Scottish Power Energy Networks

Kennoxhead to Dalquhandy OHL

National Vegetation Classification Report

2480372

MARCH 2021

RSK biocensus
EXPERTS IN ECOLOGY

RSK GENERAL NOTES

Project No.: 248372

Title: Kennoxhead to Dalquhandy – National Vegetation Classification Report

Client: Scottish Power Energy Networks

Date: March 2021

Office: Glasgow

Status: Rev 00

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EXECUTIVE SUMMARY

1. This report presents the results of a national vegetation classification (NVC) survey and ground water dependent terrestrial ecosystem (GWDTE) assessment undertaken along the route of a proposed 132kV overhead line grid connection between Kennoxhead wind farm and Coalburn substation in South Lanarkshire, over a distance of *c.*14 km.
2. There are several designated sites close to the site, including Coalburn Moss Special Area of Conservation (SAC) and Site of Special Scientific Interest (SSSI) and Muirkirk Uplands/Muirkirk and North Lowther Uplands SSSI and Special Protection Area (SPA). A habitat regulations assessment (HRA) will be required in relation to these internationally designated sites.
3. The NVC surveys have revealed the presence of a number of potential GWDTE habitats, as well as Annex I and Scottish Biodiversity List Priority Habitats. The condition of these habitats varies as there has been a degree of modification throughout the site and therefore not all instances of community types will constitute an Annex 1 habitat.
4. There are no plant species from the habitats recorded on the site that are critically endangered, endangered or vulnerable on the IUCN Red list. The non-native invasive (NNIS) plant species Japanese Knotweed and Japanese Rose were found along the route.
5. Embedded mitigation is advised at the design stage for the OHL route as well as detailed mitigation within the construction environmental management plan (CEMP) documentation to protect sensitive receptors along the route such as wetlands and peat bog habitat. This report has identified some broad mitigation measures.

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1.0 INTRODUCTION

1.1 Purpose of this report

1.1.1 This report presents the results of a national vegetation classification (NVC) survey and ground water dependent terrestrial ecosystem (GWDTE) survey carried out in July and August 2020 along the route of a proposed 132kV overhead line grid connection between Kennoxhead wind farm and Coalburn substation in South Lanarkshire. The overhead line will be *c.*14 km in length and constructed using wooden poles with lines *c.*13 m in height.

1.1.2 This survey was commissioned in order to map and detail individual plant species and NVC communities found within the development area. This information is required to make an assessment of the value of the habitats along the proposed overhead line route, identify those areas of greatest ecological interest (i.e. Annex I habitats[1]; potential GWDTE[2]; and Scottish Biodiversity List (SBL)[3] priority habitats), the potential impacts upon them and how these impacts might be mitigated.

1.1.3 The survey area (termed 'the site' throughout this report) includes all areas within a 250 m buffer of the route alignment for the botanical and GWDTE element (See Figure 1).

1.2 Landscape context

1.2.1 The route passes through varied habitats including two disused quarries, peat bog, grazed fields and plantation woodland. It also crosses the Douglas Water. There are numerous small waterbodies and burns in the vicinity of the route. Part of the Muirkirk Uplands/Muirkirk and North Lowther Uplands Site of Special Scientific Interest (SSSI)/Special Protection Area (SPA) lies immediately to the south west of the route, and Coalburn Moss Special Area of Conservation (SAC)/ SSSI lies immediately to the south of the northern most section of the route and planned substation.

[1] As defined by the Council Directive 92/43/EEC on the Conservation of natural habitats and of wild fauna and flora – the 'Habitats Directive' https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:31992L0043

[2] As defined within SEPA (version 3, 2017). Guidance Note 31: Guidance on Assessing the Impacts of Windfarm Development Proposals on Groundwater Abstractions and Groundwater Dependent Terrestrial Ecosystems. https://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

[3] As produced by the Scottish Government (2013). Available at: https://www.nature.scot/scottish-biodiversity-list. Accessed: October 2020.

2.0 METHODS

2.1 General

2.1.1 The survey was undertaken in line with standard guidance for NVC surveys, as detailed in the NVC Users' Handbook (Rodwell, 2006)[4] and is an accepted core standard. 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.

2.1.2 The survey was carried out in July and August 2020 by experienced botanist Irene Tierney of IMTeco Ltd, on behalf of RSK Biocensus.

2.1.3 The site was walked through, and individual plants and plant communities (or mosaics and transitions thereof) were recorded with the use of quadrats and whole community species lists were compiled.

2.1.4 NVC communities were attributed to the mapped polygons and matching field data against published floristic tables (Rodwell, 1991 et seq)[5]. Stands were classified to sub-community level where possible, although in many cases the vegetation was mapped to community level only because the vegetation was too species-poor or patches were too small to allow meaningful sub-community determination; or because some areas exhibited features or fine-scale patterns of two or more sub-communities.

2.1.5 In order to access the potential risk to GWDTE, a distance of a 250 m survey zone (SEPA, 2017) was been surveyed around the proposed overhead line location (with possible excavations deeper than 1 m). No track information was given as part of the initial study area and therefore no additional 100 m survey zone for around tracks out with the main study area (with possible excavations less than 1 m deep) was carried out. The infrastructure and the 250 m buffer zones are illustrated in Figure 1.

2.1.6 Figure 2 illustrates the areas where High, Moderate & Low GWDTE communities are located within the study area. This map also illustrates the location of the overhead line route and the 250 m buffer.

2.1.7 Vascular plants follow the nomenclature of The Botanical Society for the British Isles database (BSBI[6]) with all other flora and fauna following the UK Species Inventory (Natural History Museum[7]), New Flora of the British Isles, Fourth edition (Stace, 2019), Atherton et al (2010) for bryophytes and Purvis W. (2000) for lichens.

