



APPENDIX 6-5

BIODIVERSITY MITIGATION AND ENHANCEMENT PLAN

Biodiversity Management and Enhancement Plan (BMEP)

Proposed Seven Hills Wind
Farm, Co. Roscommon





DOCUMENT DETAILS

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Project Title: **Proposed Seven Hills Wind Farm, Co. Roscommon**

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Document Title: **Biodiversity Management and Enhancement Plan (BMEP)**

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1. INTRODUCTION

1.1 Background

This Biodiversity Management and Enhancement Plan (BMEP) has been prepared in support of the Environmental Impact Assessment Report (EIAR) produced for the proposed Seven Hills Wind Farm, Co. Roscommon.

The Biodiversity Management and Enhancement Plan has been prepared as part of the Proposed Development to offset the proposed loss of approximately 2.7ha of Annex I habitat Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (* important orchid sites) [6210] (hereafter referred to as Calcareous grassland [6210/6210*]).

The proposed 2.7ha of habitat loss is associated with the development footprint, notably; Turbines T09, T10, T12, T13, T15 and T16 and associated site access roads.

It is proposed to compensate for this loss by re-creating approximately 9-12 ha (over three times that to be lost) of species rich semi-natural grassland. This extra habitat restoration is proposed given that it would not be a like for like replacement, and would take time to establish. The 8 areas identified for recreation currently comprise of improved or semi-improved agricultural grassland that would have historically confirmed to Calcareous grassland [6210/6210*] but have been subject to land ‘reclamation’ and agricultural improvement. The areas identified for restoration and management are denoted as Areas A – H for the proposed of this BMEP (see Section 2.1). Of the extent of lands shown in these figures, between approximately 9-12 ha of the total 41.66ha that comprises the combined areas of Areas A – H will be utilised for the purposes of the proposed habitat restoration.

Separately, the areas of Annex I Calcareous grassland [6210/6210*] occurring within the site have also been incorporated into this BMEP and will be subject to separate management measures, in particular that there would be no further land reclamation of these lands for the lifetime of the Proposed Development (see Section 2.5).

This management plan describes the management actions required for each of the proposed management lands. Measures include the:

- Green-hay strewing (sourced from donor sites within the EIAR Site Boundary),
- Grazing management,
- Natural colonisation, and where necessary,
- Bought native Irish seed mix.

Monitoring of the plan will be implemented from pre-construction, construction and for the lifetime of the Proposed Development by the Project Ecologist.

2. Identification of Relevant Management Opportunities

The management measures identified in this BMEP are high level, and indicative only of what can be undertaken within the EIAR Site Boundary. Following agreement in principal, individually tailored management plans will be drawn up for each of the farms following consultation between the project team and the individual landowners in question.

The management measures prescribed within the individual farm plans will be translated into detailed project actions that will be undertaken by the farmer each year. The plans will be subject to ongoing review by the Project Ecologist and the farmer. Where required, the plan will be updated to take account of actions achieved and future requirements. The goal of the overall BMEP is to combine all management areas within the EIAR Site Boundary to ensure that the management actions achieve sustainable agricultural management of the Annex I priority Calcareous grassland habitat [6210/6201*] within the site and areas undergoing restoration.

