Technical Appendix 7.1
Habitat Technical Report

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1 Habitat Technical Report

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1 Habitat Technical Report

1.1 Introduction

1.1.1 Habitat surveys at the Proposed Development were undertaken by Whytock Ecology between July and August 2022 and by ITPEnergised in August 2023. The full results for the 2022 surveys are presented in **Annex A,** are summarised below, and shown in the **Environmental Impact Assessment (EIA) Report Figure 7.3**. Survey results from 2023 surveys found habitats in the additional survey areas to be as described in the Whytock Ecology Survey Report (2022) **Annex A** and so further descriptions are not replicated in this document.

1.1.2 Sensitive ecological receptors were identified using the following survey methods:

- Desk based survey;
- Phase 1 habitat survey;
- National Vegetation Classification (NVC) survey; and
- Groundwater Dependent Terrestrial Ecosystem (GWDTE) survey.

1.2 Methodology

Phase 1 Habitat Survey

1.2.1 The site was surveyed in accordance with the Phase 1 habitat survey methods described by Joint Nature Conservation Committee (JNCC) (2010). The survey consisted of recording all Phase 1 habitats within the boundary line. Surveys in 2022 assessed the initial site boundary as provided in **Annex A**. Further surveys of the Dungavel, Lightshaw and Burnfoot areas were completed through 2023 as the iterative design process of the development evolved, ensuring appropriate coverage of the baseline for habitat data.

National Vegetation Classification (NVC)

1.2.2 NVC communities within the survey boundary were mapped by eye and classified according to Rodwell (1998a, 1998b, 2003). Where required, five 2 x 2 m quadrats were set up for each habitat type where detailed floristic samples were recorded to allow the habitat to be categorised later into the appropriate NVC classification.

GWDTE Surveys

1.2.3 Groundwater features were identified in the field, and where these were not apparent, plant species that required base-rich conditions were checked for. If these were located, further investigations took place to check whether the community was associated with an obvious rain-fed surface water feature. Obvious surface water features include:

- Watercourses (drains/streams/valleys);
- Waterbodies;
- Floodplains;
- Downslope of a rain-fed community; and
- Adjacent to ponding locations such as marshes or swamps.

1.2.4 The NVC habitats were mapped according to their dominant NVC community, though many of these habitats were made up of mosaics of NVC communities. Hence when determining whether a particular habitat was potentially groundwater dependent, the composition of the mosaic was considered.

1.2.5 Areas supporting communities which area potentially dependent on groundwater sources were also classified according to guidance issued by SEPA (2017).

1.3 Results

Phase 1 and NVC

1.3.1 Eight habitat types were recorded during the Phase 1 habitat survey. The NVC surveys undertaken in 2022 and 2023 recorded a total of 32 communities shown in the **EIA Report Figure 7.3** and in **Chapter 7** Where these communities were floristically distinct, they were assigned into corresponding sub-communities.

1.3.2 The communities recorded during the survey were:

- Mires and flushes: M2, M3, M4, M6, M9, M17, M18, M19, M20, M23, M25, M27, M28 & M37;
- Dry heath: H12 & H18;
- Wet heath: M15;
- Wet heath/acid grassland mosaic: U6;
- Grasslands: CG7, CG10, MG6, MG7, MG9, MG10, U2, U4 & U5;
- Tall herb communities: U20;
- Woodland: W4 & W7; and
- Swamp and fen: S9 & S10.

1.3.3 The habitats that did not fit into any of the NVC communities are:

- Open or running water;
- Buildings/tarmac;
- Arable, game crops, newly planted or bare ground; and
- Plantation woodland.

GWDTE

1.3.4 Within the original survey boundary, a number of potential GWDTEs were recorded. It has subsequently been confirmed that the M37 NVC community is reliant on groundwater influences due to the presence of springs which maintained base rich conditions for the vegetation to persist. M37 habitats were only recorded outside of the site boundary and were sufficiently distant from the site boundary that they will not be affected indirectly through hydrological changes. (see **EIA Report Chapter 8**).

1.4 Conclusions

1.4.1 The surveys recorded a range of upland habitats dominated by peatland communities and species poor upland grassland and heaths in higher altitude areas. At lower altitudes much of the survey area is dominated by improved grassland. While there are species rich grasslands which are also frequent, they account for a much smaller area in total.

1.4.2 The original 2022 survey area covered parts of the Muirkirk Uplands SSSI and the Muirkirk and North Lowther Uplands SPA. The Muirkirk Uplands SSSI citation lists the upland habitat assemblage and blanket bogs as a feature of the SSSI. Blood Moss and Slot Burn SSSI is also contained entirely within the original survey area. The site boundary no longer includes land within the SSSI or SPA, with the exception of a thin corridor of land adjoining the existing B743 which has been included in the site boundary for possible abnormal load transport oversail reasons only (see **EIA Report Figure 7.2**).

1.4.3 No GWDTEs were recorded within the site boundary (refer to **EIA Report Chapter 8**) and those identified outside of the site boundary will not be impacted indirectly through hydrological changes.

1.5 References

Joint Nature Conservation Committee (2010) Phase 1 Habitat Survey: A technique for environmental audit.

Rodwell, J.S., (1998a) British Plant Communities. Volume 2: Mires and heaths. Cambridge: Cambridge University Press.

Rodwell, J.S., (1998b) British Plant Communities. Volume 3: Grasslands and montane communities. Cambridge: Cambridge University Press.

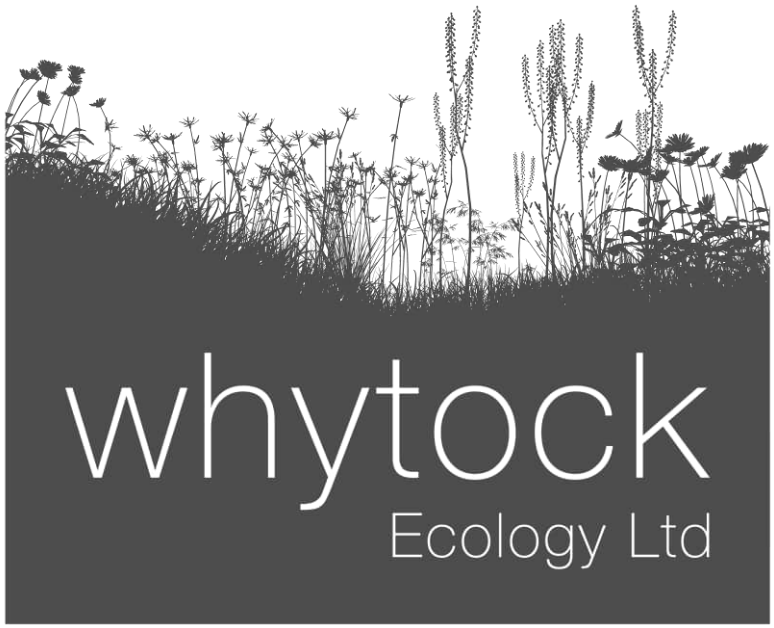
Rodwell, J.S., (2003) British Plant Communities. Volume 1: Woodlands and scrub. Cambridge: Cambridge University Press.

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

Annex A: Habitat Survey Results 2022

Hagshaw Energy Cluster

Habitat Survey Report



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Introduction

The Hagshaw Energy Cluster is located approximately 2 kilometres (km) north of Muirkirk, East Ayrshire (Grid reference: NS6831). The survey area covers a large area and is approximately 4425ha in size. Within the survey area there is a mixture of peatland, grassland, commercial forestry and marsh habitats.

The site is located partly within and contains several formal conservation designations including Muirkirk Uplands Site of Special Scientific Interest (SSSI), Blood Moss and Slot Burn SSSI and the Muirkirk and North Lowther Uplands Special Protection Area (SPA). Both SSSIs are relevant to this habitat survey as they are designated for their upland habitat assemblage and blanket bogs which are found throughout the survey area.

This report details the results of a habitat survey carried out in 2022 by Whytock Ecology Ltd. The site and the survey boundaries can be found in Figure 1 below.

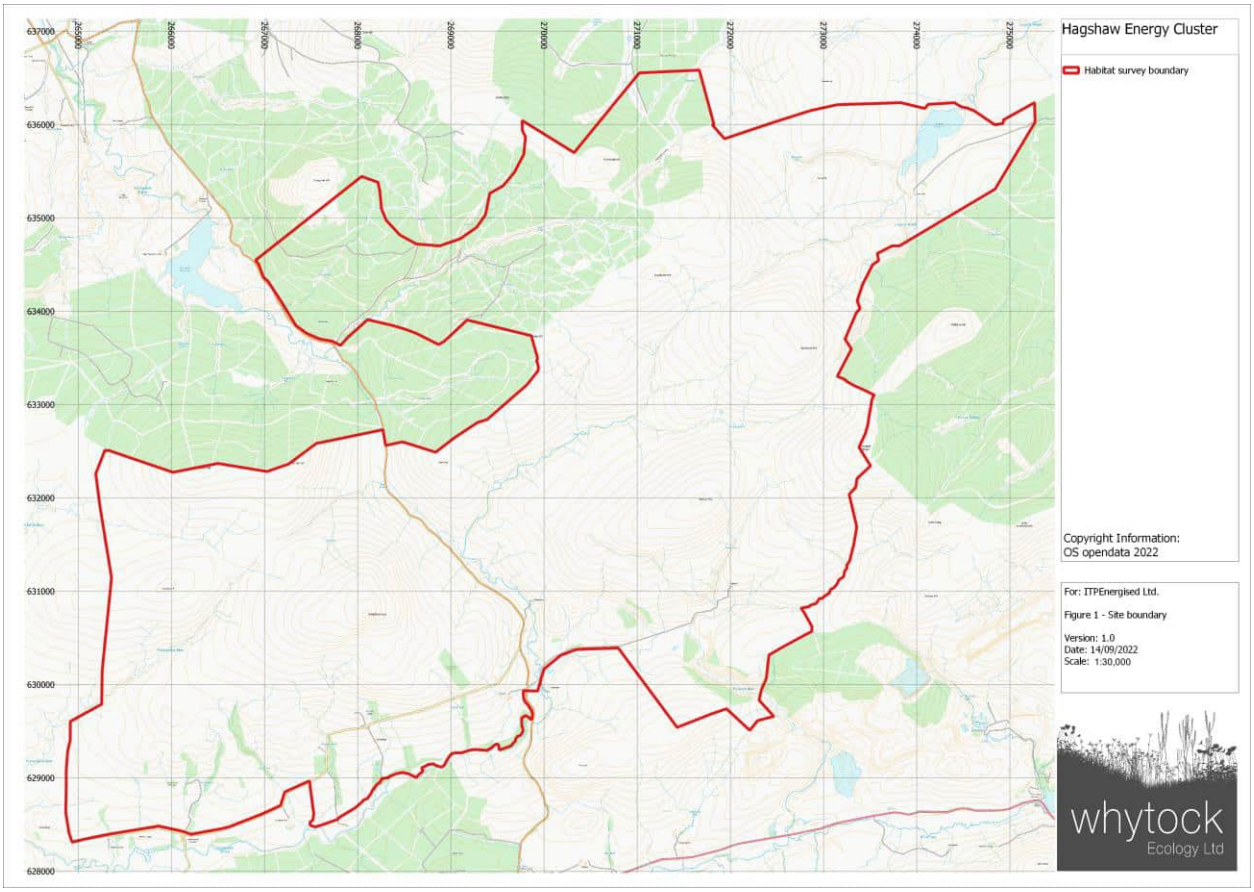

Figure 1: Map showing site survey boundary.

Scope of services

In order to identify any potentially sensitive ecological receptors on site that may be adversely impacted by the proposed development, a range of surveys have been carried out. These included:

- Desk based survey
- Phase 1 habitat survey
- National Vegetation Classification (NVC) survey
- Groundwater Dependent Terrestrial Ecosystem (GWDTE) survey

Habitat survey methods

Phase 1 habitat survey

The site was surveyed in accordance with the Phase 1 habitat survey methods described by Joint Nature Conservation Committee (2010). The survey consisted of recording all Phase 1 habitats within the boundary line (See Figure 1). The field maps and habitat compartments have been digitised using Quantum Geographical Information System (QGIS) and can be found in Appendix A. Target notes were taken of any relevant ecological features which can be found in Appendix B.

National Vegetation Classification (NVC)

The NVC survey were carried out by Rory Whytock ACIEEM between the 25th to the 29th of July, the 8th and 12th, and the 22nd to the 29th of August 2022. The surveys were carried out in predominantly dry conditions with good visibility throughout.

NVC communities within the survey boundary were mapped by eye and classified according to Rodwell (1998a, 1998b, 2003). Where required five 2 x 2m quadrats were set up for each habitat type where detailed floristic samples were recorded to allow the habitat to be categorised later into the appropriate NVC classification.

Small areas of interest and general descriptions of features were made using target notes as per Phase 1 survey methodology (JNCC, 2010). The NVC survey area was mapped in the field then digitised using GIS to produce a detailed map of dominant and subdominant community composition. Higher plant nomenclature follows that of Stace (2019), bryophyte nomenclature follows that of the Blockeel *et al.* (2021) and lichens follow Coppins (2002).

An NVC survey has previously been carried out by NatureScot (formerly Scottish Natural Heritage) in 1999. The survey results have been used to inform some aspects of the present survey.

Groundwater Dependent Terrestrial Ecosystems (GWDTEs) Survey Methods

In order to establish whether any of the identified communities are considered groundwater dependent, an evaluation was carried out. In the first instance, this involved identifying whether there was an obvious groundwater feature (i.e., a springhead) in the field. If this was not apparent, plant species that required base-rich conditions were checked for. If these were located, further investigations took place to check whether the community was associated with an obvious rain-fed surface water feature. Obvious surface water features include:

- Watercourses (drains/streams/valleys)
- Waterbodies
- Floodplains
- Downslope of a rain-fed community
- Adjacent to ponding locations such as marshes or swamps

If any of these features are present, they are followed upstream to establish whether the source of the feature is groundwater dependent or not. If a groundwater source is found, the community is determined to be groundwater dependent.

