The Secretary
An Coimisiún Pleanála
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V94 NP9F
4th August 2026

RESPONSE TO FURTHER INFORMATION

Dear Sir/Madam,
Re: Knockshanvo Windfarm
Windfarm: ABP-320705-24
Grid Connection: ABP-320727-24
Applicant: FuturEnergy Knockshanvo Designated Activity Company

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Executive Summary

This submission examines the Applicant's assessment of potential effects on **Hen Harrier (*Circus cyaneus*)**, with particular reference to the Further Information submitted in response to observations on the Knockshanvo Wind Farm application.

The Applicant has undertaken an extensive ornithological assessment, supplemented by additional survey work, technical responses and a substantial package of proposed habitat enhancement and compensation measures. The volume of material submitted is acknowledged. However, the quantity of information provided does not, of itself, demonstrate that the conclusions reached are scientifically robust or that the remaining uncertainties have been satisfactorily resolved.

The central concern raised in this submission is that the Applicant's assessment repeatedly relies upon assumptions which are presented as conclusions without being transparently demonstrated through the underlying ecological evidence. Individually, many of these assumptions may appear reasonable. Collectively, however, they form the foundation upon which the Applicant concludes that significant effects upon Hen Harrier, including cumulative effects, can be excluded. It is that evidential pathway which this submission examines.

The submission considers, in particular:

- whether the exclusion of the Slieve Aughty Mountains Special Protection Area from detailed assessment is adequately supported by the available scientific evidence;
- whether the recorded breeding, winter roosting and wider seasonal use of the Knockshanvo landscape have been fully understood and integrated into the assessment;
- whether the treatment of Hen Harrier activity associated with Gortacullin Bog, the Collision Risk Model and the vantage point surveys provides a complete and internally consistent assessment of collision risk and flight activity;
- whether the cumulative interaction between Knockshanvo, the adjoining Oatfield proposal and other consented wind energy developments has been assessed in a manner that adequately considers habitat connectivity, seasonal movement and the changing nature of the commercial forestry landscape;
- whether the Applicant has demonstrated that the proposed habitat enhancement and compensation measures are based upon a correctly identified and quantified ecological effect and are capable of delivering the ecological outcomes attributed to them; and

- whether the assessment, viewed as a whole, removes reasonable scientific uncertainty regarding the conclusions reached.

This submission does not contend that every uncertainty identified necessarily demonstrates that significant adverse effects will occur. Nor does it seek to substitute one ecological model for another. Rather, it examines whether the Applicant has provided sufficient evidence to support the assumptions upon which its conclusions depend.

Throughout the planning documentation there is a recurring distinction between **recorded ecological observations** and **interpretative assumptions**. In several important respects, including functional connectivity, seasonal habitat use, cumulative effects, collision-risk assessment and the predicted effectiveness of habitat compensation, this submission concludes that the latter extend beyond what has been clearly demonstrated by the former.

Hen Harrier is an Annex I species afforded a high level of protection under European and national law. Where the Applicant relies upon ecological judgement, predictive modelling and future habitat management to conclude that significant effects will not arise, those conclusions should be supported by a transparent and reproducible evidential basis. In the opinion of the undersigned, the Further Information does not fully achieve that standard.

Accordingly, this submission respectfully invites the Commission to examine the issues identified in the following sections before accepting the Applicant's conclusions regarding Hen Harrier, cumulative effects and the adequacy of the proposed mitigation and compensation measures.

1. Introduction

This submission considers a single aspect of the proposed Knockshanvo Wind Farm: the assessment of potential effects upon **Hen Harrier (*Circus cyaneus*)**, an Annex I species protected under the Birds Directive and one of the principal ornithological receptors identified by the Applicant throughout the environmental assessment.

It has been prepared following a detailed review of the Applicant's Environmental Impact Assessment Report (EIAR), Natura Impact Statement (NIS), Biodiversity Management Plan, Collision Risk Assessment, the Further Information submitted in response to observations, and other relevant planning documentation relating to the assessment of Hen Harrier. Particular attention has been given to the Applicant's responses to concerns raised by Clare County Council, statutory consultees and third-party observers regarding Hen Harrier, cumulative effects and habitat compensation.

The purpose of this submission is not to repeat the original objections made to the proposed development, nor to challenge every aspect of the Applicant's ornithological assessment. Rather, it examines whether the Further Information has adequately

addressed a number of important ecological questions that remain material to the Commission's assessment of the application.

The Applicant has clearly devoted considerable effort to the ornithological assessment. The volume of ecological information submitted is substantial and reflects a significant programme of field survey, technical assessment and proposed mitigation. This submission does not question that work has been undertaken. The issue is whether the evidence presented supports the conclusions that the Applicant ultimately asks the Commission to accept.

