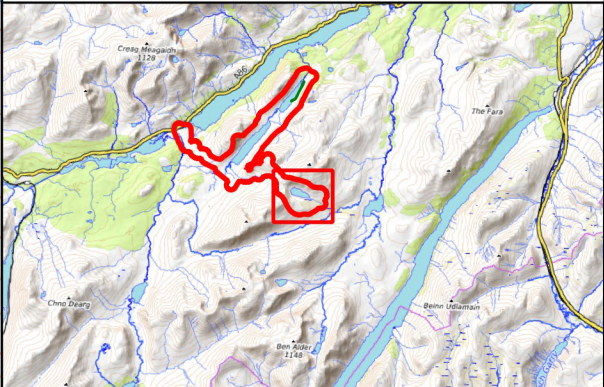
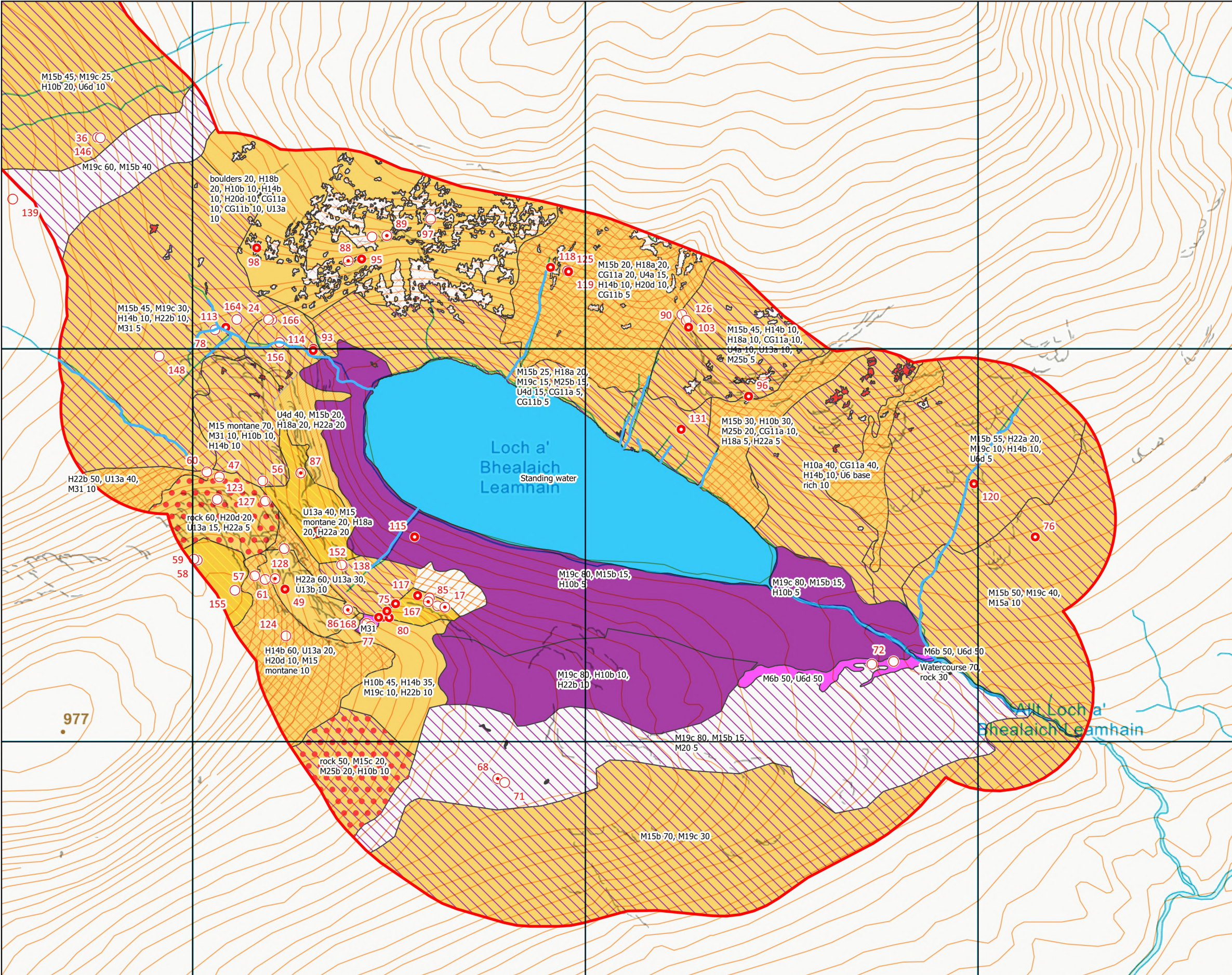


Loch Earba Pump Storage
Hydro

Figure 3d: Habitat Survey Results (4/7)



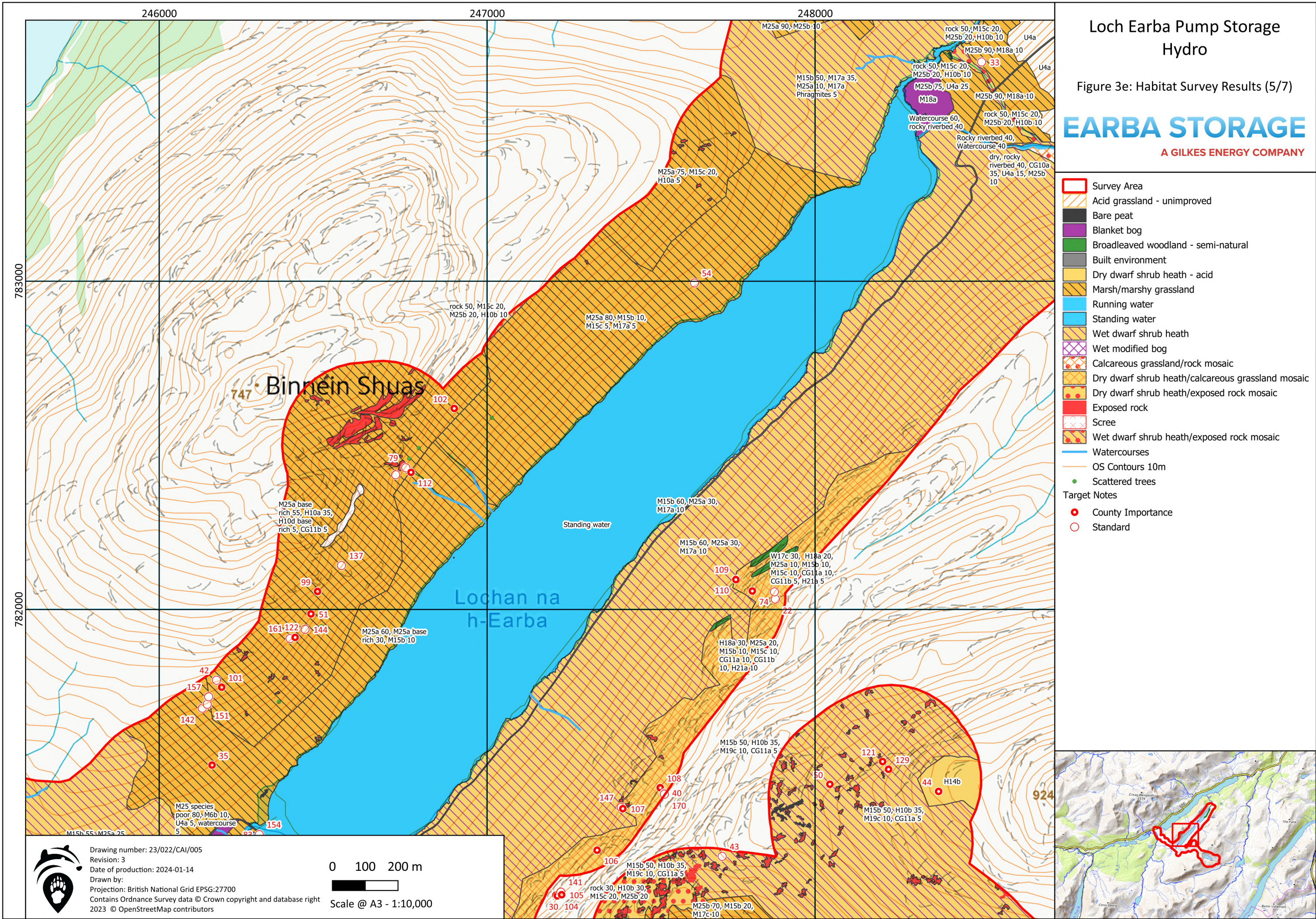
- Survey Area
- Acid grassland - unimproved
- Acid/neutral flush
- Bare peat
- Blanket bog
- Dry dwarf shrub heath - acid
- Dry heath/acid grassland mosaic
- Dry modified bog
- Running water
- Scrub - dense/continuous
- Standing water
- Wet dwarf shrub heath
- Basic Flush
- Dry dwarf shrub heath/calcareous grassland mosaic
- Dry dwarf shrub heath/exposed rock mosaic
- Exposed rock
- Montane heath/dwarf herb
- Scree
- Wet dwarf shrub heath/exposed rock mosaic
- Watercourses
- OS Contours 10m
- Target Notes
 - County Importance
 - National Importance
 - Standard