2.1.8 Common names are provided first with the scientific name following in brackets in the first instance of each name.

[4] Rodwell, J.S. (2006). NVC Users' Handbook. ISBN 978 1 86107 574 1. Available at https://data.jncc.gov.uk/data/a407ebfc-2859-49cf-9710-1bde9c8e28c7/JNCC-NVC-UsersHandbook-2006.pdf

[5] Rodwell, J. S. (Ed). (1991 et seq.) British Plant Communities Volumes 1–5. Cambridge University Press, Cambridge.

[6] https://database.bsbi.org

[7] https://www.nhm.ac.uk/our-science/data/uk-species/species/index.html

2.2 Constraints and limitations

2.2.1 Some areas of the route were very wet making it difficult to survey and record all plant species present.

2.2.2 At the time of the survey, an area of land west of Coalburn had recently been burned and as a result it was not possible to identify the plant species present.

2.2.3 The results of the survey and assessment work undertaken are representative at the time of surveying. Botanical lists should not be considered fully comprehensive, as rarely-occurring or early or late-flowering species may have been missed. This will not affect the broader assessment of the ecological value of the site and its habitats. The absence of evidence of any particular species should not be taken as conclusive proof that the species is not present or that it will not be present in the future.

2.3 Evaluation criteria

2.3.1 Habitats can be classified as 'Priority Habitats' - Habitats of Principal Importance as listed in UK Biodiversity Action Plan Priority Habitat Descriptions (revised 2011)[8]. The NVC communities were also compared with other habitat classifications in order to assess their sensitivity and conservation interest or value. The NVC communities were compared against the following three classifications:

- SEPA guidance on GWDTE (SEPA 2017a; 2017b).
- Annexe 1 Habitats; Habitats Directive (92/43/EEC)[9] .
- Scottish Biodiversity list (SBL)[10] priority habitats

2.3.2 SEPA has classified a number of NVC communities as potentially dependent on groundwater (SEPA, 2017a & 2017b). Wetlands or habitats containing these particular NVC communities are to be considered GWDTE.

2.3.3 Many of the NVC communities on the list are very common habitat types across Scotland, and some are otherwise generally of low ecological value. Furthermore, some of the NVC communities may be considered GWDTE only in certain hydrogeological settings. Designation as a potential GWDTE does not therefore infer an intrinsic biodiversity value, and GWDTE status has not been used as criteria to determine a habitats respective conservation importance. There is however a statutory requirement to consider GWDTEs and the data gathered during the NVC surveys has been used to inform this assessment.

[8] https://hub.jncc.gov.uk/assets/2728792c-c8c6-4b8c-9ccd-a908cb0f1432

[9] Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora. https://www.legislation.gov.uk/eudr/1992/43/annex/I

[10] https://www.nature.scot/scotlands-biodiversity/scottish-biodiversity-strategy/scottish-biodiversity-list

3.0 RESULTS

3.1 Botanical survey and evaluation

3.1.1 A total of forty-five NVC vegetation types, including the sub-categories, were found in the study area. The NVC communities are listed in Table 1 and summarized below with a detailed description in Appendix A. Non-NVC types were also recorded within the study area and are listed in Table 2.

3.1.2 In summary the habitat is varied over the length of the proposed development and consists of commercial conifer plantation, early mixed woodland plantations, natural woodlands, agricultural grassland, bracken, open hillside with associated grass communities, open water, wetland habitats and peat vegetation on the lower slopes and flatter ground. Dry heath is also evident on disused open mine areas. Peatland habitat is recorded over the study area with some peatland communities throughout and is prominent in the northern section with Class 1 peat soil adjacent to Coalburn Moss.

3.1.3 The NVC map for the proposed overhead line route is shown in Figure 1 which shows the route alignment and the phase 1 habitat survey overlaid with details of where individual NVC community types are located.

Table 1: **National Vegetation Classification types recorded within the study area of the proposed overhead line route.**

NVC code	Description
M6	*Carex echinata-Sphagnum recurvum/auriculatum* mire
M6c	*Carex echinata-Sphagnum recurvum/auriculatum* mire*, Juncus effusus* sub-community
M6d	*Carex echinata-Sphagnum recurvum/auriculatum* mire*, Juncus acutiflorus* sub-community
M15	*Trichophorum cespitosum-Erica tetralix* wet heath
M15b	*Trichophorum cespitosum-Erica tetralix* wet heath, typical sub community
M15d	*Scirpus cespitosus-Erica tetralix* wet heath*, Vaccinium myrtillus* sub-community
M17	*Trichophorum germanicum – Eriophorum vaginatum* blanket mire
M18	*Erica tetralix-Sphagnum papillosum* raised and blanket mire
M19	*Calluna vulgaris-Eriophorum vaginatum* blanket mire
M19a	*Calluna vulgaris-Eriophorum vaginatum* blanket mire; *Erica tetralix* sub community
M20	*Eriophorum vaginatum* blanket and raised mire
M20a	*Eriophorum vaginatum* blanket and raised mire, species-poor sub-community
M23	*Juncus effusus/acutiflorus-Galium palustre* rush-pasture