Throughout the planning documentation, the Applicant reaches a series of important conclusions regarding Hen Harrier. These include conclusions concerning functional connectivity with nearby Special Protection Areas, breeding and winter habitat use, displacement, collision risk, cumulative effects, habitat compensation and the likely effectiveness of proposed mitigation measures. Many of these conclusions rely upon professional ecological judgement, predictive modelling and assumptions regarding future habitat conditions.

Professional judgement is an essential component of ecological assessment. However, where such judgement forms the basis upon which significant environmental effects are discounted, it should be supported by a transparent and reproducible evidential pathway. One of the recurring themes identified during this review is that, in several important areas, the planning documentation explains **what** conclusions have been reached more clearly than **how** those conclusions have been derived.

This submission therefore focuses on the relationship between the available evidence and the conclusions drawn from it. It asks whether the planning documentation demonstrates, with sufficient transparency, that:

- the recorded ecological evidence supports the conclusions reached;
- alternative interpretations of that evidence have been adequately considered;
- important sources of uncertainty have been fully addressed; and
- the cumulative implications of those uncertainties have been properly evaluated before concluding that significant effects upon Hen Harrier will not arise.

The observations which follow should not be interpreted as asserting that the proposed development will necessarily result in significant adverse effects upon Hen Harrier. Ecological assessment rarely lends itself to absolute certainty. Equally, however, the absence of certainty should not be replaced by assumptions that are insufficiently explained or demonstrated. The purpose of this submission is to identify those areas where further explanation, justification or evidence appears necessary before the Applicant's conclusions can be accepted with confidence.

The report is structured around a number of key themes arising from the Further Information, including functional connectivity with nearby European sites, seasonal habitat use, survey methodology, collision risk assessment, cumulative landscape effects and the proposed habitat enhancement and compensation strategy. While these

topics are examined individually, they should not be viewed in isolation. Together they form the evidential basis upon which the Applicant concludes that the proposed development will not give rise to unacceptable effects upon Hen Harrier. It is that overall evidential basis which this submission respectfully invites the Commission to examine.

2. The Applicant's Central Assumption

Having reviewed the Environmental Impact Assessment Report (EIAR), Natura Impact Statement (NIS), Biodiversity Management Plan, Collision Risk Assessment and the Further Information submitted in response to observations, I consider that a common assumption underpins much of the Applicant's assessment of potential effects upon Hen Harrier.

That assumption is not expressly stated in a single paragraph or conclusion. Rather, it emerges consistently throughout the assessment.

In summary, the Applicant's assessment proceeds on the basis that the ecological effects arising from the proposed development are sufficiently localised, sufficiently understood and sufficiently predictable that they can be identified, quantified and addressed through the assessment methodology adopted and the proposed habitat enhancement and compensation measures.

This assumption is reflected in a number of important conclusions throughout the planning documentation, including:

- that the Slieve Aughty Mountains Special Protection Area can be excluded from further assessment on the basis of the Applicant's screening methodology;
- that the recorded breeding, foraging and winter activity represents a sufficiently complete understanding of how Hen Harrier use the Knockshanvo landscape;
- that the survey programme and vantage point coverage provide an adequate evidential basis for assessing collision risk and displacement;
- that predicted habitat loss can be quantified using the methodology adopted by the Applicant;
- that the cumulative effects of Knockshanvo together with Oatfield and other relevant developments have been adequately characterised; and
- that the proposed habitat enhancement and compensation measures are sufficient to address the ecological effects identified.

None of these conclusions is necessarily unreasonable when considered individually. However, they are not independent of one another. Each conclusion forms part of a sequential chain of ecological reasoning.

For example, confidence in the proposed habitat compensation depends upon confidence that the functional habitat effect has first been correctly identified and quantified. Confidence in the habitat-loss calculation depends upon confidence in the assumptions regarding displacement, habitat availability and survey interpretation.

Confidence in those assumptions depends upon the completeness of the survey data and the ecological understanding of how Hen Harrier use the landscape throughout the breeding and non-breeding seasons. Similarly, confidence in the cumulative assessment depends upon confidence that the spatial extent of those effects has first been correctly understood for the proposed development itself.

Accordingly, this submission does not seek to challenge individual conclusions in isolation. Instead, it examines whether the evidential pathway linking the Applicant's ecological observations to its overall conclusions is sufficiently transparent, internally consistent and scientifically robust.

In several areas discussed in the following sections, the planning documentation appears to move directly from recorded observations to broad conclusions without fully explaining the intermediate analytical steps by which those conclusions have been reached. In some cases, important assumptions appear to be accepted without sufficient examination of alternative interpretations, cumulative interactions or residual uncertainty.

