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Volume 7E Proposed Development (Onshore) Appendices

Appendix 7-2 Peat Survey Reports

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Volume 7E Appendix 7-2 Peat Survey Reports

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Table of Contents

1 Peat near Turriff: Peat survey 1
2 New Deer substation sites: Habitats, peat & GWDTE 13

1 Peat near Turriff: Peat survey

Peat near Turriff

Peat survey

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Contents

Summary **1**

1 Introduction **2**

Remit 2

Aim & objectives 2

The site 2

2 Approach **2**

Survey boundary & buffers 2

Desk study 2

Survey 2

Probing 3

3 Baseline **3**

General description 3

Carbon & Peatland Map 3

Habitats & vegetation 7

Peat-depth probing 7

Soil pits 7

Drain flanks 8

4 Assessment **9**

Peatland Condition Assessment 9

Peat 9

5 Conclusions **9**

Tables

Table 1: Statutory designations & qualifying features. 3

Figure 1: Soil pits 1 & 2. 8

Figure 2: Soil pit stratigraphy 8

Figure 3: Drain flank exposure 8

Maps

Map 1: Carbon & Peatland Map 4

Map 2: Habitats & vegetation 5

Map 3: Peat depth & distribution 6

Cover picture: Neutral grassland with rushes - typical vegetation across the survey area.

Summary

This report describes the results of a peat survey of a small (0.42 ha) area, 300 m south of Ewebrae Farm, 6 km southeast of Turriff, in Aberdeenshire.

The **aim** of the report is to describe the distribution & depth of any peat located within the survey area.

The **site/survey area** is located in the base of a valley, with slopes rising to the north, south & east. A minor, canalised watercourse flows along the base of the valley and the southern edge of the survey area. Two drains cross the survey area, to the watercourse. These drains lead from a pond that straddles the northern boundary of the survey area (see Map 1 *et seq.*).

The **Carbon & Peatland Map** predicts that Class 3 peatland underlies the survey area and extends for up to 160 m to the south & east. (Class 3 is associated with "occasional peatland habitats" and "carbon-rich soils, with some areas of deep peat").

Grassland habitats are extensive across the survey area, with exception to the open water of the pond.

Soil pits identified mineral soils (brown earth & brown gley) with the survey area.

A section of **drain flank** demonstrates the presence of mineral, no peat, soil.

None of the **habitat** associated with the survey area is peatland.

No peat is present.

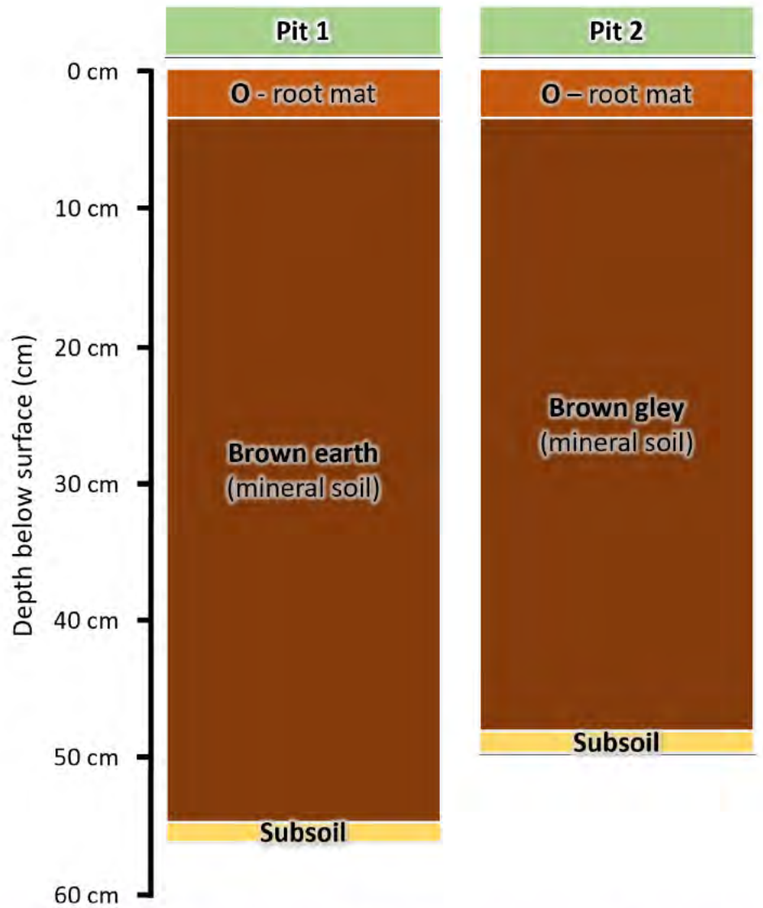


Image: The two soil pits relate the presence of mineral soil (brown earth & brown gley), not peat.

1 Introduction

Remit

1.1 This report describes the results of a peat survey of a small (0.42 ha) area, 300 m south of Ewebrae Farm, 6 km southeast of Turriff, in Aberdeenshire.

Aim & objectives

1.2 The aim of the report is to describe the distribution & depth of any peat located within the survey area by meeting the following objectives:

- Identification of peat-forming habitat/vegetation.
- Probing to detect the presence & depth of peat.
- Soil pits to identify the substrate type (e.g. peat).

The site

1.3 The site/survey area is located in the base of a valley, with slopes rising to the north, south & east. A minor, canalised watercourse flows along the base of the valley and the southern edge of the survey area. Two drains cross the survey area, to the watercourse. These drains lead from a pond that straddles the northern boundary of the survey area (see Map 1 *et seq*.).

2 Approach

2.1 In preparation of the baseline, a desk-based study of environmental information is undertaken, to identify relevant data (on designations, etc), and then a field-based survey. The resulting, desk study & survey data is then assessed to identify sensitivities in relation to sources of guidance & legislation. Details on the methods & sources are provided in the following sections.

Survey boundary & buffers

2.2 The site boundary is defined in Map 1 *et seq*. No specific buffer is applied because the search for peatland or peat extends as far from the mapped peatland/peat as necessary.

Desk study

2.3 A desk study is undertaken to identify peatland & peat-related designations, including:

- Sitelink[1] to identify nature conservation designations.
- Carbon & Peatland Map[2] to identify 'Class 1' or 'Class 2' peatland, or Class 5 peat soils.

Survey

2.4 Survey activity involves the following stages:

- Identification of peatland habitat.
- Identification of peat deposits.

2.5 Peatland habitat is readily identified by the superficial presence of plants & vegetation typical of the habitat. Most distinctively, this includes bog-mosses (*Sphagnum* spp.), especially species typical of peat-formation (e.g. *Sphagnum medium* or *Sphagnum papillosum*). Additional indicators include certain other mosses as well as particular grasses, rushes, sedges &/or sub-shrubs. These species collectively form peatland communities that are recognisable in terms of the National Vegetation Classification (NVC), specifically: M17, M18, M19 & M20.

2.6 Peat soils can be cryptic, especially where severe habitat modification has occurred. For example, even heavily-improved, agricultural grassland be surprisingly present on deep peat. Otherwise, topography, signs of waterlogging &/or persistent peatland or wetland species are used as a guide to the potential presence of peat soils, and probing is used in confirmation.

[1] SiteLink data, including mapping & site documentation available at https://sitelink.nature.scot/home. Accessed 18/04/2024.

Probing

2.7 Manual probing (with a long rod) is used to determine the presence of soft sediments, their identity, and their depth & extent below the ground surface. Each of these aspects is described in the following sections.

Sediment depth & extent

2.8 The depth & extent of soft sediments below the ground surface is determined by probing with a narrow rod of suitable length. In this study, a 1.5 m probe was used to determine the extent of deep peat because a full depth measurement was not required. Details of the probe used by Botanæco are here.

2.9 Ahead of survey a 10 m x 10 m grid was established across the survey area. This was used to systematically probe where there were no surface features to guide sampling. Where surface features indicated the peat margins, probing was undertaken off-grid to more accurately define the limits. In these instances, probes were undertaken either side of the margin to demonstrate the depth or absence of peat precisely.

2.10 Use of species richness, evenness & distinctiveness as measures of habitat/vegetation biodiversity therefore aids appraisal of habitat/vegetation composition, condition & ecological importance.

Sediment type

2.11 The soft sediments that yield to probing include peat as well as unconsolidated gleys (waterlogged mineral soils with some organic/peat content). Distinction between peat and gley or other mineral soil types can be made with a probe through the following observations:

- The mineral content of a gley creates a rasping noise that is transmitted through the probe, when it is pushed into the ground. Stones may impede the probe and these produce a grating or clinking sensation/noise upon contact. Wholly organic peat deposits pose no more than soft resistance when probed (with none of the sharp arrests associated with stones), and there is no rasping or grating.
- Expanded joints at 0.5 m intervals along the probe retrieve small amounts of sediment from their respective depths. When this is manipulated by hand, gley can be detected by its fine to coarse grittiness and the skin of the fingers may be stained. In contrast, peat has no grittiness and can easily be washed off, to leave no staining.

2.12 In order to provide further clarity on the soil type, two soil pits are excavated through the surface layer(s) and as far as the subsoil (as relevant). These pits were excavated with a spade and assessment of the soil type derived from the exposed flanks.

[2] Carbon & Peatland Map details are available at https://soils.environment.gov.scot/maps/thematic-maps/carbon-and-peatland-2016-map/. Accessed XX/XX/XXXX.

3 Baseline

3.1 In this section, the peat-related baseline of the site is described in relation to its general characteristics, designations, habitats, vegetation communities & soil types.

General description

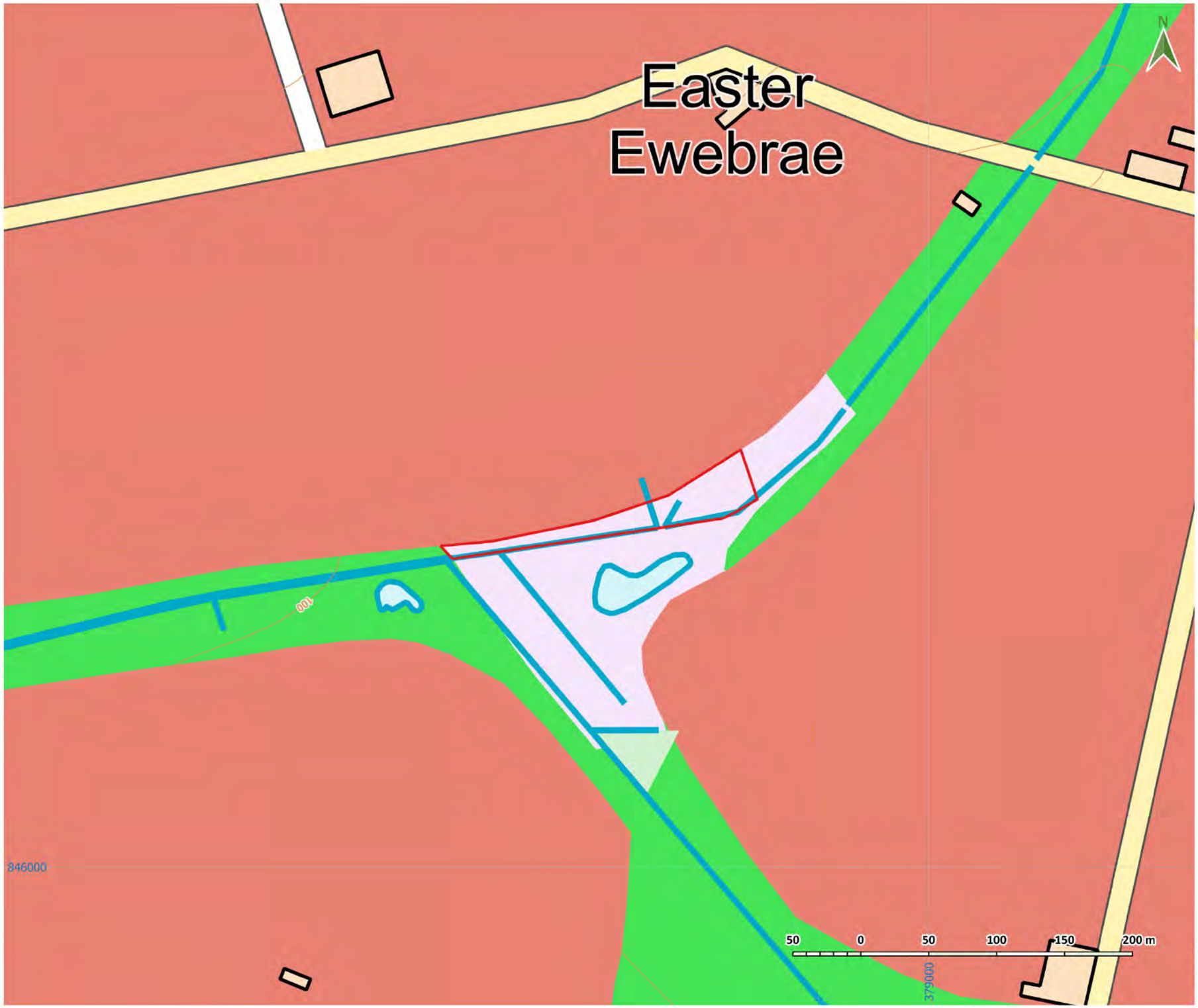
3.2 The survey area is located at around 100 m altitude on a gentle, 1:13 slope at its western end, and it is broadly level at its eastern end where there is a pond (that straddles the northern boundary). A minor watercourse, that has been canalised into a drain, flows along the southern boundary and two smaller drains lead from the pond to the watercourse.

Carbon & Peatland Map

3.3 In this section, the potential for peat is assessed from the Carbon & Peatland Map that identifies areas of peatland, peat and other soil types across Scotland. Its relation to the survey area is illustrated in Map 1 and the relevant classes are defined in Table 1. The Carbon & Peatland Map[2] predicts that Class 3 peatland underlies the survey area and extends for up to 160 m to the south & east. Class 4 extends beyond this, along the valley-base in which the survey area is located, and the surrounding slopes are associated with Class 0. Classes 0 & 4 are not normally associated with peat soils or habitat but Class 3, which underlies the survey area, is associated with "occasional peatland habitats" and "carbon-rich soils, with some areas of deep peat". There is therefore some potential for the presence of peat within the survey area.

Table 1: Statutory designations & qualifying features.

Class	Description
Class 0	Mineral soil - Peatland habitats are not typically found on such soils.
Class 3	Dominant vegetation cover is not priority peatland habitat but is associated with wet and acidic type. Occasional peatland habitats can be found. Most soils are carbon-rich soils, with some areas of deep peat
Class 4	Area unlikely to be associated with peatland habitats or wet and acidic type. Area unlikely to include carbon-rich soils.



Map 1:
Carbon & Peatland Map.

Peat nr Turriff

Physical features

Legend

Survey area

Carbon & Peatland Map

Class 0
Class 3
Class 4

Physical features

Contour (10 m)
Building
Minor Road
Waterbody
Watercourse
Woodland

Scale: 1:3,000 at A3

botanaeco

NVC community codes & titles

MG1c Arrhenatherum elatius grassland, Filipendula ulmaria sub-community
MG9a Holcus lanatus-Deschampsia cespitosa grassland, Poa trivialis sub-community
MG10a Holcus lanatus-Juncus effusus rush-pasture, typical sub-community
S22a Glyceria fluitans water-margin vegetation, Glyceria fluitans sub-community
U4b Festuca ovina-Agrostis capillaris-Galium saxatile grassland, Holcus lanatus-Trifolium repens sub-community

N

Map 2:
Habitats & vegetation.