NVC code	Description
M23a	*Juncus effusus/acutiflorus-Galium palustre* rush-pasture, *Juncus acutiflorus* sub-community
M23b	*Juncus effusus/acutiflorus-Galium palustre* rush-pasture, *Juncus effusus* sub-community
M25	*Molinia caerulea-Potentilla erecta* mire
M25a	*Molinia caerulea-Potentilla erecta* mire, *Erica tetralix* sub-community
M25b	*Molinia caerulea-Potentilla erecta* mire, *Anthoxanthum* odoratum sub-community
M27	*Filipendula ulmaria-Angelica sylvestris* mire
H9	*Calluna vulgaris-Deschampsia flexuosa* heath
H10	*Calluna vulgaris – Erica cinerea heath*
H12	*Calluna vulgaris – Vaccinium myrtillus heath*
U2	*Deschampsia flexuosa* grassland
U4	*Festuca ovina-Agrostis capillaris-Galium saxatile* grassland
U4a	*Festuca ovina-Agrostis capillaris-Galium saxatile* grassland, typical sub-community
U4b	*Festuca ovina-Agrostis capillaris-Galium saxatile* grassland, *Holcus lanatus-Trifolium* repens sub-community
U4d	*Festuca ovina-Agrostis capillaris-Galium saxatile* grassland, *Holcus lanatus-Trifolium repens* sub-community
U5a	*Nardus stricta – Galium saxatile* grassland, species-poor sub-community
U5b	*Nardus stricta-Galium saxatile* grassland, *Agrostis canina-Polytrichum commune* sub-community
U6	*Juncus squarrosus – Festuca ovina* grassland
U20	*Pteridium aquilinum – Galium saxatile* community
MG6	*Lolium perenne – Cynosurus cristatus* grassland
MG7	*Lolium perenne leys* and related grasslands
MG9	*Holcus lanatus – Deschampsia cespitosa* grassland
MG10	*Holcus lanatus – Juncus effusus* rush-pasture
MG10a	*Holcus lanatus-Juncus effusus* rush-pasture, typical sub-community
W7	*Alnus glutinosa-Fraxinus excelsior-Lysimachia nemorum* woodland
W11	*Quercus petraea – Betula pubescens* – Oxalis acetosella woodland
W23	*Ulex europaeus – Rubus fruticosus* scrub
S9	*Carex rostrata* swamp
S10	*Equisetum fluviatile* swamp
S12	*Typha latifolia* swamp
OV24	*Urtica dioica - Galium aparine* community
OV25	*Urtica dioica – Cirsium arvense* community

NVC code	Description
OV27	*Chamerion angustifolium* community

Table 2: Non-NVC types recorded within the study area of the proposed overhead line route

NVC type	Description
Je/Ja	Non-NVC *J. effusus/acutiflorus*
CP/YCP	Commercial Conifer plantations (Y – young)
BP/YBP	Broadleaved plantations (Y – young)
MW	Semi-natural mixed woodland
MP	Mixed Plantations
CF	Clearfell conifer plantation
SW	Standing water
RW	Running water
Sp	Spoil
DG	Cultivated/disturbed land - ephemeral/short perennial
BG	Bare ground
INNS	Invasive Species

4.0 EVALUATION & DISCUSSION

4.1 Evaluation of Botanical Interest

4.1.1 There are a wide range of habitats found within the study area which consist of raised bog, heath, fen, acid grassland, rush pastures, scrub, woodland, vegetation of open habitats and open water.

4.1.2 In regard to conservation interests the following habitats were most notable:

i) Distinct areas of modified mire communities (M17, M18, M19, M19a, M20 and M20a) are present within the study area and are located at Kennoxhead open cast mine, here the bog vegetative communities would be regarded as in an unfavourable condition, but still with the potential to recover or are recovering. This can also be seen in the areas of historical open cast mines near Coalburn and the larger swathes of bog habitat north of Coalburn.

ii) The OHL route ends at Coalburn substation, which is also adjacent to Coalburn Moss SSSI/SAC designated for its active raised bog (a priority habitat) and is one of the best examples of lowland raised bog (that also has degraded bog), which is still capable of natural regeneration.

iii) Where the route traverses close to the edge of Coalburn Moss the vegetative community that lies over the peat, or around the margins of the bog consist of wet and dry grassland, dominated by *Juncus* spp. and *Deschampsia* spp respectively. These grasslands are considered to be part of the same hydrological unit as the active raised bog, and they are important in maintaining the hydrological condition of the site as a whole.

Groundwater Dependent Terrestrial Ecosystems (GWDTE's)

4.1.3 SEPA has classified a number of NVC communities as potentially dependent on groundwater (SEPA, 2017a & 2017b). Wetlands or habitats containing these particular NVC communities are to be considered GWDTE.

4.1.4 Many of the NVC communities on the list are very common habitat types across Scotland, and some are otherwise generally of low ecological value. Furthermore, some of the NVC communities may be considered as GWDTE only in certain hydrogeological settings. Designation as a potential GWDTE does not therefore infer an intrinsic biodiversity value, and GWDTE status has not been used as criteria to determine a habitats respective conservation importance. There is however, a statutory requirement to consider GWDTEs and the data gathered during the NVC surveys has been used to inform this assessment.

4.1.5 Among the habitats found in this survey, the following are classed by the Scottish Environmental Protection Agency (SEPA, 2017a; 2017b) as GWDTE (Table 3).

Table 3: NVC communities and their GWDTE score (1= Strong dependency upon groundwater, 2= likely to be some dependency, 3= slight or no dependency).

NVC Code & Description	GWDTE score (1,2, or 3)
M6 *Carex echinata-Sphagnum recurvum/auriculatum* mire	1
W7 *Alnus glutinosa-Fraxinus excelsior-Lysimachia nemorum* woodland	1
M23 *Juncus effusus/acutiflorus-Galium palustre* rush-pasture	2(*1)
M15 *Trichophorum cespitosum-Erica tetralix* wet heath	2
M27 *Filipendula ulmaria-Angelica sylvestris* mire	2
U6 *Juncus squarrosus – Festuca ovina* grassland	2
MG9 *Holcus lanatus – Deschampsia cespitosa* grassland	2
MG10 *Holcus lanatus – Juncus effusus* rush-pasture	2
M25 *Molinia caerulea-Potentilla erecta* mire	3(*2)
M17 *Trichophorum germanicum – Eriophorum vaginatum* blanket mire	3
M18 *Erica tetralix-Sphagnum papillosum* raised and blanket mire	3
M19 *Calluna vulgaris-Eriophorum vaginatum* blanket mire	3
M20 *Eriophorum vaginatum* blanket and raised mire	3
H9 *Calluna vulgaris-Deschampsia flexuosa* heath	3
H10 *Calluna vulgaris – Erica cinerea* heath	3
H12 *Calluna vulgaris – Vaccinium myrtillus* heath	3
U2 *Deschampsia flexuosa* grassland	3
U4 *Festuca ovina-Agrostis capillaris-Galium saxatile* grassland	3
U5 *Nardus stricta – Galium saxatile* grassland	3
S9 *Carex rostrata* swamp	3
S10 *Equisetum fluviatile* swamp	3
S12 *Typha latifolia* swamp	3
* ***GWDTE Score Scotland or may vary for different hydroecological settings*** **GWDTE Code (LUPS -GU31, SEPA 2017); Colour Code** **High=Red** **Moderate=Yellow**	

Explanation of GWDTE scores:

1 – Strong dependency upon groundwater discharge.