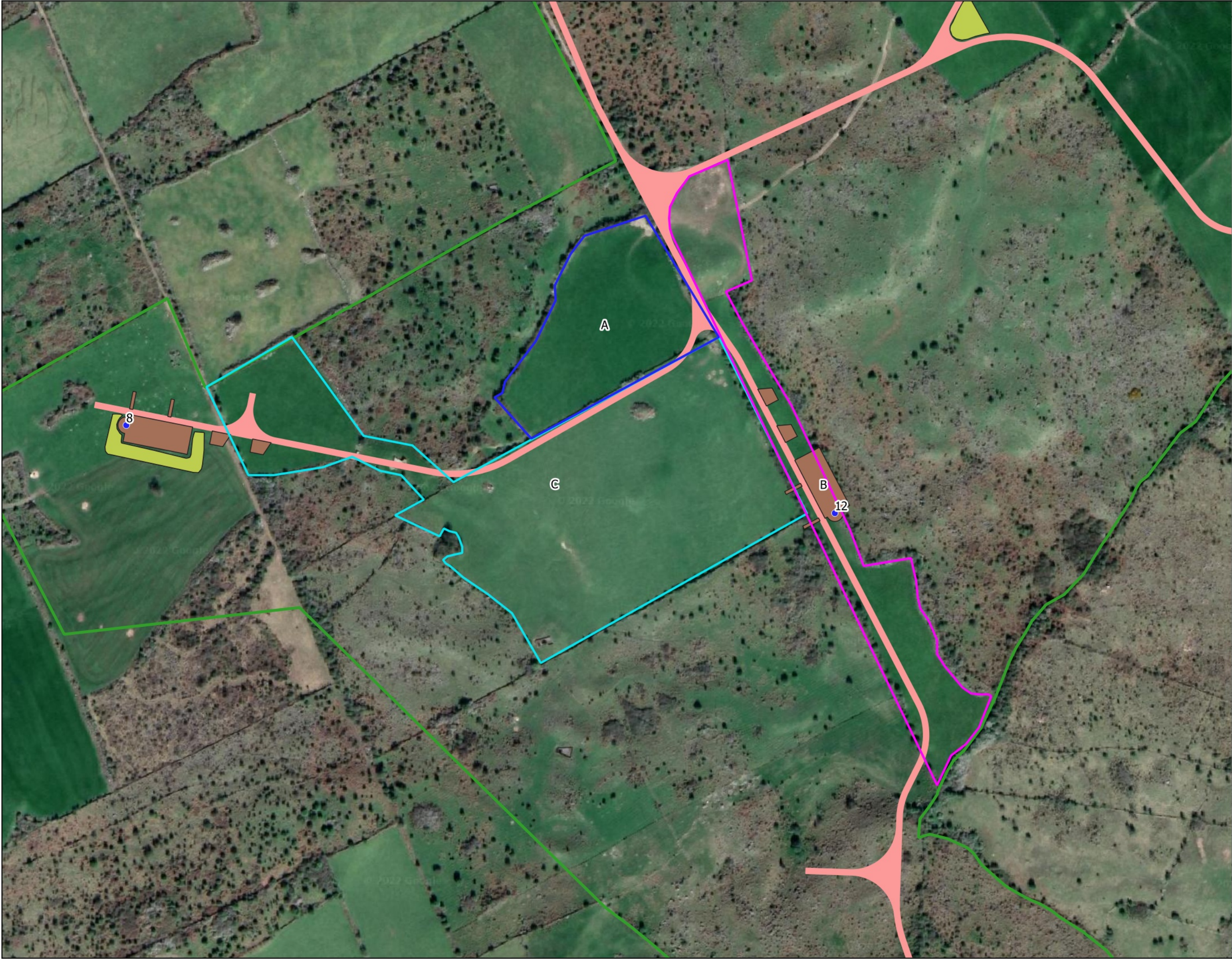
Section 2.1 provides a breakdown of the management opportunities on farmland identified within the EIAR Site Boundary. The areas chosen for management and enhancement are provided in Figures 2.1 to 2.3. Section 2.2 describes the management actions required in order to create a species-rich semi-natural grassland.

In addition, existing areas conforming to Calcareous grassland habitat [6210/6201*] within the site are also proposed for agreement where there will be no land reclamation permissible i.e. the lands will continue to be subject to current low intensity agricultural management with no scrub clearance, fertiliser application or reseeding, see Figures 2.4 and 2.5. This is further described in Section 2.3.

2.1 Proposed grassland management measures

Land management opportunities within the EIAR Site Boundary are provided below in Tables 2-2 to 2-8 and a description of each of the management practices for each management area provided. The proposed management measures, in terms of restoring species-rich grasslands using green hay timeline and low intensity grazing, in provided in Table 2-1. As it is proposed to manage at least three times the area of lands to be lost to the development footprint, comprising of between approximately 9-12ha, the below combinations of management lands (as shown in Figures 2.1 to 2.3) are provided here as suitable options.

