

Appendix 9B
Constraints Survey Report

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APEM Group

Derrygreenagh Power Constraints Surveys



Report prepared by Woodrow, APEM Group

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1. Background

Woodrow Sustainable Solutions and APEM Ireland were commissioned by Bord na Móna Powergen Limited to carry out a suite of surveys and provide ecological support to help inform the development of a power station and related gas pipeline and electricity transmission connection routes. The proposed Derrygreenagh Power Plant has already been consented under Strategic Infrastructure Development (SID) application file reference 19.PA0011 by An Bord Pleanála, granted a 5-year extension of appropriate period by Offaly County Council. The consent allows for a 600 MW thermal plant comprising a Combined Cycle Gas Turbine (CCGT) generator and Open Cycle Gas Turbine (OCGT) Generator. The consented site area is 22.8 ha, with the main site east of the R400 occupying 17.5 ha, and the adjacent switchyard site on the western side of the R400 roadway occupying 5.3 ha.

It is understood that further consent applications are required to facilitate project development, and a number of options have been put forward for development of gas pipelines to the north and electricity transmission routes to the south as well as a number of options for a 200/400kV substation at the 400kV line Oldstreet-Woodland line.

The surveys were conducted on Bord na Móna lands, private lands and public routes in the vicinity of Derrygreenagh, near the Offaly-Westmeath border.

1.1 Aims of the Report

The surveys were intended to identify constraints that would inform the layout and design of the proposed power station and associated connections, and focused mainly on marsh fritillary butterfly habitat, other important or protected habitats, and buildings/ structures and habitats having potential opportunity for roosting bats. This includes the following:

- Identify areas of habitat suitable for marsh fritillary butterflies
- Assess the habitat quality of the specified areas for marsh fritillary butterflies
- Carry out larval web searches for larvae of marsh fritillary butterflies
- Identify and map the habitats, record the main plant / animal species observed along proposed pipeline/transmission routes and at proposed substation locations
- Describe the baseline bat data collection and roost assessment methodologies used
- Identify and describe potential significant effects on bat species as a result of the proposed development

2. Site Overview

Bord na Móna lands at Derrygreenagh Bogs are situated in a flat cutaway peatland context predominantly on the Offaly – Westmeath border south of the M6 motorway corridor and north of the Grand Canal. Junction 3 off the M6 motorway connects to the R400 which dissects the consented power plant site in a northwest – southeast direction. The L1113 / L1019 runs to the west and south of Derryarkin and Ballybeg bogs, the L1009 runs to the south of Drumman bog. The L1010 intersects the main Ballybeg bog unit from a remnant bog to the south of this road, the remnant bog itself is north of the Grand Canal. Ballybeg Bog is located in Co Offaly whilst the majority of Drumman and Derryarkin bogs are located in Co. Offaly and Co. Westmeath. Derryhinch bog is located in Co. Westmeath with a portion in the southeast of this bog located in Co. Meath.

The Mongagh River divides Drumman bog into north and south areas and also delineates the Westmeath and Offaly County boundary and the river runs approximately 600m south of Derryhinch bog. The Mongagh River itself is a tributary of the Yellow River and flows from west to east before joining the Yellow River, south of Castlejordan, just west of Clongall Bridge. The Yellow River runs west to east and dissects Derryarkin and Ballybeg Bog before crossing the R400. Ballybeg bog is bisected by the Coolcor Stream which is a tributary of the Yellow River. The Coolcor stream has been canalised and flows west to east through Ballybeg bog. Other rivers in the vicinity of the proposed development site include the Milltown River, the Derry River and the Kinnegad River.

The Grand Canal (pNHA) which connects the River Shannon from the west with Dublin in the east runs just south of Ballybeg bog remnant. The Royal Canal (pNHA) which connects the River Shannon with Dublin is located just over 5 km from the north of the Derryhinch bog. All bogs are gravity drained, with the exception of Ballybeg bog, part of which is drained via a pumped drainage system on the eastern boundary with pumped water discharges via an outfall into the Yellow River.

On a regional scale, the Application Site is in the Boyne Hydrometric Area and Catchment, with the exception of the southern section of Ballybeg Bog below the L1010 (Rhode to Croghan road), which is in the Barrow Hydrometric Area and Catchment. At a local scale, the lands are located between the Yellow River to the south and the Mongagh River to the north. All rivers ultimately discharge to the Yellow (Castlejordan) River with the exception of the overgrown drainage ditch located at the southern end of Ballybeg Bog which eventually discharges to the Esker River.

There are a number of Natura 2000 sites in the vicinity of the proposed development including:

- Lough Ennell SAC (c. 7.5km northwest)
- Lough Ennell SPA (c. 7.5km northwest)
- Raheenmore Bog SAC (c. 5km west)
- Mount Hevey Bog SAC (c. 7.5km east); and
- Split Hills and Long Hill Esker SAC (c. 7km north-west)
- Wooddown Bog SAC (c. 10km north of Derryhinch bog)
- River Boyne and Blackwater SAC (c. 13.5km from Derryhinch bog)
- River Boyne and Blackwater SPA (c. 13.5km from Derryhinch bog)

- The Long Derries SAC (c. 14.5km east of Ballybeg Remnant)

The Bord na Móna lands have a network of railways and machine passes, some of which are still in occasional or regular use. The power plant consented site at Derrygreenagh, along the R400 road, contains several buildings, paved and concreted areas, railways, sheds and outhouses, car-parking facilities, and machinery yards.

The land in the area is mainly a mixture of bog and farmland. Much of the land owned by Bord na Móna has previously been used for peat-milling or turf-cutting, and some of these areas are now being recolonised by peatland herbaceous plants or scrub. Several large drains are present in the area as a result of previous works. The land is generally quite flat, and some pools of standing water occur in low-lying areas.

There are sand and gravel quarrying activities ongoing across a large section of Derryarkin Bog including a large quarry pond on former gravel pit to the west of the R400 and quarrying activity in sections to the west and north of the Drumman bog, east of R400 including a number of ponds. The storage, seasoning and chipping of biomass logs is another consented activity at Drumman south of the Mongagh River on 29.17 Ha of land. There is a telecommunications mast fenced off to the east of R400, east of the existing Derrygreenagh Works (site of consented power plant). This mast is currently leased out to a third-party operator. There is a Motocross amenity facility located to the north of Derryarkin bog. There are two guyed wind monitoring masts, one located to the south of the Derryarkin bog and the other east on Ballybeg bog.

Figure 1: Overview of the survey area, with proposed cable & pipeline routes

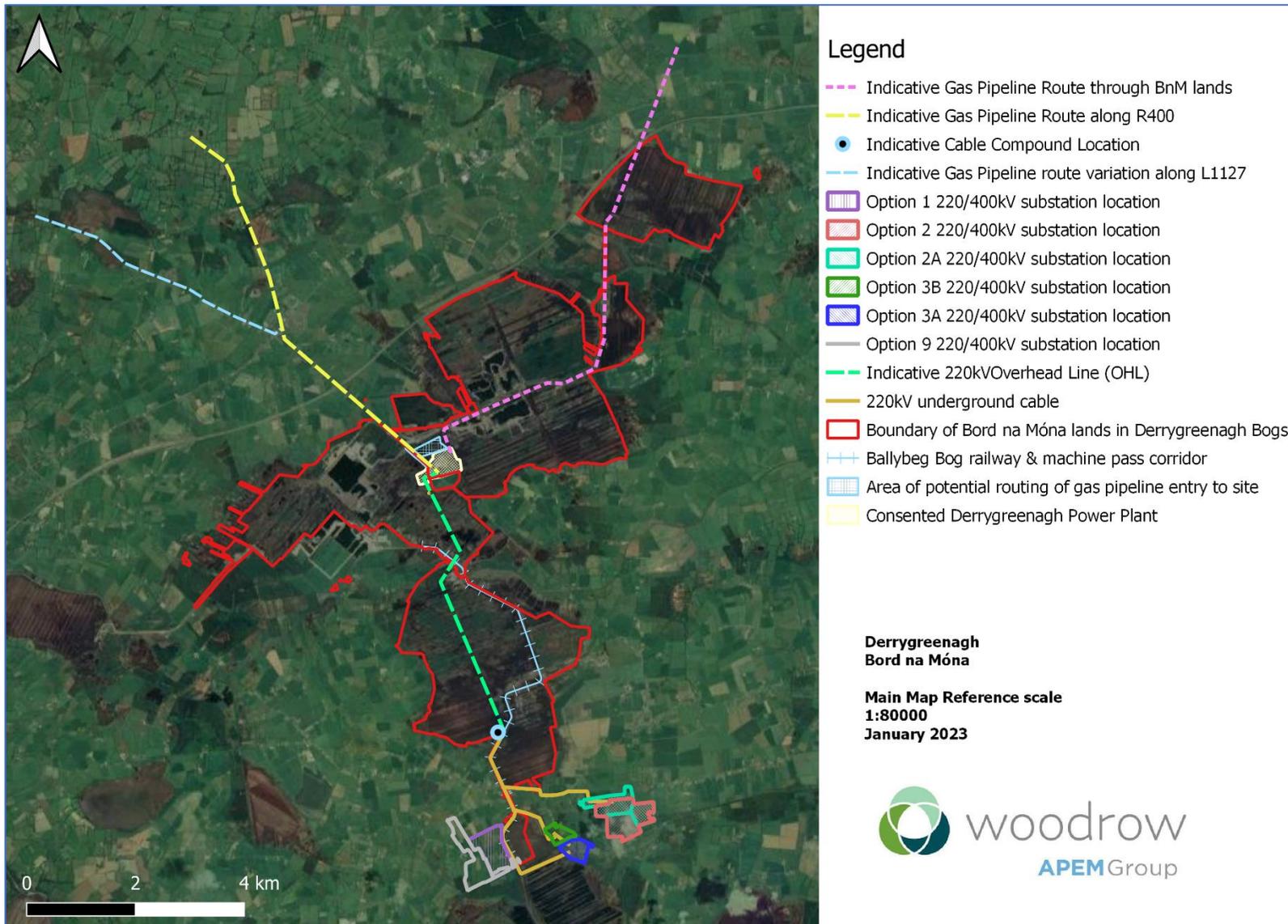
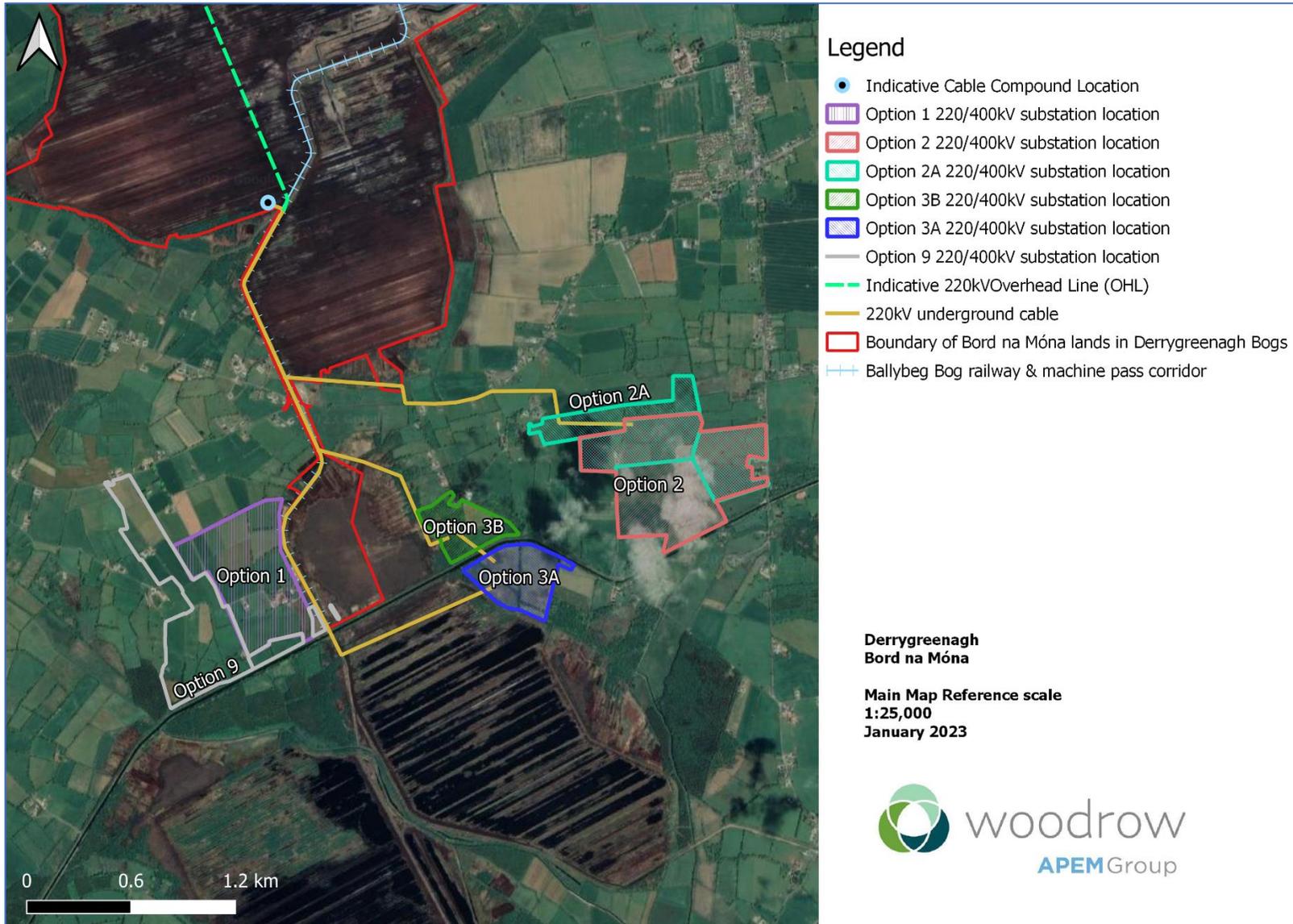


Figure 2: Options for the 220/400 kV substation at Derrygreenagh Bogs



3. Methodology

3.1 Site Surveys

The surveys were carried out over a large area on or in the vicinity of the Derrygreenagh bog group (Ballybeg, Derryarkin, Drumman, Derryhinch bogs). **Figure 1** shows the consented Bord na Móna power station site at Derrygreenagh, and the surrounding lands owned by Bord na Móna. Also shown are options for electricity transmission and gas pipeline routes from the consented site to the 400kV Oldstreet-Woodland electricity line (south of consented power plant site) and high-pressure Dublin-Galway gas line (north of consented power plant site), along which surveys were carried out.

Site surveys focused on

- a) Consented power plant site east of R400 and location of the 220kV substation site west of the R400
- b) Gas pipeline routes
 - Northeast from consented site through Bord na Móna lands as far as the M6 with some limited assessment of third-party land north of the M6 where possible without entry
 - Northwest from consented site along R400
 - Northwest from consented site along L1127 (variation from R400)
- c) Electricity transmission routes
 - OHL through Derryarkin Bog
 - OHL through Ballybeg Bog
 - Underground cable through Ballybeg Bog along the railway line
 - Various third-party lands for locating underground cable
- d) Substation (220/400kV) site at Oldstreet-Woodland (400kV line)
 - Ballybeg bog remnant (below L1010 road)
 - Cavemount bog south of the canal
 - Various third-party land options

Site visits were carried out on the following dates:

- September 13, 2022 – marsh fritillary surveys & bat roost potential surveys
- September 14, 2022 - marsh fritillary surveys
- September 21, 2022 - marsh fritillary surveys
- September 26, 2022 – bat emergence/re-entry surveys
- September 27, 2022 - bat emergence/re-entry surveys
- September 27, 2022 - habitats/constraints surveys
- September 29, 2022 - habitat surveys
- October 3, 2022 - marsh fritillary surveys
- October 11, 2022 - habitats/constraints surveys
- October 24, 2022 - habitats/constraints surveys
- October 27, 2022 – bat roost potential survey/constraints surveys

As various pipeline and cable routes were under consideration, walkover surveys began with a selection of the potential routes, with feedback being provided to Bord na Móna regularly, thus helping refine the survey scope as regards which routes would be chosen. At this stage, the purpose was to identify any constraints that may apply due to marsh fritillary butterfly breeding areas, bat roosts, and protected habitats. The methodology used for each of these is discussed in the following sections. Other potential constraints were noted where encountered, such as signs of badger activity, but these were not the main focus of the survey effort.

In addition to the routes discussed in the preceding chapter, potential sites for sub-stations were examined. The same surveys were carried out at these locations, and habitats were mapped. This approach was also taken at the consented Derrygreenagh power station site.

Surveys were conducted using the ArcGIS program Survey123 on a computer tablet or mobile phone. QField software was also used on a computer tablet for mapping areas of habitat or other ecological features.

3.2 Marsh Fritillary Surveys

3.2.1 Habitat Suitability Surveys

Habitat condition assessments were carried out at suitable locations identified during the site walkover surveys. This involved the collection of data on the following criteria:

- Vegetation height - recorded by the average band in which the sample fell into (A= <12cm, B = 12--25cm, C = 25--50cm, D = >50cm)
- Devil's bit scabious (*Succisa pratensis*) abundance (A = 1-2 plants /m², B = 3-9 plants /m², C=10+ plants /m², D = No plants)
- Presence of structured vegetation
- Presence of low invading scrub (<25cm tall and >10% cover)
- Evidence of stock grazing (poaching, dung etc.)
- Associated feature (whether any web was associated with a vegetation structural feature such as a tussock or a bank)
- Habitat was ranked as Good Condition Habitat (GC), Suitable (Over-grazed) Habitat (SO); and Suitable (Under-grazed) Habitat (SU);

Following NBDC methodology (NBDC, n.d.), areas shortlisted as containing potentially suitable marsh fritillary habitat were mapped to include the extent of the observed habitat.

3.2.2 Larval Web Surveys

At the locations identified as being suitable for marsh fritillary breeding, larval web searches were conducted. Due to the seasonal requirements of this work, it could be conducted no later than the first week of October. Any suitable areas of habitat encountered after that were mapped, and may be considered for further surveys in the future, if required.

During larval web searches, a zig-zag walk of the survey area was undertaken in order to identify the presence of larval webs. The larval survey approach was as follows:

- After an initial walkover of the site to ascertain potentially suitable habitat, a survey boundary edge was established and marked with bamboo canes;
- Fieldworkers formed a line with each fieldworker no more than 2 metres from the next and walked an initial transect along the length of the survey area, inside the boundary line, marking the inside of the transect with marker canes;
- Transects were repeated, each inside the previous, until the entire survey area had been surveyed;
- Any larval webs found were photographed, and their locations recorded.

3.3 Habitat Surveys

Habitats were identified in accordance with the system of Fossitt (2000)¹. Potential pipelines, cable routes and other locations were programmed on a computer tablet using QField, and areas of habitat in these locations were identified and mapped in the field. It was considered that all of this work was completed within a suitable time of year, as distinguishing features were visible and many plants were still fully in leaf, and some were still in flower. Photographs of habitats and habitats features were taken using Survey123, allowing each picture to be geo-referenced. Final digitising of maps was done using QGIS.

For the PB1 Raised Bog habitat, additional information on the vegetation was obtained by setting out a 2m x 2m relevé and recording all vegetation within the defined area. **Figure 3** shows the location where this relevé was located. The ITM co-ordinates of the location are: X 651061, Y 731207.

¹ Fossitt, J. (2000) A guide to habitats in Ireland. The Heritage Council, Kilkenny.

Figure 3: The location of a relevé (quadrat) where raised bog vegetation was recorded. The red line indicates the boundary of Bord na Móna lands at Derrygreenagh Bogs.



3.4 Bat Surveys

3.4.1 Guidance Documents

This report will draw on guidelines already available in Ireland and Europe and will use the following documents:

- Marnell, F., Kelleher, C. & Mullen, E. (2022). Bat mitigation guidelines for Ireland v2. Irish Wildlife Manuals, No. 134. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Ireland
- NPWS (2019). The status of EU protected habitats and species in Ireland: Conservation status in Ireland of habitats and species listed in the European Council Directive on the Conservation of Habitats, Flora and Fauna 92/43/EEC. National Parks and Wildlife Service, Department of Environment, Heritage and Local Government.
- BTHK (2018). Bat Roosts in Trees – A Guide to Identification and Assessment for Tree-Care and Ecology Professionals. Pelagic Publishing, Exeter UK.
- Collins, J. (Editor) (2016). Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edition). Bat Conservation Trust, London
- Hundt, L. (2012). Bat Surveys: Good Practice Guidelines, 2nd edition. Bat Conservation Trust.
- Aughney, T., Kelleher, C., & Mullen, D. (2008). Bat Survey Guidelines: Traditional Farm Buildings Scheme. The Heritage Council, Áras na hOidhreachta, Church Lane, Kilkenny.
- Kelleher, C. & Marnell, F. (2006). Bat Mitigation Guidelines for Ireland. Irish Wildlife Manuals, No. 25. National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland.
- McAney, K. (2006). A conservation plan for Irish vesper bats, Irish Wildlife Manual No. 20 National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland.
- National Roads Authority (2006). Best Practice Guidelines for the Conservation of Bats in the Planning of National Road Schemes
- National Roads Authority (2006). Guidelines for the Treatment of Bats during the Construction of National Road Schemes. National Roads Authority (now named Transport Infrastructure Ireland), Ireland.

Relevant legislation is referenced in Appendix 1.

3.4.2 Survey Methodology

The methods used to carry out the survey, evaluate the effects on bats and prepare the report are outlined in this section.

3.4.2.1 Study Area

The study area for the desk review has been determined by the Core Sustainment Zone (CSZ) sizes calculated for bat species (BCT, 2016), to determine if the proposed project will impact roosts in the surrounding area by affecting commuting/ foraging habitat in the absence of information on local foraging behaviour.

During an initial site survey, the consented site and the proposed routes (**Figure 1**) were walked and the buildings/ structures/ trees to be removed were assessed on their suitability to support roosting bats. Additional internal roost inspection surveys were carried out on structures evaluated as having suitability to support roosting bats. The study area used for the initial site survey comprises the planning application boundary. The study area used for the internal roost inspection survey is defined by the footprint of structures evaluated as having suitability to support roosting bats.

3.4.2.2 Desk Study

A desk study was carried out, in September 2022, to collate the available existing information on bat populations along the proposed routes and the wider landscape. The routes and surrounding area were viewed using available satellite imagery² to help identify features and habitats which may be regularly used by foraging, commuting and/or roosting bats. The desk study also comprised the following data sources:

- Collation of known bat records within 10 km grid squares N43, N44, N53 and N54, encompassing the proposed routes from the National Bat Database held by the NBDC (www.biodiversityireland.ie)³
- Records of designated sites within an initial search radius of 15 km of the proposed routes where bats form part or all of the reason for designation (<https://www.npws.ie/protected-sites>)
- Collation of Lesser Horseshoe bat records within an initial search radius of 2.5 km CSZ of the proposed routes from the National Parks and Wildlife Service Lesser Horseshoe bat database (<https://www.npws.ie>)
- Collation of data on known caves within a 4 km⁴ radius of the proposed sites from the Cave Database for the Republic of Ireland, compiled by Trinity College (http://www.ubss.org.uk/search_irishcaves.php)
- Review of bat survey data from Ecological Impact Assessments from proposed and permitted developments within the wider environs of the site.