Peat nr Turriff

Habitats & vegetation

Legend

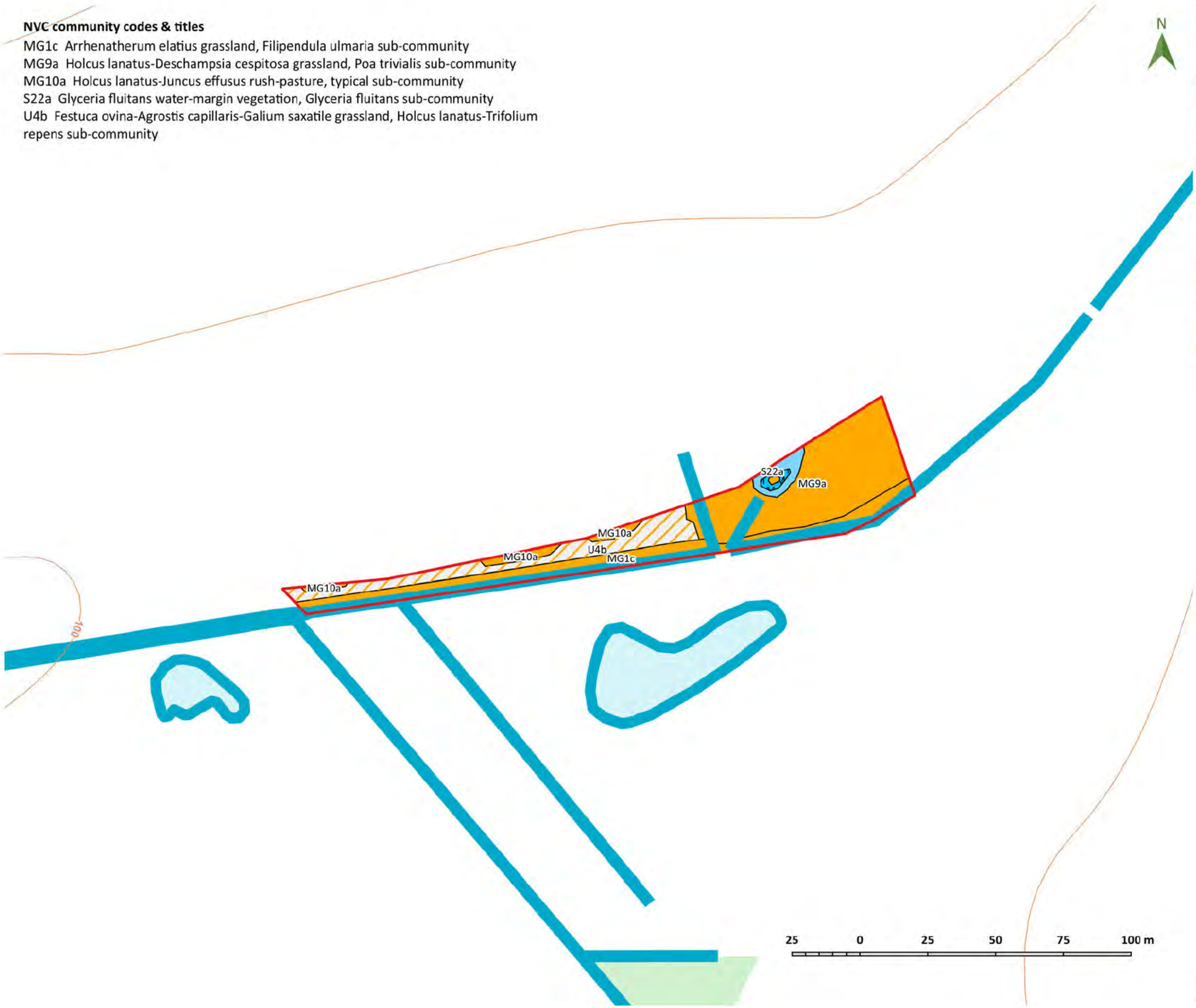
Survey area

Phase 1 habitats

B1.1 - Acid grassland - unimproved
B2.1 - Neutral grassland - unimproved
F1 - Swamp
G1.2 - Standing water - mesotrophic

Physical features

Contour (10 m)
Waterbody
Watercourse
Woodland



25 0 25 50 75 100 m

Scale: 1:1,500 at A3

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Map 3:
Peat depth & distribution.

N

Peat nr Turriff

Peat depth & distribution

There is no peat - mineral soils only.

Soil pit 2

Drain flank exposure

Soil pit 1

100

Legend

- Survey area
- Soil pits & drain flank exposure

Peat depth sampling

- No data
- No peat

Physical features

- Contour (10 m)
- Waterbody
- Watercourse
- Woodland

25 0 25 50 75 100 m

Scale: 1:1,500 at A3

botanaeco

Habitats & vegetation

3.4 In this section, the habitats & vegetation associated with the survey area are described, with a particular focus on the detection of peat-forming types. The extent of the habitats and their related NVC communities is illustrated in Map 2.

3.5 With exception to the open water of the pond, grassland habitats are extensive across the survey area, including the pond margins. Across the western end of the survey area, there is semi-improved acid grassland & neutral grassland respectively associated with the U4a fescue - bent - heath bedstraw grassland, typical sub-community & MG10a Yorkshire fog - soft-rush rush-pasture, typical sub-community. The MG1c false oat-grass grassland, meadowsweet sub-community extends along the full length of the southern boundary, adjacent to the minor watercourse/drain.

3.6 Across the eastern end of the site, delineated by the tributary drain, there is a neutral grassland sward dominated by tufted hair-grass and identifiable as the MG9a Yorkshire fog - tufted hair-grass grassland, rough meadow-grass sub-community. In addition, the pond is ringed by a floating raft of the S22a floating sweet-grass water-margin vegetation, floating sweet-grass sub-community. This and the other NVC communities are described in the following sections.

MG1c false oat-grass grassland, meadowsweet sub-community

3.7 The MG1c grassland extends along the flanks of the minor watercourse where it may have established on spoil excavated during canalisation. Flas oat-grass dominates the tall sward (to around 1.8 m high); cleavers, marsh woundwort, nettles, tufted hair-grass & valerian are frequent to occasional; and there is rare: creeping buttercup, creeping thistle & foxglove. Mosses & liverworts are also rare because of the rank vegetation and they include: *Brachythecium rutabulum*, *Kindbergia praelonga* & *Lophocolea bidentata*.

MG9a Yorkshire fog - tufted hair-grass grassland, rough meadow-grass sub-community

3.8 Tufted hair-grass dominates the MG9a grassland, exclusively so in some places. Occasional associates include robust herbs able to compete with the tufted hair-grass. They include: broad buckler-fern, broad-leaved willowherb, marsh thistle, soft-rush, valerian & Yorkshire fog. Mosses & liverworts are occasional, including the wetland *Calliergonella cuspidata*, as well as the generalists *Kindbergia praelonga* & *Lophocolea bidentata*.

MG10a Yorkshire fog - soft-rush rush-pasture, typical sub-community

3.9 A sward of dominant soft-rush & Yorkshire fog among the U4a acid grassland identifies the MG10a rush-pasture. Associates are limited in their cover & number by the dense, tall sward to occasional: broad-leaved dock, couch grass & creeping buttercup.

S22a floating sweet-grass water-margin vegetation, floating sweet-grass sub-community

3.10 The floating raft of S22a floating sweet-grass water-margin vegetation in the margins of the pond is dominated solely by the eponymous species.

U4b fescue - bent - heath bedstraw grassland, Yorkshire fog - white clover sub-community

3.11 In the U4b grassland, Yorkshire fog is dominant and there is frequent to occasional: broad-leaved dock, common bent, creeping buttercup, creeping thistle & Timothy. These species form a tall, rank sward in which smaller species, such as mosses are rare.

Peat-depth probing

3.12 A total of 41 peat-probe locations were sampled on a grid with 10 m spacing. Two sample locations that fell within the pond were excluded (out of a total of 43 potential sampling locations).

3.13 No peat was detected by probing. All of the locations permitted some penetration of the probe which was usually arrested within 10 cm to 15 cm from the surface by the presence of stones. In addition, a rasping noise & sensation was transmitted by the probe's travel – this relates the presence of sand & silt. (In contrast, organic/peat soil offers much less resistance and there is little or no noise or sensation transmitted through the probe). Consequently, the presence of a mineral soil (or the absence of a peat soil) was confirmed.

Soil pits

3.14 Two soil pits were excavated to firmly identify the substrate type and an exposure in the face of one of the drains was also examined. Their location & stratigraphy are respectively illustrated in Map 3 and in Figure 1 & Figure 2 and was selected on the basis of a low slope angle, towards the base of the valley, and avoidance of the potential for sampling spoil excavated from the drain/watercourse. This approach was undertaken to maximise the likelihood of encountering peat in less well-drained situations.

3.15 Both soil pits were excavated through a few centimetres of an organic surface layer (the 'O horizon') and then through a homogenous, brown earth or brown gley (the 'A horizon'), to around 50 cm depth, where contact was made with a lighter-coloured (light-fawn), mineral subsoil. In Pit 1 & Pit 2, the O horizon is 2 cm to 3 cm deep. Below this horizon, a brown earth extends to 53 cm in Pit 1 and a brown gley to 47 cm in Pit 2; and the pale-coloured subsoil extends below these soil types.

Figure 1: Soil pits 1 & 2.

Red bands on the rod in the photographs are at 10 cm intervals.

Figure 2: Soil pit stratigraphy.

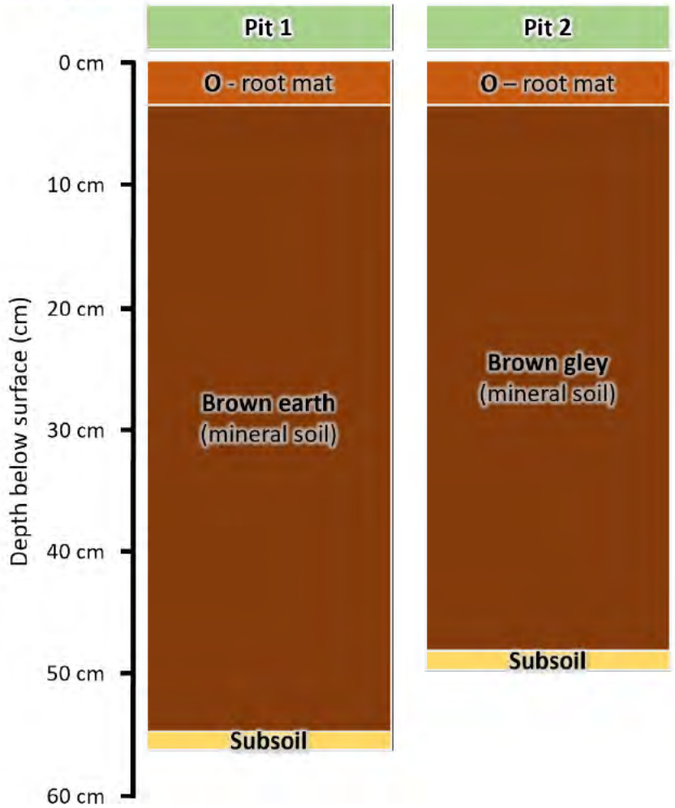

Figure 3: Drain flank exposure.

3.17 Roots with leaf litter and unidentifiable/decomposed organic matter forms the surficial O horizon. The brown earth in Pit 1 below this layer is very homogenous - a consistent mid-brown. The darkness of Pit 2 relates some waterlogging after a period of rain and likely a degree of gleying in this valley-bottom location adjacent to ponds as well as the drain/watercourse & ponds. A small amount of water was expressed from one side of Pit 2, closest to the ponds, whereas Pit 1 has a graduated colouration relating some waterlogging in the bottom few centimetres of the horizon. Otherwise, both pits had a well-developed crumb structure and evidently, periods of aeration & waterlogging within a mesic environment. In relation to this, Pit 2 is closer to or intermediate with a 'brown gley' soil type.

Drain flank

3.18 The drain flank face illustrated in Figure 3 was not 'cleaned', to create a clearer stratigraphic picture, to avoid subsequent erosion risk during high flows. However, it is clearly a comparable stratigraphy to Pit 2, but with a more fully-developed brown gley. Minor amounts of water were being expressed from its lower levels (>30 cm depth) and above this, cracking relates periodic drought.

4 Assessment

Peatland Condition Assessment

4.1 None of the habitat associated with the survey area is peatland, so no Peatland Condition Assessment has been undertaken. The site is instead, associated with grassland & rush-pasture vegetation that is typical of mesic but well-drained, mineral soils.

Peat

4.2 No peat is present. This has been confirmed by probing and by the excavation of soil pits.

5 Conclusions

5.1 The Carbon & Peatland Map predicts that Class 3 peatland underlies the survey area and extends for up to 160 m to the south & east. (Class 3 is associated with "occasional peatland habitats" and "carbon-rich soils, with some areas of deep peat").

5.2 Grassland habitats are extensive across the survey area, with exception to the open water of the pond.

5.3 Soil pits identified mineral soils (brown earth & brown gley) with the survey area.

5.4 A section of drain flank demonstrates the presence of mineral, no peat, soil.

5.5 None of the habitat associated with the survey area is peatland.

5.6 No peat is present.

5.7 No peat is associated with the survey area.

2 New Deer substation sites: Habitats, peat & GWDTE

New Deer substation sites

Habitats, peat & GWDTE

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Prepared by: [redacted]
Email:
Web:

Contents

Summary **1**
1 Introduction **2**
Remit 2
Aim & objectives 2
The sites 2
2 Approach **2**
Survey boundary & buffers 2
Habitat designations 2
Habitat & GWDTE survey 2
Peat-depth survey 3
Assessment 4
3 Baseline **6**
General description 6
Designations 6
Habitats & vegetation 6
Notable flora 13
Peat 15
4 Assessment **18**
Peatland Condition Assessment 18
Deep peat 18
Conservation importance 18
Groundwater dependency 18
Notable species 21
Constraint 21
Mitigation 21
5 Conclusions **25**

Tables

Table 1: Ecological importance categories. 4
Table 2: List of corresponding Phase 1 habitats & National Vegetation Classification plant communities, and mosaics; and their absolute & relative areas. 11
Table 3: Assessment of conservation importance. 21
Table 4: Assessment of groundwater dependency. 22

Figures

Figure 1: Stratigraphy of the soil pits excavated at Site 1 & Site 5. 15

Maps

Map 1: Physical features 5
Map 2: Statutory designations 7
Map 3: Non-statutory designations 8
Map 4: Phase 1 habitats 9
Map 5: 3D Phase 1 habitats 10
Map 6: Notable species 14
Map 7: Peat depth: raw data 16
Map 8: Peat depth: interpolation 17
Map 9: Peatland Condition Assessment 19
Map 10: Conservation importance 20
Map 11: Guidance groundwater dependency 23
Map 12: Site-specific groundwater dependency 24
Map 13: Habitats & vegetation communities ..... Appendix 2

Appendices

Appendix 1: Target Notes
Appendix 2: Habitat & vegetation map

Cover picture: View eastward from the western end of of M23b marshy grassland in the base of Site 5.

Summary

This report describes the results of a habitat, GWDTE & peat-focused survey & assessment of two potential substation sites 6 km west of New Deer, in Aberdeenshire.

The **aim** of the report is to describe the habitat baseline & assessment process to identify habitat, GWDTE &/or peat-related constraints.

Both of the **substation units** are located in an arable & pastoral, agricultural landscape. Site 1 (in the north) extends across 44 ha and Site 5 (in the south) extends across 31 ha. Each has a central, low-lying 'wetland' area (potentially with peat) and flanking, arable &/or pastoral, fields &/or grassland. The surrounding area is low-lying (100 m to 180 m altitude) with extensive arable fields and smaller extents of pastoral, permanent grassland & conifer plantation.

There are no **statutory designations** within a 4.8 km radius from the sites.

The **Carbon & Peatland Map** predicts nationally-important, Class 1 in the centre of Site and adjacent to the southern boundary of Site 1. Class 5 peat soil is predicted in the centre of Site 5.

Ancient Woodland is not associated with the sites.

Habitat areas: A third (10 ha, 33 %) of **Site 5** is associated with an arable field under a grass ley and there are moderate extents of improved grassland (7 ha, 24 %) & marshy grassland (7 ha, 23 %). Semi-improved acid grassland extends across 5 ha, (16 %) and there are minor areas (<0.3 ha, ,1 %) of: coniferous plantation, nondescript mire & wet modified bog. A third (14 ha, 32 %) of **Site 1** is associated with arable production of barley & beet and there are moderate areas of semi-improved acid grassland (9 ha, 21 %); unimproved neutral grassland (7 ha, 15 %) & improved grassland (8 ha, 19 %). There is also a mosaic between the acid & neutral grassland that accounts for an additional 4 ha (10 %). A minor area of marshy grassland on the southern boundary accounts for 1 ha (3 %) and there are very minor areas (<0.1 ha, ≤0.2 %) of broadleaved &/or coniferous plantation, scrub & swamp.

No **notable species** were recorded by the survey.

Peat is identified in the centre of both sites and along the south-western boundary of Site 1.

Peatland Condition Assessment identifies a single, minor area of wet modified bog.

Conservation importance of the most valued habitats is Local.

GWDTE: an area of Moderate groundwater-dependency M23b marshy grassland is located in the centre of Site 5.

The key **habitat constraints** to development identified by the survey & assessment are the following:

- Deep peat/peaty soils across the centre of both sites and in the southwest of Site 1.
- Moderate groundwater-dependency of an area of M23b marshy grassland.

Habitat-related **mitigation** requires:

- Avoidance of the deep peat/peaty soils and pursuance of the mitigation hierarchy otherwise.
- Management of any excavation north of the M23b GWDTE area to prevent disconnection from its groundwater source in the slope above.

3D representation of the habitats at New Deer.
A = arable; I = improved grassland; Orange fill & hatch = grassland; purple hatch on orange = marshy grassland; pink = mire; purple stripes = bog.

1 Introduction

Remit

1.1 This report describes the results of a habitat, GWDTE & peat-focused survey & assessment of two potential substation sites approximately 6 km west of New Deer, in Aberdeenshire.

Aim & objectives

1.2 The aim of the report is to describe the habitat baseline & assessment process to identify habitat, GWDTE &/or peat-related constraints & opportunities by meeting the following objectives:

- Phase 1 habitat & National Vegetation Classification survey.
- Measurement of peat depth on a 100 m grid.
- Assessment of habitat importance & sensitivity, including designations, peat/peatland & Groundwater Dependent Terrestrial Ecosystems (GWDTE).

The sites

1.3 Both of the substation units are located in an arable & pastoral, agricultural landscape. Site 1 (in the north) extends across 44 ha and Site 5 (in the south) extends across 31 ha. Each has a central, low-lying 'wetland' area (potentially with peat) and flanking, arable &/or pastoral fields. The surrounding area is low-lying (100 m to 180 m altitude) with extensive arable fields and smaller extents of pastoral, permanent grassland & conifer plantation.

