

Biodiversity Management and Enhancement Plan

Slieveacurry Renewable
Energy Development, Co.
Clare





DOCUMENT DETAILS

Client: **Slieveacurry Ltd**

Project Title: **Slieveacurry Renewable Energy Development, Co. Clare**

Project Number: **170224c**

Document Title: **Biodiversity Management and Enhancement Plan**

Document File Name: **BMEP F – 2021.10.27 – 170224c**

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Rev	Status	Date	Author(s)	Approved By
01	Draft	20/09/2020	DMN	JH
02	Final	30/09/2020	DMN	JH
03	Final	12/04/2021	DMN	JH
04	Final	27/10/2021	DMN/OOG	JH

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1. INTRODUCTION

1.1 Background

This Biodiversity Management and Enhancement Plan (BMEP) has been prepared by MKO in support of the Environmental Impact Assessment Report (EIAR) produced for the proposed Slieveacurry Renewable Energy Development, Co. Clare.

A Biodiversity Management and Enhancement Plan has been prepared as part of the Proposed Development to offset the loss of degraded peatland habitats that are within the footprint. In addition, this plan also outlines the measures described in the EIAR for the protection of marsh fritillary habitat that occurs in close proximity to the Proposed Development infrastructure.

Turbines T1, T2, T4, part of T7 & T8 and much of the associated infrastructure, including site compounds and borrow pit 1, are located within plantation forestry (WD4) and areas of spoil and bare ground (ED2). The extent of the proposed infrastructure located on degraded peatlands within the EIAR study area boundary has therefore been kept to a minimum. The degraded peatland habitats on which the Proposed Development is located consists primarily of a mosaic of Cutover bog (PB4), Upland blanket bog (PB2) and Wet heath (HH3) mosaic. The majority of the peatlands within the study area have been subject to significant historic peat extraction/turf cutting, with old peat banks occurring throughout the study area, see Plate 1.1. The receiving habitats are fully described in Chapter 6 of the accompanying EIAR. The areas of deep peat within the study area have been avoided in the design of the development and all areas that are within the construction footprint have been degraded through extensive grazing of sheep or cattle, drainage, peat cutting, forestry or scrub encroachment. In addition, as shown in Figure 1-1 '*Plan Drawing Of Wind Farm With Road Construction Type*' of the accompanying Peat & Spoil Management Plan (FehilyTimoney, 2021¹) Appendix 4-2, Chapter 4 of the accompanying EIAR, existing site access tracks have been utilised where possible to minimise the impact of the Proposed Development footprint on the receiving environment. Secondly, the road construction methodology has also been designed to minimise the amount of material movement (FehilyTimoney, 2021).

The loss of degraded peatland habitat to the Proposed Development footprint, including temporary loss associated with borrow pit no. 2, is 2.97 hectares (ha). This is associated with associated with Turbines T3, T5, T6 & part 7 and part of T8 infrastructure, as well as a proposed borrow pit to the south of T5 (borrow pit no. 2). Therefore, this BMEP provides for the restoration of forestry land, that has been planted on peatland mosaic habitats, back to this peatland habitat. This will be undertaken around Turbines T2 (1.5ha), T4 (1.8ha) & T8 (1.2ha) equating to 4.5ha. In addition, the proposed borrow pit no. 2, located to the south of T5, will also be fully reinstated post-construction. This is fully set out in the accompanying *Peat & Spoil Management Plan*. The reinstated borrow pit will equate to approximately 1.28 ha. The soft levelled areas associated with the proposed development will be fully reinstated post-construction. Following the implementation of the measures outlined in this report, to offset the loss of degraded peatland habitat, there will be no residual net loss of peatland habitats on the site. In addition, the proposed forestry reinstatement to peatland has the potential to result in a long-term positive effect with an additional area of 2.12 ha of peatland habitat reinstated/managed overall. The extent of lands subject to peatland restoration are shown in Figure 1.1.

Approximately 1.28 ha of the peatland loss calculation is associated with borrow pit no. 2. This area was chosen as the peatland has already been subject to significantly degradation with much of the peat mass removed as a result of turf cutting, see Plate 1.2.

¹ FehilyTimoney, 2021, *Peat & Spoil Management Plan, Slieveacurry Renewable Energy Development*

This BMEP provides measures that will be employed to improve the ecological quality of the peatland habitats that are located outside the construction footprint but within the control of the developer. The bog restoration programme described in this report will be implemented in accordance with the published guidelines and best practice including the guidelines arising from the EU-LIFE/Coillte ‘*Irish Blanket Bog Restoration Project*’ (2002-2007), Scottish Natural Heritage (SNH)’s guidance note Planning for development: *What to consider and include in Habitat Management Plans* (Version 2, January 2014).