3.4.2.3 Bat Landscapes

Bat Conservation Ireland produced a landscape conservation guide for Irish bat species using their database of species records collated during the 2000-2009 survey seasons. An analysis of the habitat and landscape associations of all bat species deemed resident in Ireland was undertaken and reported in Lundy *et al.*, 2011.

The degree of favourability ranges from 0 – 100, with 0 being least favourable and 100 most favourable for bats. The values of the grid squares represent the range of habitat suitability values the bat species can tolerate within each individual square.

A caveat is attached to the model and it is that the model is based on records held on the Bat Conservation Ireland database, while core areas have been identified, areas outside the core area should not be discounted as unimportant as bats are a landscape species and can travel many kilometres between roosts and foraging areas nightly and seasonally.

² <https://www.google.ie/maps> (last accessed 09 February 2022)

³ A specific data request was not made to Bat Conservation Ireland because they regularly update NBDC with their records and it is only judged to provide an additional useful source of data if a location is designated as high potential for bat roosts.

⁴ This is the maximum CSZ radius for the species of bats found in Ireland according to BTC, 2016.

3.4.2.4 Designated Sites

A search was made for designated sites within 15 km of the proposed planning boundary. These included sites designated at the European level (in the context for bats, this refers to Special Areas for Conservation or SACs) and the Irish level (Natural Heritage Areas or NHAs and proposed Natural Heritage Areas or pNHAs). The Habitats Directive (Article 6) forms a basis for the designation of SACs. Further information on the context of SACs for bats is given in section 2.3.

NHAs are areas considered important for the habitats present or which holds species of plants and animals whose habitat needs protection. Under the Wildlife Amendment Act (2000), NHAs are legally protected from damage from the date they are formally proposed for designation.

pNHAs were published on a non-statutory basis in 1995 but have not since been statutorily proposed or designated. pNHA are subject to limited protection, in the form of County/ Local Area Plans, Agri-environmental farm planning schemes and recognition of their ecological value by planning and licensing authorities. However, for the purposes of this assessment all pNHAs have been considered as fully designated sites.

Both NHAs and pNHAs may be designated due to the presence of bats.

3.4.2.5 Field Surveys

Surveys were undertaken by Jason Guile, Owen Twomey and Randal Counihan of APEM Ireland and Philip Doddy, Emmeline Cosnett and Aoife Hughes of Woodrow (part of the APEM Group).

Preliminary Ecological Appraisal (PEA)

While Woodrow conducted the daytime surveys between 13th September and 3rd October, habitats along the proposed routes and the immediate surroundings were noted. This was done to assess bat foraging/commuting habitat availability, and to record the presence of significant landscape features, particularly linear features that provide wildlife corridors for commuting bats.

The value of habitat features for bats was defined in accordance with Bat Surveys: Good Practice Guidelines publication (Collins, 2016), as shown in **Table 1**.

Preliminary Roost Assessment (PRA)

The consented Site / proposed connection routes were visited by Owen Twomey and Jason Guile on 26-27 September and 27 October 2022, respectively. During the visits all buildings and structures within the consented project boundary, gas route through BnM lands and overhead line route were assessed for their potential to support roosting bats. Surveys were undertaken with the aid of binoculars, a digital camera and a high-powered torch. The exterior inspection identified features, such as potential entry/egress points, and potential to contain features to support roosting bats, such as cracks in concrete/ bricks, cavity walls, raised roof tiles / lead flashing, gaps or cracks in soffits / fascia boards and any visible droppings or staining. The search also identified evidence of bat usage, including any bat specimens,

droppings, staining, feeding remains, etc. The design of the structures were also considered when assessing their potential to support roosting bats (e.g., a traditional cavity wall and timber roof structure would typically have more potential than a steel frame and cladded structure).

Internal inspection was carried out on all buildings (except Building 3 due to health and safety concerns) with the aid of a digital camera and a high-powered torch. The interior was systematically examined (where safe to do so) for any evidence of use by bats. Evidence includes any live or dead bats, audible squeaking, feeding remains, droppings, urine splashes or fur oil staining. Particular attention is given to any potential entry and entry / egress points identified during external inspection, as evidence of use tends to accumulate over time should bats be present.

The value of each building/ structure was noted according to its potential for use by bats for roosting, in accordance with Bat Surveys: Good Practice Guidelines (Collins, 2016), as shown in **Table 1**.

Emergence / Re-entry Survey

Dusk surveys of buildings within the consented site that were identified as being of moderate to high potential for bats during the roost inspection surveys were undertaken on 26 and 27 September 2022. The purpose of the surveys was to determine the presence or absence of bats within the buildings at the time of the survey. The dusk emergence surveys commenced approximately 15 minutes before sunset and ended approximately 90 minutes after sunset. Re-entry surveys commenced 2 hours before local sunrise and continues until 15 minutes after local sunrise. The surveys were undertaken in suitable weather conditions (avoiding periods of very heavy rain, strong winds (> Beaufort Force 5), mists and dusk temperatures below (12°C)). Two people surveyed the structures (Owen Twomey and Randal Counihan of APEM Ireland).

Anabat Scout Active Bat Detectors were utilised for the survey, which record bat echolocation calls directly on to an internal SD memory card. Each time a bat is detected, an individual time-stamped (date and time to the second) file is recorded. Data were then downloaded and all recordings were analysed using the Anabat Insight spectrogram sound analysis software Version 1.9.7.

Table 1: Potential Suitability of Habitats for Bats (Collins, 2016)

Suitability	Description of Roosting Habitats	Commuting and Foraging Habitats
Negligible	Negligible habitat features on site likely to be used by roosting bats.	Negligible habitat features on site likely to be used by commuting or foraging bats.
Low	<p>A structure with one or more potential roost sites that could be used by individual bats opportunistically. However, these potential roost sites do not provide enough space, shelter, protection, appropriate conditions⁵ and/or suitable surrounding habitat to be used on a regular basis or by larger numbers of bats (i.e. unlikely to be suitable for maternity or hibernation⁶).</p> <p>A tree of sufficient size and age to contain PRFs but with none seen from the ground or features seen with only very limited roosting potential⁷.</p>	<p>Habitat that could be used by small numbers of commuting bats such as gappy hedgerow or un-vegetated stream, but isolated, i.e. not very well connected to the surrounding landscape by other habitat.</p> <p>Suitable, but isolated habitat that could be used by small numbers of foraging bats such as a lone tree (not in a parkland situation) or a patch of scrub.</p>
Moderate	A structure or tree with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions and surrounding habitat but unlikely to support a roost of high conservation status (with respect to roost type only- the assessments in this table are made irrespective of species conservation status, which is established after presence is confirmed).	<p>Continuous habitat connected to the wider landscape that could be used by bats for commuting such as lines of trees and scrub or linked back gardens.</p> <p>Habitat that is connected to the wider landscape that could be used by bats for foraging such as trees, scrub, grassland or water.</p>
High	A structure or tree with one or more potential roost sites that are obviously suitable for use by larger numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions and surrounding habitat.	<p>Continuous, high quality habitat that is well connected to the wider landscape that is likely to be used regularly by commuting bats such as river valleys, streams, hedgerows, lines of trees and woodland edge.</p> <p>High quality habitat that is well connected to the wider landscape that is likely to be used regularly by foraging bats such as broadleaved woodland, tree-lined watercourses and grazed parkland.</p> <p>Site is close to and connected to known roosts.</p>

⁵ For example, in terms of temperature, humidity, height above ground level, light levels or levels of disturbance

⁶ Evidence from the Netherlands shows mass swarming events of common pipistrelle bats in the autumn followed by mass hibernation in a diverse range of building types in urban environments (Korsten et al., 2015). This phenomenon requires some research in the UK but ecologists should be aware of the potential for larger numbers of this species to be present during the autumn and winter in large buildings in highly urbanised environments.

⁷ This system of categorisation aligns with BS 8596:2015 Surveying for bats in trees and woodland (BSI, 2015).

4. Results

The following sections give the results of the various surveys carried out at Derrygreenagh.

4.1 Marsh Fritillary Surveys

The locations where marsh fritillary larval webs were recorded are detailed in **Table 2**. These locations are shown as an overview in **Figure 4**, and shown in more detail in the following maps (**Figure 5** to **Figure 11**). Some of the larval webs recorded are shown in the following photographs (**Plate 1** to **Plate 4**).

The areas of habitat assessed for suitability for marsh fritillary butterflies are shown in a series of maps in **Figure 12** to **Figure 22**, and in the associated shapefile.

The units identified as suitable habitat varied in size, with some habitats containing several small suitable patches within a larger unsuitable unit. This habitat pattern is often found to maintain breeding populations of marsh fritillary due to the transient and mobile nature of this species, and such areas cannot be disregarded.

Table 2: Marsh fritillary larval webs found at Derrygreenagh

Date	Number on map	Location (ITM co-ordinates)		Number of marsh fritillary larval webs at this location
		X	Y	
9/13/2022	1	-7.222762975	53.40495367	1
9/13/2022	2	-7.222758738	53.40505211	1
9/13/2022	3	-7.222374329	53.40494583	2
9/14/2022	4	-7.243308119	53.34405497	1
9/14/2022	5	-7.236414404	53.36862022	1
9/13/2022	6	-7.22165306	53.40526158	1
9/14/2022	7	-7.24036433	53.34026268	1
9/14/2022	8	-7.24319889	53.34365924	1
9/14/2022	9	-7.24327087	53.34372837	1
9/14/2022	10	-7.24326188	53.34373646	1
9/14/2022	11	-7.23646176	53.36864039	1
9/21/2022	12	-7.210173886	53.42089242	1
9/21/2022	13	-7.210148066	53.42455444	1
9/21/2022	14	-7.210141942	53.4246821	1
9/21/2022	15	-7.21025741	53.42092161	1
9/21/2022	16	-7.21018303	53.4244329	1
9/21/2022	17	-7.21013318	53.42459913	1
9/21/2022	18	-7.21021825	53.42464534	1
9/21/2022	19	-7.21020207	53.42465855	1
9/21/2022	20	-7.21011761	53.4259564	1
9/21/2022	21	-7.20924641	53.43140173	1
9/21/2022	22	-7.20970102	53.43148506	1

Figure 4: Locations where marsh fritillary larval webs were recorded (overview map). The red line indicates the boundary of Bord na Móna lands in Derrygreenagh Bogs.

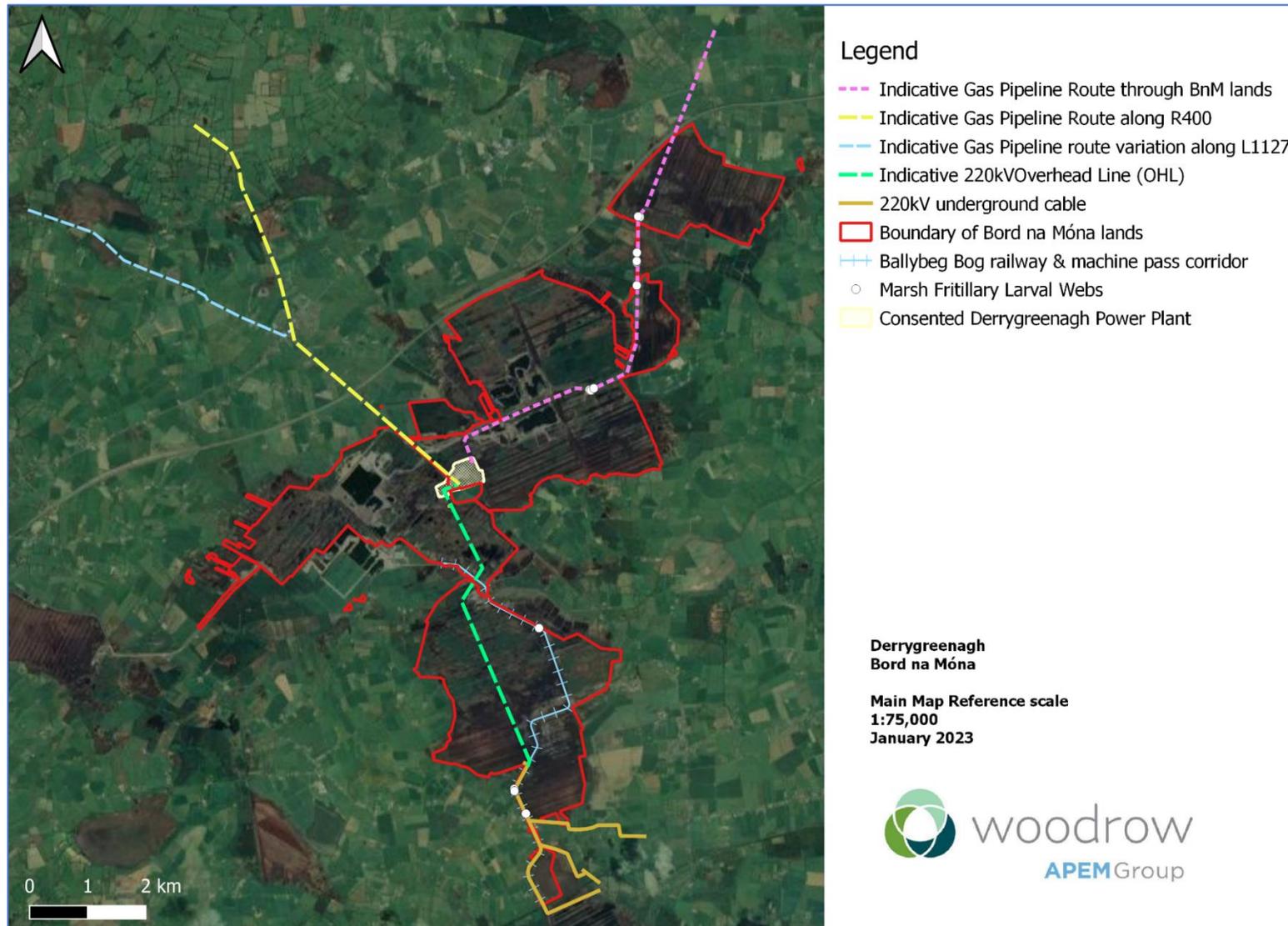


Figure 5: Marsh fritillary larval webs recorded on Bord na Móna lands in Derrygreenagh Bogs – Map 1



Figure 6: Marsh fritillary larval webs recorded on Bord na Móna lands in Derrygreenagh Bogs – Map 2



Figure 7: Marsh fritillary larval webs recorded on Bord na Móna lands in Derrygreenagh Bogs – Map 3



Figure 8: Marsh fritillary larval webs recorded on Bord na Móna lands in Derrygreenagh Bogs – Map 4



Figure 9: Marsh fritillary larval webs recorded on Bord na Móna lands in Derrygreenagh Bogs – Map 5



Figure 10: Marsh fritillary larval webs recorded on Bord na Móna lands in Derrygreenagh Bogs – Map 6



Figure 11: Marsh fritillary larval webs recorded on Bord na Móna lands in Derrygreenagh Bogs – Map 7



Plate 1: Larval web of marsh fritillary photographed on Bord na Móna lands in Derrygreenagh Bogs



Plate 2: Larval web of marsh fritillary photographed on Bord na Móna lands in Derrygreenagh Bogs



Plate 3: Larval web of marsh fritillary photographed on Bord na Móna lands in Derrygreenagh Bogs



Plate 4: Larval web of marsh fritillary photographed on Bord na Móna lands in Derrygreenagh Bogs



Figure 12: Marsh fritillary habitat suitability on Derrygreenagh Bogs – Map 1. The red line indicates the boundary of Bord na Móna lands in Derrygreenagh Bogs.

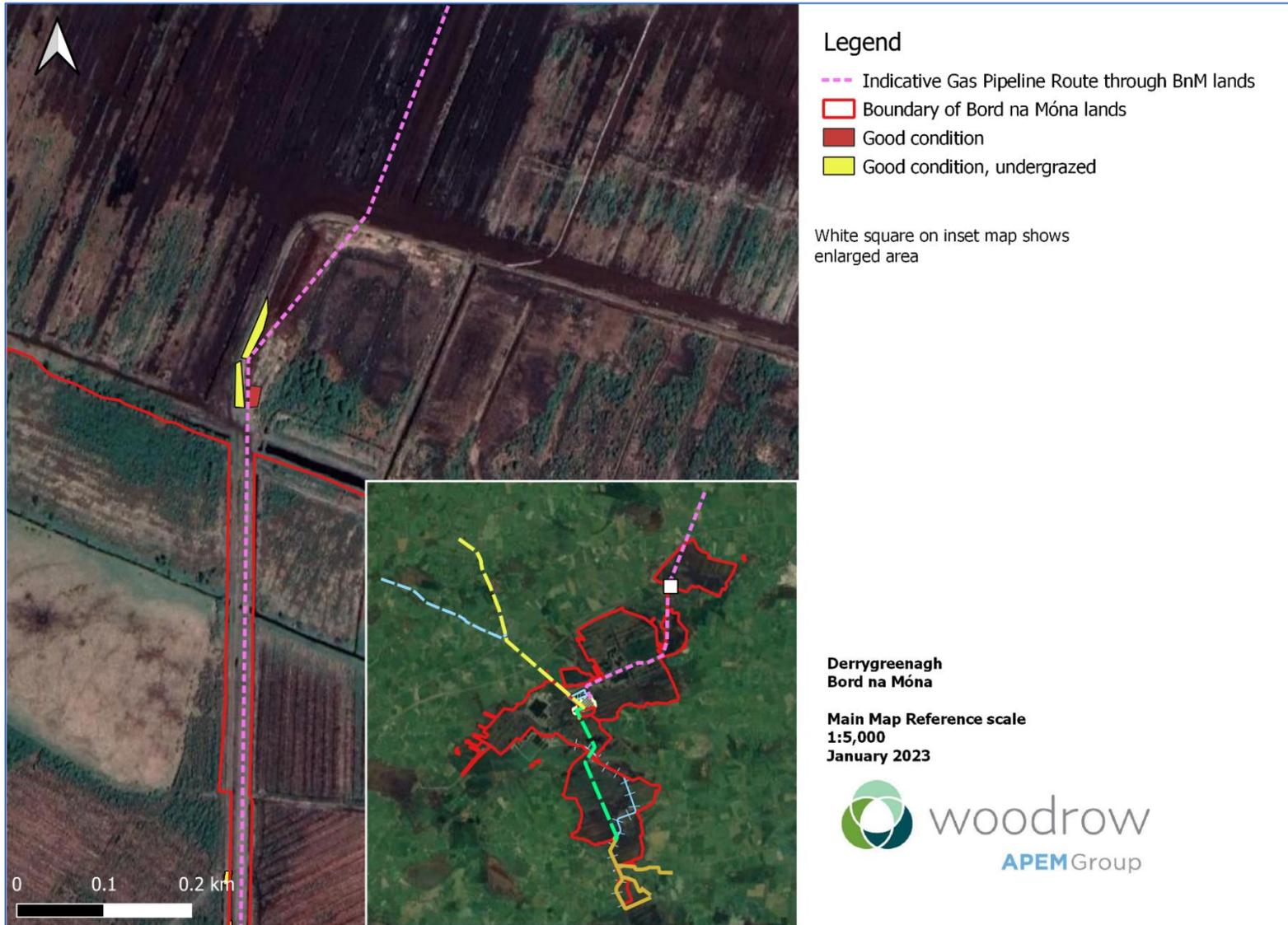


Figure 13: Marsh fritillary habitat suitability on Bord na Móna lands in Derrygreenagh Bogs – Map 2. The red line indicates the boundary of Bord na Móna lands in Derrygreenagh Bogs.

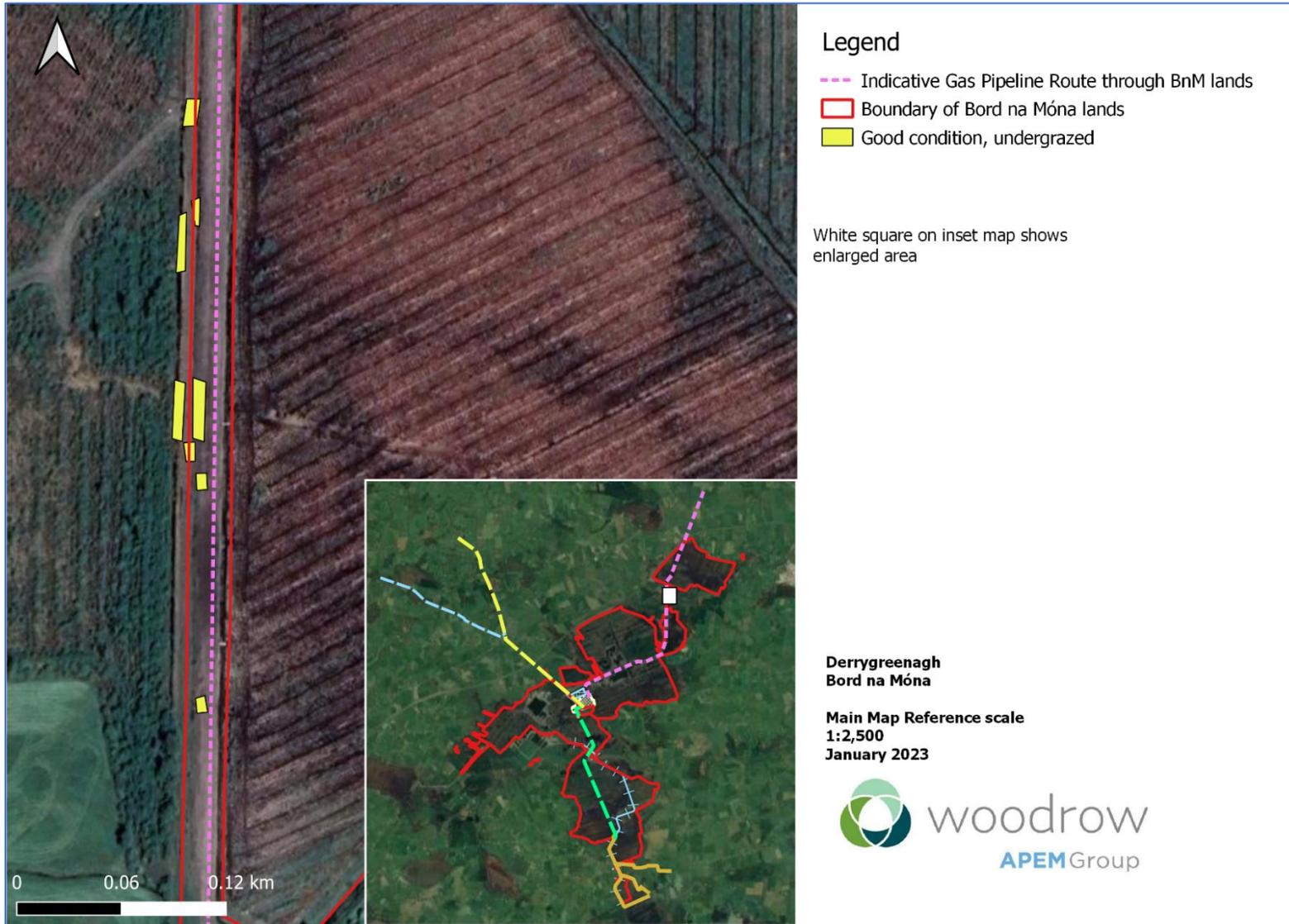


Figure 14: Marsh fritillary habitat suitability on Bord na Móna lands in Derrygreenagh Bogs – Map 3. The red line indicates the boundary of Bord na Móna lands in Derrygreenagh Bogs.