2 Approach

2.1 In preparation of the baseline, a desk-based study of environmental information was undertaken, to identify available habitat data, and then a field-based survey. The resulting data is then assessed to identify sensitivities in relation to guidance & legislation. Details on the methods & sources are provided in the following sections.

Survey boundary & buffers

2.2 The survey area is defined in Map 1 *et seq*. It includes the site boundary and GWDTE only within a 250 m buffer.

Habitat designations

2.3 A desk study was undertaken to identify habitat designations, including:

- NatureScot's Sitelink[1] to identify nature conservation designations
- NatureScot's Carbon & Peatland Map 2016[2] to identify high value 'Class 1' or 'Class 2' peatland
- Ancient Woodland Inventory[3] to identify native woodlands.

Habitat & GWDTE survey

2.4 There are two elements to the habitat & GWDTE survey: a 'Phase 1' habitat survey and more detailed 'National Vegetation Classification' (NVC) of vegetation within the habitats. The data from these is mapped & described and supplemented by field assessment of habitat/vegetation condition & groundwater dependency. The methods are described in the following sections.

Phase 1 habitat survey

2.5 Phase 1 habitat survey was undertaken within the site boundary according to the standard method[4] and guidance[5]. As a 'broad-brush' approach, Phase 1 habitat survey is now somewhat outdated by current legislation and initiatives but it still provides a well-established & useful overview. Furthermore, it includes habitats not covered by the more detailed National Vegetation Classification described below. In the **Baseline** (Section 3, below), the vegetation communities are grouped and described under the heading of the relevant Phase 1 habitat.

[1] SNH's SiteLink data, including mapping & site documentation available at https://sitelink.nature.scot/home. Accessed 24/07/2023.

[2] Carbon & Peatland Map details are available at https://soils.environment.gov.scot/maps/thematic-maps/carbon-and-peatland-2016-map/. Accessed 24/07/2023.

[3] *A guide to understanding the Scottish Ancient Woodland Inventory* is available at https://www.nature.scot/doc/guide-understanding-scottish-ancient-woodland-inventory-awi. Accessed 24/07/2023.

[4] JNCC 2010. *Handbook for phase 1 habitat survey - a technique for environmental audit* and other relevant information available at http://jncc.defra.gov.uk/page-2468. Accessed 24/07/2023.

[5] Chartered Institute of Ecology and Environmental Management 2017. *Guidelines for Preliminary Ecological Appraisal*. Available at https://www.cieem.net/guidance-on-preliminary-ecological-appraisal-gpea-. Accessed 24/07/2023.

National Vegetation Classification

2.6 The National Vegetation Classification (NVC) is more detailed & precise than the Phase 1 habitat method; and is necessary for identifying habitats/plant communities of relevance to modern legislation (such as Annex I of the Habitats Directive, or GWDTE of the Water Framework Directive). It is therefore the primary system to which vegetation (& habitat) is related within this report, for the purposes of identification, description & mapping.

2.7 Vegetation is identified, mapped & described according to the five volumes of *British Plant Communities*[6] in accordance with the standard NVC method (as outlined in the *NVC Users Handbook*[7]). This involves walking the site on a route determined by topography/viewpoints and the need to sample distinctive areas. Homogenous areas are mapped onto rectified aerial photographs overlain with contours & other physical features to ensure accuracy. A single vegetation community or mosaic of more may be mapped, depending upon the scale and patterning of the vegetation. Where mosaics are mapped, the percentage cover of each NVC community is stated in the mapping.

2.8 Characteristics of the vegetation and point-features too small to otherwise map are recorded as 'Target Notes' (see Appendix 1). These and the habitat & vegetation descriptions include lists of characteristic species that are semi-quantified using the DAFOR scale[8].

Survey accuracy

2.9 Survey accuracy is influenced by a number of factors including the following:

- GPS error.
- Georectification errors in the aerial photography used for base-mapping.
- Gradual, rather than abrupt changes between habitats & vegetation that are poorly-defined.
- Transitional habitats & vegetation bearing similarity to two or more Phase 1 habitats or NVC communities.

2.10 Furthermore, the fit of vegetation to the published NVC communities is often imperfect and the closest approximation is therefore adopted (with explanation in the habitat/vegetation descriptions in the Habitats & vegetation baseline). Surveying in Scotland also has the added limitation that NVC sampling was weighted towards England so the published descriptions, and even community titles, are not always directly applicable (for example: certain species may not be present in Scotland).

Notable species

2.11 Notable species are those that are subject to nature conservation designation. The JNCC spreadsheet of taxa designations[9] defines these species and is used as the main point of reference in addition to guidance published by the North East Scotland Biodiversity Partnership[10].

Nomenclature

2.12 Standardised vernacular names are used for the vascular plants (ferns, herbs and trees). Scientific names (italicised within the text) are used for the moss, liverwort and lichen species because although vernacular names are now in existence, they are not in general usage. The standard checklists for vernacular and scientific names are employed[11].

Peat-depth survey

2.13 Peat-depth survey is undertaken using a pre-defined grid, with sample locations spaced at 100 m intervals. A mobile GIS assists navigation to each sampling location and recording of the depth. Sampling is undertaken using 6 mm diameter, rigid steel rods, with 9 mm diameter joints, that can be connected to reach the necessary depth.

2.14 Probing in peat is detected through the smooth penetration of the probes, with no more than 'soft resistance', when encountering woody remains, for example. Sampling through non-organic, mineral sediments such as clay, sand or gravel, is apparent from the rasping &/or grating; and 'hard resistance' transmitted by the probes. Exposures of sediment in drains or cut faces are also examined, to identify the local stratigraphy.

2.15 The peat-depth data is presented in raw format and also as an interpolation that estimates the depth of peat between sample points. Triangular Interpolation (TIN) has been used to interpolate the peat depth using the standard Processing Toolbox in QGIS 3.28.6.

[6] Rodwell, J.S. 1991-2000. *British plant communities*. 5 Volumes. Cambridge University Press.

[7] Rodwell, J.S. 2006. *NVC Users' Handbook*. Available at http://jncc.defra.gov.uk/page-3724. Accessed 24/07/2023.

[8] DAFOR scale: **D**ominant > **A**bundant > **F**requent > **O**ccasional > **R**are.

[9] JNCC spreadsheet of taxa designations & further information available at: http://jncc.defra.gov.uk/page-3408. Accessed 24/07/2023.

[10] North East Scotland Biodiversity Partnership guidance available at https://www.nesbiodiversity.org.uk/biodiversity-information-for-developers/. Accessed 24/07/2023.

[11] BSBI *List of British & Irish Vascular Plants & Stoneworts*, for higher plants, available at https://bsbi.org/taxon-lists. For mosses and liverworts, the *Census Catalogue of British and Irish Bryophytes 2021* available at https://www.britishbryologicalsociety.org.uk/publications/census-catalogue/. Accessed 24/07/2023.

Assessment

2.16 Assessment of the baseline is undertaken against local, national & international legislation & initiatives to identify priorities for nature conservation and sensitive habitats. The methods described in the following sections have been applied in assessment of the baseline.

Peatland Condition Assessment

2.17 Peatland Condition Assessment[12] was employed in the field to determine the condition of the peatland habitat. This classifies the peatland into four classes:

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

2.18 Field-based assessment of a series of key indicators identifies the appropriate class for each area of peatland. These indicators include features such as the *Sphagnum* cover & vegetation condition; evidence of fire frequency & intensity; bare peat; and scrub/tree invasion[13].

Conservation priorities & ecological importance

2.19 The baseline established by the desk study and survey is assessed against the following to identify priorities for protection & conservation at the European and national (Scottish) scale:

- Peatland & carbon map 2016[2]
- Ancient Woodland Inventory[3]
- NE Scotland habitat statements[10]
- Annex I of the EU Habitats Directive[13]
- Scottish Biodiversity List[14].

2.20 The assessment is undertaken according to the Ecological Impact Assessment guidance[15], which recommends that a level of ecological importance is assigned to ecological features using a geographical context. Table 1 summarises the geographical contexts as they relate to the Site.

Table 1: Ecological importance categories.

Importance	Context	Characteristics
International	Europe	• Any viable area of habitat included in Annex I of the EC Habitats Directive.
National	UK\Scotland	• A viable area of priority habitat listed in the UKBAP. • Habitat area >1% of the national resource. • An area of habitat fulfilling the criteria for designation as an ASSI/SSSI.
Regional	North-east Scotland	• Habitat importance greater than county level but not sufficient for SSSI designation.
County	Aberdeenshire	• County-designated (e.g. Biodiversity Action Plan) habitats. • Habitat area >1% of the county resource. • Semi-natural, ancient woodland >0.25ha in extent.
Local	Site & 2 km buffer	• Habitats that are unique in or of some other significance in the local area; • Areas of habitat that contribute to the local ecological resource.
Site	Site only	• Common, often anthropogenic habitats.

Groundwater dependent terrestrial ecosystems

2.21 Potential Groundwater Dependent Terrestrial Ecosystems (GWDTE) were identified during the NVC survey according to current Confor[16] & SEPA[17] guidance. Their location-specific groundwater dependency is assessed because GWDTE are not always groundwater dependent, so their inappropriate consideration can cause unnecessary constraint. Assessment is based on the physical environment (geology, hydrology & topography) of the potential GWDTE as well as their floristics.

[12] NatureScot 2017. *Peatland Condition Assessment*. Available for download from https://www.nature.scot/sites/default/files/2017-10/Guidance-Peatland-Action-Peatland-Condition-Assessment-Guide-A1916874.pdf. Accessed 24/07/2023.

[13] List & descriptions of Habitats Directive Annex I habitats available at http://jncc.defra.gov.uk/Publications/JNCC312/UK_habitat_list.asp. Accessed 24/07/2023.

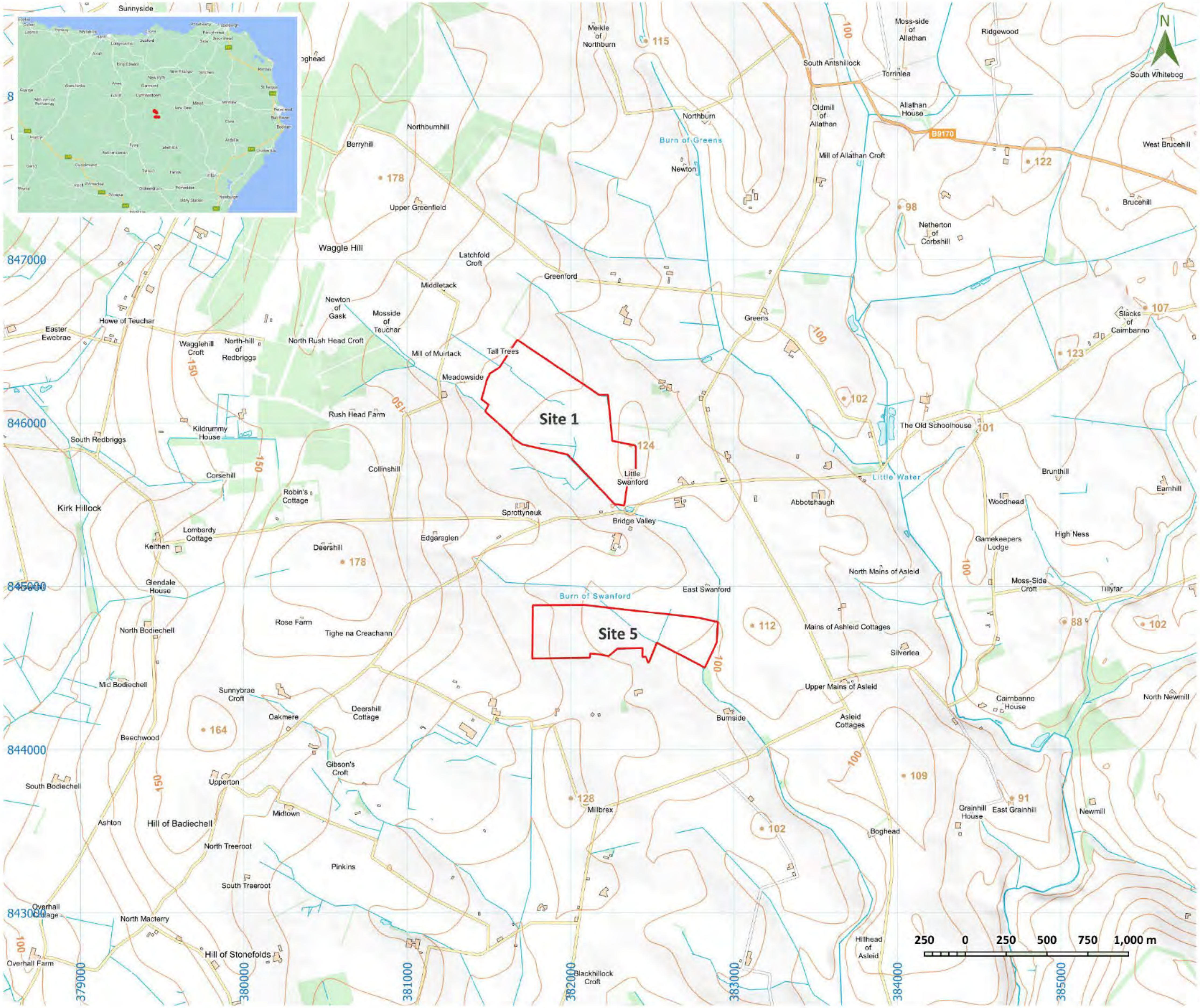
[14] Further details and download of the Scottish Biodiversity List available at https://www.nature.scot/doc/scottish-biodiversity-list. Accessed 24/07/2023.

[15] CIEEM 2018. Guidelines for Ecological Impact Assessment in the UK & Ireland: Terrestrial, Freshwater, Coastal and Marine. Chartered Institute of Ecology and Environmental Management, Winchester. Available at https://cieem.net/resource/guidelines-for-ecological-impact-assessment-ecia/. Accessed 24/07/2023.

[16] Confor 2018. Practice guide for forest managers to assess and protect Groundwater Dependent Terrestrial Ecosystems when preparing woodland creation proposals. Available at https://www.confor.org.uk/media/246950/practice-guide-on-ground-water-dependent-terrestrial-ecosystems.pdf. Accessed 24/07/2023.

[17] Land Use Planning System SEPA Guidance Note 31. Guidance on Assessing the Impacts of Development Proposals on Groundwater Abstractions and Groundwater Dependent Terrestrial Ecosystems. Available at http://www.sepa.org.uk/media/144266/lups-gu31-guidance-on-assessing-the-impacts-of-development-proposals-on-groundwater-abstractions-and-groundwater-dependent-terrestrial-ecosystems.pdf. Accessed 24/07/2023.

Map 1:
Physical features.



New Deer substation sites

Physical features

Legend

- Boundary

Physical features

- Point height (m)
- Contour (10 m)
- Building
- B Road
- Minor Road
- Waterbody
- Watercourse
- Woodland

Scale: 1:25,000 at A3

Map contains:
• OS data © Crown copyright and database right (2023).

3 Baseline

3.1 In this section, the habitat baseline of the site is described in relation to its general characteristics, designations, habitats, vegetation communities & notable plant species.

General description

3.2 **Site 1** is broadly rectangular area of 44 ha, aligned along the flanks of a shallow valley that is oriented and slopes from northwest to southeast, at 110 m to 130 m altitude (see Map 1). Permanent pastoral grassland is located in the north & west; and there is an arable field in the east. The south & centre is associated with rush-dominated wetland in shallow depressions and across levels; and there is acid grassland over low, water-shedding mounds & ridges.

3.3 **Site 5** is also broadly rectangular and it extends across 31 ha. This site is oriented and slopes downward, from west to east, from 126 m altitude to 98 m (see Map 1). The western end is an arable field currently under a productive, perennial rye-grass ley; and the eastern end is permanent, pastoral grassland. In the centre, there is an extensive wetland are that extends south of the boundary. This wetland is dominated by rushes and there is a high likelihood of peat being present.

Designations

3.4 In this section, statutory & non-statutory nature conservation designations associated with the site are identified. The distribution of designated habitats & sites is illustrated in Map 2 & Map 3 (note that for clarity, woodland is not illustrated in these and subsequent maps).

Statutory designations

3.5 Statutory nature conservations designations provide a legal basis to the protection of certain sites and their specified features. Their distribution is normally illustrated in Map 2, however, there are no statutory designations within a 4.8 km radius from the sites.

Non-statutory designations

3.6 Non-statutory designations do not have the same legal basis as statutory designations. They identify areas of natural heritage importance and assist planning & management decisions. The non-statutory designations relating to the site are illustrated in Map 3 and described below.

Carbon & Peatland Map

3.7 The Carbon & Peatland Map predicts nationally-important, Class 1 in the centre of Site 1 and adjacent to the southern boundary of Site 1. Class 5 peatland is indicated across the centre & southwest of Site 1 and south of the Class 1 peatland in Site 5. Class 1 defines "nationally important carbon-rich soils, deep peat and priority peatland habitat" of "high conservation value"; and Class 5 indicates the potential for peat soils in the absence of peatland habitat.