Option 1:	Option 2	Option 3	Option 4
Area A: 1.86	Area D: 1.7ha	Area E: 2.65ha	Area G: 11.16ha
Area B: 2.3	Area E: 2.65	Area H: 8.15ha	
Area C: 6.6	Area F: 4.59		<u>Total: 11.16ha</u>
<u>Total: 10.76</u>	<u>Total: 8.94</u>	<u>Total: 10.8ha</u>	



Map Legend

- EIAR Site Boundary
- Habitat Management Areas**
 - A
 - B
 - C
 - D
 - E
 - F
 - G
 - H
- Turbine Layout
- Proposed Access Roads
- Proposed Hardstands
- Proposed Substation Location
- Proposed Spoil Storage Areas
- Infrastructure Spoil Storage Areas
- Proposed Met Mast
- Proposed Construction Compound

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Drawing Title
Habitat Management Areas A, B & C

Project Title
Seven Hills Wind Farm, Co. Roscommon

Drawn By PE	Checked By JH
Project No. 190907	Figure No. 2-1
Scale 1:3000	Date 2022-06-02

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- Proposed Met Mast
- Proposed Construction Compound

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N
Z
O
N

Drawing Title
Habitat Management Areas D, E, F & G

Project Title
Seven Hills Wind Farm, Co. Roscommon

Drawn By PE	Checked By JH
Project No. 190907	Figure No. 2-2
Scale 1:6000	Date 2022-06-02

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Map Legend

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- Proposed Construction Compound

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Drawing Title

Habitat Management Area H

Project Title

Seven Hills Wind Farm, Co. Roscommon

Drawn By	PE	Checked By	JH
Project No.	190907	Figure No.	2-3
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2.4 Management Actions

Grassland establishment typically takes 3 to 5 years to establish a desirable and stable vegetative community. During this period a regime of cutting and light grazing is typically required (Ashwood, 2014)¹.

2.4.1 Mowing

The establishment of a mowing regime will aim to reduce competition from rank species and initially the encroachment of scrub. After mowing, cuttings will be removed from the site as hay or silage. Where more fertile soils exist within the management areas, as a result of historic fertilisation/agricultural improvement, it may be necessary to cut hay/silage twice a year for the first year or two. One cut earlier in the year to reduce the weeds and competitive grasses and a late cut in August or September to further reduce nutrients. Once the nutrient levels have decreased and a species rich grassland established, light grazing can begin during the mid-late summer months.

2.4.2 Green hay strewing

Green hay strewing involves the harvesting of a species rich donor site, just as they are shedding seed and still 'green' and spreading this over the species-poor recipient site where it is spread allowing the seed to drop. Initially the receptor site will need to be harvested for hay/silage in order to leave an exposed field onto which the green hay is spread. Green hay would usually be harvested in late August to September before the seeds drop (NRA, 2006²). The hay collected from the donor site should be spread within 24 hours of collection to prevent the spoiling or loss of seeds during storage (Ashwood, 2014). After the green hay has been allowed to dry and drop seeds, this will then be baled/removed from the site as a traditional harvest.

The seeds from the green hay need to be put in contact with the soil to germinate. This can either be done by rolling the recipient field straight after the seed has been spread, or by putting out livestock, particularly cattle (Magnificent Meadows, ND)³.

Following the application of green hay, there will be no grazing between April - July in the first year. This will allow flowers to bloom, particularly yellow rattle. The receptor field should then be cut for hay from mid-July / August onwards, again allowing for all flowering plants to set seed.

2.4.3 Seeding

Where seed collection from the donor sites is not possible, native Irish sourced seed may be bought at an approved supplier of native seed stock. Only species indicative of the Annex I Calcareous grassland habitat [6210] will be sown to ensure a similar species-rich habitat is created. Initially it would be recommended that only Yellow rattle be sown as seed to reduce the vigour of the grasses within the improved pastures. This, along with the use of green hay strewing would allow for the natural establishment of a species rich grassland similar in composition to the adjacent lands. Seeding would be undertaken between August or September following the removal of the existing grass sward by means of hay or silage. This would allow sufficient time for seeds to germinate and become established.

