



Technical Appendix 9-1

Desk Study and Habitats Results

Scout Moor II Wind Farm

Cubico Wind Development (Wind 1) Ltd



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Version	Date	Reason
8706 9-1 Rev1	April 2025	Draft issued for client review
8706 9-1 Rev2	May 2025	Reissued following client comment
8706 9-1 Rev3	June 2025	Reissued following client comment



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1. Introduction

1.1 Terms of Reference

Atmos Consulting Ltd (Atmos) were commissioned by Cubico Wind Development (Wind 1) Ltd to undertake habitat surveys and a desk study at a site on Scout Moor to inform the planning application for the development of a wind farm known as Scout Moor II. This planning application includes the creation of the wind farm, associated infrastructure and access, moorland restoration and works on the Common Land as well as the electrical grid connection. Collectively, these components are hereafter referred to as the 'Assessment Boundary'. Survey work and the desk study were undertaken on an area larger than the Project for Assessment boundary.

1.2 Site location and description

The Assessment Boundary is c.1,024 ha of land that is located to the north of Rochdale, Greater Manchester, England. The Assessment Boundary has an approximate central national grid reference (NGR) of SD 85570 18022.

The Assessment Boundary comprises upland habitat, predominately moorland with fields to the south that are often utilised by farmers. A series of existing wind turbines lie adjacent west of the Assessment Boundary with some present in the north-west extent of the Assessment Boundary itself. The environment surrounding the Assessment Boundary is mostly urban, with Rochdale to the south and further housing developments being undertaken to the east.

1.3 Objectives

The objective of the study was to undertake a survey to document the UK Habitat (UKHab) and National Vegetation Classification (NVC) communities present within the Assessment Boundary in order to evaluate their potential nature conservation interest. This report provides details of the following:

- desk study results to collate existing information for the Assessment Boundary;
- field survey methods and results including description of the plant communities present within the Assessment Boundary;
- identification of any potential notable habitats, including discussions regarding potential nationally and internationally important habitats; and
- discussion of potential Ground Water Dependent Terrestrial Ecosystems.

2. Methodology

2.1 Survey/Study Areas

The current guidance on ecological impact assessment (EcIA) (CIEEM, 2024) recommends that all ecological features that occur within a 'zone of influence' (Zol) for a proposed development are investigated. The Zol includes:

- Areas directly within the land take for the proposed development and access;
- Areas which will be temporarily affected during construction;
- Areas likely to be impacted by hydrological disruption; and
- Areas where there is a risk of pollution and noise disturbance during construction and/or operation.

The Zol is variable depending on the ecological receptors affected. The size of survey areas are determined by considering the likely Zol for each receptor. Table 9-1-1 below summarises the study area used for the desk study and the survey area used for ecological receptors.

Table 9-1-1: Survey / study areas used for this assessment.

Ecological receptors	Survey / study area
Sites designated for their international importance	Assessment Boundary and within 10km buffer of the Assessment Boundary
Sites designated for their international importance with bats and/or geese as a qualifying feature	Assessment Boundary and within 30km of the Assessment Boundary
Sites designated for their national importance	Assessment Boundary and within 5km of the Assessment Boundary
Sites designated for their county or local importance	Assessment Boundary and within 2km of the Assessment Boundary
Potential habitats of Principal Importance and ancient woodland	Assessment Boundary and within 1km of the Assessment Boundary
Waterbodies	Assessment Boundary and within 250m of the Assessment Boundary
Protected species evidence	Assessment Boundary
UK habitat classification and NVC survey	Assessment Boundary
Desk study records (for protected and notable species)	Assessment Boundary and within 2km buffer of the Assessment Boundary

2.2 Desk Study

A review of online data¹ was undertaken in 2024 to gather details of statutory nature conservation designations, e.g. Special Protection Areas (SPAs), Special Areas of Conservation (SACs), Ramsar Sites, Sites of Special Scientific Interest (SSSIs), National Nature Reserves (NNRs) and Local Nature Reserves (LNRs).

Greater Manchester Ecological Records Centre (GMERC) and Lancashire Ecological Records Network (LERN), the Local Ecological Records Centre for Lancashire, were contacted in July 2023 to obtain the following ecological data:

¹ Using the MAGIC website (www.Magic.gov.uk) which provides authoritative geographic information about the natural environment from across government.

- Details of non-statutory designated sites of nature conservation importance within 2km of the Assessment Boundary, e.g. Sites of Nature Conservation Interest (SNCIs), Ancient Woodlands, and Local Wildlife Sites (LWSs); and
- Details of legally protected species or otherwise notable² species recorded within 2km of the Assessment Boundary.

A review of the Woodland Trust's Ancient Tree Database was undertaken for veteran trees within or adjacent to the Assessment Boundary.

A review of Ordnance Survey maps and aerial images was undertaken to identify the presence of waterbodies within 250m of the Assessment Boundary. Great crested newts *Triturus cristatus*, which are protected together with their habitats, can travel relatively large distances between breeding ponds and terrestrial habitat. Following guidance issued by Natural England (English Nature, 2001), land within 250m of a great crested newt breeding pond should be treated as potential great crested newt terrestrial habitat and evaluated accordingly.

Data older than 10 years have generally been excluded from the report and appraisal, as the length of time elapsed between collection and the time of writing means the data is less likely to be relevant. However records older than 10 years are used to inform the assessment where appropriate. It should be noted that the absence of records should not be taken as confirmation that a species is absent from the search area.

2.3 UKHab Survey

The field survey consisted of a UK Habitat Classification (UKHab) survey, which involved mapping of habitats by a suitably qualified and experienced ecologist from Atmos, plus an assessment of the Assessment Boundary's potential to support protected species. This survey was completed on 15th, 16th, 22nd-26th July, 5th-9th August and 26th September 2024.

The habitat types were identified and mapped in compliance with the UKHab guidance documents (2023) and a small minimum mapping unit, as listed in Table 9-1-2.

Table 9-1-2: UKHab Minimum Mapping Units.

MM Unit	MM Area Minimum Mappable area feature (m ²)	MM Length Minimum Mappable length of linear feature (m)	MM Width Minimum Mappable width of area feature and maximum width of linear feature (m)
Small	25 (5x5)	5	1
Standard	400 (20x20)	20	5
Large	2500 (50x50)	20	5

Primary Habitats and urban features on-site were classified using Level 3, Level 4 or Level 5 of the UKHab hierarchy and are shown on Figure 9-2 UKHab Baseline, with secondary codes used to further describe the primary habitat present. Dominant plant species were noted, as were any protected, uncommon, invasive species or species indicative of particular habitat types, but there was no attempt to compile exhaustive species lists for this element of the site assessment. Botanical nomenclature in this report follows Stace (2020) for both scientific and English names.

² Species listed within published red data lists or within national and local policies as being of conservation concern. These include species listed under the Greater Manchester Biodiversity Action Plan (GMBAP), the Lancashire Biodiversity Action Plan (Lancashire BAP) and Species of Principal Importance in England (Section 41 of the NERC Act 2006)

In addition to mapping out habitats, a series of target notes were produced (Appendix B) to highlight features of ecological interest, or any other features that may present a potential constraint to the proposed development.

2.4 NVC Survey

In addition to the UKHab survey, further Phase 2 habitat surveys were conducted in the form of a National Vegetation Classification (NVC) survey. This survey was completed between 15th July and 9th August 2024.

The vegetation was surveyed by a suitably qualified (FISC Level 4) and experienced botanical surveyor using the NVC (Rodwell, 1991 – 2000, 5 volumes) and in accordance with NVC survey guidelines (Rodwell, 2006). The NVC scheme provides a standardised system for classifying and mapping semi-natural habitats and ensures that surveys are carried out to a consistent level of detail and accuracy.

Homogenous stands and mosaics of vegetation were identified and mapped by eye, drawn as areas onto field maps; these areas were surveyed qualitatively to record dominant and constant species, sub-dominant species and other species present. In practice the vegetation was mapped progressively across the Assessment Boundary to ensure that no areas were missed and that mapping was accurate. Aerial photography of the Assessment Boundary was also used to aid accurate mapping of vegetation boundaries. NVC communities were attributed to the mapped areas using surveyor experience and matching field data against published floristic tables (Rodwell, 1991 – 2000). Stands were classified to sub-community where possible. The floristics of the main NVC communities were recorded using 2m by 2m quadrat samples to aid vegetation type classification. Woodland quadrats were adapted to the size of the community and were preferentially 10m by 10m for assessment of the tree canopy and 2m by 2m for the ground flora. Small areas of interest and general descriptions of features were made using target notes (Appendix A) following Phase 1 habitat survey methodology (JNCC, 2010).

Higher plant nomenclature follows that of Stace (2020) and bryophyte nomenclature follows that of Hill *et al.* (2008). For every species recorded, an estimate was made of its quantitative contribution to the habitat. When quadrats were completed this abundance was estimated using the DOMIN scale:

- Cover of 91-100% given a score of 10;
- Cover of 76-90% given a score of 9;
- Cover of 51-75% given a score of 8;
- Cover of 34-50% given a score of 7;
- Cover of 26-33% given a score of 6;
- Cover of 11-25% given a score of 5;
- Cover of 4-10% given a score of 4;
- <4% (many individuals) given a score of 3;
- <4% (several individuals) given a score of 2; and
- <4% (few individuals) given a score of 1.

Data recorded outside of quadrats used the DAFOR scale when recording species composition, which stands for dominant (51-100%), abundant (31-50%), frequent (16-30%), occasional (6-15%) and rare (1-5%).

2.5 GWDTE Survey Methods

As part of the NVC exercise, any wetland habitats identified with the Assessment Boundary were evaluated in terms of their potential to be Groundwater Dependent Terrestrial Ecosystems (GWDTEs), making reference to SEPA guidance (SEPA, 2017), modified from the United Kingdom Technical Advisory Group (UKTAG) list of NVC communities and associated groundwater dependency scores.

GWDTE are defined within the UKTAG report (UK Technical Advisory Group, 2004) as:

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

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

2.6 Limitations

No identifiable limitations were encountered during the surveys. Both habitat surveys were undertaken during the optimal survey periods by experienced ecologists. Some areas of the assessment boundary were added at a late stage in the project and therefore were not surveyed. This is not considered a limitation to the validity of these surveys as there will be no turbines or related infrastructure in these areas.

3. Results

3.1 Desk Study

As described in the sections below, review of online data found the Assessment Boundary does not overlap with any statutory nature conservation designation; however, one such designation is located directly adjacent to the Assessment Boundary and another one is located within a 2km distance. In addition, a non-statutory nature conservation designation was found to overlap with the Assessment Boundary and further non-statutory sites were found in the surrounding area. These are illustrated on Figure 9-1 Designated Sites within 10km.