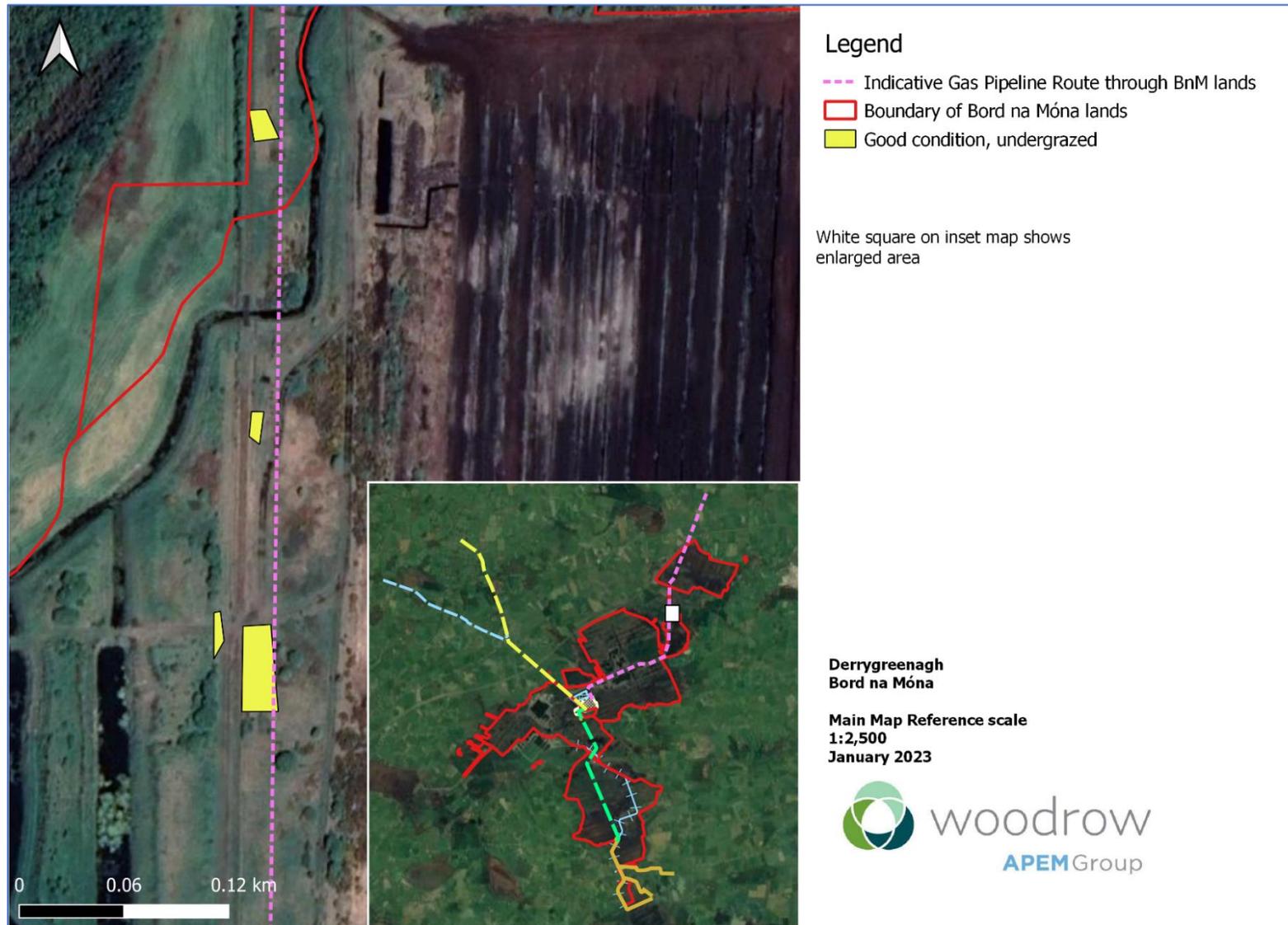


Figure 15: Marsh fritillary habitat suitability on Bord na Móna lands in Derrygreenagh Bogs – Map 4. The red line indicates the boundary of Bord na Móna lands in Derrygreenagh Bogs.



Figure 16: Marsh fritillary habitat suitability on Bord na Móna lands in Derrygreenagh Bogs – Map 5. The red line indicates the boundary of Bord na Móna lands in Derrygreenagh Bogs.

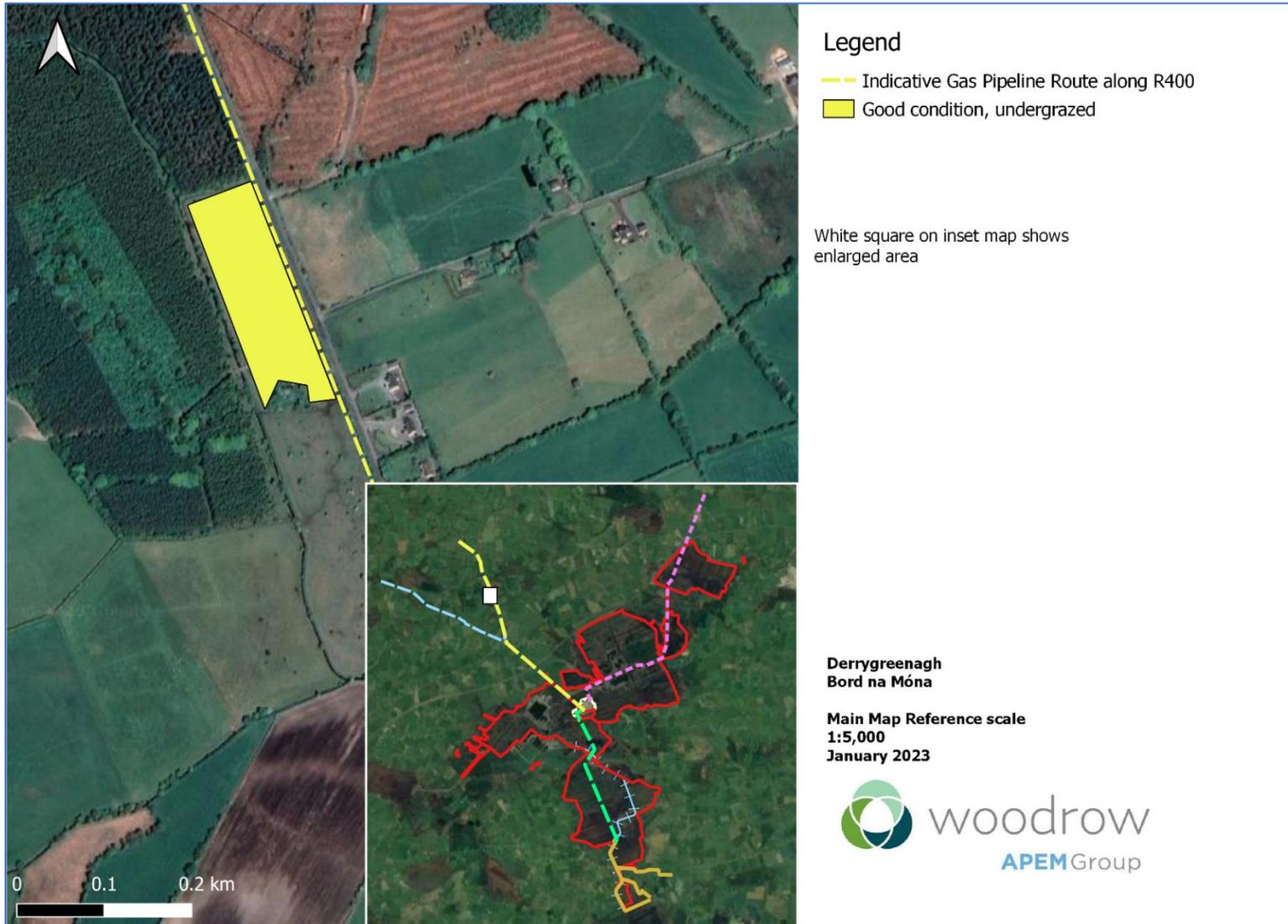


Figure 17: Marsh fritillary habitat suitability on Bord na Móna lands in Derrygreenagh Bogs – Map 6. The red line indicates the boundary of Bord na Móna lands in Derrygreenagh Bogs.

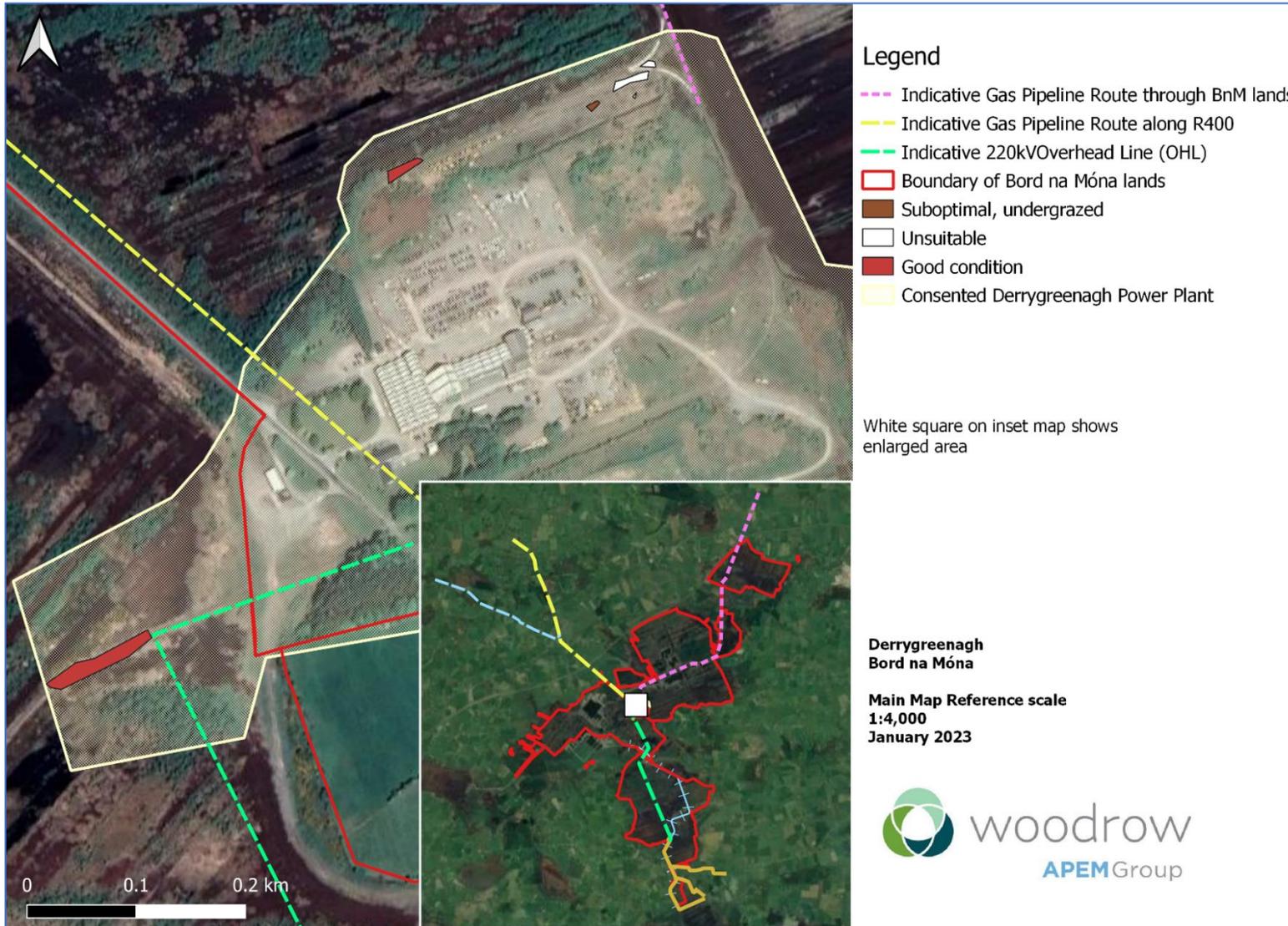


Figure 18: Marsh fritillary habitat suitability on Bord na Móna lands in Derrygreenagh Bogs – Map 7. The red line indicates the boundary of Bord na Móna lands in Derrygreenagh Bogs.



Figure 19: Marsh fritillary habitat suitability on Bord na Móna lands in Derrygreenagh Bogs – Map 8. The red line indicates the boundary of Bord na Móna lands in Derrygreenagh Bogs.



Figure 20: Marsh fritillary habitat suitability on Bord na Móna lands in Derrygreenagh Bogs – Map 9. The red line indicates the boundary of Bord na Móna lands in Derrygreenagh Bogs.

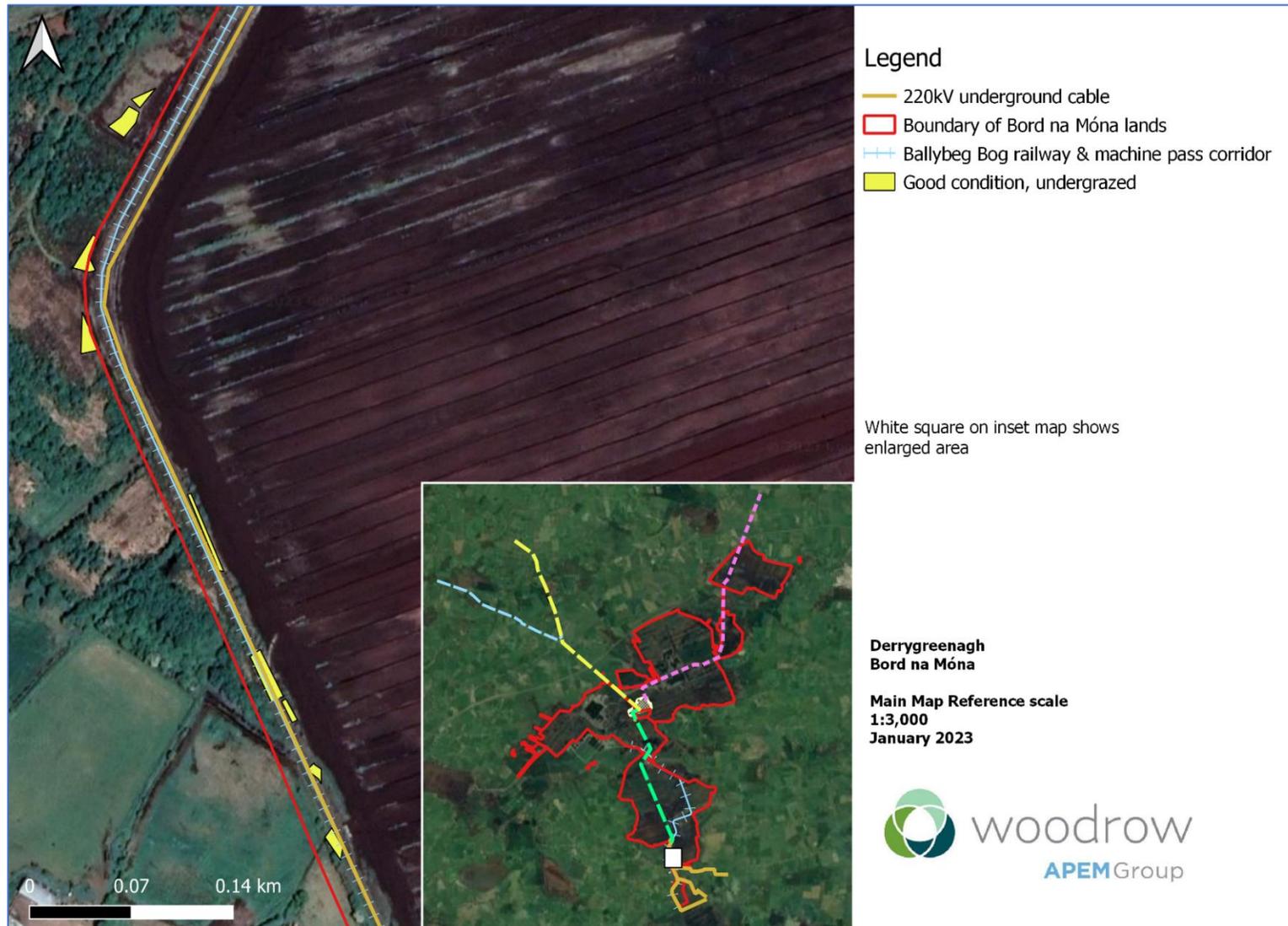


Figure 21: Marsh fritillary habitat suitability on Bord na Móna lands in Derrygreenagh Bogs – Map 10. The red line indicates the boundary of Bord na Móna lands in Derrygreenagh Bogs.

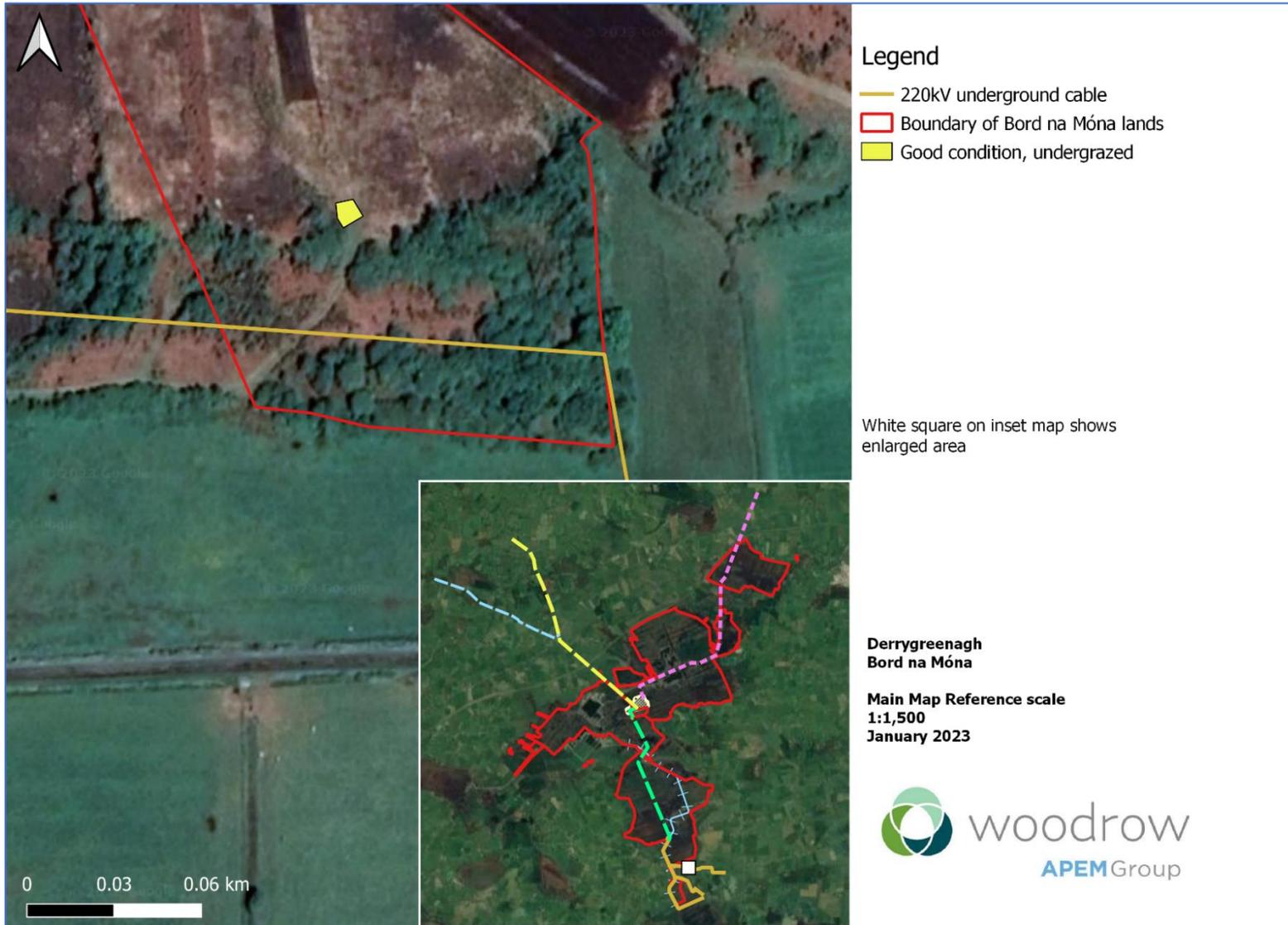
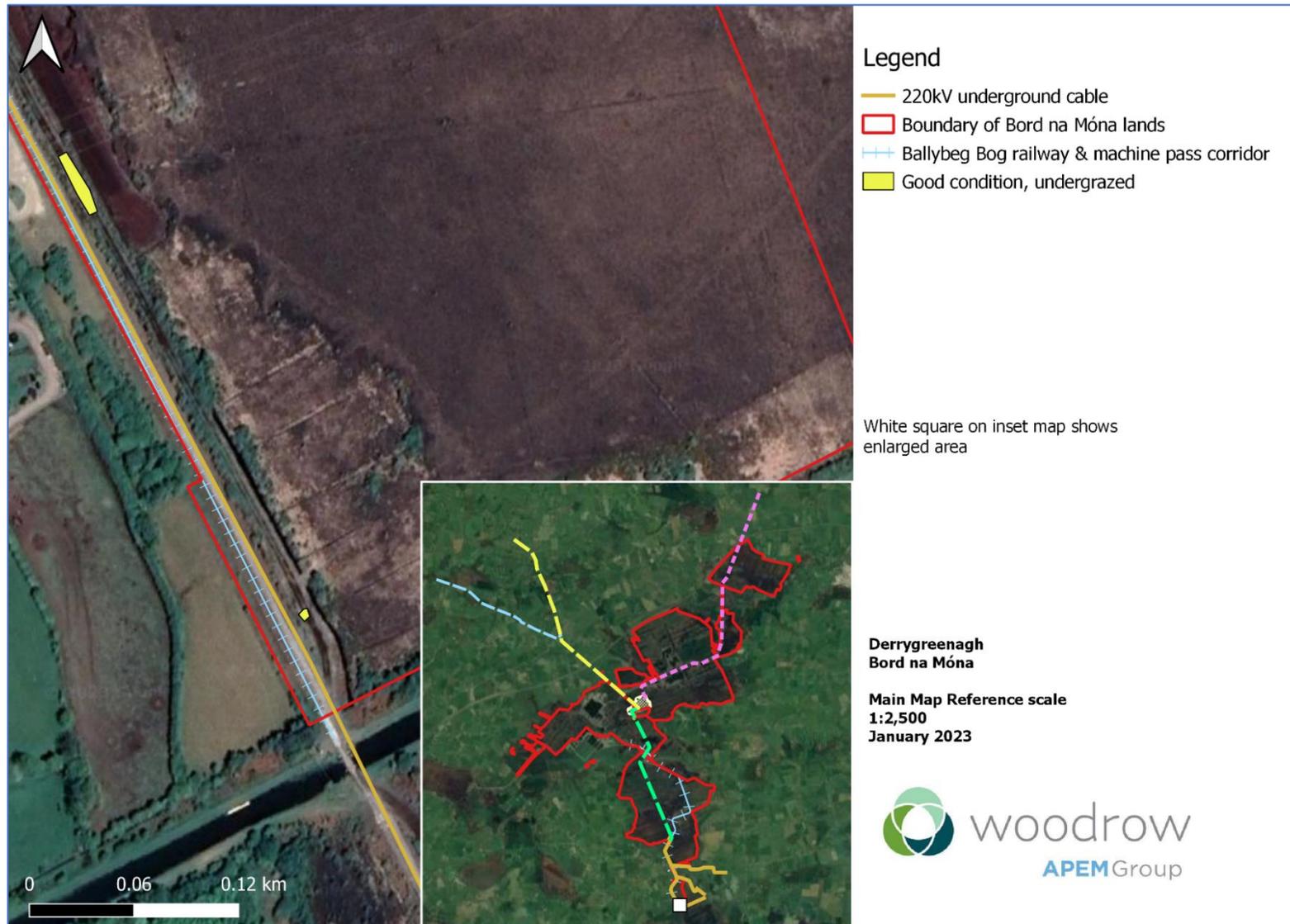


Figure 22: Marsh fritillary habitat suitability on Bord na Móna lands in Derrygreenagh Bogs – Map 11. The red line indicates the boundary of Bord na Móna lands in Derrygreenagh Bogs.