¹ Ashwood, Frank. (2014). *Best Practice Guidance Note for Land Regeneration No. 18: Lowland Calcareous Grassland – Creation and Management in Land Regeneration*, Online, Available at: https://www.researchgate.net/publication/268809115_Best_Practice_Guidance_Note_for_Land_Regeneration_No_18_Lowland_Calcareous_Grassland_-_Creation_and_Management_in_Land_Regeneration, Accessed: 20.01.2021

² National Roads Authority, 2006, *A Guide to Landscape Treatments for National Road Schemes in Ireland*. Dublin: National Roads Authority

³ Magnificent Meadows (ND), *Restoring species-rich grassland using green hay*, Online, Available at: http://www.magnificentmeadows.org.uk/assets/pdfs/Restoration_using_green_hay.pdf, Accessed 20.01.2020

The grassland will be rolled following the application of seed to ensure contact with the soil, required for germination (National Roads Authority, 2006).

2.4.4 Grazing

Long-term management through grazing (cattle or horses) and/or cutting is essential for maintaining species richness (O'Neill et al., 2013). Historically, grazing has been the typical management technique. However, initially mowing may be more suitable at the identified lands where machinery access is feasible. This would ensure that the entire grass sward is removed and may also reduce potential for overgrazing during the plant flowering and self-seeding period. Following mowing and grass growth has started again, it should be grazed by livestock. This aftermath grazing will further control the dominance of grasses. Once a satisfactory species richness has been established, cattle and sheep can provide year-round grazing management if used at low stocking rates. A rule of thumb is to use 0.5 cattle or 2.5 sheep per hectare per year (Department of Transport, 1993⁴). Winter grazing will be monitored for poaching (Ashwood, 2014).

Once a desired species rich grassland sward has been achieved, the grassland can be treated as pasture, instead of hay cutting. This would involve livestock will be put on the field to graze from mid July / August onwards into the autumn.

Temporary fencing may be required for some of the identified management lands in order to prevent access by livestock from the surrounding lands and thereby control the safeguard the proposed management actions i.e. initial mowing and or reseeding regime.

2.4.5 Weed control

Given the improved/semi-improved nature of the management lands, containing some thistles, ragwort and nettles; there may be a requirement for spot treatments with herbicides or the cutting or pulling of individual plants prior to flowering.

2.4.6 Natural colonisation

The management lands have been chosen as they are located adjacent to the existing Calcareous grassland [6210] grasslands. Given this close proximity, it is possible that natural colonisation of the sites identified for management would occur. However, this would take much longer to establish a sufficiently species rich sward. It is therefore considered that natural colonisation will supplement the above prescribed management measures to allow for a greater species richness in the management lands.

⁴ Department of Transport (1993). *The wildflower handbook*. HMSO, London.

Table 2-1 Restoring species-rich grasslands using green hay timeline

Phasing	Prior to restoration			Restoration			Post-restoration Year 1				Post-restoration Year 2			
Season	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter
Site preparation														
Keep the sward short	√	√	√											
Create bare ground				√										
Active restoration / recreation														
Cut green hay at donor site, transport green hay and spread on recipient site				√										
Roll recipient field or put livestock on to tread the seeds into the soil				√										
Post-restoration / recreation management treating the field as a hay meadow														
Graze fields (aftermath grazing)					√	√								
Remove livestock during core flowering period							√	√						
Hay cut								√						
Graze fields (aftermath grazing)									√	√				
Remove livestock during core flowering period											√	√		
Hay cut												√		
Graze fields (aftermath grazing)													√	√

Adapted from Magnificent Meadows (ND)