3.1.1 Statutory Nature Conservation Designations

There were ten statutory designated sites identified within 10km of the Assessment Boundary during the data search. These consist of two Special Area of Conservation (SAC), one Special Protected Area (SPA), six Site of Special Scientific Interest (SSSI), and a Local Nature Reserve (LNR). Details of each of these sites can be found below.

Statutory Designated Sites of International Importance

See table below for a description of sites designated for their international importance within the 10km radius.

Table 9-1-3: Summary of sites designated for their international importance.

Site Name	Approx. distance and direction from Assessment Boundary	Description
Rochdale Canal SAC/SSSI	6.15km south-east	A 24.86ha stretch of canal running through Greater Manchester. The SAC and underlying SSSI is designated for supporting a significant population of floating water-plantain <i>Luronium natans</i> in a botanically diverse waterplant community, which also holds a wide range of pondweeds <i>Potamogeton</i> spp.
South Pennine Moors Phase 2 SPA	6.88km north-east	This SPA is a large 20,994.46ha site that includes two discrete blocks of moorland, one south of Ilkley and another on the watershed between Bradford and Burnley and stretching south to Marsden at the northern edge of the Peak District. The site is of European importance for upland breeding birds, with habitats providing key feeding areas for merlin <i>Falco columbarius</i> and golden plover <i>Pluvialis apricaria</i> . The designation also contains the only UK breeding sites for twite <i>Carduelis flavirostris</i> .
South Pennine Moors SAC/SSSI	8.24km east	A 65,024.32 ha site designated for the presence of old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in addition to supporting both European dry heaths and blanket bog habitats. The SAC is also notable for its northern Atlantic wet heaths with <i>Erica tetralix</i> and transition mires and quaking bogs.

No internationally designated sites with bats or geese as a qualifying feature have been identified within a 30km radius of the Assessment Boundary.

Statutory Designated Sites of National Importance

See table below for a description of sites designated for their national importance within the 5km radius.

Table 9-1-4: Summary of sites designated for their national importance.

Site Name	Approx. distance and direction from Assessment Boundary	Description
Lee Quarry SSSI	Adjacent to the Assessment Boundary	This site is a 49.13ha disused quarry on the south side of the Rossendale Valley that is designated for geological reasons. However, the quarry is also a Biological Heritage Site (BHS), a non-statutory designation in Lancashire, because of its value to a number of breeding Schedule 1 birds and birds of conservation concern including little ringed plover <i>Charadrius dubius</i> , skylark <i>Alauda arvensis</i> and ring ouzel <i>Turdus torquatus</i> .
Headley Dell LNR	0.78km south-east	The LNR is 26.4ha and is situated along the steep sided valley of the River Spodden. It is part of one of the most important clough woodlands in the area, supporting semi-natural broadleaved woodland as well as areas of young broadleaved plantation. The site meets the selection guidelines for its habitats (Hm3, habitat mosaic). Furthermore, survey work conducted by the Wildlife Trust for Lancashire, Manchester & North Merseyside in 2005 found the designation should be recognised as a SSSI for its mosses and liverworts.
Hodge Clough SSSI	4.78km west	A 2.95ha small tributary of the River Irwell, situated 2km north of Ramsbottom, and designated for geological reasons.
Lower Red Lees Pasture SSSI	4.81km west	A 4.02ha pasture within the valley of the River Irwell. It is important as one of the few remaining examples of herb-rich unimproved neutral to slightly acidic pasture typical of south-east Lancashire. This vulnerable habitat has become nationally scarce and has almost been completely lost in Lancashire due to agricultural intensification.
West Pennine Moors SSSI	5.06km west	This SSSI is a 7,615.49ha site comprising three distinct areas of moorland bordered by major roads to the west and east, stretching from Horwich and Bolton in the south to Darwen in the north and to Haslingden and Ramsbottom in the east. The SSSI is designated for supporting an extensive mosaic of upland and upland-fringe habitats. It is of special interest for the following nationally important habitats: • blanket bogs; • wet and dry heathlands; • acid and lime-rich flushes; • rush pastures and mire grasslands; • acid grasslands; • neutral hay meadows and pastures; and • wet and dry broadleaved woodlands and scrub. In addition, the site supports populations of starry lady's-mantle <i>Alchemilla acutiloba</i> , large-toothed lady's-mantle <i>A. subcrenata</i> and floating water-plantain <i>Luronium natans</i> . Furthermore the SSSI supports breeding black-headed gulls <i>Chroicocephalus ridibundus</i> , Mediterranean gulls <i>Larus melanocephalus</i> and grey herons <i>Ardea cinerea</i> .

3.1.2 Non-statutory Nature Conservation Designations

There are twenty-one non-statutory designated sites found within 2km of the Assessment Boundary, including six Sites of Biological Importance (SBI), eleven Biological Heritage Sites (BHS) and four Local Wildlife Sites (LWS). These included designations for acid grassland, heathland, bog, blanket bog, swamp and fen, lowland meadow, quarries, ponds and also broadleaved, mixed and wet woodlands. Species cited as part of the designations included invertebrates, white-clawed crayfish *Austropotamobius pallipes*, birds, and fungi. Knowl Moor, an SBI, is located within the Assessment Boundary itself and is detailed below.

Knowl Moor SBI

An extensive area of moorland which supports important upland breeding birds. The main habitats are acid grassland and blanket bog, which occur in a mosaic with localised ericaceous heath and wet flushes. The majority of these habitats are listed on Section 41 (S41) of the Natural Environment and Rural Communities Act (NERC) (2006) as habitats of principal importance (HPIs). Acid grassland dominates much of the site especially in the north and east. Purple moor-grass *Molinia caerulea* is the most abundant species with mat-grass *Nardus stricta* and wavy hair-grass *Deschampsia flexuosa* occurring less commonly. The blanket bog, an HPI, is most extensive in the south of the site. Although the bog is degraded and, in most areas, could not be described as ‘active’ bog.

The SBI includes the breeding territories of specialist moorland birds, which require extensive tracts of suitable habitat. Characteristic moorland breeding birds include red grouse *Lagopus lagopus* and waders such as lapwing *Vanellus vanellus*, curlew *Numenius arquata* and golden plover. Other breeding birds include kestrel *Falco Tinnunculus*, wheatear *Oenanthe oenanthe*, skylark and a number of birds of prey. Redshank *Tringa totanus*, dunlin *Calidris alpina*, ring ouzel and twite have previously been recorded as breeding in the area.

Potential habitats of principal importance and ancient woodland

Six potential HPIs, one area of ancient woodland and one non-priority grassland have been identified within 1km of the Assessment Boundary³.

Table 9-1-5: Potential HPIs and ancient woodland within 1km of the Assessment Boundary.

Habitat	Approx. distance and direction from Assessment Boundary	Description
Potential HPI – Upland Heathland	Within north-eastern corner of Assessment Boundary	A single 1.49ha area of Upland Heathland has been identified located south of Green Lane within Greens Moor.
Potential HPI – Upland Flushes, Fens and Swamps	Within Assessment Boundary	Multiple areas of this potential HPI lie within the Assessment Boundary.
Potential HPI – Lowland Fens	Within Assessment Boundary	Multiple areas of Lowland Fens are situated within 1km of the Assessment Boundary. The nearest is located within the Assessment Boundary, adjacent to Fern Isle Brook and located north of Broad Lane.
Potential HPI – Deciduous Woodland	Within Assessment Boundary	Multiple areas of Deciduous Woodland are situated within 1km of the Assessment Boundary. The nearest relates to a 1.81ha woodland, namely Fern Isle Wood, situated north of Broad Lane. Fern Isle Brook runs through this area of woodland.
Good Quality Semi-Improved Grassland (Non Priority)	Adjacent to Assessment Boundary	Six areas of this habitat are present within 1km of the Assessment Boundary, with the nearest located adjacent to the Assessment Boundary north of Spring Mill Reservoir.
Ancient & Semi-Natural Woodland	0.26km south-east	Three areas of Ancient & Semi-Natural Woodland are situated within 1km of the Assessment Boundary. The nearest is a 7.83ha area forming Smallshaw Wood.
Potential HPI – Lowland Heathland	0.60km east	Two areas of Lowland Heathland are located within 1km of the Assessment Boundary, the nearest of which is west of Market Street.

³ Using the MAGIC website (www.Magic.gov.uk)

Habitat	Approx. distance and direction from Assessment Boundary	Description
Potential HPI – Lowland Dry Acid Grassland	0.98km north-east	One 2.49ha area of Lowland Dry Acid Grassland is situated within 1km of the Assessment Boundary near Stubbylee Park.

A review of the Woodland Trust's Ancient Tree Inventory found no veteran trees located within or adjacent to the Assessment Boundary however two ancient trees (tree IDs: 247418 and 247697) are situated adjacent to the eastern tip of the Assessment Boundary, located east of Cown Brook and Back Crown Lane, north of Cown Reservoir.

3.1.3 Species of Conservation Interest

Badger

There are 19 badger *Meles meles* field records between 2005 and 2022 within 2km of the Assessment Boundary. Additionally, there are 25 badger sett records which are not included in this report due to their sensitivity. Records are primarily in gardens in Rochdale and nature reserves south of the Assessment Boundary; however, there is one record of a field sighting in woodland within the north-east of the Assessment Boundary.

Bats

Records of six bat species were identified during the data search, along with further records of *Pipistrellus* sp. and *Myotis* sp. bats that were not identified to species level and further records of unidentified bats. There have been multiple recordings of bat roosts within 2km of the Assessment Boundary, mostly around residential areas in Rochdale such as Healey Dell and Norden. These are listed in Table 9-1-6.

Table 9-1-6: Bat records within 2km of the Assessment Boundary.

Species	Number of records	Most Recent Record	Number of roost records
Daubenton's <i>Myotis daubentonii</i>	17	2019	0
Natterer's <i>Myotis nattereri</i>	1	2015	1
Whiskered <i>Myotis mystacinus</i>	1	2005	0
Common pipistrelle <i>Pipistrellus pipistrellus</i>	133	2021	11
Soprano pipistrelle <i>Pipistrellus pygmaeus</i>	9	2019	4
Noctule <i>Nyctalus noctula</i>	10	2013	0
Pipistrelle sp.	141	2019	6
Unidentified <i>Myotis</i> sp.	2	2015	0
Unidentified bat species	1	2014	1

A search on MAGIC for recent Natural England licence applications found five bat licences had been granted within 2km of the Assessment Boundary. The nearest of these relate to the damage and destruction of a resting place for common pipistrelle between October 2018 to October 2023 (licence reference: 2018-37007-EPS-MIT).

Otter

There is one otter *Lutra lutra* territory record from 2022 in Caldershaw, which lies approximately 1.5km south-east of the Assessment Boundary. The territory is noted as long standing and aerial mapping shows the territory is situated along the River Spodden, which runs north through Healey Dell Nature reserve which lies approximately 0.8km adjacent east of the Assessment Boundary.