Drawing number: 23/022/CAI/004
Revision: 3
Date of production: 2024-01-14
Drawn by:
Projection: British National Grid EPSG:27700
Contains Ordnance Survey data © Crown copyright and database right
2023 © OpenStreetMap contributors

0 100 200 m

Scale @ A3 - 1:10,000

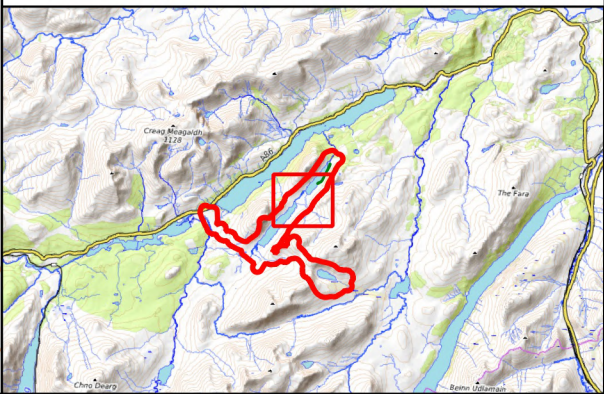


Loch Earba Pump Storage
Hydro

Figure 3f: Habitat Survey Results (6/7)



- Survey Area
- Acid grassland - unimproved
- Bare peat
- Blanket bog
- Broadleaved woodland - semi-natural
- Built environment
- Marsh/marshy grassland
- Mixed woodland - semi-natural
- Running water
- Standing water
- Scrub - dense/continuous
- Wet dwarf shrub heath
- Wet modified bog
- Calcareous grassland - unimproved
- Calcareous grassland/rock mosaic
- Coniferous woodland - semi-natural
- Dry dwarf shrub heath/calcareous grassland mosaic
- Exposed rock
- Scree
- Wet dwarf shrub heath/exposed rock mosaic
- Watercourses
- OS Contours 10m
- Scattered trees
- Target Notes
 - County Importance
 - Standard



249000 250000 251000

Loch Earba Pump Storage Hydro

Figure 3g: Habitat Survey Results (7/7)

EARBA STORAGE
A GILKES ENERGY COMPANY

- Survey Area
- Acid grassland - unimproved
- Bare peat
- Blanket bog
- Broadleaved woodland - semi-natural
- Built environment
- Coniferous woodland - plantation
- Marsh/marshy grassland
- Mixed woodland - semi-natural
- Running water
- Scrub - dense/continuous
- Standing water
- Wet dwarf shrub heath
- Wet modified bog
- Bracken
- Bracken/Scattered broadleaved trees
- Calcareous grassland - unimproved
- Coniferous woodland - semi-natural
- Dry dwarf shrub heath/calcareous grassland mosaic
- Exposed rock
- Scree
- Tall herb over scree
- Wet dwarf shrub heath/exposed rock mosaic
- Watercourses
- OS Contours 10m
- Scattered trees
- Rhododendron
- Target Notes
 - County Importance
 - Standard

786000

785000

667 Binnein Shios

643 Creag a' Chuir

Lochan na
h-Earba

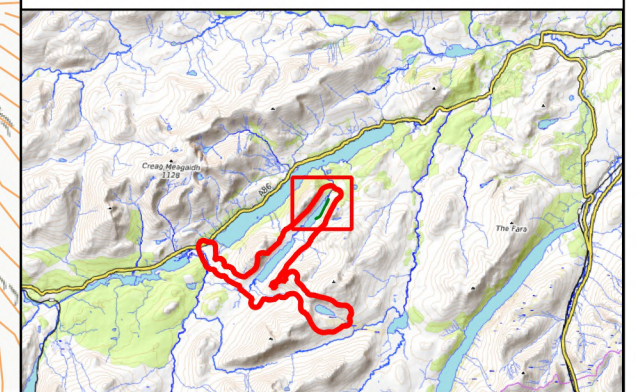
Loch Coire
Chuir

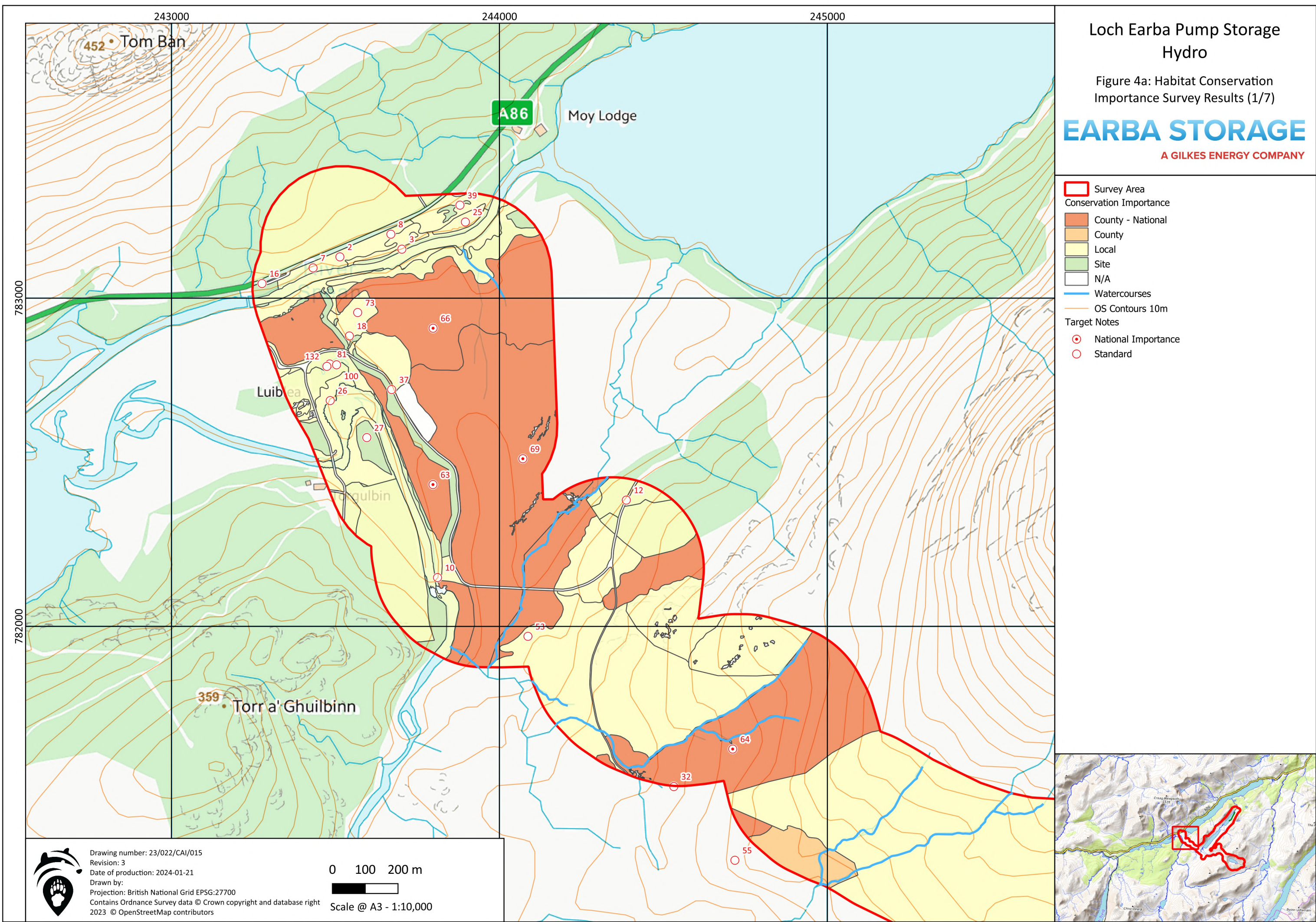


Drawing number: 23/022/CAI/007
Revision: 3
Date of production: 2024-01-14
Drawn by:
Projection: British National Grid EPSG:27700
Contains Ordnance Survey data © Crown copyright and database right
2023 © OpenStreetMap contributors