4.2 Habitat Surveys

The habitats recorded in the survey areas at Derrygreenagh Bogs are shown in **Error! Reference source not found.** and in the following maps. The area of each habitat recorded is also provided, as well as any correspondence to habitats listed in Annex 1 of the EU Habitats Directive. The areas covered in surveys were guided by the proposed development areas and pipeline routes, and so focused on these areas in particular. The following sections give a brief description of the habitats recorded, with photographs and species lists where applicable.

Table 3: Habitats recorded in the survey area, classified according to Fossitt (2000). Dimensions are given in hectares (ha) or metres (m).

Habitat (Fossitt 2000)	Potential EU Annex I Affiliations	Area / Length
BC3 Tilled Land	No	11.456 ha
BL3 Buildings & Artificial Surfaces	No	8.571 ha
FW2 Lowland Depositing River	No	779 m
FW4 Drainage Ditches	No	3822.5 m
ED2 Spoil & Bare Ground	No	6.108 ha
FL2 Acid Oligotrophic Lake	No	3.277 ha
GA1 Improved Grassland	No	169.21 ha
GA2 Amenity Grassland	No	0.995 ha
GS2 Dry Meadows and Grassy Verges	No	5.939 ha
GS4 Wet grassland	No	3.285 ha
HD 1 Dense Bracken	No	1.122 ha
PB1 Raised Bog	Yes (7110)	42.726 ha
PB4 Cutover bog	No	357.007 ha
PF2 Poor Fen and Flush	No	0.328 ha
W Scrub & Developing Woodland Mosaic	No	23.785 ha
WD1 Mixed Broadleaved Woodland	No	1.122 ha
WD2 Mixed Broadleaf/Conifer Woodland	No	21.644 ha
WD4 Conifer Plantation	No	105.807 ha
WL1 Hedgerows	No	1.585 ha
WL2 Treelines	No	0.111 ha
WN1 Oak-Birch-Holly Woodland	No	0.06 ha
WN7 Bog Woodland	No	14.079 ha
WS1 Scrub	No	33.971 ha
WS2 Immature Woodland	No	35.888 ha

Figure 23: Habitats recorded at Derrygreenagh – Map 1



Figure 24: Habitats recorded at Derrygreenagh – Map 2. The red line indicates the boundary of Bord na Móna lands in Derrygreenagh Bogs.

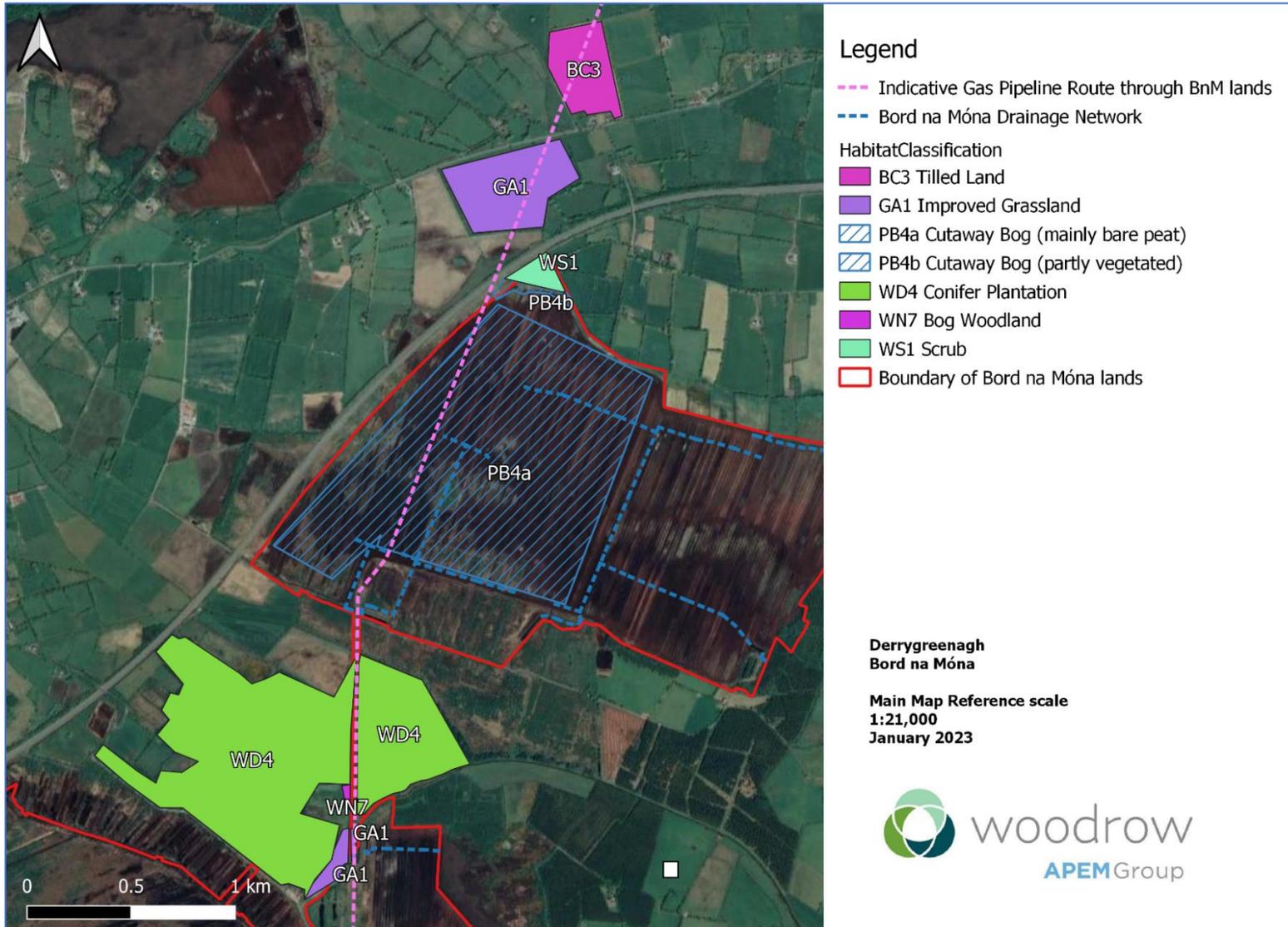


Figure 25: Habitats recorded at Derrygreenagh – Map 3. The red line indicates the boundary of Bord na Móna lands in Derrygreenagh Bogs.

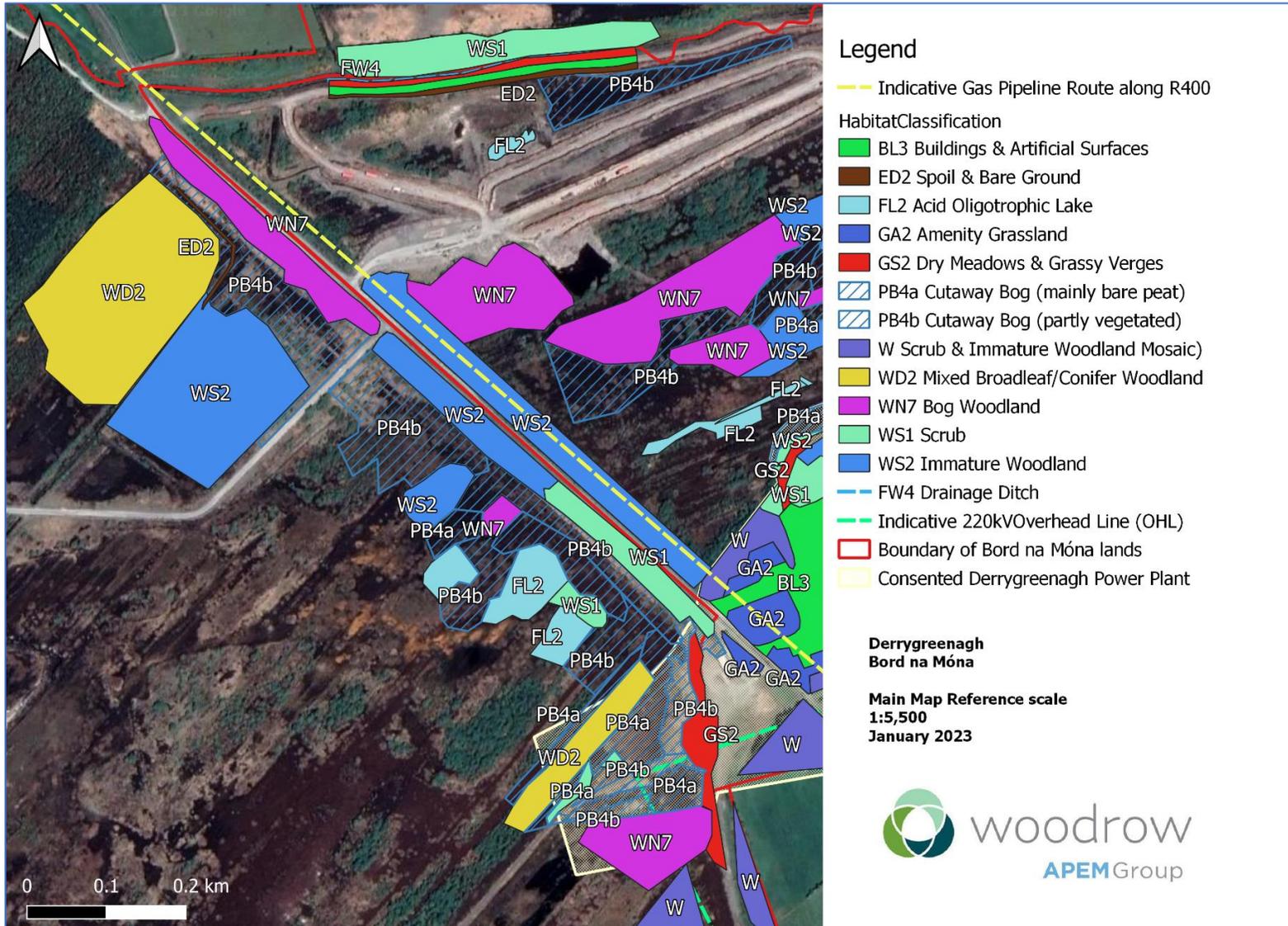


Figure 26: Habitats recorded at Derrygreenagh – Map 4. The red line indicates the boundary of Bord na Móna lands in Derrygreenagh Bogs.

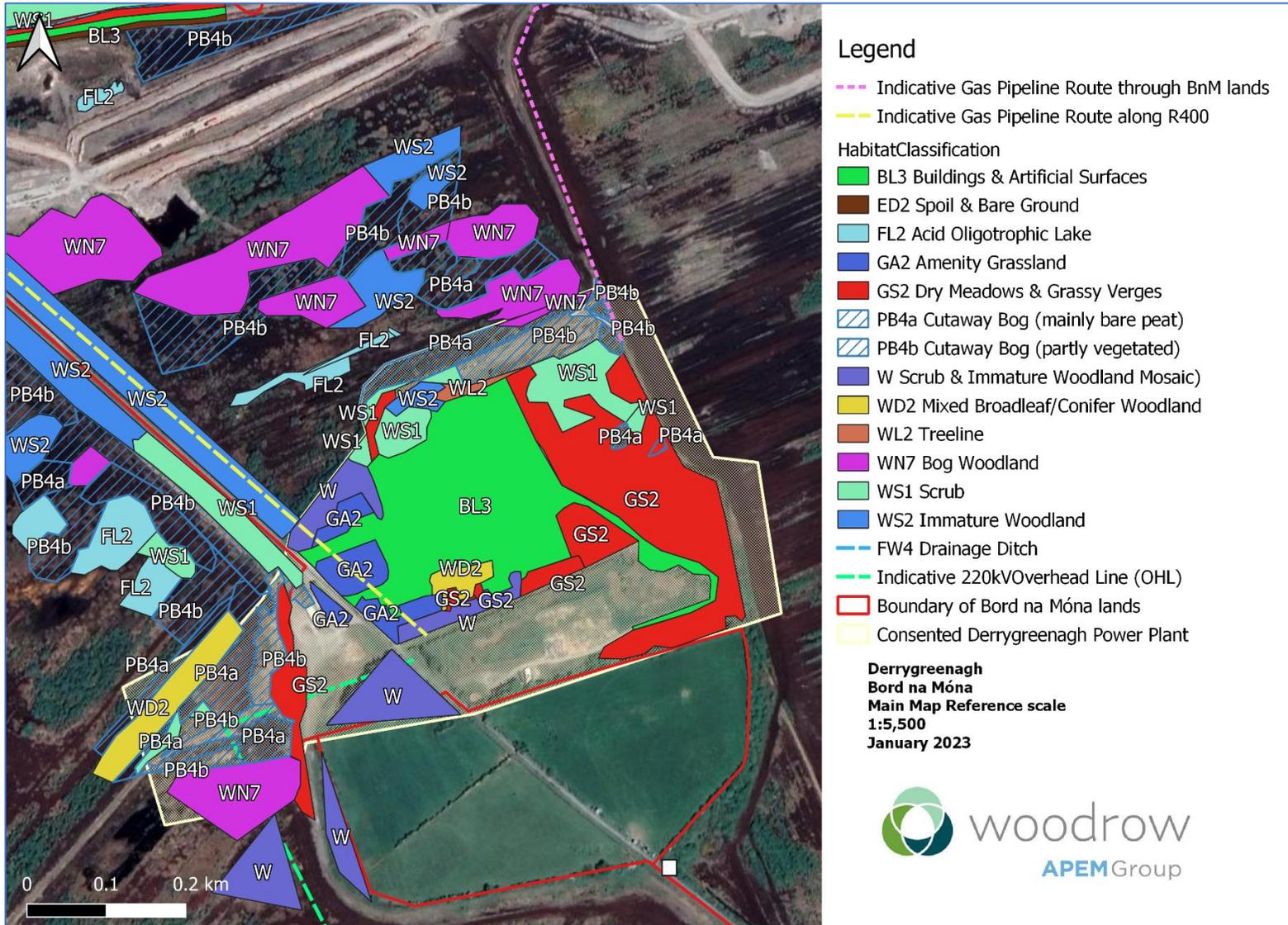


Figure 27: Habitats recorded at Derrygreenagh – Map 5. The red line indicates the boundary of Bord na Móna lands in Derrygreenagh Bogs.

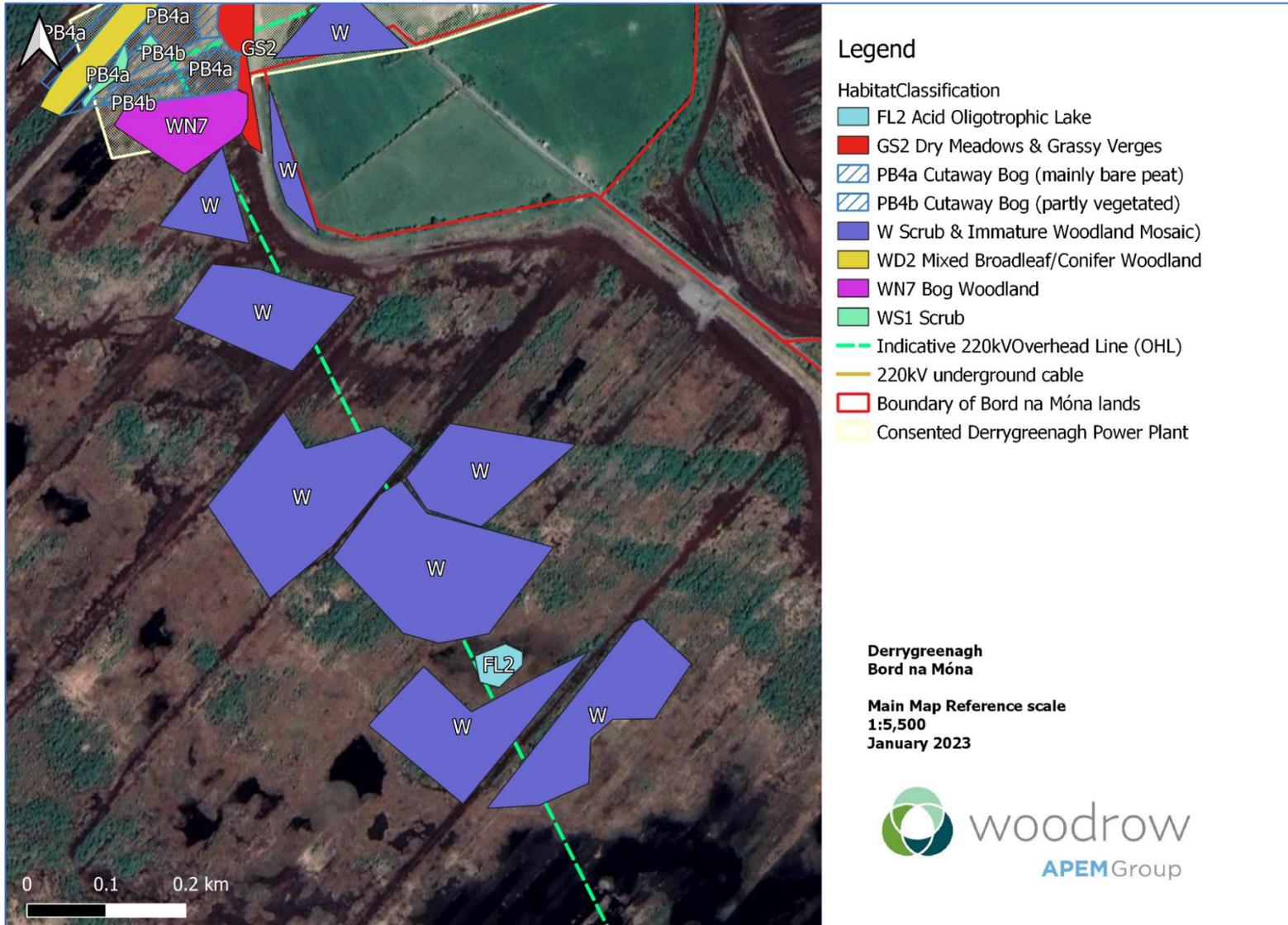


Figure 28: Habitats recorded at Derrygreenagh – Map 6. The red line indicates the boundary of Bord na Móna lands in Derrygreenagh Bogs.