As described above, the NVC habitats were mapped according to their dominant NVC community, though many of these habitats were made up of mosaics of NVC communities. Hence when determining whether a particular habitat was potentially groundwater dependent, the composition of the mosaic was considered.

Areas supporting communities which are potentially dependent on groundwater sources were also classified according to guidance issued by SEPA (2017).

Limitations

The surveys were carried out at the optimal time of year, as such there were few limitations.

Habitat survey results

A total of eight broad habitat types were recorded during the phase 1 habitat survey. The NVC survey recorded a total of 32 communities. Where these communities were floristically distinct, they were assigned into corresponding sub-communities.

The communities recorded during the survey were:

- Mires and flushes: M2, M3, M4, M6, M9, M17, M18, M19, M20, M23, M25, M27, M28 & M37
- Dry heath: H12 & H18
- Wet heath: M15
- Wet heath/acid grassland mosaic: U6
- Grasslands: CG7, CG10, MG6, MG7, MG9, MG10, U2, U4 & U5
- Tall herb communities: U20
- Woodland: W4 & W7
- Swamp and fen: S9 & S10

A number of semi-natural habitats were not recorded as they are not included in the NVC system. Where appropriate, these were placed into their corresponding Phase 1 habitat categories. The habitats that did not fit into any of the NVC communities are:

- Open or running water
- Buildings/tarmac
- Arable, game crops, newly planted or bare ground
- Plantation woodland

The following section categorises Phase 1 habitats and the NVC communities which fall within them. Details regarding the flora recorded, structure and condition of each of the habitats are given. Maps of the survey results can be found in Appendix A with target notes describing notable species or features found during the survey in Appendix B. In addition, a summary of the communities, their associated conservation designations can also be found in Appendix B.

Woodland (A1)

W4 Betula pubescens – Molinia caerulea woodland

This woodland community has a restricted distribution within the survey area. It is found in small to medium sized stands on moderately wet soil types. Much of the W4 communities recorded within the survey area does not conform closely with the NVC floristic tables as they are dominated by *Salix sp.* as opposed to *Betula pubescens*. *Betula pubescens* was rarely dominant within the community, but *Salix* dominated communities are not well represented in the NVC system. Where dominated by *Salix sp.*,

the W4 community has been used as a best fit, as detailed in Averis (2014). Less frequently recorded tree species included *Sorbus aucuparia* and *Salix caprea*. Flora recorded at ground level was dominated by *Deschampsia cespitosa*, *Sphagnum palustre, Juncus effusus* and *Molinia caerulea*. Where water flushed the ground, species such as *Juncus acutiflorus*, *Achillea ptarmica* and *Viola palustris* were locally frequent.

The W4b *Juncus effusus* sub-community was the only one of the three described within the NVC system to be recorded within the survey area. The presence and frequency of *Juncus effusus*, *Deschampsia cespitosa, Sphagnum palustre* and *Dryopteris dilatata* distinguishes W4b from the other sub-communities.

W7 Alnus glutinosa – Fraxinus excelsior – Lysimachia nemorum woodland

This community is found in one location to the south of the survey area. It is dominated by *Alnus glutinosa*, though contained other tree species such as *Corylus avellana, Betula pubescens, Crataegus monogyna* and *Fraxinus excelsior*. The ground flora was species poor but varied depending upon the amount of water in the soil. *Urtica dioica, Ranunculus repens, Chrysosplenium oppositifolium* were frequently recorded throughout the community, as such the woodland was assigned to the W7a *Urtica dioica* sub-community

Unimproved acid grassland (B1.1)

U2 Avenella flexuosa grassland

This is a species poor community which is dominated by *Avenella flexuosa*. Other species are present, but diversity is low. Species such as Sheep's fescue *Festuca ovina*, Common bent *Agrostis capillaris*, heath bedstraw *Galium saxatile* and Tormentil *Potentilla erecta* were all widespread but were never encountered in large quantity.

Of the two described sub-communities, U2a *Festuca ovina-Agrostis capillaris* sub-community was assigned to the sole location of this community within the survey area. It has a grassier assemblage compared to the U2b *Vaccinium myrtillus* sub community that contains a higher frequency of heath species.

U4 Festuca ovina - Agrostis capillaris - Galium saxatile grassland

The only U4 sub-community which falls within the unimproved grassland Phase 1 category within the survey area is the U4d *Luzula multiflora-Rhytidiadelphus loreus* grassland. U4 is a grassland community where frequent grazing maintains a short sward length. It typically occupies areas on free draining, slightly acidic soils. The most frequently recorded species are *Festuca ovina*, *Agrostis capillaris, Holcus lanatus*, *Galium saxatile* and *Anthoxanthum odoratum,* though *Cynosurus cristatus* can also be locally frequent in some stands.

The U4d sub-community is distinctive in having a thick sward of common bryophytes such as *Hylocomium splendens, Pleurozium schreberi* and *Pseudoscleropodium purum*. Species commonly associated with heaths can be locally frequent such as *Potentilla erecta, Luzula multiflora* and *Succisa pratensis*.

U5 Nardus stricta – Galium saxatile grassland

This community is found at moderate altitudes on rather moist, acidic soils often with a mix of shallow peat and mineral substrates. *Nardus stricta* is the most frequent grass and often grows in thick wiry clumps. Other species recorded within the community include *Juncus squarrosus*, *Agrostis capillaris, Festuca ovina*, *Avenella flexuosa* and *Anthoxanthum odoratum*. *Galium saxatile* can form intricate patches in places and is generally widespread throughout. A familiar suite of mosses including *Hylocomium splendens, Pleurozium schreberi, Hypnum jutlandicum* and *Rhytidiadelphus squarrosus* are frequent throughout the community.

Four out of the five described sub-communities were recorded within the survey area. The U5a species poor sub-community is floristically poor and dominated by thick clumps of *Nardus stricta.* A range of other species were recorded including *Agrostis capillaris, Juncus squarrosus, Luzula multiflora, Molinia caerulea, Potentilla erecta, Carex binervis* and *Vaccinium myrtillus*, however these were patchy in their distribution and generally scarce within the habitat.

The U5b *Agrostis canina-Polytrichum commune* sub-community is found on slightly damper soils often closely situated to wet heath and ombrogenous mires. The U5c *Carex panicea – Viola riviniana* sub-community has a restricted distribution within the survey area and is confined to areas where base rich water flushes over the substrate and creates conditions suitable for a diverse assemblage of species. *Nardus stricta* is the most frequent grass species but *Carex panicea* can become co-dominant in some places. *Carex flacca* can also be locally frequent. Other recorded species include *Briza media, Danthonia decumbens*, *Ranunculus acris* and *Leontodon autumnalis*. The U5d *Calluna vulgaris-Danthonia decumbens sub-community* has a mixed sward of graminids including *Festuca ovina, Agrostis capillaris, Anthoxanthum odoratum* and *Danthonia decumbens*, the latter species being locally frequent in some stands.

Semi-improved acid grassland (B1.2)

U4 Festuca ovina - Agrostis capillaris - Galium saxatile grassland

U4a is the typical sub-community within the semi-improved grassland category. Grass species that dominate the sward include *Agrostis capillaris, Anthoxanthum odoratum, Festuca ovina* and *Holcus lanatus*. Forb species recorded included *Achillea millefolium, Trifolium repens, Plantago lanceolata* and *Cerastium fontanum*. The U4b *Holcus lanatus-Trifolium repens* sub-community is less improved than U4a communities. As such, it contains a slightly more diverse flora containing species such as *Viola lutea, Lotus corniculatus* and *Conopodium majus*. These latter species are often sparse however and are rarely frequent within each stand. This is a regionally and nationally widespread community with no conservation designations associated with it. Though moderately species rich U4b stands are considered to be of intermediate conservation value due to their diversity.

Semi-improved neutral grassland (B2.2)

MG9 Holcus Lanatus – Deschampsia cespitosa grassland

This habitat was recorded in a few locations within the survey area, though was generally scarce throughout. The community is dominated by tussocky *Deschampsia cespitosa* with frequent *Holcus lanatus*, *Poa trivialis* and *Rumex acetosa*. The MG9a *Poa trivialis* sub-community was the only one of its type to be recorded within the survey area.

Unimproved calcareous grassland (B3.1)

MG5 Cynosurus cristatus-Centaurea nigra grassland

This community was recorded in one location in southern areas of the site. The grass assemblage is similar to the more ubiquitous U4 communities with species such as *Festuca ovina, Anthoxanthum odoratum* and *Agrostis capillaris*. However, this is a community that is rich in forb species such as *Thymus polytrichus*, *Galium verum*, *Viola lutea*, *Linum catharticum*, *Pilosella officinarum* and *Lotus corniculatus* all of which are typical of base rich soils. Other species recorded within the community included *Avenella pubescens, Taraxacum officinale agg.* and *Prunella vulgaris*. Where the grassland community borders small rocky outcrops or is found on stony soil, *Aira praecox* is frequent. On the exposed rocks within the grassland, bryophyte species indicative of base rich conditions such as *Homalothecium lutescens* and *Tortella tortuosa* are locally frequent.

The community was assigned to the MG5b *Galium verum* sub-community due to the frequency of the *G. verum*. This grassland is floristically similar to CG7 *Festuca ovina-Pilosella officinarum-Thymus polytrichus* grassland, particularly due to the notable lack of frequency of *Centaura nigra* within the community. Though the overall frequency of the species recorded within the community is a closer fit to MG5 communities (with the exception of *Centaura nigra*) in the NVC floristic tables.

CG10 Festuca ovina – Agrostis capillaris – Thymus polytrichus grassland

This community occurs frequently throughout the survey area. It is floristically similar to CG7 with *Festuca ovina, Thymus polytrichus* and *Agrostis capillaris* all frequently recorded but contains lesser amounts of *Pilosella officinarum*. Other species recorded included *Campanula rotundifolia*, *Achillea millefolium*, *Viola riviniana*, *Viola lutea, Conopodium majus, Luzula campestris, Carex binervis* and *Carex caryophyllea* which were all frequent within the community. This is species rich grassland with a high conservation value due to its floristic diversity and has a limited distribution in East Ayrshire.

Improved grassland (B4)

MG6 Lolium perenne – Cynosurus cristatus grassland

This habitat was recorded as medium sized areas throughout the site. It is a habitat that is indicative of agricultural improvement. The community is dominated by nutrient demanding species like *Lolium perenne* and *Cynosurus cristatus*, *Bellis perennis* and *Trifolium repens*. The MG6a typical sub-community was recorded at lower altitudes and was typical of more improved soils. The MG6b *Anthoxanthum odoratum* sub-community occurred on higher ground and was typically found where the soil was less improved.

This is a habitat which is of high value for grazing but low in biodiversity and of limited conservation value.

MG7 Lolium perenne – Cynosurus cristatus grassland

This is a species poor grassland that is dominated by *Lolium perenne*. Other species such as *Plantago major, Bellis perennis* and *Poa annua* were recorded within this habitat though they were often found in low frequency. *Trifolium repens* was one of the few species other than *Lolium perenne* that was found to be relatively frequent within the community. All MG7 grasslands corresponded with the MG7a *Lolium perenne – Trifolium repens* leys sub-community. Similar to MG6 communities, MG7 is of high value for grazing but low in biodiversity and of limited conservation value.

Marshy grassland (B5)

M23 Juncus effusus/acutiflorus – Galium palustre rush pasture

M23 communities are widespread throughout the survey area and are found mainly in valley bottoms and gently sloping ground with slow, constant water movement. The habitat is dominated by rush species which gives it a dark green colour which can be seen from a distance. This habitat is closely associated with M6 *Carex echinata – Sphagnum fallax* mires and is often found adjacent to them but M23 differs in having a greater diversity of rushes and a lesser amount of *Sphagnum* species.

Two sub-communities are described for the M23 community, both of which were recorded within the survey area. M23a is dominated by *Juncus acutiflorus* and is the more floristically diverse of the two. *Juncus effusus* can still occur in stands of M23a but is never dominant or co-dominant. Other species recorded within M23a includes *Viola palustris, Galium palustre, Cirsium palustre, Ranunculus acris* and *Ranunculus repens*. M23b can contain a similar range of species, though they are often found in much lesser frequency. *Juncus effusus* is the dominant rush species within M23b as opposed to *Juncus acutiflorus* in M23a. Species such as *Cirsium palustre*, *Rumex acetosa* and *Anthoxanthum odoratum* are more frequently found within M23b.

M23a communities are the botanically richer of the two sub-communities, though the composition of species varied throughout the survey area. Species rich stands contained a high density of *Lotus pedunculatus, Angelica sylvestris*, *Carex echinata* and *Carex panicea*. Despite the presence of base rich bedrock in some locations of the site, these species rich stands were very rare within the survey area.

MG10 Holcus lanatus – Juncus effusus rush-pasture

This community is sparsely but widely distributed within the survey area. *Juncus effusus* tussocks are the most obvious feature of this community, though *Juncus acutiflorus* was also recorded occasionally. Between the tussocks of *Juncus*, there is a species poor sward of *Holcus lanatus*, *Agrostis stolonifera* and *Poa trivialis*. Forb species included *Ranunculus repens*, *Ranunculus acris* and *Cardamine pratensis*. It is distinct from other rush dominated communities by the higher frequency of grasses that are frequently grazed which maintains the open, short sward of the grass pasture between the tussocks of rush species.

All MG10 communities were assigned to the MG10a typical sub-community.

Bracken (C1)

U20 Pteridium aquilinum – Galium saxatile community

Pteridium aquilinum is the overwhelmingly dominant species within this habitat. Where U20 habitat occurred, fronds of *Pteridium aquilinum* carpeted much of the ground and smothered most of the growth of other species. The community was assigned to the U20c species poor community as a result.

