



Outline Biodiversity Management Plan

Lissinagroagh Wind Farm

FutureEnergy Ireland

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Executive Summary

This Outline Biodiversity Management Plan (OBMP) sets out FutureEnergy Ireland's strategy to deliver all ecological compensation and enhancement measures required to address the predicted residual impacts of the proposed Lissinagroagh Wind Farm in County Leitrim. Prepared jointly by SLR Environmental Consulting (Ireland) Ltd and TOBIN, the plan provides a long-term, evidence-based framework to compensate for effects on the nationally important breeding hen harrier population, key upland and grassland habitats, marsh fritillary, bats, and linear landscape features such as hedgerows and treelines. The OBMP is designed to operate for the full 35-year lifespan of the wind farm. Following consent, the plan will be refined into a detailed Biodiversity Management Plan (BMP) in agreement with the planning authority and NPWS to address any specific requirements attached to the permission, ensuring the delivery of the committed biodiversity management actions and associated long-term benefits.

Hen harrier surveys undertaken between 2020 and 2025 confirm the presence of one to two breeding pairs in and around the site, with variable nesting success but consistent territorial use. As operational turbines have the potential to cause disturbance and effective displacement of both nesting and foraging birds, the OBMP adopts a precautionary approach by providing compensation sufficient for two breeding pairs. Central to this strategy is the establishment of two large Nesting Enhancement Areas (NEAs), totalling 54.15 hectares, located more than 750 metres from all turbines and positioned close to historical nesting locations. These areas will be created through the felling of low-yield conifer plantation and restoration of heather and scrub habitats known to support successful nesting in Ireland. Unlike the shifting suitability of commercial forestry, NEAs provide fixed, long-term nesting opportunities secured for the life of the Proposed Project.

To compensate for an estimated 140 hectares of foraging habitat predicted to be effectively lost through turbine-related displacement, the OBMP secures 164.25 hectares of enhancement lands across agricultural, peatland and mixed habitats, all situated within 2 kilometres of at least one NEA. Combined with the NEAs themselves, a total of 218.4 hectares will be managed to provide high-quality, structurally diverse foraging habitat. Habitat improvements will be delivered through tailored measures including revised grazing regimes, rush control, hedgerow restoration, scrub management, fertiliser reduction, peatland rewetting, and invasive species control. These actions draw on proven methodologies from national agri-environment schemes and the Hen Harrier Project, ensuring that enhancements are both deliverable and ecologically effective.

In addition to measures for hen harrier, the OBMP provides compensation for other important ecological features identified in the EIAR. This includes the restoration of 5.4 hectares of upland blanket bog and wet heath, management of 2 hectares of wet grassland to support marsh fritillary, planting of 4.9 hectares of mixed broadleaved woodland to replace bat foraging habitat lost within the wind farm site and turbine delivery route, and creation of 1.5 kilometres of new hedgerows and treelines. Many of these measures exceed a 1:1 restoration ratio, recognising the uncertainties inherent in habitat creation and the need to deliver net ecological benefit. Restoration targets are aligned with national Annex I habitat condition criteria and the species-specific requirements of marsh fritillary, ensuring that compensation is functionally equivalent to what is lost.

The OBMP also sets out clear roles and responsibilities for the developer, specialist ecological teams, landowners, and statutory consultees. Enhancement lands are secured through legal agreements, ensuring management control for the duration of the Proposed Project. A comprehensive monitoring programme, including breeding raptor surveys, vantage point observations, carcass searches, habitat condition assessments and regular Farm Plan audits, will track the success of all measures and enable adaptive management.



Where required, further mitigation such as turbine curtailment or automated detection-based shutdown systems may be implemented to avoid unexpected impacts.

Overall, the OBMP provides a robust, long-term and enforceable framework to ensure that the ecological effects of the Lissinagroagh Wind Farm are fully compensated and that significant biodiversity enhancements are delivered at a landscape scale. Its approach follows best-practice guidance, reflects current scientific evidence, and is supported by detailed landowner agreements and monitoring commitments that will be maintained throughout the operational life of the Proposed Project.

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1.0 Introduction

This outline biodiversity management plan (“OBMP”) has been prepared by SLR Environmental Consulting (Ireland) Ltd (“SLR”) and TOBIN on behalf of FutureEnergy Ireland (“FEI”) to support the delivery of all the compensation and enhancement measures referred to in the Biodiversity Chapter (Chapter 5) and Ornithology Chapter (Chapter 6) of the Lissinagroagh Wind Farm (hereafter “the Proposed Project”) Environmental Impact Assessment Report (“EIAR”).

The OBMP specifically covers proposed compensation and enhancement measures relating to the primary target species hen harrier *Circus cyaneus* as well as supporting habitats such as Upland blanket bog (PB2), Wet heath (HH3), and Wet grassland (GS4). In addition to supporting hen harrier, the restoration of the upland habitats will also compensate for likely significant effects on upland habitats consisting of: Upland blanket bog (PB2), Cutover bog (PB4), and Dry siliceous heath (HH1)/Dry humid acid grassland (GS3) mosaic. The management practices to be implemented within the enhancement lands will be of benefit to the secondary target species marsh fritillary *Euphydryas aurinia* to compensate for likely significant effects on this species.

Furthermore, the planting of native broadleaved woodland will compensate for the direct loss of habitat and provide alternative foraging habitat for bats compensating for likely significant effects on local bat populations. The planting of Hedgerows (WL1) and Treelines (WL2) will compensate for the direct loss of these habitats and improve connectivity within the landscape.

The OBMP represents a formal commitment by the Developer to implement these compensation measures in full. For details on wind farm layout, site characteristics, birds, habitats, protected species present, and predicted ecological and ornithological impacts reference should be made to the relevant sections of the EIAR for the Proposed Project.

1.1 Brief Description of the Site

The planning application site boundary (the “Site”) is situated in north County Leitrim between the villages of Kiltyclogher to the north, and Manorhamilton to the southwest. The Site is located in close proximity to the Northern Ireland border in County Fermanagh which is approximately 3 km to the north.

The land use within the Survey Area for the proposed Wind Farm Site is primarily Conifer Plantation (WD4) (609ha), with expanses of Wet grassland (GS4) (132ha) used for rough grazing livestock as well as limited Upland blanket bog (PB2) (39ha).

Coillte forestry within the Site comprises of different stages of coniferous plantation forestry including recent clear-fell, second rotation, immature, semi-mature and mature forestry. The Site ranges in elevation from 170 to 380 m AOD. The management of land for red grouse *Lagopus lagopus* occurs nearby but outside the Site boundary.

There are a number of watercourses within the Site. These range from naturally occurring upland streams to modified drainage channels within forested areas at mid to lower elevations. The southeastern part of the Site is characterised by a number of spate watercourses, the majority of which have existing crossings in place as part of the existing forest road network.

1.2 Brief Description of the Proposed Project

The Proposed Project will consist of the installation of 14 wind turbines, a 110kV on-site substation, new entrances and access roads, upgraded access roads, cabling, compound areas, borrow pits, turbine delivery route works and other associated works.



The overall project will also include a 110kV grid connection which will export electricity generated on-site via an underground cable to the existing 110kV substation ESNB Srananagh substation in Co. Sligo. This element of the Proposed Project is being progressed under a separate planning application to An Coimisiún Pleanála (“ACP”).

See Drawing 1 in Appendix A for further details.

1.3 Background

1.3.1 Hen Harrier

Bird surveys conducted between 2020 and 2025^{1,2,3,4,5,6,7} have consistently recorded the presence of 1-2 nesting hen harrier within the Site and/or the surrounding area. These comprised a ‘northern’ and a ‘southern’ pair, with the southern pair showing greater consistency of site use. In addition, a third pair was recorded approximately 1.5 – 1.8 km northeast of the Site boundary in 2021 and 2024. Historical, pre-2020 surveys recorded successful nesting attempts by the ‘southern’ pair in 2018 and 2019 also.

The southern pair attempted to nest annually between 2020 and 2025, using a corridor approximately 2.5 km in length and shifting nest locations within this area between 2021-2024. The southern pair has not nested within the proposed wind farm site boundary for the last four years of survey. In contrast, the northern pair nested only in 2021, 2024 and 2025, with nest sites located within a few hundred metres of each other in 2021 and 2024. The northern pair has not nested within the proposed wind farm site boundary for the last four years of survey. In 2025, no exact nesting locations were identified for either northern or southern pair.

Nesting success has varied: the southern pair successfully fledged chicks in four out of five years, with an average productivity of at least 2.67 chicks per year when breeding was successful, or 1.6 chicks per year when unsuccessful breeding attempts were taken into account. The northern pair, however, failed to rear chicks in all survey years.

A third, off-site pair outside the survey area had confirmed breeding success in 2021, fledging at least two chicks. However, they were likely disturbed in 2022, which appears to have prevented successful breeding in subsequent years. A nesting attempt in 2024 also appears to have failed. A possible nest was suspected to be off-site and outside the survey area in 2025 to the east.

The Ornithology Chapter of the EIAR provides a detailed assessment of potential impacts on hen harrier and concludes that breeding hen harriers are likely to be disturbed by the Proposed Project, leading to potential displacement from nesting and foraging areas and possibly resulting in the effective loss of the species from the site. In the absence of mitigation, disturbance is predicted to occur during both construction and operational phases, particularly due to the presence of operating wind turbines.

¹ MKO (2025). Lissinagroagh Wind Farm, Co. Leitrim. Winter Season 2020-2021. MKO, Galway, Ireland.

² MKO (2025). Lissinagroagh Wind Farm, Co. Leitrim. Breeding Season 2021. MKO, Galway, Ireland.

³ MKO (2023). Lissinagroagh Wind Farm, Co. Leitrim. Winter Bird Survey Report 2021/22. MKO, Galway, Ireland.

⁴ MKO (2023). Lissinagroagh Wind Farm, Co. Leitrim. Breeding Bird Survey Report 2022. MKO, Galway, Ireland.

⁵ MKO (2023). Lissinagroagh Wind Farm, Co. Leitrim. Breeding Bird Survey Report 2023. MKO, Galway, Ireland.

⁶ MKO (2025). Lissinagroagh Wind Farm, Co. Leitrim. Breeding Bird Survey Report 2024. MKO, Galway, Ireland.

⁷ MKO (2025). Lissinagroagh Wind Farm, Co. Leitrim. Breeding Bird Survey Report 2025. MKO, Galway, Ireland.



Current guidance⁸ recommends a disturbance-free buffer of up to 750 m around nesting sites to avoid impacts. Foraging birds may also be displaced, though typically at shorter distances. The situation is further complicated by the species' tendency to nest in young second-rotation forestry, which becomes unsuitable as canopy closure progresses. Without targeted management, nest locations are likely to shift over the lifetime of the wind farm, with nesting hen harrier potentially impacted by both forestry cycles and operating wind turbines.

Given that a single breeding pair of hen harrier is considered of national importance⁹, it is vital that appropriate mitigation and/or compensation measures are implemented to address potential impacts on this species.

1.3.2 Habitats and Secondary Target Species

Habitat surveys were conducted in 2020, 2021, 2024, and 2025 (EIAR Chapter 5 – Biodiversity, Table 5-2). Phase 1 habitat surveys were carried out within the Survey Area for the proposed Wind Farm Site and all habitats were classified according to Fossitt (2000) level 3. Phase 2 habitat surveys were carried out in upland habitats surrounding T3, T4 and T10 where four Annex I habitat types were identified. The Biodiversity Chapter of the EIAR provides a detailed descriptions of all habitats identified within the survey area of the proposed Wind Farm Site (EIAR Chapter 5 – Biodiversity, Section 5.4).

Appropriate compensation measures have been designed to off-set residual effects on important ecological features (IEFs), including habitats and species, as a result of the Proposed Project, and consist of the following (EIAR Chapter 5 – Biodiversity, Section 5.9):

- Management of 5.4ha of Upland blanket bog (PB2) and Wet heath (HH3) for biodiversity;
- Management of 2ha of Wet grassland (GS4) for marsh fritillary;
- Planting of 1.5km of Hedgerows (WL1)/Treelines (WL2) habitat for biodiversity; and
- Planting of 4.9ha of (Mixed) broadleaved woodland (WD1) to compensate for the loss of bat foraging habitat within the proposed Wind Farm Site and for the loss of habitat along the TDR.

1.4 Scope of this Document

The OBMP sets out the framework, including key aims, objectives and practical management measures that will be implemented, for the establishment and long-term management of land designated to compensate for residual adverse impacts on breeding hen harrier and other ecological features identified in the EIAR for the lifespan of the Proposed Project. The OBMP forms a commitment to deliver in full all mitigation and compensation measures set out in both chapters. For details on wind farm layout, site characteristics, birds, habitats, protected species present, and predicted ecological and ornithological impacts reference should be made to the relevant sections of the EIAR for the proposed project.

For hen harrier, in addition to compensation, several of the proposed measures are designed to deliver ecological enhancements. This includes the creation of additional nesting and foraging habitats beyond those previously available within the Site.

⁸ Goodship, N.M. and Furness, R.W. 2022. Disturbance Distances Review: An updated literature review of disturbance distances of selected bird species. A report from MacArthur Green to NatureScot.

⁹ Ruddock, M., Wilson-Parr, R., Lusby, J., Connolly, F., J. Bailey, & O'Toole, L. (2024). The 2022 National Survey of breeding Hen Harrier in Ireland. Report prepared by Irish Raptor Study Group (IRSG), BirdWatch Ireland (BWI), Golden Eagle Trust (GET) for National Parks & Wildlife Service (NPWS). Irish Wildlife Manuals, No. 147. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Ireland



Similarly, the delivery ecological enhancements will be achieved over the long-term for habitats and species where the hectareage of supporting habitat which will be restored under the OBMP exceeds that which is to be lost as a result of the Proposed Project.

The scale of the measures proposed is also expected to generate wider biodiversity benefits, including the potential for colonisation by other species such as passerines, which should be attracted to the improved habitats over time.

This document should be read in conjunction with Chapter 5 Biodiversity and Chapter 6 Ornithology of the EIAR, along with the associated technical appendices. Details regarding the wind farm layout, site characteristics, baseline ecological data, and predicted impacts are presented within the relevant EIAR sections.

This document relates to measures which are intended to be in place throughout wind farm operation, noting that some of the measures included will first be implemented prior to wind farm operation commencing. Mitigation measures to be implemented solely during wind farm construction are beyond the scope of this document and are addressed separately in the Construction Environmental Management Plan (“CEMP”).

This document constitutes an outline plan. A more detailed BMP will be prepared in agreement with the planning authority and NPWS to address any specific requirements attached to the permission guided by the principles and commitments set out herein.

1.5 Evidence of Technical Competence and Experience

The ornithological components of this report were written by Jonathon Dunn MCIEEM, PhD (Avian Ecology and Conservation), MA (Cantab.) (Natural Sciences – Zoology) and MSc (Ecology, Evolution and Conservation). Jonathon has extensive experience of designing and implementing baseline ecology surveys for over 20 wind farms in Ireland, along with impact assessment including EIAR, Ecological Impact Assessment (EclA), AA screening and NIS.

Technical review of the ornithological components of this report was undertaken by Duncan Watson CEnv MCIEEM. He has over 26 years of experience working on wind farm planning applications in the UK and Ireland, having worked on over 90 such projects.

The ecological components of this report were co-authored by Ciara Byrne and Sinead O’ Reilly. Meadhbh Costigan undertook the technical review of the biodiversity components of this report.

Ciara Byrne B.Sc. Wildlife biology, Ecologist with TOBIN. Ciara has three years consulting experience with Tobin. Ciara has authored AA screening, NIS, Invasive Species Management Plans (ISMP), Preliminary Ecological Assessment (PEA) and biodiversity chapters within Planning Environmental Considerations Report (PECRs).

Sinead O’ Reilly, M. Res., Senior Ecologist with TOBIN. She is a qualified and experienced environmental consultant with thirteen years’ post-graduate experience in freshwater sciences and environmental consultancy in Ireland. Sinead has a strong technical background as a freshwater ecologist and has extensive field experience in freshwater habitats and species across Ireland.

Meadhbh Costigan M.Sc. ACIEEM, Senior Ecologist with TOBIN. Meadhbh graduated from Trinity College Dublin with a B.A. (Hons) in Natural Science, reading Botany. She then received a M.Sc. in Botany from the University of Kent with training from the Royal Botanic Gardens, Kew. She has 5+ years’ experience in consulting, primarily engaged in the preparation of impact assessments and biodiversity chapters for the renewable energy sector. Her work focusses on the identification of Annex I habitat types and the assessment of habitat condition. She applies the information she gathers in the field to provide guidance to clients on avoiding and mitigating adverse effects on natural habitats of community importance. She is an Associate member of Chartered Institute of Ecology and



Environmental Management (ACIEEM) and is an elected member of the CIEEM Irish Section Committee.



2.0 Overall Approach to the Development of Compensation and Enhancement Proposals

2.1 The Mitigation Hierarchy

A structured, step-by-step approach known as the ‘mitigation hierarchy’ has been implemented throughout the EIA process to avoid, reduce, and compensate for potential negative impacts on biodiversity resulting from the Proposed Project. This process is described further in the Biodiversity and Ornithology EIAR chapters and illustrated in Figure 1 below.

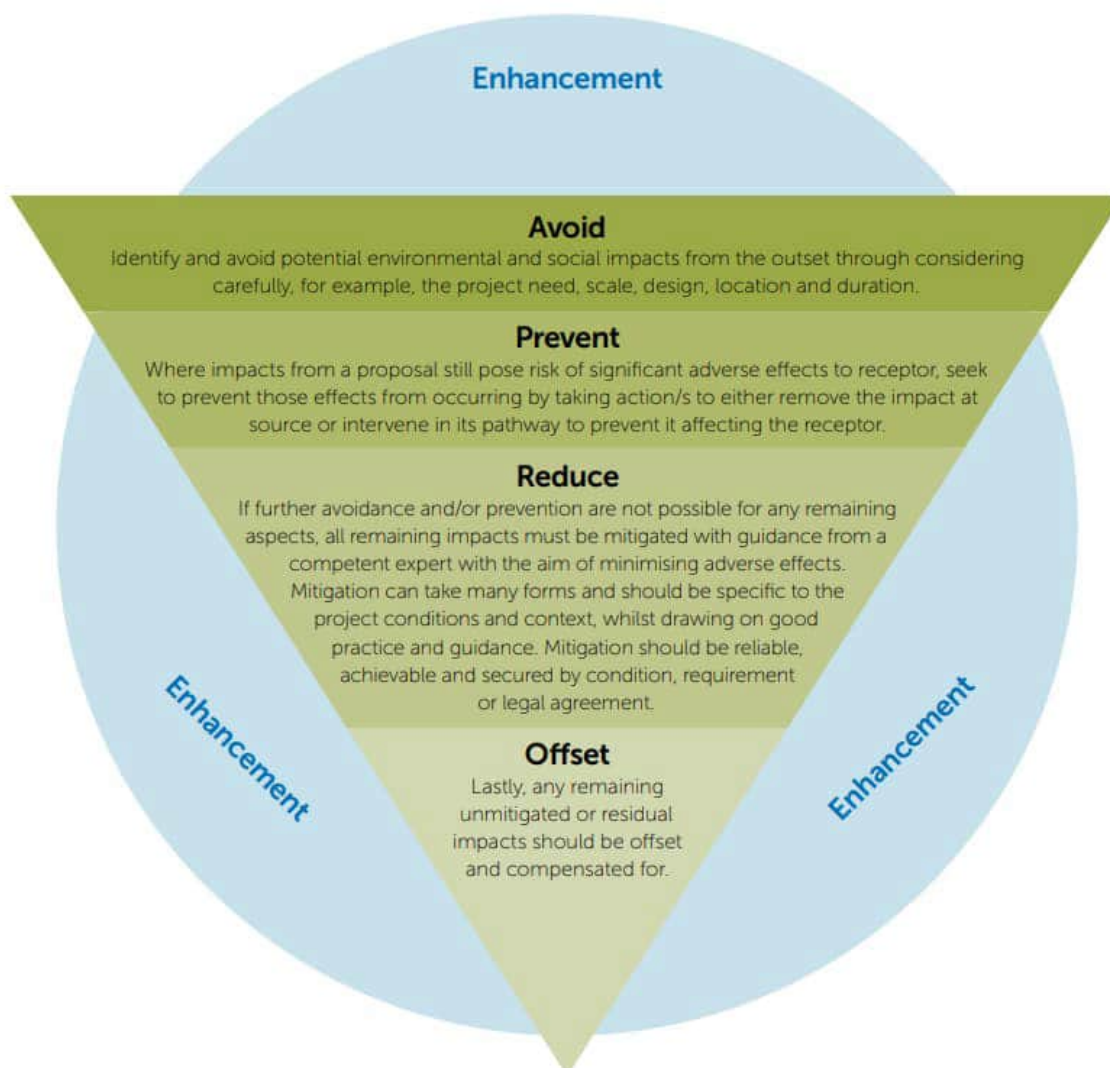


Figure 2-1: The Mitigation Hierarchy¹⁰

The mitigation hierarchy has guided the Proposed Project’s design from the outset, with the primary aim of avoiding significant ecological effects wherever possible. Where avoidance was not feasible, efforts were made to minimise impacts through careful planning and design

¹⁰ Figure reproduced from Beadle, Burgess, Callaghan, Howard, Knott, Riley, Walker et al. (2024) Institute of Environmental Management and Assessment (IEMA) Guidelines: Implementing the Mitigation Hierarchy from Concept to Construction



and the implementation of mitigation measures. In cases where significant effects remain, they will be offset or compensated, in accordance with the principles outlined in Figure 1. Avoidance and mitigation measures are described in the relevant EIAR chapters and the CEMP and are not repeated here. The purpose of this document is to provide details of the proposed compensation measures and additional enhancements and how they will be implemented and monitored to offset any identified likely significant effects on biodiversity as a result of the Proposed Project.

According to Chartered Institute of Ecology and Environmental Management (CIEEM) guidance, the distinction between mitigation and compensation is that mitigation avoids or reduces the occurrence of negative impacts and effects, whereas compensation addresses effects which are residual, after avoidance and mitigation have been considered¹¹.

CIEEM guidance further states (emphasis added):

*“Compensation describes measures taken to offset residual effects resulting in the loss of, or permanent damage to, ecological features despite mitigation. **For example, it may take the form of replacement habitat or improvements to existing habitats.** Compensation can be provided either within or outside the Site (defined by the red line of a planning application). Compensation should always be seen as a last resort, when all other mitigation options have been exhausted”.*

The approaches to providing compensation and enhancement are described below, firstly for hen harrier and then for habitats and secondary target species.

2.2 Hen Harrier

2.2.1 Overview

The overall approach to providing compensation and enhancement is based on the creation and management of suitable nesting and foraging habitat for hen harrier located away from proposed turbine locations that remains suitable for the long-term and is not subject to change in response to forestry management cycles, thus providing a benefit compared with the existing baseline situation.

It is assumed management measures need to compensate for loss of nesting and foraging habitat for two pairs of hen harrier. This is because over the last five years of survey, a maximum of two pairs has been recorded breeding within the Site (see Section 1.3). It is acknowledged that in some survey years, only a single pair has been recorded and that one or both pairs may not necessarily be ‘lost’ due to the Proposed Project; therefore, providing compensation for two pairs represents a precautionary approach.

Details on territories such as the number of territories and the sizes of territories have been provided in Appendix 6.12 of the accompanying EIAR.

To maximise the chance of success of the proposed management measures, there is a need to provide sufficient foraging and nesting habitat to support at least two pairs of hen harrier. As such, two separate nesting areas will be managed, with multiple options provided for foraging birds.

This approach was developed including consideration of the following key principles, and the recommendations made in the latest ‘2022 National Survey of breeding Hen Harrier in Ireland’ report⁹ and information provided in the ‘Hen Harrier Threat Response Plan 2024-

¹¹ CIEEM (2018). Guidelines for Ecological Impact Assessment in the UK and Ireland. Terrestrial, Freshwater, Coastal and Marine. Version 1.3 updated September 2024. Chartered Institute of Ecology and Environmental Management



2028¹² including its cross-sector actions and enabling measures (including emphasis on landowner incentives and agri-environment approaches). The strategy also drew on precedent and learning from planning processes for recent, comparable wind projects where breeding hen harrier were present. These included: Booltiagh Wind Farm¹³, Cahermurphy Wind Farm¹⁴, Carrownagowan Wind Farm¹⁵, Knockshanvo Wind Farm¹⁶ and Taurbeg Wind Farm¹⁷.

The approach considered the following:

- Extent – the extent of the enhancement areas needs to be sufficient to compensate adequately for nesting and foraging habitats that will be lost. A 1:1 ratio of compensation land to habitat lost may not always be appropriate, depending on the quality of what is being proposed to what will be lost;
- Location – compensation habitats need to be located in a way that maximises the chances that they will be used by hen harriers and reduces their potential for disturbance from operating wind turbines;
- Habitat type – habitat types proposed for enhancement must be proven to be used by nesting and foraging hen harrier as shown in the scientific literature and by field survey at the Site;
- Additionality – habitat enhancement plans need to demonstrate clearly that what is proposed provides additional habitat to what is already present;
- Deliverability – habitat enhancement plans must be demonstrated to be deliverable and that any necessary landowner agreements are in place; and
- Establishment time – most habitats will take time to establish to a level at which they are suitable for foraging and nesting hen harrier. In some cases, this can take several years. To provide adequate compensation for lost habitats, compensation areas need to be available for hen harriers at the time that the existing habitats are lost (i.e. commencement of wind farm operation in the case of habitats indirectly lost due to turbine displacement).

There are differences between the lands required for nesting and foraging harriers, and different sized disturbance-free buffers are also required. However, there are also links between nesting and foraging habitats, which we have incorporated into our approach.

This is expanded upon in the sections below, with reference made to key management principles and the local breeding hen harrier population.

2.2.2 Nesting Habitat

2.2.2.1 Nesting Requirements for Hen Harrier in Ireland and at the Site

Research has shown that nesting hen harrier require dense vegetation cover for nesting, and that in Ireland, hen harrier will nest in the pre-thicket stage of first (and particularly) second rotation conifer plantations, upland heath and scrub habitats⁹. While most breeding

¹² NPWS (2024). Hen Harrier Threat Response Plan 2024-2028. Prepared by National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Department of Agriculture, Food and the Marine, and Department of Environment, Climate and Communications. Government of Ireland.

¹³ ACP Ref ABP-03-120616 (original permission) and Clare County Council Ref P23/328 (extension to life)

¹⁴ ACP Ref ABP-311044-21

¹⁵ ACP Ref ABP-308799-20

¹⁶ ACP Ref ABP-320705-24

¹⁷ Cork County Council Ref 25/05406



pairs nest in second rotation forest⁹, it is thought that this is largely due to the relative lack of suitable heath and scrub habitats, which are likely to be preferred if good quality habitat was more widely available¹⁸.

Fragmented areas for nesting result in an ecological trap (i.e. leads to a negative effect on breeding success and productivity)¹⁹; therefore, breeding hen harrier are more successful and productive when using homogenous blocks of suitable nesting and foraging areas, with fewer isolated patches of high edge / small area habitats.

MKO surveys²⁰ showed that hen harriers at the Site have typically nested in small patches of heather, surrounded by a mosaic of scrub and forestry, often in proximity to local roads or forestry tracks, and in one instance, not far from a dwelling house. These locations are unlikely to be optimal and likely reflect limited availability of suitable nesting habitat.

2.2.2.2 Disturbance-Free Buffers from Nesting Areas

Size of Buffer

Goodship and Furness (2022)⁸ provide best-practice guidance for assessing disturbance to birds in the context of onshore wind farms in the UK and Ireland. They state that while hen harrier may nest as close as 200 to 300 m from operational turbines²¹, a precautionary buffer of 300-750 m should be applied during the breeding season to minimise disturbance.

The guidance also highlights that the buffer size should be informed by the level of habituation to disturbance. Specifically:

“A buffer zone at the lower end of this range may be sufficient to protect individuals that have some habituation to disturbance. For activities with a high potential for visual and audial disturbance (e.g. forestry operations), a larger buffer zone between 500 – 1,000 m may be necessary during the breeding period”.

Construction and, to a lesser extent, decommissioning activities are considered more disruptive than turbine operation due to increased human presence, vehicle movement, and forestry clearance required for infrastructure development. As such, the most precautionary approach is to apply the upper end of the recommended buffer range during these phases. A 1 km buffer is therefore considered appropriate during construction and decommissioning; see EIAR Chapter 6 and the CEMP appended to the EIAR.

Goodship and Furness (2022) further advise:

“Therefore, the upper limit of the disturbance buffer should be used unless it can be demonstrated that a lower buffer is sufficient. This is intended to provide a precautionary approach; however, it is noted that in certain circumstances lower buffers will be appropriate. Factors influencing whether a lower buffer would be considered sufficient include, but are not limited to, type of disturbing activity, duration, topography and known levels of habituation. We also recognise the importance of incorporating site-specific factors into our consideration when applying buffers.”

At Lissinagroagh, the Site and surrounding landscape are intersected by a network of roads and subject to ongoing forestry, agricultural operations and red grouse management.

¹⁸ Marc Ruddock, pers. comm.

¹⁹ Sheridan, K., Monaghan, J., Tierney, T.D., Doyle, S., Tweney, C., Redpath, S.M. and McMahon, B.J., 2020. The influence of habitat edge on a ground nesting bird species: hen harrier *Circus cyaneus*. *Wildlife Biology*, 2020(2), pp.1-10.

²⁰ Andrew O'Donoghue, pers. comm.

²¹ For example, as demonstrated by Madders, M. and Whitfield, D. P. (2006). Upland raptors and the assessment of wind farm impacts. *Ibis* 148: 43-56



Notably, the southern hen harrier pair has been recorded nesting within 5–10 m of local roads, suggesting a degree of habituation to regular disturbance. Additionally, many historical nest sites have been naturally screened by topography and vegetation, which likely helped reduce the impact of nearby activity.

The findings of the Irish Windharrier project²² also provide important context. A key publication from this project (Fernandez-Bellon *et al.*, 2015)²³ analysed breeding performance at 84 nest sites located at varying distances from wind farms. No statistically significant relationships were found between breeding parameters and distance to the nearest wind turbine; however, non-statistically significant lower nest success rates were observed within 1 km of wind turbines. The authors stated that this putative relationship may be wholly or partly due to the influence of landscape elements, which may be linked to wind farm development (e.g. changes in land use following construction), or it could be due to other unrelated practices (e.g. agricultural intensification, afforestation or peat extraction). The Fernandez-Bellon *et al.* study did not specifically examine disturbance to nesting hen harrier and while it is acknowledged that disturbance to nesting hen harrier could potentially have contributed towards lower nest success rates, it is likely to have been just one of many different factors responsible.

Taken together, these findings suggest that there is no conclusive evidence of disturbance to nesting hen harriers up to 1 km from operational turbines, and so the maximum buffer distances recommended by Goodship and Furness (2022), i.e. 750 m, represent a conservative and precautionary approach.

Accordingly, a 750 m disturbance-free buffer from operational turbines has been applied to the identification of proposed nesting areas in the preparation of this OBMP.

What to Buffer

A common approach to minimising disturbance to nesting hen harrier by operational turbines is to apply a 750 m buffer around current and historical nest locations, with infrastructure designed to avoid these areas. However, this method is not considered suitable for this Project for two key reasons.

1. **Nest Site Variability:** Survey data indicate that hen harrier do not consistently nest in the same location each year within the Site. This is especially true for the southern pair, which have nested or attempted to nest within a corridor approximately 2.5 km in length over the period 2020-2024. This variability makes it impractical and inappropriate to apply static buffers around previous nest sites; and
2. **Dynamic Forestry Landscape:** Much of the Site comprises commercial agroforestry, where habitat suitability for nesting hen harrier fluctuates over time due to forestry cycles. As areas transition through different stages of growth, their suitability for nesting changes, likely contributing to the observed variation in nest site selection by the southern pair. This also makes it inappropriate to apply buffers to previous nest sites, which are likely to become unsuitable within a few years (if not unsuitable already in some cases).