Table 2-2 Proposed land management measures for Area A


Management Area ID	Management Opportunities	Example photo
<p>Area A</p> <p>Area in hectares: 1.86ha</p>	<p>This area comprises of improved agricultural grassland. The lands are bordered to the north and west by areas of semi-natural grassland that conform to the EU Habitats Directive Annex I listed Calcareous grassland [6210]. Therefore, these lands could be subject to a suitable management regime to allow for the creation of a species rich semi-natural grassland. It would also, in time, contribute to the surrounding network of the Annex I Calcareous grassland [6210].</p> <p>Species diversity could be improved by:</p> <ul style="list-style-type: none"> ➤ Initially the lands would be managed by removing the grass as hay or silage during the summer months (mid-June/late July). This would aim to reduce grass dominance. ➤ Late summer and winter grazing, using cattle or horses, to remove the dense grass vegetation and create small areas of open ground. ➤ The lands would benefit from the spreading of green hay, containing, in particular, Yellow rattle (<i>Rhinanthus minor</i>) following the cutting of hay/silage. This species occurs in abundance in the adjacent field to the south which would act as a donor site. This would further help to reduce grass dominance and increase the diversity of herbaceous plants. ➤ No fertiliser or chemical usage ➤ Controlling of noxious weeds i.e. ragwort, may be required. 	

Table 2-3 Proposed land management measures for Area B


Management Area ID	Management Opportunities	Example photo
<p>Area B</p> <p>Area in hectares: 2.3ha</p>	<p>These areas contain improved agricultural grassland. The land is located in close proximity to Annex I Calcareous grassland [6210] to the north, southwest, south and east. It would therefore contribute to increasing connectivity between these species rich grasslands, would be suitable for natural recolonisation from the adjacent grasslands as well as providing a steppingstone for a wide variety of species</p> <p>Species diversity could be improved by:</p> <ul style="list-style-type: none"> ➤ Initially the lands would be managed by removing the grass as hay or silage during the summer months (mid-June/late July). This would aim to reduce grass dominance. ➤ Late summer and winter grazing, using cattle or horses, to remove the dense grass vegetation and create small areas of open ground. ➤ The lands would benefit from the spreading of green hay, containing Yellow rattle (<i>Rhinanthus minor</i>) following the cutting of hay/silage. This species occurs in abundance in the adjacent field to the west which would act as a donor site. This would further help to reduce grass dominance and increase the diversity of herbaceous plants. ➤ No fertiliser or chemical usage ➤ Controlling of noxious weeds i.e. ragwort, may be required. 	

Table 2-4 Proposed land management measures for Area C


Management Area ID	Management Opportunities	Example photo
<p>Area C</p> <p>Area in hectares: 6.6ha</p>	<p>These areas contain relatively species rich although improved agricultural grassland. The grassland is also rich in Yellow rattle (<i>Rhinanthus minor</i>) which should continue to be an important component of this grassland. The site could also be used as a donor site for supplying 'green hay' to other receptor sites within the Habitat Management Plan. If the land is used as a donor site for green hay, this should only be done in strips of the land to allow for natural regeneration and prevent depletion of the herb species present.</p> <p>Species diversity could be improved by:</p> <ul style="list-style-type: none"> ➤ The annual harvesting of hay during the mid to late summer months (late-June to late-August). A late cut (August) would be undertaken at least once every 5 years to allow late flowering species to set seed (e.g. devils bit scabious). ➤ The pasture could then be subject to autumn/winter light grazing (using cattle or horses). This would aim to reduce grass dominance. ➤ No fertiliser or chemical usage ➤ Controlling of noxious weeds i.e. ragwort, may be required. 	

Table 2.5 Proposed land management measures for Area D

Management Area ID	Management Opportunities	Example photo
<p>Area D</p> <p>Area in hectares: 1.71ha</p>	<p>These areas contain improved agricultural grassland. The land is located in close proximity to Annex I Calcareous grassland [6210] to the north, northwest, east and south. It would therefore contribute to increasing connectivity between these species rich grasslands, would be suitable for natural recolonisation from the adjacent grasslands as well as providing a steppingstone for a wide variety of species.</p> <p>Species diversity could be improved by:</p> <ul style="list-style-type: none"> ➤ Initially the lands would be managed by removing the grass as hay or silage during the summer months (mid-June/late July). This would aim to reduce grass dominance. ➤ Late summer and winter grazing, using cattle or horses, to remove the dense grass vegetation and create small areas of open ground. ➤ The lands would benefit from the spreading of green hay, containing Yellow rattle (<i>Rhinanthus minor</i>) following the cutting of hay/silage. This species occurs in abundance in the adjacent field to the west which would act as a donor site. This would further help to reduce grass dominance and increase the diversity of herbaceous plants. ➤ No fertiliser or chemical usage ➤ Controlling of noxious weeds i.e. ragwort, may be required. 	