Plate 1-1 Example of relegating Cutover bog (PB4) habitat within the study area



Plate 1.2 Location of proposed borrow pit to the south of Turbine no. 5, showing historic peat extraction resulting in exposure of the subsoil.

1.1.1 **Statement of Authority**

This report has been prepared by David McNicholas (B.Sc., M.Sc., MCIEEM). David has over 10 years' professional ecological consultancy experience and is a full member of the Chartered Institute of Ecology and Environmental Management. This report was updated by Olivia O' Gorman (B.Sc., M.Sc.) who has over 5 years' professional ecological consultancy experience. This report has been reviewed by John Hynes (B.Sc., M.Sc., MCIEEM). John has 10 years' experience in ecological management and assessment.

2. BIODIVERSITY MEASURES

2.1.1 Forestry Felling and Natural Regeneration

As shown in Figure 1.1, it is proposed to reinstate areas of coniferous plantation forestry around turbine T8. This felling will be conducted as part of the construction phase of the wind farm. Areas around T8 where plantation forestry will be removed comprise of typical peatland species beneath the conifers. These areas will be allowed to regenerate to peatland habitat, which is present in the surrounding area, thereby enhancing the biodiversity of the habitats and also within the area surrounding the turbine.

2.2 Forestry Felling and Peatland Restoration Around Turbines

As shown in Figure 1.1, it is proposed to reinstate areas of coniferous plantation forestry around turbines T2 and T4. These areas will be felled as part of the construction phase of the wind farm. However, these areas will require further maintenance to achieve successful reinstatement back to peatland habitat. Areas where plantation forestry will be removed still comprise of typical peatland species beneath the conifers, see Plate 2.1. These areas are therefore most likely to be successfully reinstated to peatland if the conifer crop is sympathetically removed.

As described in the Irish Wildlife Manual “*Best practice in raised bog restoration in Ireland*” (Mackin et al, 2017²), which techniques are also applicable to degraded blanket bogs:

‘Removal of forestry is a proven restoration measure, and has been used effectively by organisations such as Coillte at a number of raised bogs in Ireland, both on the high bog and cutover. In recent years, this measure has been applied at many raised bog sites as part of EU LIFE-funded restoration projects, including Crosswood Bog SAC, Lough Ree SAC, Killyconny Bog (Cloghbally) SAC, Girley Bog NHA, Scohaboy Bog NHA and Wooddown Bog NHA’.

Plate 2-1 illustrates the rapid change to conditions after conifer removal and drain blocking. This rewetting of the peat mass facilitates Sphagnum moss establishment/ spreading and prevents further drying out.