To address these challenges, two dedicated Nesting Enhancement Areas (“NEAs”) will be established and managed throughout the lifespan of the Proposed Project. These NEAs have been strategically located at least 750 m from all proposed turbine locations and

²² Wilson, M., Fernández-Bellon, D., Irwin, S. & O'Halloran, J. (2015) The interactions between Hen Harriers and wind turbines: WINDHARRIER - Final Project Report. School of Biological Earth & Environmental Sciences (BEES), University College Cork

²³ Fernández-Bellon, D., Irwin, S., Wilson, M. and O'Halloran, M. (2015) Reproductive output of Hen Harriers *Circus cyaneus* in relation to wind turbine proximity. *Irish Birds*, 10(2), pp.143-150.



positioned near known nest sites to maximise the likelihood of uptake by breeding hen harrier.

While the NEAs are not 750 m from all other project components such as borrow pits, substations, the meteorological mast, or access roads, this is considered acceptable for the following reasons:

- **Turbines as Primary Disturbance Source:** Wind turbines are expected to be the most significant source of disturbance during the operational phase;
- **Temporary Infrastructure:** Borrow pits and construction compounds will only be present during the construction phase and will be removed and restored thereafter;
- **Low-Impact Infrastructure:** Substations and other permanent infrastructure are low-profile, stationary features that will be largely screened from the NEAs by existing topography and forestry; and
- **Evidence of Habituation:** Observations made during the suite of bird surveys suggest that the southern hen harrier pair have habituated to certain levels of disturbance to some extent, with nests recorded as close as 5–10 m from local roads.

This targeted and flexible approach to buffer design and habitat enhancement reflects both best-practice guidance and site-specific ecological conditions, ensuring that compensation measures are both precautionary and practical.

Nesting Enhancement Areas

Hen harriers do not require very large areas to nest in as the nests themselves are small (the immediate nest-site footprint including the nest platform and surrounding trampled vegetation typically occupies only a few square metres^{24,25,26,27}); however, it is important to provide them with several options for nesting to maximise the chances of the Site supporting at least two pairs, which could otherwise potentially be lost because of the Proposed Project.

To this end, two folios of land that are currently low yield forestry coupes managed by Coillte will be created into NEAs and shown in Drawing 2, Appendix A. The areas of the two NEAs are 18.3 ha and 35.85 ha for the northern and southern NEAs respectively, giving a combined total of 54.15 ha. These are located 500 m and 375 m away from previous nesting locations used by the northern and southern pairs respectively, to maximise the chance of uptake by existing pairs.

Furthermore, the NEA areas were also selected due to their topographical and hydrological features, which have been shown to be associated with choice of hen harrier nesting habitat in the scientific literature, again, maximising the chance of uptake. For example, hen harrier nests are typically located on moderate slopes (0-10°), with some preference for north- or east-facing slopes^{26,27}. Both NEAs are located on flat to moderate slopes and face north, or northeast.

The creation of the NEAs will involve felling of forestry habitats and creating new heather and scrub habitats, comprising predominantly heather habitats with small patches of scrub

²⁴ Amar, A. & Redpath, S.M. (2002) Determining the cause of individual differences in nest success: design and analysis of a long-term hen harrier study. *Ibis*, 144(1), pp.14–26.

²⁵ Arroyo, B.E., Leckie, F.M., Amar, A., McCluskie, A., & Redpath, S.M. (2009) Habitat use and range management effects on breeding success of hen harriers on Langholm Moor: conservation implications. *Animal Conservation*, 12(3), pp.283–292.

²⁶ Picozzi, N. (1980) Food, growth and survival of nestling Hen Harriers *Circus cyaneus* in Orkney. *Journal of Animal Ecology*, 49(2), pp.697–706.

²⁷ Watson, D. (1977) *The Hen Harrier*. Berkhamsted: T. & A.D. Poyser.



interspersed as a mosaic. These target habitats were chosen because of known suitability for nesting hen harrier in Ireland and based on evidence from surveys at the Site (see Section 2.2.2.1).

A key benefit to the use of dedicated NEAs is that they can be readily managed *in situ* over the lifespan of the Proposed Project. This avoids the issue of suitable nesting habitat moving around the Site as forest coupes are felled, restocked and subsequently reach canopy closure, which would make it impossible to maintain a 750 m buffer for the lifespan of the Proposed Project. Provision of heath and scrub habitats would also have other biodiversity benefits, which would not be achieved via provision of young rotation forestry. For example, this would involve enhancing habitats for other avian species, especially those that prefer open moorland habitats.

The maintenance of NEAs over the lifespan of the Proposed Project provides a long-term ecological benefit that would not occur if the Proposed Project did not proceed.

Disturbance to breeding hen harrier will be avoided through adherence to existing DAFM restrictions²⁸, which preclude forestry operations within 1.2 km of known nest locations during the breeding season (1 March–15 August). Coillte implements these measures as standard practice.

The use of the NEAs is grounded in evidence from Ireland that demonstrates that hen harrier nest distribution responds to the availability of suitable nesting habitat at the landscape scale. For example, national survey analyses have shown strong selection for, and a positive relationship between nest numbers and the extent of, suitable early-stage plantation habitats, indicating that breeding hen harrier can establish nests in newly available suitable habitat where it occurs²⁹. This responsiveness underpins the rationale for creating fixed, high-quality nesting opportunities in locations that are protected from turbine-related disturbance. The strategy aligns with national conservation objectives and best-practice guidance, and its implementation will be secured through planning conditions and formal agreements with landowners for the operational lifespan of the wind farm, anticipated to be 35 years. As such the likelihood of success for the proposed compensatory measures is high.

Furthermore, the NEA lands were also selected because their existing ecological, hydrological and topographical conditions are highly conducive to successful conversion from commercial forestry to a stable heath/scrub mosaic. These open-habitat systems typically establish most readily on soils that retain moisture, have low nutrient status, and contain remnant bog/heath seedbanks. Given that the NEAs located in areas that are currently low yield conifer plantation planted over peat habitats (i.e. are acidic with low nutrient status), with multiple watercourses in the area (i.e. a wet area) and are adjacent to or in proximity to existing heath and bog habitats (i.e. remnant seedbanks likely), the conditions for successful habitat conversion are high. Thus, once forestry is removed, the ground is predisposed to natural re-establishment of heather, bilberry, rush and sedge without requiring intensive intervention, confirming that the NEAs are not low-value or marginal lands but areas with a high predicted probability of successful conversion.

More generally, the use of habitat restoration and long-term management as compensation for residual ecological effects is an established principle in European nature conservation law and guidance, provided that compensatory measures are targeted, technically feasible,

²⁸ Coillte. (2024). Coillte Forest Birds Report. Coillte

²⁹ Wilson, M., Gittings, T., O'Halloran, J., Kelly, T. and Pithon, J. (2006). The distribution of Hen Harriers in Ireland in relation to land use cover, particularly forest cover. COFORD, Dublin



secured for the long term, and designed with appropriate timing and monitoring to maintain ecological coherence³⁰.

2.2.3 Foraging Habitat

A detailed review and assessment of hen harrier foraging habitat requirements in Ireland and at the Proposed Project is provided in EIAR Appendix 6-12 (Hen Harrier Foraging Loss Report) with key findings summarised below.

2.2.3.1 Foraging Requirements for Breeding Hen Harrier

Successful breeding is closely linked to the availability of optimal foraging habitats that support abundant prey such as small mammals and birds³¹. Hen harriers favour areas with sufficient vegetation cover to support prey populations, but not so dense as to hinder prey capture. Typical habitats include moorland, rough grassland, bogs, and rush-dominated pastures with varied sward structure.

2.2.3.2 Assessing Indirect Loss of Hen Harrier Foraging Habitat

Although some studies have reported non-statistical reductions in breeding success within 1 km of wind turbines in Ireland²³, Pearce-Higgins et al. (2009)³² remains the only study to demonstrate statistically significant displacement effects on foraging hen harriers. As elaborated on in Appendix 6.12 in the EIAR, this research supports the use of a 250 m displacement buffer for assessing habitat loss due to turbine presence in the current Project.

Habitat suitability for foraging hen harrier within the Proposed Project area was evaluated through a combination of literature review and field-based mapping. Details of the mapping are described in the EIAR Biodiversity Chapter.

Habitats currently within 250 m of proposed turbine locations were categorised as either potentially suitable or unsuitable for foraging, with further classification into 'higher' and 'lower' suitability, with definitions provided in Appendix 6-12 in the accompanying EIAR. Closed-canopy forestry was generally considered unsuitable, while open habitats such as blanket bog and wet grassland were deemed suitable to varying extents.

Initial estimates suggest that 109 ha of currently suitable habitat may be lost due to displacement. When future forestry cycles are considered, acknowledging that some currently unsuitable areas may become suitable over time, the estimated loss increases to an average of 140 ha over the lifetime of the Proposed Project. This figure reflects 76 ha of higher suitability habitat and 64 ha of lower suitability habitat.

Further analysis explored the functional use of these habitats by foraging hen harriers. However, the difference in habitat loss estimates when factoring in functional usage was found to be minimal. Therefore, the habitat suitability-based assessment remains the most robust and precautionary approach.

³⁰ European Commission (2012). Guidance document on Article 6(4) of the 'Habitats Directive' 92/43/EEC. Clarification of the concepts of: alternative solutions, imperative reasons of overriding public interest, compensatory measures, overall coherence, opinions of the commission; European Commission (2021). Official Journal C 437/2021; Hoorick, G. (2014). Compensatory measures in European nature conservation law. Utrecht Law Review.

³¹ McClure, C. J. W., Westrip, J.R.S., Johnson J. A., Schulwitz, S.E., Virani M.Z., Davies R., Symes A., Wheatley H., Thorstrom R., Amar A. & Buij R., (2018). State of the world's raptors: Distributions, threats, and conservation recommendations. *Biological Conservation* 227: 390– 402

³² Pearce-Higgins, J.W., Stephen, L., Langston, R.H.W., Bainbridge, I.P. and Bullman, R. (2009), The distribution of breeding birds around upland wind farms. *Journal of Applied Ecology*, 46: 1323-1331. <https://doi.org/10.1111/j.1365-2664.2009.01715.x>



The total effective loss of foraging habitat due to displacement, over the lifetime of the Proposed Project, is estimated at 140 ha. This figure underpins the compensatory measures proposed. Management measures at proposed enhancement lands have been designed to reflect the proportional loss of higher (c.76 ha) and lower (c.64 ha) suitability areas.

2.2.3.3 Foraging Enhancement Lands

To offset the loss of foraging habitats, three peatland / farmland folios totalling 164.25 ha will be enhanced for foraging hen harrier, as shown in Drawing 3, Appendix A. This will offset the loss of 140 ha of foraging habitats over the lifespan of the Proposed Project and could enhance the overall area for foraging hen harrier. These enhancement lands are located within 2 km (and in most cases, they are much closer) of any single NEA, increasing the likelihood of uptake by breeding pairs once NEAs are established (see Section 2.2.4). Additionally, the NEAs themselves will serve as supplementary foraging habitats (see Section 3.4.0 below for further details), further increasing the total area of foraging enhancement lands to 218.4 ha.

Improvement of the habitats selected will increase their suitability for foraging hen harrier and provide a greater quality foraging resource. The overarching goal is to enhance prey availability in the foraging enhancement lands using proven management techniques from the hen harrier project³³, farming organisations³⁴ and other agri-environmental schemes in Ireland. This approach is aligned with the policy direction of national hen harrier conservation delivery¹², which explicitly recognises that outcomes for hen harrier depend on supporting and incentivising landowners to manage habitat appropriately. The Hen Harrier Project (2017–2023) further demonstrates that, where farmers are supported and incentivised through results-based approaches, measurable habitat improvements can be delivered at scale, providing an evidence-backed model for habitat management as a conservation mechanism for hen harrier and associated upland biodiversity³⁵.

Importantly, the proposed foraging enhancement habitats will be available for the long term and are not reliant on forestry felling cycles or subject to changing farming practices. This provides a long-term ecological benefit that would not occur if the Proposed Project did not proceed and would enhance habitats for other avian species.

Selection of Foraging Enhancement Lands

The selection of compensatory lands was implemented as follows. First, a desk-based review of available maps and aerial photography was conducted in conjunction with the land agent, project manager and other members of the FEI project team. Second, a habitat mapping exercise was undertaken for areas of potentially suitable land identified during the first stage by Tobin and Bird Surveyors Ltd (overseen by Dr Marc Ruddock) ecologists (full details on survey methodologies and folios surveyed by each survey team are given in Appendix B and Appendix C).

The desk-based exercise focused on identifying lands that are either not currently suitable for foraging hen harrier, such as improved agricultural grasslands or habitat that is suitable for foraging hen harrier but is currently degraded and capable of being enhanced for hen harrier through simple changes in current land management practices as recognised in the Conservation Objectives Supporting Document for Breeding Hen Harrier³⁶. Only lands >250

³³ Hen Harrier Project website <http://www.henharrierproject.ie/> [last accessed 12 September 2025]

³⁴ Farming for Nature <https://www.farmingfornature.ie/> [last accessed 12 September 2025]

³⁵ Sullivan and Monaghan (2023). Hen Harrier Project Final Report (2017-2023). Hen Harrier Project Ltd.

³⁶ NPWS (2022). Conservation Objectives Supporting Document: Breeding Hen Harrier. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage.



m from any proposed turbine locations and <2 km from NEAs were considered to maximise the chance of usage by breeding hen harrier.

The field surveys involved providing baseline data on habitats to establish the opportunities for habitat and landscape management for foraging hen harrier. Full details of the habitat survey results are given in Appendix B and Appendix C.

Current Land Use within Foraging Enhancement Lands

The proposed foraging enhancement lands are currently predominantly used for agriculture and forestry and are summarised below.

Folio 38 (Drawing 3, Appendix A) in the south was typically associated with agriculture comprising fields that were of uniform sward heights owing to either cattle grazing or grass cutting. Many had evidence of cultivation e.g. slurry spreading. Rush density was typically low. Where wet grasslands were present, rush density was often higher and subject to less intense grazing. Low numbers of hen harrier prey species such as meadow pipits *Anthus pratensis* were present in such grasslands. Many of the associated hedgerows were 'gappy'.

To the north in Folio 28, the habitats typically comprised peatland habitats. In some areas, Sitka spruce *Picea sitchensis* had invaded and evidence of past turf cutting was present. No signs of agricultural management or burning were present. Low intensity grazing by sheep and deer was evident. Displaying prey species such as skylark *Alauda arvensis* and meadow pipits were present throughout.

The largest folio is Folio 13 to the northeast of the Site. This folio is bordered by extensive commercial conifer plantations and includes a mix of habitats. The eastern area consists of semi-improved wet grasslands and poor fen, grazed by cattle and partly used for silage/hay, with unmanaged hedgerows and two streams feeding into the Straduffly River. The western half is upland blanket bog, previously cut for peat and grazed by sheep, with heathland, scrub, and bracken *Pteridium aquilinum* along the river valley. Minor roads provide access throughout. Non-native rhododendron *Rhododendron ponticum*, snowberry *Symphoricarpos albus* and fuchsia *Fuchsia magellanica* are all present.

A breakdown of the size and habitats currently present for each folio is provided below in Table 2-1 with full details provided in Appendix B and Appendix C. The current and potential future suitability of the habitats for foraging hen harrier has been assessed with further explanation on the suitability categorisations given in Appendix 6.12 in the accompanying EIAR. The current habitat suitability categorisation is based both on habitat type and results from the field survey, with habitat features that are sub-optimal highlighted.

In summary, of the total 164.25 ha of foraging enhancement lands, 0 ha, 153.49 ha and 10.76 ha are made up of habitat types that are currently of higher, lower and no suitability for foraging hen harrier.

Following enhancement, there should be 153.49 ha, 1.04 ha and 9.72 ha of habitat types of higher, lower and no suitability for foraging hen harrier.

This will offset c.76 ha and c.64 ha of higher and lower suitability habitat due to be lost due to the Proposed Project, demonstrating that these managed habitats will provide better quality foraging habitat than most of that which will be effectively lost.



Table 2-1: Details of Foraging Enhancement Lands

Folio Number	Fossitt Habitat Type (Code)	Dimensions (area in ha or length in m)	Currently Suitable (Yes / No)	Current Suitability Category (None, Lower, Higher)	Justification for Current Categorisation	Sub-Optimal Habitat Features	Potential to be Suitable in Future Following Enhancement (Yes / No)	Potential Future Suitability (None, Lower, Higher)
28	Conifer plantation (WD4)	6.4 ha	No	None	Closed habitat type	<ul style="list-style-type: none"> Closed habitat type 	No	None (forestry in this folio is excluded from the OBMP))
	Wet grassland (GS4)	9.18 ha	Yes	Lower	Some level of use	<ul style="list-style-type: none"> Sitka spruce invading Grazing by sheep or deer 	Yes	Higher
	Wet heath (HH3)	23.6 ha	Yes	Lower	Preferred habitat type but currently sub-optimal	<ul style="list-style-type: none"> Sitka spruce invading Grazing by sheep or deer Evidence of past turf cutting 	Yes	Higher
	Buildings and artificial surfaces (BL3)	0.15 ha	No	None	Artificial habitat type	<ul style="list-style-type: none"> Artificial habitat type 	No	None
	Eroding / upland rivers (FW1)	2,341 m	Yes	Lower	Provides habitat for occasional amphibian prey	<ul style="list-style-type: none"> None 	No	Lower
38	Buildings and artificial surfaces (BL3)	0.64 ha	No	None	Artificial habitat type	<ul style="list-style-type: none"> Artificial habitat type 	No	None



Folio Number	Fossitt Habitat Type (Code)	Dimensions (area in ha or length in m)	Currently Suitable (Yes / No)	Current Suitability Category (None, Lower, Higher)	Justification for Current Categorisation	Sub-Optimal Habitat Features	Potential to be Suitable in Future Following Enhancement (Yes / No)	Potential Future Suitability (None, Lower, Higher)
	(Mixed) conifer woodland (WD3)	0.08 ha	No	None	Closed habitat type	<ul style="list-style-type: none"> Closed habitat type 	No	None
	Oak-ash-hazel woodland (WN2)	0.38 ha	No	None	Closed habitat type	<ul style="list-style-type: none"> Closed habitat type 	No	None
	Scrub (WS1)	2.97 ha	Yes	Lower	Preferred habitat type but currently sub-optimal	<ul style="list-style-type: none"> Very dense 	Yes	Higher
	Wet grassland (GS4)	14.45 ha	Yes	Lower	Some level of use	<ul style="list-style-type: none"> Some areas had soft rush density >70% Some encroachment of scrub and hedgerow in areas Poaching from livestock Grazing by cattle in summer Leaked animal waste from nearby pig farm 	Yes	Higher



Folio Number	Fossitt Habitat Type (Code)	Dimensions (area in ha or length in m)	Currently Suitable (Yes / No)	Current Suitability Category (None, Lower, Higher)	Justification for Current Categorisation	Sub-Optimal Habitat Features	Potential to be Suitable in Future Following Enhancement (Yes / No)	Potential Future Suitability (None, Lower, Higher)
	Treelines (WL2)	613 m	Yes	Lower	Effectively an escaped hedgerow which is a preferred habitat type; not closed canopy	<ul style="list-style-type: none"> None 	No	None
	Hedgerows (WL1)	1,477 m	Yes	Lower	Preferred habitat type but currently sub-optimal	<ul style="list-style-type: none"> Unmanaged and gappy Some less than 3 m wide Generally, not stockproof 	Yes	Higher
	Drainage ditches (FW4)	99 m	Yes	Lower	Provides habitat for occasional amphibian prey	<ul style="list-style-type: none"> None 	No	Lower
13	Upland blanket bog (PB2)	14.01 ha	Yes	Lower	Preferred habitat type but currently sub-optimal	<ul style="list-style-type: none"> Some self-seeded Sitka spruce and rhododendron invading 	Yes	Higher
	Cutover bog (PB4) and mosaics	33.33 ha	Yes	Lower	Some level of use	<ul style="list-style-type: none"> Heavily disturbed Heavily grazed by sheep 	Yes	Higher



Folio Number	Fossitt Habitat Type (Code)	Dimensions (area in ha or length in m)	Currently Suitable (Yes / No)	Current Suitability Category (None, Lower, Higher)	Justification for Current Categorisation	Sub-Optimal Habitat Features	Potential to be Suitable in Future Following Enhancement (Yes / No)	Potential Future Suitability (None, Lower, Higher)
						<ul style="list-style-type: none"> • Low heather and <i>Sphagnum</i> moss coverage • Extensive artificial drains present 		
	Poor fen and flush (PF2)	2.5 ha	Yes	Lower	Preferred habitat type but currently sub-optimal	<ul style="list-style-type: none"> • Heavily grazed by sheep in places • Poor variety in sward type 	Yes	Higher
	Wet grassland (GS4) and mosaics	46.71 ha	Yes	Lower	Some level of use	<ul style="list-style-type: none"> • Some areas of lower quality and dominated by soft rushes (>70%) • Low sward height and cover • Homogeneity of sward • Application of fertilisers • Overgrazed by cattle • Vehicle disturbance and soil compaction 	Yes	Higher



Folio Number	Fossitt Habitat Type (Code)	Dimensions (area in ha or length in m)	Currently Suitable (Yes / No)	Current Suitability Category (None, Lower, Higher)	Justification for Current Categorisation	Sub-Optimal Habitat Features	Potential to be Suitable in Future Following Enhancement (Yes / No)	Potential Future Suitability (None, Lower, Higher)
						<ul style="list-style-type: none"> Invasive fuchsia and snowberry present Fly tipping and littering Artificial drains 		
	Acid grassland (GS3) and mosaics	2.45 ha	Yes	Lower	Some level of use	<ul style="list-style-type: none"> Heavily grazed by sheep 	Yes	Higher
	Dry siliceous heath (HH1) and mosaics	1.46 ha	Yes	Lower	Preferred habitat type but currently sub-optimal	<ul style="list-style-type: none"> Badly degraded by sheep grazing with damaged heather Artificial drains 	Yes	Higher
	Wet heath (HH3)	2.83 ha	Yes	Lower	Preferred habitat type but currently sub-optimal	<ul style="list-style-type: none"> Heavily grazed by sheep Disturbance by sheep Heather burning Degenerate heather Peat slippage Self-seeded conifers Artificial drains 	Yes	Higher



Folio Number	Fossitt Habitat Type (Code)	Dimensions (area in ha or length in m)	Currently Suitable (Yes / No)	Current Suitability Category (None, Lower, Higher)	Justification for Current Categorisation	Sub-Optimal Habitat Features	Potential to be Suitable in Future Following Enhancement (Yes / No)	Potential Future Suitability (None, Lower, Higher)
	Dense bracken (HD1) and mosaics	0.12 ha	No	None	Too dense to allow foraging currently	<ul style="list-style-type: none"> • Too dense to allow foraging • Disturbance and overgrazing by sheep • Self-seeded conifers • Degenerate sward • Artificial drains 	Yes	Lower
	Semi-natural woodland (WN)	1.58 ha	No	None	Closed habitat type strongly avoided	<ul style="list-style-type: none"> • Closed habitat type 	No	None
	Highly modified / non-native woodland (WD) and mosaics	0.63 ha	No	None	Closed habitat type strongly avoided	<ul style="list-style-type: none"> • Self-seeded conifers • Forestry drains • Closed habitat type • Disturbance from forestry operations • Forestry edge effects 	Yes	Lower
	Hedgerows (WL1)	5,616 m	Yes	Lower	Preferred habitat type but	<ul style="list-style-type: none"> • Generally overgrown and unmanaged 	Yes	Higher



Folio Number	Fossitt Habitat Type (Code)	Dimensions (area in ha or length in m)	Currently Suitable (Yes / No)	Current Suitability Category (None, Lower, Higher)	Justification for Current Categorisation	Sub-Optimal Habitat Features	Potential to be Suitable in Future Following Enhancement (Yes / No)	Potential Future Suitability (None, Lower, Higher)
					currently sub-optimal	<ul style="list-style-type: none"> Often gappy 		
	Treelines (WL2)	928 m	No	None	Tend to avoid mature trees	<ul style="list-style-type: none"> Limited in extent and comprised of largely mature trees 	No	None
	Eroding / upland rivers (FW1)	4,328 m	Yes	Lower	Provides habitat for occasional amphibian prey	<ul style="list-style-type: none"> Many modified 	No	Lower
	Drainage ditches (FW4)	6,544 m	Yes	Lower	Provides habitat for occasional amphibian prey	<ul style="list-style-type: none"> Many artificial 	No	Lower
	Spoil and bare ground (ED2)	0.13 ha	No	None	Unvegetated habitat type	<ul style="list-style-type: none"> Lack of vegetation 	Yes	Lower
	Recolonising bare ground (ED3)	0.13 ha	No	None	Largely bare habitat type	<ul style="list-style-type: none"> Largely bare 	Yes	Lower
	Active quarries (ED4)	0.13 ha	No	None	Unvegetated habitat type	<ul style="list-style-type: none"> Lack of vegetation 	No	None
	Stonewalls and other	110 m	No	None	Artificial, unvegetated habitats	<ul style="list-style-type: none"> Artificial habitats Lack of vegetation 	No	None



Folio Number	Fossitt Habitat Type (Code)	Dimensions (area in ha or length in m)	Currently Suitable (Yes / No)	Current Suitability Category (None, Lower, Higher)	Justification for Current Categorisation	Sub-Optimal Habitat Features	Potential to be Suitable in Future Following Enhancement (Yes / No)	Potential Future Suitability (None, Lower, Higher)
	stonework (BL1)							
	Roads and buildings (BL3)	0.36 ha / 2,160 m	No	None	Artificial habitats	<ul style="list-style-type: none"> • Artificial habitats • Linear post and wire fence feature along road 	No	None



2.2.4 Relationship between Nesting and Foraging Habitat

The scientific literature shows that 90% of foraging flights by breeding hen harrier occur within 2 km from nest sites^{37,38}, with foraging females spending most of their time within 1 km of the nest and hunting males mostly within 2 km of the nest³⁹. Therefore, foraging lands have been located within 2 km of at least one of the NEAs (and in practice each NEA has foraging lands adjacent to it) to ensure that they are available and can be used by nesting harriers.

Each NEA can be used for both nesting and foraging, and so each NEA also counts towards the total amount of foraging habitat available to hen harrier. This is because nesting harriers prefer to nest within small patches of scrub surrounded by heath (see Section 2.2.2.1), which are also suitable for foraging (see Section 2.2.3). Any single nesting area will be very small relative to the overall size of each NEA and so use of the NEA by both nesting and foraging birds will not be mutually exclusive. This means the 54.15 ha of land taken up by the NEAs (which will be higher suitability habitat when converted) when combined with the 164.25 ha of foraging enhancement lands will result in a total of 218.4 ha of enhancement lands available for foraging hen harrier. This is greater than a 1:1 ratio of habitat loss: compensatory lands.

Both NEAs and the nearby foraging enhancement lands represent large, continuous blocks of habitats, which will help prevent any negative fragmentation effects from materialising, as described in Section 2.2.2.1.

A turbine-free corridor c.1.2 km wide is present between turbines T13 and T14 and the rest of the array, which is not to be managed for hen harrier but is a consequence of turbine layout that has been dictated by other factors. However, this corridor will allow for passage of foraging hen harrier through the turbine array without being subject to displacement effects or collision risk, which is especially relevant for years where only a single breeding pair is present, as it will help the birds access foraging habitat areas at the other end of the Site.

2.3 Habitats and Secondary Target Species

Appropriate compensation measures to off-set residual effects on IEFs are listed below, including habitats and secondary target species (EIAR Chapter 5 – Biodiversity, Section 5.9):

- Management of 5.4ha of Upland blanket bog (PB2) and Wet heath (HH3) for biodiversity;
- Management of 22.58ha of Wet grassland (GS4) for marsh fritillary;
- Planting of 4.9ha of (Mixed) broadleaved woodland (WD1); and,
- Planting of 1.53km of Hedgerows (WL1)/Treelines (WL2) habitat for biodiversity.

Compensation measures are actions implemented to offset likely significant effects on IEFs associated with development (CIEEM, 2018)¹¹. Compensation should aim to achieve ecological equivalence through matching the function, condition and scale of the IEFs that have been lost (CIEEM, 2018)¹¹. Compensation ratios of greater than 1:1 ratio of lost to

³⁷ Arroyo, B.E. Leckie, F., Amar, A., Hamilton, J., McCluskie, A. & Redpath, S. (2005). Habitat use and range management on priority areas for hen harriers: 2004 report. CEH report for SNH.

³⁸ Arroyo, B.E. Leckie, F., & Redpath, S.M. (2006). Habitat use and range management on priority areas for hen harriers: final report. CEH report for SNH.

³⁹ Arroyo, B., Amar, A., Leckie, F., Buchanan, G.M., Wilson, J.D. & Redpath, S. 2009. Hunting habitat selection by Hen Harriers on moorland: implications for conservation management. *Biological Conservation* 142: 586-596.



restored are often recommended to account for uncertainty, especially in restoration, habitat creation, or species translocation (CIEEM, 2018)¹¹.

2.4 Timings

The overall approach to the programme for this OBMP assumes that no compensation or enhancement works will commence until planning permission is granted. Upon receiving planning permission, a detailed BMP will be produced, which will contain specific management plans or Farm Plans for each landholding.

2.4.1 Hen harrier

In the year prior to construction, NEA works will include felling, baseline surveys and agreement of NEA-specific plans. Habitat establishment then continues through the two-year construction phase. Development and agreement of the Farm Plans will also occur in year prior to construction, but implementation of the Farm Plans will occur at the start of Project construction. The rationale for this is that it will take longer to establish the NEAs than enhancing the foraging lands covered by the Farm Plans, and so a longer lead time is needed. This is because there are multiple actions that will need to occur to establish the NEAs including the felling of forestry, baseline surveys and the establishment of heather and scrub. In contrast, implementation of the Farm Plans will involve actions that generally can be achieved much more quickly and easily.

Works will commence at least 1 years prior to Project operation commencing, with the expectation that it will take c.2 years for Project construction, and the operational lifespan of the Proposed Project will be 35 years.

2.4.2 Habitats and Secondary Target Species

The majority of habitat loss associated with the Proposed Project will take place during the construction phase. Consequently, the compensation measures will be implemented as soon as possible after the issuance of the individual Farm Plans, commencing in the pre-construction phase (Table 3-10).



3.0 Plan Details

As stated previously, this document forms an outline plan and following planning consent, the intention is to develop and agree a detailed BMP with the planning authority and NPWS to address any specific requirements attached to the permission, with specific management plans and farm plans for each landholding contained therein.

3.1 Roles and Responsibilities

The Developer will assume overall responsibility for the implementation of the detailed BMP. The Developer will be responsible for agreed payments to landowners, the appointment and payment of relevant agricultural and ecological specialists, specialist agents / groups, and provision of *inter alia* materials. The Developer or their appointed agents will also be responsible for ensuring compliance with relevant planning conditions and engaging with statutory bodies and advisory agencies as needed.

The agents appointed by the Developer will be responsible for preparing / overseeing the preparation of the specific Farm Plans and any management plans for NEAs forming part of the detailed BMP. The agents / group will also assume responsibility for auditing the land holdings, determining if the measures are achieving the desired results and, where necessary, amending each Farm Plan or NEA management plan to achieve the required results.

The responsibility for implementing the measures will lie with the landowner once the relevant Farm Plan has been prepared and agreed. In the case of the NEAs, the responsibility for implementing the measures lies with the Developer.

3.2 Aims and Objectives

The aims of the OBMP are broadly described here along with more detailed objectives associated with each aim, which illustrate how each aim will be implemented along with the measures of success for each aim, any monitoring and remedial actions required and the indicative programme to achieve each aim and objective.

3.2.1 Aim 1: Management of lands for nesting hen harrier

The creation and management of two NEAs will involve the removal of 54.15 ha of conifer plantation, the restoration of heath and scrub habitats and their ongoing management.

The specific objectives under Aim 1 seek to align with conservation goals and address specific needs of hen harrier and their preferred nesting habitats.

3.2.1.1 Objective 1.1: Establishment and Management of NEAs

The suite of management measures proposed for the NEAs have been developed using the measures applied in the hen harrier project⁴⁰, literature on the ecology of the species, UK

⁴⁰ Hen Harrier Project website <http://www.henharrierproject.ie/> [last accessed 15 September 2025]



and Irish heathland restoration guidelines^{41,42,43,44}, and experience of the ecologists working on the Proposed Project. The suite of management measures that will be implemented have been tried and tested on other schemes in the UK and Ireland⁴⁵. Baseline surveys carried out post-felling will be used to further develop the targeted habitat management measures.

The proposed management measures outlined below are management prescriptions that are routinely used by a variety of community, conservation and development projects across Ireland and the UK to convert conifer plantation to heathland.