The low diversity of species associated with this habitat means that this habitat is of little conservation value.

Dry heath (D1)

H12 Calluna vulgaris - Vaccinium myrtillus heath

H12 *Calluna vulgaris – Vaccinium myrtillus* heath was abundant and widespread throughout the survey area. The community covered large areas that were uniform in their composition. It is a dry heath community with *Calluna vulgaris* and *Vaccinium myrtillus* as co-dominants and is found on a range of shallow peat substrates (<50cm in depth) but may occur on deeper areas of peat where long term muirburn regimes has dried the peat surface out and created a heath type species community. Where H12 heaths occurred within a mosaic of blanket bog, the depth of the peat was checked to establish whether it occurred on a peat layer greater than 50cm. Despite this, all areas of H12 heaths that were checked within the survey area occurred on a peat layer less than 50cm in depth.

Dwarf shrubs are overwhelmingly dominant and provide little room for other plant growth. Cowberry V*accinium vitis-idaea,* viviparous sheep's fescue *Festuca vivipara,* and wavy hair-grass *Avenella flexuosa* were also present but were patchy in their occurrence. The vegetation is thick and interspersed with a familiar common assemblage of robust bryophytes growing through the dwarf shrubs. Moss species recorded include *Leucobryum glaucum*, *Rhytidiadelphus loreus, Hylocomium splendens, Pleurozium schreberi* and *Hypnum jutlandicum*.

All areas of H12 heath have been assigned to the H12a *Calluna vulgaris* sub-community. This has no real distinguishing species of its own but lacks the frequency of *Vaccinium vitis-idaea* found in H12b and does not contain the grassier assemblage found in H12c.

H18 Vaccinium myrtillus - Avenella flexuosa heath

H18 communities are found on well drained slopes where it has some amount of shelter from the prevailing winds. The habitat requires free draining soils that are neutral to acidic in nature, on a mixture of shallow peat and mineral soils (Averis *et al.,* 2014). This is a heath community where *Vaccinium myrtillus* is the dominant dwarf shrub with *Calluna vulgaris* being only thinly scattered throughout. Pleurocarpous mosses are frequent to abundant within this community and contain species such as *Rhytidiadelphus loreus, Pleurozium schreberi, Hylocomium splendens* and *Hypnum jutlandicum*.

This community is rather sporadically spread throughout the survey area, though can occur in moderately large stands in some locations. The H18a *Hylocomium splendens - Rhytidiadelphus loreus* sub-community was the only type recorded during the survey. The carpet of robust mosses is distinctive in this sub-community as is hard fern *Blechnum spicant* which was locally frequent. H18a is separated from H18b *Alchemilla alpina - Carex pilulifera* and H18c *Racomitrium lanuginosum - Cladonia* species sub-communities by the lack or relative infrequency of species found in their respective title descriptions.

Wet heath (D2)

M15 Trichophorum germanicum – Erica tetralix wet heath

This community has a rather restricted distribution within the survey area. It is a habitat that occurs on shallow, ombrogenous peat substrates. It is possible that some areas of M15 have been derived from blanket bog communities and still occurs on a peat layer greater than 50cm in depth, however most stands appear to occur on gently sloping ground on a peat layer less than 50cm.

The M15 community illustrates a wide variation in its flora including species that occur as dominants or co-dominants. Species that were recorded in high frequency included *Trichophorum germanicum*, *Erica tetralix* and *Calluna vulgaris*.

Two sub-communities were recorded within the survey area. The M15b typical sub-community has frequent *Erica tetralix* with lesser amounts of *Calluna vulgaris* and the M15d *Vaccinium myrtillus* sub-community has a higher frequency of *V. myrtillus* than all of the other described sub-communities.

Wet heath/grassland mosaic (D6)

U6 Juncus squarrosus – Festuca ovina grassland

This community is located on mineral deficient, peaty substrates and is often found adjacent to degraded peatland areas. The dark green basal rosettes of *Juncus squarrosus* is the most prominent feature of this habitat type. These are mixed with *Anthoxanthum odoratum, Agrostis canina, Avenella flexuosa*, *Galium saxatile* and *Potentilla erecta*. Bryophytes recorded within this community included *Hylocomium splendens*, *Pleurozium schreberi, Rhytidiadelphus squarrosus* and *Calliergonella cuspidata*.

Two U6 sub-communities were recorded within the survey area – U6c and U6d. These were widely distributed throughout the survey area. U6c occupies areas that are most often found adjacent to peatland habitats and can form distinct communities within them where the peat layer becomes thin on gently sloping ground. The U6d *Vaccinium myrtillus* sub-community contains a much grassier assemblage with species such as *Agrostis canina, Anthoxanthum odoratum*, and *Avenella flexuosa* frequent alongside the ubiquitous *Juncus squarrosus*.

Blanket bog (E1.6.1)

M2 Sphagnum cuspidatum/fallax bog pool community

This community was recorded in small, wet depressions within blanket bog communities. The community occupies both small, isolated pools or can be extensive along with M3 communities in M19 communities. The small, isolated pools are nearly always natural depressions in the peat, though where the communities are large and extensive, it is often due to significant erosion. The vegetation within the pools lack diversity and are dominated by *Sphagnum fallax*, *S. cuspidatum* and scattered shoots of common cottongrass *Eriophorum angustifolium*. Other species recorded toward the margin of the pool included *Sphagnum papillosum*, *Eriophorum vaginatum, Trichophorum germanicum* and *Erica tetralix*, *Vaccinium oxycoccos* and *Drosera rotundifolia*.

Both M2a *Rhynchospora alba* and the M2b *Sphagnum fallax* sub-communities were recorded during the survey. The M2a sub-community was the rarest of the two within the survey area and confined to the depressions within large eroding gullies on the top of Spirebush hill. M2b is more widespread and occurs as larger stands throughout the eroded gullies within blanket bog habitats.

M3 Eriophorum angustifolium bog pool community

This community was most frequent at the bottom of large, eroded gullies in degraded peatlands. M3 bog pools were also found in more natural settings such as depressions in relatively undisturbed mires where the ground becomes waterlogged. The dominant species of this community, *Eriophorum angustifolium*, occurs with relatively few associates but soft rush *Juncus effusus*, *Sphagnum fallax, Sphagnum medium and S. papillosum* can occur in varying amounts. This community was recorded in several locations within the survey area but is most frequent within M17, M18 and M19 mire communities. There are no sub-communities associated with this habitat type.

M17 Trichophorum germanicum - Eriophorum vaginatum blanket mire

M17 communities were found on waterlogged peat which allowed a significant sphagnum layer to dominate underneath tussocks of *Trichophorum germanicum*, *Erica tetralix* and lesser amounts of *Calluna vulgaris*. Sphagnum species include many important peat-forming mosses such as *Sphagnum medium*, *Sphagnum papillosum* and *Sphagnum capillifolium*. Many of the communities on site are slightly degraded however as a result of an extensive network of drains. Although some of these are old, they are still actively draining water from M17 communities.

The M17a *Drosera rotundifolia-Sphagnum* species sub-community was the most frequent to be recorded within the survey area. Species such as round-leaved sundew *Drosera rotundifolia, Eriophorum vaginatum, Sphagnum capillifolium* and *Vaccinium oxycoccos* were all frequent. The M17b *Cladonia spp.* Community was only recorded in one location at Blood Moss and Slot Burn SSSI. Both communities occurred together as a mosaic within the latter location.

Many of the M17 communities recorded within the survey area were a close fit to the NVC floristic tables. Degradation of the peatlands (primarily through drainage) mean that examples not showing some form of erosion were rare. The species composition remained close to the floristic tables to their respective sub-communities however.

M18 Erica tetralix - Sphagnum papillosum raised and blanket mire

This community occupies small areas of peatlands within the survey area. It is a community that is found on deep or very deep saturated peat. The very wet conditions allow ideal habitat for peat forming Sphagnum species such as *S. papillosum, S. medium* and *S. capillifolium.* Other bryophyte species frequent within the community included *Aulacomnium palustre, Pleurozium schreberi*, and *Polytrichum strictum. Erica tetralix* is the dominant dwarf shrub within this community, though *Calluna vulgaris* occurs where the peat layer is slightly drier in nature, particularly around the margins of the community. Vascular plants found included *D. rotundifolia*, *Eriophorum vaginatum, Eriophorum angustifolium, Vaccinium oxycoccos* and *Narthecium ossifragum*.

The M18b *Empetrum nigrum ssp. nigrum-Cladonia spp*. was the only one to be recorded within the survey area where it conformed closely to the floristic tables in containing large sheets of *Sphagnum papillosum, Sphagnum medium* with locally frequent patches of *Cladonia uncialis*, and *C. arbuscula*.

It is notable that some areas previously mapped as M18 communities by the survey for SNH in 1999 no longer correspond to this community type in the present survey. The vegetation in these areas are thought to have changed through degradation as a result of drainage, and in some instance over-grazing. Much of these former M18 communities are currently located on areas where extensive peat hags and erosional features are prominent. These features are likely to have been present in the original surveys, but the degradation of the vegetation has amounted to a change in the community type within this time period.

M19 Calluna vulgaris - Eriophorum vaginatum blanket mire

This habitat is the most abundant blanket bog habitat type to be recorded within the survey area. It is dominated by large swathes of *Calluna vulgaris, Eriophorum vaginatum* and sparse but regular shoots of *Eriophorum angustifolium*. Bryophytes are dominated by common pleurocarpous mosses including *Hylocomium splendens, Pleurozium schreberi, Rhytidiadelphus loreus* and *Hypnum jutlandicum*. Sphagnum species are not as well represented in this community as either M17 or M18 blanket mires. However, *S. capillifolium* can be conspicuous and is the most common *Sphagnum* species, though *S. papillosum* was also present in small amounts.

One of the three described sub-communities were recorded during the present surveys. The M19a *Erica tetralix* sub-community was found throughout much of the survey area. M19a is often located where the topography is flat or only slightly inclined so that a continuous peat layer can form. The

community was rather uniform in composition and contained *Calluna vulgaris*, *Eriophorum angustifolium*, *Eriophorum vaginatum*, *Trichophorum germanicum*, *Molinia caerulea* and *Empetrum nigrum*. *Narthecium ossifragum* and *Drosera rotundifolia* frequently occurred in wetter areas. *Rubus chamaemorus* was present in some locations but was never frequent enough or contained within a broader assemblage of species representing either of the other two sub-communities.

M19 communities recorded in this survey area were often a close fit to the NVC floristic tables, However, there is a graduation of "intactness" throughout the community. Those areas least affected by drainage or erosion conform closely to the floristic tables, whereas areas affected by drainage show a gradual change in vegetation where *Eriophorum vaginatum* becomes increasingly dominant and *Calluna vulgaris* is significantly suppressed until the community grades into an M20b communities.

M20 Eriophorum vaginatum Blanket and raised mire

This is a community where *Eriophorum vaginatum* is dominant and contains thick tussocks allowing few other species to compete. It is a community characteristic of ombrogenous peatland habitats that have been negatively affected by drainage and/or grazing.

Where *Eriophorum vaginatum* was overwhelmingly dominant, the community is assigned to the M20a species poor community. The M20b *Calluna - Cladonia* sub-community is more diverse and has affinities to *Calluna vulgaris* dominated mires (e.g., M19). *Eriophorum vaginatum* is still dominant or co-dominant with dwarf shrubs and pleurocarpous mosses are confined to common species such as *Polytrichum commune*, *Polytrichum strictum*, *Hylocomium splendens, Pleurozium schreberi* and *Hypnum jutlandicum*. Unlike many of the *Calluna* dominated mires, Sphanga are rare or scarce and *C. vulgaris* is rarely dominant or co-dominant.

Large areas of communities mapped as M19 in the original NatureScot NVC survey are now classed as M20. This demonstrates some form of degradation in large areas of peatland communities which are now dominated by *Eriophorum vaginatum* which has suppressed *Calluna vulgaris* frequency and abundance.

Wet modified bog (E1.7)

M25 Molinia caerulea – Potentilla erecta mire

This community occurs on moderately wet peat substrates and is widely distributed throughout the survey area. *Molinia caerulea* is the most dominant species within this community and can form large conspicuous tussocks. Botanical diversity is very low within all M25 communities recorded. The species poor form of M25 is not a recognised sub community, it has therefore not been assigned to one.

Heathy assemblages containing species such as *Calluna vulgaris, Empetrum nigrum, Sphagnum capillifolium s. str.* and *Erica tetralix* are assigned to the M25a *Erica tetralix* sub-community but these species are

always in low frequency compared to *Molinia caerulea*. M25a mires are likely to have been derived from blanket bog and may still occur on a layer of deep peat (>50cm).

Many communities mapped as M19 in the original NatureScot NVC survey are now classed as M25. This demonstrates a clear degradation in large areas of peatland communities which are now overwhelmingly dominated by *Molinia caerulea*. This grass becomes dominant where the hydrology of the mire has become compromised and the surface of the peatland has slowly dried, allowing *Molinia* to dominate.

Acid/neutral flush (E2.1)

M4 Carex rostrata – Sphagnum fallax mire

M4 communities have a restricted distribution within the survey. They are found in permanently wet depressions or gullies where water moves slowly through the vegetation. All M4 communities within the survey area were species poor and dominated almost exclusively by *Carex rostrata* as the vascular plant component and *Sphagnum fallax* as the dominant component of the bryophyte assemblage. Few other species were recorded within these communities, though common sedge *Carex nigra, Aulacomnium palustre* and *Viola palustris* were also recorded.

M6 Carex echinata - Sphagnum fallax/denticulatum mire

M6 communities are a type of mire found on peat substrates that are fed primarily by base-deficient water. These mires are situated in valley bottoms, sloping valley sides or channels within the site where water flows slowly over a peaty surface. M6 communities are defined by the dominance of rush species such as *Juncus effusus* or *J. acutiflorus* with a ground layer of *Sphagnum* species such as *S. fallax, S. cuspidatum* and *S. palustre*. M6 can be differentiated from similar NVC communities such as M23 *Juncus effusus/acutiflorus – Galium palustre* mires as these typically lack the abundance of *Sphagnum* found in M6 communities.