Ancient Woodland Inventory

3.8 Ancient Woodland is not associated with the sites. The closest such area is 1.8 km to the east.

Habitats & vegetation

3.9 The conditions & results of the field survey are described in this section in relation to the ecology & floristics of the habitats & vegetation communities. Statistics on the absolute (ha) & relative (%) habitat & vegetation cover are provided in Table 2. Habitat distribution is illustrated in Map 4 & Map 5 and a large-scale map (Map 11) in Appendix 2. This latter map includes Target Notes and labels for the NVC communities within the habitats. Maps 4 & 5 provide habitat details only.

Survey

3.10 Survey was undertaken on the 21st of July, 2023 by [redacted], Principal Botanist at Botanæco. Weather on the day was initially wet but this cleared by mid-morning to dry, overcast & bright conditions; and low wind speeds; that were ideal for survey. All parts of the site were accessible but the extreme-eastern end of Site 5 was avoided because of the presence of excitable cattle.

Habitat areas

3.11 Habitat areas are summarily described in this section; and there are more detailed, individual accounts in the following section (Habitat & vegetation descriptions).

3.12 A third (10 ha, 33 %) of **Site 5** is associated with an arable field under a grass ley and there are moderate extents of improved grassland (7 ha, 24 %) & marshy grassland (7 ha, 23 %). Semi-improved acid grassland extends across 5 ha, (16 %) and there are minor areas (<0.3 ha, ,1 %) of: coniferous plantation, nondescript mire & wet modified bog.

Map 2:
Statutory designations.

New Deer substation sites

Statutory designations

There are no statutory designations within 5 km from the boundaries.

Legend

- Boundary

Physical features

- Point height (m)
- Contour (10 m)
- Building
- B Road
- Minor Road
- Waterbody
- Watercourse

Scale: 1:25,000 at A3

Map 3:
Non-statutory designations.

New Deer substation sites

Non-statutory designations

Legend

- Boundary

Designations

Carbon & Peatland Map

- Class 1 (high value peatland habitat)
- Class 5 (peat soil)

Ancient Woodland Inventory

- Long-Established (of plantation origin)

Physical features

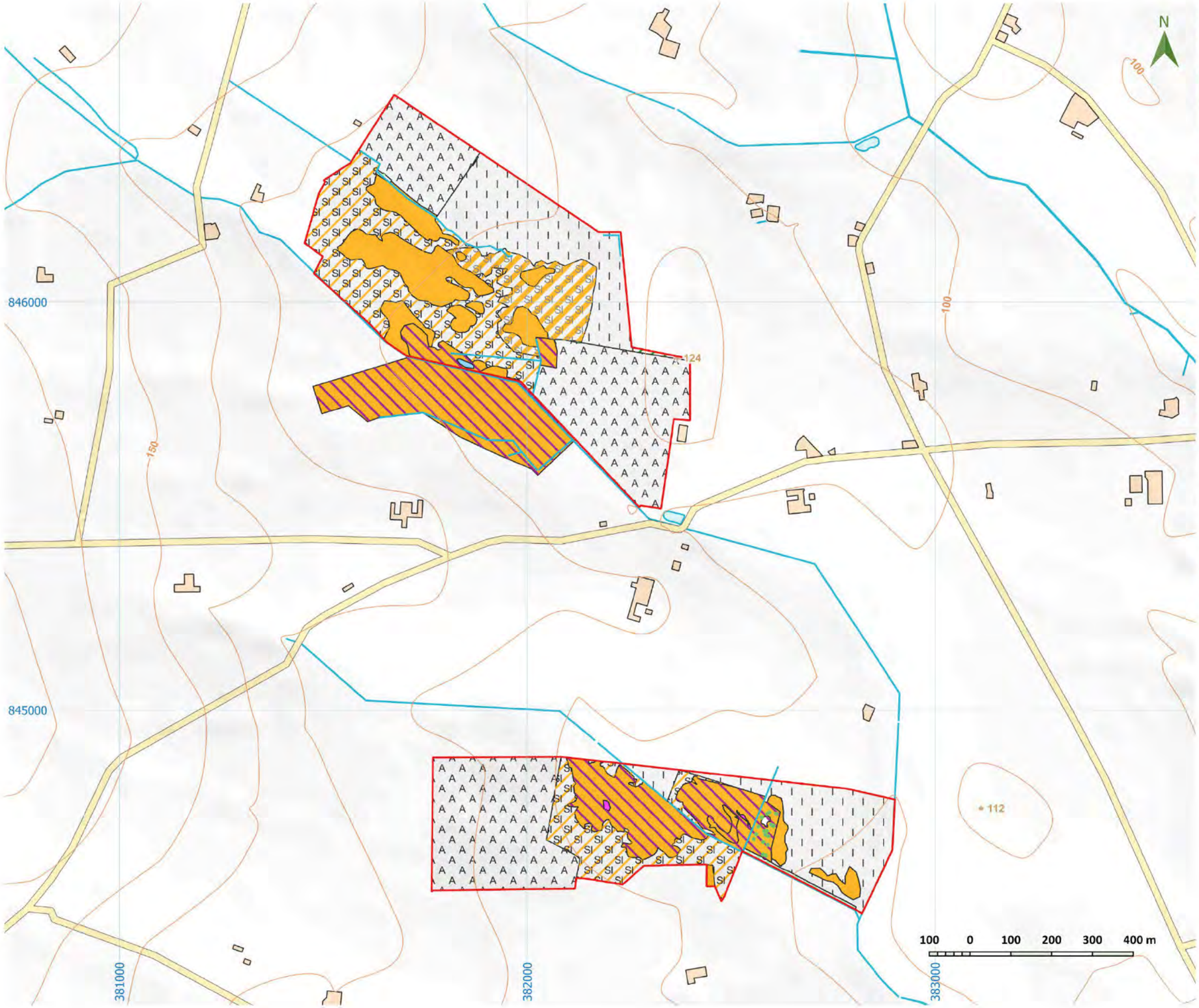
- Point height (m)
- Contour (10 m)
- Building
- B Road
- Minor Road
- Waterbody
- Watercourse

Scale: 1:25,000 at A3

Map 4:
Phase 1 habitats.

New Deer substation sites

Phase 1 habitats



Legend

- Boundary

Phase 1 habitats

- A1.1.2 - Broadleaved woodland - plantation
- A1.2.2 - Coniferous woodland - plantation
- A1.3.2 - Mixed woodland - plantation
- A2.1 - Scrub - dense/continuous
- B1.2 - Acid grassland - semi-improved
- B1.2-B2.1 mosaic
- B2.1 - Neutral grassland - unimproved
- B4 - Improved grassland
- B5 - Marsh/marshy grassland
- E - Mire
- E1.7 - Wet modified bog
- F1 - Swamp
- J1.1 - Cultivated/disturbed land - arable
- Scattered shrubs

Physical features

- Point height (m)
- Contour (10 m)
- Building
- Minor Road
- Waterbody
- Watercourse

100 0 100 200 300 400 m

Scale: 1:10,000 at A3

Map 5:
3D Phase 1 habitats.

New Deer substation sites

3D Phase 1 habitats

Legend

- Boundary

Phase 1 habitats

- A1.1.2 - Broadleaved woodland - plantation
- A1.2.2 - Coniferous woodland - plantation
- A1.3.2 - Mixed woodland - plantation
- A2.1 - Scrub - dense/continuous
- B1.2 - Acid grassland - semi-improved
- B1.2-B2.1 mosaic
- B2.1 - Neutral grassland - unimproved
- B4 - Improved grassland
- B5 - Marsh/marshy grassland
- E - Mire
- E1.7 - Wet modified bog
- F1 - Swamp
- J1.1 - Cultivated/disturbed land - arable
- Scattered shrubs

Physical features

- Point height (m)
- Contour (10 m)
- Building
- Minor Road
- Waterbody
- Watercourse

Not to scale.

botanæco

Table 2: List of corresponding Phase 1 habitats & National Vegetation Classification plant communities, and mosaics; and their absolute & relative areas.

Phase 1 habitat code & title	Area		National Vegetation Classification code & title	Area	
	Absolute (ha)	Relative (%)		Absolute (ha)	Relative (%)
Site 1					
A1.1.2 Broadleaved woodland - plantation	0.11	0.2		0.11	0.2
A1.3.2 Mixed woodland - plantation	0.04	0.1		0.04	0.1
A2.1 Scrub - dense/continuous	0.02	0.0	**W23a** *Ulex europaeus-Rubus fruticosus* scrub, *Anthoxanthum odoratum* sub-community	0.02	0.0
B1.2 Acid grassland - semi-improved	9.21	20.8	**U4b** *Festuca ovina-Agrostis capillaris-Galium saxatile* grassland, *Holcus lanatus-Trifolium repens* sub-community	9.21	20.8
B1.2-B2.1 mosaic	4.25	9.6	**MG10a-U4b** mosaic	4.25	9.6
B2.1 Neutral grassland - unimproved	6.58	14.9	**MG10a** *Holcus lanatus-Juncus effusus* rush-pasture, typical sub-community	6.45	14.6
			MG9a *Holcus lanatus-Deschampsia cespitosa* grassland, *Poa trivialis* sub-community	0.13	0.3
B4 Improved grassland	8.43	19.1	**MG6a** *Lolium perenne-Cynosurus cristatus* grassland, typical sub-community	8.43	19.1
B5 Marsh/marshy grassland	1.20	2.7	**M23b** *Juncus effusus/acutiflorus-Galium palustre* rush-pasture, *Juncus effusus* sub-community	1.20	2.7
F1 Swamp	0.05	0.1	**S10a** *Equisetum fluviatile* swamp, *Equisetum fluviatile* sub-community	0.05	0.1
J1.1 Cultivated/disturbed land - arable	14.30	32.4		14.30	32.4
Totals:	**44.19**	**100.0**	**Totals:**	**44.19**	**100.0**
Site 5					
A1.2.2 Coniferous woodland - plantation	0.23	0.7	n.a.	0.23	0.7
B1.2 Acid grassland - semi-improved	4.91	15.9	**U4b** *Festuca ovina-Agrostis capillaris-Galium saxatile* grassland, *Holcus lanatus-Trifolium repens* sub-community	4.91	15.9
B2.1 Neutral grassland - unimproved	0.85	2.8	**MG10a** *Holcus lanatus-Juncus effusus* rush-pasture, typical sub-community	0.85	2.8
B4 improved grassland	7.33	23.8	**MG6a** *Lolium perenne-Cynosurus cristatus* grassland, typical sub-community	7.33	23.8
B5 Marsh/marshy grassland	7.15	23.2	**M23b** *Juncus effusus/acutiflorus-Galium palustre* rush-pasture, *Juncus effusus* sub-community	0.23	0.7
			Common sedge sward	6.92	22.5
E Mire	0.06	0.2	**MG9** *Holcus lanatus-Deschampsia cespitosa* grassland	0.06	0.2
E1.7 Wet modified bog	0.04	0.1	**M20** *Eriophorum vaginatum* blanket and raised mire	0.04	0.1
J1.1 Cultivated/disturbed land - arable	10.23	33.2	**MG7a** *Lolium perenne* leys and related grasslands, *Lolium perenne-Trifolium repens* leys	10.23	33.2
Totals:	**30.80**	**100.0**	**Totals:**	**30.80**	**100.0**

3.13 A third (14 ha, 32 %) of **Site 1** is associated with arable production of barley & beet and there are moderate areas of semi-improved acid grassland (9 ha, 21 %); unimproved neutral grassland (7 ha, 15 %) & improved grassland (8 ha, 19 %). There is also a mosaic between the acid & neutral grassland that accounts for an additional 4 ha (10 %). A minor area of marshy grassland on the southern boundary accounts for 1 ha (3 %) and there are very minor areas (<0.1 ha, ≤0.2 %) of broadleaved &/or coniferous plantation, scrub & swamp.

Habitat & vegetation descriptions

3.14 Habitats & their constituent vegetation communities are described in this section in relation to their distribution, floristic composition, ecology, condition & management. Target Notes in Appendix 1 are referenced where applicable.

A1.1.2 Broadleaved woodland - plantation

3.15 Broadleaved plantation has less than 10 % conifer cover and has been deliberately planted with broadleaved trees. A single, minor area of broadleaved plantation (a line of trees) is located on the eastern edge of Site 1, along the boundary of a field. A small plantation has also been recently established on this site and the trees are still within their tubes (see Target Note 2 in Appendix 1).

A1.2.2 Coniferous woodland - plantation

3.16 Coniferous plantation has a greater than 30% cover of planted trees of which more than 90 % are conifers. A single, minor area is located along the south-eastern boundary of Site 1 where it forms a field boundary and is planted with Norway spruce.

A1.3.2 Mixed woodland - plantation

3.17 Mixed plantation has a mix of planted, broadleaved & coniferous trees in which neither has over 90 % cover. A single, minor area of this habitat is planted along an internal boundary within Site 1, with common osier & Norway spruce. See also Target Note 4 in Appendix 1.

A2.1 Scrub - dense/continuous

3.18 Scrub is vegetation dominated by native shrubs, usually less than 5 m tall, and occasionally with a few scattered trees. It can be continuous or scattered. This habitat type is associated with a couple of patches of gorse within grassland at Site 1. The dominance of gorse, and the grassy field layer partially degraded by litter accumulations & shade from the shrubs, identifies the W23a *Ulex europaeus-Rubus fruticosus* scrub, *Anthoxanthum odoratum* sub-community (gorse-bramble, sweet vernal grass sub-community).

B1.2 Acid grassland - semi-improved

3.19 Unimproved acid grassland is usually associated with unenclosed hill-grazing on acid soils. It is generally species-poor and frequently grades into wet or dry dwarf shrub heath. This habitat type is moderately extensive across both sites where it is associated with a single NVC community as described below.

U4b *Festuca ovina-Agrostis capillaris-Galium saxatile* grassland, *Holcus lanatus-Trifolium repens* sub-community

3.20 The U4b sheep's-fescue - common bent - heath bedstraw grassland, Yorkshire fog - white clover sub-community is dominated by Yorkshire fog, especially across Site 5 and the less-grazed southern edge of Site 1. Where grazing is active, there is a more even mix of abundant Yorkshire fog, with locally frequent to occasional: common bent, creeping buttercup, creeping thistle, groundsel, meadow foxtail, meadow-grasses, red fescue, spear thistle, sweet vernal grass &/or white clover. However, the vegetation is consistently species-poor, uneven & indistinctive. See also Target Notes 3, 10, 25 & 29 in Appendix 1.

3.21 A 'weedy corner' of acid grassland, in the west of Site 1, has dominant Yorkshire fog; frequent: common bent, common mouse-ear, creeping buttercup & creeping thistle; and occasional: groundsel, meadow foxtail & spear thistle. These plants are established in an area of recent plantation with maple (see Paragraph 3.16 & Target Note 3 in Appendix 1).

B2.1 Neutral grassland – unimproved

3.22 Neutral grassland encompasses a wide range of grass-dominated communities occurring on mesic, neutral soils. Unimproved areas are not associated with management (such as fertiliser or re-seeding). Two NVC communities are associated with the habitat.

MG9a *Holcus lanatus-Deschampsia cespitosa* grassland, *Poa trivialis* sub-community

3.23 A single area of MG9a Yorkshire fog - tufted hair-grass grassland, rough meadow-grass sub-community vegetation is present in the damp depression on the southern boundary of Site 1. It is dominated by tussocks of tufted hair-grass with a scattered sub-sward of Yorkshire fog. This vegetation is extremely species-poor but moderately even & distinctive.

MG10a *Holcus lanatus-Juncus effusus* rush-pasture, typical sub-community

3.24 Areas of soft-rush dominance across both sites, in relatively well-drained situations, are identified as the MG10a Yorkshire fog - soft-rush rush-pasture, typical sub-community. The presence of typical grassland associates, rather than mesic herbs, distinguishes the MG10a rush-pasture from the M23b marshy grassland established in waterlogged depressions.

3.25 Alongside the dense sward of soft-rush in MG10a, there is abundant Yorkshire fog; and locally frequent to occasional: common mouse-ear, creeping buttercup, marsh thistle, sorrel & sweet vernal grass, tufted hair-grass & velvet bent. The dominance of soft-rush and accumulations of its litter widely limit the cover & number of associates, so the vegetation is consistently species-poor, uneven & indistinctive. See also Target Notes 5 & 8 in Appendix 1.

B4 Improved grassland

3.26 Improved grasslands are influenced by heavy grazing, drainage, re-seeding; and/or the application of herbicides, inorganic fertilisers, slurry &/or manure so that they are dominated exclusively by productive, agricultural grasses. A single NVC community is present.

MG6a *Lolium perenne-Cynosurus cristatus* grassland, typical sub-community

3.27 The MG6a perennial rye-grass - crested dog's-tail grassland, typical sub-community is a moderately extensive, pastoral grassland located on well-drained slopes across both sites. Common bent, crested dog's-tail & perennial rye-grass are abundant in the sward with frequent white clover; and occasional: broad-leaved dock, common mouse-ear, creeping buttercup, meadow-grasses, spear thistle, Yorkshire fog.

3.28 The species-poor, moderately even & indistinctive sward is dominated by productive pastoral grasses that have been promoted through improvement (ploughing, re-seeding & fertiliser applications). Some areas have been mown and all areas have been grazed to varying levels. See also Target Notes 6 & 15 in Appendix 1.