Table 2-6 Proposed land management measures for Area E


Management Area ID	Management Opportunities	Example photo
<p>Area E</p> <p>Area in hectares: 2.65ha</p>	<p>These areas contain improved agricultural grassland. The land is located in close proximity to Annex I Calcareous grassland [6210] to the north, west, east and south. It would therefore contribute to increasing connectivity between these species rich grasslands, would be suitable for natural recolonisation from the adjacent grasslands as well as providing a steppingstone for a wide variety of species.</p> <p>Species diversity could be improved by:</p> <ul style="list-style-type: none"> ➤ Initially the lands would be managed by removing the grass as hay or sileage during the summer months (mid-June/late July). This would aim to reduce grass dominance. ➤ Late summer and winter grazing, using cattle or equines, to remove the dense grass vegetation and create small areas of open ground/sward. ➤ The lands would benefit from the spreading of green hay, containing Yellow rattle (<i>Rhinanthus minor</i>) following the cutting of hay/silage. This species occurs in abundance in the adjacent field to the west which would act as a donor site. This would further help to reduce grass dominance and increase the diversity of herbaceous plants. ➤ No fertiliser or chemical usage. ➤ Controlling of noxious weeds i.e. ragwort, may be required. ➤ Fencing would initially also be required to manage stocking densities. 	

Table 2-7 Proposed land management measures for Area F



Management Area ID	Management Opportunities	Example photo
<p>Area F</p> <p>Area in hectares: 4.59ha</p>	<p>These areas contain a mosaic of species poor and species rich grassland as a result of agricultural improvement i.e. historic overgrazing or increased nutrification. The small areas of species rich grassland remain on shallow soils/rocky outcrops and would provide a natural seed source/natural reinstatement to a species rich grassland. The land is located adjacent to an extensive area of Annex I Calcareous grassland [6210] to the south-southwest.</p> <p>Species diversity could be improved by:</p> <ul style="list-style-type: none"> ➤ Late low intensity grazing by cattle or equine species would allow spring and summer plants to flower and set seed. ➤ The pasture could then be subject to autumn/winter light grazing (using cattle or horses). This would aim to reduce grass dominance. ➤ The lands are unsuitable for any intensive machinery management given the occurrence of scattered scrub, topography and scattered boulders. ➤ No fertiliser or chemical usage ➤ Controlling noxious weeds i.e. ragwort, may be required, particularly around the periphery of the land along hedgerows. 	

Table 2-8 Proposed land management measures for Area G

Management Area ID	Management Opportunities	Example photo
<p>Area G</p> <p>Area in hectares: 11.16ha</p>	<p>These areas contain a mosaic of species poor and species rich grassland as a result of agricultural improvement i.e. overgrazing or increased nutrification. The small areas of species rich grassland remain on shallow soils/rocky outcrops and would provide a natural seed source/natural reinstatement to a species rich grassland/Annex I habitat.</p> <p>Species diversity could be improved by:</p> <ul style="list-style-type: none"> ➤ The annual harvesting of hay during the mid to late summer months (late-June to late-August). A late cut (August) would be undertaken at least once every 5 years to allow late flowering species to set seed (e.g. devils bit scabious). If hay harvesting is not achievable, late low intensity grazing by cattle or equine species would agreeable. ➤ The pasture could then be subject to autumn/winter light grazing (using cattle or horses). This would aim to reduce grass dominance as well as ensuing areas are managed that are otherwise unaccusable to conventional machinery i.e. surrounding small areas of boulders etc. ➤ No fertiliser or chemical usage ➤ Controlling noxious weeds i.e. ragwort, may be required, particularly around the periphery of the land along hedgerows. 	