0 100 200 m

Scale @ A3 - 1:10,000





Loch Earba Pump Storage
Hydro

Figure 4a: Habitat Conservation
Importance Survey Results (1/7)

EARBA STORAGE
A GILKES ENERGY COMPANY

- Survey Area
- Conservation Importance
- County - National
 - County
 - Local
 - Site
 - N/A
- Watercourses
- OS Contours 10m
- Target Notes
- National Importance
 - Standard

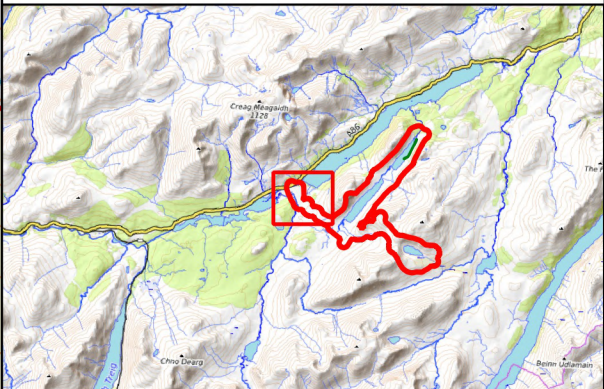


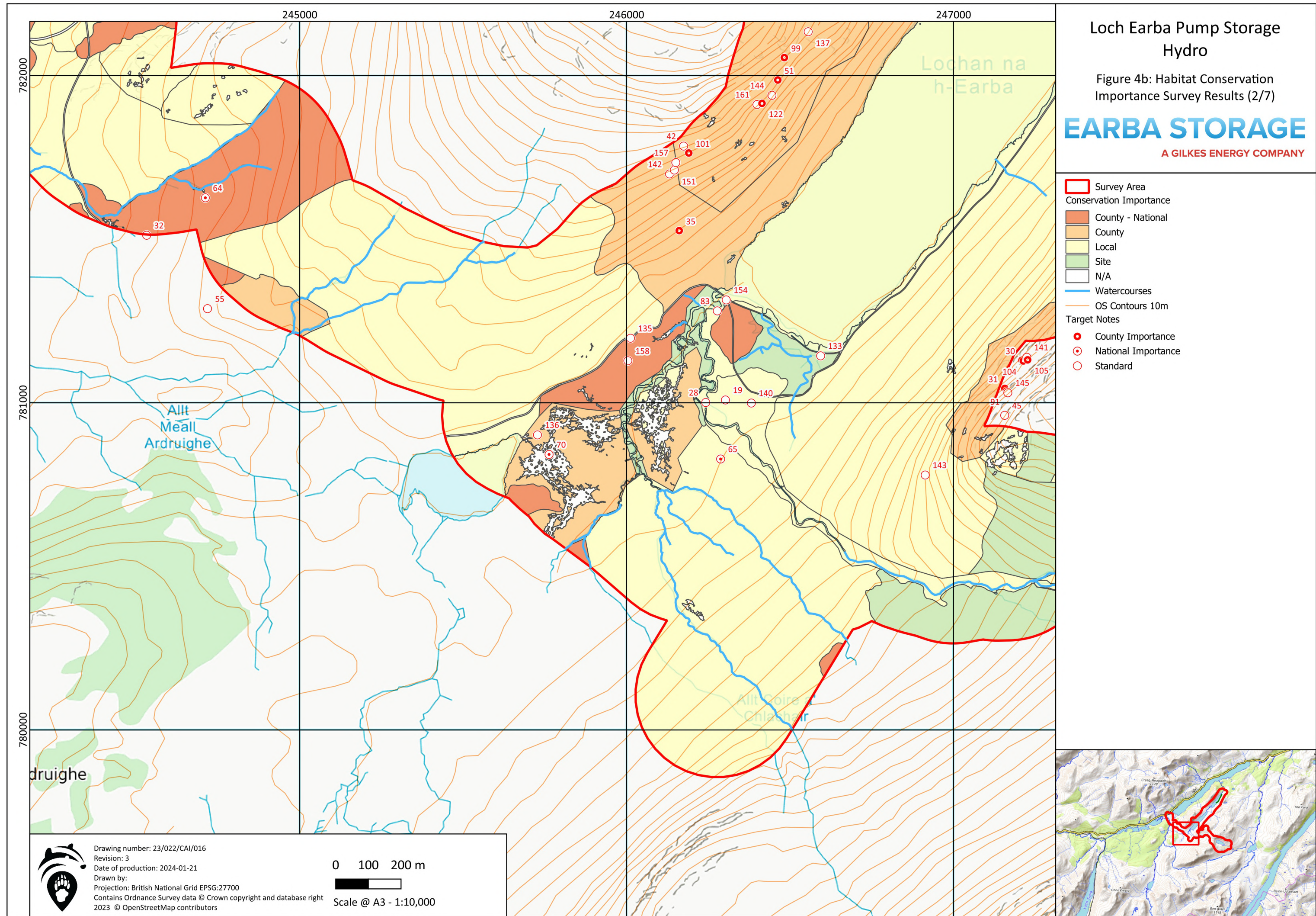
Drawing number: 23/022/CAI/015
Revision: 3
Date of production: 2024-01-21
Drawn by:
Projection: British National Grid EPSG:27700
Contains Ordnance Survey data © Crown copyright and database right
2023 © OpenStreetMap contributors

0 100 200 m



Scale @ A3 - 1:10,000





247000 248000 249000

Loch Earba Pump Storage Hydro

Figure 4c: Habitat Conservation
Importance Survey Results (3/7)

EARBA STORAGE
A GILKES ENERGY COMPANY

-  Survey Area
- Conservation Importance
-  National
 -  County - National
 -  County
 -  Local
 -  Site
 -  N/A
- Watercourses

- OS Contours 10m

- Target Notes
-  County Importance
 -  National Importance
 -  Standard

781000

780000

924 Creag Pitridh

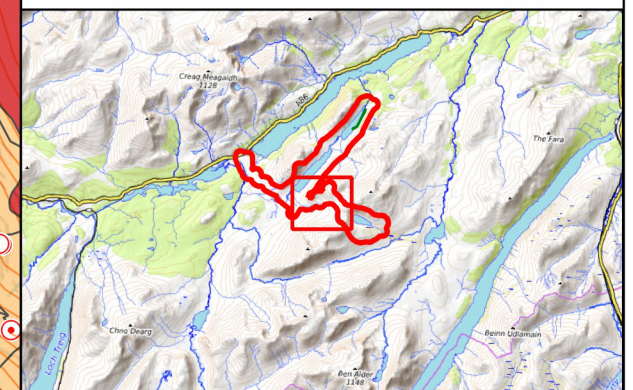


Drawing number: 23/022/CAI/017
Revision: 3
Date of production: 2024-01-21
Drawn by:
Projection: British National Grid EPSG:27700
Contains Ordnance Survey data © Crown copyright and database right
2023 © OpenStreetMap contributors