Targets

Minimum targets for success include:

- Creation of two NEAs for hen harrier.
- Maintenance of two NEAs for hen harrier over the lifespan of the Proposed Project.
- Compliance with NEA management plans.

Establishment Actions

Establishment actions to be implemented will include, but are not limited to, the following:

a) Felling conifer plantation

- The first step in establishing the NEAs will be to remove the existing low-yield forestry coupes so that they can be converted into mosaics of heather and scrub suitable for hen harrier nesting.
- All felling will be carefully timed to avoid disturbing any breeding birds; felling will not occur if any birds of conservation concern are present during the breeding bird season of April to August and are liable to be disturbed by felling works. However, if surveys confirm that the works were unlikely to cause disturbance, they may proceed during this period.
- Some scattered trees or deadwood may be retained where appropriate, as these can provide perching opportunities for birds, but care will be taken to ensure that they do not create vantage points for predators such as crows.
- Brash will either be removed from the site or carefully piled to avoid excessive nutrient enrichment of soils, which could otherwise suppress heather and scrub regeneration.

⁴¹ NatureScot. Peatland ACTION – Technical Compendium – Restoration – 8 Forest to bog restoration. <https://www.nature.scot/doc/peatland-action-technical-compedium-restoration-8-forest-bog-restoration> [last accessed September 2025]

⁴² Forestry Commission. Forests and Peatland Habitats (Guideline Note). <https://www.forestry.gov.scot/edocman/forests-and-peatland-habitats.pdf> [last accessed September 2025]

⁴³ IUCN. (2024). Forest to Bog Restoration – Demonstrating Success' https://www.iucn-uk-peatlandprogramme.org/sites/default/files/2024-03/Demonstrating%20Success%20Forest%20to%20Bog_small.pdf [last accessed September 2025]

⁴⁴ Natural England. (1992). The Lowland Heathland Management Handbook. <https://publications.naturalengland.org.uk/publication/2267376#:~:text=This%20record%20was%20published%20by%20Natural%20England%20on,lowland%20heathlands%20where%20the%20primary%20objective%20is%20conservation.> [last accessed September 2025]

⁴⁵ LIFE Raised Bog Restoration. <https://www.raisedbogs.ie/> [last accessed September 2025]



b) Baseline survey

- Ecological specialists will commence survey work of the NEAs post-felling of conifer plantation, which will include, as a minimum, the following:
 - Survey and classification of habitats present within each landholding, as well as vegetation types within the same. Habitat classification will follow '*A Guide to Habitats in Ireland*⁴⁶'; and
 - Survey and classification of soils, and consideration of topography, drainage and access within each landholding.
- The baseline survey results will be used to prepare a Management Plan specific to each NEA area, which will form part of one overall detailed BMP. These surveys will assist in identifying the optimal land management programme to establish and manage the NEAs for nesting hen harrier. Each NEA Management Plan will set out specific measures for each NEA to achieve the optimum results for nesting hen harrier such as:
 - Methods of heather establishment;
 - Methods of creating and maintaining the appropriate habitat structure (e.g. heath and scrub mosaic); and
 - Setting specific targets / outcomes that will be audited in line with a set schedule.

c) Habitat creation: heath and scrub mosaic

- Following felling, the land will be restored to a heath and scrub mosaic. This is expected to be successful given that the native habitats in the wider area are predominantly peat habitats that contain heather, suggesting that the underlying soil type and pH is suitable for heather establishment. There are also numerous case studies and guidance documents demonstrating conifer habitats being successfully converted to heathland habitats⁴³.
- Where a viable heather seedbank exists, natural regeneration will be encouraged. It is likely that a natural seedbank exists for the northern NEA given the presence of peat habitats containing heather immediately adjacent to the NEA itself (see EIAR Chapter 5 for further details). It is less clear that this is the case for the southern NEA, as fewer peat habitats are located immediately nearby.
- In areas where the seedbank has been lost, which could be the case for the southern NEA, brush-harvested heather seed may be collected from nearby heathland and spread onto bare ground or cutover peat if possible.
- Alternatively, bought seed or cut heather brush from a nearby site may be used.
- Scarification or light soil disturbance will be used, where possible and where necessary, to expose mineral or peat surfaces to encourage germination.
- Hydrological restoration will also form part of habitat creation, where appropriate, with drains blocked to re-wet peat soils and support *Sphagnum* moss growth alongside heather, although care would be taken to avoid potentially suitable nesting areas from becoming too wet to support nesting hen harrier.
- Any habitat creation works will be timed to avoid disturbing hen harrier or other bird species of conservation interest during the breeding season of April – August.

⁴⁶ Fossitt (2000). *A Guide to Habitats in Ireland*. The Heritage Council.



However, if surveys confirm that the works are unlikely to cause disturbance, they may proceed during this period.

d) Habitat structure for hen harrier nesting

- Once initial heather and scrub establishment has taken place, the restored NEAs will be managed to create a mosaic of vegetation types, maintaining heather of different heights alongside open bog and scattered scrub. This will be implemented via targeted cutting and potentially winter grazing.
- Tall heather (over 30–40 cm) will be maintained in areas away from forestry edges to provide secure nesting cover for hen harrier.
- In contrast, shorter heather and grassland will be maintained near nesting patches to support foraging.
- Any habitat structuring works will be timed to avoid disturbing hen harrier or other bird species of conservation interest during the breeding season of April – August. However, if surveys confirm that the works are unlikely to cause disturbance, they may proceed during this period.

Monitoring and Remedial Actions

Although the conversion of conifer plantation to heath and scrub mosaic is a well-established and frequently successful restoration method in the UK and Ireland, several ecological and practical challenges may arise during implementation. Awareness of these potential pitfalls enhances the robustness of the management framework and ensures appropriate remedial measures can be deployed if required.

Potential Pitfall 1: Slow or Patchy Heather Establishment

Post-felling sites may exhibit slow or uneven heather regeneration, especially where the historic heathland seedbank has been depleted or where conifer canopy cover limited dwarf shrub persistence.

Potential Pitfall 2: Excessive Nutrient Enrichment from Brash and Litter

Nutrient pulses from decomposing brash and forestry residues can favour competitive grasses (e.g. *Molinia*, *Agrostis*) over dwarf shrubs, thereby suppressing heath regeneration.

Potential Pitfall 3: Regeneration of Conifers and Invasive Scrub

Self-seeding conifer regeneration is common after felling and can rapidly reverse progress if not controlled. Invasive or over-dominant scrub species (e.g. gorse, birch) may also colonise newly exposed soils before heather becomes established.

Potential Pitfall 4: Hydrological Instability After Felling

Legacy drains may continue to dry peat soils, inhibiting heath development, while over-blocking can lead to localised waterlogging. Both hydrological extremes can reduce the suitability of the developing habitat.

Potential Pitfall 5: Soil Compaction or Erosion Following Timber Extraction

Ground compaction from forestry machinery or exposure of bare peat can hinder heather establishment and increase erosion risk on sloped areas.

Potential Pitfall 6: Risk of Fire During Early Establishment

Newly opened habitats can be more vulnerable to fire until vegetation structure matures. Restoration programmes in upland and lowland heath have highlighted the increased fire risk associated with early-stage heather development where dry material accumulates.



Monitoring and remedial actions that will be implemented (if required) include:

- Monitoring will be undertaken regularly to check for regenerating conifers, which will be removed promptly wherever possible, and to ensure that scrub levels remain balanced, providing nesting opportunities without closing the habitat.
- Routine site monitoring will also assess vegetation condition, fire risk, and the overall suitability of the habitat for nesting hen harrier (see Section 3.3 for further details).
- The long-term success of the NEAs will depend on active management throughout the lifespan of the Proposed Project. The results of monitoring will guide adaptive management actions allowing the NEAs to be maintained as high-quality nesting habitat over the full operational life of the wind farm.
- Where heather regeneration is slow or uneven, additional measures could include brush-harvested seed from nearby donor sites, spreading cut heather brush to provide seed and microclimate benefits and carrying out targeted scarification to expose mineral or peat surfaces to stimulate germination.
- Supplementary livestock feeding will not be permitted within or adjacent to heather areas or watercourses, as this can cause poaching, nutrient enrichment, and invasive plant spread. Additional nutrient management interventions could include additional brush removal or raking of any enriched topsoil patches, and/or the use of directed seasonal grazing to suppress competitive grasses.
- If monitoring reveals over-wetting or drying, peat dams may be installed, existing dams adjusted, or shallow relief channels cut to stabilise conditions.
- Fire prevention will be addressed by reducing purple moor grass dominance through use of appropriate machines where required. Additional fire protection will be provided by establishing firebreaks, particularly if fire risk increases due to dry vegetation or climatic conditions.
- Native scrub species such as willow *Salix* spp. and bog myrtle *Myrica gale* will be retained and encouraged, while invasive or over-dominant scrub, particularly gorse, will be controlled through flailing. Stump or root treatments may be implemented to control invasive conifers where regrowth persists.
- Any remedial works will be timed to avoid disturbing hen harrier or other bird species of conservation interest during the breeding season of April – August. However, if surveys confirm that the works are unlikely to cause disturbance, they may proceed during this period.

Programme

The indicative programme to achieve Objective 1.1 is given in Table 3-1.

Table 3-1: Indicative Management and Monitoring Programme for Objective 1.1

Summary Action	Timescale Relative to Planning Consent
Fell conifers	Year 3
Baseline survey of NEAs post-felling of conifers and development of specific management plans for each NEA	To be conducted following felling of conifers in Year 3
Habitat creation: heath and scrub	To be commenced following baseline survey and development of specific management plans for each NEA landholding in Year 4



Summary Action	Timescale Relative to Planning Consent
Habitat structuring for nesting hen harrier	Upon establishment of heather i.e. years 4-5
Monitoring (condition assessment of habitats in NEAs) / Reporting	Years 4 to 8 and then every 5 years thereafter for the lifespan of the Proposed Project
Remedial actions (invasive / problematic native plant control and scrub control)	As required

3.2.2 Aim 2: Management of lands to improve suitability for foraging hen harrier

The enhancement of lands for foraging hen harrier will involve management actions to be implemented at 164.25 ha of agricultural, peatland and woodland habitats. Of this total, c. 86.37 ha comprises of agricultural lands / wooded habitats and the other 77.85 ha comprises of peatlands.

The specific objectives under this Aim seek to align with conservation goals and address the specific needs of hen harrier and their preferred foraging habitats.

3.2.2.1 Objective 2.1: Management of Agricultural Lands

The suite of management measures proposed for the agricultural lands have been developed using the measures applied in the hen harrier project, literature on the ecology of the species and experience of the ecologists working on the wind farm project. The suite of management measures that will be implemented have been tried and tested by the hen harrier project⁴⁰, farming organisations⁴⁷ and other agri-environment schemes in Ireland. The efficacy of the proposed management measures has been demonstrated by agri-environment schemes such as the hen harrier project.

The legal agreements for the 164.25 ha of offset lands will be for the lifetime of the wind farm once operational plus an additional 2 years from commencement of construction. The Landowner participation is secured through legal agreement for the management of their lands for biodiversity.

The suite of standard management measures is contained in the legal agreements that the landowners have committed to.

Targets

Minimum targets for success include:

- 86.37 ha of agricultural land to be enhanced for foraging hen harrier.
- Of this 86.37-ha total, at least 75.76 ha of land to comprise higher suitability habitat and 0.89 ha of lower suitability habitat following enhancement.
- Compliance with Farm Plans.

Establishment Actions

Establishment actions to be implemented include, but are not limited to, the following:

⁴⁷ Farming for Nature <https://www.farmingfornature.ie/> [last accessed 15 September 2025]



a) Grazing Regime

- Livestock management plays an important role in maintaining habitats that are beneficial for hen harrier. When livestock grazing is carefully controlled, it helps to create a varied landscape with patches of open ground and areas of low, native vegetation, which are ideal for hen harriers to hunt. Overgrazing, however, can degrade vegetation cover and reduce the abundance of prey species, so balancing livestock density ensures that habitats remain rich in biodiversity. This balanced approach encourages the presence of small mammals, birds, and invertebrates that hen harrier relies on for food.
- The hen harrier project field guidance states⁴⁸ “*Sward structure is an important contributor to both prey numbers and prey accessibility. Rush tussocks create foraging and nesting opportunities for small rodents along with Meadow Pipits and other ground nesting birds. Sward structure responds well to management and significant progress can be made in a single growing season.*” The overall aim of the grassland management will be to create foraging and nesting opportunities for hen harrier prey species through changes to the grazing regime by changes to the length of time lands are grazed, and reduction or increase in stocking density as deemed appropriate to develop and / or enhance foraging habitat for hen harrier. The specific detail of the grazing regime will be developed on a land holding by land holding basis and provided in relevant Farm Plans.
- The grazing management may also help increase potential for marsh fritillary *Euphydryas aurina* in wet grasslands with abundant devil’s bit scabious *Succissa pratensis* (Section 3.2.3.2).

b) Rush Management

- The structure of the sward, as described earlier, is important to the successful provision of optimal foraging habitat for hen harrier. Sward structure must include a mix of vegetation heights and while rush tussocks are a desirable part of the sward, they must not make up more than 70% of the sward at most⁴⁸.
- As a rule of thumb, rush management will not be carried out during the period 1 March – 31 August inclusive to avoid disturbance and mortality or injury of ground nesting bird species and other wildlife.
- The management of rushes cannot be carried out using chemicals such as glyphosate.
- Mechanical control may therefore be required from time to time to prevent rush cover becoming excessive. Where mechanical control is to be undertaken, the rush cutting regime will be specified in the Farm Plan.

c) Delayed Topping / Mowing

- The availability of tussocky rushes and multi- layered swards is key to supporting the prey species of birds and small mammals favoured by hen harrier. However, individual landholdings may be allowed, as specified in each Farm Plan, to top or mow grasslands during the period referenced above. Any such allowance / deviation would be written into the relevant Farm Plan and closely monitored.

⁴⁸ Hen Harrier Programme Field Guidance for scoring Species Rich Grassland Ver. 2 June 2021
<http://www.henharrierproject.ie/HHPSRGGuidance.pdf> [last accessed 15 September 2025]



- As a rule of thumb, topping or mowing will not be carried out during the period 1 March – 31 August inclusive to avoid disturbance and mortality or injury of ground nesting bird species and other wildlife.

d) Hedgerow Establishment and Management

- The hen harrier project supporting actions states “*Hen harrier show strong preferences for foraging along intact, dense structured hedgerows between 3 and 4 metres wide. Supporting actions on farm plans therefore should establish and restore hedgerows to these ideal specifications.*”
- The Farm Plan for each landholding will therefore include establishment and enhancement of hedgerows in appropriate locations through additional planting (gapping up) of hedgerows with native species to encourage dense growth.
- Where available, native hedgerow species will be of local provenance and where appropriate, a buffer strip along hedgerows will be retained and sown with wild bird cover crops to provide additional foraging habitat. The cover crop will provide cover for small mammals and birds and attract invertebrates.
- Management of hedgerows using low impact mechanical means will be limited to a minimum of every 3 years and with the exact rotation period for each landholding specified in the relevant Farm Plan. Fencing of hedgerows may be required to protect them from livestock.
- Control and removal of invasive and non-native invasive species (INSS) present within hedgerows will be implemented (Section 3.2.3.1).

e) Scrub Development

- Scrub is a valuable habitat for hen harrier and many of their prey species. Hen harrier will hunt along the edges of scrub and allowing scrub at suitable locations will increase suitable foraging habitat and may also provide roosting opportunities.
- Scrub encroachment into grasslands will be discouraged through the continued use of grazing animals or by use of mechanical means if specified in the relevant Farm Plan.
- The locations for any desired scrub expansion will be agreed with the landowner and set out in the relevant Farm Plan.

f) Reduction / Cessation of Fertiliser Application

- The requirements for reduction or cessation of the application of fertilisers will be determined by soil testing and surveys carried out by the agricultural advisor to inform each individual farm plan.
- The aim of this measure would be to increase the species and structure diversity of the grassland sward through reduced nitrate application.
- This measure would also assist in meeting the requirements of the Nitrates Directive and improve the quality of surface water run-off to streams and drains locally.

Monitoring and Remedial Actions

Although management of farm habitats for foraging hen harrier is well-established in Ireland, several ecological and practical challenges may arise during implementation. Awareness of these potential pitfalls enhances the robustness of the management framework and ensures appropriate remedial measures can be deployed if required.



Potential Pitfall 1: Incorrect or Inconsistent Grazing Levels

Both over-grazing and under-grazing are common causes of management failure in agricultural habitats. Over-grazing reduces vegetation height, eliminates tussocks and cover for small mammals/birds, and reduces invertebrate abundance. Under-grazing results in dense rank grassland (particularly *Molinia* or *Agrostis*), inhibiting prey accessibility for hen harrier.

Potential Pitfall 2: Excessive Rush Encroachment

Rushes (*Juncus* spp) are valuable in moderation but >70% cover typically results in reduced prey accessibility for hen harrier.

Potential Pitfall 3: Nutrient Enrichment from Fertilisers or Livestock

Nutrient pulses can cause conversion of diverse swards into uniform ryegrass or *Molinia* stands, resulting in reduction in tussock variability and thus species richness of hen harrier prey habitats.

Potential Pitfall 4: Poorly Timed Cutting or Tipping

If cutting occurs too early, it eliminates prey nests / cover and reduces structural heterogeneity. If it occurs too late, it allows coarse grasses to dominate and collapse, forming thatch. Both issues can hinder foraging hen harrier.

Potential Pitfall 5: Hedgerow Declines or Structural Failure

Hedgerows are critical for foraging hen harrier and gaps, over-trimming, excessive grazing pressures and INNS invasion can reduce structural density and prey availability.

Potential Pitfall 6: Excessive or Uncontrolled Scrub Spread

Scrub is beneficial in patches but if unmanaged can close in grasslands, reduce open-foraging zones and displace vegetation preferred by small mammals that are hen harrier prey.

Potential Pitfall 7: Soil Compaction / Poaching

Livestock pressure on wet soils may destroy tussock structure, increase bare ground or puddling and reduce plant diversity which may negatively affect hen harrier prey species.

Monitoring and remedial actions that will be implemented, if required, include:

- Monitoring will be undertaken regularly to check for compliance with the establishment actions outlined in each respective Farm Plan (see Section 3.3 for further details).
- Any management prescriptions will be amended, if required, depending on the monitoring results.
- Any remedial works will be timed to avoid disturbing hen harrier or other bird species of conservation interest during the breeding season of April – August. However, if surveys confirm that the works are unlikely to cause disturbance, they may proceed during this period.

Programme

The indicative programme to achieve Objective 2.1 is given in Table 3-2.

Table 3-2: Indicative Management and Monitoring Programme for Objective 2.1

Summary Action	Timescale Relative to Planning Consent
Development and agreement of Farm Plans	Year 3



Summary Action	Timescale Relative to Planning Consent
Grazing management, rush management, delayed topping / mowing / hedgerow establishment and management, scrub development and fertiliser management	From the commencement of construction (Year 4), and then every year for the lifespan of the Proposed Project
Monitoring (compliance checks for Farm Plans) / Reporting	Every year for the lifespan of the Proposed Project: years 5-8 specialist site visits to be conducted per year, then after year 8, annual landowner self-reporting supported by formal team inspections every 3 years
Remedial actions (similar to establishment actions)	As required; formal team inspections would be reinstated if landowner self-reporting found to be unsatisfactory

3.2.2.2 Objective 2.2: Management of Peatland Habitats

The management measures proposed for peatland habitats were developed in the same way as described in Section 3.2.2.1 above. Approximately 77.85 ha of peatland habitats will be managed for the benefit of foraging hen harrier. Of these, c. 49.52 ha forms part of Dough/Thur Mountains NHA (Folio 13).

The site synopsis for Dough/Thur Mountains NHA⁴⁹ states that habitat loss and damage to the hydrological condition of the NHA are due to sheep grazing and machine cutting of peat within the NHA, as well as extensive conifer afforestation, peat cutting and grazing nearby. The management of peatlands within Folio 13 for hen harrier will help improve the condition of habitats within the NHA also. Liaison with National Parks & Wildlife Service (NPWS) will be undertaken at the stage of preparing the detailed BMP.

Targets

Minimum targets for success include:

- At least 77.85 ha of land to be enhanced for foraging hen harrier.
- Of this 77.85-ha total, at least 77.73 ha of land to comprise higher suitability habitat and 0.12 ha of lower suitability habitat following enhancement.
- Compliance with Farm Plans.

Establishment Actions

The establishment actions to be implemented include, but are not limited to, the following:

a) Heather Management

- Winter grazing will be avoided across peatland restoration areas to prevent poaching, compaction and damage to young heather and *Sphagnum* regeneration.
- Light summer grazing by cattle will be used selectively to reduce the dominance of purple moor grass and to encourage a structurally diverse sward that benefits small mammals and passerine prey species.

⁴⁹ <https://www.npws.ie/sites/default/files/protected-sites/synopsis/SY002384.pdf> [last accessed September 2025]



- Any grazing prescriptions (stock type, timing, intensity and paddock rotation) will be specified in the Farm Plan for each holding based on guidance from Teagasc⁵⁰, the Irish Hen Harrier Project³⁵ and the Scottish Government⁵¹.
- Burning will be prohibited as a routine management action; where vegetation control is required and cannot be undertaken by grazing, mechanical measures (e.g. flail mowing) will be considered only where ecologically justified

b) Scrub Management

- Existing native scrub such as willow and bog myrtle will be retained and encouraged in discrete patches to provide structural diversity and roosting opportunities.
- Management will prevent scrub from developing into continuous closed canopy that would reduce open bog/heath habitat. Gorse and other species that threaten to dominate open peatland will be controlled sensitively, favouring hand-cutting and removal rather than wholesale clearance, and any clearance will be staged to maintain cover for wildlife. Where appropriate, small areas will be allowed to succeed towards bog woodland to increase habitat heterogeneity, subject to site-specific assessment.

c) Soil and Peat Management

- Measures to protect peat and soil structure will include minimising vehicular access, reducing winter stocking densities on vulnerable ground, and relocating any necessary supplementary feeding away from fragile, wet peat areas and watercourses.
- Stock types will be adjusted where necessary (for example, favouring lighter stock) to reduce poaching and erosion.
- The establishment of vegetation cover on bare peat (e.g. by encouraging heather and *Sphagnum* recolonisation) will be prioritised to reduce erosion risk; in severely eroded areas, temporary stabilisation (for example, coir rolls or geotextile where appropriate) may be used under ecological supervision

d) Hydrological Management

- Restoration of natural peatland hydrology is a core action and will be achieved primarily through blocking or damming drainage ditches, ceasing maintenance of artificial drains, and avoiding the creation of new drains.
- Peat dams, bunds or other low-impact blocking techniques will be used to raise water tables and rewet peat where appropriate, with works prioritised in shallow peat and purple moor grass dominated areas to encourage *Sphagnum* recovery and heather regeneration.
- Hydrological interventions will be designed and monitored to avoid unintended downstream impacts and to protect sensitive watercourses.

⁵⁰ Kelly, K. (2022). *Conservation Grazing in the Uplands*. Munster Technological University / Teagasc Signpost Series. <https://inrbs.ie/conservation-grazing/>

⁵¹ Scottish Government (2015). *Supporting Guidance for Heather Restoration*. Agri-Environment Climate Scheme (AECS). <https://www.ruralpayments.org/topics/all-schemes/agri-environment-climate-scheme/management-options-and-capital-items/heather-restoration/guidance-for-heather-restoration/>



e) Control of Negative Indicators and Invasive Species

- Applications of fertiliser and manure will be avoided on areas targeted for peatland restoration to reduce nutrient enrichment and encourage a naturally diverse bog flora.
- Management of grazing timing and intensity will be used to reduce spread of weedy species.
- Where invasive non-native species (e.g. rhododendron, self-seeded conifers) are present, removal will be undertaken using the least damaging techniques practicable e.g. targeted cutting, pulling, or herbicide injection by specialists where necessary and lawful, and will be followed by habitat recovery measures to prevent re-invasion (EIAR Chapter 5 – Biodiversity, Appendix 5-8).

f) Fire and Fuel Load Management

- Uncontrolled burning is a major threat to peatland biodiversity and carbon stores and will be avoided.
- Fuel load reduction will be achieved by controlling purple moor grass through summer grazing or, where required, flail-mowing in carefully targeted strips

g) Turbary (Peat Cutting)

- New peat-cutting operations will be avoided in peatland management areas; existing cutover areas will be prioritised for rehabilitation.
- Old cut areas will be stabilised and rehabilitated by drain blocking, re-vegetation where required, and stock exclusion until natural recovery progresses.

h) Supplementary Feeding

- Supplementary feeding will be minimised and located away from sensitive peatland and watercourse margins to avoid nutrient enrichment, poaching and concentration of stock that damage vegetation.
- Where supplementary feeding is necessary, concentrates rather than bulky, wet feed will be preferred, and feeding sites will be rotated.
- All feeding locations and timings will be agreed and written into the relevant Farm Plan.

i) Bracken Control

- Bracken control will be targeted to locations where it is actively suppressing heather or preventing recovery of characteristic peatland vegetation.
- Control methods will be selected to avoid excessive soil disturbance or erosion and will focus on sites judged to have a good potential for recovery; specialist advice will be sought before any large-scale bracken removal.

j) Other Damaging Activities

- Dumping, unauthorised use of machinery, creation of new tracks, and recreational activities that cause erosion or disturbance will be prohibited within peatland restoration areas.
- Vehicle access will be minimised and controlled, and landowners will be required under the agreements to prevent damaging activities.



Monitoring and Remedial Actions

Although management of farm habitats for foraging hen harrier is well-established in Ireland, several ecological and practical challenges may arise during implementation. Awareness of these potential pitfalls enhances the robustness of the management framework and ensures appropriate remedial measures can be deployed if required.

Pitfall 1: Hydrological Instability

Peatlands are highly sensitive to hydrological change. If drains continue to function, peat dries, *Molinia* dominates and heather dies back. If blocking is excessive, waterlogging reduces hen harrier prey diversity and destabilises surface peat.

Pitfall 2: Molinia Dominance

Molinia often becomes dominant after past grazing pressure or drainage. It can form dense monocultures limiting movement of small mammals, invertebrate abundance, and accessibility for hen harrier foraging.

Pitfall 3: Excess Scrub and Gorse Encroachment

When scrub or gorse dominates the habitat becomes structurally unsuitable, the prey base changes and vegetation become more fire prone, all of which could negatively affect foraging hen harrier.

Pitfall 4: Soil / Peat Damage from Livestock

Poaching, rutting and compaction can create bare peat vulnerable to erosion and reducing suitability for foraging hen harrier by removing habitats for prey species.

Pitfall 5: Nutrient Enrichment

If uncontrolled, enrichment shifts peatland composition towards grassland degraded states, which limits hen harrier foraging by removing habitats for prey species.

Pitfall 6: Bracken and Self-Seeded Conifer Spread

Bracken and conifers may self-spread and colonise the peatland habitats, which if uncontrolled, could limit hen harrier foraging through removal of habitats for prey species.

Pitfall 7: Fire Risk and Fuel Load Accumulation

Peatlands with unmanaged *Molinia* or gorse are highly flammable and fires could reduce hen harrier foraging opportunities by removing habitats for prey species.

Monitoring and remedial actions that will be implemented include:

- Monitoring will be undertaken regularly to check for compliance with the establishment actions outlined in each respective Farm Plan (see Section 3.3 for further details).
- Management prescriptions will be adjusted, if required, depending on the monitoring results.
- Any remedial works will be timed to avoid disturbing hen harrier or other bird species of conservation interest during the breeding season of April – August. However, if surveys confirm that the works are unlikely to cause disturbance, they may proceed during this period.

Programme

The indicative programme to achieve Objective 2.2 is given in Table 3-3.



Table 3-3: Indicative Management and Monitoring Programme for Objective 2.2

Summary Action	Timescale Relative to Planning Consent
Development and agreement of Farm Plans / Liaison with NPWS	Year 3
Management of heather, scrub, soil/peat, hydrological, invasive species, fire, turbarry, supplementary, bracken and other damaging activities	From the commencement of construction (Year 4), and then every year for the lifespan of the Proposed Project
Monitoring (compliance checks for Farm Plans) / Reporting	Every year for the lifespan of the Proposed Project: years 5-8 specialist site visits to be conducted per year, then after year 8, annual landowner self-reporting supported by formal team inspections every 3 years
Remedial actions (similar to establishment actions)	As required; formal team inspections would be reinstated if landowner self-reporting found to be unsatisfactory

3.2.2.3 Objective 2.3: Management of Disturbance

Human-related disturbance can affect foraging and breeding hen harrier through displacement and has potentially negative consequences for long-term population persistence or recovery. Disturbance reduces nest attendance and increases predation risk, influenced by factors like nest visibility, predator proximity, and food availability⁵². Birds leaving nests to find food can leave them unguarded⁵³. Disruptions from roads, trails, tracks, buildings, burning, can lead to habitat loss and increased predator access.

Management of disturbance helps create a more stable and secure environment where hen harriers can nest, hunt, and rear their young with minimal stress. Reducing disturbance around nesting sites decreases the likelihood of nest abandonment, ensuring that chicks have a higher chance of survival.

This management also encourages other wildlife to inhabit the area, supporting broader biodiversity that enhances the ecological balance of the hen harrier's habitat. In summary, disturbance management not only directly benefits hen harriers by providing safer, quieter spaces for essential behaviours but also promotes a healthier ecosystem, which sustains a resilient and productive habitat for these birds and other wildlife.

Targets

Minimum targets for success include:

- Enforcement of buffer zones during the hen harrier nesting season where required.
- Compliance with disturbance restrictions written into Farm Plans.

⁵² Ruddock, M. & Whitfield, D.P. (2007). A review of disturbance distances in selected bird species. Report from Natural Research (Projects) Ltd to Scottish Natural Heritage. Natural Research, Banchory, UK

⁵³ Caravaggi, A., Irwin, S., Lusby, J., Ruddock, M., Mee, A., Nagle, T., O'Toole, L., O'Neill, S. & O'Halloran, J., (2019). Anthropogenic pressures within the breeding range of the Hen Harrier *Circus cyaneus* in Ireland. Bird Study 66: 461-470



Establishment Actions

The establishment actions to be implemented will include, but are not limited to, the following:

- Restricting forestry operations within 750 m of each NEA during the hen harrier breeding season (April to August inclusive) or within 750 m of active nests within the NEA (if nest locations are known).
- Implementing training for forestry contractors operating near NEAs on hen harrier protection protocols such as buffer zones.
- Limiting recreational activities within NEAs via fencing, signage and any other mechanisms available.
- Limiting recreational activities within foraging enhancement lands, which will be agreed and written into the relevant Farm Plans.

Monitoring and Remedial Actions

Monitoring and remedial actions that will be implemented include:

- Monitoring will be undertaken regularly (see Section 3.3 for further details) to check for compliance with the establishment actions outlined in each respective Farm Plan and NEA Management Plan.
- Management prescriptions will be adjusted if required depending on the monitoring results.
- Any remedial works will be timed to avoid disturbing hen harrier or other bird species of conservation interest during the breeding season of April – August. However, if surveys confirm that the works are unlikely to cause disturbance, they may proceed during this period.

Programme

The indicative programme to achieve Objective 2.3 is given in Table 3-4.

Table 3-4: Indicative Management and Monitoring Programme for Objective 2.4

Summary Action	Timescale Relative to Planning Consent
Development and agreement of Farm Plans	Year 3
Training forestry operatives on hen harrier protection protocols to avoid disturbance	Year 3
Restricting forestry operations / limiting recreational activities within buffer zones	Every year for the lifespan of the Proposed Project from year 4 onwards
Monitoring (compliance checks for Farm Plans / NEA Management Plans) / Reporting	For NEAs, years 4 to 8 and then every 5 years thereafter for the lifespan of the Proposed Project. For Farm Plans, years 5-8 specialist site visits to be conducted per year, then after year 3, annual landowner self-reporting supported by formal team inspections every 3 years



Summary Action	Timescale Relative to Planning Consent
Remedial actions	As required; for Farm Plans, formal team inspections would be reinstated if landowner self-reporting found to be unsatisfactory

3.2.3 Aim 3: Management of lands for habitats and secondary target species

Appropriate compensation measures to off-set residual effects on IEFs are listed below, including habitats and secondary target species (EIAR Chapter 5 – Biodiversity, Section 5.9):

- Management of 5.4ha of Upland blanket bog (PB2) and Wet heath (HH3) for biodiversity;
- Management of 2ha of Wet grassland (GS4) for marsh fritillary;
- Planting of 1.5km of Hedgerows (WL1)/Treelines (WL2) habitat for biodiversity; and
- Planting of 4.9ha of (Mixed) broadleaved woodland (WD1) to compensate for the loss of bat foraging habitat within the proposed Wind Farm Site and for the loss of habitat along the Turbine Delivery Route (TDR).