Water vole

There are no recent records of water vole *Arvicola amphibius* within 2km of the Assessment Boundary. Two outdated records were located at Caldershaw in 2015, as well as at Healey Dell LNR in 2006.

Other Mammals

There are nine record locations within Rochdale for hedgehog *Erinaceus europaeus*, which is listed on Section 41 (S41) of the Natural Environment and Rural Communities Act (NERC) (2006) as a species of principal importance (SPI), with the most recent dated 2021. No recent records of the SPI brown hare *Lepus europaeus* were returned.

Birds

There are many bird species records from within 2km of the Assessment Boundary, including 11 species protected under Schedule 1 of the Wildlife and Countryside Act, 1981. These were barn owl *Tyto alba*, black redstart *Phoenicurus ochruros*, common scoter *Melanitta nigra*, goldeneye *Bucephala clangula*, hen harrier *Circus cyaneus*, hobby *Falco subbuteo*, kingfisher *Alcedo atthis*, little ringed plover *Charadrius dubius*, peregrine *Falco peregrinus*, red kite *Milvus milvus* and whooper swan *Cygnus cygnus*. The additional bird species mentioned below are either listed on the Greater Manchester or the Lancashire Biodiversity Action Plan, are listed as Species of Principal Importance in England on the NERC Act (2006) or are on the IUCN Red List of Threatened Species. Three species of note, lapwing, curlew and golden plover are listed as breeders in the Knowl Moor SBI, which is located within the central section of the Assessment Boundary. Lee Quarry, located adjacent north-east of the Assessment Boundary, is cited as supporting Schedule 1 species with many of the bird records in the data search from this area.

Table 9-1-7: Birds of conservation interest within 2km of the Assessment Boundary.

Species	Number of records	Most recent record
Barn owl <i>Tyto alba</i>	16	2021
Black redstart <i>Phoenicurus ochruros</i>	3	2014
Bullfinch <i>Pyrrhula pyrrhula</i>	186	2022
Common Scoter <i>Melanitta nigra</i>	1	2020
Cuckoo <i>Cuculus canorus</i>	3	2020
Curlew <i>Numenius arquata</i>	44	2021
Dunnock <i>Prunella modularis</i>	340	2021
Goldeneye <i>Bucephala clangula</i>	2	2015
Grasshopper warbler <i>Locustella naevia</i>	7	2021
Greenfinch <i>Chloris chloris</i>	3	2015
Grey partridge <i>Perdix perdix</i>	14	2021
Hen harrier <i>Circus cyaneus</i>	1	2021
Herring gull <i>Larus argentatus</i>	6	2021
Hobby <i>Falco subbuteo</i>	2	2021
House martin <i>Delichon urbicum</i>	1	2019

Species	Number of records	Most recent record
House sparrow <i>Passer domesticus</i>	251	2021
Kingfisher <i>Alcedo atthis</i>	21	2021
Lapwing <i>Vanellus vanellus</i>	37	2021
Lesser redpoll <i>Acanthis cabaret</i>	67	2021
Linnet <i>Linaria cannabina</i>	8	2021
Little ringed plover <i>Charadrius dubius</i>	33	2015
Mistle Thrush <i>Turdus viscivorus</i>	11	2015
Peregrine <i>Falco peregrinus</i>	40	2021
Red Grouse <i>Lagopus lagopus</i>	1	2015
Red Kite <i>Milvus milvus</i>	1	2020
Reed bunting <i>Emberiza schoeniclus</i>	64	2021
Ring ouzel <i>Turdus torquatus</i>	14	2021
Skylark <i>Alauda arvensis</i>	147	2021
Song thrush <i>Turdus philomelos</i>	135	2021
Spotted Flycatcher <i>Muscicapa striata</i>	11	2021
Starling <i>Sturnus vulgaris</i>	277	2021
Swift <i>Apus apus</i>	4	2014
Twite <i>Linaria flavirostris</i>	16	2015
Whinchat <i>Saxicola rubetra</i>	3	2014
Whooper swan <i>Cygnus cygnus</i>	1	2014
Wood warbler <i>Phylloscopus sibilatrix</i>	4	2020
Woodcock <i>Scolopax rusticola</i>	3	2014

Amphibians

There are records of three amphibian species from within 2km of the Assessment Boundary including the SPI common toad *Bufo bufo*. No great crested newt *Triturus cristatus* records were returned by either local record centres, with GMERC data specifying that surveys have been conducted within the 2km Assessment Boundary buffer; however, this species was recorded as absent during survey work.

Table 9-1-8: Amphibian records within 2km of the Assessment Boundary.

Species	Number of records	Most recent record
Common frog <i>Rana temporaria</i>	5	2019
Common toad <i>Bufo bufo</i>	8	2010
Palmate newt <i>Lissotriton helveticus</i>	3	2015

Reptiles

The reptile records obtained during the data search were for common lizard *Zootoca vivipara* dating from 2012 to 2021, where they were recorded eight times. These were present in Knowl Moor SBI which runs through the centre of the Assessment Boundary, as well as the Naden valley and Greenbooth Reservoirs which lie adjacent to the west of the Assessment Boundary.

Invertebrates

There are a number of invertebrate records from within 2km of the Assessment Boundary, with the invertebrate species mentioned below either listed on the Greater Manchester Biodiversity Action Plan or Lancashire Biodiversity Action Plan and are listed as Species of Principal Importance in England on the NERC Act (2006) or are on the IUCN Red List of Threatened Species. Whilst there

were small heath *Coenonympha pamphilus*, white-letter hairstreak *Satyrion w-album* and cinnabar *Tyria jacobaeae* recorded in both counties, there were a large number of further UK BAP Priority species and Species of Principal Importance in England (Section 41) records for moths and butterflies returned by GMERC, mainly from between 2010 and 2013 by a single individual in Norden.

Table 9-1-9: Invertebrates of conservation interest within 2km of the Assessment Boundary.

Species	Number of records	Most recent record
Buff Ermine <i>Spilosoma luteum</i>	9	2017
Cinnabar <i>Tyria jacobaeae</i>	8	2021
Crescent <i>Celaena leucostigma</i>	1	2015
Dark-barred Twin-spot Carpet <i>Xanthorhoe ferrugata</i>	2	2017
Latticed Heath <i>Chiasmia clathrata</i>	1	2018
Sallow <i>Xanthia icteritia</i>	14	2014
Small Heath <i>Coenonympha pamphilus</i>	173	2021
Small Phoenix <i>Ecliptopera silaceata</i>	38	2017
Wall <i>Lasiommata megera</i>	311	2021
White ermine <i>Spilosoma lubricipeda</i>	3	2014
White-letter Hairstreak <i>Satyrion w-album</i>	21	2021

White-Clawed Crayfish

One record of white-clawed crayfish was recorded in 2004 in a pond located north-west of the Assessment Boundary; however, this record is considered to be out of date with no more recent records returned.

Fish

A total of eight records of SPI brown trout *Salmo trutta* were recorded in Lancashire and Greater Manchester between 2004 and 2021.

Plants

There are a number of vascular plant records from within 2km of the Assessment Boundary, with bluebell *Hyacinthoides non-scripta* and floating water plantain *Luronium natans* being the only plant species protected under Schedule 8 (Wildlife and Countryside Act, 1981). However, it should be noted that all notable plant records are older than ten years old.

Table 9-1-10: Plants of conservation interest within 2km of the Assessment Boundary.

Species	Number of records	Most recent record
Bluebell <i>Hyacinthoides non-scripta</i>	2	2013
Brackish Water-crowfoot <i>Ranunculus baudotii</i>	1	2013
Cowberry <i>Vaccinium vitis-idaea</i>	1	2013
Floating water plantain <i>Luronium natans</i>	2	2008

Non-Native Invasive Species

No non-native invasive plant species were returned by the data search within 2km of the Assessment Boundary

3.2 UKHab and NVC Survey

3.2.1 NVC

The NVC survey recorded a total of nineteen communities, eight of which are considered to be of relevance to moorland and peat restoration. Where these communities were floristically distinct, they were assigned to corresponding sub-communities. The relevant moorland communities recorded during the survey were:

- Mires, springs and flushes: M25, M20, M3, M6, M1 and M2; and
- Dry heath communities: H18 and H12.

A map containing all the recorded NVC communities, and their locations, can be found on Figure 9-3 NVC Survey Results.

M25 Purple moor-grass *Molinia caerulea* – Tormentil *Potentilla erecta* mire

This mire community was found widely across the Assessment Boundary, with two sub-communities occurring namely the M25a cross-leaved heath *Erica tetralix* sub-community and the M25b sweet vernal grass *Anthoxanthum odoratum* sub-community.

The M25a *Erica tetralix* sub-community, in which common cottongrass *Eriophorum angustifolium*, hare's-tail cottongrass *Eriophorum vaginatum*, bog-moss *Sphagnum* sp. and common haircap *Polytrichum commune* are all preferential, was the most widespread. This sub-community signals the presence of degraded blanket bog, as it has come to replace stands of burnt, grazed and drained blanket bog communities. Vegetation height within the five M25a quadrats varied between 5 up to 60cm, with leaf litter in quadrat 14 being only 10% whilst 90% of quadrat 18 was covered with leaf litter.

Table 9-1-11: Results from quadrat surveys undertaken within M25a (abundance using DOMIN).

Quadrat	8	14	17	18	19
Date	18/07/24	24/07/24	30/07/24	31/07/24	01/08/24
Easting, Northing	386256, 417679	385678, 420055	386660, 419459	386604, 417467	385491, 417594
Species					
<i>Molinia caerulea</i>	9	8	9	9	8
<i>Potentilla erecta</i>	Not present	Not present	Not present	Not present	Not present
<i>Agrostis canina</i>	Not present	2	Not present	Not present	Not present
<i>Calypogeia fissa</i>	Not present	Not present	Not present	Not present	2
<i>Deschampsia flexuosa</i>	2	Not present	Not present	2	3
<i>Eriophorum angustifolium</i>	Not present	Not present	3	2	Not present
<i>Eriophorum vaginatum</i>	2	5	2	3	Not present
<i>Festuca ovina</i>	Not present	Not present	Not present	Not present	4
<i>Festuca rubra</i>	Not present	3	Not present	2	Not present
<i>Hypnum jutlandicum</i>	2	Not present	Not present	3	4
<i>Juncus squarrosus</i>	Not present	Not present	Not present	Not present	3
<i>Luzula multiflora</i>	Not present	Not present	Not present	Not present	2

Quadrat	8	14	17	18	19
<i>Polytrichum commune</i>	3	8	Not present	Frequent – locally abundant	5
<i>Rhytidiadelphus loreus</i>	Not present	Not present	Not present	Not present	2
<i>Rhytidiadelphus squarrosus</i>	Not present	Not present	Not present	Not present	4
<i>Sphagnum fallax</i>	2	Not present	Not present	Not present	Not present
<i>Sphagnum fimbriatum</i>	Not present	3	Not present	Not present	3
<i>Sphagnum papillosum</i> *	4	Not present	2	Not present	Not present
<i>Sphagnum subnitens</i>	Not present	Not present	4	Not present	Not present
<i>Vaccinium myrtillus</i>	Not present	Not present	Not present	Not present	3

*Checked using a microscope.