B5 Marsh/marshy grassland

3.29 Marshy grassland is a diverse set of habitats including those dominated by rushes, sedges &/or tall herbs on substrates where the water table is close to the surface. There are two vegetation types associated with the marshy grassland habitat but only one is described within the NVC.

Common sedge sward

3.30 A sward dominated by common sedge is located in the centre-east of Site 5. Alongside the dominant common sedge, there is abundant velvet bent; and frequent to occasional: heath wood-rush, marsh bedstraw, marsh hawk's-beard, sorrel, sweet vernal grass, tormentil, valerian & Yorkshire fog. This distinctive vegetation is moderately species-rich & even. See also Target Note 28 in Appendix 1.

M23b *Juncus effusus/acutiflorus-Galium palustre* rush-pasture, *Juncus effusus* sub-community

3.31 M23b rush - marsh bedstraw rush-pasture, soft-rush sub-community is extensive in the most waterlogged depressions: in the centre of Site 1 & Site 5. Soft-rush is dominant, as in the MG10a neutral grassland described above (Paragraph 3.25), but in the M23b marshy grassland vegetation, there are frequent, mesic species. These include frequent to occasional: *Calliergonella cuspidata*, marsh bedstraw, marsh thistle, marsh willowherb, valerian & water horsetail among the rank soft-rush. The cover of these species is limited by the rank soft-rush sward that reaches chest height and is underlain by a carpet of fallen soft-rush stem litter. As a result, although the vegetation is distinctive, it is never more than moderately species-rich &/or even. See also Target Notes 11, 14, 17 & 26 in Appendix 1.

E Mire

3.32 The 'E Mire' habitat classification is used to describe two nondescript rafts of vegetation over poorly-consolidated, waterlogged sediment. Yorkshire fog dominates the raft with frequent watercress in one location (see Target Note 16 in Appendix 1) and broad-leaved dock in the other (see Target Note 19 in Appendix 1). Both of these areas receive & retain surface water, and groundwater inputs are suspected in the vicinity of Target Note 16. Hydrology is discussed further in the Assessment section (see Paragraph 4.6 *et seq*.).

3.33 This nondescript mire vegetation dominated by Yorkshire fog has no analogue in the NVC, so it is mapped simply as the MG9 *Holcus lanatus-Deschampsia cespitosa* grassland, because of dominance of the eponymous Yorkshire fog.

E1.7 Wet modified bog

3.34 Although wet modified bog is usually defined by wet conditions and the absence or low cover of *Sphagnum*, this group of mosses can be frequent to locally abundant. A single NVC community is associated with the small area of marginal wet modified bog located on Site 5.

M20 *Eriophorum vaginatum* blanket and raised mire

3.35 An area of relict, wet modified bog is located east-of-centre in Site 5. The relict status is inferred from a step to the east that indicates the edge of cut-over peat (see Target Note 22 in Appendix 1). This area of M20 is therefore either: a relict of the original surface, or it may have been cut-over itself.

3.36 The M20 hare's-tail bog-cotton community is assigned because of its abundance alongside generalist mire species. These include abundant common sedge, hare's-tail bog-cotton & velvet bent; and frequent: blaeberry, broad buckler-fern, heath bedstraw, *Pleurozium schreberi*, *Polytrichum commune*, *Sphagnum fallax*, *Sphagnum palustre*, tormentil, wavy hair-grass & Yorkshire fog. This atypical assemblage has evidently been modified directly or indirectly, by peat-cutting; and enrichment though oxidisation of the now perched, partially dewatered, peat-mass. See also Target Note 18 in Appendix 1.

F1 Swamp

3.37 Swamp is defined as emergent or frequently inundated vegetation on peat or mineral soils. A single, small area attributable to a single NVC community is present.

S10a *Equisetum fluviatile* swamp, *Equisetum fluviatile* sub-community

3.38 The single area of S10a water horsetail swamp is located on the southern edge of Site 1, in a waterlogged, swampy hollow. Water horsetail is abundant in the tall sward with frequent marsh thistle, marsh willowherb, tufted hair-grass & Yorkshire fog. The density & height of the sward excludes more diminutive associates.

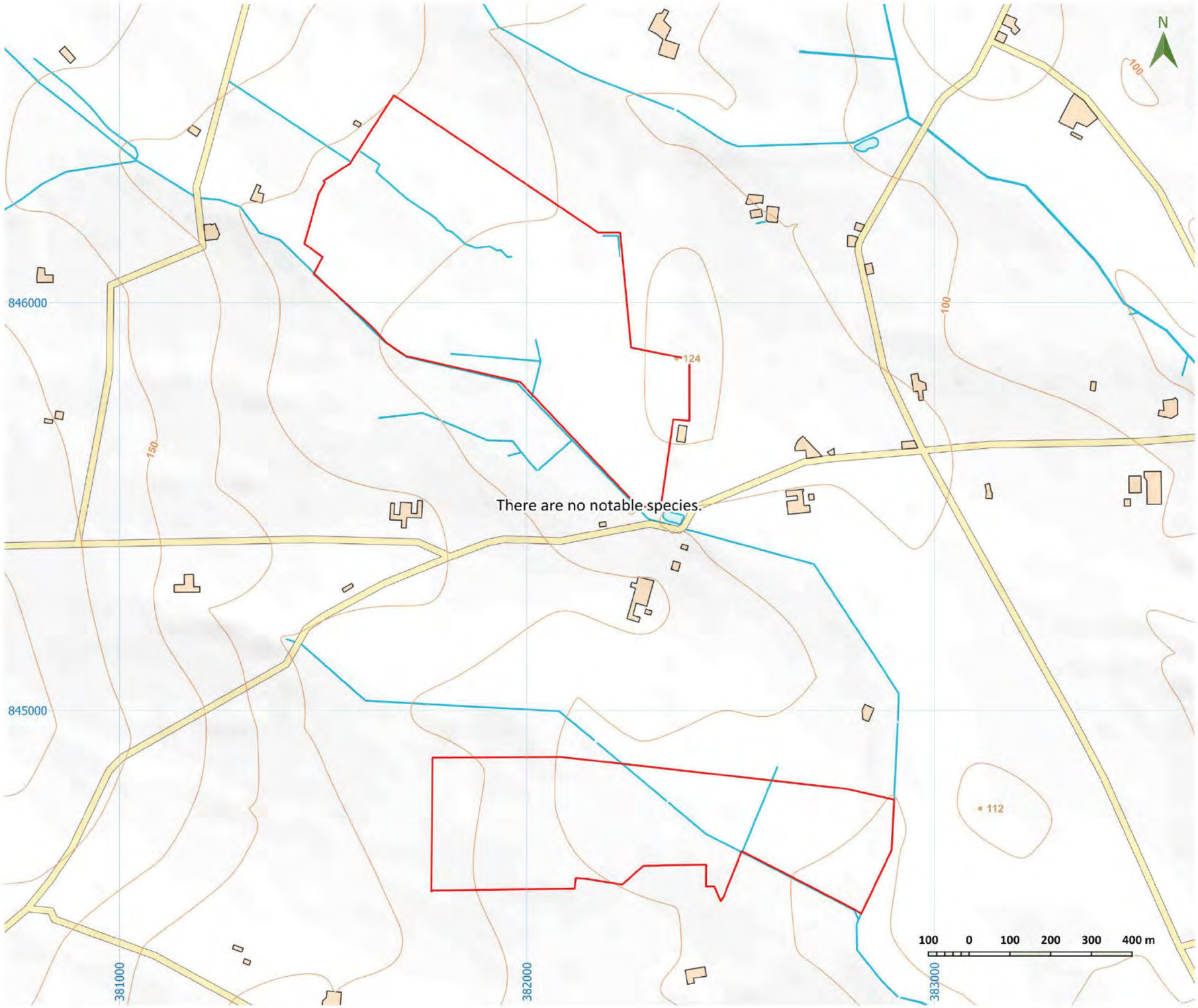
J1.1 Arable

3.39 Arable habitat includes arable cropland, horticultural land (e.g. nurseries, vegetable plots & flower beds), freshly-ploughed land and recently reseeded grassland, such as rye grass & clover. Arable habitat includes a beet crop in the west of Site 1 and barley in the east. At Site 5, the arable cover in the west is associated with a rye-grass & clover ley and a scatter of common, agricultural 'weeds. This latter vegetation is identified as the MG7a *Lolium perenne* leys and related grasslands, *Lolium perenne-Trifolium repens* leys community.

Notable flora

3.40 It should be noted that this report is of a habitat & vegetation survey, not a floristic survey focused upon the detection of notable species. Floristic survey requires different search methods, patterns & timings; as well as an appropriate expert for each targeted group (e.g. vascular plants, bryophytes, lichens &/or fungi). However, in the course of habitat & vegetation survey, notable species are detected incidentally. These non-comprehensive records are provided & described in this section and their distribution illustrated in Map 6.

3.41 No notable species were recorded by the survey.



Map 6:
Notable species.

New Deer substation sites

Notable species

Legend

- Boundary

Physical features

- Point height (m)
- Contour (10 m)
- Building
- Minor Road
- Waterbody
- Watercourse

Scale: 1:10,000 at A3

Map contains:
• OS data © Crown copyright and database right (2023).

Peat

3.42 In this section, the results of the peat-depth measurements & soil pits are described.

Peat-depth

3.43 Peat distribution & depth has been measured on a 100 m grid across Site 1 & Site 5. Some samples have been moved to avoid the line of a cable across Site 1 and a couple of additional samples have been taken where peat was suspected in shallow depressions. The raw data is provided in Map 7 and the data is interpolated (to estimate peat depth between measurements on the 100 m grid) in Map 8.

3.44 The presence of peat has been confirmed by:

- Examination of exposures in the flanks of drains and in two soil pits.
- The smooth penetration of the probes (with no rasping/grating or resistance typical of mineral sediments).

3.45 In the flanks of the drains (see Target Notes 13 & 20 in Appendix 1), peat was identified by its dark colour & soft texture lacking any of the hard grittiness associated with mineral deposits. A lack of plasticity was also observed when manipulating the peat (e.g. it cannot be rolled into a cylinder or bent, etc.).

3.46 Across **Site 1**, the peat is concentrated along the south-western boundary, in a shallow valley, and northeast of here, it forms a shallow ring around a low, water-shedding summit (according to the interpolation). The depth of the peat is up to 104 cm in the northwest of the ring but less than 54 cm otherwise (within the ring); and the peat is consistently measured at over 50 cm (to 78 cm) along the south-western boundary. Note that the interpolation stops short of the boundary in the southwest, for processing reasons. Peat is otherwise anticipated to extend along the along the shallow valley, to the boundary & beyond.

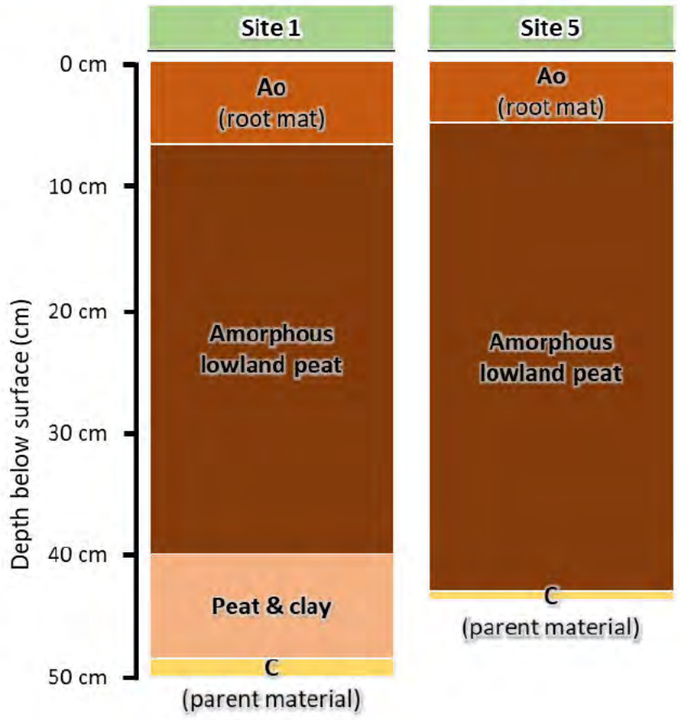
3.47 Two separate basins filled with peat are evident in the base of **Site 5**. The western basin reaches a depth of 120 cm and the eastern basin, a depth of 168 cm. Both basins are around 1 ha in size. A ridge between the basins has depths of peat around 15 cm to 18 cm; and the depth of peat shallows at the basins' periphery where slopes descend from the north, west & south.

Soil pits

3.48 Two soils pits were excavated, one on each site, to identify the sediment type underlying the vegetation. Their location is illustrated in Map 7; the stratigraphy is illustrated in Figure 1; and photographs are provided in Target Notes 9 & 23 in Appendix 1.

3.49 At **Site 1**, the soil pit was excavated in semi-improved acid grassland on the edge of the peat within the shallow valley along the south-western boundary. Below the vegetation, there is a root mat to around 7 m depth and below this, there is an amorphous peat to 40 cm. This amorphous peat sits on another peat layer, with a clay content that is sufficient to supply some plasticity to the sediment (for example, the sediment can be rolled into a cylinder but it will not bend without breaking. At the base of the peat profile at 49 cm, there is a clay sediment.

Figure 1: Stratigraphy of the soil pits excavated at Site 1 & Site 5.



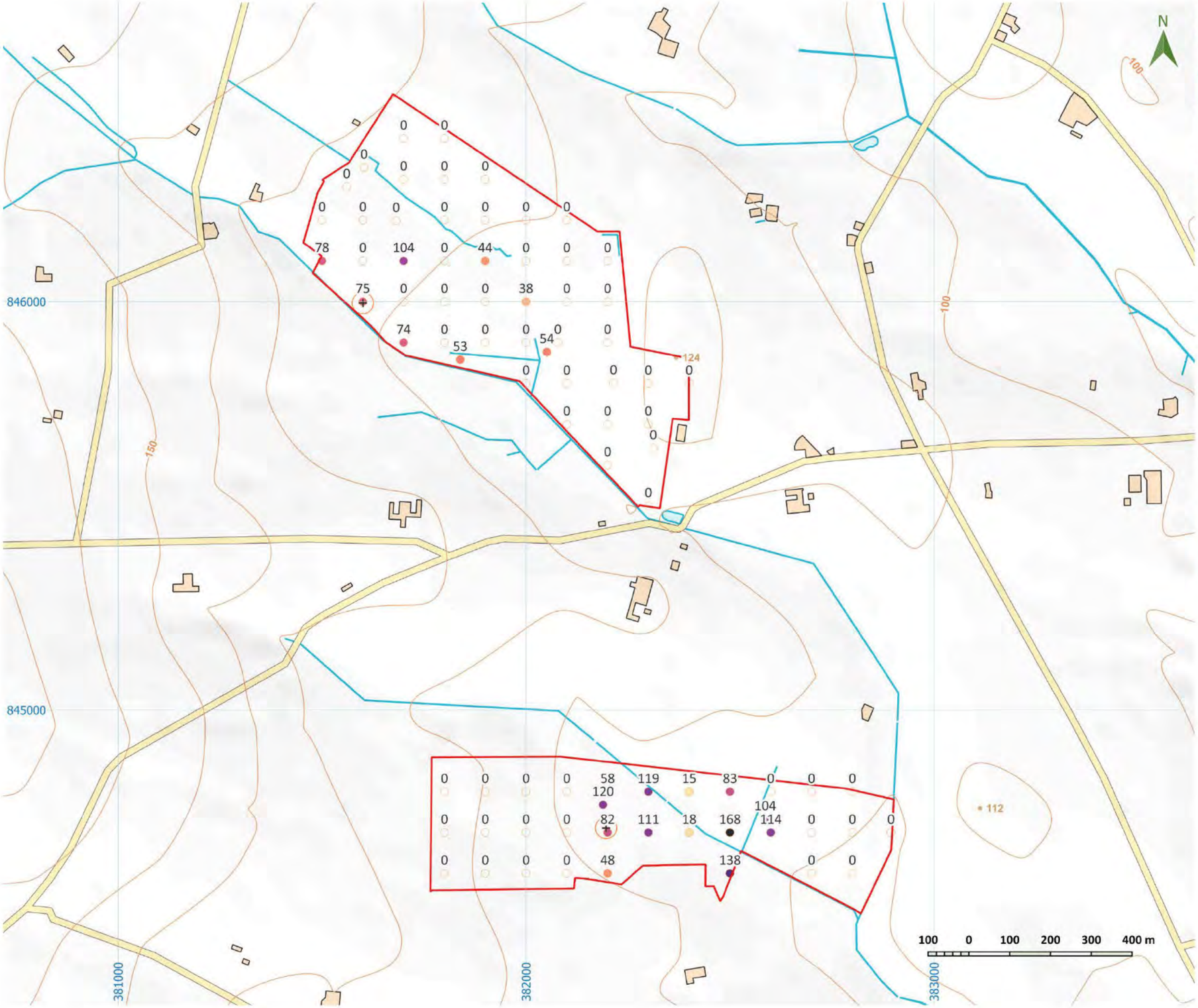
3.50 At **Site 5**, the soil pit reveals a shallow root mat within the upper 4 cm of the stratigraphy. Below this, there is a consistent, amorphous peat to a depth of 43 cm and below this, there is the same clay parent material as recorded at Site 1. Water rapidly filled this pit and is suspected to be derived from a groundwater source because of widespread drainage of the peat and the location at the foot of a slope.