3.2.3.1 Objective 3.1: Restore Upland Habitats

A total of 5.43 ha of Upland blanket bog (PB2) and Wet heath (HH3) will be managed to compensate for the loss of upland habitats as a result of the Proposed Project.

Targets

Minimum targets for success are defined by the Annex I habitat condition assessments for upland habitats and are summarised below⁵⁴:

- Annex I habitat type 7130* Blanket bog (active):
 - Positive indicator species ≥ 7 (Appendix VI)
 - Bryophyte/lichen cover (excluding *Sphagnum fallax*) ≥ 10
 - Cover of *Calluna vulgaris*, *Eleocharis multicaulis*, *Eriophorum vaginatum*, *Molinia caerulea*, *Schoenus nigricans* and *Trichophorum germanicum* individually $< 75\%$
 - Negative indicator species (*Agrostis capillaris*, *Holcus lanatus*, *Phragmites australis*, *Pteridium aquilinum*, *Ranunculus repens*) collectively $< 1\%$
 - Non-native species cover $< 1\%$
 - Scattered native trees and scrub cover $< 10\%$
 - Damaged *Sphagnum* $< 10\%$ of total *Sphagnum* cover
 - Browsed shoots of ericoids $< 33\%$

⁵⁴ Perrin, P.M., Barron, S.J., Roche, J.R. & O'Hanrahan, B. (2014) Guidelines for a national survey and conservation assessment of upland vegetation and habitats in Ireland. Irish Wildlife Manuals No. 79, National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland. Available at: <https://www.npws.ie/sites/default/files/publications/pdf/IWM79.pdf> [accessed: 28/01/2026].



- No burning impacts on moss/lichen layer or peat exposure
- No burning within sensitive area boundaries
- Disturbed bare ground < 10%
- Drainage impacts (trampling, tracking, ditches, peat cutting) < 10%
- Erosion gullies and eroded areas < 5% of bog mosaic

Positive indicator species for the Annex I habitat type consist of:

Bog rosemary *Andromeda polifolia*, Breutelia moss *Breutelia chrysocoma*, heather *Calluna vulgaris*, Bigelow's sedge *Carex bigelowii*, liverwort *Diplophyllum albicans*, sundews *Drosera spp.*, crowberry *Empetrum nigrum*, cross-leaved heath *Erica tetralix*, common cotton-grass *Eriophorum angustifolium*, hare's-tail cotton-grass *Eriophorum vaginatum*, bogbean *Menyanthes trifoliata*, bog myrtle *Myrica gale*, bog asphodel *Narthecium ossifragum*, non-crustose lichens, sphagnum moss *Odontoschisma sphagni*, lousewort *Pedicularis sylvatica*, butterwort *Pinguicula lusitanica*, purple-scaled liverwort *Pleurozia purpurea*, thyme-leaved milkwort *Polygala serpyllifolia*, woolly fringe-moss *Racomitrium lanuginosum*, rushes *Rhynchospora spp.*, liverwort *Scapania gracilis*, black bog-rush *Schoenus nigricans*, sphagnum mosses *Sphagnum spp.*, exclude *S. fallax*, deer grass *Trichophorum germanicum*, bilberry *Vaccinium myrtillus*⁵⁴.

- Annex I habitat type 4010 North Atlantic wet heath
 - *Erica tetralix* present — 20 m radius
 - Cover of positive indicator species ≥ 50%
 - Total cover of *Cladonia species*, *Sphagnum species*, *Racomitrium lanuginosum* and pleurocarpous mosses ≥ 10%
 - Cover of ericoid species and *Empetrum nigrum* ≥ 15%
 - Cover of dwarf shrub species < 75%
 - Cover of negative indicator species (*Agrostis capillaris*, *Holcus lanatus*, *Phragmites australis*, *Ranunculus repens*) collectively < 1%
 - Cover of non-native species < 1%
 - Cover of scattered native trees and scrub < 20%
 - Cover of *Pteridium aquilinum* < 10%
 - Cover of *Juncus effusus* < 10%
 - Crushed, broken or pulled-up *Sphagnum* species < 10% of *Sphagnum* cover
 - Browsed shoots of ericoids < 33% (assess ≥ 10 shoots across plot)
 - No burning impacts on bryophyte
 - No burning within boundaries of sensitive areas
 - Disturbed bare ground < 10%
 - Drainage impacts from trampling, tracking or ditches < 10%

Positive indicator species for the Annex I habitat type consist of:

Breutelia moss *Breutelia chrysocoma*, heather *Calluna vulgaris*, sedges *Carex spp.*, liverwort *Diplophyllum albicans*, sundews *Drosera spp.*, Irish heath *Erica erigena*, cross-leaved heath *Erica tetralix*, common cotton-grass *Eriophorum angustifolium*, bog myrtle *Myrica gale*, bog asphodel *Narthecium ossifragum*, non-crustose lichens, pleurocarpous mosses, purple-scaled liverwort *Pleurozia purpurea*, thyme-leaved milkwort *Polygala serpyllifolia*, tormentil



Potentilla erecta, rushes *Rhynchospora spp.*, creeping willow *Salix repens*, black bog-rush *Schoenus nigricans*, sphagnum mosses *Sphagnum spp.*, devil's-bit scabious *Succisa pratensis*, deer grass *Trichophorum germanicum*⁵⁴.

Establishment Actions

Phase 1 surveys of the peatland habitats have already been carried out within the enhancement lands (2024). Further to this, Annex I habitat condition assessments surveys will be carried out within the 5.4ha of Upland blanket bog (PB2) and Wet heath (HH3) to be restored. As stated in Section 3.2.1.1, the baseline survey results will be used to prepare a Management Plan specific to each area, which will form part of one overall detailed BMP. These surveys will assist in identifying the optimal land management programme to establish and manage the upland habitat. Each Management Plan will set out specific measures for each area to achieve the optimum results for the structure and function of the upland habitats.

Aim 3 is in alignment with Aim 2, meaning the management actions recommended in Section 3.2.2 will be implemented to restore and enhance the management of 5.43 ha of Upland blanket bog (PB2) and Wet heath (HH3). These areas may overlap with the hen harrier foraging habitat and are not required to be spatially distinct, given that the aims and objectives are aligned. It is likely, based on proposed measures under Aim 2 that an area larger than 5.43ha will be restored.

The following establishment actions, described in full in Section 3.2.2.2, are to be implemented within the 5.43 ha of Upland blanket bog (PB2) and Wet heath (HH3) to be restored and are also listed below for clarity:

- a) Heather Management
- b) Scrub Management
- c) Soil and Peat Management
- d) Hydrological Management
- e) Control of Negative Indicators and Invasive Species
- f) Fire and Fuel Load Management
- g) Turbary (Peat Cutting) Management
- h) Supplementary Feeding Management
- i) Bracken Control
- j) Management of Other Damaging Activities

As stated in Section 3.2.1.1 c), hydrological restoration will also form part of upland habitat restoration, where appropriate, with drains to be blocked in order to re-wet peat soils and support *Sphagnum* mosses. This action deviates from that listed for hen harrier in Section 3.2.1.1 c), as no upper threshold for wetness will be applied, given that peatland habitats cannot be too wet to support their restoration objectives. The management and restoration for restoration of upland habitats will follow guidance on drain blocking on peatlands listed in '*Best Practice in Raised Bog Restoration in Ireland*⁵⁵.

As stated in Section 3.2.2.1, overgrazing can threaten the structure of sensitive peatland vegetation. For the restoration of upland habitats, a stocking rate of 0.02LU/ha/yr will be

⁵⁵ 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. Available at: https://www.npws.ie/sites/default/files/publications/pdf/IWM99_RB_Restoration_Best%20Practice%20Guidance.pdf [accessed: 28/01/2026].



implemented (NatureScot, 2025)⁵⁶. For the purposes of this assessment, one livestock unit (LU) is defined as equivalent to one cow, with one ewe representing approximately 0.15 LU. Calculations must consider grazing/trampling pressure from wild herbivores. The upland habitat to be restored will only be grazed in the dryer summer months and livestock will be removed if poaching is noted.

The indicative timeline for management actions is listed in Table 3-5.

Monitoring and Remedial Actions

Monitoring and remedial actions that will be implemented include:

- Monitoring will be undertaken regularly to check for compliance with the establishment actions outlined in each respective Farm Plan.
- Management prescriptions will be adjusted, if required, depending on the monitoring results.
- Regenerating conifers will be removed promptly wherever possible.
- Species composition will be recorded using relevés. The Irish Vegetation Classification (IVC) will be used for the identification of the vegetation community (IVC, no date).
- As the stocking rates are based on guidelines and successful results are dependent on external factors such as the weather, the grazing effects must be monitored and possibly adjusted accordingly.
- Where invasive non-native species (e.g. rhododendron, self-seeded conifers) are present, removal will be undertaken using the least damaging techniques practicable e.g. targeted cutting, pulling, or herbicide injection by specialists where necessary and lawful, and will be followed by habitat recovery measures to prevent re-invasion (EIAR Chapter 5 – Biodiversity, Appendix 5-8).

Programme

Table 3-5: Indicative Management and Monitoring Programme for Objective 2.4

Summary Action	Timescale Relative to Planning Consent
Baseline Annex I habitat condition assessment surveys	Year 3
Development and agreement of Farm Plans / Liaison with NPWS	Year 3
Management of hydrology, invasive species, fire, turbary, grazing, supplementary feed, bracken and other damaging activities	From the commencement of construction (Year 4), and then every year for the lifespan of the Proposed Project
Record IVC vegetative composition using relevés.	Annual landowner self-reporting supported by formal team inspections every 3 years
Monitoring Annex I habitat condition assessment surveys	Annual landowner self-reporting supported by formal team inspections every 3 years

⁵⁶ NatureScot (2025) Peatland ACTION – Peatland Management Guidance: grazing and muirburn, NatureScot. Available at: <https://www.nature.scot/doc/peatland-action-peatland-management-guidance-grazing-and-muirburn> [accessed: 28/01/2026].



Summary Action	Timescale Relative to Planning Consent
Identify threats to the structure and function of habitats and recommend appropriate management actions	Annual landowner self-reporting supported by formal team inspections every 3 years
Monitoring (compliance checks for Farm Plans) / Reporting	Every year for the lifespan of the Proposed Project: years 5-8 specialist site visits to be conducted per year, then after year 8, annual landowner self-reporting supported by formal team inspections every 3 years
Remedial actions (similar to establishment actions)	As required; formal team inspections would be reinstated if landowner self-reporting found to be unsatisfactory

3.2.3.2 Objective 3.2: Management of Wet Grassland Habitat (GS4) for Marsh Fritillary

Marsh fritillary larval is listed as vulnerable on the red list of Irish butterflies and is listed on Annex II of the Habitats Directive⁵⁷. To compensate for the loss of suitable habitat for the species within the proposed Wind Farm Site, 2.58 ha of Wet grassland (GS4) will be managed within the enhancement lands for the secondary target species marsh fritillary. There may be additional ancillary benefits to marsh fritillary arising from management of hen harrier habitat and so additional habitats beyond this 2.58 ha may potentially be available for marsh fritillary.

Targets

The targets for success are taken from guidance on '*Marsh Fritillary Habitat Condition*⁵⁸:

- Implement conservation grazing techniques to promote biodiversity;
- Evidence of cattle grazing;
- Absence of overgrazing and poaching;
- Structured vegetation with variation in sward height;
- >10% cover of low invading scrub (<0.25m);
- <10% cover of tall scrub (>0.5m);
- Vegetation height 12-25cm tall;
- >20% frequency of at least 3-9+/m² plants of Devil's-bit scabious *Succisa pratensis*;
- Habitat being occupied by the secondary target species marsh fritillary.

Establishment Actions

A) Grazing Regime

⁵⁷ Regan, E.C., Nelson, B., Aldwell, B., Bertrand, C., Bond, K., Harding, J., Nash, D., Nixon, D. & Wilson, C.J. (2010) Ireland Red List No. 4 – Butterflies. National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland. Available at: https://www.npws.ie/app/uploads/2021/04/RL_2010_Butterflies.pdf [accessed: 28/01/2026].

⁵⁸ National Biodiversity Data Centre (2025a) Marsh Fritillary Habitat Condition Form (v3). Available at: https://biodiversityireland.ie/app/uploads/2025/11/Marsh-Fritillary-Habitat-Condition-Form_v32025.pdf [accessed: 28/01/2026].



Small-scale non-intensive farming with cattle in spring and summer months is the optimum approach to managing wet grassland for marsh fritillary⁵⁹; cattle grazing best practice facilitates the creation of an uneven sward structure, which is favoured by the marsh fritillary⁵⁹.

Grazing rates will likely vary from year to year, but recommended grazing rates prescribe 1LU/ha of cattle⁶⁰ (INCC, 2018). Stocking rates may not be increased without written recommendation within monitoring reports.

Monitoring of the receiving site will include observation on sward height, with the aim of the grazing regime to maintain the sward height between 12-25 cm⁵⁹. The cattle must be moved elsewhere if the sward height reaches below 12cm, as this threshold indicative of overgrazing⁶⁰. Similarly, if poaching is noted throughout the site, then adjustments to stocking rates and/or the length of the grazing season must be made. Supplementary feed will not be placed within the area as it can lead to localised nutrient enrichment.

Controlled burning events will not be implemented⁶⁰. Sheep grazing within enhancement lands for marsh fritillary is to be avoided as it is unsuitable for the species⁵⁹.

B) Cessation of Fertiliser Application

As listed in Section 3.2.2.1, the cessation of the application of fertilizers will be implemented within the habitats managed for marsh fritillary. The aim of this measure would be to increase the species and structure diversity of the grassland sward through reduced nitrate application.

Monitoring and Remedial Actions

Monitoring and remedial actions that will be implemented include:

- Monitoring will be undertaken regularly to check for compliance with the establishment actions outlined in each respective Farm Plan.
- As the stocking rates are based on guidelines and successful results are dependent on external factors such as the weather, the grazing effects must be monitored and possibly adjusted accordingly.
- Management prescriptions will be adjusted, if required, depending on the monitoring results.
- Species composition will be recorded using relevés. The Irish Vegetation Classification (IVC) will be used for the identification of the vegetation community (IVC, no date).
- Habitat Condition Assessments will be carried out across the 2.58ha of Wet grassland (GS4) managed for the secondary target species marsh fritillary⁵⁸.
- Marsh fritillary larval web monitoring will be conducted each monitoring year⁶¹.

⁵⁹ Phelan, N., Nelson, B., Harding, J. & Lysaght, L. (2021) Ireland's Butterflies Series No. 1: Habitat Management for the Marsh Fritillary. National Biodiversity Data Centre, Waterford. Available at: <https://biodiversityireland.ie/app/uploads/2021/08/Irelands-Butterfly-Series-Marsh-Fritillary-WEB.pdf> [accessed: 28/01/2026].

⁶⁰ INCC (2018) Habitat Management: The Marsh Fritillary Butterfly. Institute of Nature Conservation Cymru / Natural Resources Wales. Available at: <https://www.natureconservation.wales/wp-content/uploads/2021/02/INCC-Habitat-Management.-The-Marsh-Fritillary-Butterfly-Eng.pdf> [accessed: 28/01/2026].

⁶¹ National Biodiversity Data Centre (2025) Marsh Fritillary Larval Survey Form. Available at: <https://biodiversityireland.ie/app/uploads/2025/11/Marsh-Fritillary-Larval-Survey-Form-2025.pdf> [accessed: 28/01/2026].



- Where invasive non-native species (e.g. rhododendron, self-seeded conifers) are present, removal will be undertaken using the least damaging techniques practicable e.g. targeted cutting, pulling, or herbicide injection by specialists where necessary and lawful, and will be followed by habitat recovery measures to prevent re-invasion (EIAR Chapter 5 – Biodiversity, Appendix 5-8).

Programme

Table 3-6: Indicative Management and Monitoring Programme for Objective 2.5

Summary Action	Timescale Relative to Planning Consent
Baseline marsh fritillary habitat condition assessment surveys	Year 3
Development and agreement of Farm Plans / Liaison with NPWS	Year 3
Management of hydrology, invasive species, fire, turbary, grazing, supplementary feed, bracken and other damaging activities	From the commencement of construction (Year 4), and then every year for the lifespan of the Proposed Project
Record IVC vegetative composition using relevés.	Annual landowner self-reporting supported by formal team inspections every 3 years
Marsh fritillary larval web monitoring	Annual landowner self-reporting supported by formal team inspections every 3 years
Monitoring marsh fritillary habitat condition assessment surveys	Annual landowner self-reporting supported by formal team inspections every 3 years
Identify threats to the structure and function of habitats and recommend appropriate management actions	Annual landowner self-reporting supported by formal team inspections every 3 years
Monitoring (compliance checks for Farm Plans) / Reporting	Every year for the lifespan of the Proposed Project: years 5-8 specialist site visits to be conducted per year, then after year 8, annual landowner self-reporting supported by formal team inspections every 3 years
Remedial actions (similar to establishment actions)	As required; formal team inspections would be reinstated if landowner self-reporting found to be unsatisfactory

3.2.3.3 Objective 3.3 Management of (Mixed) Broadleaved Woodland (WD1)

A combined total of 4.9ha of (Mixed) broadleaved woodland (WD1) will be planted within the enhancement lands to compensate for the loss of 2.9ha of higher value foraging habitat for bat species within the proposed Wind Farm Site as well as the loss of 1.96ha of (Mixed) broadleaved woodland (WD1) along the TDR.



Targets

Minimum targets for success are defined by the Annex I habitat condition assessments for 91E0 Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae) and are summarised below⁶²:

- Positive indicator species: At least 1 target species; >6 positive species;
- Negative species cover: <10% cover of plot;
- Negative species regeneration: Absent;
- Median canopy height: >7 m;
- Total canopy cover: >30% of plot;
- Proportion of target species in canopy: >50% of canopy;
- Native shrub layer cover: 10–75% of plot;
- Native dwarf shrub/field layer: >20% of plot, height >20 cm;
- Bryophyte cover: >4%;
- Grazing pressure: Absent;
- Nettle (*Urtica dioica*) cover: <75% cover of plot.

Positive indicator species inclusive of target species for the Annex I habitat type are listed below⁶²:

- Target species: alder *Alnus glutinosa*, ash *Fraxinus excelsior*, grey willow *Salix cinerea*, willow *Salix spp.*
- Other woody species: downy birch *Betula pubescens*, hawthorn *Crataegus monogyna*, bittersweet nightshade *Solanum dulcamara*, guelder rose *Viburnum opulus*
- Herbs, ferns & graminoids: creeping bent *Agrostis stolonifera*, wild angelica *Angelica sylvestris*, remote sedge *Carex remota*, meadowsweet *Filipendula ulmaria*, marsh bedstraw *Galium palustre*, yellow iris *Iris pseudacorus*, gypsywort *Lycopus europaeus*, water mint *Mentha aquatica*, reed canary grass *Phalaris arundinacea*, creeping buttercup *Ranunculus repens*, bloody dock *Rumex sanguineus*, common nettle *Urtica dioica*.
- Mosses: pointed spear-moss *Calliergonella cuspidata*, tree-climbing moss *Climacium dendroides*, foxtail feather-moss *Thamnobryum alopecurum*.

Establishment Actions

A) Woodland Planting

The Irish Native Woodland Scheme (NWS), under the 2023-2027 Forestry Programme, supports landowners in establishing new native woodlands⁶³. A forester and ecologist registered under the native woodland scheme registered will be contracted to oversee the application process, planting, and maintenance of the woodland.

⁶² Daly, O.H., O'Neill, F.H., & Barron, S.J. (2023). The monitoring and assessment of four EU Habitats Directive Annex I woodland habitats. Irish Wildlife Manuals, No. 146. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Ireland. Available at: IWM146.pdf [accessed: 28/01/2026].

⁶³ Department of Agriculture, Food and the Marine. (2023). Farm forestry booklet: Plant the forest that suits your farm [PDF]. Government of Ireland. Available at: <https://assets.gov.ie/static/documents/farm-forestry-booklet-3b208876-f664-44a3-843e-2d98890cf07d.pdf> [accessed: 28/01/2026].



The forester and ecologist will select an appropriate planting mix based on the underlying soil type. The most suitable areas for planting within the enhancement lands are the Wet grassland (GS4) areas. The underlying soil type for Wet grassland (GS4) is likely a gley soil. Under such circumstances, the most appropriate planting mix to select for woodland for establishment consists of: alder *Alnus glutinosa* (50%), grey willow *Salix cinerea* (10%), downy birch *Betula pubescens* (10%), pedunculate oak *Quercus robur* (10%), hawthorn *Crataegus monogyna* (5%), plus minor species (15%) comprising at least one of the following: holly *Ilex aquifolium*, hazel *Corylus avellana*, guelder rose *Viburnum opulus*⁶³.

It is important to note that peatlands are not suitable for tree planting and are not eligible for planting under the scheme, due to their ecological and hydrological sensitivities (S.I. No. 484/2023).

B) Hydrology

As listed in Section 3.2.2.2, hydrological restoration will also form part of habitat creation, where appropriate, with drains blocked. This will facilitate the re-establishment of natural riverine processes and alluvial habitats, specifically the development of alluvial woodland.

Monitoring and Remedial Actions

Monitoring and remedial actions that will be implemented include:

- Monitoring will be undertaken regularly to check for compliance with the establishment actions outlined in each respective Farm Plan.
- Management prescriptions will be adjusted, if required, depending on the monitoring results.
- Species composition will be recorded using relevés. The Irish Vegetation Classification (IVC) will be used for the identification of the vegetation community (IVC, no date).
- Where invasive non-native species (e.g. rhododendron, self-seeded conifers) are present, removal will be undertaken using the least damaging techniques practicable e.g. targeted cutting, pulling, or herbicide injection by specialists where necessary and lawful, and will be followed by habitat recovery measures to prevent re-invasion (EIAR Chapter 5 – Biodiversity, Appendix 5-8).

Programme

Table 3-7: Indicative Management and Monitoring Programme for Objective 2.5

Summary Action	Timescale Relative to Planning Consent
Development and agreement of Farm Plans / Liaison with NPWS	Year 3
Management of hydrology, invasive species, and other damaging activities	From the commencement of construction (Year 4), and then every year for the lifespan of the Proposed Project
Record IVC vegetative composition using relevés.	Annual landowner self-reporting supported by formal team inspections every 3 years
Monitoring Annex I habitat condition assessment surveys	Annual landowner self-reporting supported by formal team inspections every 3 years
Identify threats to the structure and function of habitats and recommend appropriate management actions	Annual landowner self-reporting supported by formal team inspections every 3 years



Summary Action	Timescale Relative to Planning Consent
Monitoring (compliance checks for Farm Plans) / Reporting	Every year for the lifespan of the Proposed Project: years 5-8 specialist site visits to be conducted per year, then after year 8, annual landowner self-reporting supported by formal team inspections every 3 years
Remedial actions (similar to establishment actions)	As required; formal team inspections would be reinstated if landowner self-reporting found to be unsatisfactory

3.2.3.4 Objective 3.4 Establishment of Hedgerows (WL1) and Treelines (WL2)

A combined total of 1.5km of Hedgerows (WL1) and Treelines (WL2) will be established within the enhancement lands to compensate for habitat loss as a result of the Proposed Project. Objective 2.7 is in alignment with Objective 2.2 Section 3.2.2.1 d), consequently, the hedgerow planting and enhancement for hen harrier can also fulfil this compensation objective.

Targets

Minimum targets for success are defined by the ‘*Hedgerow Appraisal System*’⁶⁴ and are summarised below.

- Establishing a minimum of 1.5km of Hedgerows (WL1)/Treelines (WL2)
- Species Diversity Significance (10+ species / 30m strip);
- Ground Flora Significance Floristic: (>7 species / 30m strip);
- Ground Flora Significance Pteridophytes: (>5 species);
- Habitat Connectivity Significance: Multiple links with semi-natural habitats;
- Landscape Significance: Mature trees;
- Structural Variables: Height >4m and Width >3m;
- Profile: Overgrown top heavy with outgrowth at base;
- Basal density: Dense; and,
- Continuity: Continuous.

Establishment Actions

A) Species Diversity

Species will be selected for planting to maximise the biodiversity value of the Hedgerows (WL1) with the aim of supporting >10 favourable species /30m strip inclusive of trees, shrubs and climbers⁶⁴.

Favourable hedgerow tree and shrub species consist of: Alder *Alnus glutinosa*, Silver birch *Betula pendula*, Dogwood *Cornus sanguinea*, Hazel *Corylus avellana*, Hawthorn *Crataegus monogyna*, Broom *Cytisus scoparius*, Spindle-tree *Euonymus europaeus*, Ash *Fraxinus excelsior*, Ivy *Hedera helix*, Holly *Ilex aquifolium*, Honeysuckle *Lonicera periclymenum*, Crab

⁶⁴ Foulkes, N., Fuller, J., Little, D., McCourt, S. & Murphy, P., 2013. Hedgerow Appraisal System: Best Practise Guidance on Hedgerow Surveying, Data Collation and Appraisal. Available at: <https://hedgerows.ie/wp-content/uploads/2019/11/HAS-Publication-Final-March-2013.pdf> [Accessed 29 January 2026].



Apple *Malus sylvestris*, Bog Myrtle *Myrica gale*, Scots pine *Pinus sylvestris*, Black poplar *Populus nigra*, Aspen *Populus tremula*, Wild cherry *Prunus avium*, Bird Cherry *Prunus padus*, Blackthorn, sloe *Prunus spinosa*, Sessile oak *Quercus petraea*, Pedunculate oak *Quercus robur*, Purging Buckthorn *Rhamnus cathartica*, Wild Rose *Rosa spp.*, Raspberry *Rubus idaeus*, Eared willow *Salix aurita*, Goat willow *Salix caprea*, Rusty willow *Salix cinerea* subsp. *oleifolia*, Bay Willow *Salix pentandra*, Elder *Sambucus nigra*, Bittersweet *Solanum dulcamara*, Whitebeam *Sorbus aria*, Whitebeam *Sorbus hibernica*, Rowan *Sorbus aucuparia*, Yew *Taxus baccata*, Gorse *Ulex europaeus*, Wych Elm *Ulmus glabra*⁶⁴.

B) Structure

Wide hedgerows, such as those to be implemented under Objective 2.2, have a wider biodiversity value beyond foraging hen harrier with hedgerows with a width exceeding 3m considered to be highly favourable⁶⁴. Similarly, the recommendation to plant gaps in hedgerows will increase the overall biodiversity value with continuous hedgerows considered highly favourable and those with >10% of >5m considered in unfavourable condition⁶⁴.

C) Buffer Strip

As listed in Objective 2.2 buffer strip along hedgerows will be implemented with grassy margins 2m either side of the hedge⁶⁴. The buffer strips will be fenced off to protect from grazing. No artificial fertilisers or herbicides will be used within the buffer strip.

D) Management

Failed or dead plants have to be replaced in the following planting seasons.

Management of Hedgerows (WL1) will be implemented using low impact mechanical means on a minimum 3-year cycles to allow flowering and fruiting. Hedgerows will be side trimmed only and will remain un-topped for biodiversity (Teagasc, 2025).

Monitoring and Remedial Actions

Monitoring and remedial actions that will be implemented include:

- Monitoring will be undertaken regularly to check for compliance with the establishment actions outlined in each respective Farm Plan.
- Management prescriptions will be adjusted, if required, depending on the monitoring results.
- Hedgerow appraisal following guidance '*Hedgerow Appraisal System*⁶⁴ will be undertaken in monitoring years and recommendations on management will be made accordingly.
- Where invasive non-native species (e.g. rhododendron, self-seeded conifers) are present, removal will be undertaken using the least damaging techniques practicable e.g. targeted cutting, pulling, or herbicide injection by specialists where necessary and lawful, and will be followed by habitat recovery measures to prevent re-invasion (EIAR Chapter 5 – Biodiversity, Appendix 5-8).

Programme

Table 3-8 Indicative Management and Monitoring Programme for Objective 2.6

Summary Action	Timescale Relative to Planning Consent
Baseline marsh fritillary habitat condition assessment surveys	Year 3



Summary Action	Timescale Relative to Planning Consent
Development and agreement of Farm Plans / Liaison with NPWS	Year 3
Management of invasive species	From the commencement of construction (Year 4), and then every year for the lifespan of the Proposed Project
Record IVC vegetative composition using relevés.	Annual landowner self-reporting supported by formal team inspections every 3 years
Monitoring hedgerow condition using the Hedgerow Appraisal System	Annual landowner self-reporting supported by formal team inspections every 3 years
Identify threats to the structure and function of habitats and recommend appropriate management actions	Annual landowner self-reporting supported by formal team inspections every 3 years
Monitoring (compliance checks for Farm Plans) / Reporting	Every year for the lifespan of the Proposed Project: years 5-8 specialist site visits to be conducted per year, then after year 8, annual landowner self-reporting supported by formal team inspections every 3 years; formal team inspections would be reinstated if landowner self-reporting found to be unsatisfactory
Remedial actions (similar to establishment actions)	As required; formal team inspections would be reinstated if landowner self-reporting found to be unsatisfactory



3.3 Proposed Monitoring

A monitoring programme will be implemented to record the success of the compensation and enhancement measures and identify the need for adaptive management and/or remedial measures, if required. A more detailed monitoring programme will be provided in the detailed BMP. Where baseline survey work will take place post agreement of the detailed BMP (e.g. post-felling within the NEAs), the monitoring programmes may be amended, if necessary.

The monitoring of hen harrier usage of the compensation and enhancement lands will aim to provide feedback on the success of the implemented prescriptions and to adapt these where required. Findings will be disseminated more widely to improve good practice across Ireland. The programme for the farm plans will be in place for the operational lifetime of the proposed wind.

It is critical that the process remains flexible, allowing alterations to prescriptions in response to the monitoring programme. The monitoring results for each year will therefore be analysed and presented in an annual report to the planning authority. Recommendations will be presented regarding any changes to management practices and/or monitoring requirements that may be considered necessary. Any updates to the detailed BMP prescriptions would be discussed and agreed with the planning authority.

An outline monitoring plan is given below, which aligns with the monitoring actions recommended for Aims 1, 2 and 3.

3.3.1 Hen Harrier

3.3.1.1 Birds

Bird monitoring has been informed by NatureScot best-practice guidance⁶⁵ and will comprise the following elements described below.

Breeding raptor surveys will be undertaken in the year prior to the Proposed Project becoming operational, and in years 1, 2, 3, 5 and every five years thereafter for the lifespan of the Proposed Project once the Proposed Project has become operational.

Vantage point (VP) surveys and carcass searches will be undertaken in years 1, 2, 3, 5, 10 and 15 once the Proposed Project has become operational.

Breeding raptor surveys

Targeted breeding raptor surveys will be undertaken during the breeding seasons (April to August inclusive) focused on nesting hen harrier within the Site using the methodology outlined in Hardey et al. (2013)⁶⁶. This will be used to establish whether hen harrier are using the NEAs (and/or other areas within 2 km of the Site) for nesting as well as indicators of breeding success, such as fledging rates.

VP surveys

Targeted VP surveys will be undertaken to assess hen harrier usage of the Site and foraging enhancement lands in the breeding season (April to August inclusive) using the methodology

⁶⁵ NatureScot (2009). Guidance on Methods for Monitoring Bird Populations at Onshore Wind Farms. NatureScot, Battleby, Scotland.

⁶⁶ Hardey, J., Crick, H., Wernham, C., Riley, H. and Thompson, D. (2006). Raptors: a field guide to survey and monitoring. 3rd edition. The Stationery Office, Edinburgh.



outlined in NatureScot (2025)⁶⁷ guidance. This will involve six hours of survey per vantage point per month with vantage point viewsheds covering the Site plus enhancement lands.

Carcass searches

Carcass searches will be undertaken at least once a month around each turbine location during the breeding season (April to August inclusive). These surveys should be carried out by qualified ecologists, and the searches may either be human- or dog-led. Methods to correct for biases in searcher efficiency and scavenger removal of carcasses will be included as part of these searches.