The M25b *Anthoxanthum odoratum* sub-community is a marshy grassland community typically found on slopes and drier places. Vegetation height ranged between 25 to 40cm whilst vegetation litter covered 20% for the M25b *Anthoxanthum odoratum* sub-community. Stands of M25b were often found in conjunction with extensive areas dominated by soft-rush *Juncus effusus*, where the rush has taken over areas previously dominated by purple moor-grass (with purple moor-grass still present in the sward).

Table 9-1-12: Results from quadrat surveys undertaken within M25b (abundance using DOMIN).

Quadrat	10
Date	19/07/24
Easting, Northing	386496, 418344
Species	
<i>Molinia caerulea</i>	9
<i>Potentilla erecta</i>	1
<i>Agrostis capillaris</i>	2
<i>Anthoxanthum odoratum</i>	3
<i>Deschampsia flexuosa</i>	3
<i>Festuca rubra</i>	4
<i>Galium saxatile</i>	3
<i>Hypnum jutlandicum</i>	3
<i>Juncus squarrosus</i>	3
<i>Luzula multiflora</i>	1
<i>Nardus stricta</i>	3
<i>Polytrichum commune</i>	2
<i>Rhytidiadelphus squarrosus</i>	3

A single area of M25 *Molinia caerulea* – *Potentilla erecta* mire that did not fit any sub-community and was regarded as being species-poor was recorded within the north of the Assessment Boundary, shown on Figure 9-3. This area was dominated by purple moor-grass with occasional rosebay willowherb *Chamaenerion angustifolium*, wavy hair-grass *Deschampsia flexuosa* and heath plait-moss *Hypnum jutlandicum* whilst lady fern *Athyrium filix-femina* and young grey willow *Salix cinerea* were recorded rarely.

M25 communities can feature as part of the internationally important Annex I habitat ‘Degraded raised bogs still capable of natural regeneration’. However, areas can only be included within this Annex 1 habitat “where the hydrology can be repaired and where, with appropriate rehabilitation management, there is a reasonable expectation of re-establishing vegetation with peat-forming capability within 30 years”⁴.

U5 Mat-grass *Nardus stricta* – Heath bedstraw *Galium saxatile* acid grassland

U5a *Nardus stricta* – *Galium saxatile* grassland, the species poor sub-community comprises a large area across the Assessment Boundary and typically contained dominant to abundant mat-grass *Nardus stricta*. One of the constants for this community, namely tormentil *Potentilla erecta*, was missing from the overwhelming majority of the stands recorded along with heath bedstraw *Galium saxatile*. Whilst these two species were largely absent from most areas of U5a, both tormentil and heath bedstraw were present in stands recorded at the eastern end of the Assessment Boundary (easting, northing: 386621, 417955). Other species recorded across areas of U5a included sheep’s fescue *Festuca ovina*, common bent *Agrostis capillaris*, springy turf-moss *Rhytidiadelphus squarrosus*, sweet vernal grass, pill sedge *Carex pilulifera*, wavy hair-grass, crowberry *Empetrum nigrum*, common cottongrass, hare’s-tail cottongrass, heath plait-moss, soft-rush, heath rush *Juncus squarrosus*, wood rush *Luzula multiflora*, purple moor-grass, common haircap moss, bank haircap *Polytrichum formosum*, bog haircap moss *Polytrichum strictum* and bilberry *Vaccinium myrtillus*; whilst common heather *Calluna vulgaris* and hard fern *Blechnum spicant* were recorded rarely.

A single stand contained some of the preferentials of two sub-communities and did not fit well into any sub-community, so it is displayed as U5 on Figure 9-3 NVC Survey Results. This area contained abundant mat-grass, tormentil, common bent and carnation sedge *Carex panicea*. Frequent sheep’s fescue, sweet vernal grass, heath grass *Danthonia decumbens*, wavy hair-grass was noted with common yellow-sedge *Carex demissa* and soft-rush recorded as occasional to locally frequent. Heath bedstraw and springy turf-moss were recorded as occasional within this area.

U6 Heath rush *Juncus squarrosus* - Sheep’s fescue *Festuca ovina* acid grassland

U6 *Juncus squarrosus*-*Festuca ovina* acid grassland is an upland grassland community in which heath rush is the dominant species. Within the Assessment Boundary two sub-communities were recorded, namely the U6a *Sphagnum* spp. sub-community and the U6d *Agrostis capillaris* - *Luzula multiflora* sub-community. U6a occurs in wetter areas whereas U6d is found on well-drained areas.

The U6a *Sphagnum* spp. sub-community was characterised by dominant heath rush, with abundant to occasional sheep’s fescue and frequent to dominant common haircap moss. One area of U6a also contained occasional bifid crestwort *Lophocolea bidentata*. *Sphagnum* species identified within this sub-community included *Sphagnum fallax*, *Sphagnum auriculatum* and *Sphagnum squarrosum*.

Areas of the U6d *Agrostis capillaris* - *Luzula multiflora* sub-community were dominated by heath rush with abundant to frequent sheep’s fescue. Other species recorded include common haircap moss, velvet bent *Agrostis canina*, common bent, sweet vernal grass, wavy hair-grass, crowberry, heath bedstraw, Yorkshire fog *Holcus lanatus*, glittering wood-moss *Hylocomium splendens*, heath plait-moss, soft-rush, wood rush, purple moor-grass, mat-grass, red-stemmed feather-moss *Pleurozium schreberi*, springy turf-moss and bilberry.

⁴ JNCC – Degraded bog habitat – available at <https://sac.jncc.gov.uk/habitat/H7120/>, accessed November 2024.

M20 Hare's-tail cottongrass *Eriophorum vaginatum* blanket and raised mire

M20 *Eriophorum vaginatum* blanket and raised mire contains bog vegetation in which hare's-tail cottongrass is dominant, with common cottongrass being the only other constant species found in M20 communities and shrubs rarely found. *Sphagnum* mosses are typically uncommon in M20 however *Sphagnum* was occasional or abundant in many stands; suggesting this habitat derived from *Sphagnum*-rich bog communities such as M18 *Erica tetralix* – *Sphagnum papillosum* raised and blanket mire or M17 *Trichophorum germanicum* – *Eriophorum vaginatum* blanket mire.

This habitat is extensive on the two plateaux in the north-west of the Assessment Boundary (shown on Figure 9-3), containing a deep peat layer that has suffered from erosion caused by recreational pressure particularly from motorbikes, off-road vehicles and mountain bikes, as well as occasional burning. It is in these eroded areas that stands of M3 *Eriophorum angustifolium* bog pool vegetation were noted.

There are two sub-communities for M20 *Eriophorum vaginatum* blanket and raised mire, with areas in the Assessment Boundary falling within the M20a species-poor sub-community. Vegetation height ranged between 5 to 50cm whilst the percentage of leaf litter was 5% or less.

Table 9-1-13: Results from quadrat surveys undertaken within M20 (abundance using DOMIN).

Quadrat	1	6	28
Date	16/07/24	17/07/24	08/08/24
Easting, Northing	384096, 419165	383413, 419429	385224, 419303
Species			
<i>Eriophorum vaginatum</i>	8	7	8
<i>Eriophorum angustifolium</i>	5	5	4
<i>Cephaloziella</i> sp	Not present	Not present	2
<i>Deschampsia flexuosa</i>	2	3	2
<i>Empetrum nigrum</i>	Not present	3	Not present
<i>Festuca ovina</i>	Not present	2	Not present
<i>Hypnum jutlandicum</i>	Not present	5	3
<i>Lophozia ventricosa</i>	Not present	Not present	2
<i>Molinia caerulea</i>	Not present	Not present	3
<i>Nardus stricta</i>	3	4	Not present
<i>Plagiothecium undulatum</i>	Not present	Not present	2
<i>Polytrichum commune</i>	4	5	6
<i>Polytrichum strictum</i>	Not present	3	Not present
<i>Sphagnum fallax</i>	Not present	Not present	5
<i>Sphagnum fimbriatum</i>	3	Not present	4
<i>Sphagnum subnitens</i>	8	5	Not present

Overall, M20 *Eriophorum vaginatum* blanket and raised mire areas within the Assessment Boundary were dominated by hare's-tail cottongrass with abundant to locally dominant common cottongrass, with the exception of one area where no common cottongrass was found (located at Easting: 384186, Northing: 419355).

M3 Common cottongrass *Eriophorum angustifolium* bog pool

M3 *Eriophorum angustifolium* bog pool community is found in uncharacteristically large stands across the north of the Assessment Boundary (as shown on Figure 9-3), despite this habitat typically covering small stands of open water in blanket bog. Common cottongrass is a coloniser of bare peat

and, as such, has colonised the areas of damaged peat on the plateau in the north-west of the Assessment Boundary. On undisturbed sites M3 stands may develop into other blanket bog communities, but on this Assessment Boundary the community persists due to the continual disturbance.

Also present on the plateau is a vegetation which appears to be intermediate between M20 *Eriophorum vaginatum* blanket and raised mire and M3 *Eriophorum angustifolium* bog pool. This intermediate vegetation likely marks where the colonising M3 vegetation is becoming M20 blanket mire, but has not yet attained its usual tussocky appearance.

Vegetation height ranged between 5 to 25cm whilst vegetation litter covered 10% or less and 25% of peat was exposed at NGR SD 85261 19336.

Table 9-1-14: Results from quadrat surveys undertaken within M3 (abundance using DOMIN).

Quadrat	2	4	5	27
Date	16/07/24	17/07/24	17/07/24	08/08/24
Easting, Northing	383996, 419151	383056, 419851	383347, 419614	385261, 419336
Species				
<i>Eriophorum angustifolium</i>	7	7	7	6
<i>Eriophorum vaginatum</i>	6	5	4	6
<i>Campylopus flexuosus</i>	Not present	2	3	3
<i>Deschampsia flexuosa</i>	3	2	3	Not present
<i>Empetrum nigrum</i>	5	Not present	3	Not present
<i>Festuca ovina</i>	Not present	Not present	1	Not present
<i>Hypnum jutlandicum</i>	Not present	4	3	3
<i>Molinia caerulea</i>	Not present	Not present	Not present	4
<i>Nardus stricta</i>	Not present	6	6	Not present
<i>Polytrichum commune</i>	5	5	6	5
<i>Sphagnum palustre</i> *	4	Not present	Not present	Not present
<i>Sphagnum subnitens</i>	Not present	Not present	4	3
<i>Vaccinium myrtillus</i>	Not present	Not present	Not present	3

*Checked using a microscope.