0 100 200 m



Scale @ A3 - 1:10,000



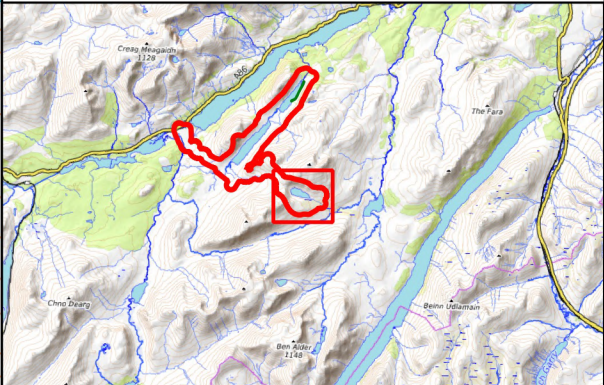
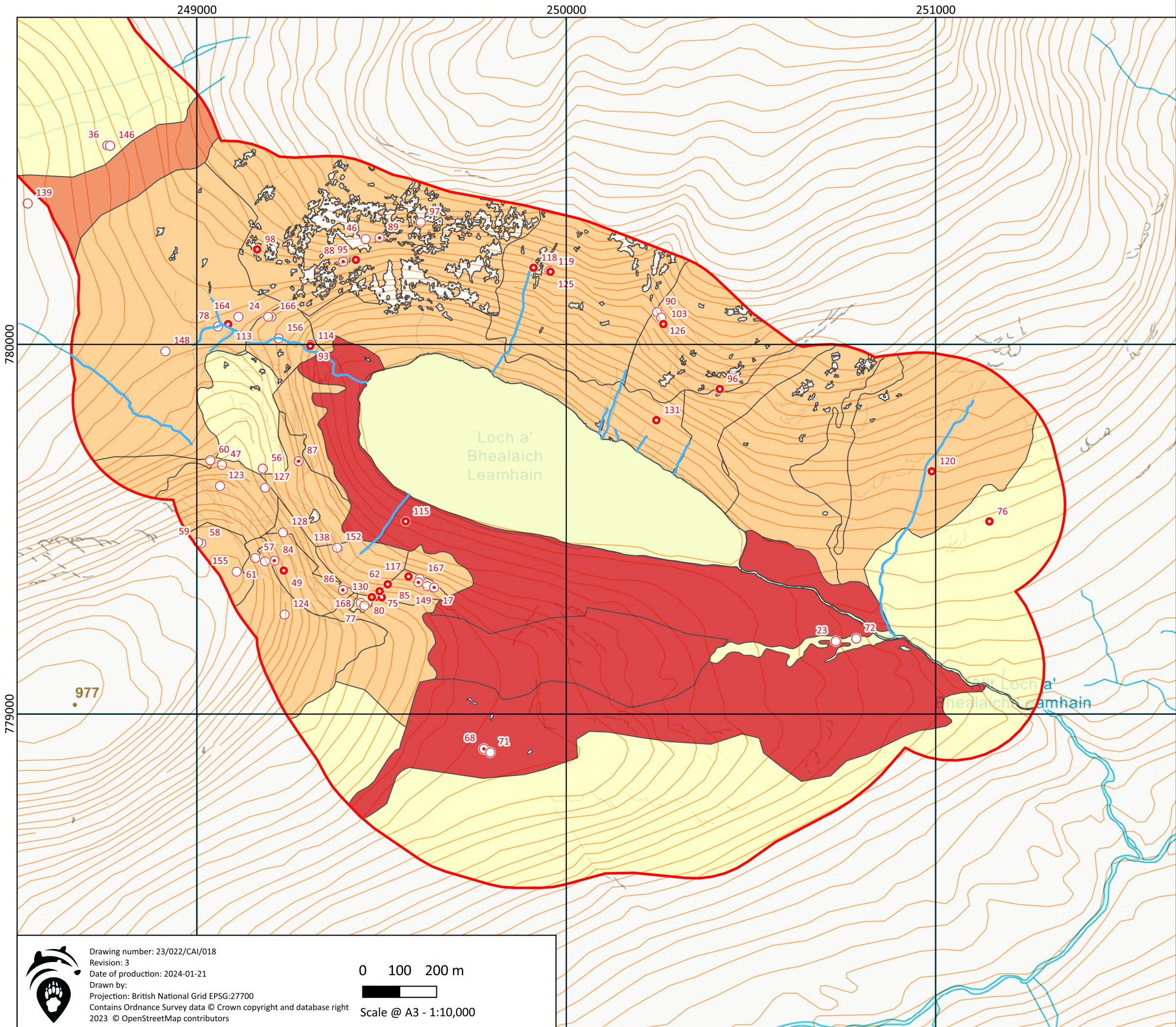
Loch Earba Pump Storage
Hydro

Figure 4d: Habitat Conservation
Importance Survey Results (4/7)

EARBA STORAGE
A GILKES ENERGY COMPANY

-  Survey Area
- Conservation Importance
-  National
 -  County - National
 -  County
 -  Local
 -  Site
 -  N/A
- Watercourses
 OS Contours 10m

