APPENDIX 6-1

BOTANICAL STUDY

Botanical Study - Table of Contents

1. INTRODUCTION

As described in Section 6.4.3.2 of Chapter 6 of this EIAR, detailed habitat classification and assessment was undertaken by MKO at targeted locations within the Proposed Development footprint, with relevés undertaken on the 29th July, and the 4th August 2021within representative habitats at each turbine base and associated infrastructure. Habitat verification surveys were subsequently carried out on the 19th August 2022 to ensure habitat composition remained the same as previous surveys.

1.1 Statement of Authority

The habitat surveys to inform this assessment were undertaken by Patrick Ellison (B.Sc., MSc., ACIEEM), Cathal Bergin (B.Sc., QCIEEM) and Rudraksh Gupta (BSc., MSc.).

All surveyors have relevant academic qualifications and experience in botanical survey and assessment and are competent experts in undertaking the ecological surveys to inform the habitat classification.

2. SURVEY METHODOLOGY

A total of 9 detailed relevés were undertaken within the Proposed Development footprint or representative habitats within the Proposed Development site and wider area within the landownership. The location of each is provided on Figure 6-2, Chapter 6 of this EIAR.

Detailed habitat classification and assessment was undertaken by MKO at targeted locations within the Proposed Development footprint within the Wind Farm Site, with relevés undertaken on the 29th July and 4th August 2021 within habitats representative of those at each turbine base and associated infrastructure. Habitat verification surveys were subsequently carried out on the 19th August 2022 to ensure habitat composition remained the same as previous surveys. The extent of each habitat on the Wind Farm Site was mapped on site using aerial photography, hand-held GPS and smartphone technology. A representative photograph was also taken for each of the habitats recorded on the Wind Farm Site, including all quadrat locations.

The survey results were then analysed in accordance the Irish Vegetation Classification (IVC) system. The IVC is a project with aims to classify, describe, and map in detail all aspects of natural and semi-natural vegetation in Ireland within a single, unified framework. The National Vegetation Database (NVD), upon which the IVC is based, holds data for over 30,000 relevés and is the core resource upon which the classification system is based.

A fundamental requirement of the IVC is to "aid in definition and identification of EU Habitat Directive (92/43/EEC) Annex I habitats" and to 'inform the planning process, for example through environmental impact assessments".

The Engine for Relevés to Irish Communities Assignment (ERICA)[1] is a web application for assigning vegetation data to communities defined by the Irish Vegetation Classification (IVC). Data can be uploaded, checked for errors and analysed and the results can then be downloaded. ERICA works with both quantitative vegetation cover data (such as are recorded in relevés and other types of botanical recording plots) and presence/absence data, such as species lists. ERICA covers grasslands, woodland, duneland, heaths, bogs, fens, mires, freshwater, saline waters, rocky habitats, scrub, strandline, saltmarsh and weed communities (Perrin, 2019).

The data collected from the botanical assessments was uploaded to ERICA, analysed and the results data downloaded.

The analysis procedure uses a clustering process to assign classification affinity to vegetation plots based on a degree of membership to each of the communities defined by the IVC. Table 6-2 details the categorizing types of plots utilizing the clustering analysis. This categorizing procedure was utilized to determine if the grassland plots within the study area had any affinity to Annex I grassland and whether further assessment was required.

Table 1: Categorising types of plots using clustering analysis (after Wiser & de Cáceres, 2013).

Plot Type	Definition
Assigned	The plot has membership ≥ 0.5 for one of the vegetation communities and therefore relates to the core definition of that vegetation community.

---

[1] Perrin, 2019, ERICA – Engine for Relevés to Irish Communities Assignment V5.0 User's Manual, Online, Available at: https://biodiversityireland.shinyapps.io/vegetation-classification/_w_9cd4889a/manual.pdf, Accessed: 10.10.2020.

Plot Type	Definition
Unassigned	The plot has membership ≥ 0.5 for the noise class and is poorly represented by the current classification scheme
Transitional	The plot has membership < 0.5 for all vegetation communities and for the noise class. It falls within the scope of the current classification scheme but does not relate to the core definition of any of the vegetation communities.