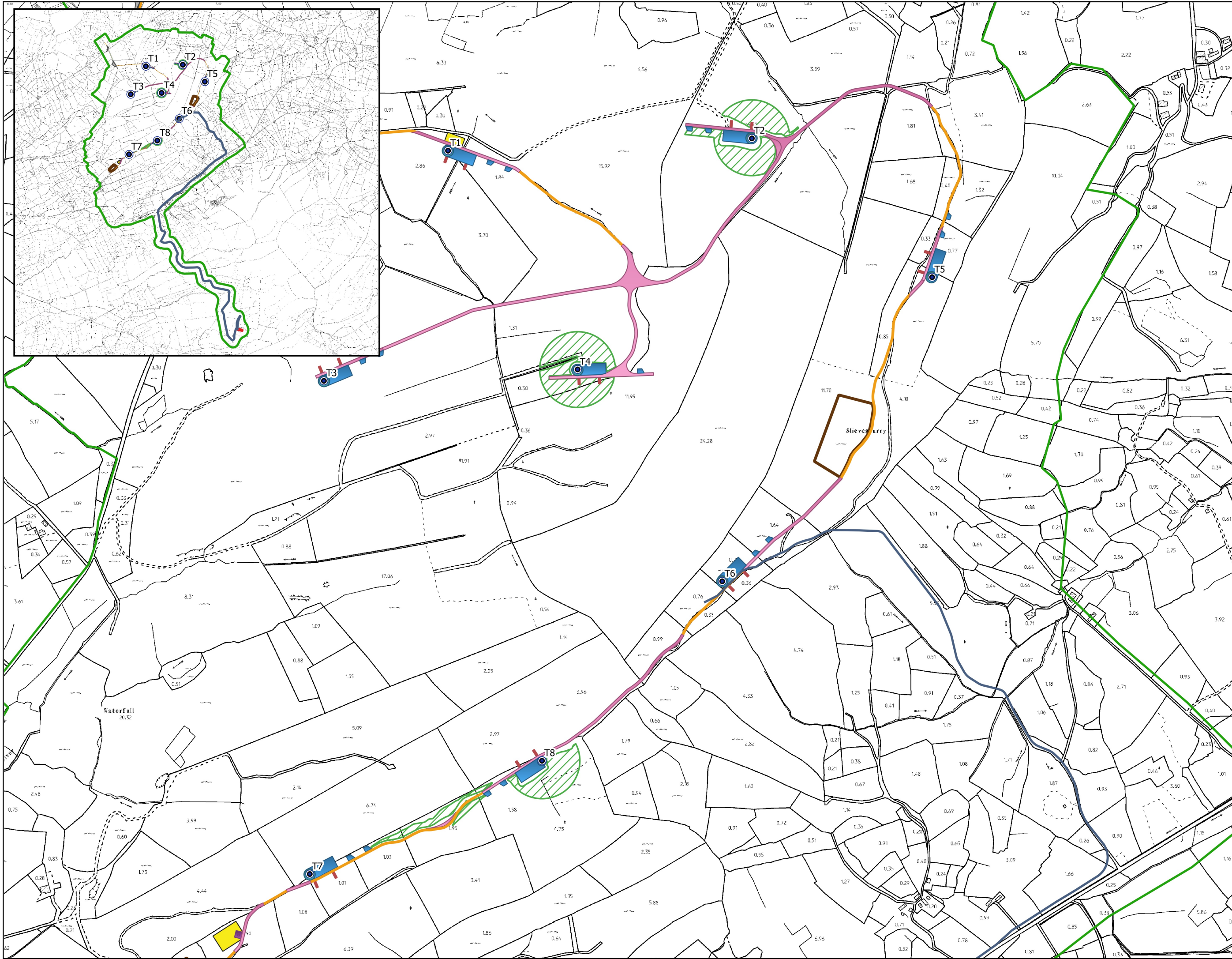
² Mackin, F., Barr, A., Rath, P., Eakin, M., Ryan, J., Jeffrey, R. & Fernandez Valverde, F. (2017) *Best practice in raised bog restoration in Ireland*. Irish Wildlife Manuals, No. 99. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht, Ireland.



Plate 2-1 Bog surface prior to forestry removal and drain blocking, (Right) Bog surface one year after forestry removal and drain blocking (Source: Mackin et al, 2017 - © John Derwin).

In order to facilitate the re-establishment of peatland vegetation within these areas, and maintain an effective hydrological regime, the following measures are proposed in these areas:

- All trees will be felled using conventional forestry harvesting approaches/machinery.
- Removal of brash from felled areas off-site post felling.
- Drain blocking will be undertaken on a local scale, both within and immediately surrounding the newly felled forestry. This will be achieved by installing peat dams within the existing drainage ditches (predominantly remnant semi-functioning forest drains). This will maintain, enhance and restore the favourable baseline hydrological and ecological conditions within each of the restoration location. This measure is effective in raising water levels in the peat and encouraging peat-forming habitats on cutover bog (Mackin et al, 2017). An example of peat dams proposed is shown in Plates 2-2 & 2-3. The methodology for peat dam construction, as per (Mackin *et al*, 2017) is provided in Plates 2-4 and 2-5, with the plastic dam methodology provide in Plate 2-6.
- No additional drainage to be installed in proximity to these habitat areas during the lifetime of the development.
- The use of off-road vehicles on the site will be restricted to the proposed new site access tracks.
- These works would also be preceded by a toolbox talk to the felling team by the project ecologist to ensure all measures are implemented in full.
- No application of chemical and organic fertilisers or herbicides and pesticides will be undertaken within the development footprint.
- Peat extraction within the proposed peatland reinstatement area will not be permitted.
- Burning and dumping will not be permitted.
- The rehabilitation area will be monitored to assess the success of the rehabilitation plan.