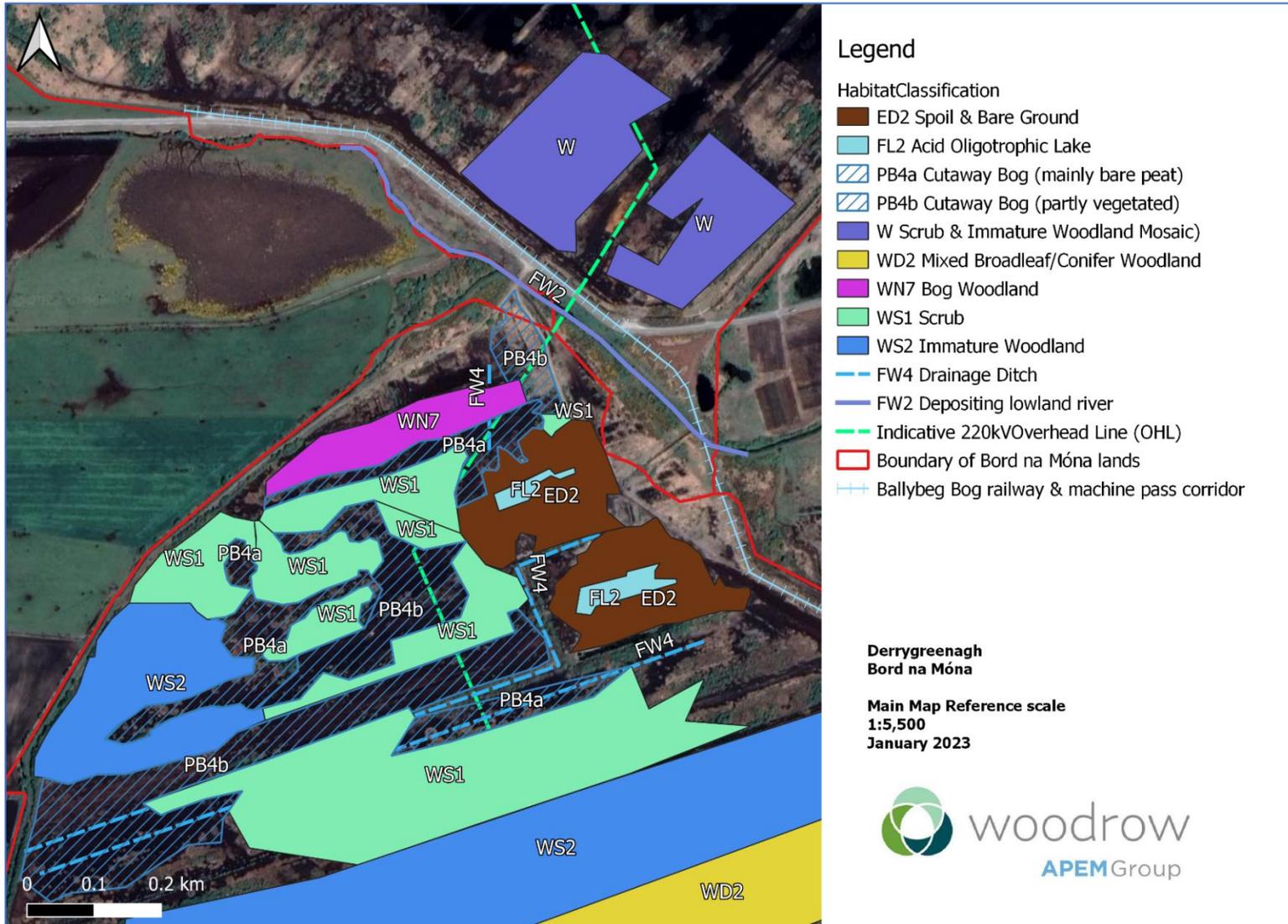


Figure 29: Habitats recorded at Derrygreenagh – Map 7. The red line indicates the boundary of Bord na Móna lands in Derrygreenagh Bogs.

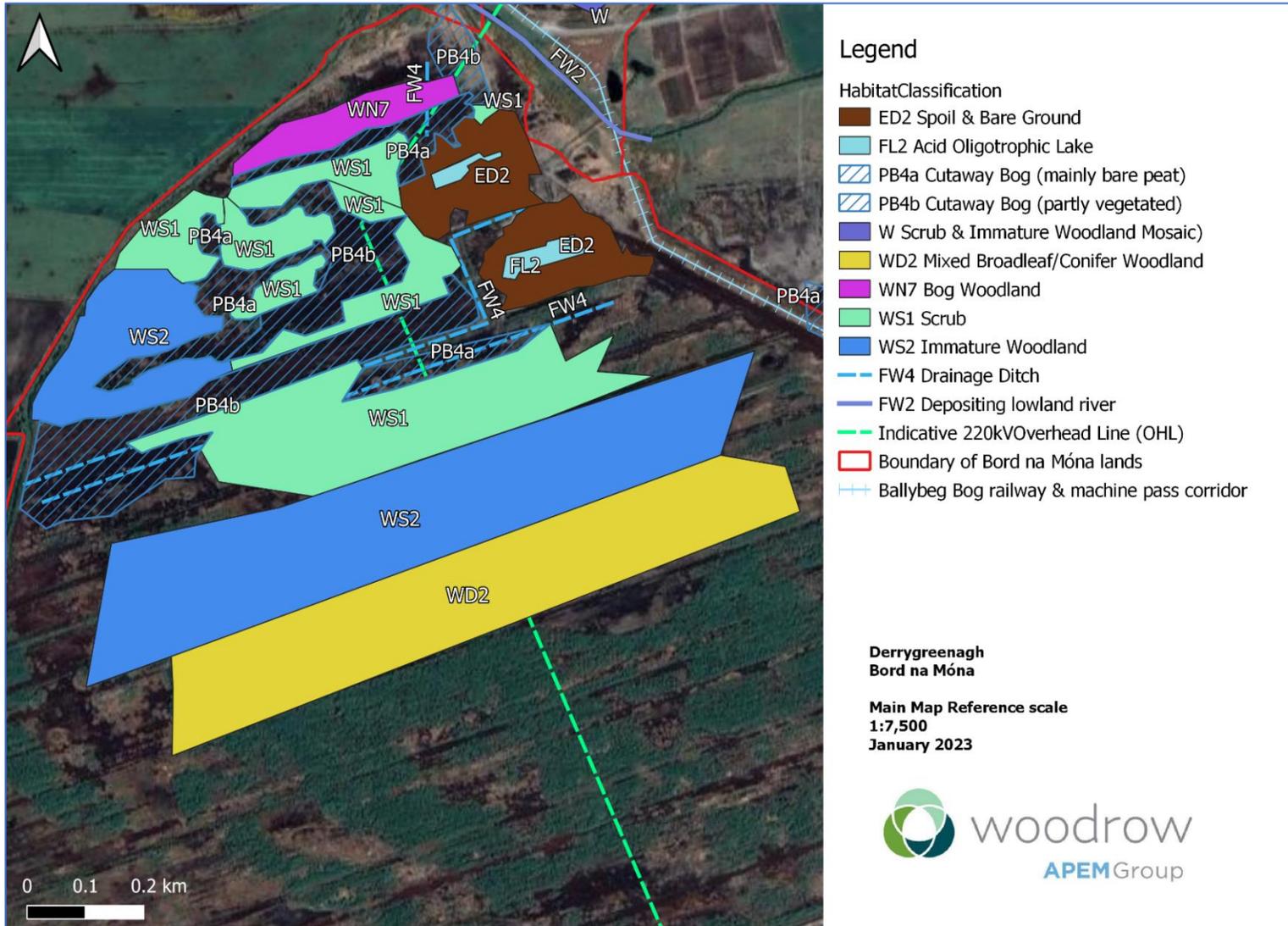


Figure 30: Habitats recorded at Derrygreenagh – Map 8. The red line indicates the boundary of Bord na Móna lands in Derrygreenagh Bogs.



Figure 31: Habitats recorded at Derrygreenagh – Map 9. The red line indicates the boundary of Bord na Móna lands in Derrygreenagh Bogs.



Figure 32: Habitats recorded at Derrygreenagh – Map 10. The red line indicates the boundary of Bord na Móna lands in Derrygreenagh Bogs.



Figure 33: Habitats recorded at Derrygreenagh – Map 11. The red line indicates the boundary of Bord na Móna lands in Derrygreenagh Bogs.

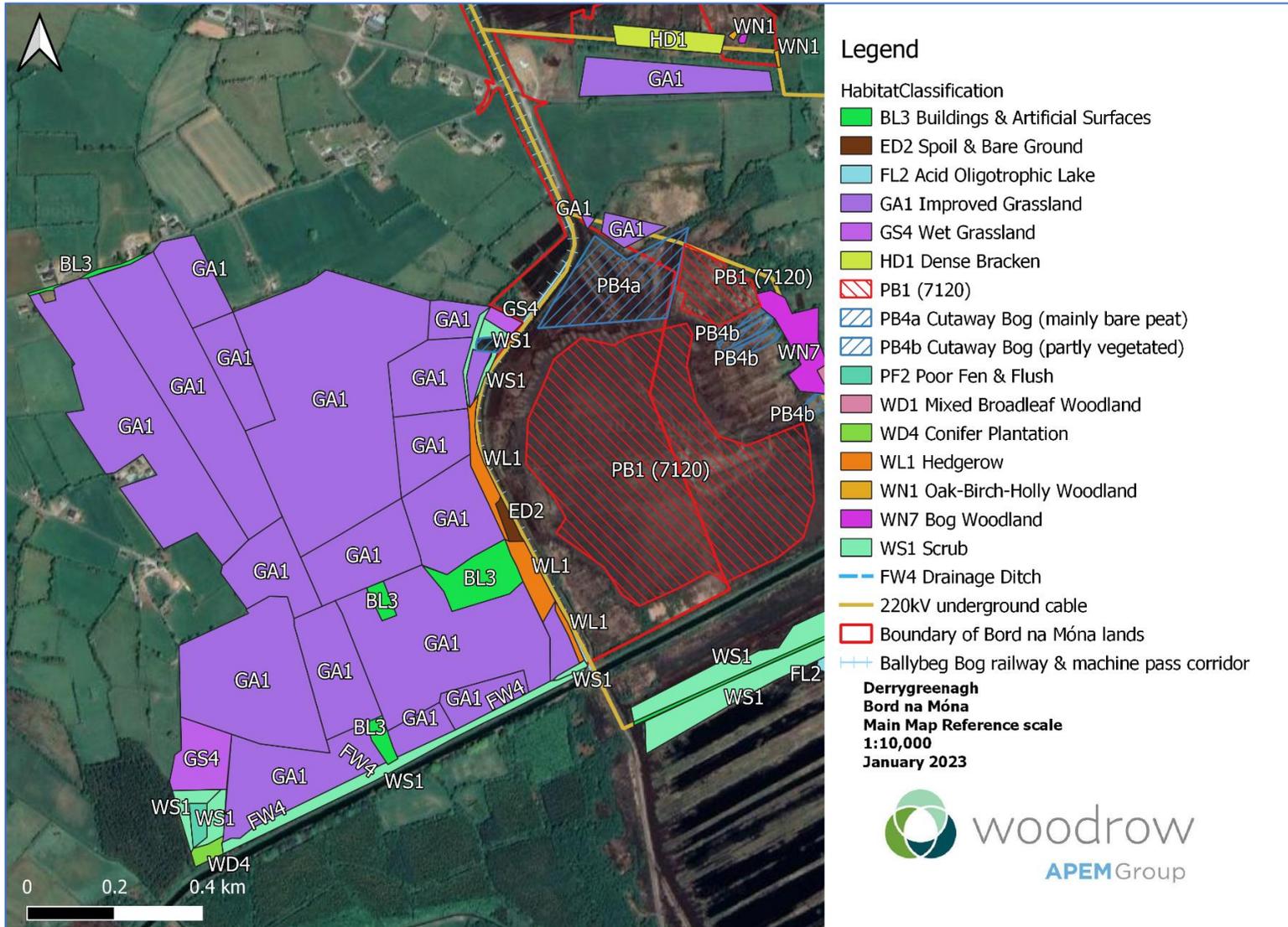
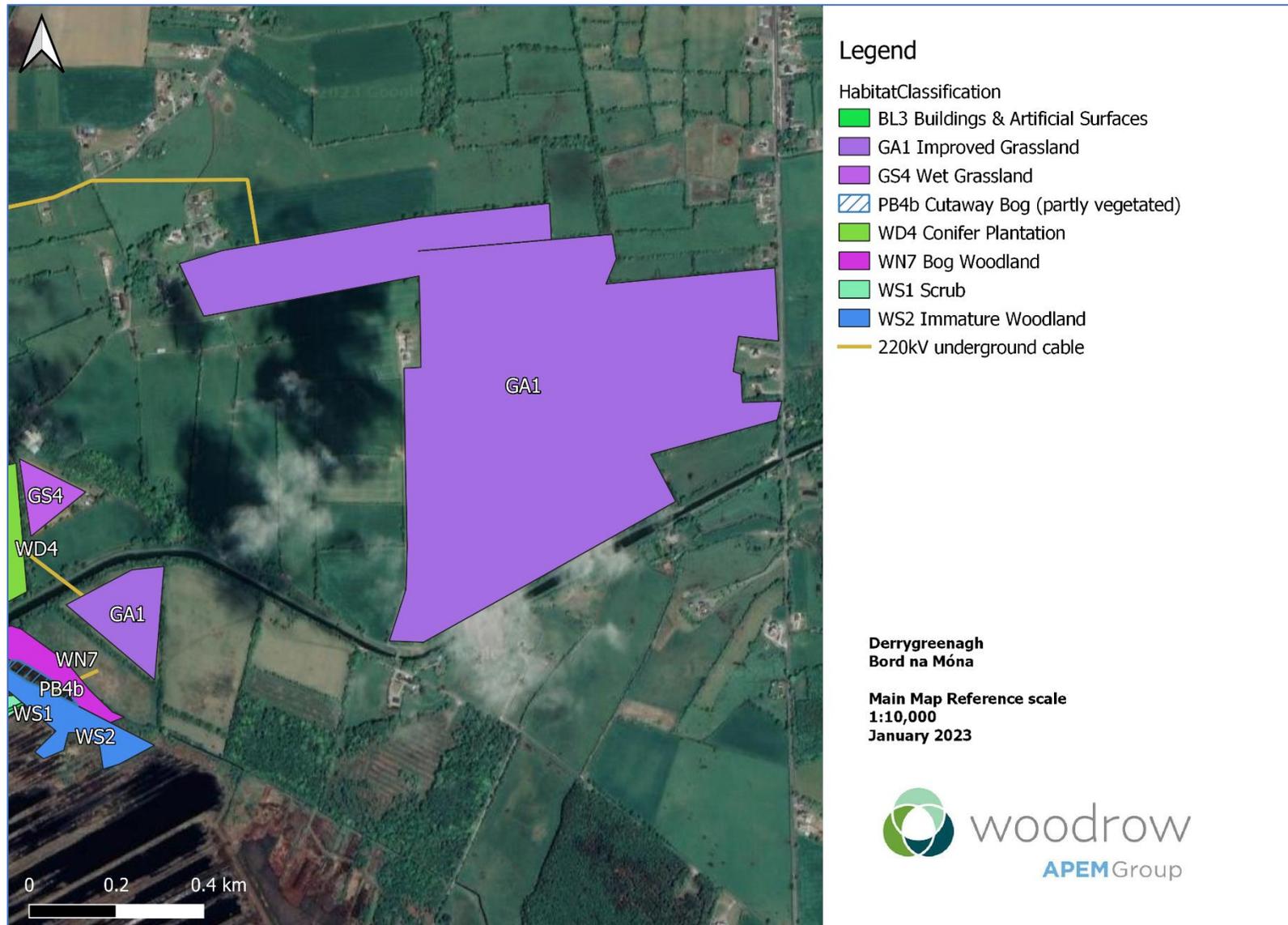


Figure 34: Habitats recorded at Derrygreenagh – Map 12



4.2.1 BC3 Tilled Land

Two small fields were identified as agricultural land used for the production of arable crops. Harvesting had taken place so no species identification was made. Remnant hedgerows with large gaps were noted, mainly of hawthorn *Crataegus monogyna*.

Affinity to EU Annex I Habitats: None noted.

4.2.2 BL3 Buildings & Artificial Surfaces

The Bord na Móna offices are located to the north-east of the R400. This site is approximately 400m x 400m in size and contains the majority of the built land and artificial surfaces in the survey area. There is an adjoining gravel roadway to the south-east.

Affinity to EU Annex I Habitats: None noted.

Plate 5: Built land & artificial surfaces



4.2.3 FW2 Lowland Depositing River

A short stretch of lowland depositing river was recorded where the Yellow River crosses the site. The Yellow River runs west to east between Derryarkin and Ballybeg Bog before crossing the R400. The Mongagh River is a tributary of the Yellow River and flows eastwards before joining the Yellow River south of Castlejordan. The Coolcor stream has been canalised and flows west to east through Ballybeg bog. However, aquatic surveys were not carried out by Woodrow or APEM, so the presence of rivers and streams was just noted where applicable during habitat surveys.

Affinity to EU Annex I Habitats: None noted.

Plate 6: FW2 Lowland Depositing River

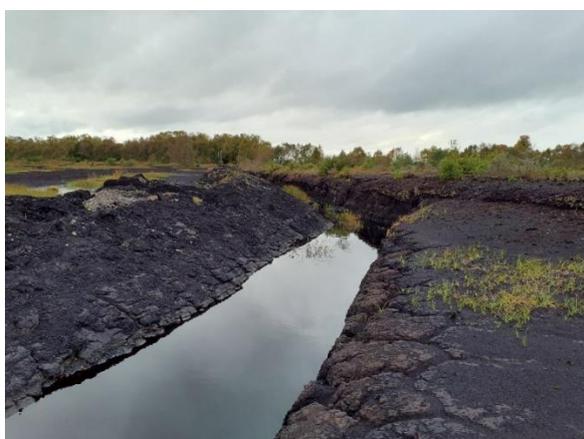


4.2.4 FW4 Drainage ditches

A network of deep drainage ditches transects the cutover bog habitats (including Ballybeg bog). These ditches are partly unvegetated, but some vegetation occurs in places. Standing water is a consistent feature of these ditches. Species include: common reed *Phragmites australis*, bulrush/reedmace *Typha* spp., bulbous rush *Juncus bulbosus*.

Affinity to EU Annex I Habitats: None noted.

Plate 7: FW4 Drainage Ditch



4.2.5 FL2 Acid oligotrophic lake

A number of lakes are located across the site and vary in size from small (10m x 60m) to large (200m x 50m). Seasonal fluctuations in the water table will likely be reflected in the depth of these lakes. The water is brown in colour due to the peaty substratum. Species include: bulrush/reedmace *Typha* spp., bog cotton *Eriophorum angustifolium*, sharp-flowered rush *Juncus acutiflorus*.

Affinity to EU Annex I Habitats: none noted. [Species recorded do not correspond to 'oligotrophic waters containing very few minerals of sandy plains (*Littorelletalia uniflorae*) (3110)' and 'oligotrophic to mesotrophic standing waters of the *Littorelletea uniflorae* and/or of the *Isoeto-Nanojuncetea* (3130)']

Plate 8: FL2 Acid Oligotrophic Lake



4.2.6 ED2 Spoil & Bare Ground

This area of agricultural grassland was used for the storage of silage bales. Frequent use of heavy machinery onsite has resulted in the loss of vegetation, as well as poaching and waterlogging. As such, the land was classified as ED2 Spoil & Bare Ground.

Plate 9: ED2 Spoil & Bare Ground



4.2.7 GA1 Improved Grassland

This category includes all highly modified grasslands which are intensively managed for agriculture. Seeded grasses are dominant, with poor overall diversity. Poaching was often noted, possibly indicative of overstocking. Species include: ryegrasses *Lolium* spp., white clover *Trifolium repens*.

Affinity to EU Annex I Habitats: None noted.

Plate 10: GA1 Improved Grassland



4.2.8 GA2 Amenity Grassland

Amenity grassland surrounds the Bord na Móna offices at Derrygreenagh. This grassland is improved, intensively maintained, and species-poor. Some non-native ornamental trees have been planted here. Species include: Fescues *Festuca* spp., daisy *Bellis perennis*, white clover *Trifolium repens*, dandelion *Taraxacum officinale*.

Affinity to EU Annex I Habitats: None noted.

Plate 11: GA2 Amenity Grassland



4.2.9 GS2 Dry meadows and grassy verges

Fairly small patches of this habitat were identified around the Bord na Móna offices in Derrygreenagh. Species include: cocksfoot *Dactylis glomerata*, knapweed *Centaurea nigra*, purple moor-grass *Molinia caerulea*. An extensive area of calcareous and neutral grassland was identified in a previous report with abundant orchids and devils bit scabious noted along the eastern entrance to the Ballybeg Bog (Douglas, no date). However, grazing is a characteristic feature of this habitat type. As no evidence of grazing was observed we have reclassified this area under ‘GS2 dry meadows and grassy verges.’

The railway embankment has given rise to a linear grassy verge, which runs alongside the Ballybeg, Derrygreenagh and Derryarkin bogs. This grassy verge provides good habitat for devil's bit scabious. Species include: bent grasses *Agrostis* spp., cocksfoot *Dactylis glomerata*, false oatgrass *Arrhenatherum elatius*, plantains *Plantago* spp., knapweed *Centaurea* spp., thistles *Cirsium* spp., hogweed *Heracleum sphondylium*, yarrow *Achillea millefolium* and devil's bit scabious *Succisa pratensis*.

Plate 12: GS2 Dry meadows and grassy verges



4.2.10 GS4 Wet grassland

Poorly-drained grassland areas with abundant rushes *Juncus effusus* were noted. These areas were often heavily poached by livestock. Some seasonal flooding and standing water were also noted. Species include: common rush *Juncus effusus*, sharp-flowered rush *Juncus acutiflorus*, thistles *Cirsium* spp.

Affinity to EU Annex I Habitats: None noted.

Plate 13: GS4 Wet grassland



4.2.11 HD1 Dense Bracken

This habitat is dominated by bracken *Pteridium aquilinum* and is typically associated with a low diversity of species. Other species identified include bindweed *Calystegia spp.*, nettles *Urtica dioica*, willows *Salix spp.*, elder *Sambucus nigra*, and gorse *Ulex europaeus*. The dense bracken habitat transitions into scrub.

Plate 14: HD1 Dense Bracken



4.2.12 PB1 Raised bog

A remnant area of raised bog is present (shown in **Figure 33**) just north of the Grand Canal. The habitat is relatively intact, despite the industrial peat-harvesting that has taken place to the north of the area, which is evident from the vertical banks. The hydrology remains good with the ground wet and slightly shaking underfoot. The bog shows good structural diversity with hummocks and hollows observed. Species diversity remains high and includes: heather *Calluna vulgaris* (dominant), purple moorgrass *Molinia caerulea* (frequent), bog cotton *Eriophorum vaginatum*, cross-leaved heath *Erica tetralix*, tormentil *Potentilla erecta*, *Sphagnum papillosum*, *Sphagnum rubellum*, *Sphagnum capillifolium*, *Sphagnum subnitens*, *Sphagnum cuspidatum*, *Sphagnum tenellum*, *Hypnum jutlandicum*, and *Polytrichum commune*. Some encroaching scrub was also noted here.

Plate 15: PB1 Raised bog



As described in Section 3.2, further information on this habitat was obtained by setting out a relevé and recording all vegetation present. The DOMIN scale used in classifying vegetation abundance is set in **Table 4**. The information recorded in the relevé is shown in **Table 5**. The habitat qualifies as the priority Annex 1 habitat “Active Raised Bogs (7110)”⁸, as listed in the EU Habitats Directive, making it unsuitable as a location for a sub-station.

Table 4: DOMIN scale used in classifying vegetation cover

Domin Scale Number	Cover Percentage (%)
10	91–100%
9	76–90%
8	51–75%
7	34–50%
6	26–33%
5	11–25%
4	4–10%
3	<4% (many individuals)
2	<4% (several individuals)
1	<4% (few individuals)

⁸ Irish Ramsar Wetlands Committee (2018) Irish Wetland Types – an identification guide and field survey manual. EPA, Johnstown Castle, Ireland.