2 – Likely to be some dependency on groundwater discharge.

3 – Groundwater discharge usually irrelevant: site fed by other water sources.

4.1.6 It is important to note that the GWDTE classification system above uses the data for the Scotland (GW) Dependency Score (UKTAG Guidance 5ab Annex 1)[11], or where it may vary for different hydroecological conditions as noted by * in brackets.

4.1.7 Using SEPA's guidance the habitats are colour-coded according to their dependency to groundwater as illustrated in Table 3. Those communities which may have limited (moderate) dependency on groundwater in certain settings are marked in yellow and NVC communities recorded that are likely to be considered high, or sensitive GWDTE in certain hydrogeological settings are highlighted in red.

4.1.8 This code has been used in the mapping of identified potential GWDTE and can be viewed in Figure 2. The potential GWDTE sensitivity of each polygon containing a potential GWDTE is classified on a multiple tier structure, as follows:

- Highly – dominant' where potential high GWDTE's dominate the polygon.
- Highly - sub-dominant' where potential high GWDTE's make up a sub-dominant percentage cover of the polygon.
- Moderately – dominant' where potential moderate GWDTE's dominate the polygon and no potential high GWDTE's are present.
- Moderately - sub-dominant' where potential moderate GWDTE's make up a subdominant percentage cover of the polygon and no potential high GWDTE's are present.

4.1.9 Where a potential high GWDTE exists in a polygon, it outranks any potential moderate GWDTE communities within that same polygon. GWDTE sensitivity has been assigned solely on the SEPA listings (SEPA, 2017a & 2017b). Note: depending on a number of factors such as geology, superficial geology, presence of peat and topography, many of the potential GWDTE communities recorded may in fact be only partially groundwater fed or not dependent on groundwater. Determining the actual groundwater dependency of particular areas or habitat would require further detailed hydrological assessment and is outside the scope of this report.

Annex 1 Habitats

4.1.10 The Joint Nature Conservation Committee (JNCC) Annex I habitat listings and descriptions[12], have been used to compare with the survey results and field observations. A number of NVC communities can correlate to the various Annex I habitat types. However, the fact that an NVC community can be attributed to an Annex I type does not necessarily mean all instances of that NVC community actually constitutes Annex I habitat. Its Annex I status can depend on various factors such as quality, extent, species assemblages, geographical setting, substrates and so on.

4.1.11 The following NVC communities within the study area which constitute Annex I habitat are illustrated in Table 4. The NVC communities/sub-communities that correlate with Annex I types are discussed in the following sections.

[11] UKTAG Guidance 5ab Annex 1, http://www.wfduk.org/sites/default/files/Media/Characterisation%20of%20the%20water%20environment/UKTAG%20guidance%205%20ab%20ANNEX%201%20updated%205%20October%202009.pdf

[12] https://sac.jncc.gov.uk/habitat/

Table 4: National Vegetation Classification types recorded at the corresponding Annex 1 habitat types.

NVC type	Description	Annex 1 Code	Annex 1 Title
M15, M15b, M15d	*Trichophorum cespitosum-Erica tetralix* wet heath	4010	Northern Atlantic wet heaths with Erica tetralix
M17	*Trichophorum germanicum – Eriophorum vaginatum* blanket mire	7130	Blanket bog
M18	*Erica tetralix-Sphagnum papillosum* raised and blanket mire	7130	Blanket bog
M19, M19a	*Calluna vulgaris-Eriophorum vaginatum* blanket mire	7130	Blanket bog
M20	*Eriophorum vaginatum* blanket and raised mire	7130	Blanket bog
M20a	*Eriophorum vaginatum* blanket and raised mire, species-poor sub-community	7130	Blanket bog
M25, M25a, M25b	*Molinia caerulea-Potentilla erecta* mire	7130 (where peat depth > 0.5m	Blanket bog
H9	*Calluna vulgaris-Deschampsia flexuosa* heath	4030	European dry heaths
H10	*Calluna vulgaris – Erica cinerea heath*	4030	European dry heaths
H12	*Calluna vulgaris – Vaccinium myrtillus heath*	4030	European dry heaths

4010 Northern Atlantic wet heaths with *Erica tetralix*

4.1.12 Wet heath usually occurs on acidic, nutrient-poor substrates, such as shallow peats or sandy soils with impeded drainage. The vegetation is typically dominated by mixtures *Erica tetralix,* Calluna *vulgaris*, grasses, sedges and *Sphagnum* bog-mosses. All examples of M15 wet heath were included within the Annex 1 4010[13] Northern Atlantic wet heaths category.

4030 European dry heaths

4.1.13 European dry heaths typically occur on freely-draining, acidic to circumneutral soils with generally low nutrient content. Ericaceous dwarf shrubs dominate the vegetation. The

[13] https://sac.jncc.gov.uk/habitat/H4010/

most common dwarf shrub is *Calluna vulgaris*. All dry heath in the study area is semi-natural and derived from a long history of grazing and burning. The dry heath communities recorded of H9, H10, and H12, all fall within this Annex I type of 4030[14] European dry heaths.

4.1.14 The most common forms of dry heath in the study area, as noted in the community descriptions above, are species-poor, relatively botanically impoverished forms of *Calluna* dominated heath.