- ### Map Legend
- Peatland restoration area
 - EIAR Study Boundary
 - Proposed Turbine Locations
 - Existing Roads - Upgrade Proposed
 - Proposed New Site Roads
 - Proposed Turbine Foundations
 - Proposed Turbine Hardstands
 - Proposed Borrow Pits
 - Proposed Temporary Construction Compound
 - Met Mast Location
 - Proposed Underground Cable Route
 - Proposed Extension to Existing Slievecallan Substation
 - Temporary Runover Area
 - County Road to be Maintained
 - Public Road Expansion Area
 - Soft Levelled Area

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Peatland Restoration Areas	
Drawing Title	
Sievecurry Renewable Energy Development, Co. Clare	
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Project No.	Drawing No.
170224	Figure 1-1
Scale	Date
1:7308	2021-11-16
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Plate 2.2 Example of forestry occurring near T8 with typical peatland vegetation remaining beneath the conifers. With the removal of the conifers and appropriate management, heath/peatland habitat restoration can be achieved, resulting in habitats of high biodiversity value.



Plate 2.2 Example of peat dams to be used for on-site drain blocking.



Plate 2.3 Example of plastic dams to be used for on-site drain blocking.

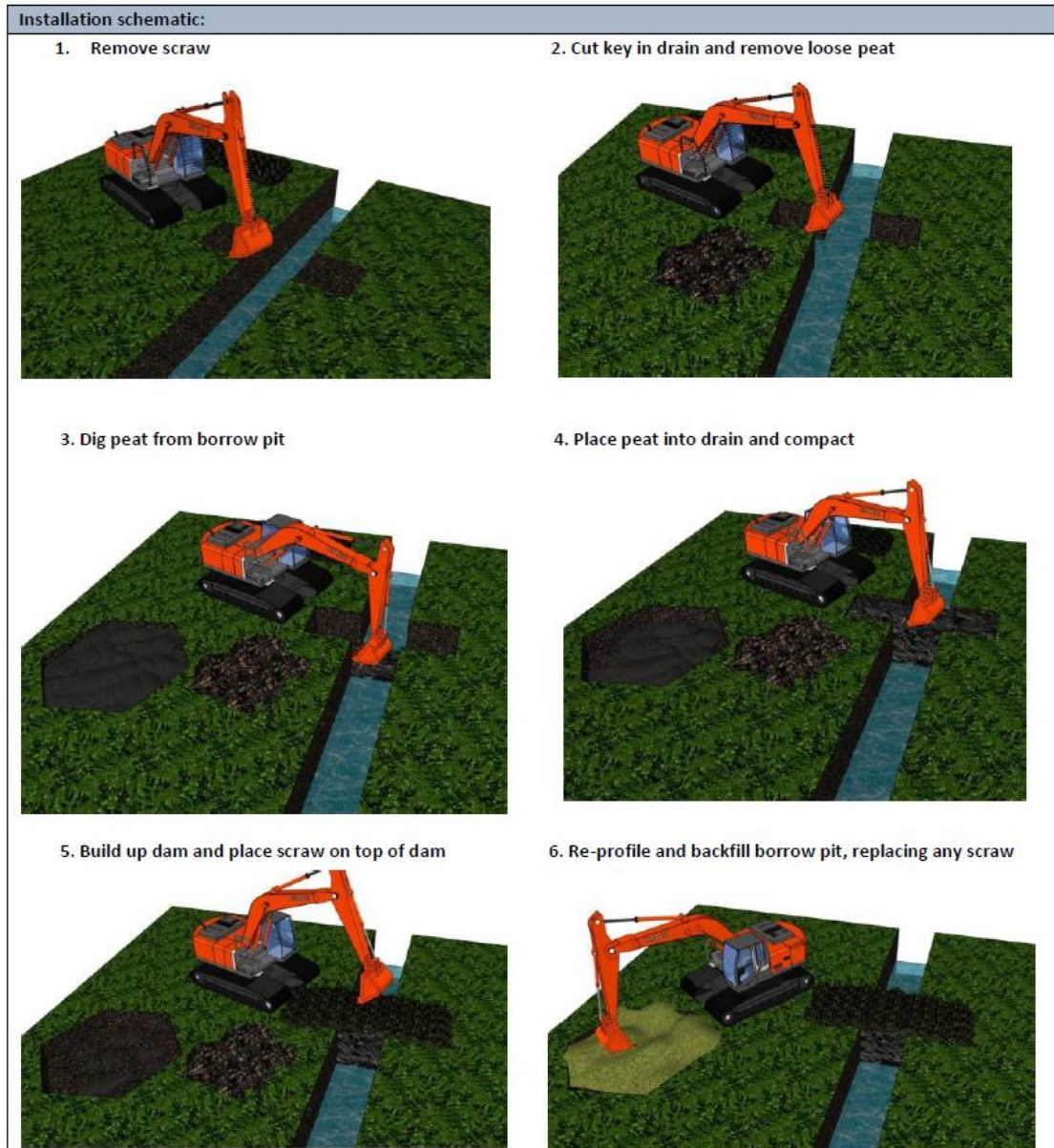


Plate 2-4 Methodology for peat dam construction (Source: Mackin et al, (2017))