- Target Notes
-  County Importance
 -  National Importance
 -  Standard

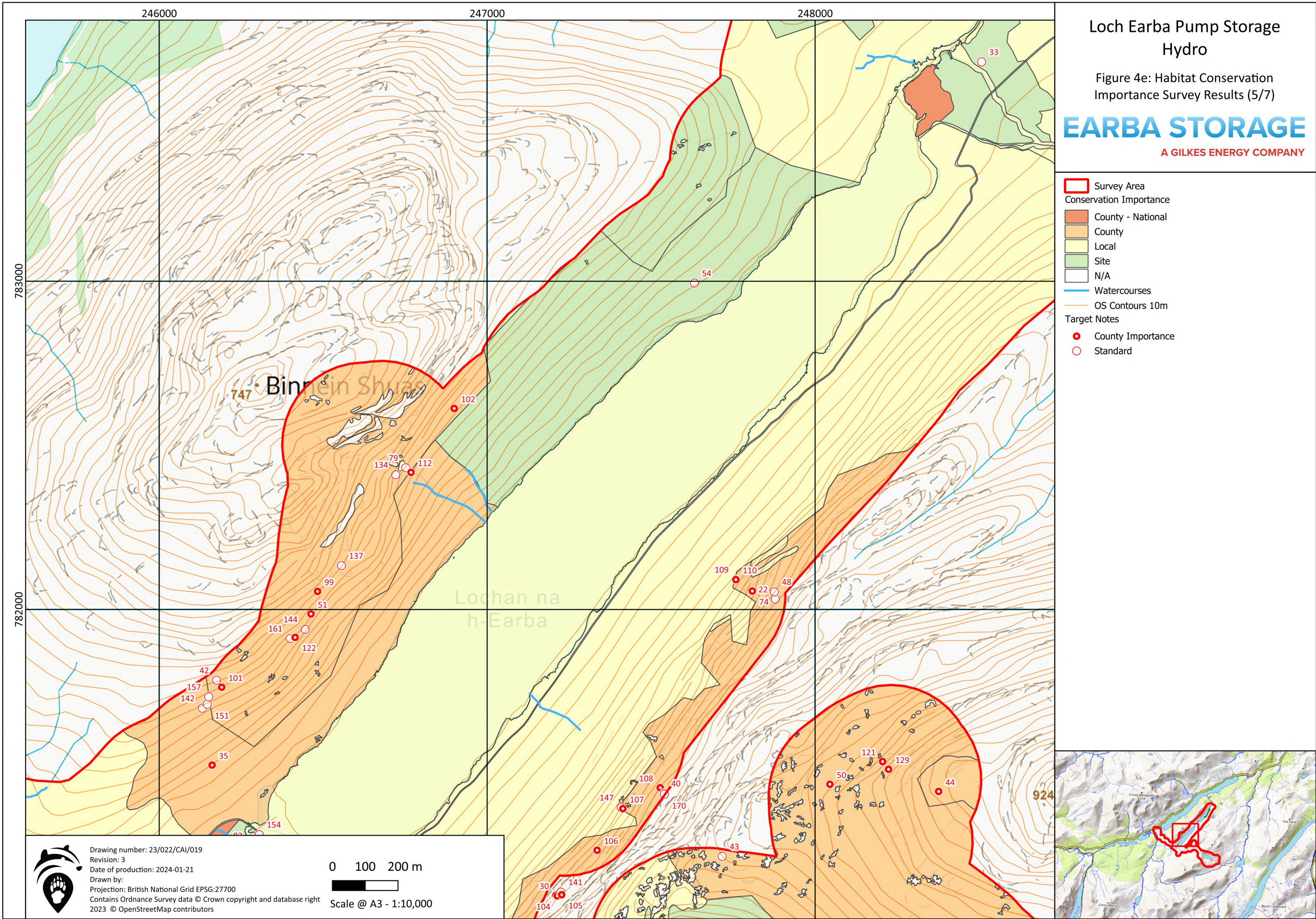


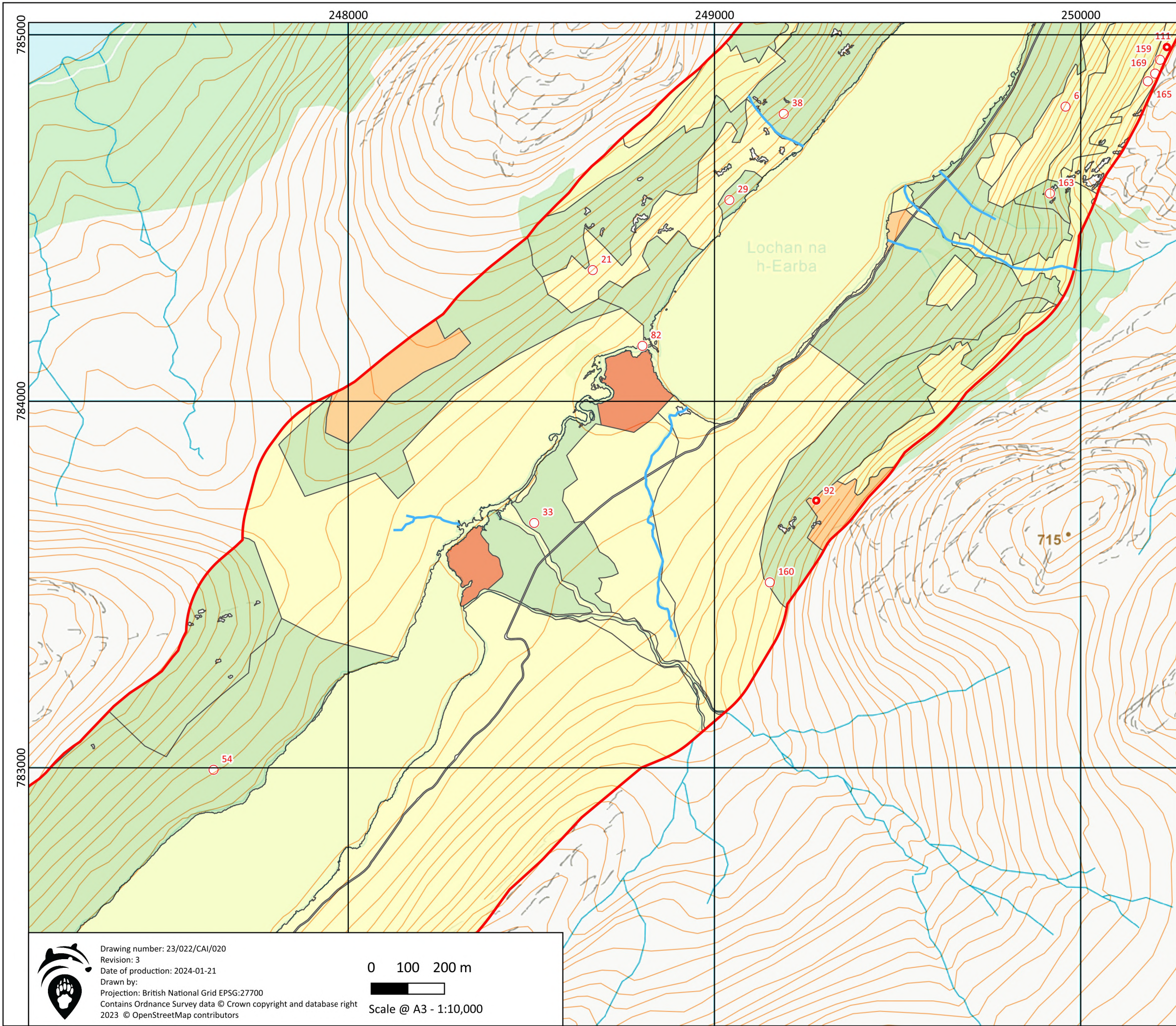
Drawing number: 23/022/CAI/018
Revision: 3
Date of production: 2024-01-21
Drawn by:
Projection: British National Grid EPSG:27700
Contains Ordnance Survey data © Crown copyright and database right
2023 © OpenStreetMap contributors

0 100 200 m



Scale @ A3 - 1:10,000



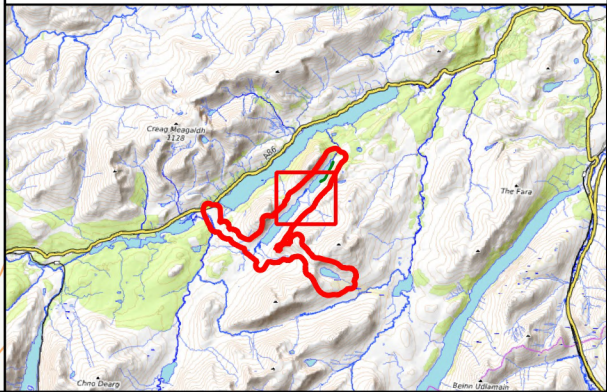


Loch Earba Pump Storage Hydro

Figure 4f: Habitat Conservation
Importance Survey Results (6/7)

EARBA STORAGE
A GILKES ENERGY COMPANY

- Survey Area
- Conservation Importance
 - County - National
 - County
 - Local
 - Site
 - N/A
- Watercourses
- OS Contours 10m
- Target Notes
 - County Importance
 - Standard



Drawing number: 23/022/CAI/020
Revision: 3
Date of production: 2024-01-21
Drawn by:
Projection: British National Grid EPSG:27700
Contains Ordnance Survey data © Crown copyright and database right
2023 © OpenStreetMap contributors

0 100 200 m



Scale @ A3 - 1:10,000

249000

250000

251000

Loch Earba Pump Storage Hydro

Figure 4g: Habitat Conservation
Importance Survey Results (7/7)

EARBA STORAGE
A GILKES ENERGY COMPANY

-  Survey Area
- Conservation Importance
-  County - National
 -  County
 -  Local
 -  Site
 -  N/A
- Watercourses
-  Watercourses
 -  OS Contours 10m
- Target Notes
-  County Importance
 -  Standard