Areas of M3 *Eriophorum angustifolium* bog pool present within the north of the Assessment Boundary were typically dominated by common cottongrass with abundant hare's-tail cottongrass and common haircap *Polytrichum commune*, frequent crowberry, occasional to locally frequent mat-grass, occasional purple moor-grass, bilberry and lustrous bog-moss *Sphagnum subnitens* with common heather recorded rarely.

Target Note (TN) TN47 relates to an area of M3 *Eriophorum angustifolium* vegetation within a dried up depression in the north of the Assessment Boundary. This dry depression was dominated by common cottongrass with abundant hare's-tail cottongrass, frequent common haircap and occasional purple moor-grass and lustrous bog-moss.

M6 Star sedge *Carex echinata* – Cow-horn bog-moss *Sphagnum recurvum* / *auriculatum* mire

Small patches of M6 *Carex echinata*-*Sphagnum recurvum/auriculatum* mire, aligning with the M6c *Juncus effusus* sub-community, are scattered across the entirety of the Assessment Boundary. This is a flush community dominated by soft-rush with common haircap and *Sphagnum* species in the

ground layer. It should be noted that all areas surveyed lacked star sedge despite this being a constant for this NVC community. Vegetation height ranged between 40 to 140cm whilst vegetation litter covered 50%.

Table 9-1-15: Results from Quadrat surveys undertaken within M6c (abundance using DOMIN).

Quadrat	9
Date	18/08/24
Easting, Northing	386404, 417901
Species	
<i>Carex echinata</i>	Not present
<i>Polytrichum commune</i>	Not present
<i>Sphagnum fallax</i>	5
<i>Agrostis canina</i>	3
<i>Juncus effusus</i>	8
<i>Sphagnum fimbriatum</i>	5
<i>Epilobium palustre</i>	3
<i>Holcus lanatus</i>	3
<i>Holcus mollis</i>	3
<i>Kindbergia praelonga</i>	3
<i>Lophocolea bidentata</i>	3
<i>Dryopteris dilatata</i>	1

M17 Deergrass *Trichophorum germanicum* – Hare’s-tail cottongrass *Eriophorum vaginatum* blanket mire

This blanket bog community was uncommon across the Assessment Boundary, composed of small fragments within areas of M25a *Molinia caerulea* – *Potentilla erecta* mire, the *Erica tetralix* sub-community. Most M17 *Trichophorum germanicum* – *Eriophorum vaginatum* blanket mires were noted to be species-poor in nature, lacking some of the constant species required for M17, and typically ericoid-poor (lacking one of the ericoid shrubs), *Sphagnum*-poor or both. This species-poor nature and lack of constants resulted in no sub-communities being assigned.

One larger stand of M17 is present within the west of the Assessment Boundary. However, this is also ericoid-poor and dominated by purple moor-grass with abundant hare’s-tail cottongrass and common haircap, frequent common heather, common cottongrass and wavy hair-grass plus occasional red bog-moss *Sphagnum capillifolium/rubellum*. In contrast, stands that were not recorded as ericoid-poor were dominated by bilberry with abundant purple moor-grass, hare’s-tail cottongrass and heath plait-moss, frequent red fescue *Festuca rubra* and wavy hair-grass plus occasional common cottongrass. Vegetation height ranged between 5 to 45cm whilst vegetation litter covered 5% or less.

Table 9-1-16: Results from quadrat surveys undertaken within M17 (abundance using DOMIN).

Quadrat	13	29
Date	23/07/24	08/08/24
Easting, Northing	384881, 418250	384994, 418966
Species		
<i>Trichophorum germanicum</i>	Not present	5
<i>Calluna vulgaris</i>	Not present	Not present

Quadrat	13	29
<i>Erica tetralix</i>	Not present	5
<i>Narthecium ossifragum</i>	Not present	Not present
<i>Eriophorum angustifolium</i>	5	5
<i>Eriophorum vaginatum</i>	4	3
<i>Potentilla erecta</i>	Not present	Not present
<i>Sphagnum capillifolium</i>	Not present	Not present
<i>Sphagnum papillosum</i>	5	4
<i>Molinia caerulea</i>	8	7
<i>Campylopus introflexus</i>	Not present	3
<i>Deschampsia flexuosa</i>	3	Not present
<i>Diplophyllum albicans</i>	2	Not present
<i>Empetrum nigrum</i>	Not present	4
<i>Hypnum jutlandicum</i>	4	Not present
<i>Polytrichum commune</i>	4	4
<i>Sphagnum auriculatum</i>	Not present	2
<i>Sphagnum cuspidatum</i>	3	Not present
<i>Sphagnum fallax</i>	3	Not present
<i>Sphagnum tenellum</i>	Not present	3
<i>Vaccinium myrtillus</i>	3	Not present

TN17 contained a *Sphagnum*-poor area of M17 *Trichophorum germanicum* – *Eriophorum vaginatum* blanket mire on the western boundary. Vegetation here was dominated by bilberry with abundant hare's-tail cottongrass, purple moor-grass, heather and heath plait-moss, frequent wavy hair-grass and red fescue with occasional common cottongrass.

TN20 was noted to be a very degraded patch of M17 *Trichophorum germanicum* – *Eriophorum vaginatum* blanket mire dominated by deergrass *Trichophorum germanicum* and frequent purple moor-grass with occasional bog asphodel *Narthecium ossifragum*, common cottongrass, hare's-tail cottongrass, cranberry *Vaccinium oxycoccos*, lustrous bog-moss, lesser cow-horn bog-moss *Sphagnum auriculatum/inundatum* and cross-leaved heather.

A fragment of M17 *Trichophorum germanicum* – *Eriophorum vaginatum* blanket mire is situated at TN21 in the west of the Assessment Boundary that was noted to contain abundant bilberry, hare's-tail cottongrass and common haircap with frequent common cottongrass, wavy hair-grass and heather plus occasional red bog-moss.

From the small scattered areas across the Assessment Boundary, it is clear that this blanket bog community should have been widespread across the Assessment Boundary; however, its rarity reflects the current degraded state of the moorland.

H18 Bilberry *Vaccinium myrtillus* – Wavy hair-grass *Deschampsia flexuosa* heath

Patches of H18a *Vaccinium myrtillus* - *Deschampsia flexuosa* heath, the glittering wood-moss *Hylocomium splendens* – little shaggy moss *Rhytidiadelphus loreus* sub-community were found on steep slopes across the Assessment Boundary. Usually areas of H18a comprised small stands but they did cover entire slopes on occasion.

This is a dry heath community dominated by bilberry with wavy hair-grass and a ground layer of pleurocarpous mosses. Areas of H18a across the Assessment Boundary were noted to be species-poor and often lacked the constant species required for this NVC community including heath bedstraw *Galium saxatile*, broom fork-moss *Dicranum scoparium* and red-stemmed feather-moss.

These two mosses, which are listed as constant species that should appear within H18 communities, are seemingly replaced on the Assessment Boundary with heath plait-moss and springy turf-moss.

Vegetation height ranged between 5 to 25cm whilst vegetation litter covered under 2%.

Table 9-1-17: Results from quadrat surveys undertaken H18a (abundance using DOMIN).

Quadrat	11	15	16
Date	23/07/24	25/07/24	30/07/24
Easting, Northing	384836, 417785	384536, 419880	387344, 419701
Species			
<i>Vaccinium myrtillus</i>	8	8	9
<i>Deschampsia flexuosa</i>	4	4	4
<i>Galium saxatile</i>	4	Not present	Not present
<i>Dicranum scoparium</i>	3	Not present	Not present
<i>Pleurozium schreberi</i>	Not present	Not present	Not present
<i>Agrostis canina</i>	Not present	3	Not present
<i>Agrostis capillaris</i>	4	3	1
<i>Anthoxanthum odoratum</i>	3	Not present	Not present
<i>Blechnum spicant</i>	Not present	Not present	2
<i>Festuca ovina</i>	Not present	Not present	3
<i>Festuca rubra</i>	4	4	Not present
<i>Hypnum jutlandicum</i>	3	4	5
<i>Luzula multiflora</i>	Not present	1	Not present
<i>Molinia caerulea</i>	Not present	Not present	2
<i>Nardus stricta</i>	Not present	6	4
<i>Polytrichum commune</i>	Not present	Not present	4
<i>Rhytiadelphus squarrosus</i>	6	6	3

H12 Heather *Calluna vulgaris* – Bilberry *Vaccinium myrtillus* heath

H12 *Calluna vulgaris* - *Vaccinium myrtillus* is a dry heath community with heather and bilberry as the main ericoid shrubs, whilst wavy hair-grass and bryophytes are typically present within the ground flora. A small area that did not fit into any sub-community is present in the north-western corner of the Assessment Boundary, whilst two areas of H12c *Galium saxatile* – sheep's fescue *Festuca ovina* sub-community were recorded along the western boundary; shown on Figure 9-3.

The fragment of H12 situated in the north-west of the Assessment Boundary was dominated by bilberry with abundant wavy hair-grass, frequent crowberry and occasional heather. Vegetation height ranged between 5 to 20cm whilst vegetation litter covered under 1%.

Table 9-1-18: Results from quadrat surveys undertaken within H12c (abundance using DOMIN).

Quadrat	12
Date	23/07/24
Easting, Northing	384806, 417902
Species	
<i>Calluna vulgaris</i>	4
<i>Deschampsia flexuosa</i>	4
<i>Vaccinium myrtillus</i>	8
<i>Dicranum scoparium</i>	3

Quadrat	12
<i>Hypnum jutlandicum</i>	7
<i>Pleurozium schreberi</i>	2
<i>Agrostis capillaris</i>	4
<i>Anthoxanthum odoratum</i>	3
<i>Empetrum nigrum</i>	1
<i>Festuca ovina</i>	4
<i>Galium saxatile</i>	3
<i>Nardus stricta</i>	1
<i>Rhytidiadelphus squarrosus</i>	3

TN4 relates to a fragment of *Calluna vulgaris* - *Vaccinium myrtillus* dry heath situated to the south of the north-western corner with dominant bilberry, abundant wavy hair-grass, frequent common cottongrass and crowberry, occasional heather and hare's-tail cottongrass recorded rarely. Similarly, TN5 is an area of H12 within this north-western corner surrounded by extensive peat hags. This area was noted to contain abundant to locally dominant crowberry, abundant bilberry, mat-grass and wavy hair-grass with occasional common cottongrass and heather. TN6 is a small fragment of H12 within this same part of the Assessment Boundary surrounded by M20 *Eriophorum vaginatum* blanket and raised mire and M3 *Eriophorum angustifolium* bog pool habitat.

U4 Sheep's fescue *Festuca ovina* – Common bent *Agrostis capillaris*-Heath bedstraw *Galium saxatile* acid grassland

A single area of U4b *Festuca ovina*-*Agrostis capillaris*-*Galium saxatile* grassland, the *Holcus lanatus*-*Trifolium repens* sub-community, was recorded within the east of the Assessment Boundary within a sheep-grazed field. This area was noted to be species poor containing locally dominant tussocks of soft-rush with abundant common bent, sweet vernal grass, Yorkshire fog and sheep's sorrel *Rumex acetosella*, frequent sheep's fescue and white clover *Trifolium repens* plus occasional heath bedstraw.