Habitats considered to be of ecological significance and in particular having the potential to correspond to those listed in Annex I of the EU Habitats Directive 92/43/EEC were identified and classified as Key Ecological Receptors (KERs).

The data within the following tables pertains to these detailed vegetation and habitat surveys undertaken for the purposes of habitat classification and assessment of ecological value of grassland habitats within the Wind Farm Site.

3. RESULTS

3.1 Quadrat 1 – Turbine 1 Location (11.03.2022)

Quadrat 1	Grid Reference: ITM X 619052.4 Y 747750.7	Date: 11.03.2022
Common Name	**Scientific Name**	**% Cover**
Perennial rye grass	*Lolium perenne*	50
Italian rye grass	*Lolium multiflorum*	40
White clover	*Trifolium repens*	5
Creeping buttercup	*Ranunculus repens*	2
Meadow buttercup	*Ranunculus acris*	1
Soft rush	*Juncus effusus*	5
Broad leaved dock	*Rumex obtusifolius*	5
Marsh thistle	*Cirsium palustre*	1
Common chickweed	*Stellaria media*	2
Dandelion	*Taraxacum agg.*	2
Creeping thistle	*Cirsium arvense*	2
Habitat Classification as per the Irish Vegetation Classification (IVC)		*Holcus lanatus - Lolium perenne* (GL2C)
Annex 1 Affinity?	**No**	

Plate 6-1-1: Example of Improved agricultural grassland (GA1) at the location of Quadrat 1.

3.2 Quadrat 2 – Turbine 2 Location (04.08.2021)

Quadrat 2	Grid Reference: ITM X 619008.8 Y 747128.9	Date: 04.08.2021
Common Name	**Scientific Name**	**% Cover**
Perennial rye grass	*Lolium perenne*	40
Italian rye grass	*Lolium multiflorum*	40
White clover	*Trifolium repens*	5
Creeping buttercup	*Ranunculus repens*	2
Soft rush	*Juncus effusus*	10
Broad leaved dock	*Rumex obtusifolius*	5
Habitat Classification as per the Irish Vegetation Classification (IVC)		*Holcus lanatus - Lolium perenne* (GL2C)
Annex 1 Affinity?	**No**	

Plate 6-1-2: Example of Wet grassland (GS4) habitat present at the location of Quadrat 2

3.3 **Quadrat 3 - Turbine 3 Location (04.08.2021)**

Quadrat 3	Grid Reference: ITM X 618946 Y 746591	Date: 04.08.2021
Common name	**Scientific name**	**% Cover**
Perennial rye grass	*Lolium perenne*	50
Italian rye grass	*Lolium multiflorum*	40
White clover	*Trifolium repens*	5
Dandelion	*Taraxacum agg.*	2
Creeping thistle	*Cirsium arvense*	3
Habitat Classification as per the Irish Vegetation Classification (IVC)		*Lolium perenne - Trifolium repens* (GL2C)
Annex 1 Affinity?	**No**	

Plate 6-1-3: Example of Improved agricultural grassland (GA1) at the location of Quadrat 3

3.4 **Quadrat 4 - Turbine 4 Location (04.08.2021)**

Turbine 4 is proposed to be located within Conifer plantation (WD4) habitat dominated by Sitka spruce (*Picea sitchensis*). Rides within the forestry comprised wet grassland, with broadleaf (primary ash) lining the edges of the forestry trees.

Quadrat 4	Grid Reference: ITM X 618738 Y 746078	Date: 04.08.2021
Common name	Scientific name	% Cover
Sitka spuce	*Picea sitchensis*	70
Bare earth/ needle litter	-	20
Little shaggy moss	*Rhytidiadelphus loreus*	10
Horsetail	*Equisetum arvense*	2
Habitat Classification as per the Irish Vegetation Classification (IVC)		N/A
Annex 1 Affinity?	**No**	

Plate 6-1-4: Example of conifer plantation forestry (WD4) present at the location of Quadrat 4; very little ground flora was present.