Table 2.9 Proposed land management measures for Area H

Management Area ID	Management Opportunities	Example photo
<p>Area H</p> <p>Area in hectares: 8.15ha</p>	<p>These areas contain a mosaic of species poor and species rich grassland as a result of agricultural improvement i.e. overgrazing or increased nitrification. The small areas of species rich grassland remain on shallow soils/rocky outcrops and would provide a natural seed source that would spread with suitable management. The area also contains a small area of Annex I Calcareous grassland [6210*] conforming to the priority habitat (important orchid rich sites). However, this area is restricted to the northwest of the site on lands containing scattered boulders and shallow soils. The remainder of the site would benefit for a formalised agricultural management regime as described below:</p> <ul style="list-style-type: none"> ➤ Grazing restricted to mid to late summer months (late-June to late-August) as the lands are not suitable for intensive mowing. ➤ The pasture could then be subject to low intensity autumn/winter grazing (using cattle or horses). This would aim to reduce grass dominance. ➤ No fertiliser or chemical usage ➤ Controlling noxious weeds i.e. ragwort, may be required, particularly around the periphery of the land along hedgerows. 	

2.5

Restricting Land Reclamation

This BMEP also aims to restrict the reclamation of Calcareous grasslands [6210/6210*] occurring within the ELAR Site Boundary in agreement with the relevant landowners. In addition, the lands will continue to be subject to low intensity grazing to maintain these areas in their current good condition. The extent of lands agreed for this future management with consenting landowners is shown in Figures 2.4 and 2.5. These land reclamation restrictions will be implemented as part of the monitoring regime for the lifetime of the Proposed Development. An example of these lands is provided in Plate 2-1.

Future management would include:

- No future land reclamation for the lifetime of the proposed development.
- Continued current management practice (low intensity grazing) to maintain area in current condition.
- Low summer stocking density.
- No fertiliser or chemical usage
- No scrub clearance.



Plate 2-1 Example of the Annex I Calcareous grasslands [6210/6210*] occurring within the ELAR Site Boundary



Map Legend

- EIAR Site Boundary
- Annex 1 6210 Grassland to be subject to no land reclamation

Habitat Management Areas

- A
- B
- C
- D
- E
- F
- G
- H

- Turbine Layout
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North Arrow

Drawing Title
Annex 1 Grassland to be Subject to No Reclamation

Project Title
Seven Hills Wind Farm, Co. Roscommon

Drawn By PE	Checked By JH
Project No. 190907	Figure No. 2-4
Scale 1:12000	Date 2022-06-02

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Map Legend

- EIAR Site Boundary
- Annex 1 6210 Grassland to be subject to no land reclamation

Habitat Management Areas

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N

Annex 1 Grassland to be Subject to No Reclamation

Seven Hills Wind Farm, Co. Roscommon

Drawn By	Checked By
PE	JH
Project No.	Figure No.
190907	2-5
Scale	Date
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3. MONITORING

3.1 Vegetation Monitoring

To confirm that habitat restoration and enhancement has been successful, all areas of restored vegetation will be monitored post-restoration. This will be undertaken in partnership between the developer, the Project Ecologist and the Landowner. The proposed management actions will be conveyed to each of the landowners and management alterations implemented as required to achieve the targets of the management plan. Monitoring results will be reported within an Annual Environmental Report with any criteria failures identified and corrective actions implemented as part of the proposed Construction Environmental Management Plan (CEMP).

Prior to the commencement of habitat enhancement measures, permanent vegetation monitoring plots will be agreed with the planning authority and established within the management areas (using GPS). 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 Martin *et al.*, (2018⁵) with plot sizes being 2m x 2m. Biotic and abiotic parameters that form baseline indicators of ecological condition of the grassland will be recorded. The number of monitoring plots will be determined by the level of plant community heterogeneity identified during the baseline survey. However, it is envisaged that a minimum of three 2m x 2m monitoring plots will be established at each of the enhanced areas. Grassland conditions assessed in both the short and long-term will be informed by O'Neill *et al.*, (2013) and Martin *et al.*, (2018).