Table 5: Vegetation and habitat details recorded within a 2 x 2 m relevé (sample area) in raised bog habitat at Derrygreenagh

Raised Bog Habitat (PB1) Derrygreenagh		Location (ITM): X 651061, Y 731207
This relevé is located in an area of raised bog habitat on a deep peat (>1 m) substrate. The ground was very wet and soft underfoot, with the water table appearing to be at or near the surface. The vegetation was composed of typical raised bog species, including several <i>Sphagnum</i> moss species, sedges and heather <i>Calluna vulgaris</i> . <i>Sphagnum</i> species were noted to be in good condition, and widespread in the surrounding area. No signs of grazing were recorded. This habitat qualifies as the priority Annex 1 habitat Active Raised Bogs (7110).		
Date	14/09/22	
Size (m)	2 x 2	
Slope	None	
Aspect	N/A	
Graminoid cover (%)	40	
Ericoid cover (%)	33	
Herbaceous (non-graminoid) cover (%)	17	
Bryophyte cover (%)	50	
Mean/max height of vegetation (cm)	35/40	
Unvegetated (%)	0	
Grazed?	No	
Species	% cover	DOMIN
<i>Calluna vulgaris</i>	25	5
<i>Erica tetralix</i>	6	4
<i>Vaccinium oxycoccus</i>	3	3
<i>Eriophorum angustifolium</i>	7	4
<i>Eriophorum vaginatum</i>	10	4
<i>Trichophorum cespitosum</i>	15	5
<i>Rhynchospora alba</i>	12	5
<i>Andromeda polifolia</i>	5	4
<i>Narthecium ossifragum</i>	5	4
<i>Drosera rotundifolia</i>	2	2
<i>Cladonia portentosa</i>	5	4
<i>Hypnum jutlandicum</i>	10	4
<i>Sphagnum rubellum</i>	7	4
<i>Sphagnum tenellum</i>	2	2
<i>Sphagnum subnitens</i>	5	4
<i>Sphagnum capillifolium</i>	3	3
<i>Sphagnum papillosum</i>	5	4
<i>Sphagnum denticulatum</i>	2	2
<i>Polytrichum</i> sp.	<1	1
<i>Aulacomnium palustre</i>	<1	2
Leafy liverwort	10	4

4.2.13 PB4 Cutover Bog

The majority of peatland systems recorded in the survey area are highly degraded, where the natural vegetation has been removed resulting in extensive areas of bare peat. Harvesting is likely to have been halted very recently in some parts of the survey area and recolonization by native species is taking place. This results in a mosaic of habitats representing various stages in ecological succession, including: bare peat, scrub, immature woodland, bog woodland. The climax habitat type here will likely be bog woodland. Where these regenerating habitats align with the corresponding Fossitt classification they have been categorised as such. The peat depth is no doubt variable but is generally deep (>80cm in places), so the peat resource has not been exhausted. In places the peat is loose and milled while in others it is more compact and dry. For the purposes of mapping, a distinction is made between areas of cutaway bog which are still mainly bare peat (shown in the following pictures as PB4a) and cutaway areas which are at least partly recolonised by vegetation (PB4b).

Species include: marsh woundwort *Stachys palustris*, willowherbs *Epilobium* spp., vetches *Vicia* spp., *Stellaria media*, creeping buttercup *Ranunculus repens*, silverweed *Potentilla anserina*, redshank *Persicaria maculosa*, compact rush *Juncus conglomeratus*, common rush *Juncus effusus*, sharp-flowered rush *Juncus acutiflorus*, bulbous rush *Juncus bulbosus*, glaucous sedge *Carex flacca*, cottongrass *Eriophorum angustifolium*, downy birch *Betula pubescens*, silver birch *Betula pendula*, purple moor-grass *Molinea carulea*, heather *Calluna vulgaris*, pine *Pinus sylvestris*, heath star moss *Campylopus introflexus*, gorse *Ulex europaeus*.

Affinity to EU Annex I Habitats: None noted.

Plate 16: PB4a Cutover Bog – mostly bare peat



Plate 17: PB4b Cutover Bog – recolonising**4.2.14 PF2 Poor Fen and flush**

Fens and flushes are associated with bogs and form in hollows when peat-forming systems are fed by groundwater which has a richer mineral content. This fen was located in a wet grassland area. Species include: bog mosses *Sphagnum spp.*, *Polytrichum commune*, common rush *Juncus effusus*, sharp-flowered rush *Juncus acutiflorus*, tormentil *Potentilla erecta*, heather *Calluna vulgaris*, cross-leaved heath *Erica tetralix*, glaucous sedge *Carex flacca*, purple moor-grass *Molinia caerulea*, lousewort *Pedicularis sylvatica*.

Affinity to EU Annex I Habitats: None noted. This habitat type is limited in distribution across Ireland and as such is of conservation interest.

Plate 18: PF2 Poor Fen and Flush

4.2.15 W (WS1 & WS2) Scrub & Immature Woodland Mosaic

This area had a mosaic of scrub and developing woodland, and is depicted as “W” on the habitat maps included in this report. Scrub is often a transitional habitat, eventually progressing to woodland as larger trees become established. This habitat contained grey willow *Salix cinerea*, bilberry *Vaccinium myrtillus*, downy birch *Betula pubescens*, gorse *Ulex europaeus*, brambles *Rubus fruticosus*, occasional spruce *Picea sitchensis*, as well as sedges, grasses and rushes such as cottongrass *Eriophorum angustifolium*, sweet vernal grass *Anthoxanthum odoratum*, purple moor-grass *Molinia caerulea* and common rush *Juncus effusus*.

Plate 19: W - Scrub & Immature Woodland Mosaic



4.2.16 WD1 (Mixed) broadleaved woodland

Mature woodland with a significant broadleaf and conifer component is categorised as mixed. The term mixed broadleaf refers to woodlands where the major component (75-100%) is broadleaf and the minor (0-25%) component is conifers. Species include; downy birch *Betula pubescens*, spruce *Picea sitchensis*, pine *Pinus sylvestris*, brambles *Rubus fruticosus*, willows *Salix* spp., holly *Ilex aquifolium*, gorse *Ulex europaeus*, bracken *Pteridium aquilinum*, rowan *Sorbus aucuparia*, oak *Quercus* spp.

Affinity to EU Annex I Habitats: None noted.

Plate 20: WD1 (Mixed) broadleaved woodland**4.2.17 WD2 Mixed broadleaf/conifer woodland**

This habitat type is similar to that above, but with the broadleaf and conifer components reaching a minimum of 25% and a maximum of 75%. Species include: downy birch *Betula pubescens* (dominant), spruce *Picea sitchensis* (frequent), pine *Pinus sylvestris* (rare), willows *Salix spp.*, purple moor-grass *Molinia caerulea*, bracken *Pteridium aquilinum*, heather *Calluna vulgaris*.

Affinity to EU Annex I Habitats: None noted.

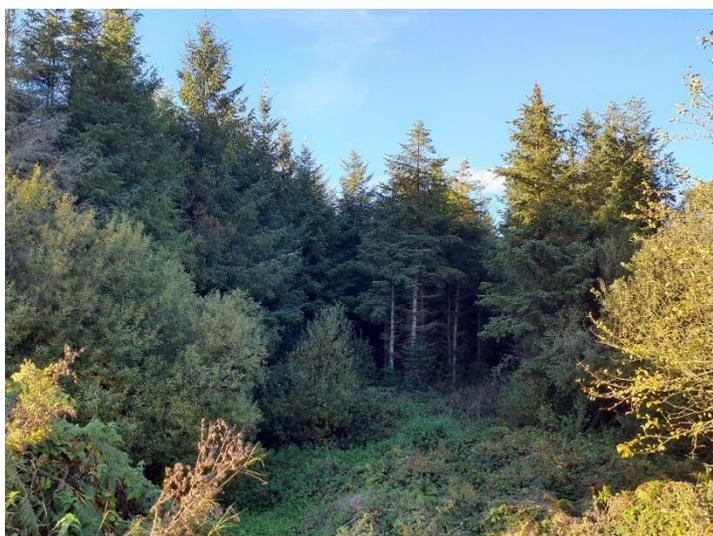
The area immediately south of this (see **Figure 29**) was not mapped by Woodrow, although a brief visual inspection suggested it was a mosaic of bare peat, heath, scrub, immature woodland, bog woodland, mixed woodland, and drains.

According to existing survey data, much of this area was identified as emerging bog woodland on cutover bog (Habitat PB4), containing birch in particular, with large drains crossing the area. The drains were noted as having little or no flow, and contained vegetation such as pondweeds, stoneworts and reeds.

Plate 21: WD2 Mixed broadleaf/conifer woodland**4.2.18 WD4 Conifer Plantation**

A small spruce plantation (approximately 70m x 120m) is located on agricultural land in the south-west of the study area, and another was recorded east of the raised bog remnant (**Figure 33 & Figure 34**). Commercial spruce plantations are densely planted, even-aged stands with low species diversity. Species include: spruce *Picea sitchensis*.

Affinity to EU Annex I Habitats: None noted.

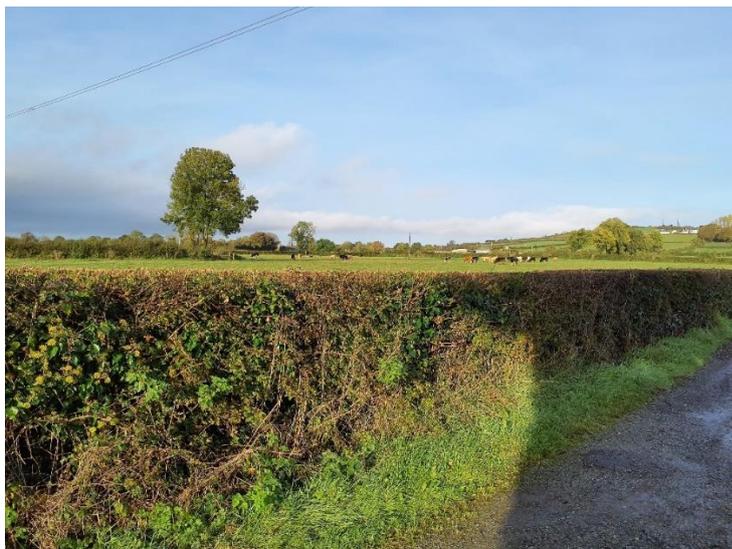
Plate 22: WD4 Conifer Plantation**4.2.19 WL1 Hedgerows**

Hedgerows form linear strips of shrubs and occasional trees at the margins of field boundaries. They are mostly planted and are generally dominated by native species. Many of the

hedgerows noted in the survey area were topped hawthorn hedgerows with mature ash trees. Others are less managed with briar, bramble, willow, and birch. Species include: hawthorn *Crataegus monogyna*, ash *Fraxinus excelsior*, brambles *Rubus fruticosus*, willows *Salix* spp., rowan *Sorbus aucuparia*, gorse *Ulex europaeus*, bracken *Pteridium aquilinum*, downy birch *Betula pubescens*.

Affinity to EU Annex I Habitats: None noted.

Plate 23: WL1 Hedgerows



4.2.20 WL2 Treelines

This habitat occurs along field boundaries when a single row of mature trees extends above 5m in height. Species include: larch *Larix decidua*, rowan *Sorbus aucuparia*, pine *Pinus sylvestris*, ash *Fraxinus excelsior*, alder *Alnus glutinosa*, downy birch *Betula pubescens*.

Affinity to EU Annex I Habitats: None noted.

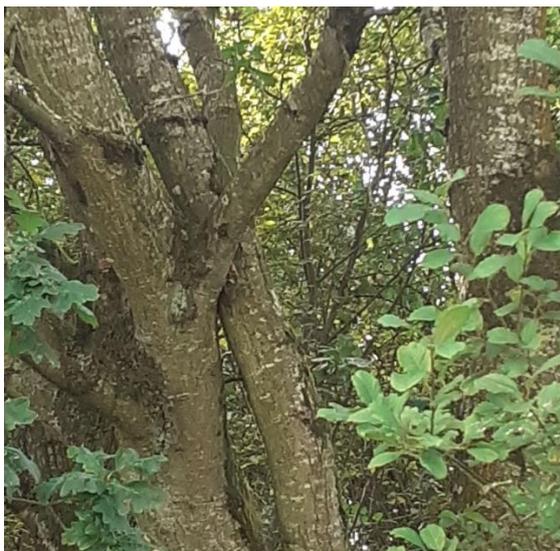
Plate 24: WL2 Treelines



4.2.21 WN1 Oak-Birch-Holly Woodland

Two very small patches of trees in the south of the survey area corresponded to this habitat type. These were in proximity to areas of bog woodland and dense bracken, with a degree of transition between habitats making it somewhat difficult to define discrete habitat areas. Species: Oak *Quercus* sp. Saplings, alder *Alnus glutinosa*, downy birch *Betula pubescens*, common bent grass *Agrostis capillaris*, heather *Calluna vulgaris*, purple moor-grass *Molinia caerulea*.

Plate 25: WN1 Oak-Birch-Holly Woodland



4.2.22 WN7 Bog Woodland

Bog woodland is known to occur on areas of cutover bog. Downy birch *Betula pubescens* was dominant and forms pure stands in places. An understory was evident comprising of heather *Calluna vulgaris*, purple-moorgrass *Molinia caerulea* and brambles *Rubus fruticosus*. Other species included: willow *Salix* spp., pine *Pinus sylvestris*, spruce *Picea sitchensis*.

Affinity to EU Annex I Habitats: None noted

Plate 26: WN7 Bog Woodland



4.2.23 WS1 Scrub

This is a transitional habitat which is dominated by shrubby and spinose species. Pockets of this habitat occur across the cutover bog, occasionally as a mosaic with developing woodland. Here it is likely to be the precursor to woodland habitat. Species include: birch *Betula* spp., pine *Pinus sylvestris*, brambles *Rubus fruticosus*, gorse *Ulex europaeus*, hawthorn *Crataegus monogyna*, ash *Fraxinus excelsior*, willows *Salix* spp., ivy *Hedera hibernica*, nettles *Urtica dioica*, elder *Sambucus nigra*, dog rose *Rosa canina*, bracken *Pteridium aquilinum*, heather *Calluna vulgaris*.

Affinity to EU Annex I Habitats: None noted.

Plate 27: WS1 Scrub



4.2.24 WS2 Immature Woodland

When young trees dominate but are less than 5 m in height the habitat is categorised as immature woodland. Pockets of this habitat are found across the cutover bog and will grow to form native bog woodland. The dominant species here is downy birch with abundant willow. Scots pine is rare. The understory is composed of early colonising species associated with the peatland habitat, especially heather and cotton grass. Species include: downy birch *Betula pubescens*, silver birch *Betula pendula*, willow *Salix* spp., pine *Pinus sylvestris*, brambles *Rubus fruticosus*, common rush *Juncus effusus*, cottongrass *Eriophorum angustifolium*, heather *Calluna vulgaris*.

Affinity to EU Annex I Habitats: None noted.

Plate 28: WS2 Immature Woodland

4.3 Bat Surveys

4.3.1 Desk Study

Review of existing records from NBDC indicates that noctule, common pipistrelle, soprano pipistrelle, Nathusius' pipistrelle, brown long-eared bat, Daubenton's bat and Natterer's bat have been recorded within the 10km grid squares N43, N44, N53 and N54. Refer to **Figure 35** for map showing 10km grid squares. The latest record is of Daubenton's bat in 2014.

Review of the NPWS Lesser Horseshoe bat database indicates that there are no records of roosts within a 2.5 km buffer (Core Sustainance Zone (CSZ)) of the proposed project.

The Cave Database for the Republic of Ireland does not hold any records of caves within a 4 km radius of the proposed wind farm site boundary.

4.3.1.1 Bat Landscape

The landscape suitability index, as generated by Lundy et al (2011) for bat species of the proposed project, is detailed in Table 1 below. The model suggests that the central (CCGT) and southern (OHL) phases of the proposed project are within low landscape suitability and the northern (Gas route) phase within low to moderate landscape suitability. To the east of the proposed project is high landscape suitability. Refer to Plates 1 and 2 below for the NBDC map highlighting the bat landscape for all bats (red dot indicated the CCGT).

Table 6: Landscape Suitability Index

Species	Suitability Index			Average Suitability Index
	High	Moderate	Low	
All bats	28.56	24.67	19.11	24.11
Soprano pipistrelle <i>Pipistrellus pygmaeus</i>	43	38	31	37
Common pipistrelle <i>Pipistrellus pipistrellus</i>	47	41	33	40
Nathusius' pipistrelle <i>Pipistrellus nathusii</i>	6	4	4	5
Brown long-eared <i>Plecotus auritus</i>	33	30	22	28
Lesser horseshoe <i>Rhinolophus hipposideros</i>	0	0	0	0
Leisler's bat <i>Nyctalus leisleri</i>	44	38	31	38
Whiskered bat <i>Myotis mystacinus</i>	15	14	12	14
Daubenton's bat <i>Myotis daubentonii</i>	35	28	22	28
Natterer's bat <i>Myotis nattereri</i>	34	29	18	27

Figure 35: 10 km grid squares in the area of Derrygreenagh Bogs

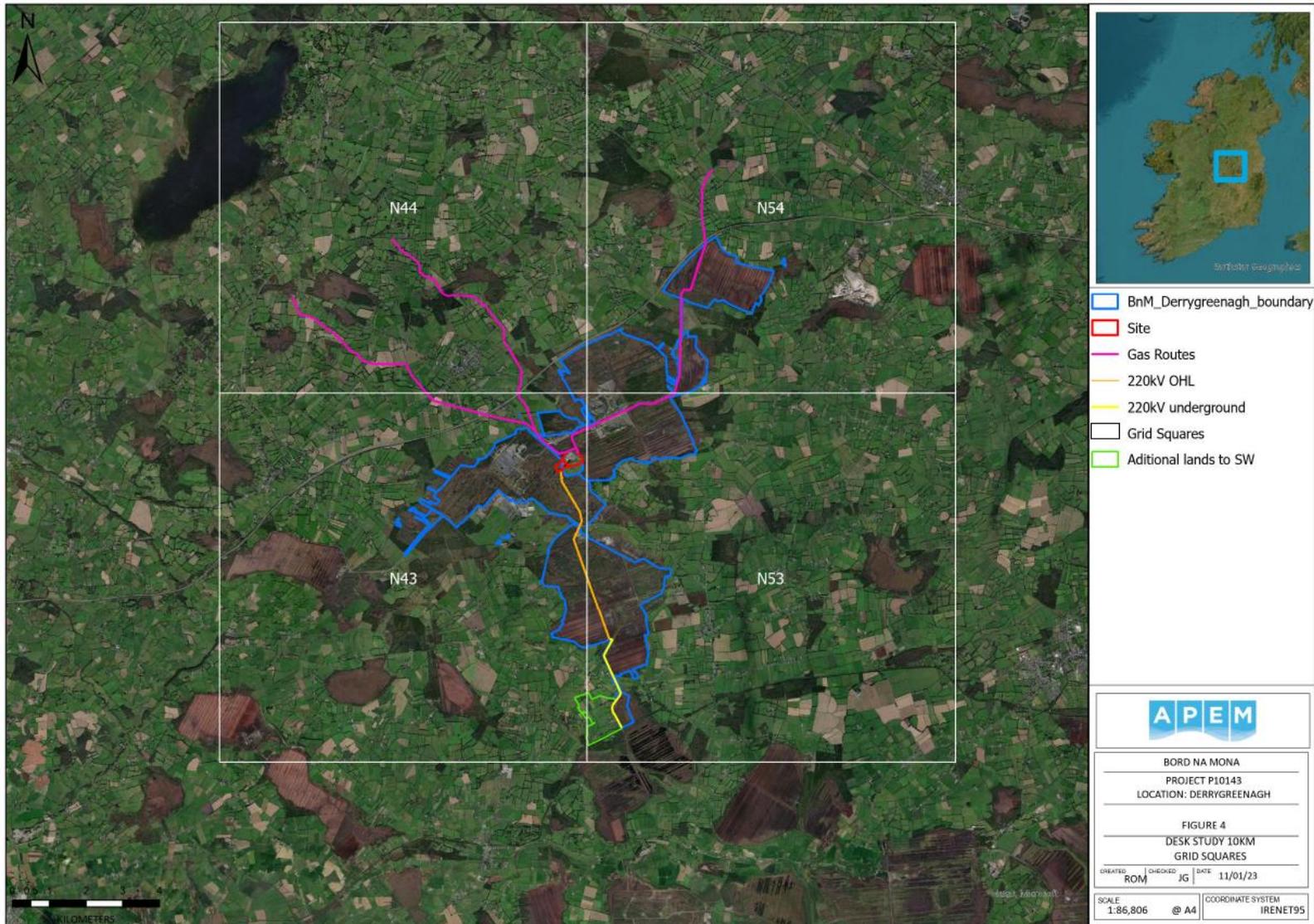
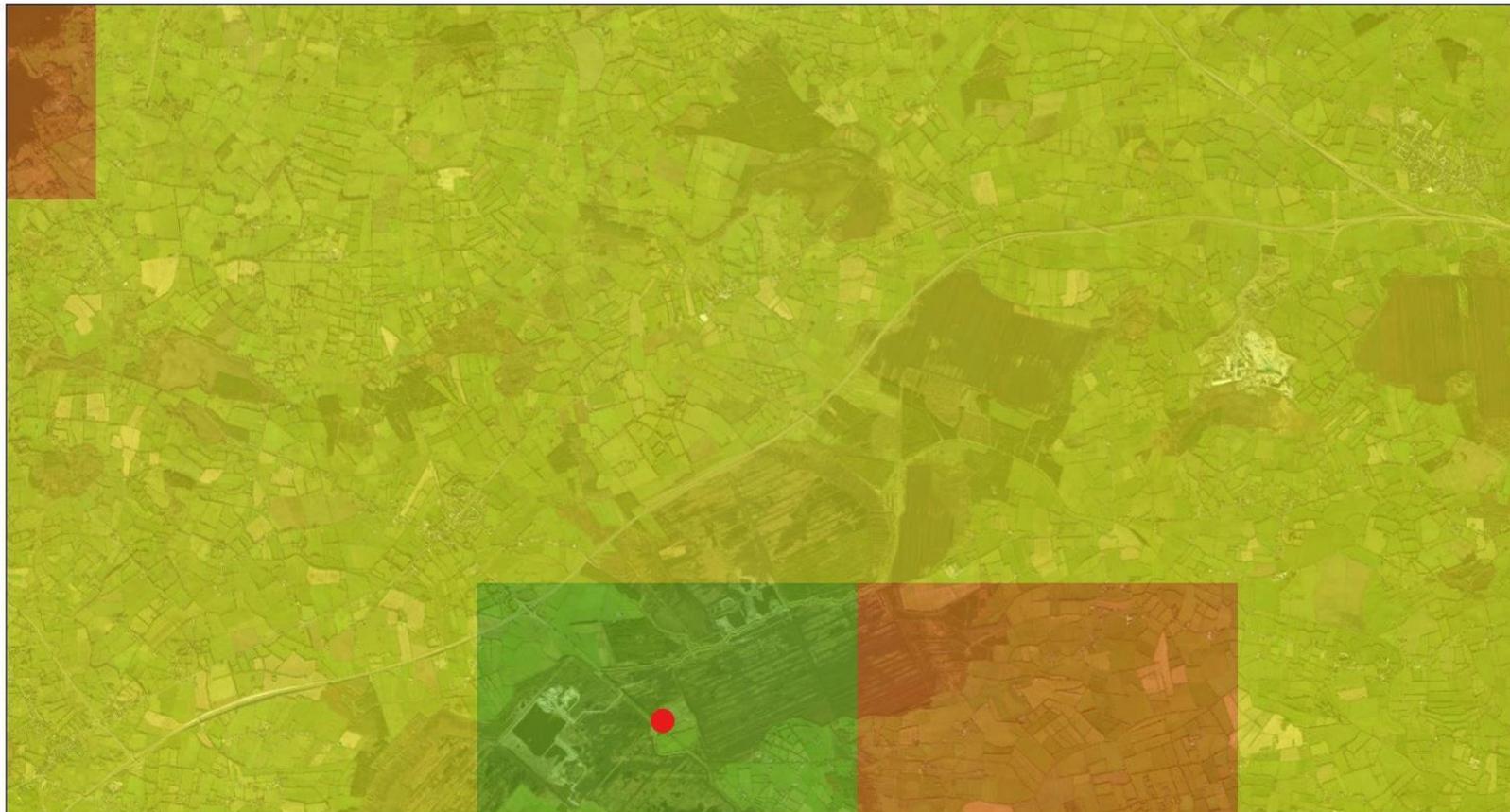


Figure 36: Landscape Suitability Index (NBDC 2022) Northern Section of the survey area

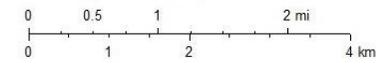


December 9, 2022

All bats

- 0.000000 - 13.000000
- 13.000001 - 21.333300
- 21.333301 - 28.111099
- 28.111100 - 36.444401
- 36.444402 - 58.555599

1:50,000



© Ordnance Survey Ireland
Compass Informatics

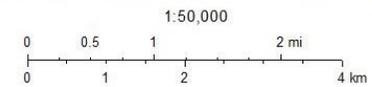
Figure 37: Landscape Suitability Index (NBDC 2022) Southern Section of the survey area



December 9, 2022

All bats

- 0.000000 - 13.000000
- 13.000001 - 21.333300
- 21.333301 - 28.111099
- 28.111100 - 36.444401
- 36.444402 - 58.555599



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4.3.1.2 Designated Sites

European Sites

There are a number of Natura 2000 sites in the vicinity of the proposed development including:

- Lough Ennell SAC (c. 7.5km northwest)
- Lough Ennell SPA (c. 7.5km northwest)
- Raheenmore Bog SAC (c. 5km west)
- Mount Hevey Bog SAC (c. 7.5km east); and
- Split Hills and Long Hill Esker SAC (c. 7km north-west)
- Wooddown Bog SAC (c. 10km north of Derryhinch bog)
- River Boyne and Blackwater SAC (c. 13.5km from Derryhinch bog)
- River Boyne and Blackwater SPA (c. 13.5km from Derryhinch bog)
- The Long Derries SAC (c. 14.5km east of Ballybeg Remnant)

No European site designated for bats are located within 15km of the proposed power station site boundary.