This does not necessarily mean that the Applicant's conclusions are incorrect. It does, however, mean that the Commission should be satisfied that each conclusion is supported by a clear evidential basis capable of independent scrutiny.

The purpose of this submission is therefore not to present an alternative ecological assessment, but to examine whether the Applicant has demonstrated, with sufficient clarity and transparency, that the assessment methodology adopted adequately reflects the complexity of Hen Harrier ecology within the wider East Clare landscape and that the conclusions reached properly follow from the evidence presented.

3. Functional Connectivity Beyond Administrative Boundaries

One of the principal conclusions reached by the Applicant is that the proposed development will not give rise to significant effects upon the Slieve Aughty Mountains Special Protection Area (SPA) (Site Code 004168) or its qualifying interest, the Hen Harrier. This conclusion is presented within the Screening for Appropriate Assessment (AA), the Natura Impact Statement (NIS) and reiterated in the Further Information submitted in response to observations.

The conclusion itself is not unusual. Many wind energy developments conclude that European sites beyond a particular distance are unlikely to experience significant effects. The important question, however, is not whether such a conclusion can ultimately be reached, but whether the evidential basis supporting that conclusion is sufficiently transparent and scientifically robust.

3.1 Distance is an indicator, not a biological boundary

The Applicant records that the proposed Wind Farm Site lies approximately 11 km from the nearest boundary of the Slieve Aughty Mountains SPA and concludes that functional connectivity with that European site can be excluded.

Distance is clearly an important consideration within ecological screening. However, ecological systems rarely operate according to fixed administrative or geometric thresholds. A linear distance may provide a useful screening tool, but it does not of itself determine the ecological relationship between two areas of habitat.

The relevant ecological question is therefore not simply:

How far is the proposed development from the SPA?

Rather, it is:

Does the available ecological evidence demonstrate that the recorded Hen Harrier activity associated with the Knockshanvo landscape is functionally unrelated to the qualifying population of the Slieve Aughty Mountains SPA?

These are fundamentally different questions.

3.2 The role of Irish movement data

The Applicant's screening approach should be considered alongside the best available information regarding Hen Harrier movement under Irish conditions.

The University College Cork HENHARRIER research project recorded movements of GPS-tagged breeding Hen Harriers beyond 10 km from the nest, including one male travelling approximately 11.4 km during the tracking period. The study itself acknowledges the limitations associated with sample size and tracking duration. It does not demonstrate that birds associated with the Slieve Aughty Mountains SPA use the Knockshanvo landscape, nor does it establish an ecological threshold for connectivity.

Its importance lies elsewhere.

It demonstrates that movements of Irish Hen Harriers are capable of extending beyond the generic 10 km screening distance often used during Appropriate Assessment screening. Consequently, a separation distance marginally exceeding 10 km should not automatically be interpreted as demonstrating the absence of ecological connectivity.

Accordingly, the Applicant's conclusion cannot rely solely upon the fact that the site lies approximately 11 km from the SPA. It should instead demonstrate why the available survey evidence, habitat distribution and ecological understanding collectively justify the conclusion that functional connectivity can reasonably be excluded.

3.3 Site-specific evidence should take precedence over generic screening thresholds

The purpose of screening guidance is to assist ecological assessment by identifying circumstances in which further investigation may or may not be required. Such guidance cannot replace site-specific ecological evidence.

In the present case, the Applicant's own surveys record repeated use of the wider Knockshanvo landscape by Hen Harrier during both the breeding and non-breeding seasons. The Applicant also accepts that the species is a key ornithological receptor for the proposed development and has undertaken detailed assessment of breeding activity, winter roosting, displacement, collision risk and habitat compensation.

Those findings demonstrate that Hen Harrier use of the site is not incidental.

Once that level of ecological importance has been established, the Commission should expect a clear explanation as to why the same evidence nevertheless supports the conclusion that no functional relationship exists with the nearest SPA.

This submission does not contend that such a relationship has been established.

Rather, it submits that the evidential basis for excluding it should be transparent, reproducible and capable of independent scrutiny.

3.4 Functional connectivity is an ecological question

Functional connectivity should not be viewed solely in terms of breeding territories.

Hen Harrier utilise landscapes differently throughout the annual cycle. Breeding, foraging, commuting, winter roosting and juvenile dispersal may all involve different spatial patterns and different habitat requirements.

Consequently, the assessment of functional connectivity should consider the ecological role of the wider landscape rather than focusing exclusively upon straight-line separation between the proposed development and the designated site.

This becomes particularly relevant where the Applicant's own assessment identifies:

- repeated breeding activity in the wider landscape;
- winter roosting within and adjacent to the Wind Farm Site;
- habitat displacement requiring compensation;
- cumulative interaction with adjoining wind energy developments; and
- changing habitat availability associated with commercial forestry.