7130 Blanket Bog

4.1.15 Active bogs are defined as supporting a significant area of vegetation that is normally peat-forming. Typical species include the important peat-forming species, such as *Sphagnum* spp. and *Eriophorum* spp., or *Molinia caerulea* in certain circumstances, together with *Calluna vulgaris* and other ericaceous species. Annex I type 7130[15] Blanket bog correlates directly with a number of NVC communities within the study area, such as, the M17, M18, M19, M20 and M25 mires.

4.1.16 Much of the bog communities on the site have been subject to the effects of drainage, grazing, burning, forestry and mining activities and are regarded as modified. This is evident in the lack of other NVC blanket bog communities that would normally be associated with the NVC types found on site and are regarded to be poor or degraded forms of Annex I habitats.

4.1.17 M25 was found across the study area boundary. The M25 mire can fall within the blanket bog Annex I type, usually where the underlying peat depth is greater than 0.5 m and the habitat is wet and contains peat forming species. The example of M25 within the study area contained abundant *Sphagnum* moss, particularly where the M25a *Erica tetralix* sub-community was recorded. Therefore, these areas have also been classified as potential Annex I blanket bog.

Annex I Woodlands

4.1.18 None of the woodlands within the study area (W7 and W11) were considered to be referable to Annex I woodland types such as 91E0[16] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* or 91A0[17] Old sessile oak woods with *Ilex* and *Blechnum*, as the species assemblages, specific geographical, plantation origin or landscape settings did not align with any of these Annex I habitat types.

Scottish Biodiversity List Priority Habitats

4.1.19 The Scottish Biodiversity List (SBL) is a list of animals, plants and habitats that Scottish Ministers consider to be of principal importance for biodiversity conservation in Scotland. The SBL was published in 2005 to satisfy the requirement under Section 2(4) of The Nature Conservation (Scotland) Act 2004[18]. The SBL identifies habitats which are the highest priority for biodiversity conservation in Scotland: these are termed

[14] https://sac.jncc.gov.uk/habitat/H4030/
[15] https://sac.jncc.gov.uk/habitat/H7130/
[16] https://sac.jncc.gov.uk/habitat/H91E0/
[17] https://sac.jncc.gov.uk/habitat/H91A0/
[18] https://www.legislation.gov.uk/asp/2004/6/contents

'priority habitats'. Some of these priority habitats are quite broad and can correlate to a large number of NVC types.

4.1.20 The relevant SBL priority habitat types (full descriptions of which can be found on the NatureScot website [19]), and associated NVC types (also see Table 5: National Vegetation Classification types recorded within study area and their corresponding sensitivities for GWDTE, Annex 1 and SBL) recorded within the study area are as follows:

- Blanket Bog: M17, M18, M19 & M20 (and M25 if peat depth is > 0.5 m).
- Upland Heathland: M15, H9, H10 and H12.
- Upland flushes, fens and swamps: M6, M23a, S9, S10 and S12.
- Wet Woodland: W7.
- Upland birchwoods: W11.

These SBL priority habitats correspond with UK Biodiversity Action Plan (BAP) Priority Habitats[20] .

4.2 Summary of Sensitivities

4.2.1 The NVC types and their associated habitat sensitivities, as described above, and their corresponding categories for Annex 1 and the Scottish Biodiversity List are summarised in Table 5.

Table 5: National Vegetation Classification types recorded within study area and their corresponding sensitivities for GWDTE, Annex 1 and SBL

NVC code	GWDTE Code (LUPS -GU31, SEPA 2017) Colour Code High=Red Moderate=Yellow	Scottish Biodiversity List (SBL)	Annex 1 Code	Annex 1 Title
M6	High	Upland flushes, fens, swamps	/	/
W7	High	Wet woodland	/	/
M23	High	Upland flushes, fens, swamps (applies to M23a only)	/	/
M15	Moderate	Upland heathland	4010	Northern Atlantic wet heaths with *Erica tetralix*
M27	Moderate	Upland flushes, fens, swamps	/	/

[19] https://www.nature.scot/landscapes-and-habitats/habitat-types/habitat-definitions

[20] https://jncc.gov.uk/our-work/uk-bap-priority-habitats/

NVC code	GWDTE Code (LUPS -GU31, SEPA 2017) Colour Code High=Red Moderate=Yellow	Scottish Biodiversity List (SBL)	Annex 1 Code	Annex 1 Title
U6	Moderate		/	/
MG9	Moderate	Coastal and floodplain grazing marsh	/	/
MG10	Moderate	Coastal and floodplain grazing marsh	/	/
M25	Moderate	/	7130 (where peat depth > 0.5m)	Blanket bog
M17	/	Lowland raised bog	7130	Blanket bog
M18	/	Lowland raised bog	7130	Blanket bog
M19	/	Lowland raised bog	7130	Blanket bog
M20	/	Lowland raised bog	7130	Blanket bog
H9	/	Upland heathland	4030	European dry heaths
H10	/	Upland heathland	4030	European dry heaths
H12	/	Upland heathland	4030	European dry heaths
S9	/	Upland flushes, fens, swamps	/	/
S10	/	Upland flushes, fens, swamps	/	/
W11	/	Upland birchwoods	/	/

4.2.2 In total, 45 NVC communities were recorded within the respective study area along with various associated sub-communities; a number of non-NVC habitat types are also present, in particular conifer plantation and mining spoil. Out with the expanse of the conifer plantations, the study area contains a mix of typical modified mire (as indicated by the vegetative communities present) and wet neutral to acidic forms of grassland, marshy grassland, farmland, ponds, reservoirs, dry and wet heaths and mixed woodland plantation. Although some large relatively homogeneous stands of vegetation occur across the study area, some of the communities form complex mosaics and transitional areas. The M18 mire is a classification of heavily modified blanket bog

which also had associated with it the bog communities of M17, M19, M20 and the mire grasslands M25 and M23.