786000

785000

667 Binnein

Allt Labhrach

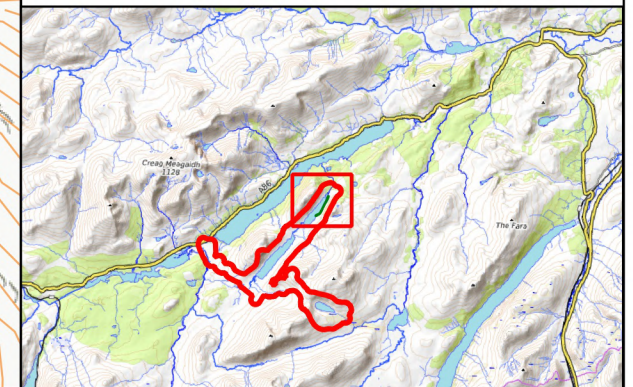
643 Creag a' Chuir

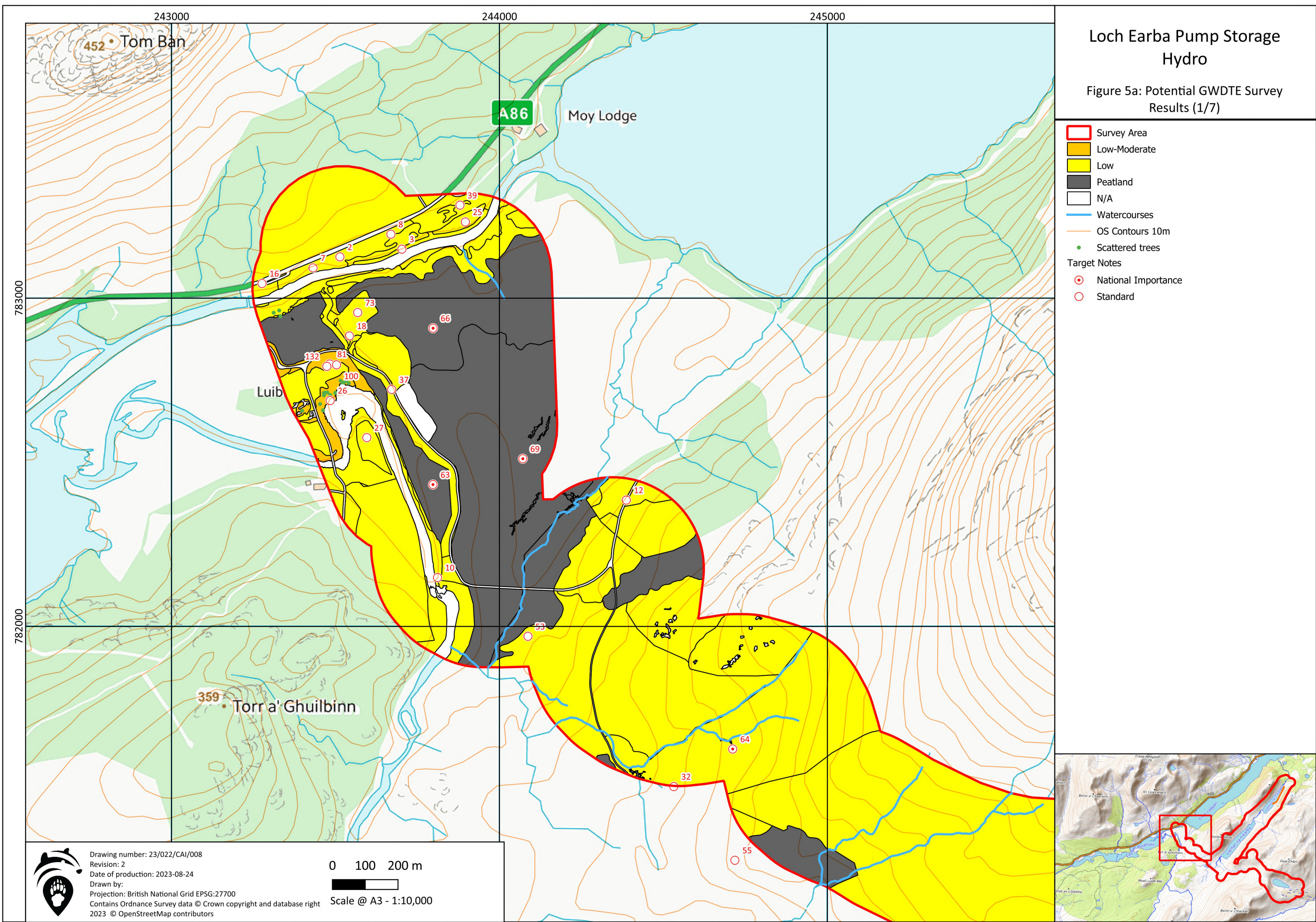
Loch Coire
ChuirLochan na
h-Earba

Drawing number: 23/022/CAI/021
Revision: 3
Date of production: 2024-01-21
Drawn by:
Projection: British National Grid EPSG:27700
Contains Ordnance Survey data © Crown copyright and database right
2023 © OpenStreetMap contributors

0 100 200 m

Scale @ A3 - 1:10,000





Drawing number: 23/022/CAI/008
Revision: 2
Date of production: 2023-08-24
Drawn by:
Projection: British National Grid EPSG:27700
Contains Ordnance Survey data © Crown copyright and database right
2023 © OpenStreetMap contributors

247000 248000 249000

Loch Earba Pump Storage Hydro

Figure 5c: Potential GWDTE Survey
Results (3/7)

- Survey Area
- High
- Moderate-High
- Moderate
- Low-Moderate
- Low
- Peatland
- N/A
- Watercourses
- OS Contours 10m
- Scattered trees
- Target Notes
 - County Importance
 - National Importance
 - Standard

781000

780000

924 Creag Pitridh

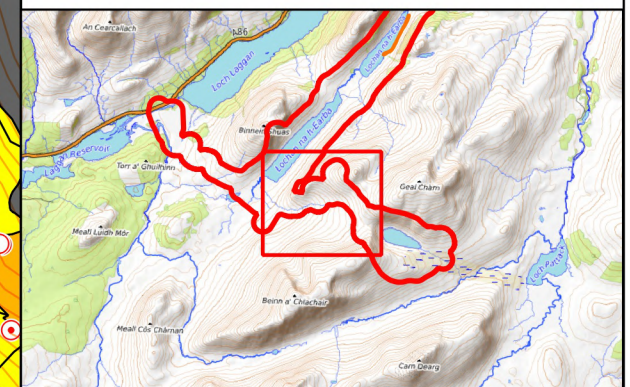


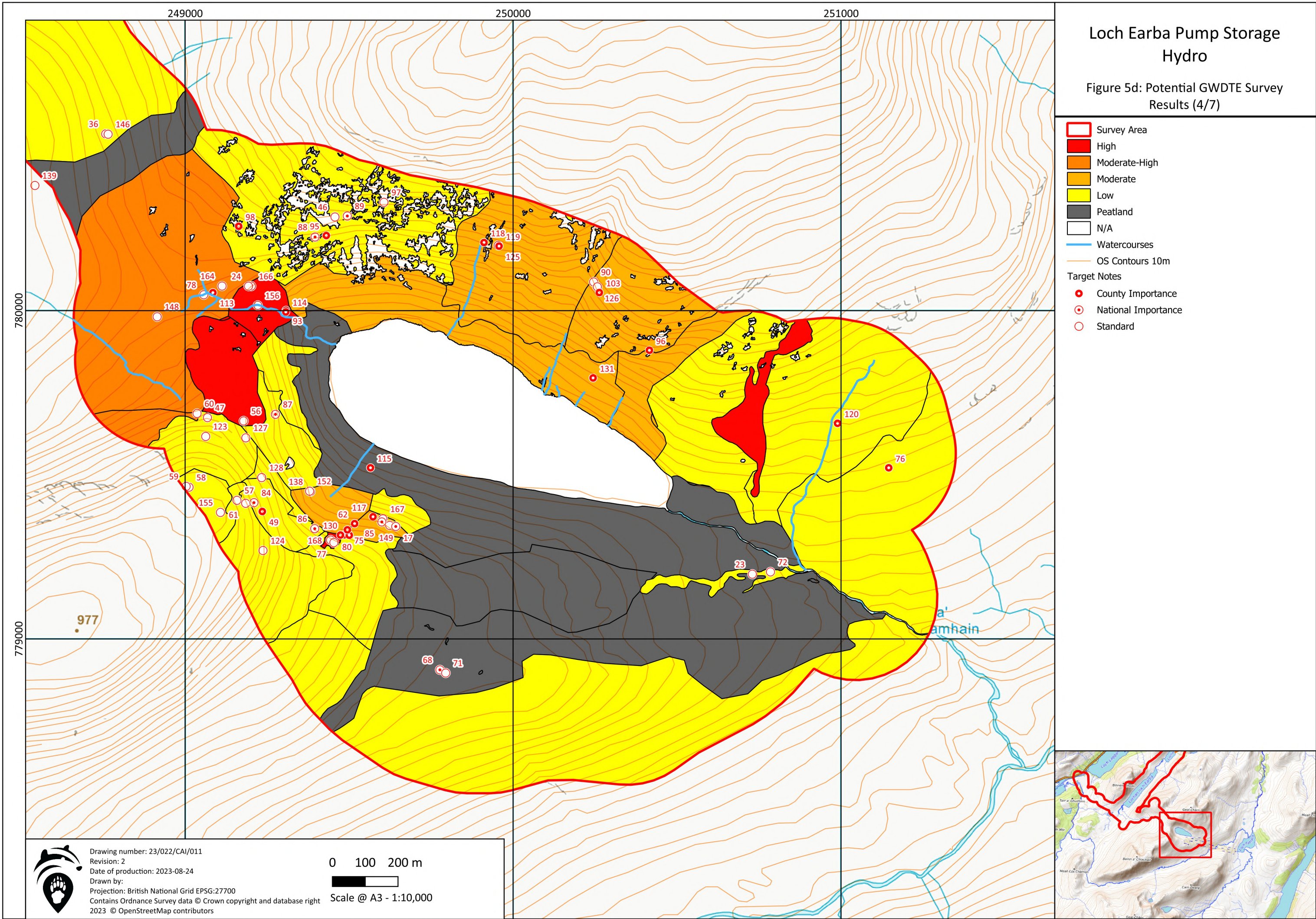
Drawing number: 23/022/CAI/010
Revision: 2
Date of production: 2023-08-24
Drawn by:
Projection: British National Grid EPSG:27700
Contains Ordnance Survey data © Crown copyright and database right
2023 © OpenStreetMap contributors