Monitoring would be carried out prior to the 3rd week in July in an given year, after which a yearly hay cut would be taken. Grazing by sheep would subsequently be carried out up until September. Monitoring would also record the establishment of yellow meadow ant (*Lasius flavus*) hills, which are an important invertebrate for healthy grassland ecosystems, are indicative of a lack of intensive management, and of the presence of wild thyme (*Thymus drucei*) which is an important indicator species of calcareous grasslands.

Monitoring plots will be surveyed once annually during the first five years of the Wind Farms operation and at 5 year intervals for the lifespan of the Proposed Development (30 years). 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.

3.2 Monitoring soil nutrients/chemistry (looking for decreases in improved lands)

Nutrient levels within monitoring plots will also be measures concurrently with vegetation monitoring as detailed in Section 3.1 above. As part of this monitoring, soil samples will be taken from within each monitoring plot once annually during the first five years of the Wind Farm and at 5 year intervals for the lifespan of the Proposed Development (30 years). A digital soil testing meter will be used in order to ascertain the levels of nutrients such as Nitrogen, Phosphorus and Potassium in the soil, with the expectation being that nutrient levels will reduce over time within these restored areas that are no longer subject to heavy agricultural enrichment or fertilisation.

⁵ Martin, J.R., O'Neill, F.H. & Daly, O.H. (2018), *The monitoring and assessment of three EU Habitats Directive Annex I grassland habitats. Irish Wildlife Manuals, No. 102. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht, Ireland.*

3.3

Reporting

Operational phase ecological 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 in light of the results will be prepared in years 1, 2, 3, 5, 10, 15, 20, 25 and 30 following commencement of the plan's implementation.

4.

Conclusions

The measures described in this overarching BMEP will serve to compensate for the loss of Annex I Calcareous grassland [6210] habitat associated with the Proposed Development footprint. The plan provides for sufficient habitat restoration to ensure no net permanent loss of this habitat type will occur and that the areas identified for management will contribute to restoring lands surrounded by the Annex I Calcareous grassland [6210] habitat. A total area of between approximately 9 – 12 ha (a minimum of three times of the area lost to the footprint) will be created as part of this plan, which will result in a long-term net gain in this habitat within the locality of the Proposed Development.

The following items are fundamental to the maintenance and future management of the Biodiversity Management areas identified:

- No land reclamation
- No spreading of manure or herbicides
- No reseeding with perennial rye grass (or equivalent)

All landowners will sign a mandatory agreement (as below) within the individual farm management plans specific to their landholding, within which they must agree to undertake the agreed management measures outlined for the landholding, including the key items listed above.

Mandatory Undertakings

The following items are fundamental to the maintenance and future management of the Biodiversity Management areas identified:

- No land reclamation
- Spreading of manure or herbicides
- Reseeding with perennial rye grass (or equivalent)

The actions and requirements as described in this Farm Plan have been fully explained to me. I agree to undertake the agreed management measures outlined for my landholding.

Signed

Date

5.

BIBLIOGRAPHY

Ashwood, Frank. (2014). Best Practice Guidance Note for Land Regeneration No. 18: Lowland Calcareous Grassland – Creation and Management in Land Regeneration, Online, Available at: https://www.researchgate.net/publication/268809115_Best_Practice_Guidance_Note_for_Land_Regeneration_No_18_Lowland_Calcareous_Grassland_-_Creation_and_Management_in_Land_Regeneration, Accessed: 20.01.2021

National Roads Authority, 2006, A Guide to Landscape Treatments for National Road Schemes in Ireland. Dublin: National Roads Authority

Magnificent Meadows (ND), Restoring species-rich grassland using green hay, Online, Available at: http://www.magnificentmeadows.org.uk/assets/pdfs/Restoration_using_green_hay.pdf, Accessed 20.01.2020

Department of Transport (1993). The wildflower handbook. HMSO, London.

Martin, J.R., O'Neill, F.H. & Daly, O.H. (2018), The monitoring and assessment of three EU Habitats Directive Annex I grassland habitats. Irish Wildlife Manuals, No. 102. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht, Ireland.