4.2.3 The survey results have been compared to a number of sensitivity classifications, indicating a relatively limited presence of Annex I, SBL and potential GWDTE habitats, as summarised in Table 5.

4.2.4 The M17, M18, M19, M19a, M20 and M20a communities are categorized as Class 3 GWDTE and the groundwater discharge is considered irrelevant and is fed by other water sources. Much of the water supply to the bog communities within the study area are rain and surface water fed, with near to the surface ground water flows.

4.2.5 The M25 communities may be either a Class 2 or 3 GWDTE depending on the underlying water flow and soil conditions, but for the communities that are on ombrogenous peat it is assumed that this community derives its water from rain and is therefore a Class 3 GWDTE. The M25 communities, although categorized as a Class 2 in UK classification it is categorized as a Class 3 in Scotland due to its association with its associated bog habitats which all share the same hydrological regime.

4.2.6 The M23 communities can be categorized as Class 1, which are strongly dependent upon groundwater, under the right hydroecological conditions. However, these features are minimal on site and the M23 communities are located where seepage has occurred at drainage ditch systems on hillslopes, with preferential water flow, within grazing fields where drainage is impeded and at small watercourses through the study area and are unlikely to be a true Class 1 or strongly dependent on groundwater. Therefore, the rush M23 communities are regarded as Class 2 GWDTE where there is likely to be some dependency on groundwater discharge. However, some M23 communities are associated with M6, which is a Class 1 and highly dependent on ground water. Where these occur the M23 should be viewed as sharing the same hydrological unit and is therefore a class 1 GWDTE. Where M23 shares the same hydrological unit as that of peatland with vegetative bog habitat, it is unlikely that it is Class 1 GWDTE.

4.2.7 MG9 and MG10a community are Class 2 GWDTE's where there is likely to be some dependency on groundwater discharge. These communities are associated with edge vegetation of M23 and U4 grassland, and also associated with impeded drainage within grazing fields, and along small watercourses and ditches. They can also be located at existing hill drainage channels where there is a preferential water flow in the linear troughs where the *Juncus* species will grow. A large area of MG9 was located over the flat open ground at Douglas West and its abundance may suggest a transition from a mire vegetative community, which was highly evident, to one with a more grassy dominance, due to drainage and grazing pressures. This would suggest that the initial vegetative classification would have grouped the vegetation with bog communities and classified as a having slight or no dependency on groundwater.

4.2.8 The wet heath M15 community is a Class 2 GWDTE where there is likely to be some dependency on groundwater discharge. This community is situated on gradual slopes that have water flow-through and are in good overall condition. There is also M15 located on old open cast mine areas where there is re-colonisation of communities occurring on the soil, even if that soil has been disturbed previously. In these instances, it is difficult to determine the natural waterflow pathways occurring, and if it has sub surface seepage or has some dependency on groundwater. As a precaution these

should be categorised as Class 2 and likely to have some dependency on ground water.

4.2.9 There are no plant species from the habitats recorded on site that are critically endangered, endangered or vulnerable on the IUCN Red list.

4.3 Impact to Sensitive Habitats & Mitigation Considerations

4.3.1 A detailed CEMP, including mitigation for invasive species, must be produced to ensure that there is no adverse effect on the adjacent designated sites and an HRA and statement to inform an appropriate assessment is likely to be required in relation the internationally designated sites. These documents must be submitted to the relevant competent authority.

4.3.2 Any development should always take into consideration any effect on the water movement on the site, especially as there are multiple drainage networks, field drains, watercourses and ponds within the proposed OHL route. Some of these may impact the water flow-through and connectivity with sensitive habitats such as with the Coalburn Moss SAC & SSSI.

4.3.3 Micro-siting maybe required to avoid GWDTE's in a localized context. All wetland features (see Figure 2) should be protected, during the construction phase as this is when sensitive habitats are at most risk from site traffic, soil/water runoff and potential pollutants.

4.3.4 The following mitigation measures are likely to be required:

- When constructing tracks, sensitive habitat and hydrological features should be avoided where possible.
- Where this is not possible, the use of bog matting or similar to protect habitats and water features in situ will be required. Bog matts should be laid on the ground for the minimum amount of time required and be removed on completion of the works to allow vegetation to recover.
- If any aggregate or substrate used to construct a track it must be laid over a geotextile to allow removal of the substrate on completion of the works.
- Drainage ditches should be constructed on both the upslope and downslope if necessary, to control the routing of water and prevent it from getting onto the construction area. Drains or ditches carrying natural clean water must be prevented from being contaminated by dirty runoff from open construction surfaces.
- Clean water should not be diverted into the same areas as dirty runoff from construction surfaces. This will fill up silt settlement traps and fences too quickly, making them vulnerable to failure during heavy storm events.
- Pollution prevention control measures such as the use of silt fencing, silt traps and other suitable filtration methods can be employed. These mechanisms are intended to reduce the speed of flow, filter runoff and allow suspended silts and particulates to settle out naturally.
- No materials should be stored on sensitive habitat types and all compounds and storage areas should not be located on sensitive habitat types.

- Diesel and other materials should be stored in bunded containers and spill kilts and spill remediation procedures should be developed.

5.0 CONCLUSIONS

5.1.1 There are several designated sites close to the site, including Coalburn Moss Special Area of Conservation (SAC) and Site of Special Scientific Interest (SSSI) and Muirkirk Uplands/Muirkirk and North Lowther Uplands SSSI and Special Protection Area (SPA). A habitat regulations assessment (HRA) will be required in relation to these internationally designated sites.

5.1.2 The NVC surveys have revealed the presence of a number of potential GWDTE habitats, as well as Annex I and Scottish Biodiversity List Priority Habitats. The condition of these habitats varies as there has been a degree of modification throughout the site and therefore not all instances of community types will constitute an Annex 1 habitat.

5.1.3 Overall, given the relatively discrete nature of the development and given the common habitats and the modified condition of some bog habitats and grassland slopes it is considered that the OHL proposal would have a low magnitude of impact provided construction best practice techniques are adopted.