This community has four sub-communities associated with it, all of which were recorded within the survey area. Two of the described sub-communities (M6a and M6b) are dominated by sedge species, whereas the other two (M6c and M6d) are dominated by rushes. M6a is dominated by *Carex echinata*, where it can form a uniform composition almost to the exclusion of all other species. The M6b *Carex nigra* sub-community was the least frequent of all the sub-communities recorded within the survey area. *Carex nigra* is the most frequent species, with lesser amounts of glaucous sedge *Carex panicea*, *Festuca ovina* and *Anthoxanthum odoratum*.

M6c *Juncus effusus* sub-community was the most frequently type recorded within the survey area. It is a mire where acidic water maintains the wet conditions and tends to be species poor in comparison with M6d. M6d contains a more varied species assemblage than the M6c sub-community and has sharp-flowered rush *Juncus acutiflorus* as the dominant rush species rather than *Juncus effusus*. *Ranunculus*

repens, *Myosotis secunda*, *Achillea ptarmica*, *Ranunculus flammula*, *Dactylorhiza fuchsii*, *Carex echinata, Viola palustris* and *C. nigra* were frequently recorded.

M9 Carex rostrata – Calliergonella cuspidata/Calliergon giganteum mire

Similar in composition to many of the other *Carex rostrata* dominated mires but containing fewer sphagnum species which is instead replaced by robust pleurocarpous bryophyte species such as *Calliergonella cuspidata* and *Warnstorfia exannulata*. M9 communities were rarely recorded within the survey area did not conform to either of the sub-communities, therefore they were not assigned to one.

Basic flush and spring (E2.2)

M37 Palustriella commutata-Festuca rubra spring

M37 springs are found various locations throughout the site but occupy very small areas (all were too small to map, please see target notes in Appendix B for grid references). They are fed by spring water which is slightly calcareous. This allows a variety of calcicolous bryophyte species to dominate including *Palustriella commutata, Philonotis fontana* and *Cratoneuron filicinum*. *Carex panicea, Carex flacca*, *Pinguicula vulgaris* and *Cardamine pratensis* were all recorded but occurred a varying frequency. As a spring fed community with an obvious groundwater source, these are considered to be groundwater dependent.

Fen/valley mire (E3.2)

M27 Filipendula ulmaria – Angelica sylvestris mire

A few small to medium stands of this community type were recorded within the survey area. It occupies areas where water flows sluggishly and are located predominantly in valley bottoms. Species recorded included *Juncus effusus, Filipendula ulmaria*, *Galium palustre, Galium uliginosum, Myrica gale, Angelica sylvestris, Viola palustris* and *Lotus pedunculatus*.

M28 Iris pseudacorus - Filipendula ulmaria mire

This community was located within a small area in the centre of the site where there were a cluster of several small stands within close proximity to one another. They occupied small areas in wet hollows and are dominated by *Iris pseudacorus*. Other species recorded included *Juncus effusus, Galium palustre, Angelica sylvestris* and *Deschampsia cespitosa* in the drier area.

The M28a *Juncus* species sub-community was assigned to all of the recorded M28 communities on site. They were assigned due to the widespread presence of *Juncus* species throughout all stands.

Swamp (F1)

S9 Carex rostrata swamp

This community type was rare within the survey area and occupied small areas. The dominant species within this community was *Carex rostrata, Carex nigra, Menyanthes trifoliata and Equisetum fluviatile*. All stands were assigned to the S9b *Menyanthes trifoliata-Equisetum fluviatile* sub-community.

S10 Equisetum fluviatile swamp

This is a species poor swamp consisting of few species other than *Equisetum fluviatile*. It occupies the standing water where the water level sits high which restricts many other plants from growing. Other than infrequent fronds of *Carex rostrata*, few other species were present. As such, all S10 communities have been assigned to the S10a species poor sub-community.

Groundwater Dependent Terrestrial Ecosystems (GWDTEs)

GWDTEs are classified according to SEPA (2017), defining each NVC community on their potential dependency on groundwater. Groundwater dependency is often linked to wetlands containing flora that is dependent upon the chemical composition of the water fed from a groundwater source. SEPA defines the habitats with regard to their potential for groundwater dependency, therefore not all communities listed may be truly groundwater dependent.

Table 1 lists the NVC communities that have a potential for groundwater dependency. The table categorises each habitat type according to whether they are likely to be moderately or highly groundwater dependent as defined by SEPA (2017). In total, there are seven communities listed as moderate and seven communities listed as having high potential for groundwater dependency.

Table 1: Potential GWDTE recorded on site

NVC code	NVC community name	GWDTE potential
M15	*Trichophorum germanicum – Erica tetralix wet heath*	**Moderate**
M25	*Molinia caerulea – Potentilla erecta mire*	**Moderate**
M27	*Filipendula ulmaria – Angelica sylvestris mire*	**Moderate**
M28	*Iris pseudacorus-Filipendula ulmaria mire*	**Moderate**
MG9	*Holcus lanatus - Deschampsia cespitosa grassland*	**Moderate**
MG10	*Holcus lanatus - Juncus effusus* rush pasture	**Moderate**
U6	*Juncus squarrosus - Festuca ovina grassland*	**Moderate**
CG10	*Festuca ovina-Agrostis capillaris-Thymus polytrichus grassland*	**High**
M6	*Carex echinata - Sphagnum fallax mire*	**High**
M9	*Carex rostrata - Calliergon cuspidatum/C.giganteum mire*	**High**
M23	*Juncus effusus/acutiflorus – Galium palustre mire*	**High**
M37	*Palustriella commutata – Festuca rubra spring*	**High**
W4	*Betula pubescens-Molinia caerulea woodland*	**High**
W7	*Alnus glutinosa-Fraxinus excelsior-Lysimachia nemorum woodland*	**High**

Maps showing locations of GWDTEs and their associate potential can be found in Appendix A.

Of the communities that are listed as being potentially groundwater dependent, only one is considered to be truly groundwater dependent within the survey area. This is all the recorded M37 *Palustriella commutata – Festuca rubra spring* communities where springheads are visible and provide constant base-rich water to support the floristic assemblage. These were too small to map, but locations are given in the target note section (See table 3 in Appendix B)

Discussion and Recommendations

While the phase 1 habitat type remained close to the original NatureScot NVC survey results in 1999, many of the NVC community descriptions have changed. The change is most notable within peatland communities (particularly blanket bogs) where an extensive network of drains has caused significant degradation throughout most of the site. Although it has been 23 years since the initial NVC survey was carried out, it is disappointing to note the effect of past and current land management practices upon blanket bogs that have resulted in such degradation that they are now being reassigned to a different NVC community within the time frame.

Following the evaluation of the ecological features on site, the following recommendations should be considered when designing the proposed development:

GWDTEs

As a guide, excavations <1m in depth should be sited at least 100m away from the sensitive receptors (All M37 communities). Excavations >1m in depth should be sited at least 250m away from the sensitive receptors (SEPA, 2017). Where this is not possible, mitigation measures will be required to ensure the GWDTEs are not negatively affected. Appropriate mitigation measures in this instance should include robust silt mitigation plans to avoid pollution events or sedimentation deposition within the sensitive receptors. Installations of infrastructure should also be sited below the topographical level of the GWDTE where possible so as not to disrupt the natural flow of water within the communities. An Ecological Clerks of Works (ECoW) will be required to ensure that mitigation measures are constructed and maintained to an acceptable standard.

Peatlands

The proposed development is likely to negatively affect many peatland communities (NVC codes: M2, M3, M15, M17, M18, M19 + M20). Infrastructure should avoid blanket bog communities where possible. Where not possible, it is important to maintain the hydrological integrity of the communities. Mitigation measures should be specific to the location and integrity of the community being negatively affected, but good practice will involve the use of floating roads and micro-siting of infrastructure where negative effects can be kept to an absolute minimum. As excavations within the peatland communities are likely to be unavoidable for the proposed development, a site-specific Peat Management Plan will be needed so that all peat removed/excavated can be stored correctly and reinstated accordingly. Where blanket bog communities will be negatively affected by the proposed development, compensatory peatland restoration measures should be considered in other areas across the site.

Species rich grasslands

The site has an abundance of species rich grasslands (NVC community: CG10). These grasslands have a restricted distribution through East Ayrshire and contain a diverse assemblage of plants. As such, these communities should be retained where possible. If this is not possible, suitable mitigation measures (compensatory measures) will need to be explored.

Summary

The habitat surveys were carried out throughout the summer of 2022 and have identified areas that may be negatively affected by the proposed development. The surveys recorded a large range of upland habitats, largely dominated by peatland communities and species poor upland grassland and heaths. At lower altitudes much of the survey area is dominated by improved grassland, though there are species rich grasslands which are also frequent, they account for a much smaller area in total.

Much of the survey area is designated within parts of the Muirkirk Uplands SSSI and the Muirkirk and North Lowther Uplands SPA. The Muirkirk Uplands SSSI citation lists the upland habitat assemblage and blanket bogs as a feature of the SSSI. Blood Moss and Slot Burn SSSI is also contained entirely within the survey area.

A number of potential GWDTEs were also recorded within the survey area. Of these potentially groundwater dependent communities only M37 communities were considered to be groundwater dependent. This was confirmed dur to the presence of springs which maintained base rich conditions for the vegetation to persist.

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Appendix A – Maps

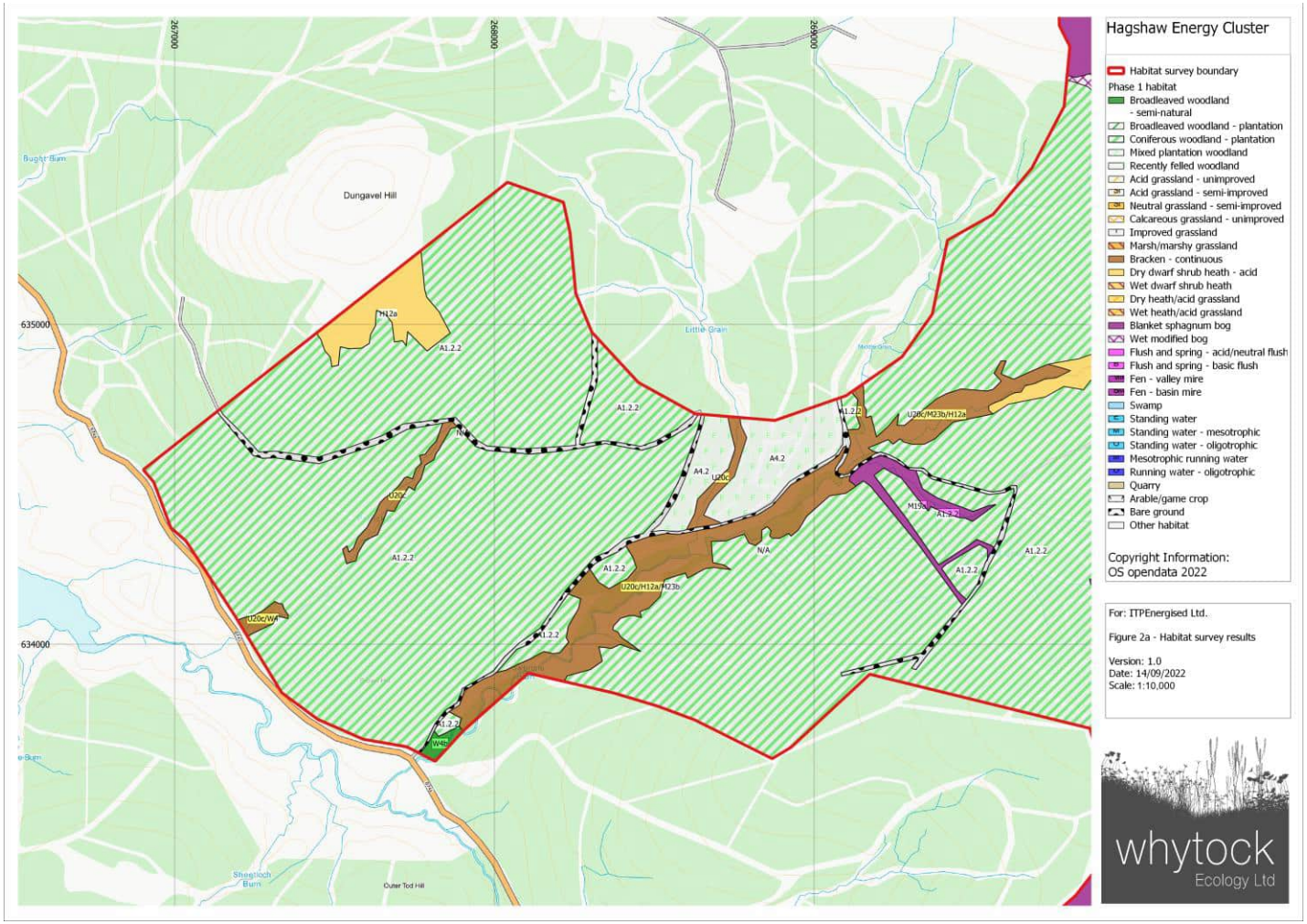

Figure 2a: NVC survey map overview. Labelled according to community or sub-community. Where mosaics occur, polygons are coloured by the dominant habitat type