0 100 200 m



Scale @ A3 - 1:10,000





Loch Earba Pump Storage Hydro

Figure 5d: Potential GWDTE Survey Results (4/7)

- Survey Area
- High
- Moderate-High
- Moderate
- Low
- Peatland
- N/A
- Watercourses
- OS Contours 10m
- Target Notes
 - County Importance
 - National Importance
 - Standard

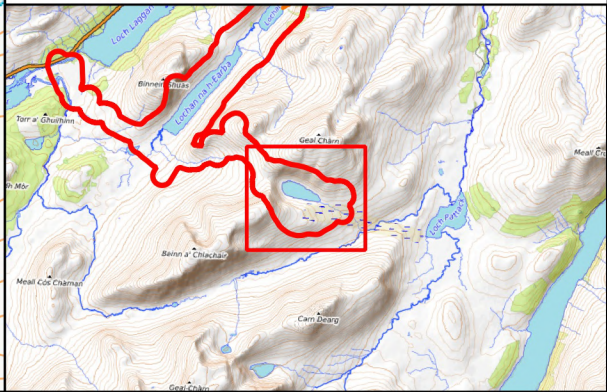


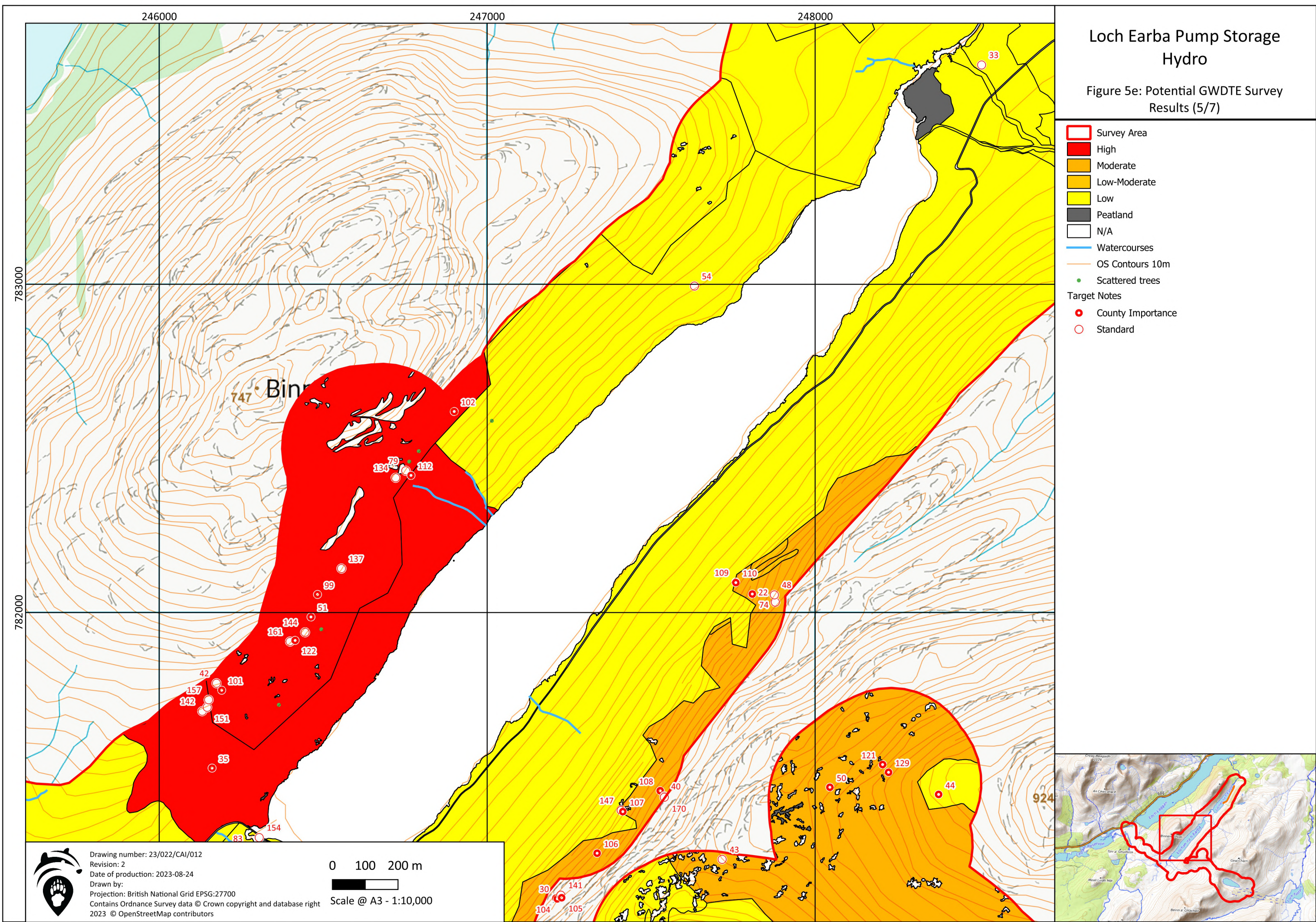
Drawing number: 23/022/CAI/011
Revision: 2
Date of production: 2023-08-24
Drawn by:
Projection: British National Grid EPSG:27700
Contains Ordnance Survey data © Crown copyright and database right
2023 © OpenStreetMap contributors