5.1.4 A detailed CEMP, including mitigation for invasive species, must be produced to ensure that there is no adverse effect on the adjacent designated sites and an HRA and statement to inform an appropriate assessment is likely to be required.

5.1.5 Construction works should mitigate activities and include embedded mitigation where required and in particular to those sensitive receptors such as wetlands bog habitats along the route and where the route shares peat and hydrology connectivity with Coalburn Moss SSSI/SAC.

5.1.6 All wetland features (surface and running water) should be protected, especially during the construction phase as this is when sensitive habitats are at most risk from site traffic, soil/water runoff and potential pollutants. All mitigation measures should follow the mitigation hierarchy (avoidance, reduction and remedy). However, where avoidance is not possible then consideration should be given to local re-alignment of the route to minimize the extent of impact. This will involve site-specific measures to protect small hydrological features, sensitive vegetation and woodland communities.

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FIGURES

277500 278000 278500

626500 626000 625500

M19a/M25
M19a/M20/M25
M20/M25
M6
M19a
M25
M19a/M25
M19a
MG6
CP
M20/M25
BG
M23b
CF
OV24/OV25/OV27

60 61 63 59 64 41 62 15 18

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

Legend:

- Allignment
- Structure
- Coniferous Semi-natural Woodland
- Coniferous Plantation Woodland
- Recently Felled Coniferous Woodland
- Improved Grassland
- Marshy Grassland
- Blanket Bog
- Modified Bog
- Acid / Neutral Flush
- Bare Peat
- Standing Water
- Swamp
- Tall Ruderal Vegetation
- Bare Ground / Hardstanding
- Running Water
- Ditch
- Dry Ditch
- Scattered Coniferous Trees
- Stone Pile
- Target Note

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Kennoxhead OHL

RSK biocensus
EXPERTS IN ECOLOGY

Figure 1
Phase 1 Survey with NVC Communities Shown
Map 1 of 11

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Metres
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278500 279000 279500 280000

627000

626500

MG6 U4 M23 MG6 M23 MG6 CP M19a/M25 M19a

OV24/OV25/OV27 S9/S12/M23 U5 OV24/OV25/OV27 M19a/M25

16 26 25 24 23 22 21 20 19 18 17 16 15 14 13 12 11 69 68 67 63

Legend:

- Allignment
- Structure
- Coniferous Plantation Woodland
- Semi-improved Acid Grassland
- Neutral Grassland
- Improved Grassland
- Marshy Grassland
- Blanket Bog
- Modified Bog
- Standing Water
- Swamp
- Tall Ruderal Vegetation
- Ephemeral / Short Perennial
- Bare Ground / Hardstanding
- Broad-leaved Hedge / Tree-line
- Ditch
- Scattered Coniferous Trees
- Stone Pile
- Target Note

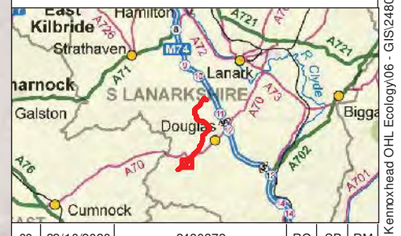

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Figure 1
Phase 1 Survey with NVC Communities Shown
Map 2 of 11

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279500 280000 280500

628500 628000 627500

M23/M6c/
M6d/U4/U5

M23/M6

U4

Je/MG10/M23/

U4

M23/Je/Ja

MG6

U4

U20

U4

W11

U20

MG6

W11

MG9

BP

M23/MG10

MG6

1 2 10

45 44 43 42 41 40 39 38 37 36 35 34 33 32 31 30 29 28 27

Legend:

- Allignment
- Structure
- Broadleaved Semi-natural Woodland
- Broad-leaved Plantation Woodland
- Coniferous Plantation Woodland
- Dense Scrub
- Semi-improved Acid Grassland
- Neutral Grassland
- Semi-improved Neutral Grassland
- Improved Grassland
- Marshy Grassland
- Modified Bog
- Standing Water
- Tall Ruderal Vegetation
- Continuous Bracken
- Amenity Grassland
- Broad-leaved Hedge / Tree-line
- Coniferous Hedge / Tree-line
- River
- Running Water
- Ditch
- Scattered Broad-leaved Trees
- Scattered Coniferous Trees
- Stone Pile
- Target Note

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EXPERTS IN ECOLOGY

Figure 1
Phase 1 Survey with NVC Communities Shown
Map 3 of 11

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Topographical Survey by Central Alliance Survey & RSK - drawing 2380773_P.dwg

280500 281000 281500

629500 629000 628500

U5/U6 U20 U5/U6/U20Je/Ja U4 W11 U20 U4 Je/M23 U5 M25/Je/Ja/U5 M17/M19a/M6d U5/Je M6 M23/M6 Mixed CF & BP M15/M25 MG6 M23/M6c/ M6d/U4/U5 MG10/Je U4/U5 MG10/M23 Je/MG10/ M23/

3 40 55 54 53 34 52 58 51 50 49 65 48 47 46 45 44 43 42 41 40

Legend:

- Allignment
- Structure
- Broadleaved Semi-natural Woodland
- Mixed Semi-natural Woodland
- Coniferous Plantation Woodland
- Dense Scrub
- Semi-improved Acid Grassland
- Improved Grassland
- Marshy Grassland
- Wet Dwarf Shrub Heath
- Modified Bog
- Acid / Neutral Flush
- Standing Water
- Continuous Bracken
- River
- Running Water
- Ditch
- Scattered Broad-leaved Trees
- Target Note