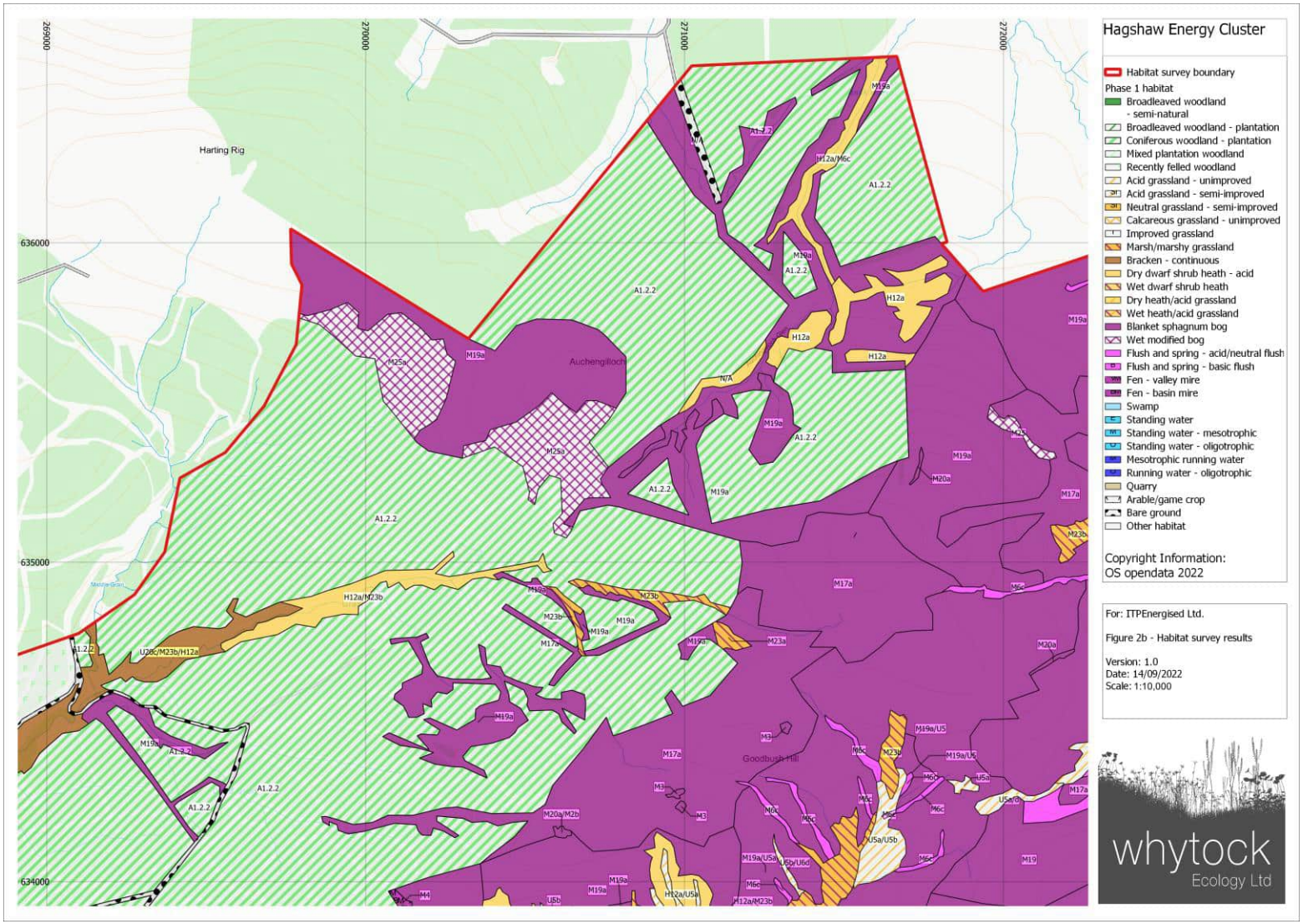

Figure 2b: NVC survey map – north west section. Labelled according to community or sub-community. Where mosaics occur, polygons are coloured by the dominant habitat type

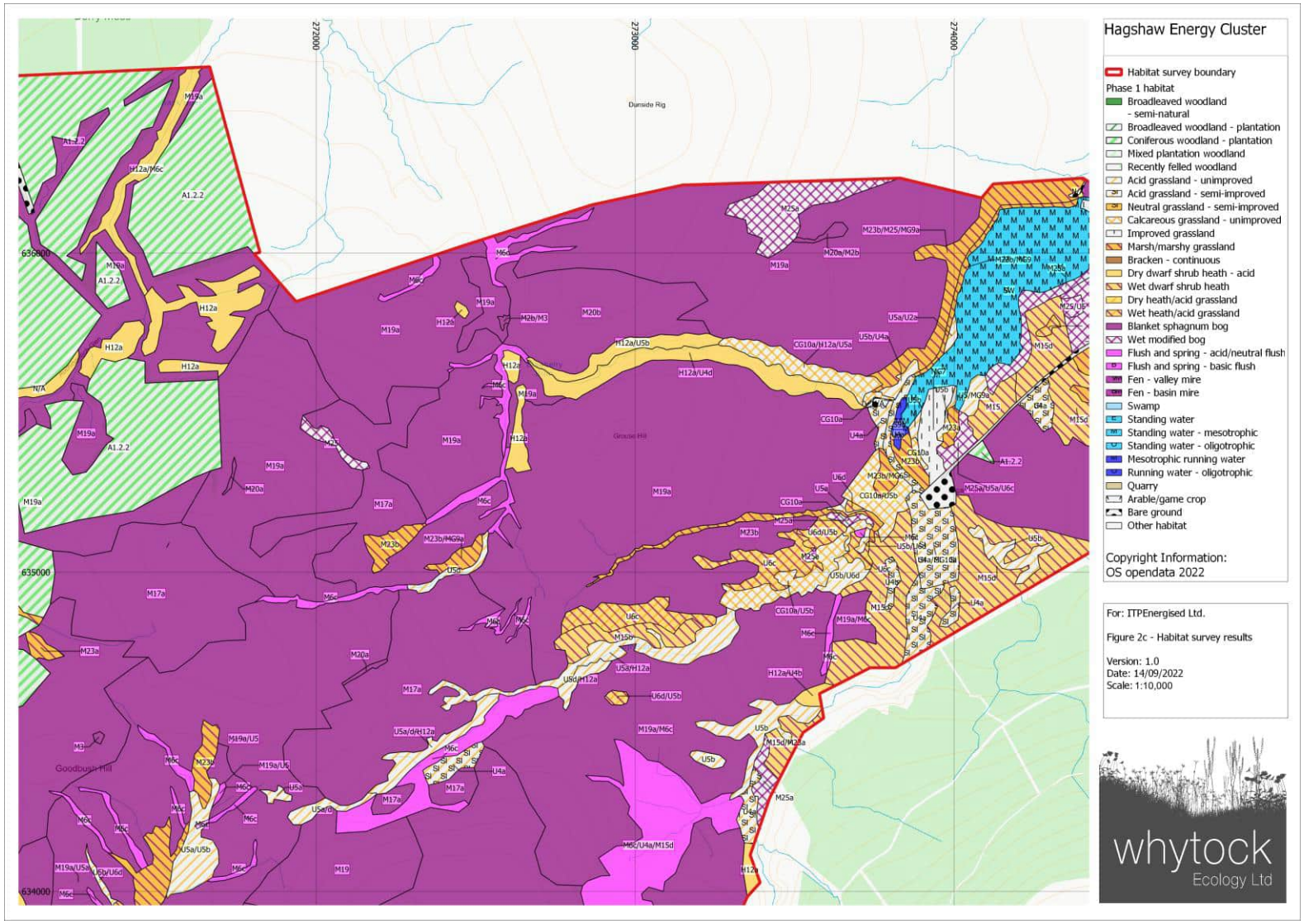

Figure 2c: NVC survey map – eastern section. Labelled according to community or sub-community. Where mosaics occur, polygons are coloured by the dominant habitat type

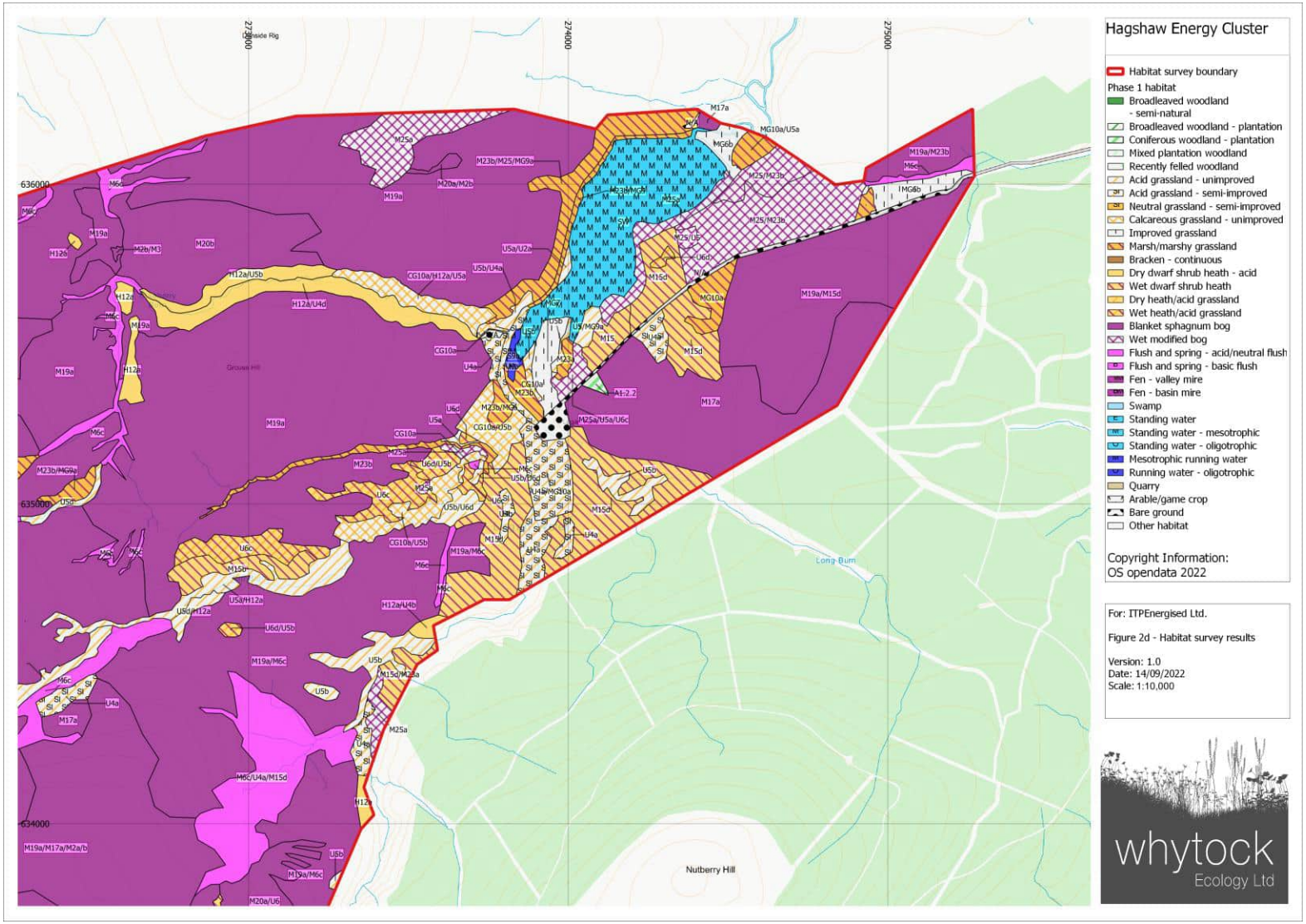

Figure 2d: NVC survey map – eastern section. Labelled according to community or sub-community. Where mosaics occur, polygons are coloured by the dominant habitat type

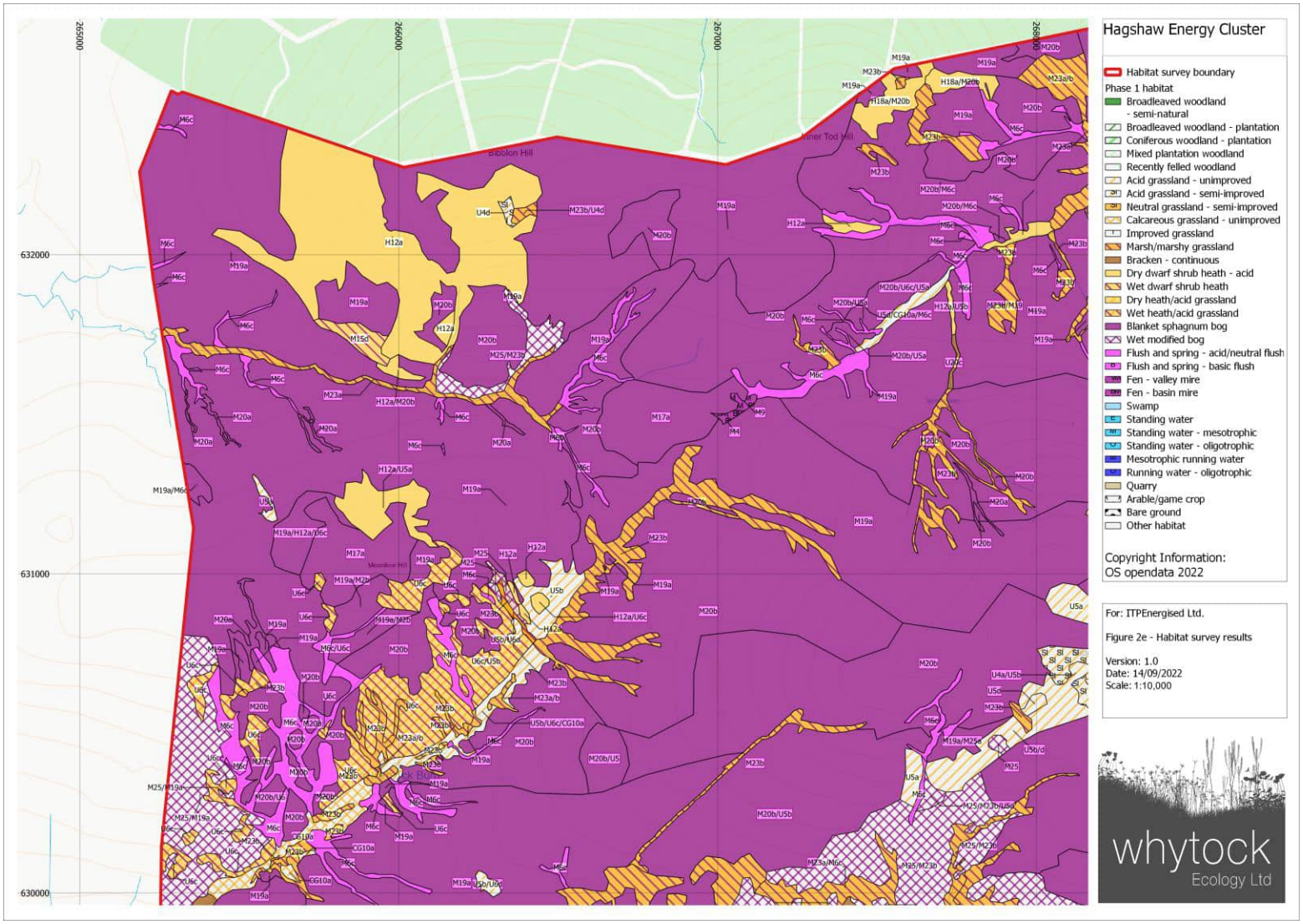

Figure 2e: NVC survey map – eastern section. Labelled according to community or sub-community. Where mosaics occur, polygons are coloured by the dominant habitat type