Adaptive management

The results of each year's monitoring will be presented in a report that will be submitted to the planning authority.

Regarding breeding raptor and VP surveys, if the monitoring results show that the birds are not using the NEAs and foraging lands, adaptive management will be implemented to ensure any remedial actions are undertaken as required.

Regarding carcass searches, after Year 15, if no significant effects are shown (this would be demonstrated via an assessment of recorded mortality in the light of changes in current conservation status at the time of the monitoring survey, indicating that Project is contributing to the decline or hindering restoration efforts for the relevant species), the monitoring should no longer be required, subject to agreement with the planning authority.

If carcass search monitoring indicates potentially significant levels of collision mortality for birds of conservation concern, adaptive management will be implemented, which will include mitigation measures and further monitoring will also be implemented, to ensure there are no significant effects on any birds of conservation concern.

Adaptive management will be implemented following discussions and agreement with NPWS and consideration of relevant experience from other wind farm sites that is available at the time.

The effectiveness of any adaptive measures will be reviewed against monitoring results and refined as necessary in agreement with NPWS.

3.3.1.2 Nesting Habitat

Habitat surveys in the NEAs will be undertaken once every year for the first five years post-felling of conifer plantation until heather and scrub mosaic habitats have been established and then once every five years thereafter for the lifespan of the Proposed Project. Surveys will assess vegetation condition, fire risk and overall suitability for nesting hen harrier. Scoring criteria will be developed using resources available from schemes such as the Irish Hen Harrier Project³³.

Examples of such criteria that could be used are shown below but will be reviewed and discussed with NPWS and Leitrim County Council prior to the preparation of the final BMP.

1. Vegetation Establishment Indicators

Indicator 1.1 – Heather Establishment Success

Metric:

⁶⁷ NatureScot (2025). Recommended bird surveys to inform impact assessment for onshore wind farms. NatureScot, Battleby, Scotland.



- Percentage cover of *Calluna vulgaris* within monitoring quadrats.
- Sampling Protocol: 2 m × 2 m quadrats at 50 m intervals along fixed transects (covering full NEAs).
- Threshold / Trigger for Remedial Action: < 20% heather cover by Year 3 triggers reseeding or additional brush deployment.
- Time-Bound Target: ≥ 40% cover across monitored quadrats by Year 5.

Indicator 1.2 – Scrub Composition and Density

Metric:

- Proportion (%) of native desirable scrub (e.g. *Salix*, *Myrica gale*) vs. undesirable scrub (e.g. gorse).
- Mean scrub height (cm) in each quadrat/transect.
- Threshold / Trigger: Gorse exceeding 25% cover or > 0.5 m height in early-stage areas triggers mechanical flailing/cutting.
- Time-Bound Target: Structural mosaic (heather + open ground + scattered scrub) present by Year 6.

2. Regeneration and Habitat Quality Indicators

Indicator 2.1 – Conifer Self-Seeding Rate

Metric:

- Number of regenerating conifer seedlings per 100 m transect.
- Threshold / Trigger: 10 seedlings per transect triggers immediate seedling sweep and stump/root treatment.
- Time-Bound Target: Conifer regeneration consistently < 5 seedlings per transect by Year 4 onward.

Indicator 2.2 – Ground Layer Condition

Metric:

- Percentage of quadrats dominated by competitive grasses (e.g. *Molinia* or *Agrostis*).
- Threshold / Trigger: 30% of quadrats showing grass dominance triggers targeted grass cutting or directed grazing.
- Time-Bound Target: Grass dominance reduced to < 15% of quadrats within 2 years of intervention.

3. Hydrological and Soil Indicators

Indicator 3.1 – Soil Moisture Condition

Metric:

- Monthly recording of soil moisture using fixed dipwells or soil moisture probes.
- Threshold / Trigger: Water table consistently > 10 cm above expected level → reduce blocking.
- Water table consistently > 20 cm below expected level → install additional peat dams.
- Time-Bound Target: Stable moisture regime suitable for heath regeneration achieved by Year 3.



Indicator 3.2 – Bare Peat/Erosion Extent

Metric:

- Area (m²) of exposed bare peat mapped annually.
- Threshold / Trigger: Increase > 10% year-on-year triggers erosion control (brash mulching, coir matting).
- Time-Bound Target: Stabilisation of bare peat areas within 2 years of detection.

4. Habitat Suitability for Hen Harrier Indicators

Indicator 4.1 – Nest-Suitable Vegetation Structure

Metric:

- Proportion of vegetation plots with heather height ≥ 30–40 cm.
- Threshold / Trigger: < 20% suitable nesting cover by Year 4 triggers selective cutting to release tall stands or targeted reseeded.
- Time-Bound Target: ≥ 40% of plots offering nesting-suitable vegetation by Year 6.

Indicator 4.2 – Foraging Habitat Suitability

Metric:

- Percentage of ground layer in “foraging-favourable” condition: short heather (< 20 cm), grass-heath mix, or open wet areas.
- Threshold / Trigger: < 30% foraging-favourable ground triggers additional mowing/grazing adjustments.
- Time-Bound Target: ≥ 50% foraging-favourable habitat by Year 6.

5. Fire-Risk Indicators

Indicator 5.1 – Accumulation of Flammable Biomass

Metric:

- Presence of dry brash, rank grass or accumulated vegetation in fixed sample plots.
- Threshold / Trigger: 10% increase in flammable biomass across plots triggers targeted cutting and expansion of firebreaks.
- Time-Bound Target: Firebreaks fully established by Year 3 and maintained annually thereafter.

3.3.2 Habitats and Secondary Target Species

Within each monitoring year (1-3, 5, 10, 20 and 35), the habitats to be restored and established under the compensation measures within the enhancement lands will be surveyed. Full details can be found in the relevant sections and are summarised below:

- As listed in Section 3.2.3.1, the upland habitats, Upland blanket bog (PB2) and Cutover bog (PB4) will be surveyed using Annex I Habitat Condition Assessments⁵⁴ as well as the IVC⁶⁸.

⁶⁸ National Biodiversity Data Centre (no date) Irish Vegetation Classification – IVC Classification Explorer. Available at: <https://biodiversityireland.ie/projects/ivc-classification-explorer/> [accessed: 28/01/2026].



- As listed in Section 3.2.3.2, the Wet grassland (GS4) habitat will be surveyed using the IVC⁶⁸, marsh fritillary Habitat Condition Assessment⁵⁸ and Larval Web Survey Form⁶¹.
- As listed in Section 3.2.3.3, the Broadleaved woodland (WD1) will be surveyed using the IVC⁶⁸, as well as the Annex I Habitat Condition Assessments⁶².
- As listed in Section 3.2.3.4, Hedgerows (WL1) and Treelines (WL2) will be surveyed using the Hedgerow Appraisal System⁶⁴.

Subsequent reporting will be issued in each monitoring year and will list the findings, which will likely inform future habitat management actions.

3.3.2.1 Compliance with Farm Plan

Compliance checks with farm plans would be undertaken every year for the lifespan of the Proposed Project and would comprise of two visits a year for the first three years of monitoring and once every year thereafter. This would involve monitoring of vegetation and habitats against agreed criteria, which will be developed using resources available from schemes such as the Irish Hen Harrier Project³³.

Examples of simple, objective and replicable indicators for agricultural and peatland foraging habitats that could be used are outlined below. These will be refined in consultation with NPWS and Leitrim County Council during preparation of the final BMP.

1. Grassland Structure Indicators

Indicator A1 — Sward Height and Structural Diversity

Metric:

- Mean sward height (cm) and proportion of monitoring points within target structural classes (short, medium, tussocky).
- Trigger: 60% of points falling into a single height class (i.e., overly uniform sward) triggers grazing adjustment or patch-mosaic mowing.
- Target: At least three sward height classes present across each landholding by Year 3.

2. Rush (*Juncus*) Cover Indicators

Indicator A2 — Rush Cover Proportion

Metric:

- % cover of rush in 2 m × 2 m quadrats at fixed points.
- Trigger: Rush cover exceeding 70% in > 30% of quadrats triggers mechanical flailing/strip cutting.
- Target: Rush cover maintained at 20–70% in > 70% of quadrats.

3. Hedgerow Structure Indicators

Indicator A3 — Hedgerow Density and Continuity

Metric:

- % of hedgerow length with dense structure (> 3 m height and sufficient basal thickness).
- Trigger: < 70% of hedgerow length meeting density criteria triggers coppicing, gapping-up or fencing.
- Target: Continuous, dense foraging lines along all priority hedgerows by Year 5.



4. Scrub Management Indicators

Indicator A4 — Scrub Encroachment into Grassland

Metric:

- % of grassland area with scrub height > 1 m or scrub cover > 20%.
- Trigger: Scrub exceeding thresholds triggers mechanical flailing or brush-saw thinning.
- Target: Scrub cover maintained at < 20% of grassland area unless explicitly designated for patch-scrub habitat.

5. Nutrient Indicator Species / Enrichment Indicators

Indicator A5 — Competitive Grass or Enrichment-Indicator Frequency

Metric:

- % quadrats dominated by *Molinia*, *Agrostis*, or ryegrass.
- Trigger: 30% dominance triggers nutrient reduction actions (remove feeding sites, adjust grazing, mechanical mowing).
- Target: Grass dominance reduced to < 15% of quadrats by Year 4.

6. Hydrological Stability Indicators

Indicator P1 — Water Table / Surface Moisture Condition

Metric:

- Dipwell levels or surface moisture class recorded at fixed peatland points.
- Trigger: Water table consistently > 20 cm below target → install additional peat dams; Water table consistently > 10 cm above target → notch dams or adjust blocking.
- Target: Stable moisture conditions suitable for heather/Sphagnum regeneration by Year 3.

7. Purple Moor Grass (*Molinia*) Dominance Indicator

*Indicator P2 — *Molinia* Cover*

Metric:

- % of monitoring quadrats where *Molinia* exceeds 50% cover.
- Trigger: 40% of quadrats dominated by *Molinia* triggers targeted cutting/flailing or adjusted summer grazing.
- Target: *Molinia* dominance reduced to < 20% of quadrats by Year 5.

8. Scrub / Woody Species Encroachment

Indicator P3 — Scrub Cover on Peatland

Metric:

- % area covered by gorse, birch, or other colonising scrub.
- Trigger: Scrub exceeding 10–15% cover triggers removal or thinning.
- Target: Open peatland maintained with scrub cover < 10% unless identified for deliberate patch-scrub heterogeneity.

9. Bare Peat Condition and Erosion

Indicator P4 — Bare Peat Extent



Metric:

- Area of bare peat mapped annually.
- Trigger: 10% increase year-on-year triggers erosion control (heather brush, coir matting, vegetation plug planting).
- Target: Stabilisation of bare peat within 2 years of first detection.

10. Peatland Vegetation Recovery

Indicator P5 — Heather/Sphagnum Presence in Monitoring Quadrats

Metric:

- % quadrats containing regenerating heather.
- Trigger: < 20% quadrats showing recovery by Year 3 triggers targeted seeding, brush-spreading, or hydrology correction.
- Target: ≥ 40% quadrats showing heather regeneration by Year 5.

3.4 Summary of Overall OBMP Programme

The overall programme set out in Table 3-9 and Table 3-10 provides a broad estimation of start and finish timelines for the various measures set out in this OBMP. A more detailed programme will be provided in the detailed BMP post-consent. This schedule will then be revised, if required, throughout the lifetime of the Proposed Project.





Appendix A Drawings

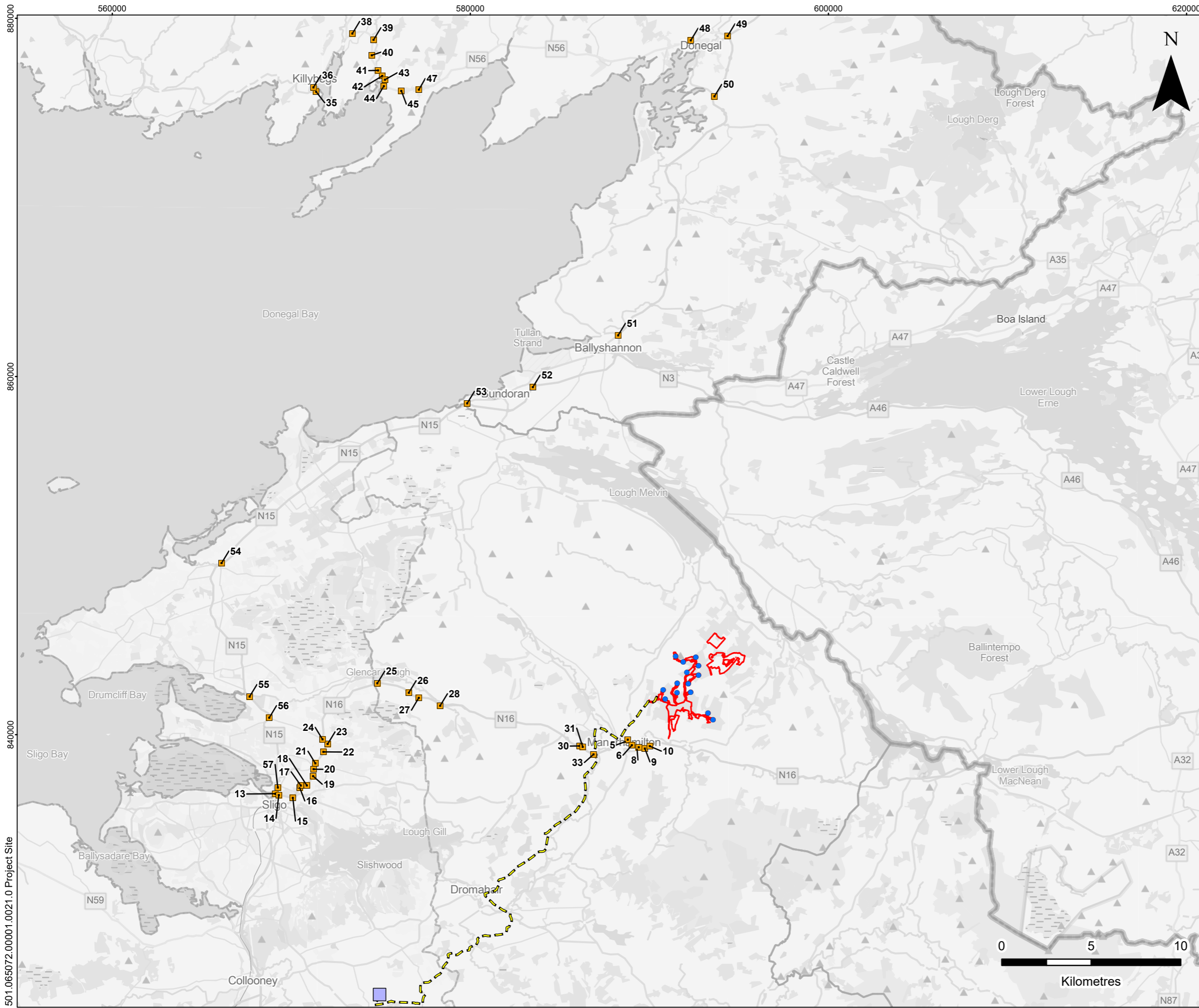
Outline Biodiversity Management Plan

Lissinagroagh Wind Farm

FutureEnergy Ireland

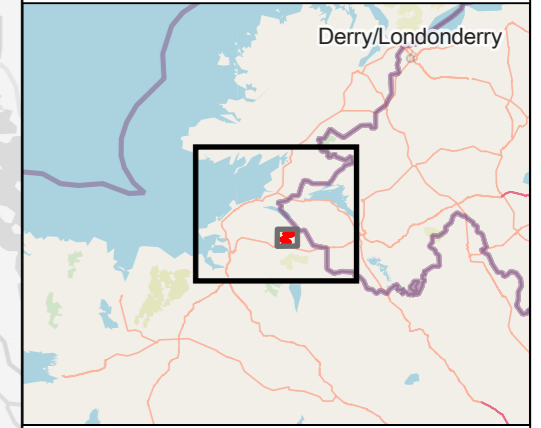
SLR Project No.: 501.065072.00001

30 March 2026



LEGEND

- Proposed Wind Farm Planning Application Boundary
- Proposed Turbine Location
- Grid Connection Infrastructure**
- Proposed Grid Connection
- Existing Srananagh 220 kV Substation Location
- Turbine Delivery Route (TDR)**
- TDR Accomodation Area Point of Interest



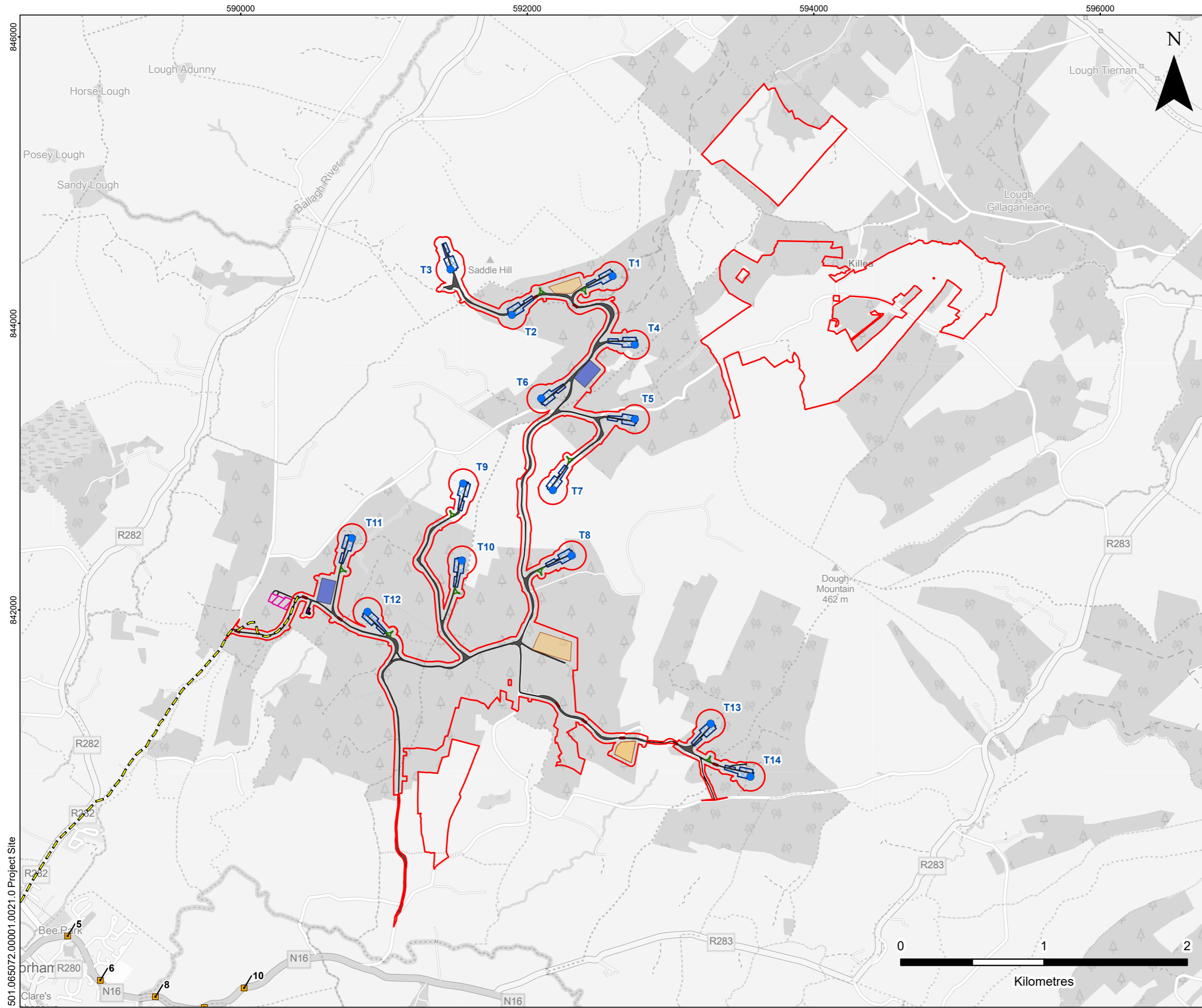
LISSINGAGROAGH WIND FARM - EIAR

**OUTLINE BIODIVERSITY
MANAGEMENT PLAN**

**PROPOSED PROJECT SITE
OVERVIEW**

DRAWING 1.1

Scale 1:200,000 @ A3	Date MARCH 2026
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LEGEND

- Proposed Wind Farm Planning Application Boundary
- Proposed Turbine Location
- Proposed Turbine Hardstand
- Proposed Substation Location
- Proposed Temporary Construction Compound
- Proposed Borrow Pit
- Proposed Permanent Met Mast Location
- Proposed Permanent Access Road
- Proposed Clear Span Bridge
- Proposed Vehicle Turning Area

Grid Connection Infrastructure

- Proposed Grid Connection

Turbine Delivery Route (TDR)

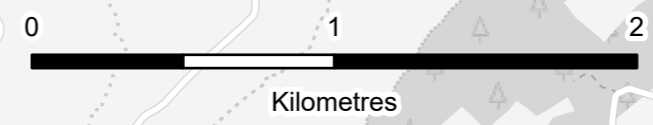
- TDR Accomodation Area Point of Interest



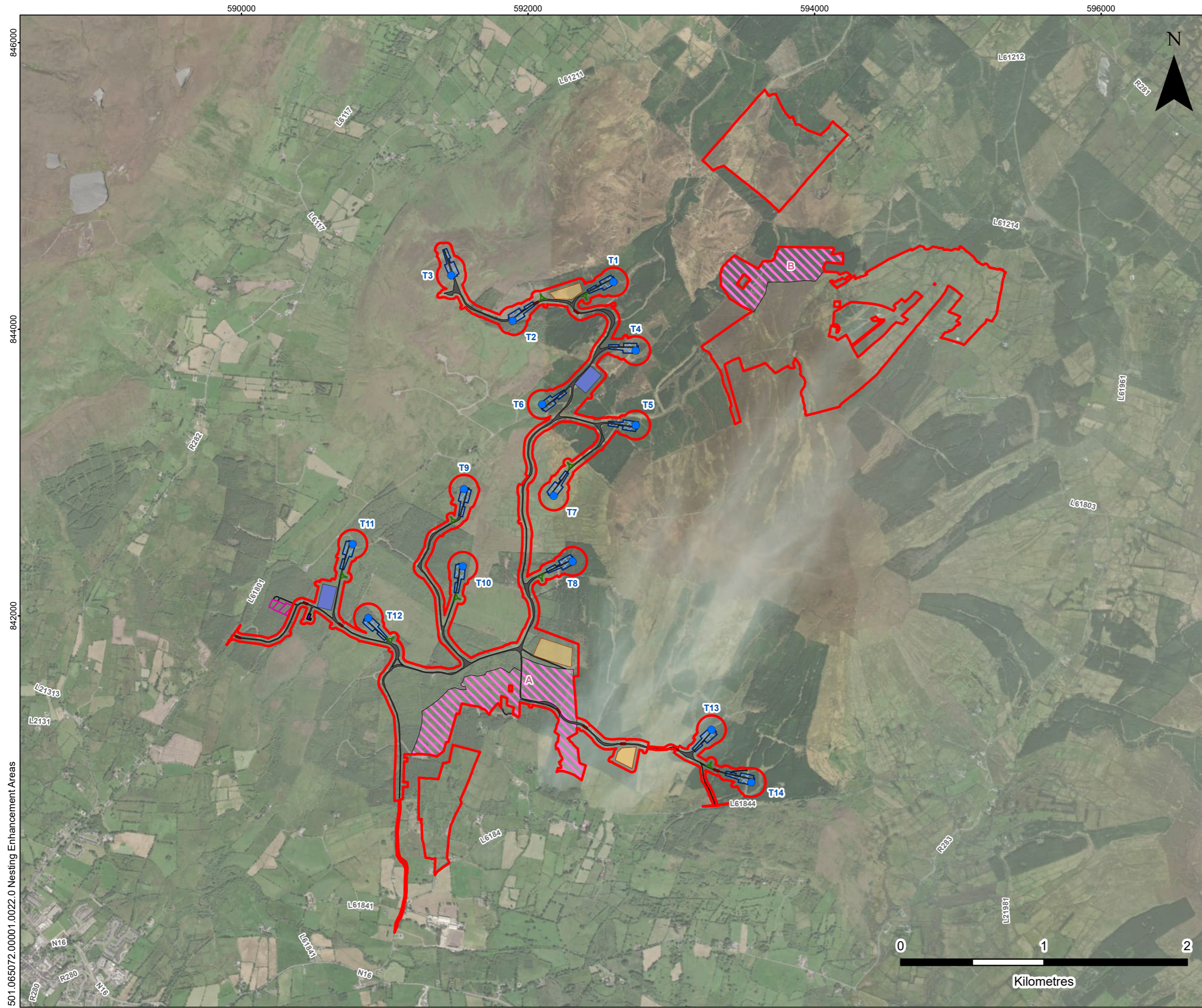
LISSINAGROAGH WIND FARM - EIAR
 OUTLINE BIODIVERSITY
 MANAGEMENT PLAN
 PROPOSED PROJECT SITE
 WIND FARM DEVELOPMENT

DRAWING 1.2

Scale 1:25,000 @ A3 Date MARCH 2026



501.065072.00001.0021.0 Project Site



LEGEND

- Proposed Wind Farm Planning Application Boundary
- Proposed Turbine Location
- Proposed Turbine Hardstand
- Proposed Substation Location
- Proposed Temporary Construction Compound
- Proposed Borrow Pit
- Proposed Permanent Met Mast Location
- Proposed Permanent Access Road
- Proposed Clear Span Bridge
- Proposed Vehicle Turning Area

Compensation Measures

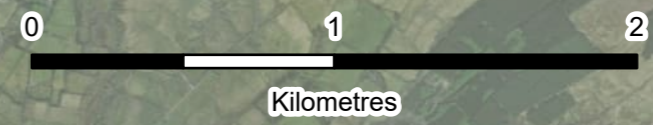
- Nesting Enhancement Area

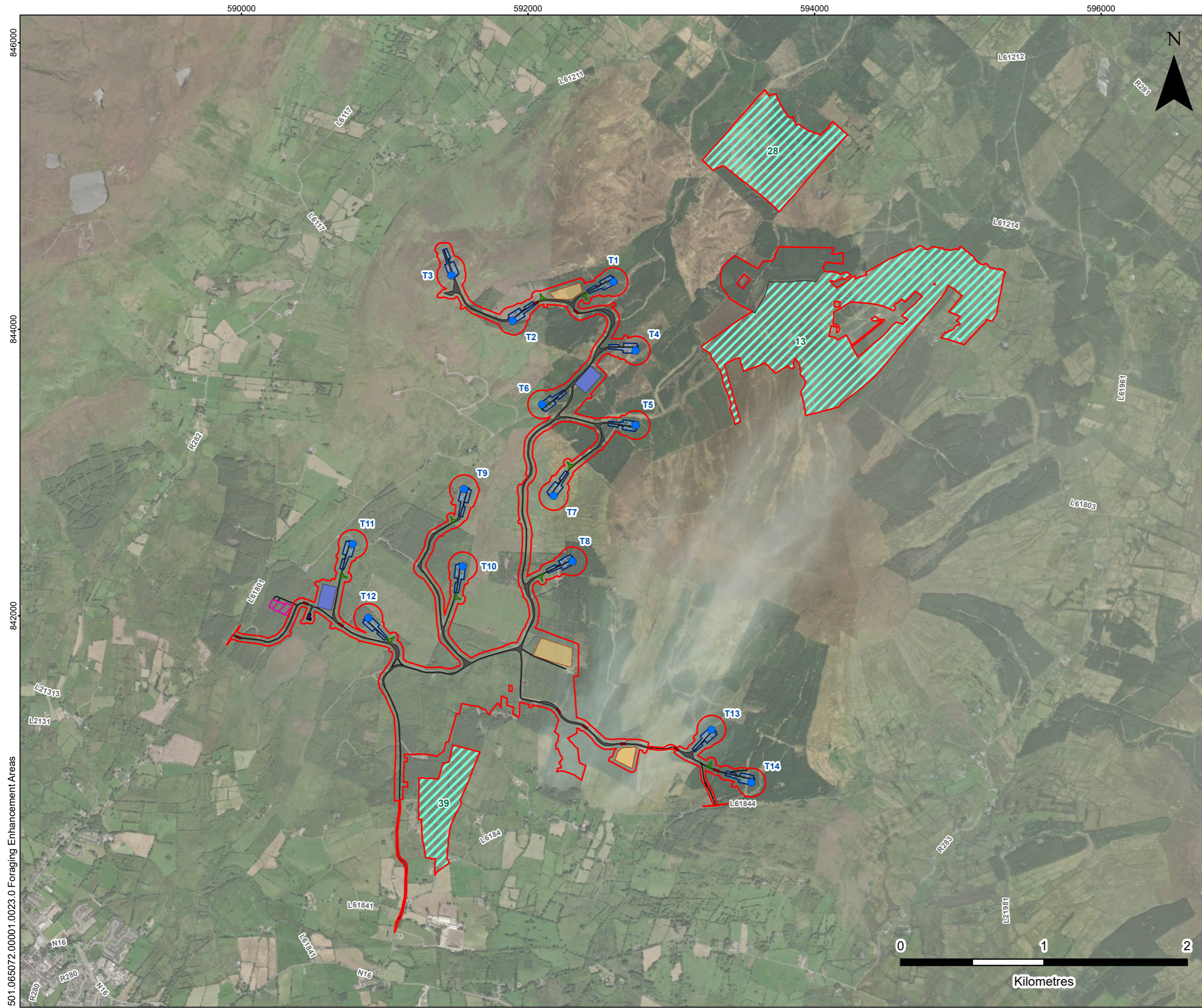


LISSINAGROAGH WIND FARM - EIAR
 ORNITHOLOGY
**HEN HARRIER
 NESTING ENHANCEMENT AREAS**

DRAWING 2

Scale 1:25,000 @ A3 Date MARCH 2026





LEGEND

- Proposed Wind Farm Planning Application Boundary
- Proposed Turbine Location
- Proposed Turbine Hardstand
- Proposed Substation Location
- Proposed Temporary Construction Compound
- Proposed Borrow Pit
- Proposed Permanent Met Mast Location
- Proposed Permanent Access Road
- Proposed Clear Span Bridge
- Proposed Vehicle Turning Area

Compensation Measures

- Foraging Enhancement Area



LISSINAGROAGH WIND FARM - EIAR
 ORNITHOLOGY
 HEN HARRIER
 FORAGING ENHANCEMENT AREAS

DRAWING 3

Scale 1:25,000 @ A3 Date MARCH 2026



501.065072.00001.0023.0 Foraging Enhancement Areas



Appendix B Tobin Habitat Survey Report

Outline Biodiversity Management Plan

Lissinagroagh Wind Farm

FutureEnergy Ireland

SLR Project No.: 501.065072.00001

30 March 2026

TOBIN

10955 Future Energy Ireland
Lissinagroagh Wind Farm
Hen Harrier Enhancement
Lands – Habitat Survey

FutureEnergy Ireland

BUILT ON KNOWLEDGE

Document Control Sheet	
Document Reference	Hen Harrier Enhancement Lands – Habitat Survey
Client:	FutureEnergy Ireland
Project Reference	10955

Rev	Description	Author	Date	Reviewer	Date	Approval	Date
D01	Draft for internal review	ÚB	13/05/2024	ÁS/JS	17/05/2024	ÁS	23/05/2024
D02	Addressing Client Comments	ÚB	08/07/2024	ÁS	09/07/2024	ÁS	09/07/2024
A01	Final Version					ÁS	09/07/2024
A02	Updates	ÚB	23/10/2024	JMM	31/10/2024	ÁS	04/11/2024

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1. INTRODUCTION

TOBIN was appointed by FutureEnergy Ireland to carry out habitat surveys within potential hen harrier enhancement lands located to the north and south of the proposed Lissinagroagh Wind Farm Site.

1.1.1 Survey Area

The hen harrier enhancement lands (hereafter referred to as the Survey Area) are illustrated on Figure 1-1 below. The survey areas were obtained from shapefiles supplied by FutureEnergy Ireland. Each land Plot was given a unique identification number (ID) and the habitats have been described within this report in line with this numbering.