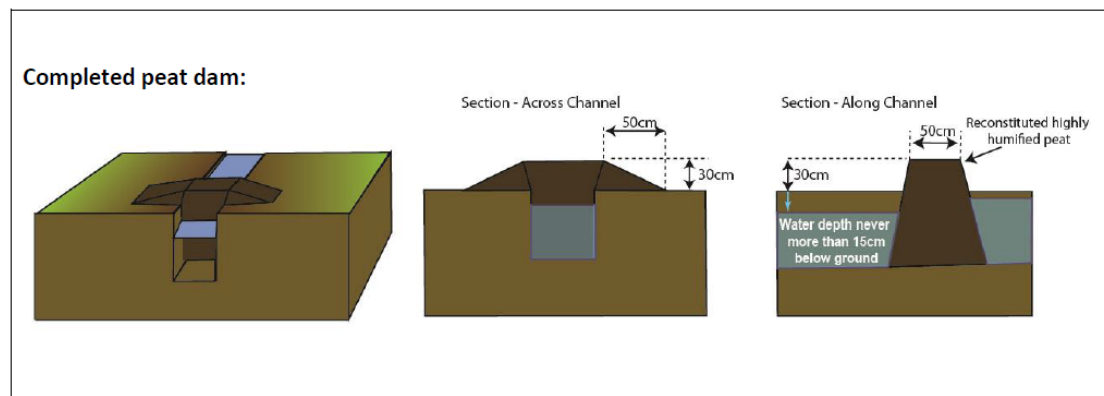


Plate 2-5 Drain Blocking by machine (McDonagh, 1996³)

³ McDonagh, E. (1996). *Drain Blocking by machine on Raised Bogs*. National Parks and Wildlife Service, Dublin.