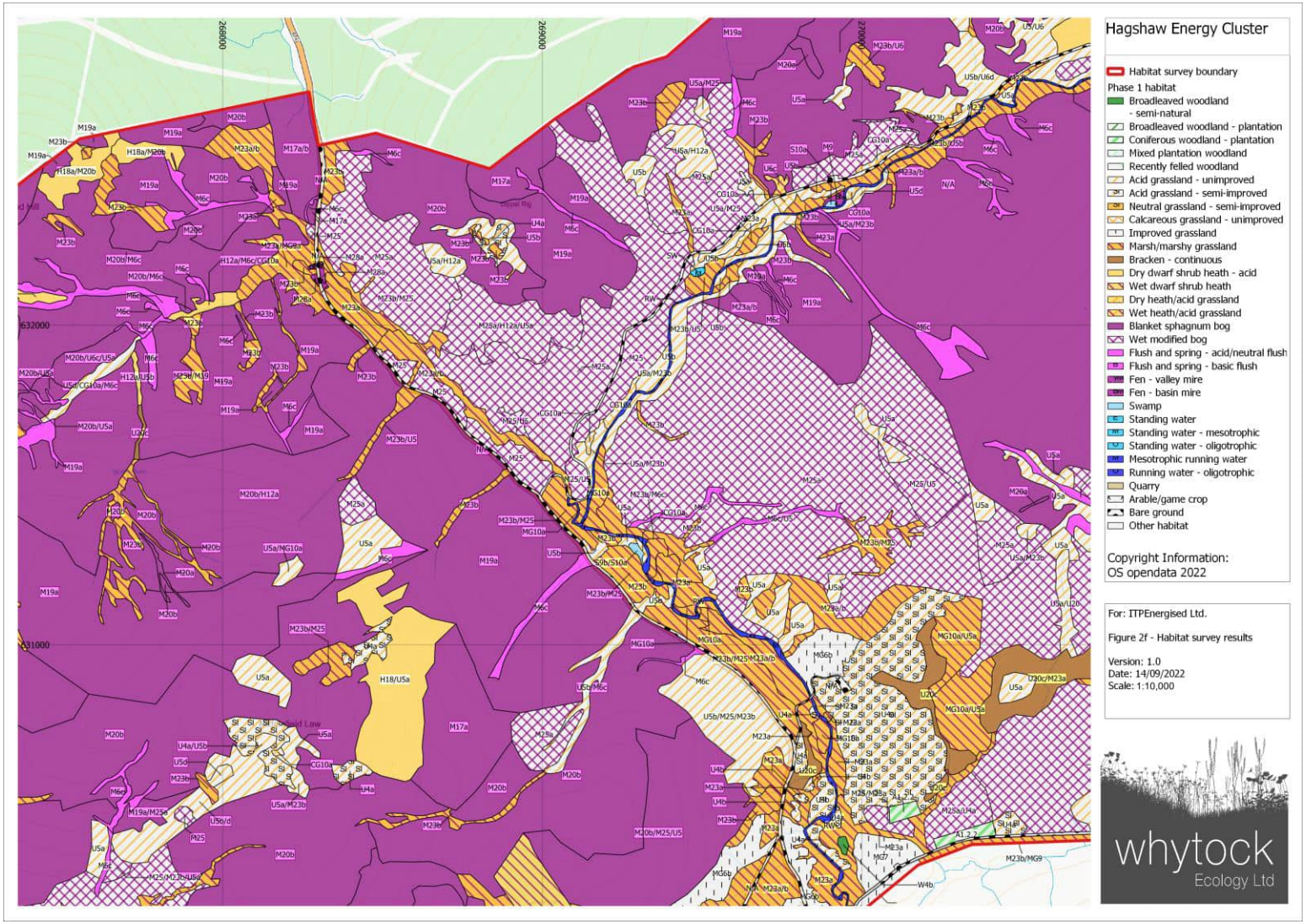

Figure 2f: NVC survey map – eastern section. Labelled according to community or sub-community. Where mosaics occur, polygons are coloured by the dominant habitat type

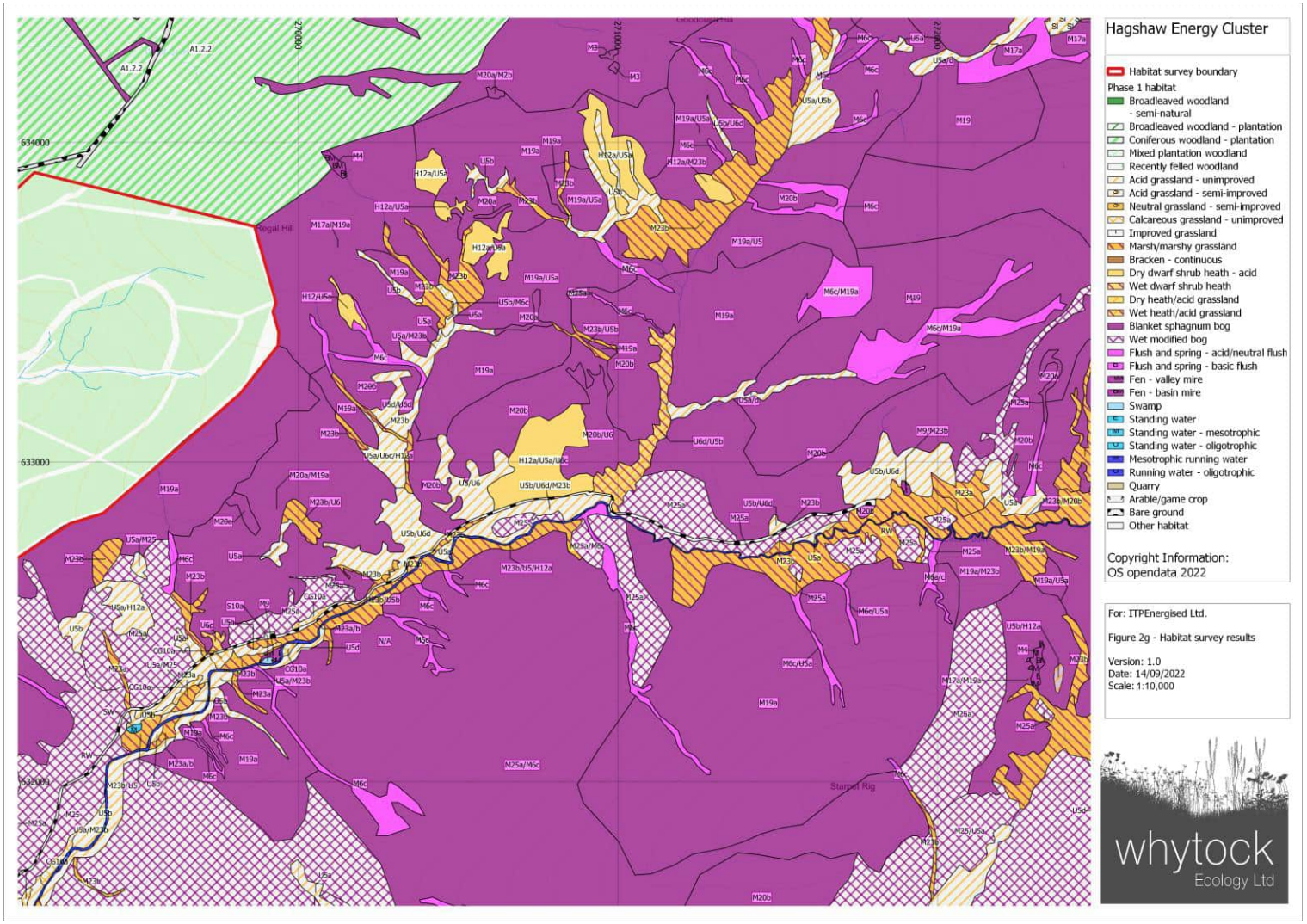

Figure 2g: NVC survey map – eastern section. Labelled according to community or sub-community. Where mosaics occur, polygons are coloured by the dominant habitat type

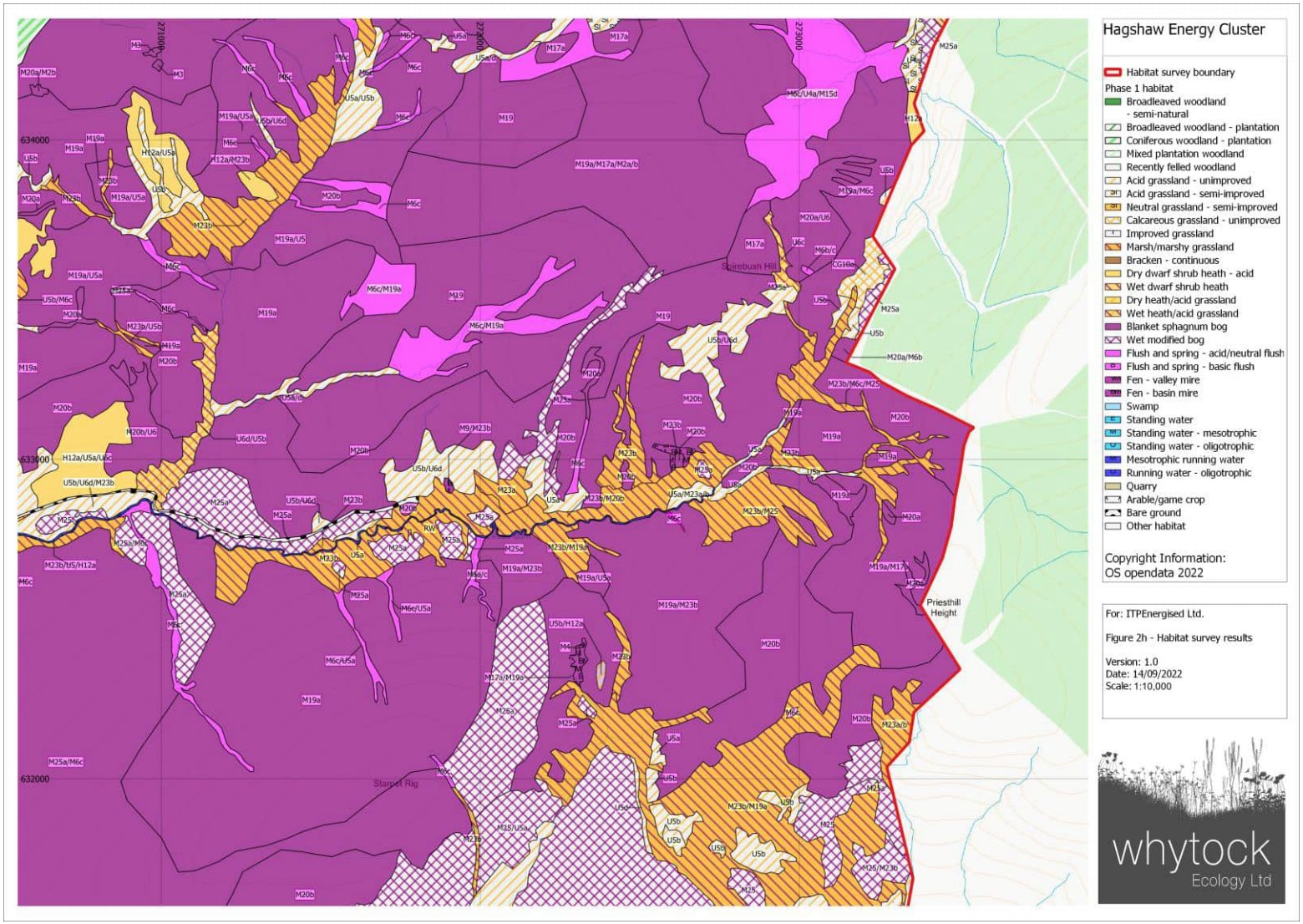

Figure 2h: NVC survey map – eastern section. Labelled according to community or sub-community. Where mosaics occur, polygons are coloured by the dominant habitat type