3.5 Quadrat 5 - Turbine 5 Location (04.08.2021)

Quadrat 5	Grid Reference: ITM X 619624.4 Y 745854.1	Date: 04.08.2021
Common name	Scientific name	% Cover
Perennial rye grass	*Lolium perenne*	45
Italian rye grass	*Lolium multiflorum*	45
Creeping buttercup	*Ranunculus repens*	2
Curled dock	*Rumex crispus*	2
Broad-leaved dock	*Rumex obtusifolius*	1
Yorkshire fog	*Holcus lanatus*	0.5
Habitat Classification as per the Irish Vegetation Classification (IVC)		*Holcus lanatus - Lolium perenne* (GL2C)
Annex 1 Affinity?	No	

Plate 6-1-5: Example of Improved agricultural grassland (GA1) at the location of Quadrat 5.

3.6 Quadrat 6 – Turbine 6 Location (29.07.2021)

Quadrat 6	Grid reference: ITM X 620207.1 Y 745891.5	Date: 29.07.2021
Common name	**Scientific name**	**% Cover**
Perennial rye grass	*Lolium perenne*	30
Italian rye grass	*Lolium multiflorum*	30
White clover	*Trifolium repens*	20
Bare Earth	-	15
Broad-leaved dock	*Rumex obtusifolius*	5
Habitat Classification as per the Irish Vegetation Classification (IVC)		*Lolium perenne - Trifolium repens* (GL2C)
Annex 1 Affinity?	**No**	

Plate 6-1-6: Example of Improved agricultural grassland (GA1) at the location of Quadrat 6.

3.7 Quadrat 7 – Turbine 7 Location (29.07.2021)

Quadrat 7	Grid reference: ITM X 620868.7 Y 745734.5	Date: 29.07.2021
Common name	Scientific name	% Cover
Perennial rye grass	*Lolium perenne*	30
Italian rye grass	*Lolium multiflorum*	30
White clover	*Trifolium repens*	20
Bare earth	-	15
Broad-leaved dock	*Rumex obtusifolius*	5
Habitat Classification as per the Irish Vegetation Classification (IVC)		*Lolium perenne - Trifolium repens* (GL2C)
Annex 1 Affinity?	**No**	

Plate 6-1-7: Example of Improved agricultural grassland (GA1) at the location of Quadrat 7.

3.8   Quadrat 8 – Turbine 8 Location(29.07.2021)

Quadrat 1	Grid reference: ITM X 620067.1 Y 745330.1	Date: 29.07.2021
Common name	**Scientific name**	**% Cover**
Perennial rye grass	*Lolium perenne*	40
Italian rye grass	*Lolium multiflorum*	30
Meadow foxtail	*Alopecurus pratensis*	15
White clover	*Trifolium repens*	10
Broad-leaved dock	*Rumex obtusifolius*	1
Habitat Classification as per the Irish Vegetation Classification (IVC)		*Holcus lanatus - Lolium perenne* (GL2C)
Annex 1 Affinity?	**No**	

Plate 6-1-8: Example of Improved agricultural grassland (GA1) at the location of Quadrat 8.

3.9 **Quadrat 9 - Turbine 9 Location (29.07.2021)**

Quadrat 2	Grid reference: ITM X 620458.7 Y 745139.6	Date: 29.07.2021
Common name	Scientific name	**% Cover**
Perennial rye grass	*Lolium perenne*	40
Italian rye grass	*Lolium multiflorum*	40
Rough meadowgrass	*Poa trivialis*	10
White clover	*Trifolium repens*	5
Broad-leaved dock	*Rumex obtusifolius*	1
Creeping buttercup	*Ranunculus repens*	1
Common sorrel	*Rumex acetosa*	1
Habitat Classification as per the Irish Vegetation Classification (IVC)		*Holcus lanatus - Lolium perenne* (GL2C)
Annex 1 Affinity?	**No**	

Plate 6-1-9 Example of Improved agricultural grassland (GA1) at the location of Quadrat 9