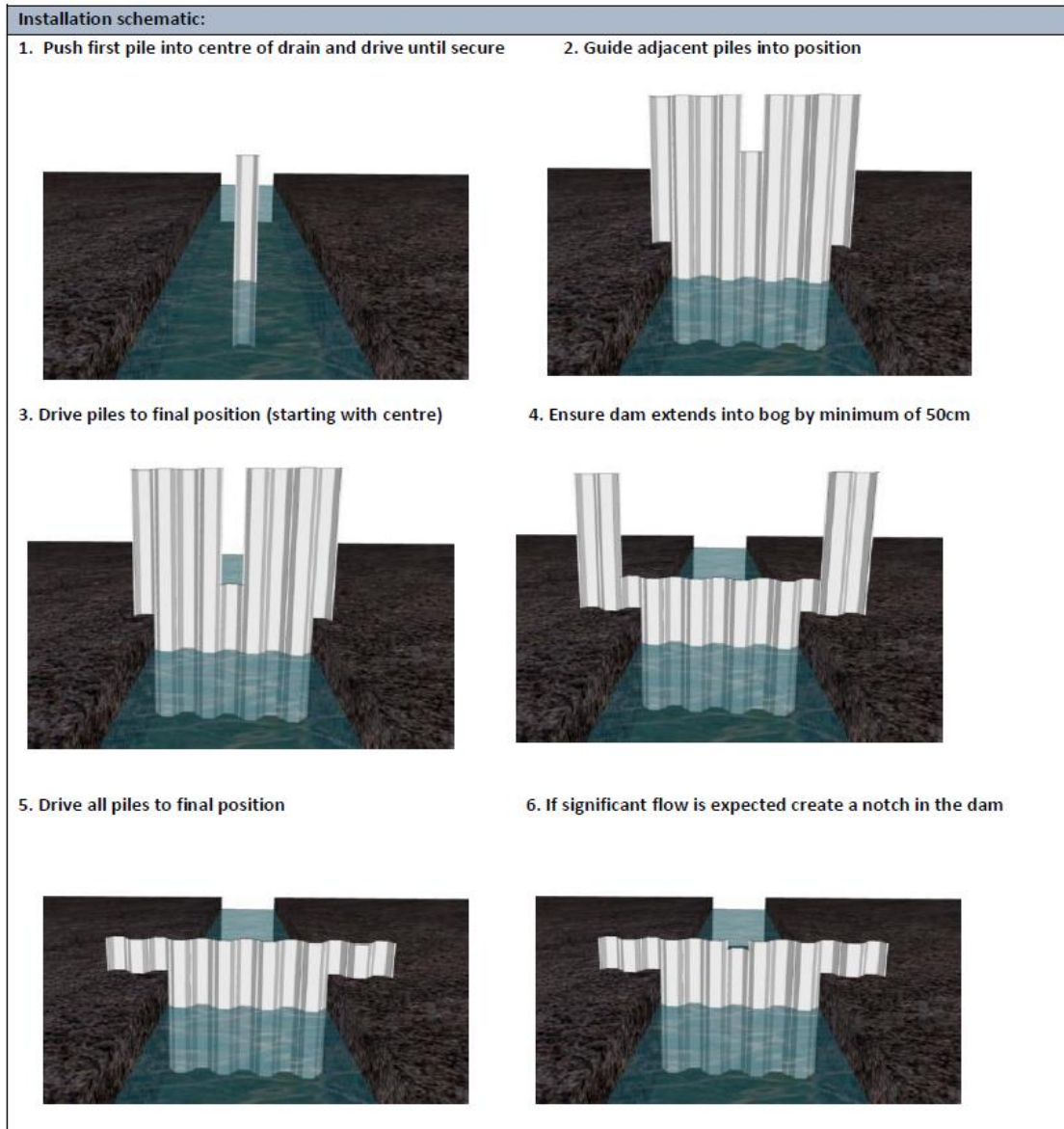


Plate 2-6 Plastic dam installation methodology (Source: Mackin et al, (2017)).

2.3

Post-Construction Borrow Pit Reinstatement

The area in which the proposed borrow pit no. 2 is located, south of T5, currently comprises of highly degraded peatland with significant areas of peat removed to the subsoil, as a result of historic turf cutting activity within the site, see Plate 1.2.

During the initial site preparation works, the top vegetated layer (acrotelm) of the existing degraded peat habitat will be carefully stripped (as turves) and stored face up so that vegetation continues to grow. Turves will be monitored and watered as necessary to ensure they are kept in good condition for reinstatement. The stripped turves will be put back in place during final reinstatement. This approach significantly increases the rate and success of vegetation recovery.

As fully described in the *Peat & Spoil Management Plan*, ‘upon removal of the rock from the borrow pits, it is proposed to reinstate the borrow pits using excavated peat and spoil’ (FehilyTimoney, 2021⁴). ‘The acrotelm shall be placed with the vegetation part of the sod facing the right way up to encourage

⁴ FehilyTimoney, 2021, *Peat & Spoil Management Plan, Slievecurry Renewable Energy Development*

growth of plants and vegetation at the surface of the peat and spoil within the borrow pits
(FehilyTimoney, 2021).

2.4

Management of Peatland Adjacent to Proposed Development Infrastructure

In addition to the reinstatement measures proposed above, this plan also sets out measures that will reinstate the embankments (cut and fill areas) alongside the newly constructed infrastructure i.e. site access roads and turbine hardstands, within areas of peatland habitat. Such measures will further minimise the peatland loss and the extent of the development footprint. As fully described in the *Peat & Spoil Management Plan*, ‘given the relatively flat topography present at the northeast and eastern part of the site, the placement of peat and spoil alongside the access roads is deemed appropriate’. ‘The peat and spoil placed adjacent to the new proposed access roads will be restricted to a maximum height of 1m over a 10m wide corridor on both sides of the access road’. ‘The acrotelm shall be placed with the vegetation part of the sod facing the right way up to encourage growth of plants and vegetation at the surface of the placed peat and spoil within the placement areas’ (FehilyTimoney, 2021). In addition to the above listed measures, the below will also be implemented:

- Burning and dumping will not be permitted.
- Application of artificial fertilisers within rehabilitation or enhancement areas will be prohibited.
- The planting of forestry will not be permitted.
- Seedlings of coniferous or other trees or any invasive plants will be removed from this area on an annual basis during the lifetime of the Proposed Development.
- Scrub species including gorse (*Ulex europaeus*) and bramble (*Rubus fruticosus* agg.) will be removed on an annual basis during the lifetime of the Proposed Development within reinstated/restored areas. Any such scrub clearance will be undertaken under the provisions of the Wildlife Acts 1976 to 2018
- No vehicular access will be permitted within the reinstated peatland areas once all initial works are completed.
- The rehabilitation areas will be monitored to assess the success of the rehabilitation plan. This is further described in Section 2.6 of this report.
- Where possible, drains will be blocked to restore the natural hydrology of the blanket bog in the area.
- Where revegetation has not established or ground conditions do not allow for easy recolonisation, any reseedling should be restricted to species occurring in the immediate surroundings. Where required, reseedling will use Sheep's fescue (*Festuca ovina*) or red fescue (*Festuca rubra*). Such grasses will help to stabilise the reinstated peat, while not outcompeting any natural revegetation from local seed dispersal.

2.5

Measures for the Protection of Marsh Fritillary and Habitat Creation

Dedicated surveys were undertaken within the study area to identify areas of suitable marsh fritillary habitat. Marsh fritillary colonies were only recorded within the site outside of the Proposed Development footprint. This section of the BMEP provides avoidance and habitat enhancement measures to for the protection of marsh fritillary as well as subsequent benefits for other invertebrates.

Measures have been included in the EIAR to avoid all potential impact on marsh fritillary or its supporting habitat during construction, due to the avoidance of all recorded colonies on site, measures have been put in place to protect the species. This includes the placement of site access roads, south of T2, on the north western side of the existing firebreak embankment, away from identified suitable habitat. This thereby avoids any remote potential for effects on the population.

Best practice measures for the protection and enhancement of the supporting habitat within the Proposed Development site include:

- **Avoidance Measures:** The entire Proposed Development has been designed to avoid marsh fritillary and supporting habitat on site, see Figure 6.7, Chapter 6 of the accompanying EIAR.
- **Pre-construction Measures:** Areas of suitable marsh fritillary habitat will be fenced off or clearly marked prior to the commencement of any site works under the guidance and supervision of a suitably qualified Ecological Clerk of Works (ECoW). This is particularly important where the site access track, south of T2, occurs in close proximity to a known colony (see Plate 2-4). Although the access track is located within forestry and the adjoining fire break, the adjacent degraded peatland habitat provides suitable supporting habitat for the species and requires protection through fencing.
- Pre-commencement surveys will be undertaken for marsh fritillary to determine long term trends of the population within the site.
- Vegetation structure and suitability will be monitored following the NBDC survey methodology (NBDC, 2020).
- Habitat condition monitoring will be undertaken during construction and in year 1 post construction to ensure that there are no negative effects on marsh fritillary habitat.
- **Construction phase measures**
- As described in Section 2.3 above, ‘*the placement of peat and spoil alongside the access roads is deemed appropriate*’ (FehilyTimoney, 2021). Such material will facilitate the establishment of peatland plant species, including devils-bit scabious (the food plant of marsh fritillary larvae). The establishment of such vegetation will benefit pollinator species generally as well as providing a food source for adult and larval stage marsh fritillary.



Plate 2-4 Example of forestry (WD4) and adjoining fire break in which the site access track, south of T2 will be located. The marsh fritillary supporting habitat is located within the adjoining peatland (right). This area will be fenced off in advance of site works.

2.6 Timing of Works

Replacement works will be conducted in line with the provisions of the Wildlife Acts 1979-2012 as amended.

2.7 Monitoring

To confirm that habitat restoration and enhancement has been successful, all areas of restored vegetation will be monitored post-restoration. Monitoring results will be reported within an *Annual Environmental Report* with any criteria failures identified and corrective actions implemented as part of the Slieveacurry Construction Environmental Management Plan (CEMP).

Prior to the commencement of habitat enhancement measures, permanent vegetation monitoring plots will be established within the management areas. The monitoring plot locations will be selected using stratified random sampling. This will allow the monitoring plots to be representative of microtopography and vegetation cover, sampling areas from the wettest, intermediate and driest parts of the management areas. Monitoring plots will be surveyed and classified using the relevé method as per the National Survey of Upland Habitats (Perrin et al., 2014) with plot sizes being 2m x 2m. Biotic and abiotic parameters that form baseline indicators of ecological and hydrological condition of the bog will be recorded. Monitoring plots will be marked out permanently using fencing posts and their location recorded using GIS. The number of monitoring plots will be determined by the level of plant community heterogeneity identified during the baseline survey post felling/drain blocking. However, it is envisaged that a minimum of ten 2m x 2m monitoring plots will be established across the enhanced areas. Visual inspections of restored areas within the application site will be carried out biannually during the first two years after restoration to check for potential soil erosion or movement and degradation of replaced turves. Vegetation monitoring will be carried out in years 1, 3, 5 and 10 after restoration. Results will be analysed and a report of the findings will be produced. The enhancement plan will be regularly updated and amended where necessary to improve the efficacy of the enhancement work. The number of monitoring plots may change depending on the results of the initial surveys. Monitoring will involve the following:

Surface peat assessment

An assessment of the physical state of the surface peat with regard to:

- Percentage bare peat not covered by vegetation (via the establishment of a number of fixed point relevés);
- Moisture status (qualitative);
- Intactness (e.g. presence of visible cracking in surface peat; and
- General stability (e.g. presence of peat erosion).

Vegetation sampling

- A number of fixed relevé sites (i.e. permanent quadrats) will be set up in areas where active management is proposed of previously forested areas. Baseline data will be recorded prior to the commencement of habitat management activities set out in this outline plan. The character of each relevé will be recorded (e.g. species proportions present, vegetation structure and height) and photographs will be taken of each relevé from a fixed point. These relevés will then be re-examined during years 1, 3, 5 and 10 following restoration in order to establish the extent of habitat improvement resulting from management practices.

Hydrological monitoring

- Water levels within areas where drains are blocked will be recorded bi-annually during the first five years of the windfarm and at 5 year intervals for the lifespan of the windfarm (30 years). A number of dipwells or piezometers will be inserted on the peatland to monitor the height of the water table. These can be constructed from 52mm internal diameter PVC. To stop peat filling the tube from the base, the pipe will be covered with gauze affixed with tape. This will be done prior to restoration to allow monitoring of water levels within both the restoration and enhancement areas. In this way, any positive impacts on the local hydrology can be verified and quantified.

The efficacy of the habitat rehabilitation and enhancement measures employed will be reviewed in years 1, 3, 5 and 10 following commencement of the plan on the basis of the results of vegetation sampling and water level readings from the managed areas. Analysis of the data collected will be the basis for a review of the measures and techniques employed.

2.8

Reporting

Reports detailing the monitoring works carried out, the results obtained and a review of their success, along with any suggestions for amendments to the plan will be prepared in years 1, 3, 5 and 10 following commencement of the plan's implementation.

3.

CONCLUSION

As described in this report, much of the proposed infrastructure is located within plantation forestry (WD4) and areas of spoil and bare ground (ED2). The extent of the proposed infrastructure located on degraded peatlands has therefore been kept to a minimum. The areas of deep peat within the study area have been avoided in the design of the development and all areas that are within the construction footprint have been degraded through extensive grazing of sheep or cattle, drainage, peat cutting, forestry or scrub encroachment. In addition, the Proposed Development will use existing site access tracks where possible to minimise the impact of the Proposed Development footprint on the receiving environment.

This Biodiversity Management and Enhancement Plan sets out measures for the restoration and enhancement of peatlands within the site as well as measures that will also protect and enhance habitat for marsh fritillary. These have been set out under the following actions:

- Forestry Felling and Peatland Restoration Around Turbines
- Post-Construction Borrow Pit Reinstatement
- Management of Peatland Adjacent to Proposed Development Infrastructure
- Measures for the Protection of Marsh Fritillary and Habitat Creation

These measures will be fully assessed through an detailed monitoring and reporting programme. Following the implementation of the measures outlined in this report, to offset the loss of degraded peatland habitat and protect marsh fritillary, there will be no residual net loss of peatland habitats on the site. In addition, the proposed forestry reinstatement to peatland has the potential to result in a long-term positive effect with an additional 2.07 ha of peatland habitat managed overall.

4. BIBLIOGRAPHY

EU-LIFE/Coillte ‘*Irish Blanket Bog Restoration Project*’ (2002-2007), Online, Available at:
http://www.irishbogrestorationproject.ie/downloads/4_progress_report.pdf, Accessed: 07.03.2021

Scottish Natural Heritage (SNH), 2014. Guidance note Planning for development: *What to consider and include in Habitat Management Plans* (Version 2, January 2014). Online, Available at:
<https://www.nature.scot/sites/default/files/2019-01/Guidance%20-%20Planning%20for%20development%20-%20What%20to%20consider%20and%20include%20in%20Habitat%20Management%20Plans.pdf>, Accessed: 07.13.2021