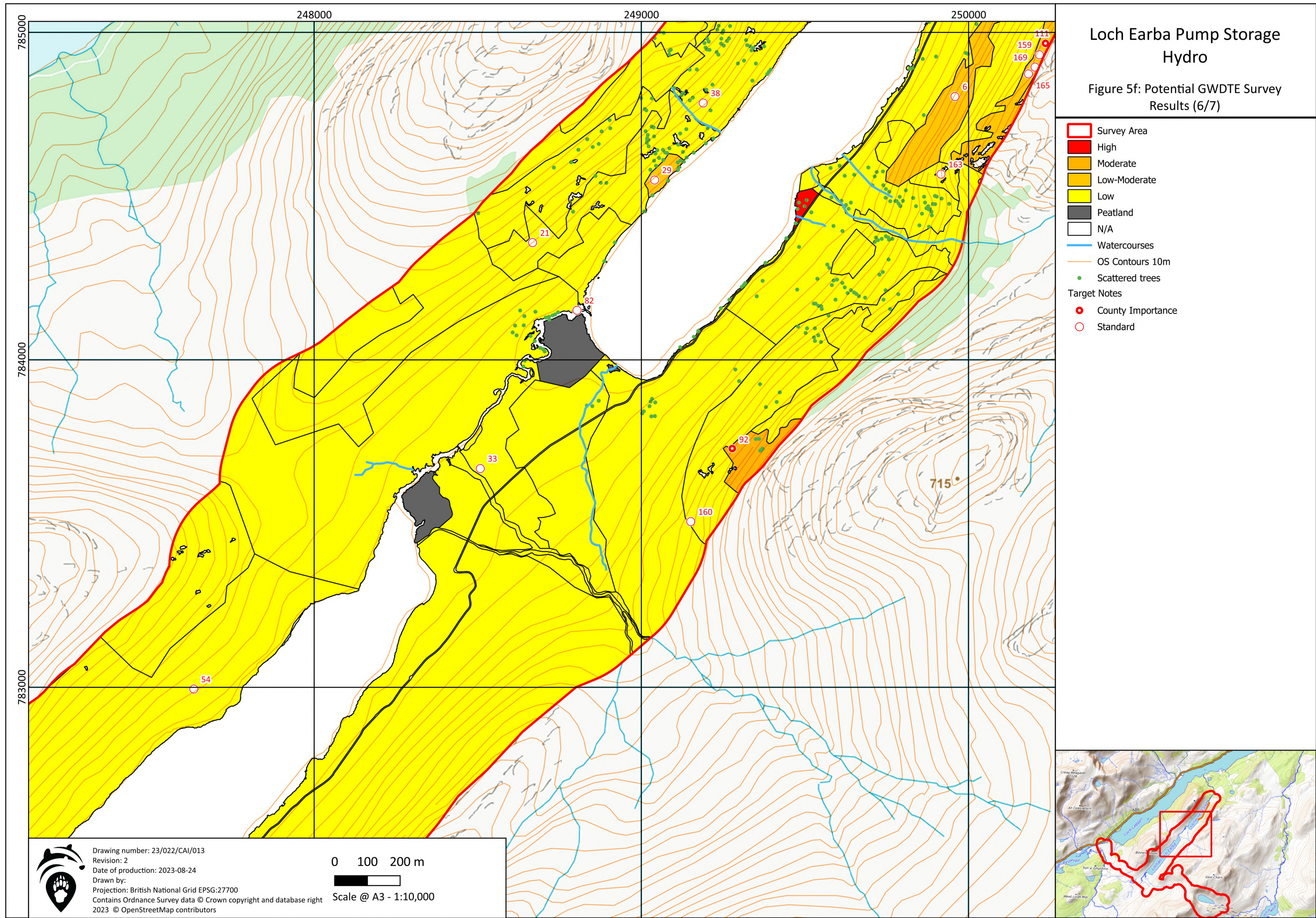
0 100 200 m



Scale @ A3 - 1:10,000







249000 250000 251000

Loch Earba Pump Storage Hydro

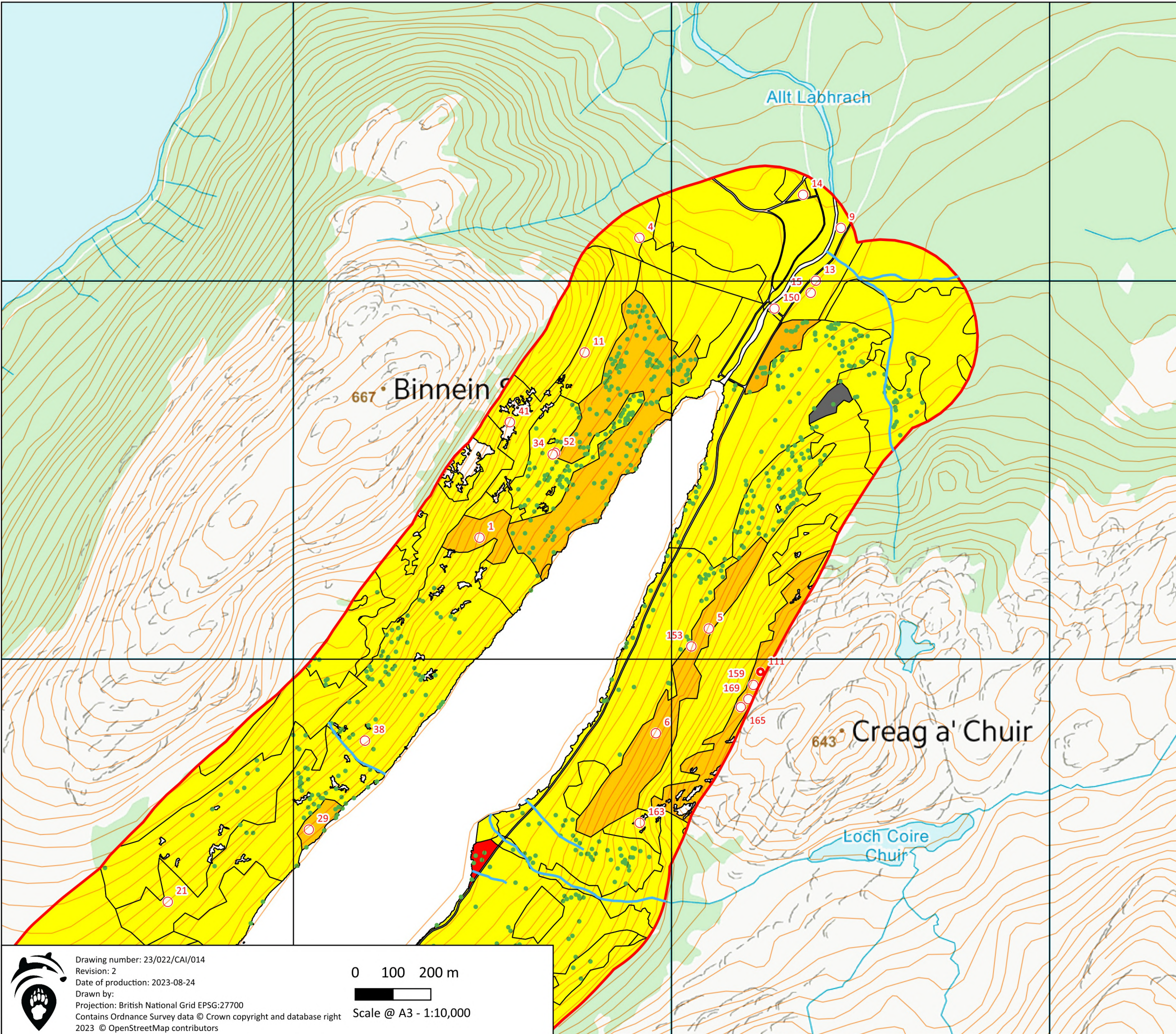
Figure 5g: Potential GWDTE Survey
Results (7/7)

- Survey Area
- High
- Moderate
- Low-Moderate
- Low
- Peatland
- N/A
- Watercourses
- OS Contours 10m
- Scattered trees
- Target Notes
 - County Importance
 - Standard

786000

785000

784000

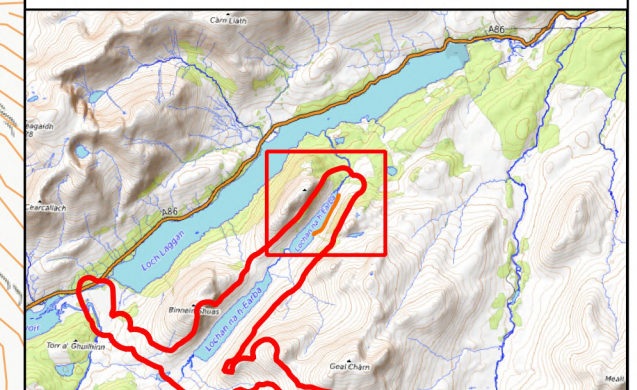


Drawing number: 23/022/CAI/014
Revision: 2
Date of production: 2023-08-24
Drawn by:
Projection: British National Grid EPSG:27700
Contains Ordnance Survey data © Crown copyright and database right
2023 © OpenStreetMap contributors

0 100 200 m



Scale @ A3 - 1:10,000



END OF DOCUMENT