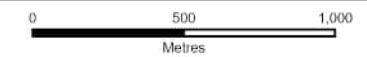
8°50'W



846000



- Legend**
- Site Boundary
 - Hen Harrier Enhancement Lands



- NOTES**
1. FIGURED DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWING.
 2. ALL DRAWINGS TO BE CHECKED BY THE CONTRACTOR ON SITE.
 3. ENGINEER TO BE INFORMED OF ANY DISCREPANCIES BEFORE ANY WORK COMMENCES.
 4. ALL LEVELS RELATE TO ORDINANCE SURVEY DATUM AT MALRI HEAD.

Rev	Date	Description	By	Chkd.
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Client: **FuturaEnergy** Ireland

Project: **Lissinagroagh Wind Farm**

Title: **Figure 1-1 Survey Area**

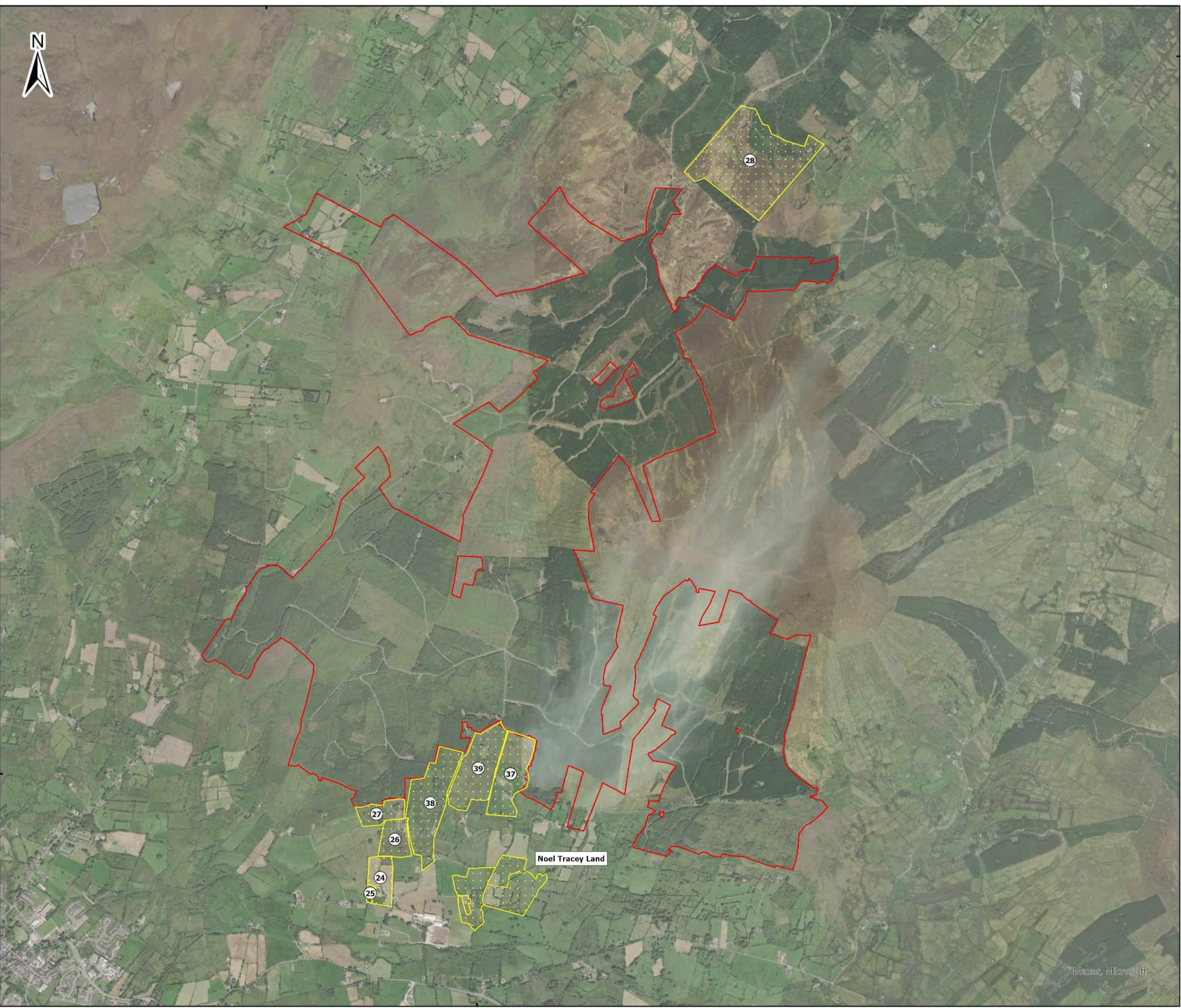
Scale @ A3: 1:25,000

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Map Ref: 10955-014-HH.ENC.L-S.BO-TOB-A Draft: A



Mapbox, Microsoft

591750

54°13'20'N

1.2 METHODOLOGY

1.2.1 Survey Methodology

TOBIN carried out the habitat surveys from the 29th of April to the 3rd of May 2024, and on the 3rd of October 2024. The entirety of the Survey Area was surveyed. Habitats were classified using '*A Guide to Habitats in Ireland*' (Fossitt, 2000), also with reference to '*Best Practice Guidance for Habitat Survey and Mapping*' (Smith *et al.*, 2011).

A description of each habitat has been provided and includes the following details (where applicable): dominant species; vegetation, sward composition and structure; height and width; density of rush; topography of the land; whether encroachment was occurring; what land management practices were being utilised; and, what grazing regime by what species was evident, and whether linear features were stockproof. In addition, the hedgerows were described following guidelines within the '*Hedgerow Appraisal System*' (Foulkes *et al.*, 2013).

The hydrology of the land was also described, in terms of the presence of drainage ditches, rivers, spring and swallow holes. Drainage ditches were described by their width, and whether any flowing water was present during the time of the survey. Rivers were described by their bank width, water width, bank depth, water depth and velocity of flow. Spring and swallow holes locations were described within habitat polygons.

Consideration of suitable habitat for hen harrier prey items was also given during the survey, with species such as meadow pipit (*Anthus pratensis*), skylark (*Alauda arvensis*) and small mammals, noted as prey items for the species (NPWS, 2022). Visual and aural records of meadow pipit and skylark were collected within the Survey Area and its surroundings, along with locations of suspected nesting areas/habitat. The surveys also assessed vegetation structure to determine suitability for small mammals, which typically prefer areas offering substantial cover. Preferred habitats for these small mammals include hedgerows, young forestry, and regions with dense vegetation cover (McCarthy *et al.*, 2021).

1.2.2 Weather Conditions

The weather conditions over the five-day survey period varied (29th of April until 3rd of May). The weather was damp, rainy, and cool on Monday (29/04/2024). Conditions dried up on Tuesday (30/04/2024), with temperature increasing steadily towards the end of the week. Thursday (02/05/2024) was the hottest day, with the highest temperatures reaching 20°C.

Weather conditions for 3rd of October were dry, cool, and averaged 15°C throughout the day.

1.2.3 Survey Limitations

No survey limitations or constraints occurred; the entire survey area was accessible and surveyed. Plot 25, areas of private residential properties, and the conifer forestry within Plot 28 were not surveyed, as requested by FutureEnergy Ireland.

1.3 PROJECT TEAM

Úna Butler M.Sc (Agr) is a qualified Ecologist with three years post-graduate experience in the environmental consultancy sector. She has been involved in a number of Screenings for

Appropriate Assessment, Natura Impact Statements and Ecological Impact Assessments predominantly for large public and private infrastructure projects. She has also carried out numerous field surveys for protected habitats and species as well as invasive species.

John Sherry (B.Sc.) is a qualified Project Ecologist/Ornithologist with TOBIN, with over five years post-graduate experience in ecology and environmental consultancy. He has been involved in the surveying and reporting of numerous large-scale renewable infrastructure projects where he has carried out Appropriate Assessment Screening reports, Natura Impact Statements, Environmental Impact Assessment Reports and Ecological Management Plans. John has a proven knowledge of field skills and has been involved with the planning and implantation of a variety of surveys including habitat surveys, non-volant mammal surveys and bat assessments. However, he has mainly been focused on ornithological surveys involving winter and breeding bird surveys associated largely with proposed wind farms or infrastructure developments.

Áine Sands (B.Sc.) is a qualified Senior Ecologist with nine years post-graduate experience in ecology and environmental consultancy. She has predominantly been involved in large public and private infrastructure projects where she has carried out numerous Screenings for Appropriate Assessments, Natura Impact Statements and Ecological Impact Assessments for the proposed developments. Áine has a strong understanding of National and European legislation associated with biodiversity and is cognisant of relevant rulings by the Court of Justice of the European Union (CJEU) associated with Appropriate Assessment. Áine also has experience with undertaking ecology surveys for protected habitats and species.

2. SURVEY RESULTS

The habitats recorded within the Survey Area have been described below, as per the unique Plot ID assigned to each land folio. Habitat maps are illustrated in Figure 2-1, which includes Plots 24, 26, 27, 38, 39, 37, and the Noel Tracey Land; and Figure 2-2, which includes Plot 28.

2.1 PLOT ID 24

Habitats recorded within Plot 24 are described hereunder:

2.1.1 Improved Agricultural Grassland

Improved agricultural grassland (GA1) comprises the majority of the land cover in Plot 24. The dominant species within this habitat is perennial ryegrass (*Lolium perenne*). The average soft rush (*Juncus effusus*) density is *ca.* 20%. Vegetation was noted to be cut short to approximately 10cm and uniform in height, with some bare soil exposed, resulting from machinery access. No encroachment of scrub was noted. Intensive land management practices were observed, including recent cutting of the grass (likely for silage), and slurry spreading. It is also likely that this habitat within Plot 24 is being grazed occasionally by cattle.



Plate 2-1: Improved Agricultural Grassland (GA1) in Plot 24

2.1.2 Wet Grassland

Wet grassland (GS4) habitat was recorded to the north and south of Plot 24. The dominant species within this habitat is soft rush, with its density of land cover ranging between 60-80%. This habitat is generally described as having mixed sward heights (between 30-40cm) of short, grazed areas with soft rush tussocks featuring frequently. Encroachment of scrub was observed in areas of the habitat to the north of the plot. The habitat within this plot was described as undulating in areas. No apparent cultivation, fertilization, or mowing of land was noted within the areas of wet grassland. These wet grassland fields were being grazed by cattle during the time of the site visit, some silage and hay bales were also present within the fields. Evidence of

sheep or deer grazing was also observed. Meadow pipits were recorded in display flight towards the north of this plot.



Plate 2-2: Wet Grassland (GS4) Habitat in Plot 24

2.1.3 Hedgerows

Hedgerows (WL1) was present within Plot 24. Hawthorn (*Crataegus monogyna*) was found to be the dominant species within this habitat.

The hedgerows towards the north and south of the plot were described as 5m high and 4m wide, with mature hawthorn featuring sporadically. Bramble (*Rubus fruticosus*) and fencing are present at the base of these hedgerows. No signs of management were evident. The hedgerows were noted to be stockproof.



Plate 2-3: Hedgerows (WL1) in Plot 24

2.2 PLOT ID 26

2.2.1 Wet Grassland

Wet grassland (GS4) comprises almost the entirety of the land cover in Plot 26. No species dominates this habitat, soft rush is present in abundance, with a density of >60%. Encroachment of hedge and/or scrub towards the northwest of the plot was noted. Mixed sward heights of short, grazed areas with soft rush tussocks with an average height of 40cm are present. The plot consists of undulating areas. Low numbers of meadow pipits were recorded across the entire plot and are likely to be breeding, as a number of display flights were observed. No apparent cultivation, fertilization or mowing was evident. This field is likely to be grazed all year around, and some old silage and hay bales were present. Some evidence of sheep/deer grazing were also present.



Plate 2-4: Wet Grassland (WS1) in Plot 26

2.2.2 Hedgerows

Hedgerows (WL1) are present along the northern, southern, and eastern boundaries of Plot 26. Hawthorn featured most frequently within this habitat.

The hedgerow to the north of the plot was 5m tall, 4m wide, with good species and structural diversity present, particularly at the ground layer. Stone walls and other stonework (BL1) also feature at the base of this hedgerow. The hedgerow did not appear to be managed; it encroaches into the surrounding fields in places. The hedgerow was noted to be stockproof.

The hedgerow to the south of the plot was described as scrubby, 2-4m high and 3m wide, and encroaches on the surrounding fields. Gorse (*Ulex europaeus*) dominates this hedgerow. No signs of management were evident, this hedgerow was classified as stockproof.

The hedgerow that runs along the eastern boundary of the plot was described as being 6m high and 4m wide, with heavily vegetated stone walls and other stonework (BL1) habitat at the base and some fencing. Good species and structural diversity was noted along this feature, with some gaps in the understory. The hedgerow did not seem to be managed and was deemed to be stockproof.



Plate 2-5: Hedgerow (WL1) to the North, South and East of Plot 26

2.2.3 Drainage Ditch

A 1m wide drainage ditch (FW4) was recorded running through the centre of Plot 26. This feature was described as being heavily vegetated, mainly with soft rush. Some standing stagnant water was present in the channel at the time of the visit.



Plate 2-6: Drainage Ditch (FW4) in Plot 26

2.3 PLOT ID 27

2.3.1 Wet Grassland

Wet grassland (GS4) comprises the majority of land cover in Plot 27. Fields were described as having diverse wet grassland populations and species but are dominated by soft rush which covers 40-70% of the fields. Vegetation averaged approximately 40cm in height during the time of the survey. Fields feature mixed sward height of young rush with some dense tussocks

throughout. Encroachment of hedging and scrub was noted towards the northern and central parts of this plot. The topography within this plot was described as sloping, with a drop of approximately 3 to 5m towards the north, and 'bowl-shaped' towards the centre of the plot. No apparent cultivation, fertilisation or mowing was evident, with some areas of dense rank vegetation. Evidence of grazing by cattle during the drier months and intermittent deer/sheep grazing was also noted. Calling and displaying meadow pipit and skylark were recorded both in the southern fields of the plot, and surrounding fields outside of the survey area.

2.3.2 Oak-ash-hazel Woodland

An oak-ash-hazel woodland (WN2) was recorded amongst the wet grassland habitat towards the north of Plot 27. Trees were noted to be 5m tall and the habitat was described as being rich in species diversity, particularly on the ground layer. The woodland is accessible by livestock as some signs of poaching and grazing were evident. A dry drain and stone wall is present running through the centre of this feature.



Plate 2-7: Oak-ash-hazel Woodland (WN2) Habitat in Plot 27

2.3.3 Scrub

A patch of dense scrub (WS1) is present within the abovementioned wet grassland field. The scrub is dominated by blackthorn (*Prunus spinosa*) and bramble, reaching an average height of 3m, with a species diverse ground layer.



Plate 2-8: Scrub (WS1) Habitat in Plot 27

2.3.4 Drainage Ditches

A 1m wide drainage ditch (FW4) is present towards the centre of the plot which is heavily vegetated with soft rush, meadowsweet (*Filipendula ulmaria*) and meadow buttercup (*Ranunculus acris*). Some standing, stagnant water was also present within the channel at the time of the survey.



Plate 2-9: Drainage Ditch (FW4) Habitat in Plot 27

2.3.5 Hedgerows

Hedgerows (WL1) were present along the western, southern, eastern and central areas of Plot 27. Hawthorn, hazel (*Corylus avellana*) and blackthorn feature in abundance within these hedgerows. Hedgerows were generally 5m tall and 4m wide with good species and structural diversity, however, some areas of the hedgerows were described as gappy. Heavily vegetated stone wall feature at the base of a number of these hedgerows. No management was evident.

Hedgerows along the field boundaries were noted to be stockproof due to the presence of sheep fencing, while hedgerows in the centre of the Plot were not considered stockproof due to the absence of any barriers for livestock.

2.3.6 Treelines

A 15m tall treeline (WL2) is present towards the southern boundary of Plot 4, this mature treeline is primarily comprised of ash (*Fraxinus excelsior*), with evidence of potential die-back in some trees. The canopy is dense with gaps in the understory, the width of the treeline was noted to be 10m. This treeline did not show any signs of management and is not considered stockproof.



Plate 2-10: Treeline (WL2) Habitat in Plot 27

2.4 PLOT ID 38

2.4.1 Wet grassland

Wet grassland (GS4) comprises the majority of land cover in Plot 38. Soft rush was found to dominate the habitat, with its density in fields ranging between 40 and 80%. Other typical wet grassland species are also present. Vegetation height averaged 30-40cm, a mixed sward height of tightly grazed areas with some soft rush tussocks were noted. This habitat forms a mosaic with scrub in areas to the centre of Plot 38 and is more open to the north and south of the land parcel, where scrub encroachment was limited. The fields within this plot slope steeply southwards, with the most southern areas of the Plot being more waterlogged during the time of the survey. No apparent cultivation, fertilization or mowing was evident, with vegetation rank in places. This field is likely to be grazed by cattle in drier months, some evidence of deer/sheep grazing was also present.

A field towards the centre of the plot, located beside old pig buildings was observed to have animal waste run-off from the adjacent buildings present. The land showed more signs of poaching closer to the pig buildings.



Plate 2-11: Wet Grassland (GS4) Habitat in Plot 38

2.4.2 Scrub

Large areas of encroaching scrub (WS1) habitat is present throughout Plot 38, forming a mosaic with wet grassland (GS4). Species such as bramble and blackthorn were found in abundance. The scrub averaged a height of 4m and did not show any signs of management. This habitat is accessible by livestock, and some signs of grazing or poaching were evident.



Plate 2-12: Scrub (WS1) Habitat in Plot 38

2.4.3 Buildings and artificial surfaces

A number of buildings and artificial surfaces (BL3) habitats are present in Plot 38, including small ruins towards the north, and a dilapidated farmhouse and farm sheds towards the centre of the plot.



Plate 2-13: Buildings and Artificial Surfaces (BL3) in Plot 38

2.4.4 Treelines

Treelines (WL2) feature frequently throughout Plot 38. Treelines towards the north of the plot were described as being 5-7m high, 3-4m wide, with willow and hawthorn frequently recorded. These treelines did not show signs of management, nor were they deemed stockproof.

A treeline running from north to south of the plot with hawthorn in abundance was described as being 5m high and 4m wide, with stone walls and other stonework (BL1) and earth banks (BL2) present at the base. This treeline was observed to be stockproof.

2.4.5 Hedgerows

Hedgerows (WL1) are also present in abundance, most frequently running through the centre of Plot 38. These hedgerows were noted to be unmanaged with some large gaps between older and immature trees and were found to be between 2-3m wide, 3-4m high.

Hawthorn and willow sp. were recorded in abundance within this habitat. The base of the hedgerows were often also noted to have a diverse ground layer, with the exception of hedgerows to the very south, which were described as having poor species diversity. Stone walls (BL1) sometimes feature at the base of these hedgerows, particularly towards the southern boundary of the plot.

Hedgerows towards the centre of the plot were generally not classified as stockproof, while hedgerows to the very south, particularly bordering the adjacent road, are stockproof, due to the presence of sheep wire.



Plate 2-14: Hedgerows to the Centre (Left) and North (Right) of Plot 38 Drainage Ditches

2.4.6 Drainage Ditches

A heavily vegetated drainage ditch (FW4) is present along the eastern boundary of Plot 38. The drainage ditch is 40m long and 2m wide with 1.5m high banks. The drain was heavily vegetated and dry during the time of the survey.

A heavily vegetated drainage ditch is present towards the southeastern boundary of Plot 38. This ditch was described as being 2m wide with 2m high banks. The depth of the water was 30cm and the wet width was 30cm. There was no flow of water along the main channel of the drainage ditch, however the connecting drainage ditch at the southern end had a slow flow of water which seemed to disappear underground. Water could be heard flowing down a crevice in the land, likely into a swallow hole.



Plate 2-15: Drainage Ditches (FW4 (Left) and Swallow Hole (Right))

2.5 PLOT ID 39

2.5.1 Wet Grassland

Wet grassland (GS4) comprises the majority of the landcover in Plot 39. The wet grassland is generally dominated by soft rush, with an average density of >60%. The habitat is also populated by other typical wet grassland species, with *Sphagnum sp.* present in wetter areas. Average sward heights were generally between 30-40cm, with some small areas of dense tussocks. The wet grassland habitats in this plot were generally found to have no evidence of cultivation, fertilization, or mowing with vegetation rank in places. These areas are likely to be grazed during the drier months, with old cattle dung present. Passing deer/sheep are also likely to graze sporadically. Poaching of the soil was observed. Meadow pipits were noted to be displaying within the wet grassland habitat of this plot.

The wet grassland to the south of the plot was covered in a lattice of shallow, heavily vegetated channels or historic drains. Very little, to no water was observed in these.

The wet grassland to the north had a number of suspected sinkholes present. Stream flow from the conifer forest outside of the survey boundary, under the R283 road and enter the site at two points at the northern boundary. These flowing streams seem to disappear and re-emerge a number of times.



Plate 2-16: Wet Grassland (GS4) in Plot 39

2.5.2 Eroding Upland Rivers

The IE_WE_35O080400, which is a tributary of the Mt. Dough River, enters Plot 39 from the northern boundary, travels south and then east, before entering the next plot. The water was noted to be peat stained. The banks were noted to be eroded at points likely due to access of sheep and other grazers.

Where the river first enters the Plot, the banks are 1.5m wide, 0.5m high with an average depth of 20cm. The wet width was 1m and the water was moderate to fast flowing, during the time of the survey.

As the river flows south and then east through the plot, the bank height averages 1.5m high. the water depth was noted to be 10cm, wet width was 30-40cm and the water levels were very low with a slow flow, compared to immediately upstream.



Plate 2-17: Eroding Upland Rivers (FW1), Fast Flowing Upstream (L) and Slow Flowing Downstream (R)

2.5.3 Scrub

A patch of scrub (WS1) is present towards the north of Plot 39. The scrub was recorded as being 5m high with blackthorn, hawthorn and willow featuring abundantly. The vegetation was dense with no management evident.

2.5.4 Hedgerows

Hedgerows (WL1) feature sporadically throughout Plot 39 and are generally 3-5m in height and 2-4m wide. Hawthorn is present abundantly throughout these features. Hedgerows towards the centre of the plot are gappy, unmanaged and were not deemed stockproof. Hedgerows along the boundaries of fields are gappy, unmanaged, with a significant, species rich earth banks at the base. Hedgerows along the field boundaries are stockproof due to the presence of sheep wire. Stone walls are also often present at the base of these hedgerows.

2.5.5 Treelines

Treelines (WL2) also feature sporadically within Plot 39, with hawthorn and goat willow (*Salix caprea*) present in abundance. Treelines are generally 5-8m high and 3-4 m wide. No management was evident. Treelines are gappy and are mostly not deemed to be stockproof.



Plate 2-18: Hedgerows (WL1) (L) and Treelines (WL2) (R) in Plot 39

2.6 PLOT ID 37

2.6.1 Wet Grassland

Wet grassland (GS4) dominates Plot 37. Some areas grade into upland blanket bog (PB4). The wet grassland is generally dominated by soft rush with an average density of >60%, but also purple moor grass (*Molinia caerulea*), where the habitat has begun to grade into bog. Other typical wet grassland species are present also, with *sphagnum sp.* present in wetter areas. Average sward heights are generally between 30-50cm, some small areas of dense tussocks are also present. The wet grassland habitats in this plot were generally found to have no evidence of cultivation, fertilization, or mowing with vegetation rank in places. These areas are likely to be grazed during the drier months by cattle. Wet grassland within this plot is also likely to be grazed by sheep and passing deer. Meadow pipits were recorded to be displaying in this area and some nests were observed.

Two fields to the very south of the plot were being grazed by donkeys and sheep during the site visit. Soft rush density is much lower here (10%), while vegetation height averaged 10cm. This is likely due to more intensive grazing practices.



Plate 2-19: Wet Grassland (GS4) Habitat with Dense Hummocks Towards the North of the Site (L) and More Intensely Grazed to the South of the Site (R)

2.6.2 Upland Blanket Bog

Upland bog (PB2) is present at the very northern boundary of Plot 37. No species was found to dominate this habitat, purple moor grass (*Molinia caerulea*) is present in abundance, with an average height of 40cm. Tussocks/hummocks of purple moor grass, moss and rush sp. were noted throughout. A scattering of short, stunted trees are also present within the habitat. This habitat was described as a mosaic of poor-quality upland blanket bog grading into wet grassland in areas. *Sphagnum sp.* is more abundant where flushed depressions occur in the wet grassland. No land management practices were evident. These areas are likely grazed during the drier months, with old cattle dung present. Deer and sheep grazing is also likely. Meadow pipit were also observed to be displaying in this area during the site visit.

2.6.3 Treelines

Very few treelines (WL2) were recorded within this plot. Two treelines were recorded adjacent to a house towards the centre of the plot. Trees stand between 5-8m in height, and are dominated by hawthorn, while goat willow also features abundantly. A treeline of large, 18m tall, European Larch is present adjacent to the house.



Plate 2-20: Treelines (WL2) in Plot 37

2.7 PLOT ID 28

2.7.1 Wet Heath

Vast areas of wet heath (HH3) grading into upland bog (PB2) were recorded towards the northeast, northwest and south of Plot 28. Ling dominates this habitat, with other typical bog and heath species present also. Vegetation structure is diverse and averaged 30cm in height. A scattering of stunted/immature Sitka spruce (*Picea sitchensis*) are also present. The land is undulating and gradually slopes towards a number of small streams. *Sphagnum sp.* is more abundant where flushed depressions occur in the wet heath habitat. Past turf cutting, in the form of vegetated turf banks were evident in areas, however no signs of agricultural management or burning were present. Low occurrences of grazing are likely throughout this area, possibly by sheep and deer. Calling and displaying meadow pipits and skylark were noted throughout these areas during the survey.



Plate 2-21: Wet Heath (PB2) Habitat in Plot 28

2.7.2 Wet Grassland

Wet grassland (GS4) is present in smaller areas towards the south and east of Plot 28, this habitat was observed to be grading into wet heath (HH3) in areas. Soft rush dominates this habitat with a 70% land cover density. Vegetation heights averaged 40cm. *Sphagnum sp.* is more abundant where flushed depressions occur in the wet grassland. A scattering of short, stunted trees are also present. Low levels of grazing were evident; however, this habitat may be used occasionally by sheep or deer. Meadow pipits were noted to be displaying in these areas, there is also probable nesting of this species in the surrounds.

2.7.3 Eroding/Upland Rivers

The Gilliganleane River (EPA Code: IE_NW_35L660960) which travels through the centre of the plot, was found to have bank widths varying between 30cm to 1.5m, wet widths varying from 30cm to 1.5m and the watercourse was noted to have a moderate flow meandering downhill. Two channels of this river flow separately out of the plot, via the southeastern boundary.

The river (IE_NW_35L660960) towards the eastern boundary, which is shown on EPA maps, was found to be absent. Instead, a spring with a moderate flow was found.



Plate 2-22 Eroding Upland Rivers (FW1) (L) and Spring Where EPA River is Mapped (R) in Plot 28

2.8 NOEL TRACEY LAND

Noel Tracey's land is located approximately 370m south of the proposed Lissinagroagh Wind Farm Site.

2.8.1 Wet Grassland

Wet grassland (GS4) comprises the majority of land cover in the Noel Tracey Land (see Plate 2-23). Soft rush dominates the habitat, with its density in fields ranging between 70 and 80%. Other typical wet grassland species are also present. Vegetation height averages 20-30cm, although the sward height is quite heterogeneous, with areas of soft rush tussocks interspersed by grazed grasses. Some encroachment of scrub from hedgerows was noted along the eastern boundary, while trees sporadically occur throughout the fields. Low numbers of meadow pipits were recorded across the entire wet grassland habitat.

The wet grassland to the north of the site is undulating, with an abundance of small hills and dips. The land to the south of the site is more of a low lying profile, with gentle sloping. Wet grassland habitat is heavily grazed by sheep and cattle with some dumping of farm waste also evident.



Plate 2-23: High Rush Density Cover in Wet Grassland (GS4) Within the Noel Tracey Land

2.8.2 Hedgerow

Hedgerows (WL1) are present throughout the Noel Tracey land, in a higher density towards the northeast of the site. Some hedgerows that appear on aerial imagery were found to be absent during the site visit, which suggests they may have been removed recently. Two meadow pipits were heard calling in the hedgerow to the west of the site during the site visit.

Hedgerows within the site are generally dominated by hawthorn, bramble or gorse, reach up to 5m in height, and are no more than 4m in width. Some hedgerows (particularly towards the east of the site) are dense, opaque, and poorly shaped, this is likely due to livestock access. Ash trees (up to 14m high) are rarely present amongst other semi-translucent hedgerows within the site, with gaps of up to 10m between trees. Many of the hedgerows also have stone walls at their base but are not stockproof. Few hedgerows within the site show any signs of active management (see Plate 2-24).



Plate 2-24: Scrubby, Dense, Low, Hedgerow (Left) and Mature Ash Trees Growing Sporadically Amongst Semi-translucent Hedgerows (Right)

2.8.3 Treelines

Treelines (WL2) feature frequently throughout the site, particularly towards the south and eastern boundary, and generally stand between 7-14m in height. Species that feature abundantly within these treelines include bramble, hawthorn and blackthorn. Some of the vegetation within the treelines encroaches onto the adjacent lands. Treelines are generally top heavy due to livestock access at the base and show little sign of active management (see Plate 2-25). In some treelines, trees are separated by gaps of up to 10m. Although some stone walls and wire fencing exists at the base of some of these treelines, the majority of these treelines are not stockproof.



Plate 2-25: Treelines (WL2) in the Noel Tracey Land

2.8.4 Dry Riverbeds

Aerial imagery shows two streams entering the site: the Mt_Dough (EPA Code: 35M62), with a north south orientation; and the Moneenshinnagh 35 (EPA Code: 35M60), with a northeast – southwest orientation. These two streams join just outside the southwest end of the Noel Tracey Land, and form part of the Owenmore (Manorhamilton)_020 WFD river water body (IE_WE_35O080400; *Good* 2016-2021 WFD water quality status¹). However, during the habitat survey, neither of these small/medium sized channels (Strahler/stream order: 3; average bank width: 2.5m) carry any water, exposing a dry substrate of large boulders and cobble (see Plate 2-26). Therefore, the dry riverbeds were not mapped as watercourses on the habitat map.



Plate 2-26: Dry Riverbeds Running From North to South Within the Site

2.8.5 Eroding / Upland Rivers

Downstream of the confluence of the two streams described in Section 2.8.4, an eroding/upland river (FW1) rises (see Plate 2-27). The reach upstream of the confluence is not part of the WFD monitoring network, but it appears to be a tributary of the Moneenshinnagh 35, flowing in a northwest – southeast orientation just upstream of the confluence. Upon joining with the Moneenshinnagh 35, it flows out of the site from the southern boundary. The stream is heavily shaded by riparian vegetation, bounding a 3-4m channel. The substrate comprises large boulders, cobbles and pebbles, supporting a fast rippling and gliding flow, at the time of the survey.

¹ Available at www.catchments.ie. Accessed in October 2024



Plate 2-27: Upland Eroding River (FW1) at the Southern Boundary of the Site

2.8.6 Stone Walls

Standalone stone walls (BL1) are restricted to the northeast of the site, approximately 50cm in width, and 30-100cm in height, in general. Although most of the stone walls are not fenced/stockproof, there is one fenced section (see Plate 2-28).

As mentioned above in Section 2.8.2 and 2.8.3, stone walls also frequently feature at the base of hedgerows and treelines within the site.



Plate 2-28: Stone Walls and Other Stonework (BL3) Within the Noel Tracey Land

2.8.7 Drainage Ditches

Two drainage ditches (FW4) are present towards the west of the site. These linear habitats are approximately 30cm deep, 40cm wide, and their margins are heavily vegetated with soft rush and perennial ryegrass (see Plate 2-29). Neither of the two drainage ditches contained any water at the time the survey.