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Kennoxhead OHL

RSK biocensus EXPERTS IN ECOLOGY

Figure 1
Phase 1 Survey with NVC Communities Shown
Map 4 of 11

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281000 281500 282000

631000 630500 630000

M15 M23/ MG10a M15b/M23 MG10a U5/M23 CP U5/Je U5/MG10/M23 Je/Ja Je/Ja Je/Ja U5 U5 U4 U4 W11 Je/Ja M15/U5/M23 U4/U6 M23 CP M23 M6/M23 U4/U6 U5/M23 BP U4/U6 U5/U6/MG10 U20 M25/M23/ Je/Ja U5/U6 M23/M6/U5 M23/M6 M25/M23/ Je/Ja U4 U5/U6 U20 U5/U6/U20Je/Ja W11

69 68 67 66 65 64 63 62 61 60 59 39 58 57 56 55 66 11 35 3

Legend:

- Allignment
- Structure
- Broadleaved Semi-natural Woodland
- Broad-leaved Plantation Woodland
- Coniferous Plantation Woodland
- Semi-improved Acid Grassland
- Improved Grassland
- Marshy Grassland
- Wet Dwarf Shrub Heath
- Acid / Neutral Flush
- Standing Water
- Swamp
- Continuous Bracken
- Running Water
- Ditch
- Scattered Broad-leaved Trees
- Target Note

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Figure 1
Phase 1 Survey with NVC Communities Shown
Map 5 of 11

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281500 282000 282500 283000

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M23/M6
M15/U5
M15/U5
W23
MP
MG9
M15/M23
CP
MG6
M23
MG9
M15/U5
M15/U5
MG6
MG9
M23
MG9
M15/M23
M23
W11
U5/U4/Je
MG10/M23
MG9
Je/Ja/MG10a/M23
MP
MG9
M23/M27/M6
M15b/M23
U5/M23
M15b/M23
MG6
M15
OV25

85 37 84 83 51 4 174.5 82 81 80 79 182.0 78 77 76 75 74 73 72 71 70 69

Legend:

- Allignment
- Structure
- Broadleaved Semi-natural Woodland
- Broad-leaved Plantation Woodland
- Mixed Plantation Woodland
- Coniferous Plantation Woodland
- Dense Scrub
- Semi-improved Acid Grassland
- Semi-improved Neutral Grassland
- Improved Grassland
- Marshy Grassland
- Wet Dwarf Shrub Heath
- Wet Heath / Acid Grassland
- Standing Water
- Tall Ruderal Vegetation
- Ephemeral / Short Perennial
- Bare Ground / Hardstanding
- Broad-leaved Hedge / Tree-line
- Running Water
- Ditch
- Old Stone Dyke Boundary
- Scattered Broad-leaved Trees
- Target Note

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Figure 1
Phase 1 Survey with NVC Communities Shown
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282000 282500 283000

633500 633000 632500

H12 H10 MG9 Je/Ja/M23 Je/Ja/MG10a/MG6 MG6 Je/Ja/MG10a/MG6 Je/Ja/MG10a/MG6 CP MG6 MG6 W11 MG6 MG6 MG6 Je/Ja/MG10a/MG6 Je/Ja/MG10a/MG6 Je/Ja/U5/M23 Je/Ja/MG10a/MG6 H12 S12 M23/M6 M15/U5 MG9

103 102 101 100 99 98 97 96 95 94 93 92 91 90 89 88 87 86

43 31 38 71 42 70 12

Legend:

- Allignment
- Structure
- Broadleaved Semi-natural Woodland
- Broad-leaved Plantation Woodland
- Mixed Semi-natural Woodland
- Mixed Plantation Woodland
- Coniferous Plantation Woodland
- Dense Scrub
- Semi-improved Neutral Grassland
- Improved Grassland
- Marshy Grassland
- Wet Dwarf Shrub Heath
- Wet Heath / Acid Grassland
- Dry Dwarf Shrub Heath
- Standing Water
- Swamp
- Tall Ruderal Vegetation
- Continuous Bracken
- Ephemeral / Short Perennial
- Bare Ground / Hardstanding
- Broad-leaved Hedge / Tree-line
- River
- Running Water
- Ditch
- Scattered Broad-leaved Trees
- Scattered Coniferous Trees
- Target Note

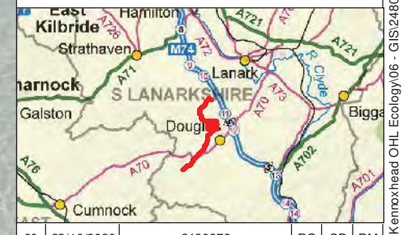

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Figure 1
Phase 1 Survey with NVC Communities Shown
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281000 281500 282000

634000 633500 633000

OV27 S9/S12/M27/M23 M23/M27 MP H12/U5 H12 W4 MG9 M15b/M25 M15b/M25/U5 CP OV27 MP U20 M15/M25 H12 BG M15b/M25 M15b/M25/U5 H12 Je/Ja/M23 H10 U20 U20 OV27 Je/Ja/MG10a/MG6

45 74 5 73 114 113 72 44 112 29 111 110 48 49 109 108 50 30 107 106 105 104 103 102 78 43 31 101 38 100 99 98

Legend:

- Allignment
- Structure
- Broadleaved Semi-natural Woodland
- Broad-leaved Plantation Woodland
- Mixed Semi-natural Woodland
- Mixed Plantation Woodland
- Coniferous Plantation Woodland
- Semi-improved Neutral Grassland
- Improved Grassland
- Marshy Grassland
- Wet Dwarf Shrub Heath
- Wet Heath / Acid Grassland
- Dry Dwarf Shrub Heath
- Dry Heath / Acid Grassland
- Modified Bog
- Standing Water
- Swamp
- Tall Ruderal Vegetation
- Continuous Bracken
- Ephemeral / Short Perennial
- Cave
- Bare Ground / Hardstanding
- Broad-leaved Hedge / Tree-line
- River
- Running Water
- Ditch
- Scattered Broad-leaved Trees
- Scattered Coniferous Trees
- Target Note

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Kennoxhead OHL

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Figure 1
Phase 1 Survey with NVC Communities Shown
Map 8 of 11

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