M1 Cow-horn bog-moss *Sphagnum auriculatum* bog pool

Small areas of M1 *Sphagnum auriculatum* bog pool are shown on Figure 9-3 as TNs situated within the south of the Assessment Boundary.

TN26 is characterised by abundant cow-horn bog-moss and occasional feathery bog-moss *Sphagnum cuspidatum* with soft-rush dominating at the pond margins with occasional bulbous rush *Juncus bulbosus* present.

TN30 was dominated by cow-horn bog-moss and common cottongrass with frequent bulbous rush and occasional purple moor-grass at the margins with frequent flat-topped bog-moss *Sphagnum fallax*.

TN31 contained abundant bogbean *Menyanthes trifoliata* and bog asphodel with frequent bog pondweed *Potamogeton polygonifolius* whilst beaked sedge *Carex rostrata* was present on the margins.

TN32 is situated within a stand of M25a *Molinia caerulea* –*Potentilla erecta* mire, *Erica tetralix* sub-community, and was dominated by cow-horn bog-moss with abundant common cottongrass, frequent bog asphodel plus occasional bulbous rush and flat-topped bog-moss.

M2 Feathery bog-moss *Sphagnum cuspidatum* / *recurvum* bog pool

Three areas of M2 *Sphagnum cuspidatum*/*recurvum* bog pool are shown on Figure 9-3 as TNs located within the centre of the Assessment Boundary.

TN1 was dominated by flat-topped bog-moss with abundant common cottongrass and occasional hare's-tail cottongrass and common haircap.

TN15 relates to a bog pool within a depression dominated by both soft-rush and flat-topped bog-moss with abundant common cottongrass and frequent hare's-tail cottongrass.

TN36 is dominated by flat-topped bog-moss with abundant common cottongrass.

S10 Water horsetail *Equisetum fluviatile* swamp

A single stand of S10 *Equisetum fluviatile* swamp was present within the Assessment Boundary, referred to as TN37 on Figure 9-3 NVC Survey Results. The stand was dominated by water horsetail *Equisetum fluviatile*, frequent marsh thistle *Cirsium palustre*, soft-rush, tufted hair-grass *Deschampsia cespitosa*, marsh willowherb *Epilobium palustre* and Yorkshire fog and occasional creeping buttercup *Ranunculus repens* and ring pelt moss *Pellia neesiana*.

Other Habitats

Other habitats present across the Assessment Boundary include the following:

- U20 *Pteridium aquilinum*-*Galium saxatile* community;
- MG6 *Lolium perenne*-*Cynosurus cristatus* grassland ;
- MG9 *Holcus lanatus*-*Deschampsia cespitosa* grassland;
- MG10 *Juncus effusus*-*Holcus lanatus* rush pasture;
- *Juncus effusus* species-poor;
- Plantation woodland; and
- Stones/scree.

Habitat Mosaics

In areas where two NVC communities occurred close together and integrated into one another making it difficult to separate discrete stands of each community, the vegetation was mapped as mosaics. Mosaics were also used on spoil heaps or hillocks where two different vegetation communities occurred very close together (for instance one on the hill sides and one on top).

The largest areas mapped as mosaic were the two plateaux in the north-west of the Assessment Boundary, which were mapped as mosaics between M20 *Eriophorum vaginatum* blanket and raised mire and M3 *Eriophorum angustifolium* bog pool community. The following mosaics were mapped across the Assessment Boundary:

- 80% M20 *Eriophorum vaginatum* blanket and raised mire and 20% M3 *Eriophorum angustifolium* bog pool community;
- 40% M20 *Eriophorum vaginatum* blanket and raised mire and 60% M3 *Eriophorum angustifolium* bog pool community;
- 40% M25b *Molinia caerulea* – *Potentilla erecta* mire, *Anthoxanthum odoratum* sub-community, 40% M6c *Carex echinata*-*Sphagnum recurvum/auriculatum* mire, *Juncus effusus* sub-community and 20% U6d *Juncus squarrosus*-*Festuca ovina* acid grassland, *Agrostis capillaris* - *Luzula multiflora* sub-community;

- 60% M25b *Molinia caerulea* – *Potentilla erecta* mire, *Anthoxanthum odoratum* sub-community and 40% U5a *Nardus stricta* – *Galium saxatile* acid grassland, species-poor sub-community;
- 70% M25b *Molinia caerulea* – *Potentilla erecta* mire, *Anthoxanthum odoratum* sub-community and 30% U5a *Nardus stricta* – *Galium saxatile* acid grassland, species-poor sub-community;
- 80% M25b *Molinia caerulea* – *Potentilla erecta* mire, *Anthoxanthum odoratum* sub-community and 20% U5a *Nardus stricta* – *Galium saxatile* acid grassland, species-poor sub-community;
- 80% *Juncus effusus* species-poor and 20% U5a *Nardus stricta* – *Galium saxatile* acid grassland, species-poor sub-community; and
- 70% *Juncus effusus* species-poor and 30% U5a *Nardus stricta* – *Galium saxatile* acid grassland, species-poor sub-community.

NVC Summary

All of the above recorded communities have potential affinities with Habitats of Principal Importance (HPI) in England (Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006). Heath and mire communities can also feature as part of the Annex I communities European dry heaths, Alpine and Boreal heaths, Active raised bogs, Degraded raised bogs still capable of natural regeneration and Blanket bogs; although it is unlikely the examples within the Assessment Boundary are of international importance (Annex 1).

Table 9-1-19: Annex 1 and HPIs.

NVC Code	Annex 1	Section 41 of NERC Act
M25 <i>Molinia caerulea</i> – <i>Potentilla erecta</i> mire	7130 Blanket bogs 7120 Degraded raised bogs still capable of natural regeneration	Blanket bog Purple moor-grass and rush pastures
M20 <i>Eriophorum vaginatum</i> blanket and raised mire	7130 Blanket bogs 7110 Active raised bogs	Blanket bog
M3 <i>Eriophorum angustifolium</i> bog pool	7110 Active raised bogs	Blanket bog
M6 <i>Carex echinata</i> - <i>Sphagnum recurvum/auriculatum</i> mire	None	Upland Flushes, Fens and Swamps
M17 <i>Trichophorum germanicum</i> – <i>Eriophorum vaginatum</i> blanket mire	7130 Blanket bogs 7120 Degraded raised bogs still capable of natural regeneration	Blanket bog
H18 <i>Vaccinium myrtillus</i> – <i>Deschampsia flexuosa</i> heath	4030 European dry heaths 4060 Alpine and Boreal heaths	Upland heathland
H12 <i>Calluna vulgaris</i> - <i>Vaccinium myrtillus</i> heath	4030 European dry heaths 4060 Alpine and Boreal heaths	Upland heathland
M1 <i>Sphagnum auriculatum</i> bog pool	7110 Active raised bogs	Blanket bog
M2 <i>Sphagnum cuspidatum/recurvum</i> bog pool	7110 Active raised bogs	Blanket bog
S10 Water horsetail <i>Equisetum fluviatile</i> swamp	None	Upland Flushes, Fens and Swamps

GWDTE Survey Results

GWDTEs are classified according to SEPA (2014) and UKTAG (2008), defining each NVC community on their potential dependency on groundwater. Groundwater dependency is often linked to wetlands that contain flora dependent upon the chemical composition of the water fed from a groundwater source. SEPA defines the habitats with regard to their potential for groundwater

dependency, therefore not all communities listed may be truly groundwater dependent. In total, there is one community listed as high potential for groundwater dependency and one listed as moderate, as defined by SEPA (2012); shown in Table 9-1-20 below.

Table 9-1-20: Potential groundwater dependence.

NVC Code	Potential groundwater dependence
M20 <i>Eriophorum vaginatum</i> blanket and raised mire	None
M3 <i>Eriophorum angustifolium</i> bog pool	None
M6 <i>Carex echinata</i> - <i>Sphagnum recurvum/auriculatum</i> mire	High
M17 <i>Trichophorum germanicum</i> – <i>Eriophorum vaginatum</i> blanket mire	None
H18 <i>Vaccinium myrtillus</i> – <i>Deschampsia flexuosa</i> heath	None
H12 <i>Calluna vulgaris</i> - <i>Vaccinium myrtillus</i> heath	None
M1 <i>Sphagnum auriculatum</i> bog pool	None
M2 <i>Sphagnum cuspidatum/recurvum</i> bog pool	None

In addition to the above mire and heath communities, the following habitats also recorded within the Assessment Boundary are listed as moderate potential for groundwater dependency (dependent on the hydrogeological setting), as defined by SEPA (2012):

- U6 *Juncus squarrosus*-*Festuca ovina* acid grassland;
- MG9 *Holcus lanatus*-*Deschampsia cespitosa* grassland; and
- MG10 *Juncus effusus*-*Holcus lanatus* rush pasture.

3.2.2 UKHab

The habitats recorded within the Assessment Boundary and their corresponding UKHab codes are listed below in decreasing order of extent:

- Degraded blanket bog (f1a6)
- Other upland acid grassland (g1b6)
- Modified grassland (g4)
- Bracken (g1c)
- Other rivers and streams (r2b)
- Upland flushes, fens and swamps (f2c)
- Dry heaths, upland (h1b5)
- Other lowland mixed deciduous woodland (w1f7)
- Other swamps f2f
- Other coniferous woodland (w2c)
- Other standing water, pond non-priority (r1g.45)
- Other inland rock and scree (s1d)
- Developed land, sealed surface (u1b)
- Buildings (u1b5)
- Other developed land (u1b6)
- Artificial unvegetated unsealed surface (u1c)
- Suburban mosaic of developed/natural surfaces (u1d)

All target note information and corresponding images can be found in Appendix B, whilst a summary of the above habitats is provided in Table 9-1-21.

Table 9-1-21: Summary habitat descriptions.