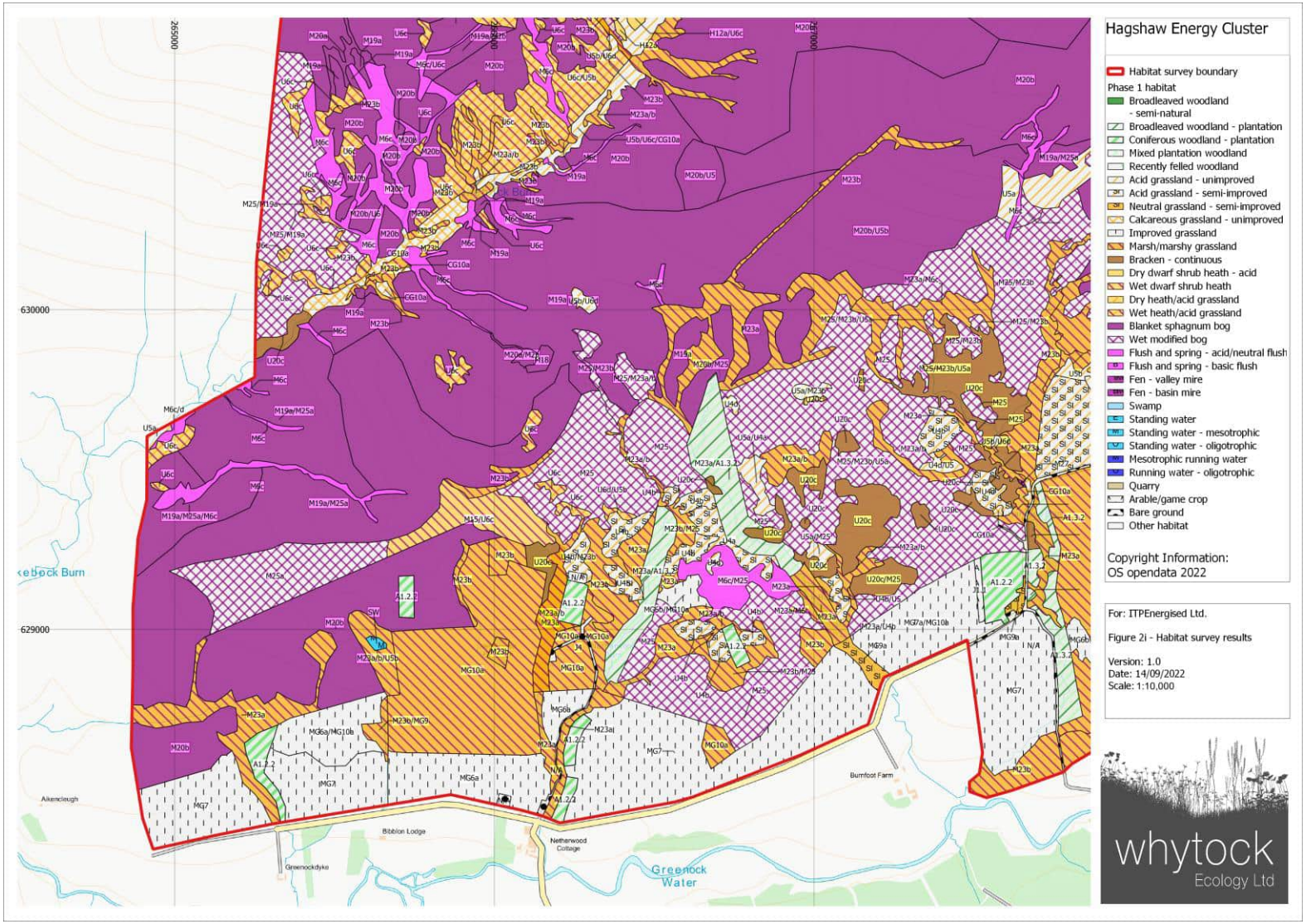

Figure 2i: NVC survey map – eastern section. Labelled according to community or sub-community. Where mosaics occur, polygons are coloured by the dominant habitat type

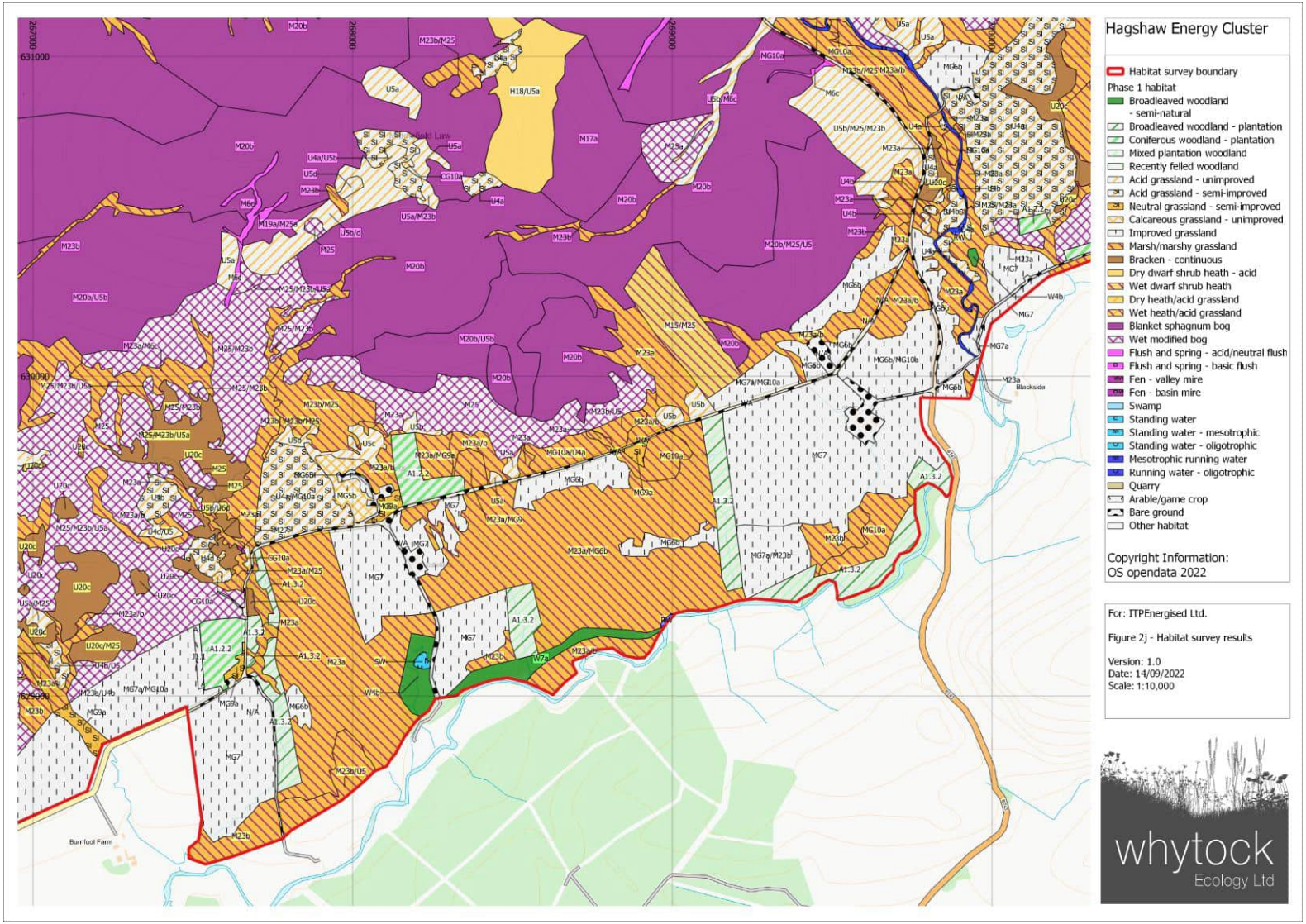

Figure 2j: NVC survey map – eastern section. Labelled according to community or sub-community. Where mosaics occur, polygons are coloured by the dominant habitat type

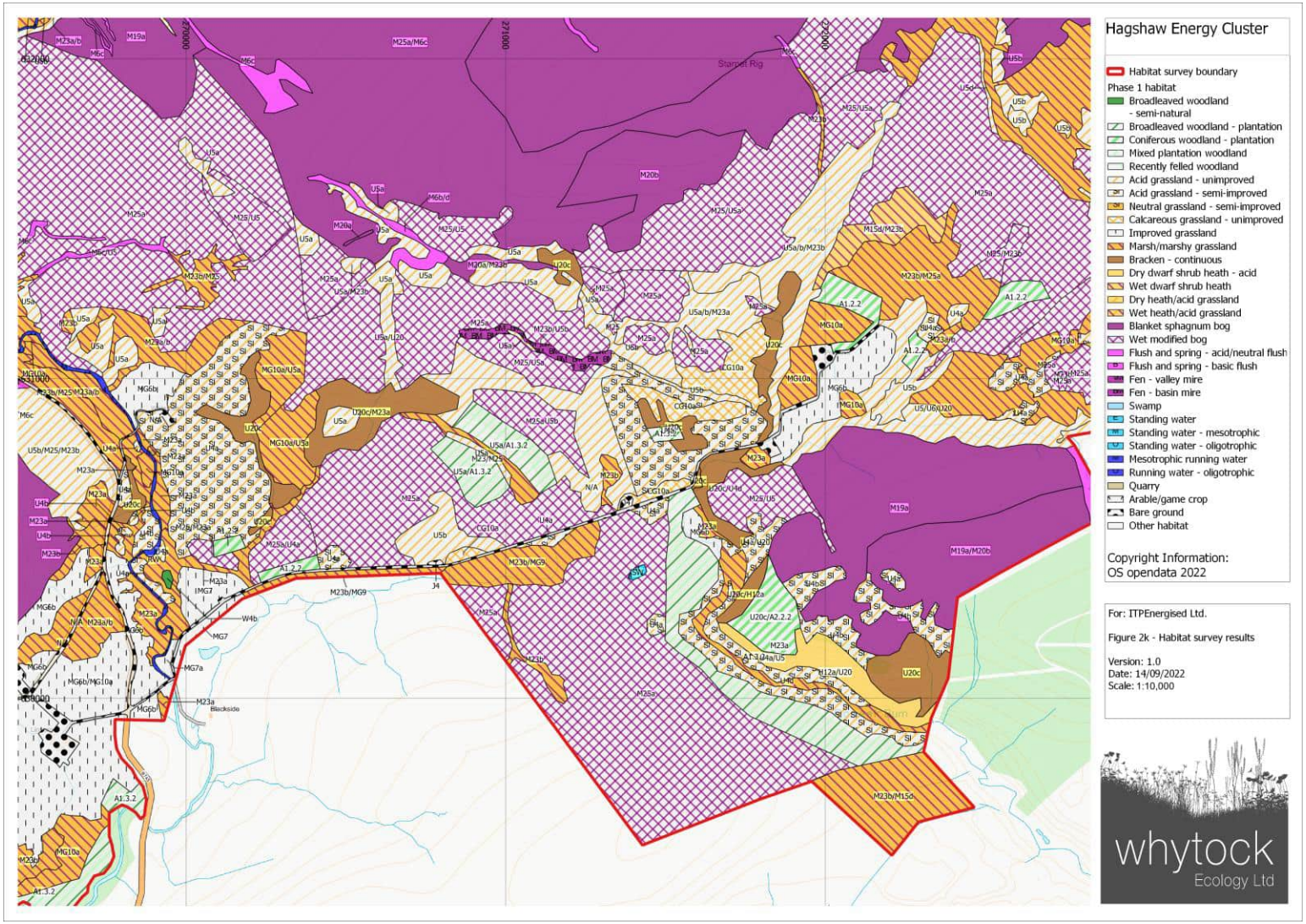

Figure 2k: NVC survey map – eastern section. Labelled according to community or sub-community. Where mosaics occur, polygons are coloured by the dominant habitat type

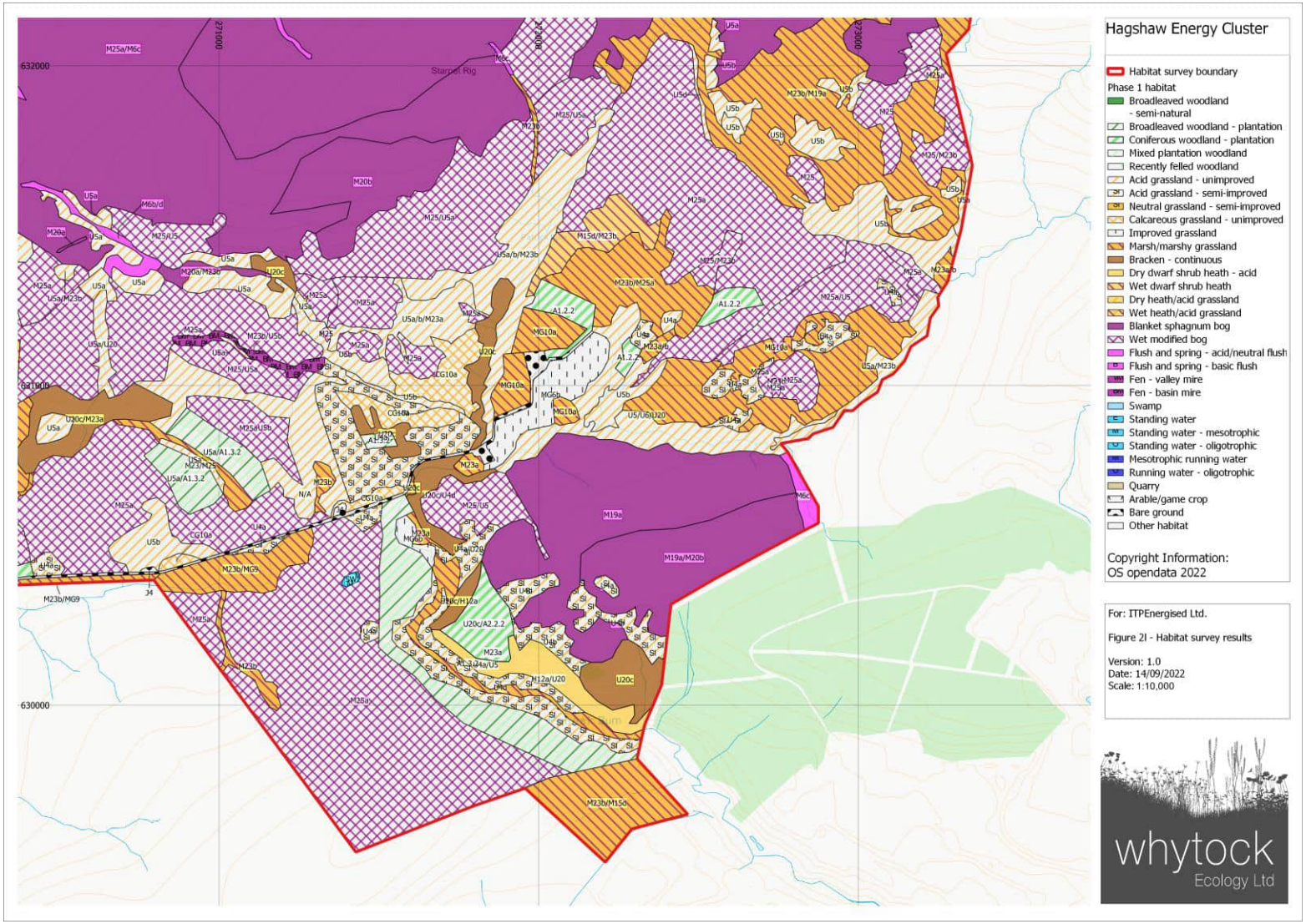

Figure 2l: NVC survey map – eastern section. Labelled according to community or sub-community. Where mosaics occur, polygons are coloured by the dominant habitat type