National Sites

There are five NHAs and nine pNHAs within the initial 15km search radius of the CCGT, namely:

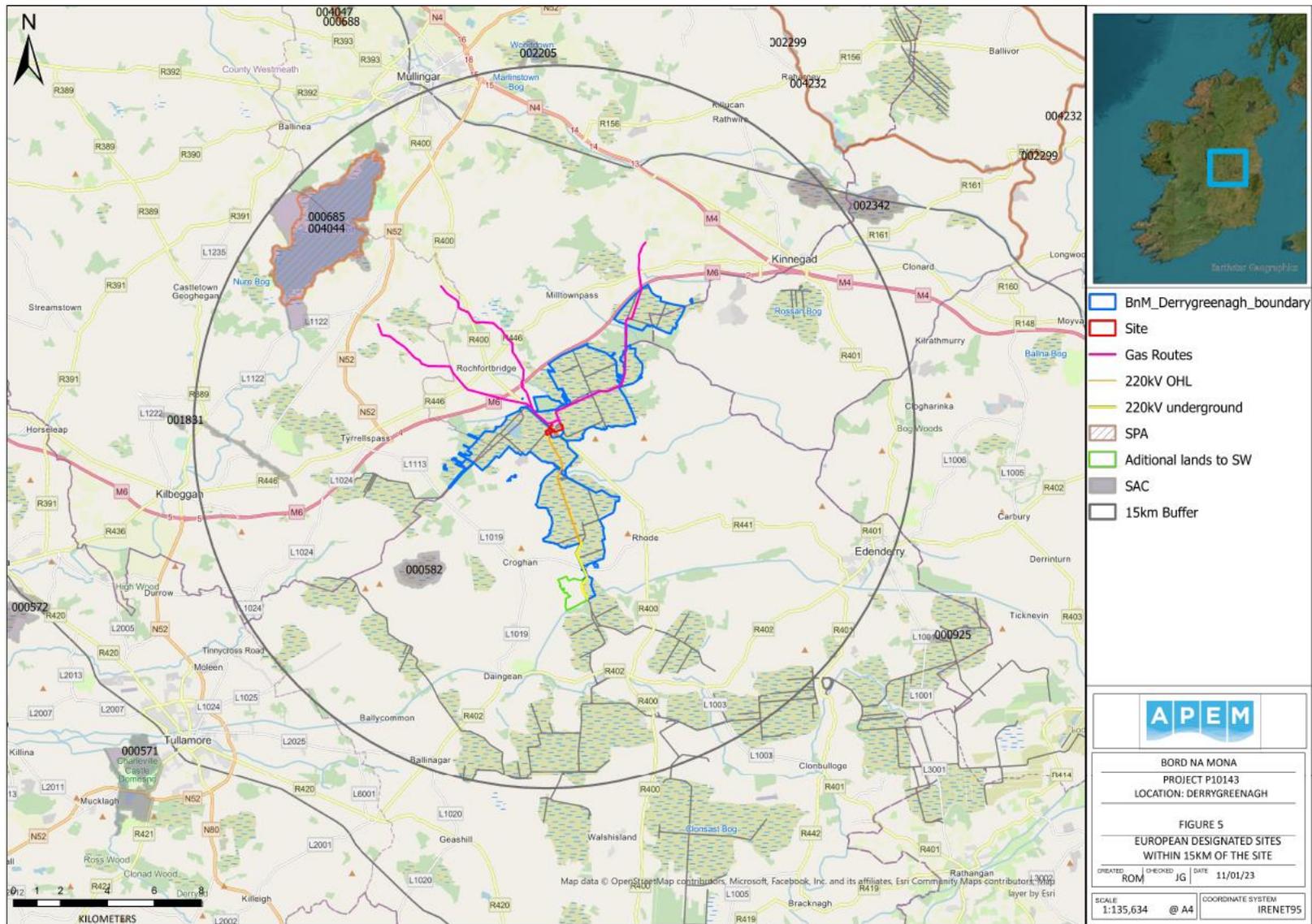
Milltownpass Bog NHA (002323)	Rahugh Ridge (Kiltober Esker) pNHA (000918)
Cloncrow Bog (New Forest) NHA (000677)	Lough Ennell pNHA (000685)
Black Castle Bog NHA (000570)	Split Hills And Long Hill Esker pNHA (001831)
Daingean Bog NHA (002033)	Royal Canal pNHA (002103)
Nure Bog NHA (001725)	Ardan Wood pNHA (001711)
Grand Canal pNHA (002104)	Murphy's Bridge Esker pNHA (001775)
Raheenmore Bog pNHA (000582)	Mount Hevey Bog pNHA (001584)

There are no Nationally designated sites for which bats are a qualifying feature. Refer to **Figure 38** and **Figure 39** for designated sites within the search radius.

4.3.2 Preliminary Ecological Appraisal

The preliminary ecological appraisal identified the Site as having the highest value for foraging suitability for bats with 50% of the features identified as being within the Site compared to the routes. The bog habitat is of negligible to low foraging/ commuting suitability, the agricultural areas to the northeast (gas route) have low suitability for foraging/ commuting bats and the agricultural/ silviculture areas to the south underground 220kV) have low to moderate suitability for foraging/ commuting bats.

Figure 38: European designated sites within 15 km of the site



4.3.3 Preliminary Roost Assessment

4.3.3.1 Buildings

There are six buildings within the Site where evidence of bat activity was recorded. Details of these buildings are provided in **Table 7** and their locations are illustrated in **Figure 40**. Refer to Appendix 2 for pictures of the buildings.

4.3.3.2 Trees

There are five trees recorded within the Site that were assessed as having potential roost features (PRFs) capable of supporting roosting bats. Details of these trees are provided in **Table 8** and their locations are illustrated in **Figure 40**. Each tree recorded was assessed as having low value suitability for roosting bats. Refer to Appendix 2 for pictures of the trees.

4.3.3.3 Structures

There are 10 structures along the proposed routes that may be impacted by the proposed development, including culverts and bridges. Four located along the proposed gas route within the BnM lands, one within the Site, three along the proposed OHL route and two along the proposed underground section of the 220kV route. Details of these structures are provided in **Table 9** and their locations are illustrated in **Figure 41**. Refer to Appendix 2 for pictures of the structures.

Table 7: Buildings with evidence of bat activity

ID	Description
B1	<p>Disused single-story workshop. Cavity block walls with no cladding or plaster. Flat galvanised steel roof with wooden rafters. No attic space. 3 windows with broken glass, grid cover apertures too large to prevent access. West facing steel sliding doors with gaps around edges. Numerous external cracks in blockwork leading to cavities. Large amount of daytime light. Borders area of scrub. No artificial light in area. Light scattering of droppings and feeding remains in interior. Confirmed roost - Likely night / foraging roost.</p>
B2	<p>Disused single-story storage shed. Cavity block walls with no cladding or plaster. Flat galvanised steel roof with steel rafters. No attic space. Minor cracks and gaps in mortar leading to cavities in interior and exterior. Borders hedgerow. No artificial light in area. Light scattering of droppings at southern entrance. Confirmed roost. Likely night / foraging roost.</p>
B3	<p>Ca. 40 m long single story timber framed building orientated roughly east to west. Shiplap cladding and corrugated pitched roof. In derelict state with numerous potential entry points. Comprises four separate rooms with timber and block partitions dividing. Partitions also have numerous holes allowing potential bat movements internally. Rooms have varying levels of light penetration. The centre two rooms have ceilings and attic space above. Remaining rooms are fully open to roof. No artificial light in area. Evidence of use recorded in each room. Largest amount of evidence (100+ droppings and feeding remains) recorded in westernmost room. Confirmed roost.</p>
B4	<p>Boiler room building. Block and render structure with steel frame and steel pitched roof. Gaps present around roller doors, piping and servicing door behind the main structure. North facing windows open. Large opening behind exhaust to on the eastern wall. Internally comprises a single large room open to the roof. Artificial exterior and interior lighting. A large amount of feeding remains and a light scattering of dropping were recorded within the structure. Two pipistrelles <i>Pipistrellus</i> sp., and two brown long-eared <i>Plecotus auratus</i> were present behind a fuel hopper at the time of survey. While the area was lit artificially the warmth of the hoppers likely attracted them to roost. Confirmed roost.</p>
B5	<p>Main offices. Comprised of two single story structure linked by a flat roof corridor. One orientated north-south and one orientated east-west. Single story block and render structures. Pitched timber framed and tiled roofs. Generally well-sealed buildings with few obvious entry points from exterior. Artificial lights on exterior of building. Internal surveys recorded light scattering of droppings in the attics of both structures with clusters of ca. 40 droppings at the eastern and western gable ends. Confirmed roost.</p>
B6	<p>Fuel store. Single storey block and render building. Steel framed and clad roof. Comprised of two rooms divided by block wall. Both rooms open to the roof. Numerous points of entry, including broken windows, gaps around doors and under lip of steel roof (no soffit / fascia). Artificial lights on exterior of building. Potential foraging remains recorded in the east room. Foraging remains and low density scattering of droppings recorded in the west room. Confirmed roost. Likely night / foraging roost.</p>

Figure 40: Buildings and trees within the site



Table 8: Trees with potential bat roost features

ID	Description
T1	Ornamental poplar <i>Populus</i> sp. Low suitability
T2	Ornamental poplar. c. 20m high, 0.75 m diameter at breast heigh (dbh). Shallow tear out underside of north leaning limb ca. 7 m high. Other superficial damage. Low suitability
T3	Ornamental poplar. c. 20m high, 0.75 m dbh. Low amount of Ivy <i>Hedrea helix</i> cover at base. Snapped limb hanging ca. 3 m high on northern aspect. Some other minor superficial damage. Low suitability
T4	Ornamental poplar. c. 20m high, 0.75 m dbh. Moderate ivy cover. Number of dead limbs but no obvious PRF – Ivy may obstruct identification. Size and presence of dead limbs give value. Low suitability
T5	Ash <i>Fraxinus excelsior</i> . c. 18 m high, 0.5 dbh. Multi-stemmed. Moderate ivy cover. West leaning snapped limb ca. 4 m high. No obvious cavity but ivy may obstruct identification. Low suitability

Table 9: Structures along the proposed routes

ID	Description
S1	Concrete railway bridge with one underpass c. 4m wide and 3m height. Piped holes near the roof of the external walls for excess water egress. Large gaps at the base of the spandrel wall where it meets the supporting wall. No artificial light in area. Linear features to the east and west. Low Suitability.
S2	No visible structure identified.
S3	Concrete railway bridge with two underpasses, each c. 4m wide and 3m height. Piped holes near the roof of the external walls for excess water egress. No artificial light in area. Linear features to the east and west. Negligible Suitability.
S4	Steel girder bridge with single layer of wooden planks between steels. Numerous gaps between planks allowing light to penetrate to watercourse below. No artificial light in area. No suitable linear features. Low suitability.
S5	Land bridge over watercourse with precast concrete culvert. No artificial light in area. No suitable linear features. Negligible Suitability.
S6	Steel girder bridge with single layer of wooden planks between steels. Numerous gaps between planks allowing light to penetrate to watercourse below. No artificial light in area. Suitable linear features to the east and west, including treeline/ plantation woodland. Moderate suitability.
S7	Steel girder bridge on top of concrete abutments. Metal grid deck allowing full light penetration to watercourse. No artificial light in area. No suitable linear features. Negligible Suitability.
S8	Railway bridge over the Yellow River. Steel structure on top of concrete piers. Metal grid deck allowing full light penetration to watercourse. Negligible Suitability
S9	Concrete road bridge with one underpass over the Yellow River. No artificial light in area. Linear features along the banks of the river. Negligible Suitability.
S10	Single drawbridge over the Grand Canal. Numerous circular concrete pilers at either side of the watercourse with a concrete deck to the moving central section of steel girders with a wooden plank deck. No artificial light in area. Linear features along the banks of the canal. Low suitability.

Figure 41: Structures along route options



4.3.3 Emergence /Re-entry Survey

Emergence and re-entry surveys were carried out on 26 and 27 September 2022 respectively. Surveys were carried out at B1, B2 and B3. The results of the surveys are shown in **Table 10**, **Table 11**, **Table 12** and **Table 13**.

Table 10: Emergence Survey Results B3 (western end)

Date	26/09/2022	Weather Conditions	Light air from NE. Dry. 8/8 Oktas, 13°C		
Sunset / Sunrise:	19:23	Survey Start / End	19:08 / 20:23		
Time	Bat species	Number	Entry/exit point	Notes	
19:27	Soprano pipistrelle	1	NA	Single pass	
19:29	Soprano pipistrelle	1	West door	Emerged and flew south along hedge	
19:36	Leisler's bat	1	NA	Flying high to southeast	
19:46	Soprano pipistrelle	1	NA	Single foraging pass/sweep N-S over grass ~ 5mk	
20:28	Common pipistrelle	1	NA	Single foraging pass, not seen	
20:49/50	Unknown	1	NA	Single unknown species (~12Khz) flying 1.8 high south-north at surveyors' location, single pass	
20:56	Leisler's bat	1	NA	Faint single pass, not seen	
21:02	Leisler's bat	1	NA	Faint single pass, not seen	
21:07	soprano pipistrelle	2	NA	Single foraging pass, not seen	

Table 11: Emergence Survey Results B3 (eastern end)

Date	26/09/2022	Weather Conditions	Light air from NE. Dry. 8/8 Oktas, 13°C		
Sunset / Sunrise:	19:23	Survey Start / End	19:08 / 20:23		
Time	Bat species	Number	Entry/exit point	Notes	
19:37	Leisler's bat	1	NA	Single pass	
19:32	Common Pipistrelle	1	East door	Emerged and flew hedge	
20:16	Common Pipistrelle	1	NA	Single pass	
20:24	Common Pipistrelle	1	NA	Treeline, 2 passes	
20:25	Soprano Pipistrelle	1	NA	Treeline, 1 pass going south	
20:26	Common Pipistrelle	1	NA	Treeline, 2 passes	

20:28	Common Pipistrelle	1	NA	not seen, v faint, 2 pass
21:00	Common Pipistrelle	1	NA	not seen, 1 pass
21:26	Common Pipistrelle	2	NA	not seen, 1 pass

Table 12: Re-entry Survey Results B1

Date	27/09/2022	Weather Conditions	Light breeze from NE. Dry. 7/8 Oktas, 11°C	
Sunset / Sunrise:	07:24	Survey Start / End	05:24/07:39	
Time	Bat species	Number	Entry/exit point	Notes
05:34	Common pipistrelle	1	NA	v faint, 1 pass
05:40	Leisler's bat	1	NA	v faint, 1 pass each
05:43	Common pipistrelle	1	NA	v faint, 1 pass each
06:15	Common pipistrelle	1	NA	3 passes, foraging around shed
06:35	Leisler's bat	1	NA	v faint, 1 pass, none seen

Table 13: Re-entry Survey Results B2

Date	27/09/2022	Weather Conditions	Light breeze from NE. Dry. 7/8 Oktas, 11°C	
Sunset / Sunrise:	07:24	Survey Start / End	05:24/07:39	
Time	Bat species	Number	Entry/exit point	Notes
05:32	Unknown	1	NA	Faint, not seen, single pass
05:33/34	Soprano / common pipistrelle	1	NA	Single bat foraging around structure, 2 passes
05:36/37	Common pipistrelle	1	NA	Single bat foraging around structure 3 passes
05:38/39	Common pipistrelle	2	NA	2 individuals, chasing behaviour, around over & through shed
05:41/42	Common pipistrelle	1	NA	Foraging around & through shed
05:45	Common pipistrelle	2	NA	Chasing behaviour
05:48	Common pipistrelle	1	NA	Not seen
05:50	Common pipistrelle	1	NA	Single pass in front of shed
06:27	Common pipistrelle	1	NA	Very faint, not seen

06:41	Common Pipistrelle	1	NA	Not seen, single pass
06:53-55	Common pipistrelle/soprano pipistrelle	1-2	flying through open doors	potentially roosting in cavity wall, location not confirmed, 1/2 individuals flying through several times

B1 - No emergence / re-entry recorded.

B2 - Potential re-entry to structure recorded – bat observed entering building but not seen entering block wall or other PRF.

B3 - A single common pipistrelle was recorded emerging from the westernmost room and a single soprano pipistrelle was recording re-entering the easternmost room.

4.3.4 Evaluation

During the PEA the Site was identified as being of moderate foraging suitability for bats due to the treelines, hedgerow, scrub, shrub and linear features providing continuous habitat connected to the wider landscape. The bog habitat is of negligible foraging/ commuting suitability and the agricultural/ silviculture areas to the north (gas route) and south (underground 220kV) have low to moderate suitability for foraging/ commuting bats.

During the PRA of all the buildings within the Site two pipistrelles (species unknown) and two brown long-eared bats were observed within building 4. Evidence of roost presence was recorded in all the buildings on the Site. The proposed demolition of the buildings will therefore result in the loss of the confirmed roosts.

During the PRA of the trees, all trees were determined to be of low suitability for bat roosting potential. However, due to the proximity of the trees to the confirmed roosts and the moderate suitability for foraging/ commuting (see above), it is assumed all identified PRFs comprise a roost and the potential for impacts will be address in this manner going forward. Removal of the trees identified in **Table 8** will therefore, result in the loss of the roosts.

During the PRA the structures assessed were determined to be of negligible to low suitability for roosting bats. Structures 2, 8 and 9 are within the proposed OHL route and the location of the pylons will be of sufficient distance from the structures as to not impact them. Structures 3 and 10, although within the route of the underground 220kV cable, are of negligible/ low suitability. Depending on the type of method used to install the underground cable, at the structure locations, the assumed impacts to any bat roosts within the structures are disturbance due to noise, dust, human presence and lighting. Although structure 1 is of low suitability, it will encounter the most disturbance, as it is within the main route for access to the consented site. The demolition of the buildings will require increased traffic and HGV/ plant vehicles. The assumed impacts to any bat roosts within this structure are disturbance due to noise, dust, vibration, human presence, lighting and increased traffic.

During the emergence/ re-entry survey a total of three species of bat were recorded: Leisler's bat, common pipistrelle and soprano pipistrelle. Common pipistrelle was the most frequently recorded species during the surveys, followed by soprano pipistrelle and Leisler's bat. Including direct observation of brown long-eared bat roosting in building B4, this brings the number of species confirmed as present to four.

4.4 Other Potential Constraints

While the surveys focused on habitats, bat features and marsh fritillary suitability, other ecological features were occasionally noted during surveys. As these records may be useful in informing further works or surveys at the site, details are given in **Table 14** and the locations are shown in the following maps (**Figure 42** to **Figure 44**).

Table 14: Ecological features recorded at Derrygreenagh. The numbers are used to indicate the locations of each feature in the following maps.