Habitat code	Associated secondary codes	Habitat type	Description
f1a6	N/A	Degraded blanket bog	The Assessment Boundary is dominated by degraded blanket bog. A summary of findings is provided below however please see the descriptions of the mire communities, and their mosaics, within section 3.2.1 above for more detailed information on species recorded. Area B1 contains deer grass, bilberry, heather common cottongrass amongst areas of exposed peat. Cowberry is present in drier areas near existing turbines whilst wetter patches were dominated by purple moor-grass with brown bent <i>Agrostis canina</i>, wavy hair-grass, heath rush, <i>Sphagnum fallax</i> plus star sedge in the wettest areas. Area B2 is purple moor-grass dominated with scattered soft-rush, fescue, sweet vernal grass, common bent but was noted to be <i>Sphagnum</i> poor with dense tussocks of purple moor-grass. Area B3 was noted to be a mosaic with acid grassland; with the bog areas being dominated by purple moor-grass with <i>Sphagnum capillifolium</i>. Area B4 was recorded as containing more grasses with red fescue, sweet vernal grass, wavy hair-grass, mat-grass, heath rush and reeds; but purple moor-grass remains present. B5 was dominated by purple moor-grass with little <i>Sphagnum</i> or cottongrass. However one area did contain tussocks of <i>Sphagnum capillifolium</i> and heath bedstraw along a vehicle track. B8 was noted to be wetter and contained a more varied sward of common cottongrass, purple moor-grass, <i>Polytrichum</i> sp., bilberry, <i>Sphagnum fallax</i> and <i>Sphagnum subnitens</i>. B11 contained bog asphodel along with star sedge, <i>Sphagnum subnitens</i>, <i>Sphagnum capillifolium</i>, common cottongrass and purple moor-grass. Whilst area B13 is still degraded in nature, it did contain heather, bilberry, common cottongrass plus <i>Sphagnum papillosum</i>, <i>Sphagnum subnitens</i>, <i>Sphagnum fallax</i> and <i>Sphagnum cuspidatum</i>, with purple moor-grass present in smaller quantities.
f2c	N/A	Upland flushes fens and swamps	This includes a habitat mosaic comprising 70% flush habitat and 30% degraded bog. This mosaic contained purple moor-grass, soft-rush and velvet bent.
f2f	N/A	Other wetlands	Fen F2 is a flush containing soft-rush, marsh willowherb <i>Epilobium palustre</i>, common cottongrass, common bent, sweet vernal grass, common sedge, marsh thistle, <i>Polytrichum</i> sp., short-fruited willowherb <i>Epilobium obscurum</i>, lady fern and <i>Sphagnum fallax</i>. Fen F3 contained soft-rush, marsh violet <i>Viola palustris</i>, common sorrel, tufted hair-grass, common cottongrass, velvet bent, marsh willowherb, common sedge, marsh bedstraw, <i>Polytrichum</i> sp., <i>Sphagnum</i> sp. and sharp-flowered rush <i>Juncus acutiflorus</i>. Fen F4 was dominated by soft-rush with lady fern, bog stitchwort <i>Stellaria alsine</i>, marsh willowherb and tufted hair-grass, with purple moor-grass in less reed prevalent areas. Fen F5 comprised compact rush, common cottongrass, marsh willowherb and celery-leaved buttercup <i>Ranunculus sceleratus</i>. Fen F6 comprised mostly of soft-rush with small amounts of bracken <i>Pteridium aquilinum</i> and <i>Sphagnum fallax</i>. Fen F7 was soft-rush dominated M25 <i>Molinia caerulea</i> – <i>Potentilla erecta</i> mire. Fen F8 contained soft-rush, purple moor-grass, sweet vernal grass and <i>Sphagnum fallax</i>.
g1b6	102 – Sheep grazed, 15	Other upland acid grassland	Multiple areas of upland acid grassland were recorded across the Assessment Boundary, some of which were sheep grazed, rush dominated and/or contained areas of scattered rush.

Habitat code	Associated secondary codes	Habitat type	Description
	– Rushes dominant, 14 – Scattered rushes		Please refer to NVC communities U4, U5 and U6 in section 3.2.1 above for more details on species recorded within these areas.
g1c	N/A	Bracken	Multiple areas dominated by bracken across the Assessment Boundary.
g4	N/A	Modified grassland	Multiple areas of modified grassland throughout the Assessment Boundary. These areas typically possessed a short sward and approximately 4-5 species per m ² . Species noted includes common bent, annual meadow grass <i>Poa annua</i> , perennial rye grass <i>Lolium perenne</i> , white clover, sweet vernal grass, creeping buttercup, thistle <i>Cirsium</i> sp. and soft-rush.
g4	102 – Sheep grazed	Modified grassland	Area G14 comprised perennial rye grass, smooth meadow grass <i>Poa pratensis</i> , crested dog's-tail <i>Cynosurus cristatus</i> , creeping buttercup, white clover, red fescue, common mouse ear, creeping bent and Yorkshire fog. The area was short mown, poor condition and contained 5 species per m ² .
g4	101 – Cattle grazed	Modified grassland	Area G25 contained sweet vernal grass, mat-grass, tormentil, heath bedstraw, meadow grass, perennial rye grass, crested dog's-tail, white clover, creeping buttercup and Yorkshire fog.
g4	103 – Horse grazed	Modified grassland	Area G16 had a very short sward and was dominated by soft-rush with common bent, creeping bent, Yorkshire fog, white clover and crested dog's-tail.
g4	102 – Sheep grazed, 15 – Rushes dominant	Modified grassland	Area G27 is a sheep grazed field containing annual meadow grass, scattered soft-rush, common bent, white clover, sweet vernal grass, crested dog's-tail, creeping buttercup and occasional tormentil. This area becomes more reed dominated in places with marsh thistle, willow herb, rough meadow grass <i>Poa trivialis</i> and scattered bracken. Area G8 supported a 6cm sward of annual meadow grass, rough meadow grass and common bent. Area G9 had rough meadow grass, white clover, common bent and occasional mat-grass with a short 5cm sward.
g4	102 – Sheep grazed, 503 – Wet	Modified grassland	Grassland G10 was dominated by common sedge <i>Carex nigra</i> with heath rush, <i>Polytrichum</i> sp., velvet bent and rough meadow grass, with hare's-tail cottongrass present in wetter patches.
g4	15 – Rushes dominant	Modified grassland	Grassland G26 is dominated by soft-rush with a short sward containing annual meadow grass, foxglove <i>Digitalis</i> sp., fescue, common bent, smooth meadow grass, Yorkshire fog and sweet vernal grass; with 4 species per m ² . Similarly, G11 is also dominated by soft-rush with mat-grass, common bent, Yorkshire fog, white clover, sweet vernal grass, marsh thistle, tufted hair-grass and was noted to support a 10cm sward with 3 species per m ² . G23 had a 10cm sward with Yorkshire fog, smooth meadow grass, annual meadow grass, sweet vernal grass, common bent, tufted hair-grass with small amounts of tormentil noted amongst the rushes. A total of 6 species per m ² were recorded.
g4	14 – Scattered rushes	Modified grassland	Grassland G50 contains soft-rush, spear thistle, cock's-foot grass, white clover, perennial rye grass, fescue and Yorkshire fog.
g4	32 – Scattered trees	Modified grassland	Grassland G12 comprised purple moor grass with planted birch <i>Betula</i> sp. trees along with wavy hair-grass and sheep's fescue.
h1b5	N/A	Dry heaths upland (H4030)	Seven areas of poor condition heathland. Area He1 is a short 15cm sward grassland dominated by bilberry with sweet vernal grass and red fescue plus occasional purple moor-grass noted. Area He2 was noted to be similar in composition to He1; however, common heather is present in addition to cowberry.

Habitat code	Associated secondary codes	Habitat type	Description
			In area He4 bilberry becomes more dominant with mat-grass, heath rush, wavy hair-grass and heather present. One area of this heathland habitat became a mosaic with degraded bog in wetter areas. This mosaic was approximately 90% h1b5 but contained common cottongrass, red fescue, deer grass and <i>Polytrichum</i> sp..
h1b5	15 – Rushes dominant	Dry heaths upland (H4030)	Three areas of poor condition heathland where rushes were dominant. Area He3 was noted to be on a steep gully and contained bilberry, wavy hair-grass, common bent, red fescue, mat-grass and velvet bent.
r1g	40 – Pond (Priority habitat)	Other standing water	A single pond, namely P7, was recorded as being a priority pond in moderate condition.
r1g	41 – Pond (non-priority)	Other standing water	Four non-priority ponds within the Assessment Boundary; three of which were assessed as being moderate condition and one as poor condition.
s1d	N/A	Other inland rock and scree	Cliff with scree coming down.
u1b6	839 – Track	Other developed land	Areas of hardstanding including tracks.
u1c	839 – Track	Artificial unvegetated unsealed surface	Tracks within the Assessment Boundary.
u1c	N/A	Artificial unvegetated unsealed surface	Gravel area with moss growing in patches.
u1d	N/A	Suburban mosaic of developed/ natural surfaces	Areas of primarily residential buildings with gardens.
u1b5	N/A	Buildings	Several areas of buildings were identified across the Assessment Boundary including an area of houses with slate roofs likely providing a minimum of moderate suitability to support roosting bats. A cow shed comprising of a single storey brick structure, open on the western side, with a plastic corrugated roof was present. This provides moderate suitability for roosting bats due to the presence of holes within the walls.
w2c	29 - Plantation	Other coniferous woodland	Recently planted area of coniferous woodland in poor condition.
w2c	N/A	Other coniferous woodland	Scots pine <i>Pinus sylvestris</i> dominated woodland with alder <i>Alnus glutinosa</i> present with a grassy understorey of wavy hair-grass, sweet vernal grass and common bent.
w2c	29 - Plantation	Other coniferous woodland	Recently planted area of Scots Pine <i>Pinus sylvestris</i>
w1f7	N/A	Other Lowland mixed deciduous woodland	Area of trees on a steep gulf dominated by mature beech <i>Fagus sylvatica</i> with oak <i>Quercus</i> sp., Sycamore <i>Acer pseudoplatanus</i> and immature rowan <i>Sorbus aucuparia</i> . Understorey contained a lot of bare ground with tufted hair-grass, common bent, sweet vernal grass and was similar in composition to the adjacent field.

3.3 Habitat Loss

A summary of notable NVC communities recorded within the Assessment Boundary is detailed in Table 9-9-22 and can be seen in Figure 9-3: NVC Survey Results.

On a precautionary basis, total loss includes habitats within 10m of all proposed infrastructure to account for indirect drying effects. Much of the Assessment Boundary is modified by livestock grazing, vegetation management and drainage. As such, an indirect loss buffer of 10m from all proposed infrastructure is considered appropriate for potential priority peatlands, which also applies to all habitats including GWDTEs.

Table 9-1- 22: Predicted losses of priority habitats within the Assessment Boundary.