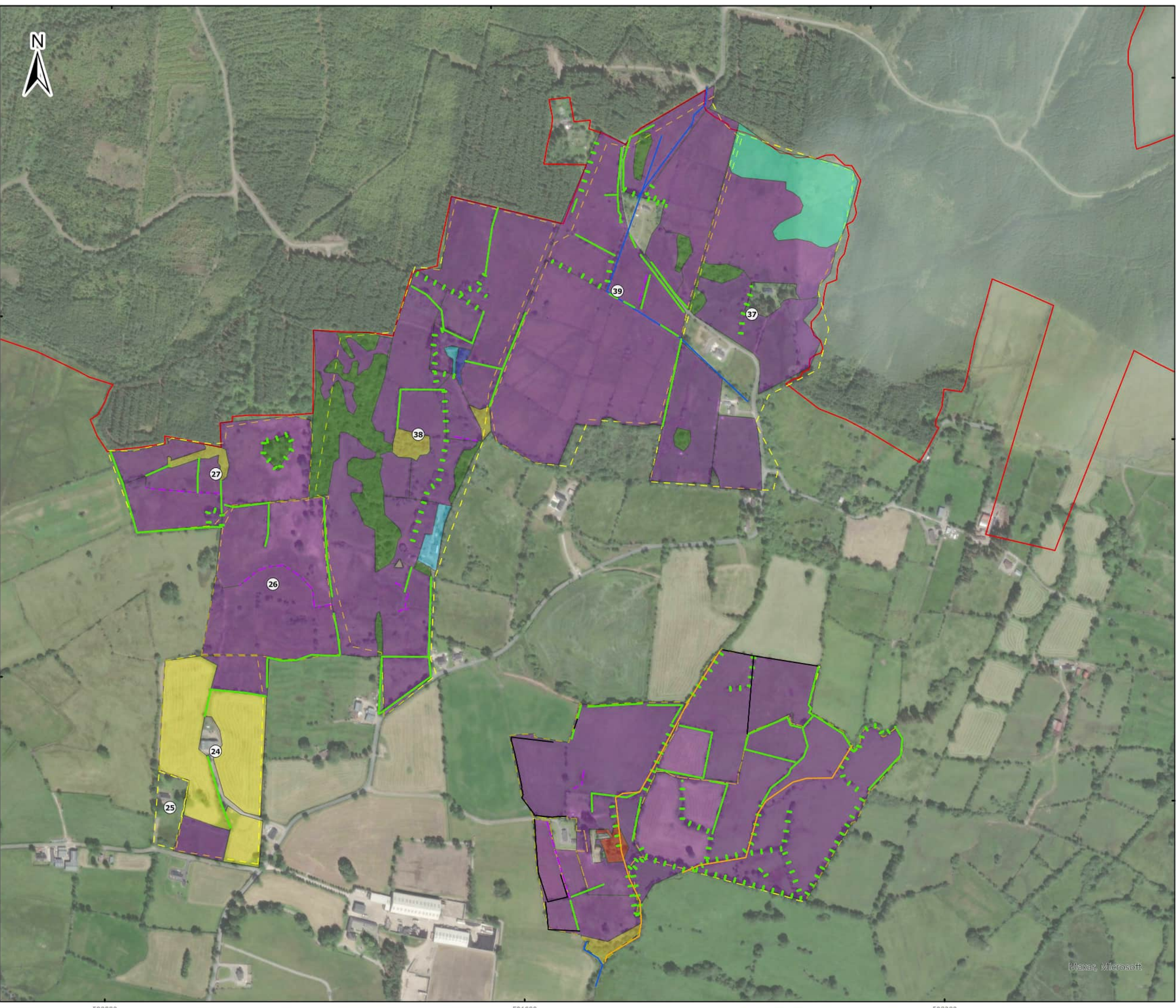
Plate 2-29: Drainage Ditches Recorded Within the Site

2.8.8 Third Schedule Invasive Species

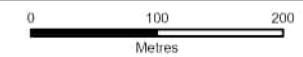
A large infestation of Japanese knotweed (*Fallopia Japonica*) is present within and adjacent to the farm buildings, towards the east of the site, covering approximately 60m² (see Plate 2-30). Japanese knotweed is listed in the Third Schedule of the European Communities (Birds and Habitats). Its robust root system can extend up to 2m deep and up to 7m horizontally from the main plant (Smith *et al.*, 2007).



Plate 2-30: Infestation of Japanese Knotweed Towards the East of the Site



- Legend**
- Site Boundary
 - Hen Harrier Enhancement Lands
- Habitats**
- FW1 - Eroding/ upland rivers
 - FW4 - Drainage ditches
 - WL1 - Hedgerows
 - WL2 - Treelines
 - BL1 - Stone walls and other stonework
 - Dry Riverbeds
 - BL3 - Buildings and artificial surfaces
 - GA1 - Improved agricultural grassland
 - GS4 - Wet grassland
 - PB2 - Upland blanket bog
 - WD1 - (Mixed) broadleaved woodland
 - WD3 - (Mixed) conifer woodland
 - WN2 - Oak-ash-hazel woodland
 - WS1 - Scrub
 - WS2 - Immature woodland



- NOTES**
1. FIGURED DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWING.
 2. ALL DRAWINGS TO BE CHECKED BY THE CONTRACTOR ON SITE.
 3. ENGINEER TO BE INFORMED OF ANY DISCREPANCIES BEFORE ANY WORK COMMENCES.
 4. ALL LEVELS RELATE TO ORDNANCE SURVEY DATUM AT MALIN HEAD.

Rev	Date	Description	By	Chkd.
A	04/11/2024	First Issue	S.P.	A.S.

Client: **FuturaEnergy Ireland**

Project: **Lissinagroagh Wind Farm**

Title: **Figure 2-1
Hen Harrier Enhancement Land Habitats
to the South of Lissinagroagh Wind Farm**

Scale @ A3: 1:6,000

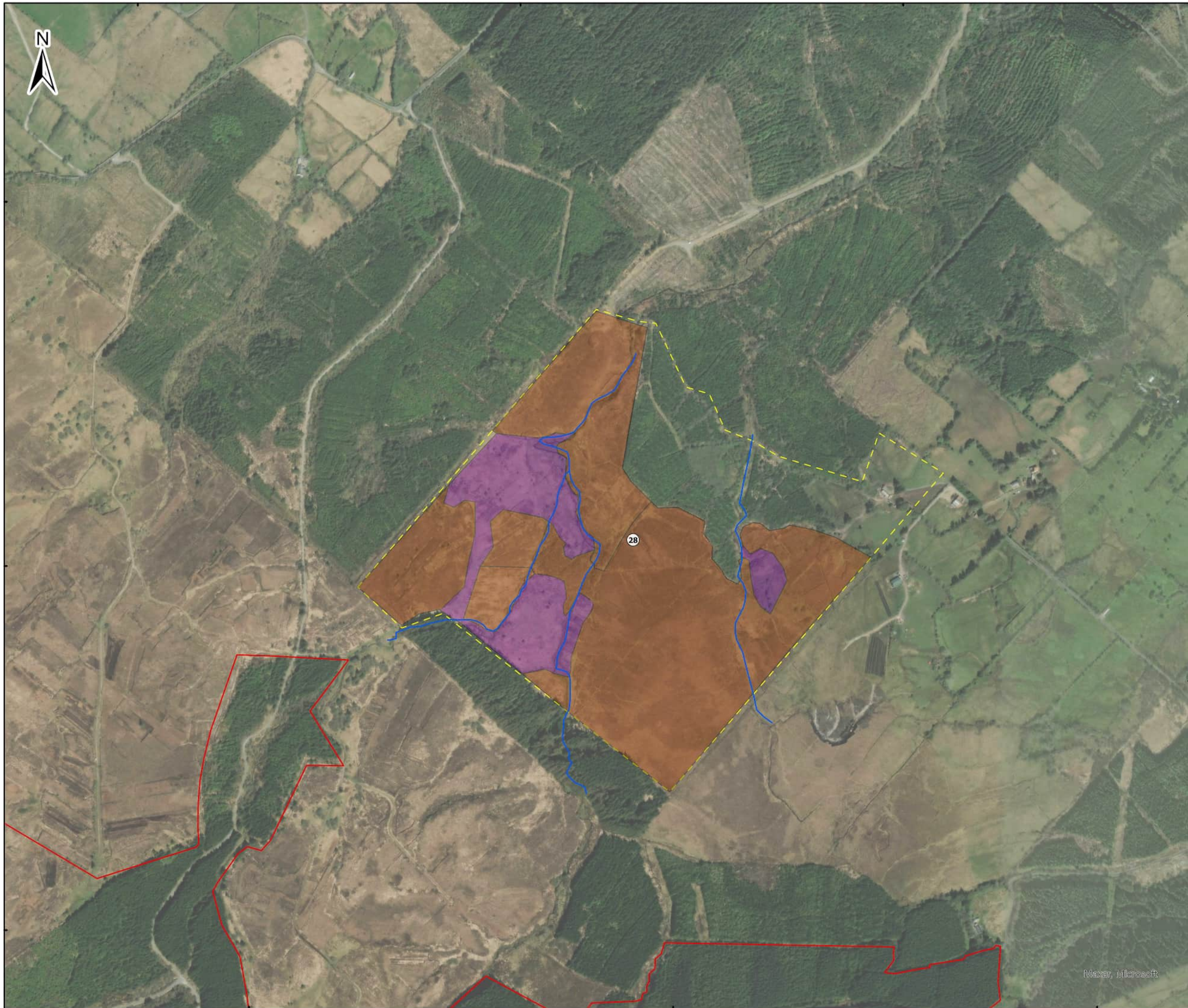
Prepared by: S.Pezzetta Checked by: A.Sands Date: November 2024

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Map Ref: 10955-015-HH.ENC.L..S-HAB-TOB-A Draft: A

Maxar, Microsoft

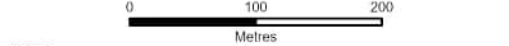


Legend

- Site Boundary
- Hen Harrier Enhancement Lands

Habitats

- FW1 - Eroding/ upland rivers
- GS4 - Wet grassland
- HH3 - Wet heath



- NOTES**
1. FIGURED DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWING.
 2. ALL DRAWINGS TO BE CHECKED BY THE CONTRACTOR ON SITE.
 3. ENGINEER TO BE INFORMED OF ANY DISCREPANCIES BEFORE ANY WORK COMMENCES.
 4. ALL LEVELS RELATE TO ORDAINANCE SURVEY DATUM AT MALRI HEAD.

Rev	Date	Description	By	Chkd.
A	30/10/2024	First issue	S.P	A.S

Client: **FuturaEnergy Ireland**

Project: **Lissinagroagh Wind Farm**

Title: **Figure 2-2
Hen Harrier Enhancement Land Habitats
to the North of Lissinagroagh Wind Farm**

Scale @ A3: 1:6,000

Prepared by: S.Pezzetta Checked by: A.Sands Date: October 2024

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Map Ref: 10955-016-HH.ENC.L..N-HAB-TOB-A Draft: A

54°21'10"N

84°56'40"

593040 593760 594480

8°7'48"W

8°7'12"W



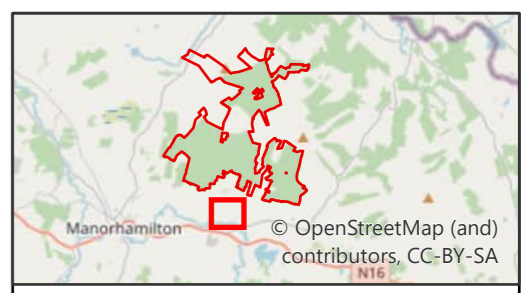
54°18'40"N

54°18'20"N

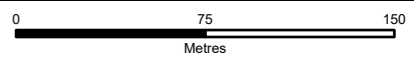


Esri Community Maps Contributors, Esri UK, Esri, TomTom, Garmin, Foursquare, GeoTechnologies, Inc, METI/NASA, USGS, Maxar, Microsoft

Esri Community Maps Contributors, Esri UK, Esri, TomTom, Garmin, Foursquare, GeoTechnologies, Inc, METI/NASA, USGS, Maxar, Microsoft



- Legend**
- - - Hen Harrier Enhancement Lands -
 - - - Noel Tracy lands
- Invasive Species**
- █ Japanese Knotweed



- NOTES**
1. FIGURED DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWING\
 2. ALL DRAWINGS TO BE CHECKED BY THE CONTRACTOR ON SITE\
 3. ENGINEER TO BE INFORMED OF ANY DISCREPANCIES BEFORE ANY \ WORK COMMENCES\
 4. ALL LEVELS RELATE TO ORDNANCE SURVEY DATUM AT MALIN HEAD

Rev	Date	Description	By	Chkd.
A	27/11/2024	First issue	S.P	A.S

Client:



Project:

Lissinagroagh Wind Farm

Title:

Invasive species

Scale @ A3: 1:3,000

Prepared by: S.Pezzetta Checked by: A.Sands Date: November 2024

TOBIN



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Map Ref: 10955-034-INV.SP-HH.ENC.L...S-TOB-A Draft: A

3. CONCLUSION

Habitats within Plot 24 were found to be dominated by intensely managed improved agricultural grassland (GA1) and is dominated by perennial ryegrass. Wet grassland (GS4) habitat dominated Plots 26, 27, 37 and 39 and were generally dominated by soft rush, which formed areas or dense tussocks or areas of rank vegetation in some places or grazed, low sward heights in others. Plot 38 is largely comprised of a mosaic/patchwork of wet grassland (GS4) and scrub (WS1) featuring rush, bramble, and blackthorn in abundance. Plot 28 has the most open habitat with wet heath (HH3) grading into upland bog (PB2) in areas. The Noel Tracey Land is dominated by intensely grazed, wet grassland habitat with dense tussocks of soft rush featuring frequently throughout. Dry riverbeds intersect the wet grassland habitat.

Meadow pipits were recorded displaying and calling throughout all plots surveyed, while skylark were observed occasionally, but more frequently in Plot 28.

Lands were generally sloping with few major drainage features present, but a number of sink holes were observed, particularly in Plots 26, 27, 37 and 39. The Noel Tracey Land features significant dry river beds running from the north to the south of the site.

Land management was generally low (with the exception of Plot 24); however, grazing was more intense in areas, particularly in the lands to the south of Plot 27. Grazing species were most frequently named as cattle, sheep, and deer, with some donkeys kept in Plot 27.

4. REFERENCES

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Appendix C Bird Surveyors Ltd Habitat Survey Report

Outline Biodiversity Management Plan

Lissinagroagh Wind Farm

FutureEnergy Ireland

SLR Project No.: 501.065072.00001

30 March 2026



Lissinagroagh Hen Harrier Enhancement Lands
- Habitat Survey





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Citation: Bird Surveyors Ltd. (2024). Lissinagroagh Hen Harrier Enhancement Lands - Habitat Survey. A technical report prepared for SLR Environmental Consulting (Ireland) Ltd by Bird Surveyors Ltd.



1.0 Introduction

Bird Surveyors Ltd was appointed by SLR Environmental Consulting (Ireland) Ltd (“SLR”) to carry out habitat surveys within potential hen harrier *Circus cyaneus* enhancement lands located to the northeast of the proposed Lissinagroagh Wind Farm Site.

Background

Habitat surveys of land adjacent to the proposed Lissinagroagh Windfarm are being undertaken as part of the hen harrier management/mitigation plans for the area. Before any habitat management actions can be implemented, a comprehensive baseline habitat assessment must be carried out. This involves mapping and surveying the area and conducting surveys to identify existing habitat types, vegetation cover, and key ecological features (e.g., potential breeding sites or foraging areas). Through these surveys it is necessary to identify areas which can be optimised for the target species. This requires an assessment of the current habitat utility; existing habitat use and future utility and evaluating current conditions to inform the selection of management techniques.

Survey Site

The site surveyed here (hereafter “Site”; Folio 13; Figure 1) is part of a complex of lands associated with the development of the Lissinagroagh Windfarm by Future Energy Ireland (FEI). The Site is situated to the north of Doagh Mountain either side of the Killea Road in the townland of Killea, Co. Leitrim. The altitude is between 140m and 370m.

Purpose of Report

This report has these main aims:

- To provide baseline data on habitats to establish the opportunities for habitat and landscape management for the hen harrier;
- To identify spatial and temporal pressures, threats and constraints for hen harrier foraging habitats; and
- To identify management units and other mitigatory/compensatory opportunities and needs.

2.0 Methodology

Vegetation and botanical surveys and habitat mapping were completed by botanist Melanie Flexen in April 2024.

Surveys to identify the current suitability of the habitat management area were completed by ornithologists Marc Ruddock, Douglas Ruddock, Craig Swenarton and James Irons across a range of weather conditions. There was multiple survey visits completed between August 2023 and July 2024.

The report was prepared by Marc Ruddock and habitat reporting and mapping was prepared by Melanie Flexen.

Habitat Surveys

The methodology used the best practice guidelines for habitat surveys and mapping in Ireland (Smith et al., 2011). A preliminary habitat map was created prior to the fieldwork. Polygons were digitised using QGIS software then subsequently ground-truthed and amended during the field survey using QField on a rugged tablet. All polygons were classified using the national standard scheme for describing



habitats in Ireland 'A Guide to Habitats in Ireland' (Fossitt, 2000). More than one habitat type was used if occurring in a mosaic. The minimum mapping area used was 0.04ha. Linear features including hedges, lines of trees and watercourses were also mapped. Target notes were recorded on the habitats and notable features and photographs were taken.

Surveys to Identify Current Suitability of Habitat Management Area

Comprehensive fieldwork surveys were carried out to establish the suitability of the habitat management area and identify where and management changes could be implemented. Habitats and points of interest were scanned from a distance with binoculars (Leica, Duovid 8+12x42) and telescope (Leica, APO Televid, 20-60x zoom) during walkover and transect surveys. Closer examination of features identified were undertaken, to examine in further detail such as tracks and signs (e.g. faecal material or pawprints or hoofprints etc). A range of locations and features were photographed using a Canon EOS R6 + 150-600mm RF lens or on QGIS rugged tablet. The location of features or specific points of interest were further plotted using a handheld Global Positioning System (Garmin 64SX) if needed.

Where key observations were made these were mapped and annotated and subsequently transferred to a project geographical information system (GIS) in ArcGIS 10.5 and used in the preparation of reports. Habitat or management features such as roads, boundaries, drains, rivers, hedges, disturbances were also mapped and annotated, and further mapping of e.g. visible drains or linear features were plotted on maps. Additional photographs were taken and georeferenced where required on target note maps. There was no hydrological or LiDaR survey conducted as part of the fieldwork.

3.0 Survey Results

Habitats Overview

The Site is surrounded by large blocks of commercial conifer plantation. The land encompasses a range of habitats. There are agricultural fields to the east of the Site which are extensively grazed by cattle in larger units of several fields. These are mainly semi-improved wet grassland and poor fen/flush, sloping down towards the river from the road. Some fields nearer the road are cut for silage/hay. Fields are surrounded by generally unmanaged hedges, lines of trees, or earth banks with occasional small shrubs/trees. Two main streams cross this area, flowing into the Straduffly River which forms the north boundary. Semi-natural woodland and scrub occurs in the small valleys.

The western half of the Site is mainly upland blanket bog on higher ground, much of which has been cut for peat in the past. Sheep grazing occurs over the moorland areas. Heavier grazing intensity occurs nearer the road. The higher altitude area of moorland is crossed by the deep gully of the Straduffly River. Areas of heathland, scrub grassland and bracken occur along this river valley. There are a range of minor tarmac roads bisecting the survey area forming and servicing network of access points into various paddocks and field parcels within the land folio. Surrounding the survey parcel is the wider complex of mountains south-west of Kiltyclogher and northeast of Manorhamilton and contains Dough Mountain and Saddle Hill and to the east is Thur Mountain and to the west is Crocknagapple. A nearby operational windfarm is located at the south side of Saddle Hill.

There are extensive conifer plantations immediately adjacent to the north, north-east and west of the Site and smaller plantations centrally within the Site. To the south-east the Site is partially bounded by



coniferous plantations and also some mixed woodland and improved / semi-improved pastures. At the north-west and the south-west corner of the Site are two areas of peatland and heath, with the former bounded by conifers and the latter moorland extending more widely to the summit of Dough Mountain. The Site is comprised of a range of habitats, predominantly moorlands and peatland in the west and grasslands in the east. Habitats are shown in Figure 2 and linear features have been shown separately in Figure 3.

Habitat Descriptions

Peatland

Upland blanket bog (PB2)

The uncut peatland to the north and south of the road is active blanket bog dominated by mature heather *Calluna vulgaris*. Cover of heather is generally 60-70% and height 30-40cm, up to 50cm occasionally. Cover of *Sphagnum* is up to 20%. Other species present include crowberry *Empetrum nigrum*, cross-leaved heath *Erica tetralix*, hare's tail cotton-grass *Eriophorum vaginatum*, reindeer lichen *Cladonia portentosa* and woolly fringe-moss *Racomitrium lanuginosum*. Sheep grazing is light in the uncut areas with only a few sheep paths. There are occasional small self-seeded conifers.



Photo 1. Intact upland blanket bog in west of Site



Photo 2. Upland blanket bog on highest altitude part of Site

Cutover bog (PB4)

The area of old cutover bog to the north of the road is quite disturbed, trampled and grazed by sheep. Heather cover is often <50%, bushes are very mature (c.40-50cm) and often degenerate or dying. Cover of *Sphagnum* is often low (<10%) and patches of soft rush occur.

There is an area of fairly recently created cutover blanket bog (1.3 ha) to the south-east of the old quarry. It appears that tractor driven machinery ('sausage machine') has been used to extract peat as lines through the peat are visible and there is also vehicle disturbance evident. The area is fairly well vegetated with cotton-grasses, *Sphagnum* and sparse cover of short heather. Sheep trampling is evident, and animals are likely to congregate in the area due to shorter vegetation compared to surrounding habitat. Higher altitude land above the road has a considerable area of old hand cutting with large vertical banks. Heather in these areas is mature, and often over 50cm. Very little grazing occurs except along the lower edges near to fields (western side) where sheep use the area leading to trampling and degradation of the habitat.



Photo 3. Mechanically cutover blanket bog



Photo 4. Old hand-cut banks on blanket bog on higher altitude land

Poor fen and flush (PF2)

There are several wet flushes running through the blanket bog habitat which are dominated by soft rush *Juncus effusus* and/or sharp-flowered rush *Juncus acutiflorus*, over a carpet of *Sphagnum*.

Poor fen habitat within the enclosed fields is dominated by sharp-flowered rush and purple-moor grass *Molinia caerulea* with frequent sweet-vernal grass *Anthoxanthum odoratum*, devil's bit scabious, *Sphagnum* moss and common haircap moss *Polytrichum commune*. It often occurs in mosaic with wet grassland on the Site. Most of the habitat is lightly cattle grazed.

The strip of steeping sloping fields between forestry blocks to the south of Lislea Road, also has marsh violet *Viola palustris* and other mosses including *Hylocomium splendens*. This vegetation is sheep grazed and likely to have been derived from wet heath/blanket bog habitat.

The area immediately to the east of the water treatment site is mainly poor fen with patches of degraded blanket bog, poor wet grassland, and small drains and flushes. The flush vegetation includes sharp-flowered rush, sedges, water horsetail *Equisetum fluviatile*, marsh marigold *Caltha palustris*, hare's tail cotton-grass *Eriophorum vaginatum*, lesser spearwort and marsh cinquefoil *Comarum palustre*. These fields are very heavily sheep-grazed and on an area that was once blanket bog.



Photo 5. Poor flush with rushes within blanket bog



Photo 6. Poor fen within fields with a carpet of Sphagnum moss

Grassland

Wet grassland (GS4)

Lower altitude fields to south of the Killea Road are mainly wet grassland. This varies from lower quality grassland to vegetation of higher conservation value.

Most of the sloping fields away from the road contain sharp-flowered rush, sedges *Carex* spp. and grasses along with frequent herbs including devil's bit scabious *Succisa pratensis*, meadowsweet *Filipendula ulmaria* and selfheal *Prunella vulgaris*. Cattle grazing was of low intensity at time of the survey.

Fields near the road which are cut for silage/hay also contain frequent herb species, e.g. lesser spearwort *Ranunculus flammula*, bugle *Ajuga reptans*, ragged robin *Silene flos-cuculi* etc. These cut fields appear to be subject to higher nutrient inputs with devil's bit scabious and sedges occasional or rare. Other field areas dominated by soft rush are of poor quality with few indicator species and are



often rush-topped. The wet grassland occurs in a mosaic with poor fen vegetation containing *Sphagnum*, particularly in the eastern block of fields. This area also has remnants of heath and bog vegetation.



Photo 7. Wet grassland with good species diversity



Photo 8. Poor wet grassland dominated by soft rush

Acid grassland (GS3)

Species-poor acid grassland is heavily sheep grazed and occurs on the steep slopes of central river valley, along with degraded heath and poor fen vegetation.



Photo 9. Valley with acid grassland, rushes, heath and scrub along stream

Heath

Dry siliceous heath (HH1)

Dry heath on valley slopes to north of road is badly degraded by sheep. Heather bushes are degenerate and occur with patches of acid grassland. The dry heath south of the road is less grazed and has a good cover of tall heather, particularly on steep gully slopes.



Photo 10. Dry heath on gully slopes

Wet heath (HH3)

Wet heath (and/or degraded blanket bog) occurs on the slopes of the western stream valley and has mature or degenerate heather of variable cover, with patches of tussocky soft rush. A peat slippage occurs on the slope in one area and some heather here appears to have been burnt in recent years.



Photo 11. Wet heath on valley slopes

Bracken (HD1)

Occasional small patches of dense bracken occur on steep slopes of valley.

Woodland and scrub

Semi-natural woodland (WN)

Drier areas of oak-ash-hazel woodland (WN2) with mature broadleaved trees (10m+) occur in the small steep stream valleys. Trees include ash *Fraxinus excelsior*, hazel *Corylus avellana*, sycamore *Acer pseudoplatanus*, holly *Ilex aquifolium* and birch *Betula* sp. Damper areas of wet woodland (WN4) have alder *Alnus glutinosa* and grey/goat willow *Salix cinerea/caprea*. Ground flora is often species-rich including ferns, primrose *Primula vulgaris*, opposite-leaved golden saxifrage *Chrysosplenium oppositifolium* and celandine *Ranunculus ficaria*.

Along the river to the north-east forming the Site boundary, there is a strip of riparian woodland (WN5) which includes mature ash, alder, willow and holly. Areas of dense scrub (WS1) across the Site are dominated by willow, mostly around 4-5m tall with occasional mature trees. These usually occur along the stream valleys with scattered bushes elsewhere.





Photo 12. Semi-natural broadleaved woodland in stream valley



Photo 13. Willow scrub in steep sided valley

Highly modified/non-native woodland (WD)

There are areas of conifer plantation (WD4) including mature cypress and spruce within the Site alongside the stream at the west boundary. Some small blocks of conifer woodland (WD3) occur next to the road/new house, one area of which has been felled (WS5).

Field boundaries

Most of the hedgerows (WL1) within the Site are found in the north-eastern block of agricultural land. These are generally overgrown and unmanaged, around 4-6m tall, but sometimes greater in height (c.8m) so could be also described as lines of trees (WL2) or sometimes narrow strips of scrub/woodland. The exceptions are some roadside hedges which are side flailed or cut short (1-2m). The dominant shrub species is willow, along with holly and some hawthorn *Crataegus monogyna*. Taller trees include birch, alder, ash and occasional conifers. Roadside hedges also contain non-native species, i.e. fuchsia *Fuchsia magellanicum* and snowberry *Symphoricarpos albus*.

Many boundaries are not stockproof so allow cattle to roam freely across blocks of land. Some areas have mainly earth banks as field boundaries with no shrubs or only scattered shrubs and trees. (N.B. These are not shown on the habitat map). There are a few treelines (WL2) where there are lines of mature trees forming the field boundary, including beech *Fagus sylvatica* or conifers.



Photo 14. Overgrown, unmanaged willow hedge



Photo 15. Line of mature birch trees

Other habitats

Eroding/upland rivers (FW1)

A few small rocky streams cross the Site, as already described.

Drainage ditches (FW4)

There are a small number of artificial drainage ditches through the peatland areas.



Photo 16. Drain in blanket bog

Spoil and bare ground (ED2)

A small area of bare shale is present on steep ground near to the quarry, possibly due to quarrying activities or erection of new fencing causing erosion.

Recolonising bare ground (ED3)

The small old quarry by the road has some bare ground and rock but has mostly recolonised with dry heath, acid grassland and gorse *Ulex europaeus*.

Active quarries (ED4)

The larger old quarry has remained mostly unvegetated and has bare rock, sands and gravel. (Note that a colony of sand martins are nesting in the quarry face).



Photo 17. Old unvegetated quarry

Stonewalls and other stonework (BL1)

The old ruins of cottages are of interest botanically and have been target noted. Numerous ferns and bryophytes are present on the old stone walls along with herbs including navelwort *Umbellicus rupestris* and herb robert *Geranium robertianum*.

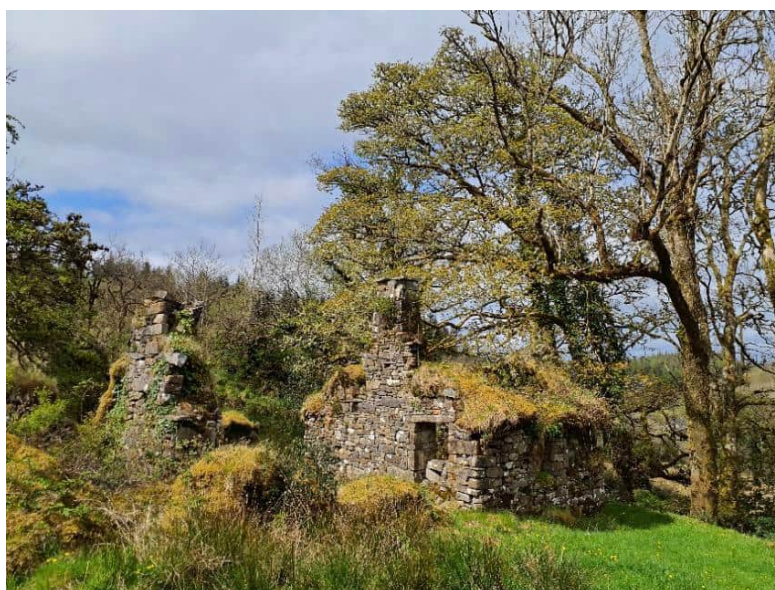


Photo 18. Ruins of cottages

Roads and buildings (BL3)

This includes buildings, artificial surfaces, roads and tracks.

Invasive species

Rhododendron is present in the blanket bog in the west of the site with two mature bushes noted. However, it did not appear to be spreading. There are also a number of young spruce *Picea* sp. present across the bog and a few mature conifers. There is a patch of Japanese knotweed *Reynoutria japonica* present by the road at east end of site, adjacent to the Site boundary.



Photo 19. Rhododendron bush on blanket bog

Spatial and temporal pressures, threats and constraints for hen harrier foraging habitats

During the habitat surveys and during additional walkover and vantage point field surveys additional observations of pressures, threats and constraints were reviewed. These were considered both from existing land uses observations, and potential for the restoration and optimisation of the management area for hen harrier foraging.