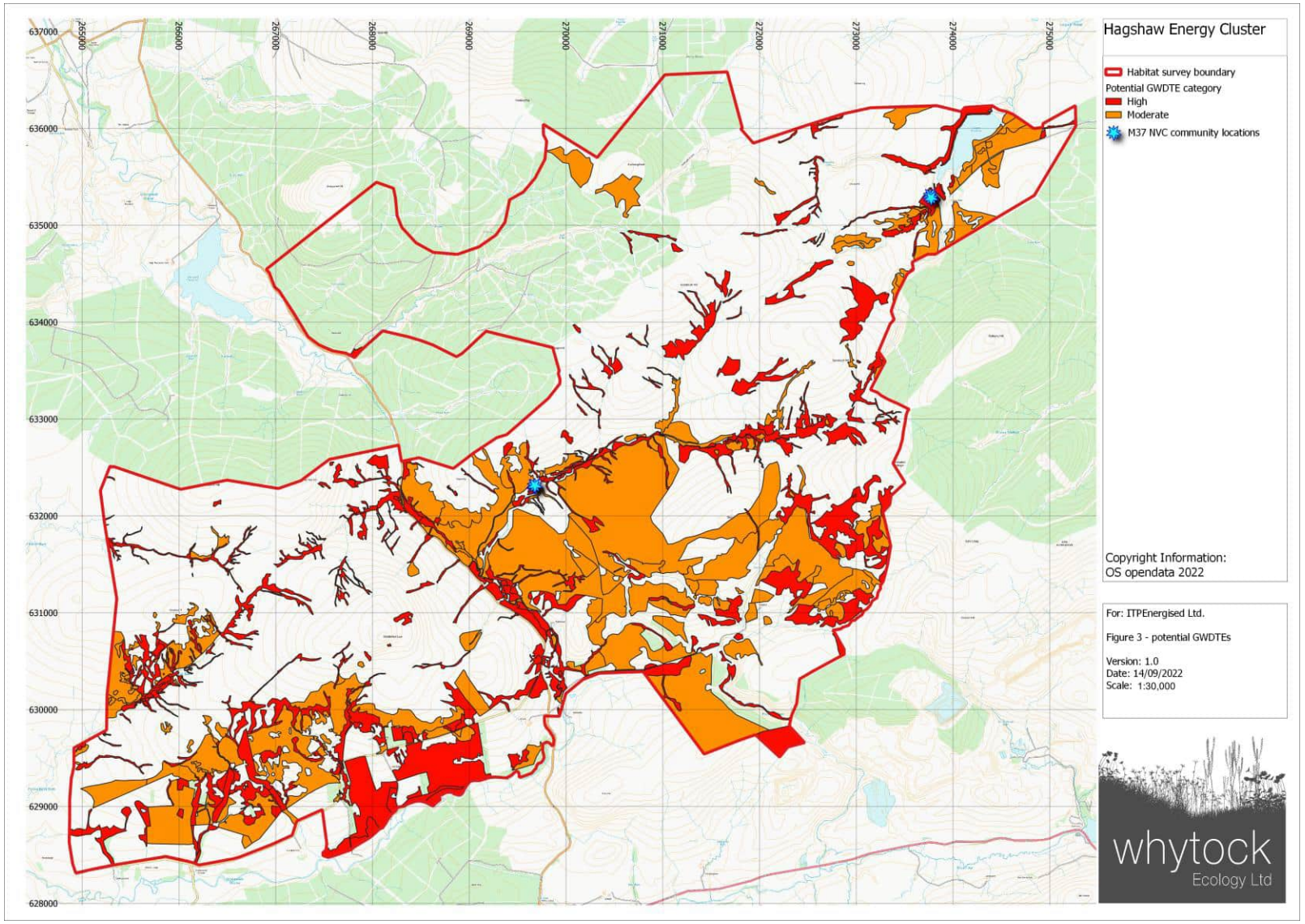

Figure 3: Map showing potential GWDTE locations

Appendix B – NVC communities + target notes

Table 2: Summary of NVC communities and their conservation designation.

NVC Community	Scottish Biodiversity List (SBL)	LBAP	GWDTE	Annex I Habitat	Annex 1 code
CG10	Lowland/upland calcareous grassland	Base rich grassland	High	Yes	H6210
H12	European dry heaths	Upland heathland	-	Yes	4030
H18	European dry heaths	Upland heathland	-	Yes	4030
M15	Blanket bog/wet heath	Blanket bog	Moderate	Yes	H4010, H7130
M17	Blanket bog	Blanket bog	-	Yes	H7130
M18	Blanket bog	Blanket bog	-	Yes	H7130
M19	Blanket bog	Blanket bog	-	Yes	H7130
M20	Blanket bog	Blanket bog	-	Yes	H7130
M23	Purple moor-grass and rush pastures (lowland)	Purple moor-grass and rush pastures	High	-	-
M25	Purple moor-grass and rush pastures (lowland)	Purple moor-grass and rush pastures	Moderate	Yes	H7120
M27	-	Fens	-	-	-
M28	-	Fens	Moderate		
M2	Blanket bog	Blanket bog	-	Yes	H7130
M3	Blanket bog	Blanket bog	-	Yes	H7130
M4	Lowland fens & Uplands flushes, fens & swamps	Fens	-	-	-
M6	Upland flushes, fens and swamps	Fens	High	-	-
M9	Lowland fens & Uplands flushes, fens & swamps	Fens	-	-	-
MG6	-	-	-	-	-
MG9	-	-	Moderate	-	-

NVC Community	Scottish Biodiversity List (SBL)	LBAP	GWDTE	Annex I Habitat	Annex 1 code
MG10	Purple moor-grass and rush pastures (lowland)	-	Moderate	-	-
S9	Upland flushes, fens and swamps	-	-	Yes	H3150
S10	-	-	-	-	H3130
S27	Upland flushes, fens and swamps	-	-	Yes	H3150
U2	-	-	-	-	-
U4	-	-	-	-	-
U5	-	-	-	-	-
U6	-	-	Moderate	-	-
U20	-	-	-	-	-
W4	Wet woodland	Wet woodland		Yes	H91D0
W7	Wet woodland	Wet woodland	High	Yes	H91E0

Table 3: Target notes from surveys

Target Note ID	Comment	Grid reference
1	Relatively undisturbed M19 mire with Vaccinium oxycoccos frequent and high-water table	NS6594829693
2	M18 - Nice example with abundant Sphagnum medium & S. papillosum but small in extent	NS6614929832
3	Species poor hedgerow	NS6657528612
3	Game crop	NS6626129162
4	Species rich U4b	NS6670928919
5	Species rich U4b	NS6680328970
6	Species rich U4b, some thyme present but assemblage not CG10	NS6663528992
7	Badger sett - single entrance. Not investigated in detail	NS6684129251
8	Nice example of CG10	NS6547430034
9	Fox/badger hole - not investigated in detail	NS6585930332
10	M20a in gullies	NS6553930801
11	M2b - Sphagnum fallax dominated bog pools. Too small to map	NS6599531089
12	Small CG10	NS6763631876
13	CG10 overlying rocks. Gymnocarpium dryopteris also	NS6748831733
14	Peat depth 30cm	NS6582831953
15	Peat depth 80cm (Minimum)	NS6596632206
16	Peat depth 40cm	NS6611732233
17	Rubus chamaemorus	NS6605032241
18	Peat depth 80cm (Minimum)	NS6695832221
19	Small peat hags	NS6709732265
20	Small bog pool dominated by Sphagnum medium	NS6705732257
21	Sphagnum austinii	NS6820732508
22	CG10 patches on thinner soils overlying rocks	NS6799832064
23	M17 but drained and not the best example. Grading into M15 due to drier conditions with less Sphagnum cover. Still defined by floristic tables as M17a	NS6874030571
24	Homalothecium lutescens	NS6801129630
25	Species rich U5c grassland with lots of Viola lutea, small amount of thyme	NS6804329775

Target Note ID	Comment	Grid reference
26	Small CG10	NS6757629628
27	Plagiochila spinulosa	NS6929831785
28	M37 spring	NS6966932309
29	3 x M37 spring communities in close proximity to one another	NS6967832314
30	Cardamine amara	NS6981232408
31	Small M2b - too small to map	NS7007333832
32	Rubus chamaemorus	NS7049434014
33	large M20a and M2b community	NS7060934152
34	Peatland restoration - geotextile matting over extensive peat hags	NS7101034306
35	Rhynchospora alba	NS7262034692
36	Asplenium viride	NS7321633589
37	Extensive peat hags covering a large area	NS7250033900
38	Extensive peat hags throughout	NS7266933691
39	Small M15 - too small to map	NS7336232506
40	Large, nice example of CG10a	NS7166630896
41	Fox/badger hole? - not investigated in detail	NS7180530823
42	M37 community	NS7377435282
43	M37 community	NS7376535307
44	Small CG10a community	NS7386535609

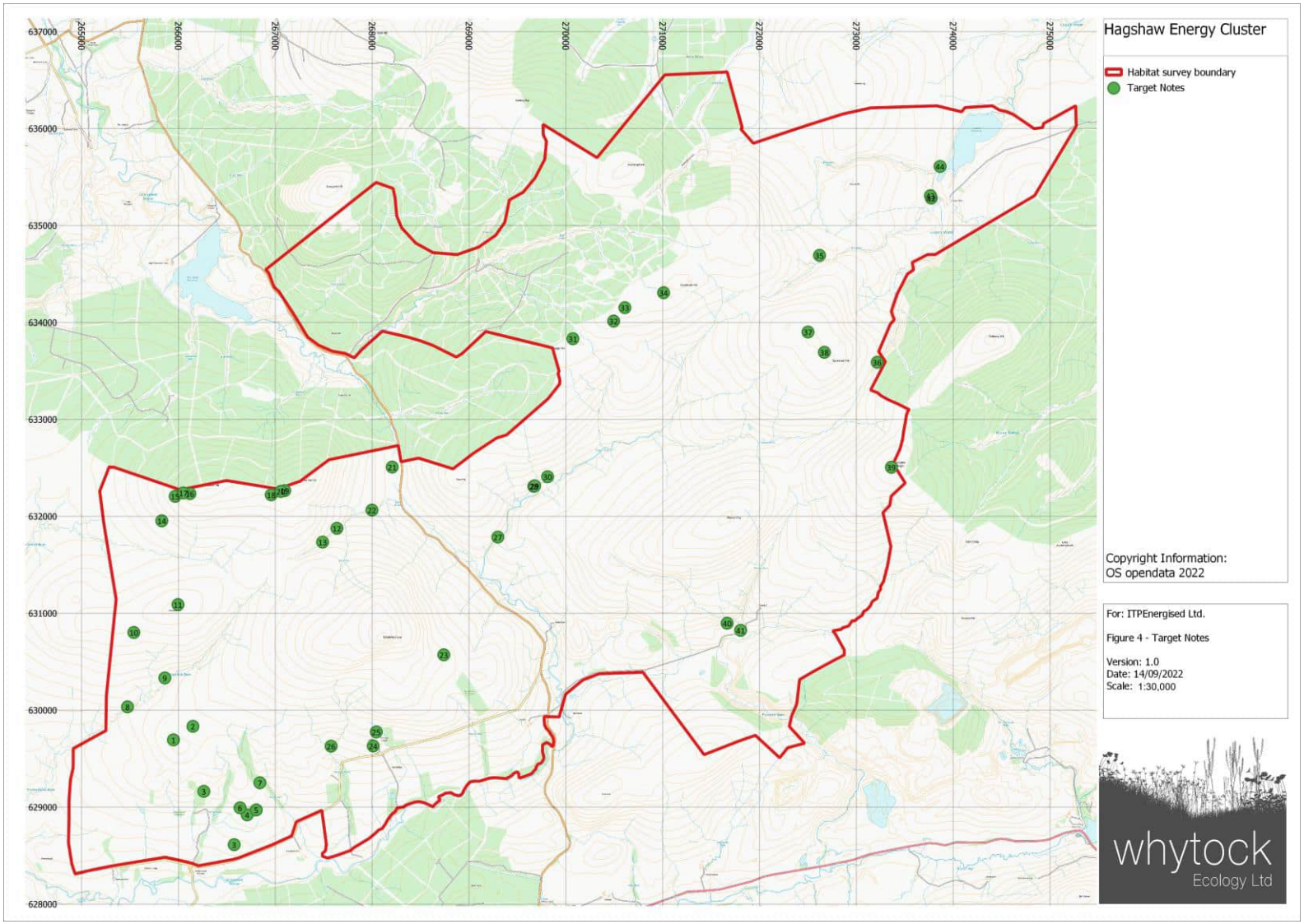

Figure 4: target note map showing locations of each