NVC Code	Total area within Assessment Boundary (ha)	Direct loss (ha)	Indirect loss (ha)	Total loss (ha)	Percentage of loss (%)
M25a <i>Molinia caerulea</i> – <i>Potentilla erecta</i> mire, <i>Erica tetralix</i> sub-community	361.17	17.81	14.93	32.73	9.06
M25b <i>Molinia caerulea</i> – <i>Potentilla erecta</i> mire, <i>Anthoxanthum odoratum</i> sub-community	76.67	0.00	0.02	0.02	0.03
M20 <i>Eriophorum vaginatum</i> blanket and raised mire	4.13	0.00	0.02	0.01	0.24
M3 <i>Eriophorum angustifolium</i> bog pool	3.16	0.37	0.24	0.61	19.30
M6 <i>Carex echinata</i> - <i>Sphagnum recurvum</i> / <i>auriculatum</i> mire	18.20	<0.001	0.03	0.03	0.16
M17 <i>Trichophorum germanicum</i> – <i>Eriophorum vaginatum</i> blanket mire	2.27	0.00	0.00	0.00	0.00
H18 <i>Vaccinium myrtillus</i> – <i>Deschampsia flexuosa</i> heath	4.64	0.00	0.00	0.00	0.00
H12 <i>Calluna vulgaris</i> - <i>Vaccinium myrtillus</i> heath	5.20	0.00	0.00	0.00	0.00
H12c <i>Calluna vulgaris</i> - <i>Vaccinium myrtillus</i> heath, <i>Galium saxatile</i> – <i>Festuca ovina</i> sub-community	2.18	0.00	0.00	0.00	0.00
M1 <i>Sphagnum auriculatum</i> bog pool	0.10	0.00	0.00	0.00	0.00
S10 Water horsetail <i>Equisetum fluviatile</i> swamp	0.25	0.00	0.00	0.00	0.00

NVC Code	Total area within Assessment Boundary (ha)	Direct loss (ha)	Indirect loss (ha)	Total loss (ha)	Percentage of loss (%)
80% M20 <i>Eriophorum vaginatum</i> blanket and raised mire and 20% M3 <i>Eriophorum angustifolium</i> bog pool community	26.70	2.39	2.72	5.11	19.14
40% M20 <i>Eriophorum vaginatum</i> blanket and raised mire and 60% M3 <i>Eriophorum angustifolium</i> bog pool community	92.32	3.16	3.09	6.25	6.77
40% M25b <i>Molinia caerulea</i> – <i>Potentilla erecta</i> mire, <i>Anthoxanthum odoratum</i> sub-community, 40% M6c <i>Carex echinata</i> - <i>Sphagnum recurvum</i> / <i>auriculatum</i> mire, <i>Juncus effusus</i> sub-community and 20% U6d <i>Juncus squarrosus</i> - <i>Festuca ovina</i> acid grassland, <i>Agrostis capillaris</i> - <i>Luzula multiflora</i> sub-community	0.43	0.00	0.00	0.00	0.00
60% M25b <i>Molinia caerulea</i> – <i>Potentilla erecta</i> mire, <i>Anthoxanthum odoratum</i> sub-community and 40% U5a <i>Nardus stricta</i> – <i>Galium saxatile</i> acid grassland, species-poor sub-community	3.45	0.00	0.00	0.00	0.00
70% M25b <i>Molinia caerulea</i> – <i>Potentilla erecta</i> mire, <i>Anthoxanthum odoratum</i> sub-community and 30% U5a <i>Nardus stricta</i> – <i>Galium saxatile</i> acid grassland, species-poor sub-community	0.66	0.00	0.00	0.00	0.00
80% M25b <i>Molinia caerulea</i> – <i>Potentilla erecta</i> mire, <i>Anthoxanthum odoratum</i> sub-community and 20%	0.57	0.00	0.00	0.00	0.00

NVC Code	Total area within Assessment Boundary (ha)	Direct loss (ha)	Indirect loss (ha)	Total loss (ha)	Percentage of loss (%)
U5a <i>Nardus stricta</i> – <i>Galium saxatile</i> acid grassland, species-poor sub-community					

4. Summary

The NVC surveys were targeted to record communities of potential conservation value and/or potential groundwater dependency. An ecological assessment was carried out for potential GWDTE NVC categories within the Assessment Boundary.

Five potentially groundwater dependant NVC communities were found; however, determination of complete groundwater dependency is complicated by the ability of many vegetation communities to use whatever source of water is available. In some topographical and hydrogeological conditions, a particular community can be groundwater-dependent whereas in others the same community is surface water-dependent. Seasonal patterns of water use provide an additional level of complexity, with groundwater reliance typically being greater in the summer when rainfall and surface water are less available. To fully determine GWDTE status see Chapter 14: Hydrology, Hydrogeology and Peatland for further information.

Seven NVC communities that may support Annex I habitats are considered to be present:

- M25 - 7130 Blanket bogs and 7120 Degraded raised bogs still capable of natural regeneration
- M20 - 7130 Blanket bogs and 7110 Active raised bogs
- M3 - 7110 Active raised bogs
- M17 - 7130 Blanket bogs and 7120 Degraded raised bogs still capable of natural regeneration
- H18 - 4030 European dry heaths and 4060 Alpine and Boreal heaths
- H12 - 4030 European dry heaths and 4060 Alpine and Boreal heaths
- M1 - 7110 Active raised bogs
- M2 - 7110 Active raised bogs

Four potential HPs recognised under Section 41 are present:

- Blanket bog (six types – M25, M20, M3, M17, M1 and M2)
- Purple moor-grass and rush pastures (M25)
- Upland Flushes, Fens and Swamps (two types - M6 and S10)
- Upland heathland (two types – H18 and H12)

5. References

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Figures

9-1 – Designated sites within 10km

9-2 - UKHab Baseline

9-3 – NVC Survey Results

Appendices



Appendix A. Target notes, images and further details relating to the NVC surveys.

Target notes are displayed on Figure 9-3.

Table 9-1-23: Target notes and images for the NVC surveys.

Target note	Image
M25a <i>Molinia caerulea</i> – <i>Potentilla erecta</i> mire, <i>Erica tetralix</i> sub-community.	

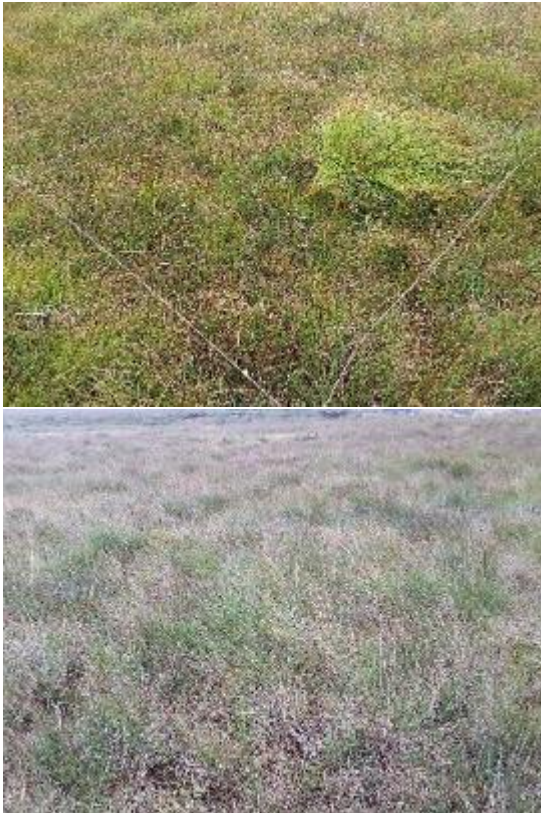
Target note	Image
	
M25b <i>Molinia caerulea</i> – <i>Potentilla erecta</i> mire, <i>Anthoxanthum odoratum</i> sub-community.	

Target note	Image
	
M20 <i>Eriophorum vaginatum</i> blanket and raised mire.	

Target note	Image
	
M3 <i>Eriophorum angustifolium</i> bog pool.	

Target note	Image
	
Mosaic between M20 <i>Eriophorum vaginatum</i> blanket and raised mire and M3 <i>Eriophorum angustifolium</i> bog pool.	

Target note	Image
M6c <i>Carex echinata</i>-<i>Sphagnum recurvum/auriculatum</i> mire, <i>Juncus effusus</i> sub-community.	 The image column contains three photographs. The top photograph is a close-up of tall, thin, green grasses with small, yellowish-brown flower heads, identified as <i>Carex echinata</i>. The middle photograph shows a dense field of similar grasses, identified as <i>Sphagnum recurvum/auriculatum</i>, under a blue sky with scattered clouds. The bottom photograph provides a wider view of the mire habitat, showing a mix of green and brown vegetation with a small tree in the distance under a cloudy sky.

Target note	Image
M17 <i>Trichophorum germanicum</i> – <i>Eriophorum vaginatum</i> blanket mire.	

Target note	Image
H18a <i>Vaccinium myrtillus</i> - <i>Deschampsia flexuosa</i> heath, <i>Hylocomium splendens</i> – <i>Rhytidiadelphus loreus</i> sub-community.	

Target note	Image
H12 <i>Calluna vulgaris</i> - <i>Vaccinium myrtillus</i> heath.	
Peat noted to be greater than 1m in depth between TN21 and TN36.	

Target note	Image
Eroded peat within M3 <i>Eriophorum angustifolium</i> bog pool.	

Target note	Image
Peat damaged by vehicles near TN19 and TN20 in the west of the Site.	

Target note	Image
Damaged peat from erection of pylon near TN27.	
Area of M25 <i>Molinia caerulea</i> –<i>Potentilla erecta</i> mire with recent evidence of burning, causing purple moor-grass to die back.	

Target note	Image
Heath star-moss <i>Campylopus introflexus</i> present in quadrat 28 (Easting: 385224, Northing: 419303) within M20 <i>Eriophorum vaginatum</i> blanket and raised mire. This is an invasive species .	
Lemon-scented fern <i>Oreopteris limbosperma</i> present on slope near TN9-TN12.	

Appendix B. Target notes, images and further details relating to the UKHab surveys.

Target notes are displayed on Figure 9-2

Table 9-1- 24: Target notes and images for the UKHab surveys.

Target note	Image
TN1. Confidential and included in Appendix 9-2	Confidential and included in Appendix 9-2
TN2. Large standing deadwood trunk. Moderate suitability to support roosting bats due to a number of holes and cracks in the trunk.	
TN3. Areas of limescale that could be an old quarry.	

Target note	Image
TN4. Bog pool.	
TN5. Remains of old buildings.	

Target note	Image
TN6. Mature beech tree with crevice as the base of the trunk. Assessed as providing high suitability for roosting bats.	
TN7. <i>Sphagnum fibreatum</i> present.	

Target note	Image
TN8. Bog pool with <i>Sphagnum</i> sp., common cottongrass and soft-rush.	
TN9. Bog pool.	

Target note	Image
TN10. More exposed peat, with this area classified as M20 within the NVC surveys.	
TN11. Area too small to map. This patch was dominated by deer grass, with bell Heather <i>Erica cinerea</i>, bog asphodel, common cottongrass, hare's-tail cottongrass, and cranberry.	

Target note	Image
TN13. Sundew <i>Drosera</i> sp. found.	
TN14. Rocky outcrop, which would make suitable habitat for basking reptiles.	
TN16. Old quarried area.	

Target note	Image
TN17. Area of exposed peat.	
TN18. Exposed peat, likely the worst area of the Assessment Boundary for peat degradation.	

Target note	Image
TN19. Existing river crossing in the form of a stone bridge.	
TN20. Exposed peat.	

Target note	Image
TN21. Area about 5m² of more exposed surface peat.	