Peatlands

Upland blanket bog (PB2)

There is only one part of the survey area, at the west, which is comprised of relatively intact blanket bog, but there are still drains recorded within and surrounding this area. The surrounding habitat e.g. conifers and associated plantation and forest boundary drainage may also compromise the water levels here. Within the areas of upland blanket bog on the Site key pressures for foraging hen harrier in these habitats include:

- Over grazing (sheep)
- Grazing / browsing (deer)
- Trampling and compaction (sheep / deer)
- Self-seeded conifers
- Self-seeded rhododendron
- Artificial drains and drainage
- Fly-tipping and littering (along juxtaposition with roads)
- Boundary composition
- Forest edge effects

Cutover bog (PB4)

The areas of cutover bog have been heavily modified in the past and in some parts of the survey area there is ongoing mechanised extraction, and grazing pressure is particularly high in some parts of these habitats resulting in very short swards and cover and concentration of over-grazing closer to the roads and fields and/or supplementary feeding sites. Key pressures for foraging hen harrier in these habitats include:



- Turf banks (old hand cut)
- Turf cutover (recent mechanical cutting)
- Vehicle disturbance (turf cutting)
- Vehicle compaction (turf cutting)
- Vehicle compaction (quads)
- Supplementary feeding of stock
- Trampling and compaction (sheep, deer)
- Disturbance (livestock; sheep)
- Over-grazing (sheep)
- Grazing / browsing (deer)
- Self-seeded conifers
- Fly-tipping and littering (along juxtaposition with roads)
- Poor sward height
- Poor sward cover
- Erosion and slippages
- Artificial drains and drainage
- Boundary composition
- Forest edge effects

Poor fen and flush (PF2)

These areas appear to have been largely reclaimed from blanket bog and or wet heath habitats over time through artificial drainage and are very heavily grazed, predominantly evidenced by sheep. There is generally poor heterogeneity of sward types and structure and in many places are dominated by rushes. Whilst rushes can provide good winter roosting habitats for hen harrier, generally these are poor for foraging birds and may require mechanical management and increased heterogeneity of swards. This can occur through creation of linear strips within the rush sward or creation of native hedgerow or boundary management. Restoration through drain blocking and removal of adjacent isolated conifer blocks and associated draining would optimise the area to the east of the Site. Key pressures for foraging hen harrier in these habitats include:

- Vehicle disturbance (farm vehicles)
- Vehicle compaction (farm vehicles)
- Vehicle compaction (farm vehicles)
- Access tracks and laneways (farm vehicles)
- Supplementary feeding of stock
- Trampling and compaction (sheep, cattle)
- Disturbance (livestock; sheep; cattle)
- Over-grazing (sheep)
- Over-grazing (cattle)
- Self-seeded conifers
- Fly-tipping and littering (along juxtaposition with roads)
- Low sward height
- Low sward cover
- Erosion and slippages
- Artificial drains and drainage
- Boundary composition



- Forest edge effects

Grassland

Wet grassland (GS4)

These areas are predominantly located at the eastern and north-eastern parts of the survey area and are interspersed with a range of other habitat types. Many of the fields are bounded by earthen and stone banded drains, overgrown hedges and various tree lines and small woodland parcel and have varied botanical composition with occasional biodiverse areas. Many parts of this habitat are fertilised and mechanically mowed for silage with occasional longer margins left depending on topography and with some electric wire fencing. During field surveys in July 2024 there were around 80-100 bales recorded stored nearby presumably derived from a single recent cut. Many of these areas of grassland are bounded by conifer forest plantations. Key pressures for foraging hen harrier in these habitats include:

- Vehicle disturbance (farm vehicles)
- Vehicle compaction (farm vehicles)
- Vehicle compaction (farm vehicles)
- Access tracks and laneways (farm vehicles)
- Mechanical cutting of vegetation (silage)
- Mechanical cutting of vegetation (rush topping)
- Loss of prey / habitats due to mechanical cutting
- Supplementary application of fertilisers
- Supplementary feeding of stock
- Trampling and compaction (cattle)
- Disturbance (cattle)
- Over-grazing (cattle)
- Fly-tipping and littering (along juxtaposition with roads)
- Invasive species (fuchsia / snowberry)
- Temporal loss of vegetation (silage)
- Homogeneity of swards
- Low sward height
- Low sward cover
- Rush cover
- Low hedgerow and treeline diversity
- Artificial drains and drainage
- Boundary composition
- Forest edge effects

Acid grassland (GS3)

These areas are interspersed throughout the other habitat types mainly within the degraded heath and poor fen vegetation regions. These areas are typically heavily overgrazed by sheep and where they are located within the river gully are heavily dominated by developing native scrub and woodland. Key pressures for foraging hen harrier in these habitats include:

- Supplementary feeding of stock



- Trampling and compaction (sheep)
- Disturbance (sheep)
- Over-grazing (sheep)
- Self-seeded conifers
- Developing scrub
- Homogeneity of swards
- Low sward height
- Low sward cover
- Rush cover
- Artificial drains and drainage
- Boundary composition
- Forest edge effects

Heath

Dry siliceous heath (HH1)

These areas are generally located on steeper sided slopes, valleys and largely dependent on topography. In some areas past, and existing drainage is leader to drier habitats and more dry heath areas than may have originally been wet heath and/or blanket bog. The heath habitats, especially to the north of the main road through the site are heavily overgrazed by sheep. Key pressures for foraging hen harrier in these habitats include:

- Supplementary feeding of stock
- Trampling and compaction (sheep)
- Disturbance (sheep)
- Over-grazing (sheep)
- Self-seeded conifers
- Developing scrub
- Degenerate sward (heather)
- High sward height (inaccessible or under-grazed)
- Low sward height (overgrazed)
- Low sward cover (overgrazed)
- Artificial drains and drainage
- Boundary composition
- Forest edge effects

Wet heath (HH3)

Like the areas of dry heath these areas are primarily located along the river corridor at the western part of the site and a small remnant patch in the east within poor fen habitat and occurred in a mosaic interspersed with the other habitat types in the west. The drainage in these habitats is more naturalised, and heath has remained wetter although more widely the drainage has modified the original blanket bog. Grazing, peat slippage and burning of vegetation occurs more generally was recorded across the habitat. Key pressures for foraging hen harrier in these habitats include:

- Peat slippage
- Heather burning and fire



- Supplementary feeding of stock
- Trampling and compaction (sheep)
- Disturbance (sheep)
- Over-grazing (sheep)
- Self-seeded conifers
- Developing scrub
- Degenerate sward (heather)
- Low sward height (overgrazed)
- Low sward cover (overgrazed)
- Artificial drains and drainage
- Boundary composition
- Forest edge effects

Bracken (HD1)

This habitat only occurs only occasionally across the Site, and mostly within the river corridor mosaic of habitats. Bracken can exclude extensive areas of foraging habitat seasonally, as it grows and senesces seasonally. It can be 2-3m tall during the mid-summer months and prevent access for foraging birds including hen harrier. These areas are interspersed throughout the other habitat types at the western parts of the site. Key pressures for foraging hen harrier in these habitats include:

- Disturbance (sheep)
- Over-grazing (sheep)
- Self-seeded conifers
- Developing scrub
- Degenerate sward (heather)
- High sward height (inaccessible or under-grazed)
- Artificial drains and drainage
- Boundary composition
- Forest edge effects

Woodland and scrub

Woodland habitats in their early stages of development are highly utilised by foraging (and nesting) hen harrier. Developing scrub and young woodland sites are used by hen harriers from when they are 3-4m in height up to 7-10m tall before canopy closure limits suitability and typically avoid habitats once they are >5m (Madders, 2003). Within the management area there are a range of small woodland parcels and more extensively within and surrounding the site it is heavily dominated by coniferous plantation woodlands.

Semi-natural woodland (WN)

These habitats occur within various mosaics along the river corridors and also within and surrounding boundaries of fields in the eastern part of the site. Two areas of larger native woodland occur at the east and these areas comprise of older trees with well-developed canopies. Key pressures for foraging hen harrier in these habitats include:

- Lack of developing scrub
- Encroachment of scrub



- Expansion of scrub
- Maturation of scrub woodland
- Hedge composition and structure

Highly modified/non-native woodland (WD)

There are only small areas of coniferous woodland within the management area, but rather these areas represent a negative adjacent and circumferential effect all around the management area. Key pressures for foraging hen harrier in these habitats include:

- Self-seeded conifers
- Drainage of peatlands
- Drying of peatlands
- Encroachment of scrub
- Maturation of conifer woodland
- Forestry disturbance
- Forest edge effects

Field boundaries

Foraging hen harriers can benefit from linear features across a range of habitats, and these can be of varied compositions and structures. The quality and type of these features can be managed to optimise the area for hen harrier. There are a range of linear features and boundaries within and surrounding the management area (Figure 3) and several types of boundary features are evident including:

- Eroding/upland rivers (FW1)
- Drainage ditches (FW4)
- Spoil and bare ground (ED2)
- Recolonising bare ground (ED3)
- Active quarries (ED4)
- Stonewalls and other stonework (BL1)
- Roads and buildings (BL3)

Key pressures for foraging hen harrier in these habitats include:

- Overgrown hedgerows
- Over-grazing
- Fragmentation through fencing
- Traffic
- Quarrying
- Deer trampling
- Forest edge effects
- Modification of watercourses

Invasive species

There are key invasive species occurring at these lands including rhododendron, Japanese knotweed, and non-native conifers species the latter which appear to have self-seeded from adjacent plantations across a range of the extant open habitats. Deriving from several of residential properties and occurring predominately along the roadside verges and hedges there are also invasive fuchsia and snowberry occurring extensively.



The self-seeded rhododendron and conifers typically occur on the open moorland habitats and likely have derived from the adjacent conifer plantations and associated afforestation and forestry activities over the years. The fuchsia and snowberry typically occur in areas closer to dwellings and human habitations in the area and likely to have derived from ornamental and garden plantings in the area. Whilst vibrant in colour and the nectar of the former and berries of the latter may confer some wildlife benefits for bees and birds respectively, these are invading widely.

Management units and management opportunities and needs

Defining management units within a hen harrier habitat management program requires a multi-faceted approach, considering habitat requirements, human impacts, and stakeholder involvement. Through habitat restoration, effective land use management, and compensatory measures for unavoidable habitat loss, a robust conservation strategy can be developed to safeguard hen harrier populations.

This section provides further observations on aspects within the landscape that could offer further management opportunities and enhancement of the area within Folio 13. Sources of disturbance or displacement were also recorded during all surveys and attempts made to understand the potential reaction or responses of birds, and whether they might be directly impacted by any extant disturbance events and how these factors might be reversed.

There are a range of key potential habitat management opportunities at the Site, which include but are not limited to:

- Reduce sheep grazing on those areas of heath, blanket bog and poor fen which are negatively impacted by current grazing levels;
- Manage and reduce cattle (and sheep) grazing on grassland and moorland habitats;
- Manage some of the overgrown hedges in a rotation by coppicing to create a denser structure, fill gaps and reduce height;
- Creation of new (native species) hedgerows along pre-existing linear features (e.g. fences);
- Remove small conifers and *Rhododendron* from blanket bog habitat;
- Control any Japanese knotweed that may be encroaching onto the land;
- Remove invasive fuchsia and snowberry from hedgerows and replace with native species;
- Blocking and damming of small artificial drains which are within blanket bog habitat;
- Creation of wet features such as scrapes and dams to increase invertebrate and bird diversity;
- Cessation of peat cutting and restoration and revegetation of turbary areas;
- Protect and optimise areas of deep heather including with the usage of temporary fencing where required;
- Manage wet grassland with abundant *Succisa pratensis* as potential habitat for breeding marsh fritillary butterfly and other invertebrates;
- Maintain light cattle grazing to ensure a mix of tall tussocky vegetation and shorter areas and not cut all the rushes in the wet grassland fields;
- Protection and improvement of riparian woodland corridors, heath and scrub proliferation along watercourses;
- Retain old, ruined buildings and optimise and restore linear features or habitat features of interest;
- Manage human and machinery disturbance and timing of activities throughout the year;
- Reduce conifer forest edges at parcel interfaces with neighbouring lands and/or replant these with native woodland and scrub.



Generally, within each management units (Figure 4) there is a requirement to implement specific management measures and with reference to habitat types occurring (Figure 2) and linear features present (Figure 3). These are summarised in Table 1-1 below.

Some of these management units overlap with Dough Mountain NHA boundary, which is shown in Figure 5.



Table 1-1. Summary of potential management measures at each management unit

Management No.	Unit	Area (ha)	Habitat types present	Potential management measures																				
				Nest protection measures	Drain blocking	Cessation of turf cutting	Re-profiling of old embankments	Naturalisation of watercourses	Creation of new / enhancement	Creation of new scrub	Planting of native grasses	Removal of conifers	Removal of invasive species	Reduction in arazid intensity	Access management	Deer management	Selective thinning of conifers alone	Control of bracken	Selective thinning of encroachment	Community enhancement	Rush management	Re-localising livestock	Transition from silage production	
1		7.3	Cutover bog with a strip of blanket bog to the west and some parcels of dry heath with good heather coverage	✓	✓				✓	✓				✓										
2		8.6	Cutover bog with large intact piece of blanket bog		✓			✓	✓				✓		✓									
3		10.4	Cutover bog with flushes of poor fen		✓			✓	✓				✓											
4		9.9	River corridor with heath, bracken, scrub, grassland, intact blanket bog and fen					✓	✓	✓		✓		✓										
5		19.7	Cutover bog and small section of coniferous woodland		✓	✓	✓	✓	✓	✓		✓		✓										
6		8.3	Poor fen and wet grassland		✓				✓	✓														
7		0.5	Poor fen and wet grassland		✓				✓	✓				✓										
8		2.4	Poor fen and wet grassland with adjacent conifer forest plantation, dwelling and a water treatment plant		✓					✓		✓									✓			
9		13.7	Wet grassland poor fen		✓					✓		✓									✓	✓	✓	✓
10		9.7	Wet grassland and riparian corridor						✓					✓	✓									✓
11		9.6	Wet grassland and farm buildings		✓			✓	✓	✓				✓										✓
12		5.6	Poor fen and wet grassland mosaic, and wet heath		✓			✓	✓	✓				✓										



4.0 Figures

Figure 1. Aerial imagery of the habitat management area (Folio 13).

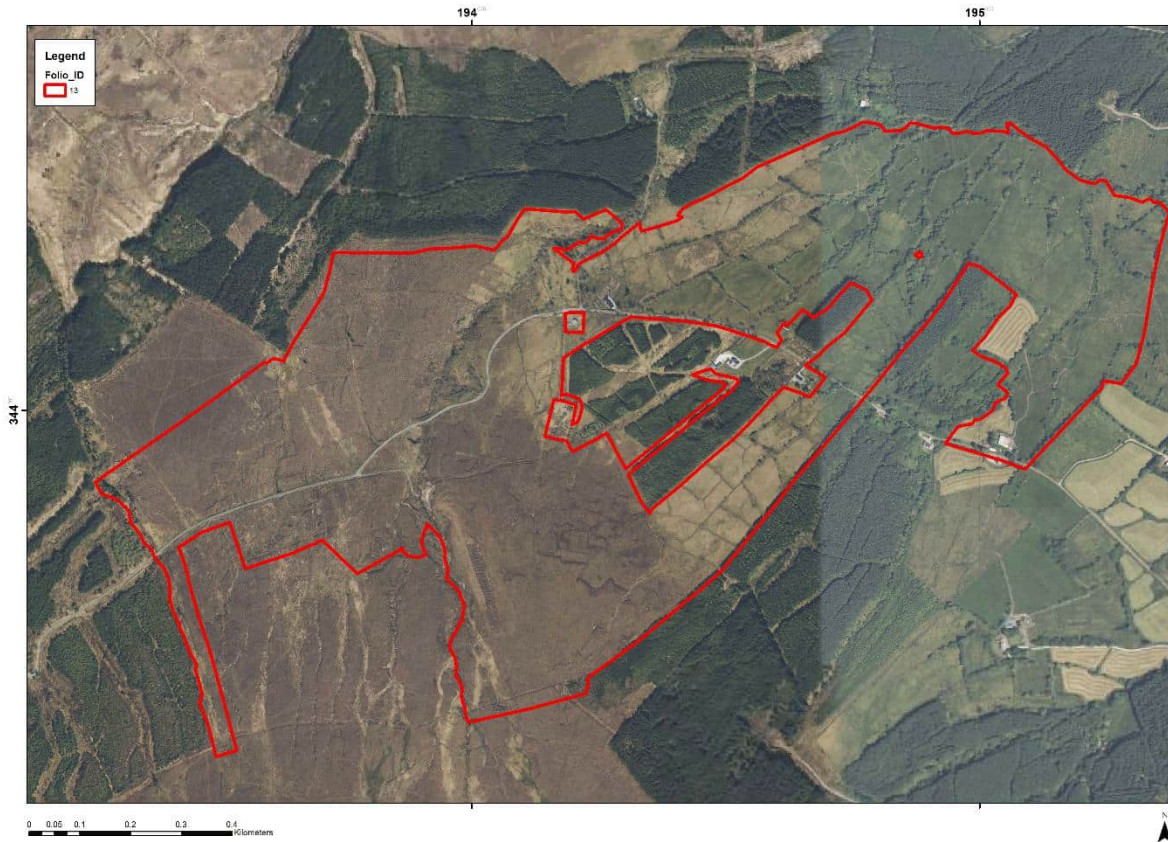


Figure 2. Habitat map showing details of habitat types (Fossitt, 2000) at the habitat management area.

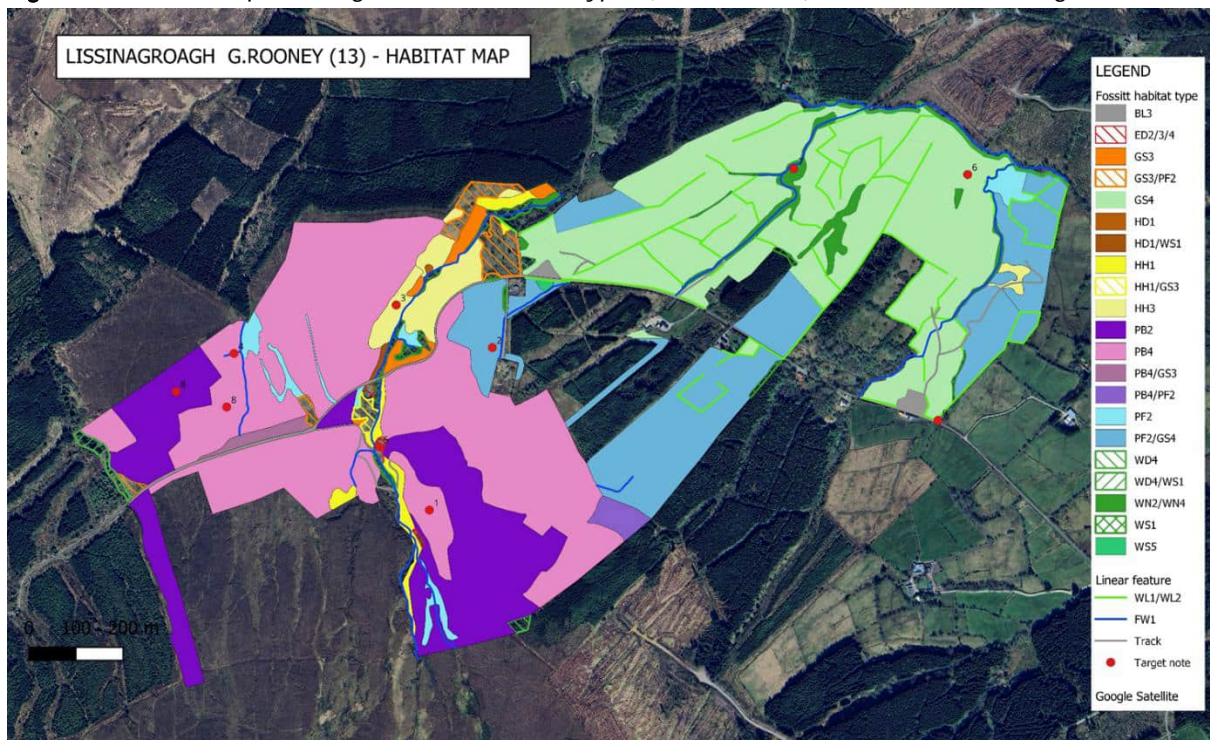




Figure 3. Linear features observed throughout the habitat management area at Folio 13 including fences, hedges, scrub, tracks, roads, woodland edge, drains and watercourses/streams.

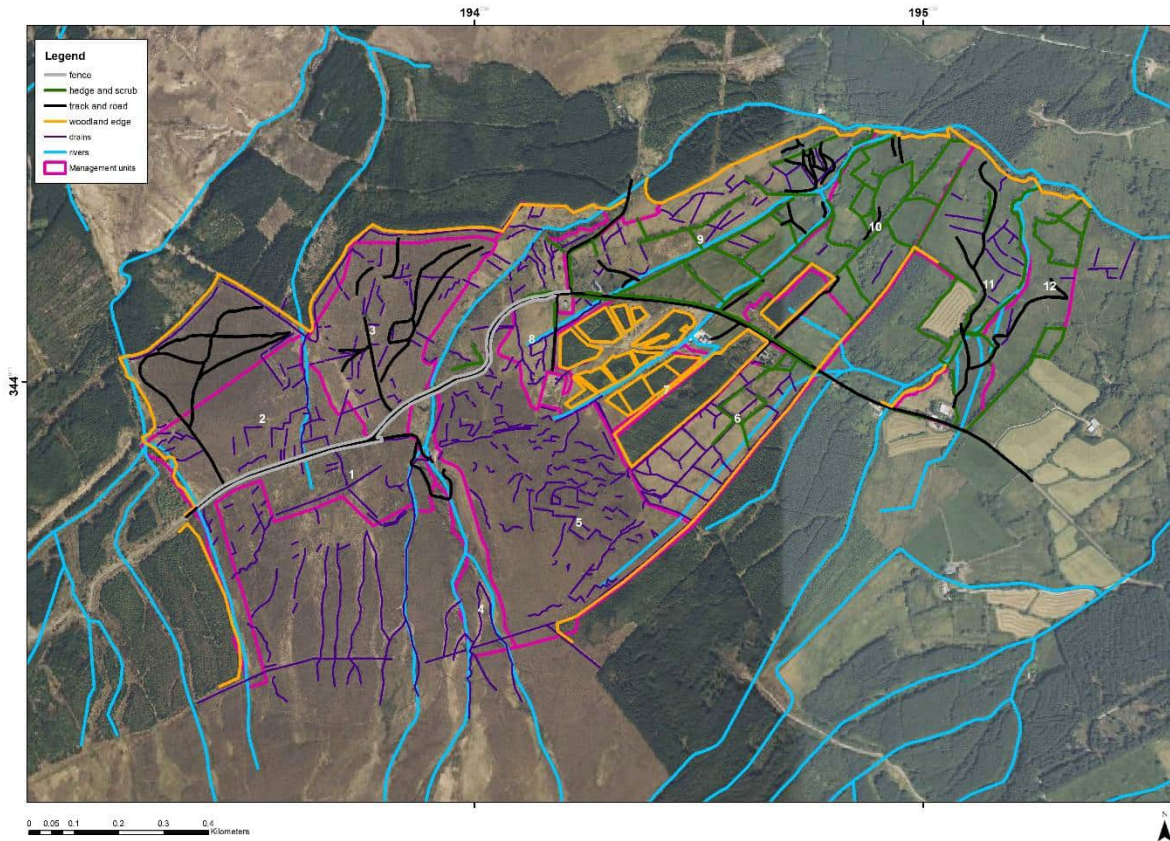


Figure 4. Management units defined across Folio 13

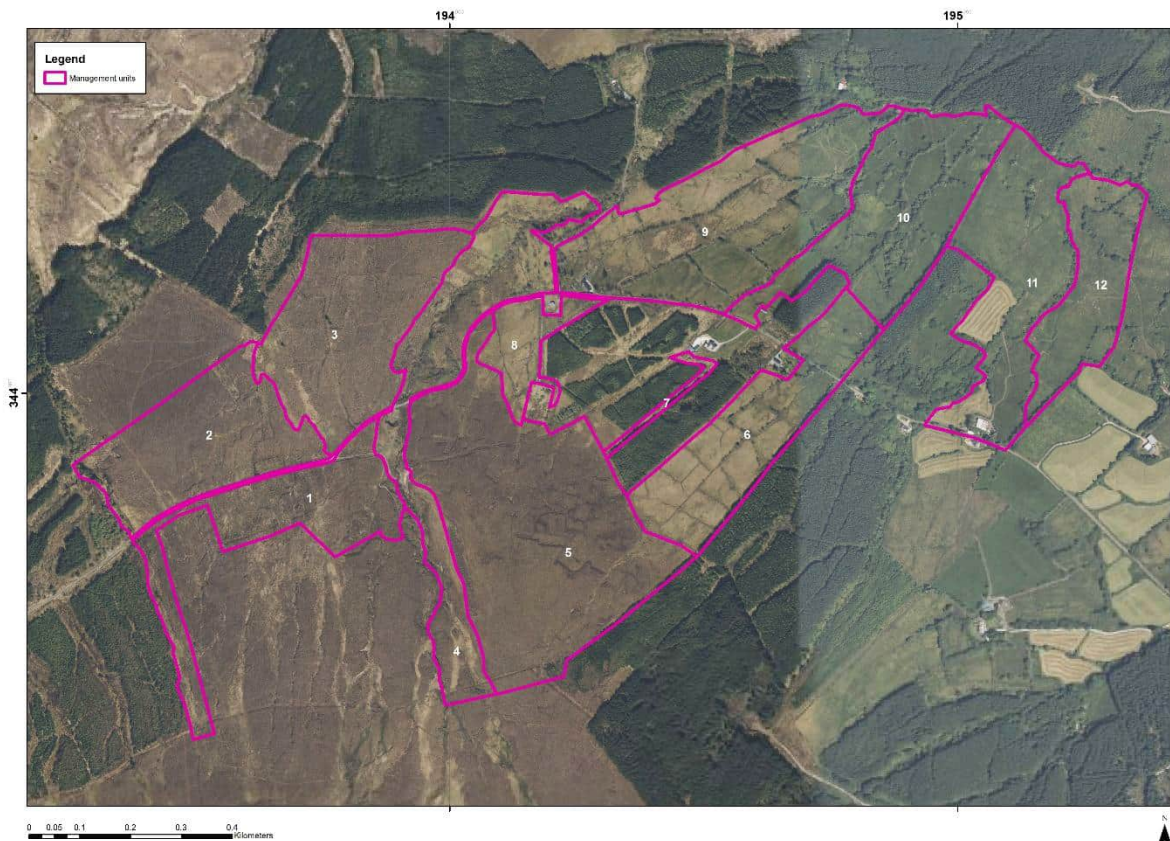
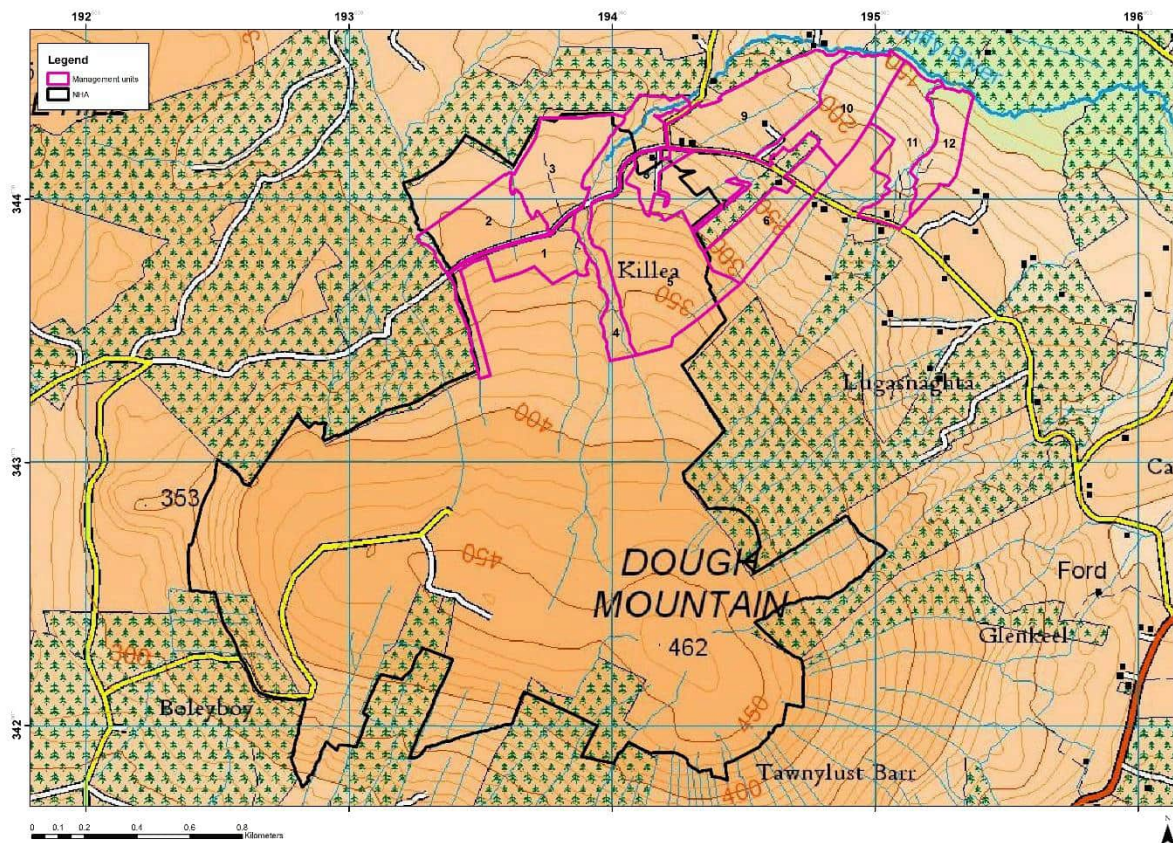




Figure 5. Management units MU1, MU2, MU3, MU4, MU5 and MU8 overlaps with the NHA boundary.



5.0 References

Fossitt, J. A. (2000). A Guide to habitats in Ireland. Heritage Council, Kilkenny.
 Smith, G. F., O'Donoghue, P., O'Hora, K. & Delaney, E. (2011) Best practice guidance for habitat survey and mapping. Heritage Council, Kilkenny.

Appendix D Lissinagroagh Biodiversity Exhibit

Outline Biodiversity Management Plan

Lissinagroagh Wind Farm

FutureEnergy Ireland

SLR Project No.: 501.065072.00001

30 March 2026



Exhibit: Biodiversity Enhancement Measures

This exhibit outlines a comprehensive list of measures aimed at enhancing the biodiversity value and providing a foraging habitat for the hen harrier on the land subject to the Option Agreement between the Landowner and the Grantee. The Grantee may request the implementation of any of the following measures, as described herein, during the option period and the subsequent lease term. The actual measures to be implemented on the lands shall be further refined and detailed in the Biodiversity Farm Plan (the farm plan), which will be drafted after a detailed survey of the lands is conducted.

1. Works for Biodiversity Conservation / Enhancement:

The Grantor agrees, upon request by the Grantee, to carry out any works required for the purposes of conserving or improving biodiversity, in accordance with the Grantee's reasonable directions. The cost of such works, if necessary, shall be borne by the Grantee. Failure to implement such works may lead to non-payment of the lease rent and/or termination of the lease.

2. Access for Monitoring and Implementation:

The Grantor shall allow access to the Property by the Grantee or their appointed agents for the purposes of survey, monitoring and/or implementation of measures for conserving or improving biodiversity within the Property.

3. Land (Habitat) Management Measures:

The Grantor shall implement the following land management measures, which may include;

- a. **Grassland Management:** Possible changes to the length of time lands are grazed, and reduction or increase in stocking density as deemed appropriate for biodiversity conservation. A stocking density of between 0.10LU and 1.40LU per hectare may be sought during the months of September to March. Advice on such requirements will be set out in the farm plan to prevent poaching or churning of lands.
- b. **Rush Management:** No spraying rushes with glyphosate or other herbicides. This is important for ground nesting species such as hen harrier.
- c. **Delayed Topping/Mowing:** To preserve habitats for nesting birds and other wildlife during the period 1 March – 31 August Inclusive. This is particularly important for ground nesting species such as hen harrier.
- d. **Hedgerow Management:** Encouraging the establishment and preservation of hedgerows for nesting and sheltering wildlife. This may include additional planting (gapping up) of hedgerows to encourage dense growth and the exclusion of mechanical management of hedgerows such as use of a flail.
- e. **Scrub Development:** Encouraging the growth of scrubland to provide diverse habitats for various species. Allowing hedgerows at suitable locations, to be agreed with the landowner, to expand into small pockets of scrub woodland. Scrub encroachment into grasslands would be discouraged through the continued use of grazing animals.

- f. **Reduction in Fertilizer Application:** Reducing or ceasing the use of fertilizers in certain areas to promote biodiversity. The requirements for reduction or cessation of the application of fertilisers would be determined by soil testing and survey carried out to prepare the individual farm plan. The aim of this measure would be to allow a diversity of grassland species including soft rush to be present in the grassland sward. This measure would also assist in meeting the requirements of the Nitrates Directive and improve the quality of surface water run-off to streams and drains locally.
- g. **Planting of Native Trees and Fruit Trees:** Adding native trees to gap up hedgerows or creating small orchards to support wildlife. This would be a measure that would be subject to suitable soil and land availability to develop small orchards or woodlands on the landholding and subject to the landowners agreement to implement same.

4. Prohibited Activities:

The Grantor shall not carry out or permit any of the following activities on the Property:

- a. Burning Areas of Vegetation.
- b. Removal of Hedgerows.
- c. Planting of Conifers.
- d. Land Drainage.
- e. Organizing, Allowing, or Engaging in Recreational Activities Involving Off-road or Racing Vehicles.
- f. Unapproved Use of Herbicides, Pesticides, or Rodenticides.
- g. Turf Cutting.

5. Non-interference with Biodiversity Management:

The Grantor shall not do or permit to be done anything upon the Property that would interfere or be likely to interfere with the Grantor's management of lands for biodiversity granted by the lease agreement.



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