3.51 Amorphous lowland peat is identified in the soil pits by its dark (nearly black) colour and the absence of any grittiness indicative of mineral material. Furthermore, the peat lacks any plasticity, except in the base of Site 1 where it has sufficient clay content to be rolled into a cylinder, but not sufficient to resist breaking when formed into a semicircle. Humification of the peat is apparent in its poor structure and this likely relates to drainage and dewatering of the uppermost peat layers (the unexamined, lower peat layers in the basins of Site 5 are likely to be resistant to drainage because of their confinement).

Map 7:
Peat depth: raw data.

New Deer substation sites

Peat depth I



Legend
- 🟥 Boundary
- ⊕ Soil pit locations

Peat depth: raw data & depth
- ○ 0 - 10 cm
- ● 10 - 20 cm
- ● 30 - 40 cm
- ● 40 - 50 cm
- ● 50 - 60 cm
- ● 70 - 80 cm
- ● 80 - 90 cm
- ● 100 - 110 cm
- ● 110 - 120 cm
- ● 130 - 140 cm
- ● 160 - 170 cm

Physical features
- • Point height (m)
- — Contour (10 m)
- ▨ Building
- — Minor Road
- ▨ Waterbody
- — Watercourse

Scale: 1:10,000 at A3

Map contains:
- OS data © Crown copyright and database right (2023).

Map 8:
Peat depth: interpolation.

New Deer substation sites

Peat depth II

Legend

Boundary

Interpolated peat depth

Peat depth contours (cm)

Peat depth: interpolated

- 0 cm
- 50 cm
- 100 cm
- 150 cm
- 170 cm

Physical features

- Point height (m)
- Contour (10 m)
- Building
- Minor Road
- Waterbody
- Watercourse

N

846000

845000

381000

382000

383000

100 0 100 200 300 400 m

Scale: 1:10,000 at A3

4 Assessment

4.1 In this section, the baseline is assessed against legislation and initiatives to identify:

- Peatland condition & deep peat
- Conservation importance
- Groundwater dependency
- Notable species
- Constraints & mitigation.

Peatland Condition Assessment

4.2 A series of indicators were employed to assess the peatland condition. The following indicators were found to relate to the site:

- Moderate species-richness & evenness; and low distinction of the vegetation.
- Absence of notable or sensitive species & structures (such as pools).
- Presence of a perched step that indicates peat-cutting.

4.3 The single area identified using the bulleted criteria is located in Map 7 in the east of Site 5. It measures 0.04 ha and despite being perched on the edge of a step, it remains wet because of the wider location in a waterlogged depression. The wetness maintains bog-moss cover, albeit species that are associated with nutrient enrichment rather than the rainwater typical of bog habitat. This enrichment may reflect lowering of the peat surface through cutting, so that it lies closer to the groundwater level; or alternatively, it may be the original surface of a poor-fen, rather than rain-fed bog habitat.

4.4 In terms of Peatland Condition Assessment, the single area of peatland is assessed to be Modified because of the legacy of peat-cutting from which the habitat has recovered, albeit it in an atypical form. In relation to the classes of the Carbon & Peatland Map, the wet modified bog is Class 3 because the "dominant vegetation cover is not priority peatland habitat but is associated with wet and acidic type" and because of the presence of deep peat. The M23b & sedge-dominated marshy grasslands; the MG10a neutral grassland; & swamp are Class 5 because they are not peatland/peat-forming habitat but they do overlie deep peat. Otherwise, the arable, improved & semi-improved acid grassland are Class 0 because they are based on productive, mineral soils rather than peat.

Deep peat

4.5 The presence of deep peat has been confirmed by the peat-depth survey and through examination of sediment exposed in the drain flanks. Some inclusion of clay within the peat is apparent but the soil is still predominantly organic in nature (as observed in its lack of plasticity).

Conservation importance

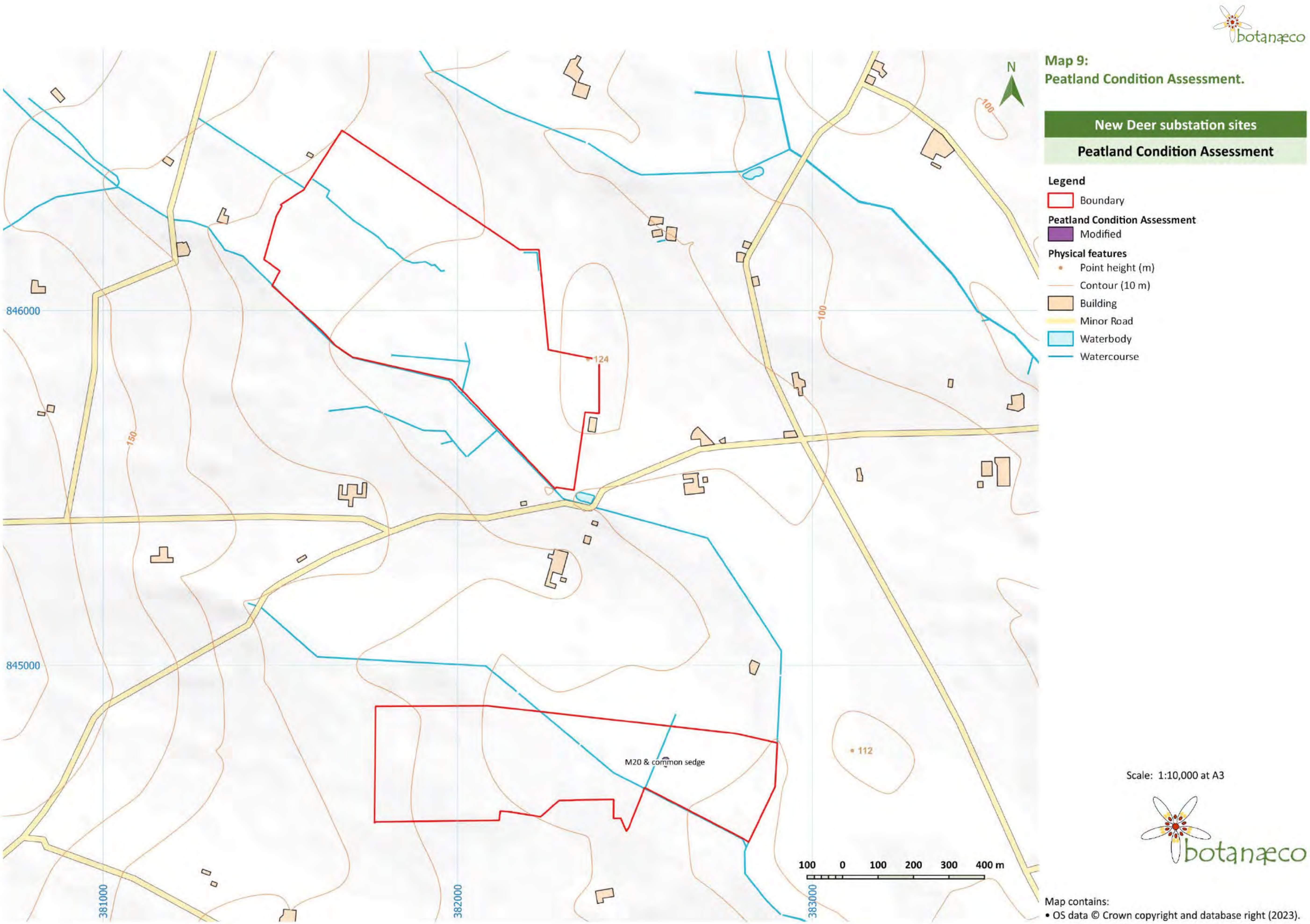
4.6 The conservation importance of the habitats and their constituent NVC communities is assessed in Table 4 and illustrated in Map 8. In summary: the arable habitat is assessed to be of Low conservation importance because of its regular, agricultural management. The remaining habitats are of Local conservation importance for their more species-rich, even &/or distinctive species assemblages; and their inclusion in conservation guidance, initiatives or policy. However, the Local importance habitats are otherwise limited by their small extent and their ecological condition because of significant modification by agricultural management (e.g. drains & grazing).

Groundwater dependency

4.7 British Geological Society hydrogeological mapping identifies that the geology underlying the site is the "Southern Highland Group"[18]. This has the character of a "low productivity aquifer" where "flow is virtually all through fractures and other discontinuities", with "small amounts of groundwater in [the] near surface weathered zone and secondary fractures", with "rare springs yielding up to 2 L/s." There is therefore potential for the presence of Groundwater Dependent Terrestrial Ecosystems (GWDTE). GWDTE are assessed in Table 5 and their guidance & site-specific, groundwater-dependency distribution illustrated in Map 9 & Map 10.

4.8 The potential for GWDTE to be present is reduced by the low-lying topography of the wider landscape (at a scale of tens of metres). This limits the capacity of any potential aquifer sustaining groundwater recharge to either site (compared to a tall hill flank, at a scale of 100s of metres, for example). As a result, groundwater recharge is only likely to be present at the western end of both sites where they adjoin the foot of a slope (that has the potential for an aquifer). A soil pit excavated at the foot of this slope, on Site 5 (see target Note 25 in Appendix 1) rapidly filled with water and it is suspected that this is groundwater recharge because of this, and the absence of obvious surface water sources. Furthermore, peat exposed in the drain (see Target Note 27 in Appendix 1) reveals that it is dewatered, so a steep hydrological gradient appears to exist

[18] British Geological Survey 1:625 000 hydrogeology mapping is at https://www.bgs.ac.uk/datasets/hydrogeology-625k/. Accessed 24/07/2023.



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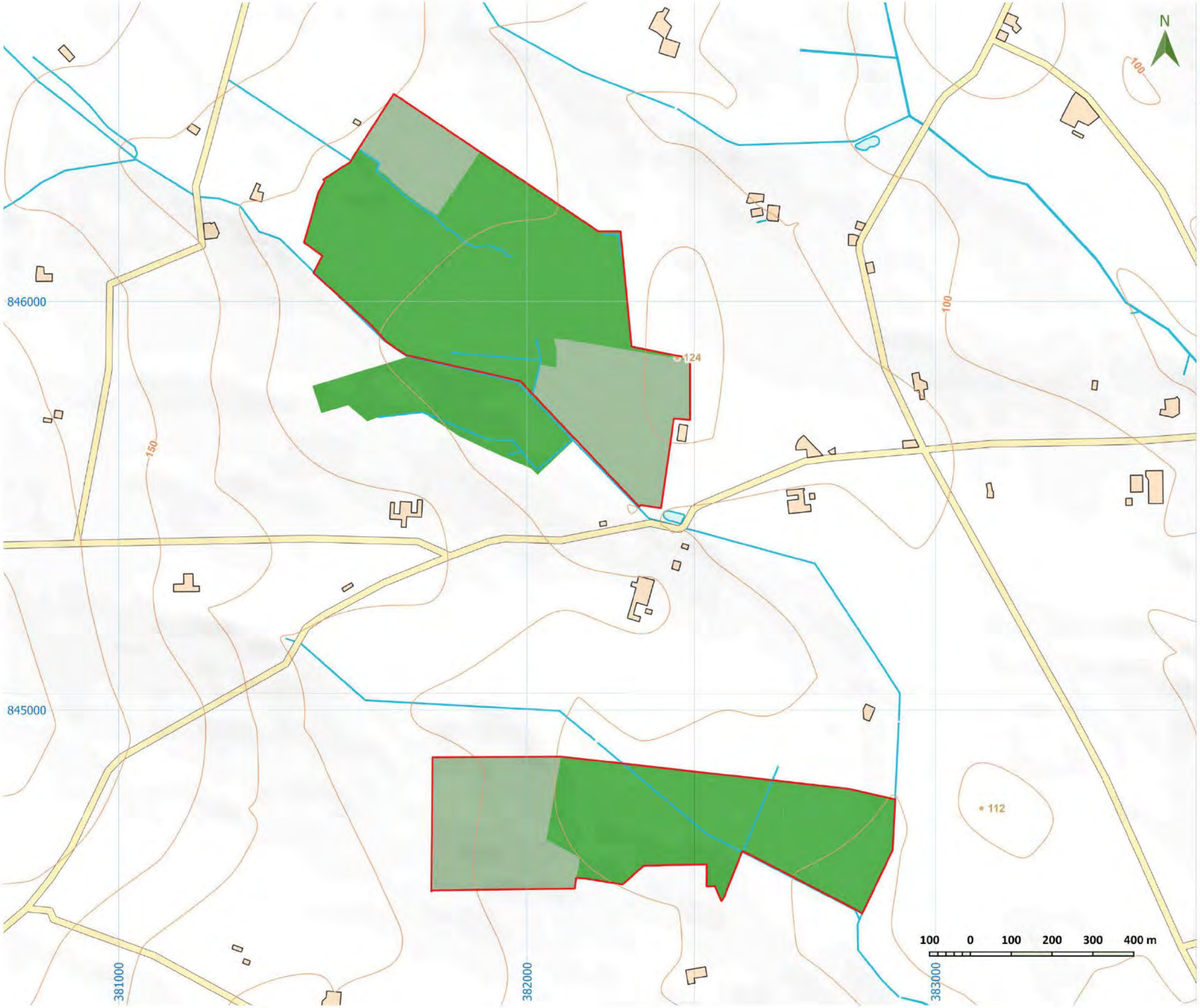
Map 9:
Peatland Condition Assessment.
New Deer substation sites
Peatland Condition Assessment
Legend
Boundary
Peatland Condition Assessment
Modified
Physical features
Point height (m)
Contour (10 m)
Building
Minor Road
Waterbody
Watercourse
N
846000
845000
381000
382000
383000
150
100
124
112
M20 & common sedge
100 0 100 200 300 400 m
Scale: 1:10,000 at A3
Map contains:
• OS data © Crown copyright and database right (2023).



Map 10:
Conservation importance.

New Deer substation sites

Conservation importance

Legend
- Boundary

Conservation importance
- Local
- Site

Physical features
- Point height (m)
- Contour (10 m)
- Building
- Minor Road
- Waterbody
- Watercourse

Scale: 1:8,000 at A3

botanæco

Map contains:
- OS data © Crown copyright and database right (2023).

4.9 between the soil pit and the other end of the wetland/peat unit. This gradient will drain water away from the soil pit making it even more probable that the recharge here is groundwater.

4.10 On this basis, the area of M23b marshy grassland in the west of Site 5 is assessed to be of Moderate groundwater-dependency. This relates the additional influence of surface water on this low-lying habitat, that has a low topographic gradient, so that water collects and is retained across its extent. Numerous, active drains further relate the waterlogging associated with the area. Additionally, the groundwater discharges to sediment below the vegetation surface that is consequently unaffected by chemical inputs from the recharge. As such, the groundwater maintains waterlogging but it does not directly influence the M23b vegetation. Hence the ''Moderate' assessment.

4.11 It is likely that some groundwater discharges to the area of M23b marshy grassland located immediately south of Site 1, especially as the density of drains in this area relates relatively high levels of water input that require to be drained. It too is likely to be of Moderate groundwater-dependency. However, this area is hydrologically disconnected from Site 1 by a drain, so further assessment is not pursued.

Notable species

4.12 The absence of notable species from Site 1 & Site 5 is a typical result for such small sites that have been highly modified by a legacy of arable & pastoral management.

Constraint

4.13 The key habitat constraints to development identified by the survey & assessment are the following:

- Deep peat/peaty soils across the centre of both sites and in the southwest of Site 1.
- Moderate groundwater-dependency of an area of M23b marshy grassland.

Mitigation

4.14 Habitat-related mitigation requires:

- Avoidance of the deep peat/peaty soils and pursuance of the mitigation hierarchy otherwise.
- Management of any excavation north of the M23b GWDTE area to prevent disconnection from its groundwater source in the slope above.