Number	Feature	Latitude	Longitude
1	Badger droppings and snuffle holes	53.40530052	-7.22643045
2	Badger prints	53.33152487	-7.23975961
3	Badger snuffle holes	53.33205407	-7.22827401
4	Badger snuffle holes	53.33888087	-7.229414368
5	Badger droppings	53.39108102	-7.252621176
6	Disturbance to ground, potential badger snuffle holes	53.39168628	-7.251493726
7	Potential badger snuffle holes	53.39214297	-7.251728503
8	Potential badger snuffle holes	53.39228022	-7.252706587
9	Badger snuffle holes	53.38945885	-7.259502446
10	Badger prints near bare peat	53.37515585	-7.254397079
11	Badger prints and hare droppings on bare peat	53.37475688	-7.253983665
12	Badger prints, at least three badgers; two adults and one juvenile	53.37515903	-7.254190974
13	Badger prints, at least three badgers; two adults and one juvenile	53.37468713	-7.253561974
14	Mammal track leading up embankment	53.39089272	-7.256508535
15	Several mammal tracks leading up embankment; soil conditions sandy and good for badgers	53.3913743	-7.25515821
16	Potential mammal track	53.390452	-7.256424045
17	Mammal burrow entrance; too small for badger	53.3917872	-7.251486434
18	Hare droppings	53.3748036	-7.253897803
20	Pond suitable for birds, invertebrates and amphibians; recording of common darters flying in tandem	53.32559537	-7.23278015
21	Eight lapwing recorded flying	53.3796261	-7.253458444
22	Two buzzards recorded flying	53.32664181	-7.22102662
23	Snipe flushed	53.39425332	-7.253240682
24	Snipe flushed	53.3908501	-7.259635152
25	Adult snipe recorded flying overhead	53.37851517	-7.251539701
26	Snipe flushed, flying north along the lake shoreline	53.37957418	-7.251949154
27	Raptor recorded harassing flock of ten birds	53.37956392	-7.252702291
28	Snipe flushed	53.38137447	-7.255641613
29	Snipe calling overhead	53.38140414	-7.255540739
30	Snipe flushed	53.3837321	-7.254925305
31	Snipe flushed - large adult	53.38347685	-7.255710932
32	Snipe flushed	53.38601446	-7.256564249

Figure 42: Ecological features noted at Bord na Móna lands in Derrygreenagh Bogs. Numbers refer to the features listed in Table 14.



Figure 43: Ecological features noted at Bord na Móna lands in Derrygreenagh Bogs. Numbers refer to the features listed in Table 14.

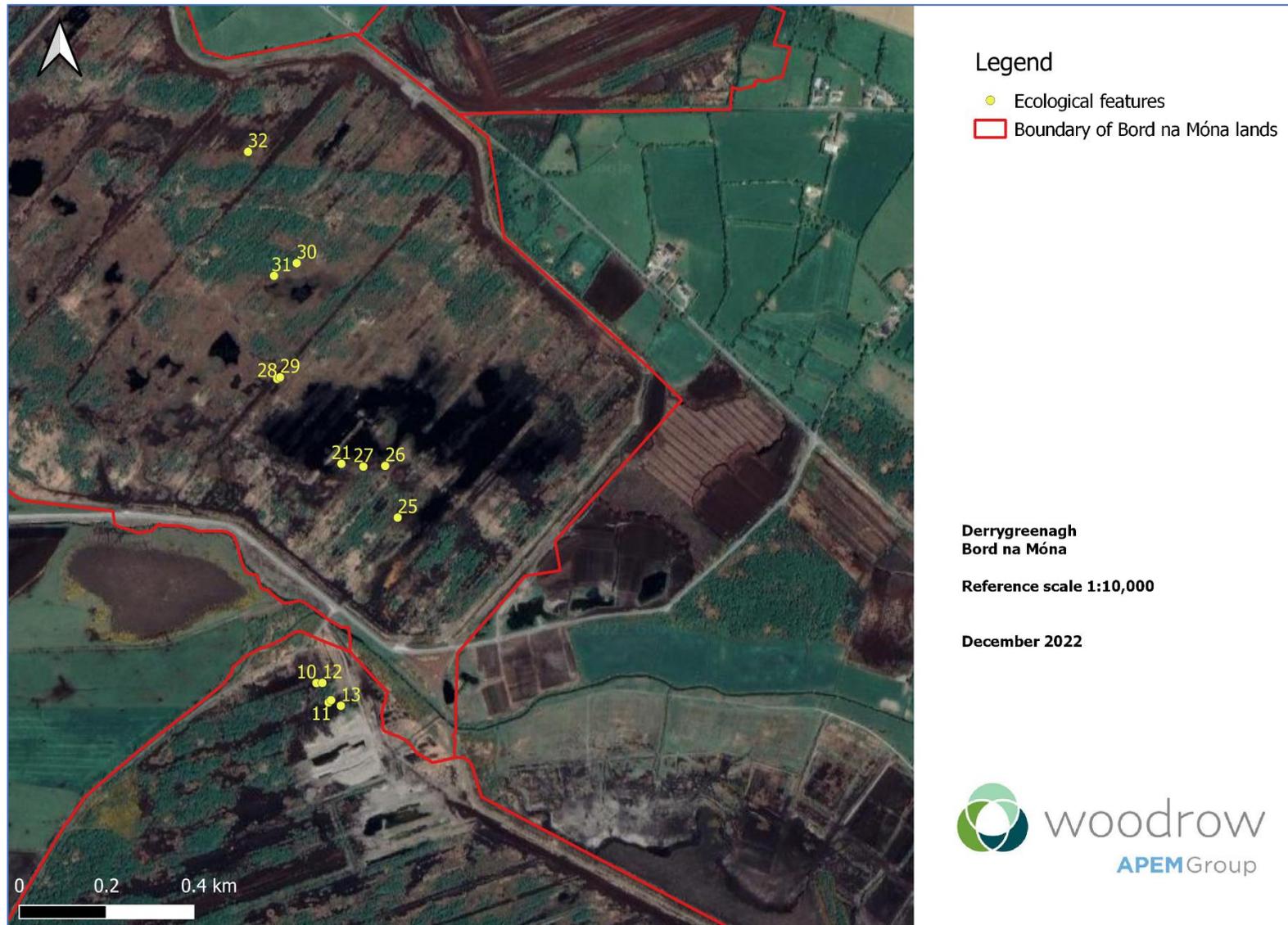
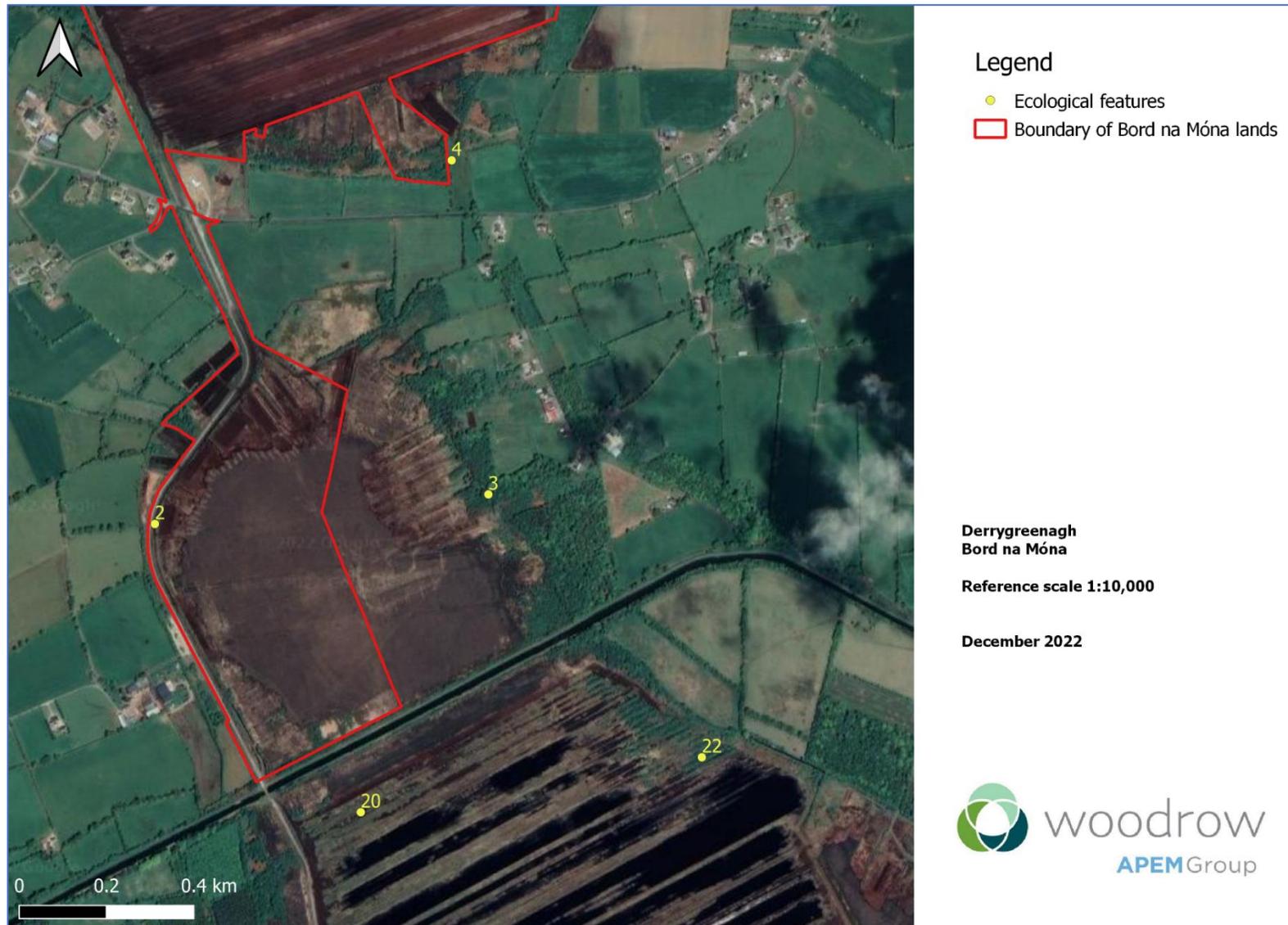


Figure 44: Ecological features noted at Bord na Móna lands in Derrygreenagh Bogs. Numbers refer to the features listed in Table 14.



5. Conclusions

5.1 Marsh Fritillaries

Several areas of suitable habitat for marsh fritillary butterflies were identified within the survey areas, as described Section 4.1. The areas identified as suitable varied considerably in size, with some areas containing several small suitable patches within a larger area. Many of the areas identified were classed as “suitable, undergrazed”. These areas contained the suitable food plant for marsh fritillary breeding, although the habitat quality could be improved by light grazing.

In several areas within the survey area, larval webs of marsh fritillaries were identified and recorded, showing that this protected species is successfully breeding at these locations.

Where suitable marsh fritillary habitats or larval webs were recorded along proposed pipeline routes (See Section 4.1), translocation of habitat areas is possible if it is not feasible to alter the route. Methodology for such habitat translocation is given in Appendix 3.

5.2 Habitats

A broad range of habitat types was identified in the survey area. These included a range of grassland, woodland, peatland and aquatic habitats, as well as artificial surfaces such as buildings and concrete.

Habitats such as Improved Grassland (GA1), Arable Crops (BC1), Tilled Land (BC3) and Conifer Plantation (WD4) tend to be rather low in biodiversity. However, habitats such as Raised Bog (PB1), Mixed Broadleaf Woodland (WD1), Bog Woodland (WN7), Hedgerows (WL1) and Dry Meadows and Grassy Verges (GS2) can be rich in biodiversity and important to many species.

The bog habitats recorded included Raised bog (PB1), Cutover Bog (PB4) and Bog Woodland (WN7). The Raised Bog remnant at Ballybeg, north of the Grand Canal was found to be in good condition, and qualifies as the priority Annex 1 habitat “Active Raised Bogs (7110)”, as listed in the EU Habitats Directive, making it unsuitable as a location for a sub-station. The Cutover Bog (PB4) varied considerably, ranging from areas of almost totally bare peat to areas where considerable colonisation of plants has already occurred. Grassland and scrub tend to develop in these areas; these are transitional habitats that develop on the peat when it is no longer being actively milled. If left undisturbed, they are likely to develop into range of woodland habitats.

5.3 Bats

Roosts have been confirmed within the buildings on Site through the means of the PRA and emergence/ re-entry surveys undertaken in September 2022 and there are PRFs within the trees of the Site. The structures identified within the proposed route comprise negligible to moderate suitability for roosting bats.

Considering the confirmed roosts within the buildings of the Site, under Regulation 54 of the European Communities (Birds and Habitats) Regulations 2011 (S.I. 477 of 2011), a derogation licence will be required in order to proceed with the works that may have potential to result in disturbance to roosting bats/ destroying of roosts and to comply with the requirements of the provisions of Regulations 51, 52 and 53 of the same Regulations.

As part of a derogation licence application to permit any works that will have the potential to result in removal of roosts and/or disturbance to roosting bats, a bat mitigation strategy will be required. This will outline requirements for further characterisation surveys, to be completed during the activity season prior to the derogation application. In addition, there will be a requirement for appropriate mitigation (practices which reduce or remove damage - e.g. by changing the layout of a scheme, or altering the timing of the work) and compensation (works which offset the damage caused by the development - e.g. by the creation of new roosts).

5.4 Other Potential Constraints

Signs of badger presence and activity were noted at many locations in the survey area (Section 4.4), including snuffles, droppings, prints and mammal paths. As badgers are protected in Ireland, it is important not to disturb their setts. Since badgers are clearly active in the area, targeted badger surveys should be carried out in areas proposed for disturbance or development.

Snipe were recorded occasionally during surveys. These are red-listed wading birds⁹ that frequent bogs or other wet areas. However, as Woodrow did not carry out a bird survey at Derrygreenagh, these are just incidental records, and the results of the targeted bird surveys carried out at the site may have further relevant details.

⁹ Gilbert, G., Stanbury, A. & Lewis, Lesley. (2021) Birds of Conservation Concern in Ireland 4: 2020–2026. Irish Birds 43: 1–22.

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Appendix 1: Legislation

The Habitats Directive (92/43/EEC);

All species of bat occurring in Ireland are protected under the Annex IV of EU Habitats Directive, which is transposed into Irish law through the EC (Birds and Natural Habitats) Regulations 2011. Section 51(2) of the Regulations makes it an offence to:

- deliberately capture or kill any specimen of these species in the wild,
- deliberately disturb these species particularly during the period of breeding, rearing, hibernation and migration, or
- damage or destroy a breeding site or resting place of such an animal.

In addition, one bat species, the lesser horseshoe bat *Rhinolophus hipposideros*, is also listed on Annex II of the EU Habitat Directive. Annex II species require the core areas of their habitat to be designated as Special Areas of Conservation (SAC).

The Wildlife Acts 1976 to 2021

Bats are also protected under the Wildlife Acts 1976 - 2021. Under this legislation it is an offence to intentionally kill or injure a bat or intentionally destroy or disturb a breeding place or resting place. It is also an offence under the Wildlife Acts if anyone wilfully interferes with or destroys the breeding place or resting place of a bat.

Derogation Licences

In certain circumstances, under both the Wildlife Act and the Habitats Directive, a person may apply for a derogation licence.

Licence to Interfere with or Destroy the Breeding Places of Any Wild Animals

The Wildlife Acts 1976 - 2021 state that any person who wilfully interferes with or destroys the breeding place or resting place of any protected wild animal, shall be guilty of an offence.

However, it is permitted to destroy breeding or resting places in certain circumstances under a derogation afforded by Section 23 (7)(iv) which states that:

“anything which is duly done pursuant to a licence or other permission granted or issued pursuant to the Wildlife Acts, 1976 and 2000, or which is duly done pursuant to any other statute or statutory instrument, which is permitted to be done under such a statute or instrument or which is done pursuant to and in accordance with a licence or other permission granted or issued pursuant to such a statute or instrument or anything caused by or which results from, or is consequent upon or the effect of any other act or thing which is lawfully done.”

Licence to Disturb Bats or their Breeding or Resting Places

Article 16 of the Habitats Directive provides for derogations. These may be issued *“provided there is no satisfactory alternative and the derogation is not detrimental to the maintenance of the populations of the species concerned at a favourable conservation status”*

If the proposed activity can be timed, organised and carried out so as to avoid committing offences under Irish wildlife legislation and the EU Habitats Regulations, then no derogation is required.

All bats are listed on Annex IV of the EU Habitats Directive. The domestic legislation that implements this Directive gives strict protection to individual bats and their breeding and resting places. Where a proposed development will affect a site known to be used by bats, consideration needs to be given to the likely impact on the population(s). Even when planning permission is given, or the activity does not require such permission, the wildlife legislation applies; bats and their breeding and resting places are still protected.

Applications for a derogation licence should be made in writing, including survey results and proposed mitigation measures, to the Wildlife Licence Unit of NPWS.

Appendix 2: Bat Roost Assessment - Photos

For features B1-B5, see Table 4 and Figure 7 for details
For features T1-T5, see Table 3 and Figure 7 for details
For features S1-S10, see Table 5 and Figure 8 for details

B1



B2



B3

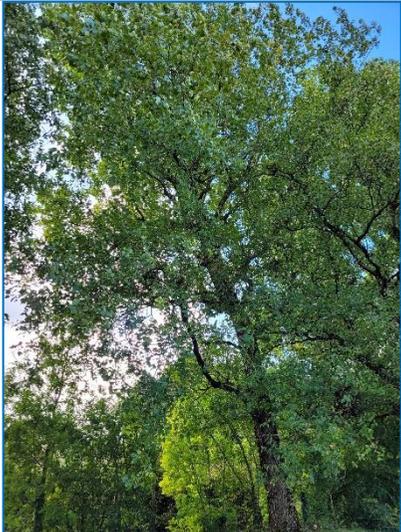
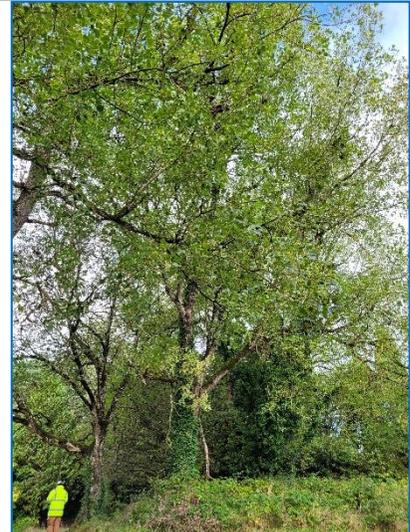
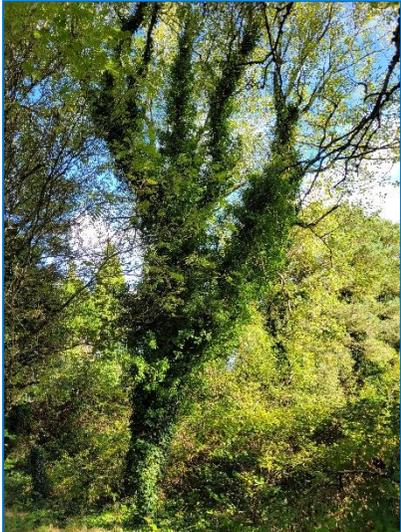
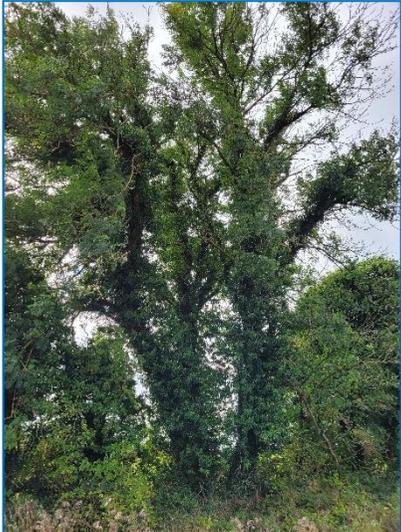


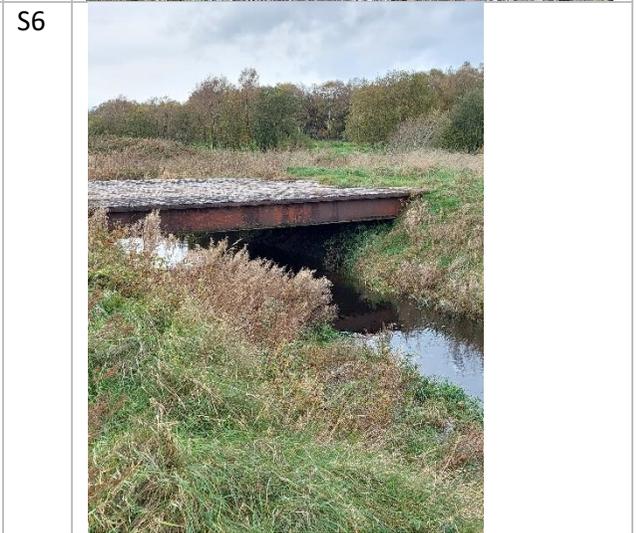
B4



B5



T1	 A large, mature tree with a thick trunk and dense green foliage, situated on a grassy area. A power line is visible in the upper left corner of the image.	T2	 A tall tree with a dense canopy of green leaves, viewed from a low angle looking up.	T3	 A tree with a thick trunk and dense green foliage, with a person in a high-visibility vest standing at its base for scale.
T4	 A tree with a thick trunk and dense green foliage, viewed from a low angle looking up.	T5	 A tall, slender tree with a dense canopy of green leaves, viewed from a low angle looking up.		

S1		S2 No structure visible	S3 
S4		S5	S6 

S7		S8		S9	
S10					

Appendix 3: Translocation of Marsh Fritillary Habitat

Before a translocation begins, the methodology will be adapted to the specific circumstances at the Application Site, and a method statement for the site will be prepared, which will detail how the work will be carried out in those particular circumstances. The methodology will normally include the following provisions:

- The proposed donor and recipient areas will be surveyed by an experienced ecologist to identify the places where devil's bit scabious (*Succisa pratensis*) are growing.
- An Ecological Clerk of Works (ECoW) will be appointed to monitor the translocation operations. The ECoW will also deliver toolbox talks for machine drivers and others on site, as required.
- Translocation should take place in autumn or winter (October-December), when many plants are dormant, outside of the bird-breeding season. It is best to avoid such work when soil conditions are very wet, to avoid undue damage and disruption to the habitat.
- Low ground-pressure tracked vehicles such as bog masters must be used to avoid compacting and smearing peat or soil.
- A specialist machine operator will be appointed for the translocation operations (removal, translocation and placement of turves), who will be suitably experienced with the required machinery and equipment.
- The recipient area (the area where the translocated turves are to be re-established) should be similar to the donor site in terms of soil conditions and hydrology. The recipient area will be prepared before the turves are removed from the donor site, so that the turves can be translocated and put in place as quickly as possible, in order to minimise drying out or other disruption.
- A flat-bottomed digger bucket should be used for removal of the turves from the donor site. The turves should be 20 – 25 cm in thickness, and as large in area as can be accommodated by the digger bucket. Turves will be neatly and vertically cut along their edges as much as possible, to ensure turves are as large as possible with clean edges for best reinstatement.
- Operations will be planned so that turves are moved from the donor area to the recipient area in a single movement, so that temporary storage is not needed.
- Translocated turves will be placed in the prepared recipient area at the same depth as they were previously situated, so that their upper surface is flush with the surrounding ground surface.
- A monitoring plan will be put in place to assess the degree of success of the translocation.