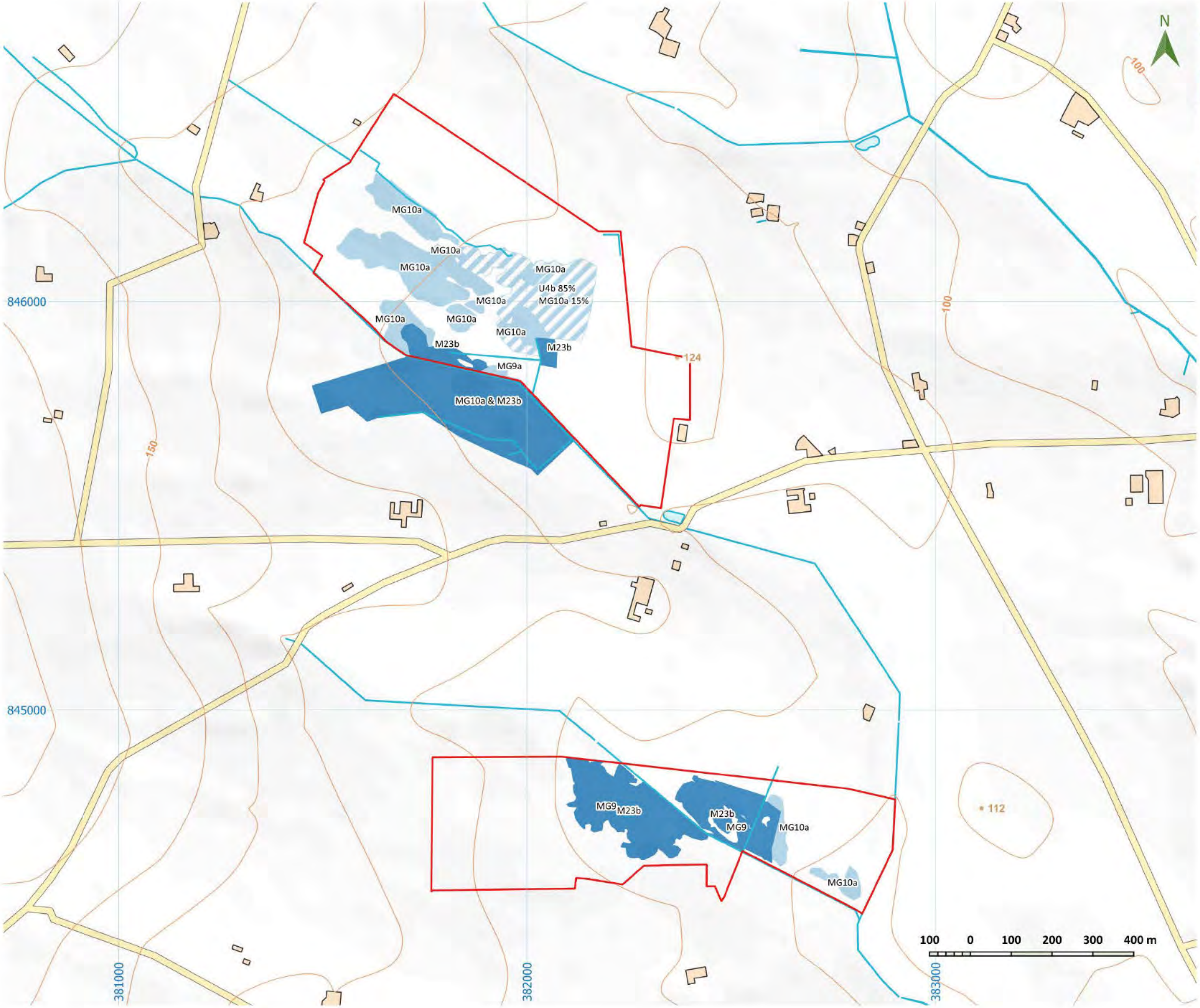
Table 3: Assessment of conservation importance.

Phase 1 habitat code & title	National Vegetation Classification code & title	Notes	Importance
A1.1.2 Broadleaved woodland - plantation **A1.2.2 Coniferous woodland - plantation** **A1.3.2 Mixed woodland - plantation**	n.a.	• Very minor areas of habitat (<1 ha) created through human agency. • 10,564 ha of broadleaved woodland; 10,170 ha of mixed woodland & 116,700 ha conifer plantation in NE Scotland, so the site has <<1 % of the regional resource. • Included within the NE Scotland habitat statements but not the Scottish Biodiversity List &/or Habitats Directive.	Local
A2.1 scrub - dense/continuous	**W23** *Ulex europaeus-Rubus fruticosus* scrub	• Single-species, uneven & indistinctive vegetation. • 546 ha in NE Scotland, so the site has <<1 % of the regional resource. • Included within the NE Scotland habitat statements but not the Scottish Biodiversity List &/or Habitats Directive.	Local
B1.2 Acid grassland - semi-improved	**U4b** *Festuca ovina-Agrostis capillaris-Galium* saxatile grassland, *Holcus lanatus-Trifolium repens* sub-community	• Moderately extensive, patchy or mosaic areas of low species-richness, evenness & distinctiveness as a result of management. • Acid grassland area in NE Scotland is more than 4,438 ha so the site has <<1 % of the regional resource. • Included within the NE Scotland habitat statements but not the Scottish Biodiversity List & Habitats Directive.	Local
B2.1 Neutral grassland - unimproved	**MG9a** *Holcus lanatus-Deschampsia cespitosa* grassland, *Poa trivialis* sub-community	• Very minor, single of extremely low species-richness, evenness & distinctiveness. • Rather rank, secondary habitat that has arisen on acid grassland partly as a result of a reduction of grazing. • Extent of this particular habitat/vegetation type in NE Scotland not known. • Only species-rich, primary forms are included within the NE Scotland habitat statements, Scottish Biodiversity List & Habitats Directive.	Local
B2.2 Neutral grassland - semi-improved	**MG10a** *Holcus lanatus-Juncus effusus* rush-pasture, typical sub-community	• Moderately extensive & smaller, patchy areas of extremely low species-richness, evenness & distinctiveness. • Rather rank, secondary habitat dominated by a rank growth of rushes. • Extent of this particular habitat/vegetation type in NE Scotland not known.	Local

Phase 1 habitat code & title	National Vegetation Classification code & title	Notes	Importance
		• Only species-rich, primary forms are included within the NE Scotland habitat statements, Scottish Biodiversity List & Habitats Directive.	
B4 Improved grassland	**MG6a** *Lolium perenne-Cynosurus cristatus* grassland, typical sub-community	• Moderately extensive areas of low species-richness & distinctiveness; and moderate evenness. • Secondary habitat created by intensive management. • Extent of this particular habitat/vegetation type in NE Scotland not known. • Only species-rich, primary forms are included within the NE Scotland habitat statements, Scottish Biodiversity List & Habitats Directive.	Local
B5 Marsh/marshy grassland	**M23b** *Juncus effusus/acutiflorus-Galium palustre* rush-pasture, *Juncus effusus* sub-community	• Minor areas of moderate species-richness, evenness & distinctiveness. • Marshy grassland area in NE Scotland is around 5,000 ha so the site has <<1 % of the regional resource. • Included within the NE Scotland habitat statements & Scottish Biodiversity List but not the Habitats Directive.	Local
E Mire	**MG9** *Holcus lanatus-Deschampsia cespitosa* grassland	• Minor areas of extremely low species-richness, evenness & distinctiveness. • No analogues exist within the Tayside Biodiversity Action Plan, Scottish Biodiversity List or Habitats Directive.	Local
E1.7 Wet modified bog	**M20** *Eriophorum vaginatum* blanket and raised mire	• Minor areas of habitat (<1.0 ha). • Moderate species-richness, evenness & distinctiveness. • Blanket bog area in NE Scotland is estimated to be 20,800 ha to 56,800 ha (with the latter figure also including wet heath) so the site has <<1 % of the regional resource. • Included within the NE Scotland habitat statements, Scottish Biodiversity List & Habitats Directive.	Local
F1 Swamp	**S10a** *Equisetum fluviatile* swamp, *Equisetum fluviatile* sub-community	• Small, isolated areas of habitat, of low species-richness & evenness; but distinctive in the context of the site. • Area of swamp not known in NE Scotland. • Included within the NE Scotland habitat statements, Scottish Biodiversity List & Habitats Directive.	Local
J1.1 Cultivated/disturbed land - arable	**MG7a** *Lolium perenne* leys and related grasslands, *Lolium perenne-Trifolium repens* leys n.a.	• Low to extremely low species-richness, evenness & distinctiveness (MG7a) or monocultures of a single crop. • Regularly disturbed and relatively easy to reproduce.	Local

Table 4: Assessment of groundwater dependency.

Phase 1 habitat code & title	National Vegetation Classification code & title	Notes	Groundwater dependency	
			Guidance	Site-specific
B2.1 Neutral grassland - unimproved	**MG9a** *Holcus lanatus-Deschampsia cespitosa* grassland, *Poa trivialis* sub-community	• Located on damp ground where tufted hair-grass appears to have spread in response to a decrease in grazing, as it is doing across the remainder of Site 1 (throughout the U4b semi-improved acid grassland). • Located at a distance from topography potentially supporting an aquifer.	Moderate	Low
B2.2 Neutral grassland - semi-improved	**MG10a** *Holcus lanatus-Juncus effusus* rush-pasture, typical sub-community	• Associated with damp areas of acid grassland invaded by rushes. • Moderately extensive on raised, water-shedding mounds, ridges &/or slopes where groundwater would not be anticipated.	Moderate	Low
B5 Marsh/marshy grassland	**M23b** *Juncus effusus/acutiflorus-Galium palustre* rush-pasture, *Juncus effusus* sub-community	• Variable levels of groundwater dependency: • Moderate groundwater-dependency where groundwater discharges to sediment below the vegetation surface. • Low groundwater-dependency where located at a distance from potential sources of groundwater (e.g. at the foot of slopes); is disconnected from a potential aquifer by drains; and in basins where surface water collects and is retained.	High	Moderate



Map 11: Guidance groundwater dependency.

New Deer substation sites

GWDTE I: Guidance

Legend

- Boundary

Guidance groundwater-dependency

- High
- Moderate
- Moderate mosaic

Physical features

- Point height (m)
- Contour (10 m)
- Building
- Minor Road
- Waterbody
- Watercourse

Scale: 1:10,000 at A3

Map contains:

Map 12:
Site-specific groundwater dependency.

New Deer substation sites

GWDTE II: Site-specific

Legend

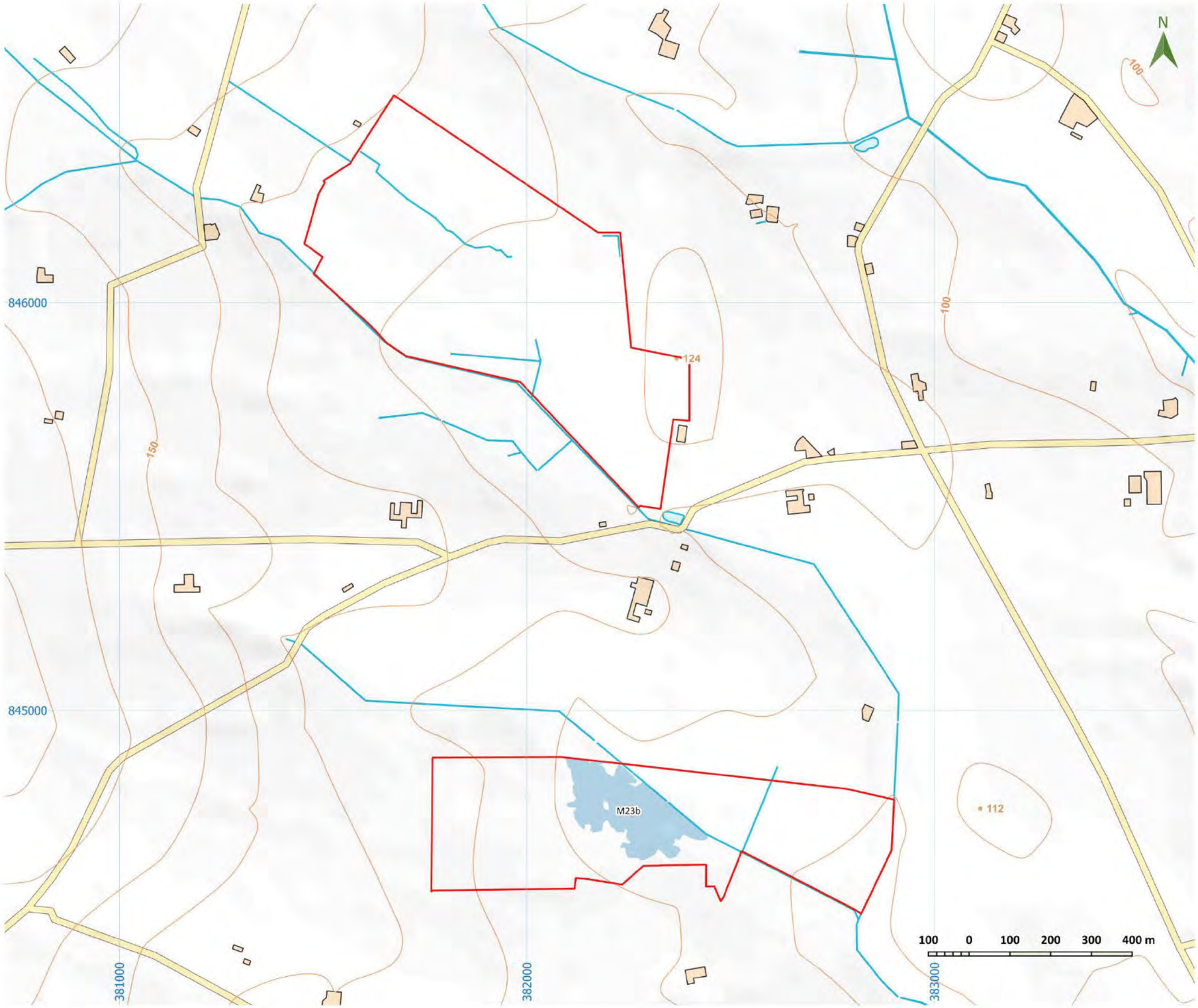
- Boundary

Site-specific groundwater -dependency

- Moderate

Physical features

- Point height (m)
- Contour (10 m)
- Building
- Minor Road
- Waterbody
- Watercourse



Scale: 1:10,000 at A3

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5 Conclusions

5.1 There are no **statutory designations** within a 4.8 km radius from the sites.

5.2 The **Carbon & Peatland Map** predicts nationally-important, Class 1 in the centre of Site and adjacent to the southern boundary of Site 1. Class 5 peat soil is predicted in the centre of Site 5.

5.3 **Ancient Woodland** is not associated with the sites.

5.4 **Habitat areas**: A third (10 ha, 33 %) of **Site 5** is associated with an arable field under a grass ley and there are moderate extents of improved grassland (7 ha, 24 %) & marshy grassland (7 ha, 23 %). Semi-improved acid grassland extends across 5 ha, (16 %) and there are minor areas (<0.3 ha, ,1 %) of: coniferous plantation, nondescript mire & wet modified bog. A third (14 ha, 32 %) of **Site 1** is associated with arable production of barley & beet and there are moderate areas of semi-improved acid grassland (9 ha, 21 %); unimproved neutral grassland (7 ha, 15 %) & improved grassland (8 ha, 19 %). There is also a mosaic between the acid & neutral grassland that accounts for an additional 4 ha (10 %). A minor area of marshy grassland on the southern boundary accounts for 1 ha (3 %) and there are very minor areas (<0.1 ha, ≤0.2 %) of broadleaved &/or coniferous plantation, scrub & swamp.

5.5 No **notable species** were recorded by the survey.

5.6 **Peat** is identified in the centre of both sites and along the south-western boundary of Site 1.

5.7 **Peatland Condition Assessment** identifies a single, minor area of wet modified bog.

5.8 **Conservation importance** of the most valued habitats is Local.

5.9 **GWDTE**: an area of Moderate groundwater-dependency M23b marshy grassland is located in the centre of Site 5.

5.10 The key **habitat constraints** to development identified by the survey & assessment are the following:

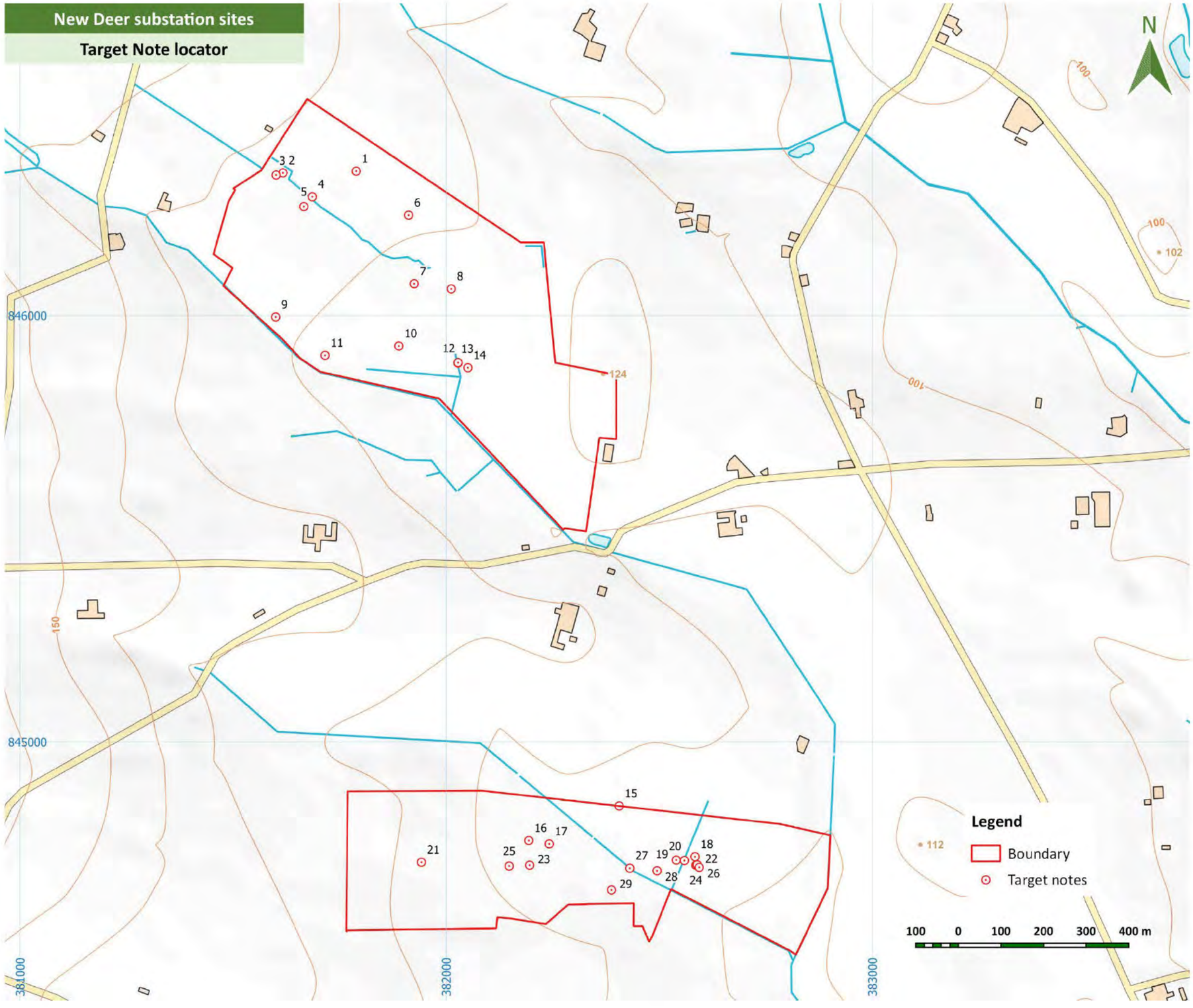
- Deep peat/peaty soils across the centre of both sites and in the southwest of Site 1.
- Moderate groundwater-dependency of an area of M23b marshy grassland.

5.11 Habitat-related **mitigation** requires:

- Avoidance of the deep peat/peaty soils and pursuance of the mitigation hierarchy otherwise.
- Management of any excavation north of the M23b GWDTE area to prevent disconnection from its groundwater source in the slope above.

Appendix 1

Target Notes


New Deer substation sites
Target Note locator
N
846000
845000
381000
382000
383000
100
102
124
150
112
Legend
Boundary
Target notes
100 0 100 200 300 400 m

Target No. & co-ords.	Description	Photograph
1 381789 846339	**Arable** A beet crop with an abundant weed cover, including: annual meadow-grass, common chickweed & redshank.	
2 381617 846335	**Recent tree plantation** A plantation of maple over a weed-rich U4b acid grassland field layer. Weeds include: broad-leaved willowherb, creeping buttercup, creeping thistle & groundsel.	
3 381601 846330	**U4b acid grassland** The U4b acid grassland here has a dominant sward of Yorkshire fog with frequent: common bent, common mouse-ear, creeping buttercup & creeping thistle; and occasional: groundsel, meadow foxtail & spear thistle.	
4 381686 846279	**Planted trees** A line of common osier with occasional Norway spruce.	
5 381666 846256	**MG10a neutral grassland** Soft-rush is dominant in the MG10a neutral grassland above a species-poor sward that includes: frequent Yorkshire fog; and occasional: common bent, tufted hair-grass & velvet bent. This area has been disturbed in recent years, to lay a pipeline, so there is persistent bare ground across which vegetation has yet to establish.	

Target No. & co-ords.	Description	Photograph
6 381912 846236	**MG6a improved grassland** Common bent & perennial rye-grass are abundant in the MG6a improved grassland with frequent white clover; and occasional: common mouse-ear, creeping buttercup, meadow-grasses, spear thistle, Yorkshire fog. Some areas have been mown and a tall sward persists where mowing has not been undertaken due to moderate grazing levels.	
7 381925 846075	**Mole hill** The mole hills here reveal a peaty soil with small stones. However, the organic content is evidently high because it is not possible to roll or mould the soil.	
8 382012 846063	**MG10a neutral grassland** The MG10a neutral grassland here has a dense sward with abundant soft-rush & Yorkshire fog; and frequent to occasional: common mouse-ear, creeping buttercup, marsh thistle, sorrel & sweet vernal grass.	
9 381600 845997	**Soil sample pit** A soil pit excavated here, to a depth of just over 50 cm, reveals the inclusion of clay below a depth of 40 cm and pure clay at around 48 cm depth.	

Target No. & co-ords.	Description	Photograph
10 381889 845929	**U4b acid grassland** The U4b acid grassland here is very species-poor and dominated by either tufted hair-grass or more extensively: Yorkshire fog. Additional associates are limited in cover & number by the dense sward formed by the named species.	
11 381716 845907	**M23b marshy grassland** The M23b marshy grassland here is very waterlogged and distinctive for the presence of common sedge alongside the usual associates (soft-rush, valerian, etc.).	
12 382028 845890	**Drain** The sluggish drain has an extensive vegetation cover including filamentous algae, floating sweet-grass, ivy-leaved water-crowfoot & water starwort.	
13 382028 845889	**Soil exposure** Exposure of the soil profile in the side of the drain here reveals 40 cm depth of peaty soil.	
14 382051 845878	**M23b marshy grassland** The M23b marshy grassland here has little floristic distinction from the MG10a neutral grassland, but for the presence of frequent valerian and patches of the moss *Calliergonella cuspidata* in waterlogged conditions where the sward above is not dense.	

Target No. & co-ords.	Description	Photograph
15 382406 844850	**MG6a improved grassland** The MG6a improved grassland here is ungrazed and may have been fenced. Alongside the dominant grasses crested dog's-tail & perennial rye-grass, there is frequent: broad-leaved dock, common bent, creeping buttercup, meadow-grasses & white clover.	
16 382194 844769	**MG9 mire** A raft of Yorkshire fog with occasional watercress has developed here, across a poorly consolidated, waterlogged surface.	
17 382242 844761	**M23b marshy grassland** The M23b marshy grassland here has an tall rank swards of soft-rush (to chest height) with occasional associates as listed for Target Note 26.	
18 382584 844731	**M20 & common sedge wet modified bog** An unusual assemblage here has abundant common sedge, hare's-tail bog-cotton & velvet bent; and frequent: blaeberry, broad buckler-fern, heath bedstraw, *Pleurozium schreberi*, *Polytrichum commune*, *Sphagnum fallax*, *Sphagnum palustre*, tormentil, wavy hair-grass & Yorkshire fog. This area appears to be a bog relict that has been impacted by historic cutting (see Target Note 22).	

Target No. & co-ords.	Description	Photograph
19 382540 844723	**MG9 mire** A raft of Yorkshire fog with occasional broad-leaved dock has developed here, across a poorly consolidated, waterlogged surface.	
20 382559 844722	**Soil exposure** An exposure in there drain here reveals a 110 cm depth of peat.	
21 381942 844718	**MG7a perennial rye-grass ley** This field has been recently sown with a perennial rye-grass ley rich in white clover. Additional associates are occasional to rare and they include: broad-leaved dock, common bent, common mouse-ear & meadow-grasses.	
22 382589 844712	**Step / historical peat-cutting** A marked step here may be indicative of past peat cutting that has left the area described by **Target Note 18** upstanding.	

Target No. & co-ords.	Description	Photograph
23 382196 844711	**Soil sample pit** A peaty soil extends to 43 cm depth here, and there is clay below this level. The pit filled rapidly with water as it was being excavated so the clay was obscured.	
24 382586 844711	**Scattered scrub** Grey willows and a couple of rowans are scattered in this area.	
25 382148 844709	**U4b acid grassland** The U4b acid grassland here is ungrazed so it has a dense sward of Yorkshire fog broken by patches of soft-rush.	
26 382594 844706	**M23b marshy grassland** The marshy grassland here is moderately distinctive, with marsh bedstraw, marsh thistle, marsh willowherb, valerian & water horsetail among the rank soft-rush.	

Target No. & co-ords.	Description	Photograph
27 382431 844704	**Drain** The drain here is fast-flowing. It has a clean gravel bottom and vegetation is absent.	
28 382495 844698	**Common sedge sward** A sward of dominant common sedge here is also associated with abundant velvet bent; and frequent: heath wood-rush, marsh bedstraw, marsh hawk's-beard, sorrel, sweet vernal grass, tormentil, valerian & Yorkshire fog.	
29 382388 844653	**U4b semi-improved acid grassland** The U4b acid grassland here is ungrazed, so it is dominated almost exclusively by a dense sward of Yorkshire fog, with occasional patches of soft-rush.	

Appendix 2

Map 13: Habitats & NVC vegetation communities

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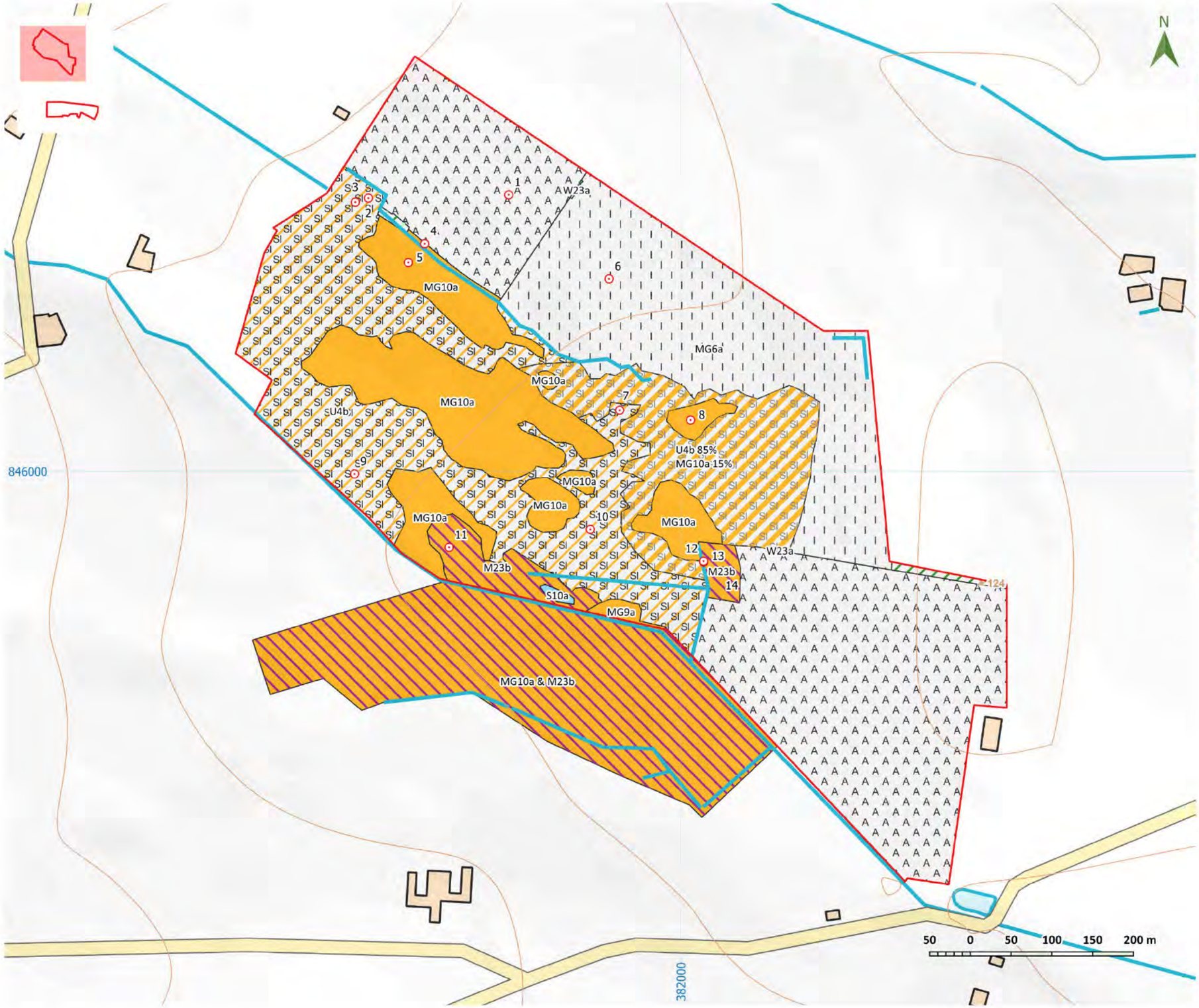
Map 13a: Site 1
Phase 1 habitats &
NVC plant communities.

New Deer substation sites

Habitats & vegetation



Legend

- Boundary
- Target notes

Phase 1 habitats

- A1.1.2 - Broadleaved woodland - plantation
- A1.3.2 - Mixed woodland - plantation
- A2.1 - Scrub - dense/continuous
- B1.2 - Acid grassland - semi-improved
- B1.2-B2.1 mosaic
- B2.1 - Neutral grassland - unimproved
- B4 - Improved grassland
- B5 - Marsh/marshy grassland
- F1 - Swamp
- J1.1 - Cultivated/disturbed land - arable

Physical features

- Point height (m)
- Contour (10 m)
- Building
- Minor Road
- Waterbody
- Watercourse

Scale: 1:5,000 at A3

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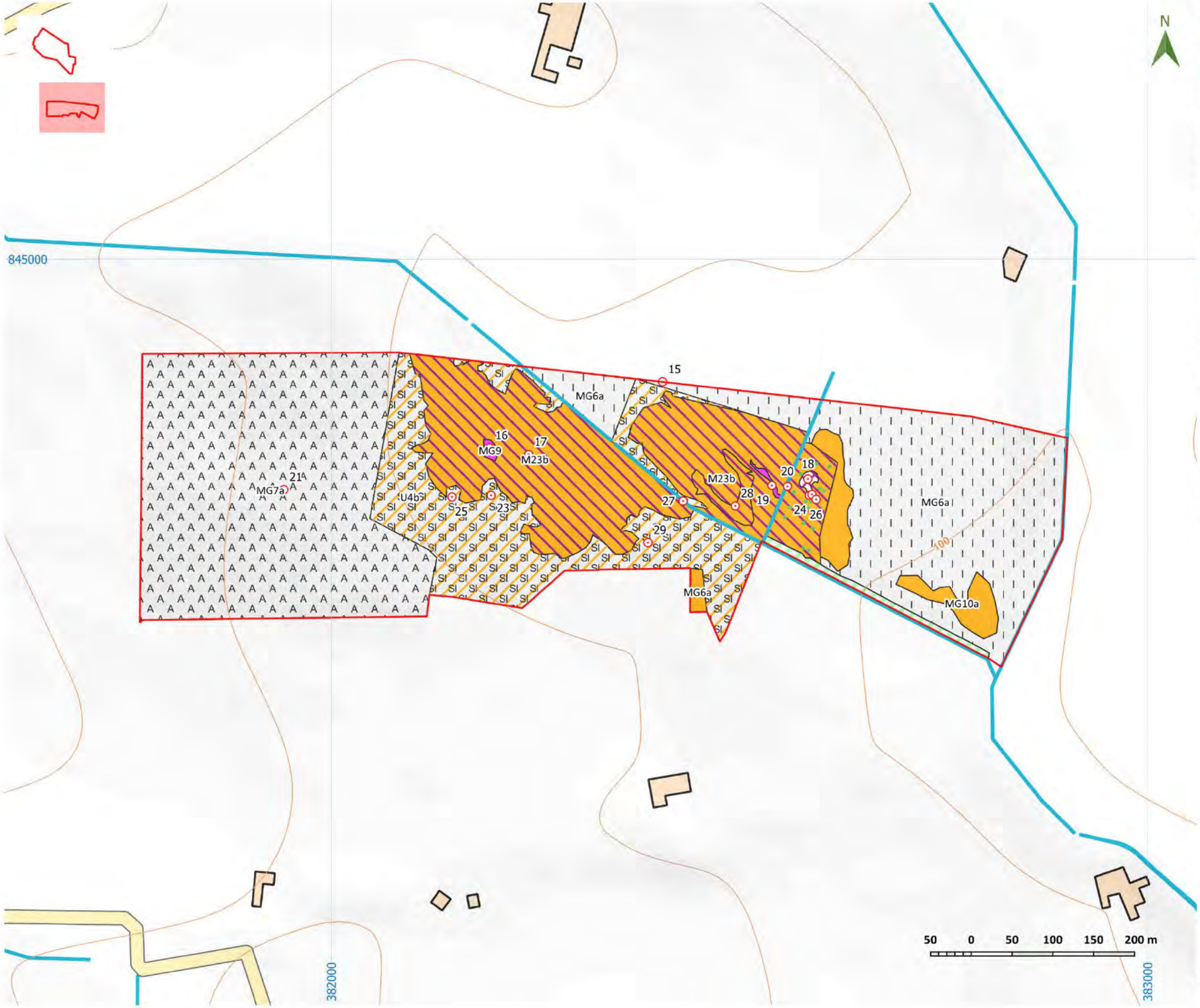
Map 13b: Site 5
Phase 1 habitats &
NVC plant communities.

New Deer substation sites

Habitats & vegetation



Legend

- Boundary
- Target notes

Phase 1 habitats

- A1.2.2 - Coniferous woodland - plantation
- B1.2 - Acid grassland - semi-improved
- B2.1 - Neutral grassland - unimproved
- B4 - Improved grassland
- B5 - Marsh/marshy grassland
- E - Mire
- E1.7 - Wet modified bog
- J1.1 - Cultivated/disturbed land - arable
- Scattered shrubs

Physical features

- Contour (10 m)
- Building
- Minor Road
- Waterbody
- Watercourse

Scale: 1:5,000 at A3

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