Taken together, these factors indicate that the ecological function of the Knockshanvo landscape extends beyond the immediate turbine footprint.

The question is therefore not simply whether the SPA lies approximately 11 km away.

The question is whether the Applicant has demonstrated that these recorded ecological functions operate independently of the SPA population.

3.5 Remaining uncertainty

The Further Information confirms the Applicant's conclusion that no significant effects upon the Slieve Aughty Mountains SPA are predicted. However, the reasoning underpinning that conclusion remains difficult to follow in several respects.

In particular, it remains unclear:

- how the approximately 11 km separation was measured and between which reference points;
- what weight was given to Irish telemetry evidence demonstrating movements beyond 10 km;
- how breeding, winter-roosting and wider seasonal habitat use were considered when assessing functional connectivity;
- whether the displacement footprint associated with the proposed turbines was considered when evaluating ecological influence beyond the site boundary; and
- how cumulative interaction with the adjoining Oatfield proposal influenced the assessment.

These questions do not establish that the Applicant's conclusion is incorrect.

They do indicate that important elements of the evidential pathway remain insufficiently explained.

Given that Hen Harrier is an Annex I species and that the Applicant relies upon this conclusion throughout the subsequent assessment of cumulative effects, displacement and compensation, it is reasonable to expect a clearer demonstration of why functional connectivity with the Slieve Aughty Mountains SPA can be confidently excluded.

4. Seasonal Ecology: Understanding How Hen Harrier Use the Knockshanvo Landscape

One of the recurring themes throughout the Applicant's ornithological assessment is that the Knockshanvo landscape supports Hen Harrier throughout different stages of the annual cycle. The planning documentation refers to breeding activity, nesting attempts, territorial behaviour, foraging, commuting flights, winter roosting and habitat use extending beyond the immediate turbine locations. It also recognises that habitat

management and compensation are required specifically because the development is predicted to affect the species' use of the surrounding landscape.

Taken together, these findings demonstrate that the assessment is not concerned simply with the location of individual nests. Rather, it concerns the ecological function of the wider landscape over time.

The question arising from the Further Information is therefore not whether Hen Harrier occur within the Knockshanvo landscape. The Applicant's own surveys clearly establish that they do. The question is whether the assessment has adequately explained **how** that landscape is used throughout the annual cycle and whether that understanding is sufficient to support the conclusions reached regarding displacement, cumulative effects and habitat compensation.

4.1 A dynamic landscape rather than a static breeding territory

Commercial forestry creates a constantly changing habitat mosaic. Areas suitable for nesting or foraging in one year may become unsuitable following canopy closure, while recently felled areas may become highly attractive during another stage of the forestry cycle.

At the same time, the proposed turbine locations remain fixed.

Consequently, the relationship between Hen Harrier and the turbine array cannot be understood solely by reference to breeding territories recorded during a particular survey season. It must also consider how habitat availability changes over time and how birds respond to those changes.

The Applicant acknowledges this dynamic landscape elsewhere in the assessment when calculating habitat availability over the forestry rotation and when proposing long-term habitat management. However, the ecological implications of this changing landscape for seasonal movement and landscape connectivity are less clearly explained.

4.2 Breeding records demonstrate repeated use of the wider landscape

The planning documentation records breeding activity associated with the Knockshanvo landscape over a number of survey years, including confirmed nests, probable breeding territories and repeated observations of breeding-season activity. While breeding success varied between years, the overall picture is one of recurring use of the wider landscape rather than isolated or exceptional records.

This is important because it demonstrates that the site forms part of a functioning breeding landscape rather than merely providing occasional foraging habitat.

However, breeding records represent only one component of the species' ecology.

Hen Harrier use of the landscape extends beyond the nesting period and cannot be fully understood from breeding data alone.

4.3 Winter ecology raises additional questions

The Applicant's surveys also record winter roosting within and around the Wind Farm Site together with increased winter activity relative to the breeding season. These observations indicate that the ecological role of the Knockshanvo landscape changes during different parts of the year.

The existence of winter roosts is significant for two reasons.

First, it demonstrates that the landscape continues to provide important ecological functions outside the breeding season.

Secondly, it raises questions regarding movement between roosting sites and surrounding foraging habitat.

The assessment identifies winter use but provides relatively little explanation of how those wintering birds interact with the wider landscape.

For example:

- Are the recorded winter birds locally breeding individuals?
- Are they birds dispersing from neighbouring breeding areas?
- Do they originate from one or more Special Protection Areas?
- Do they represent a combination of local and more distant birds?
- Are the same commuting routes used throughout successive winters?
- How do changing forestry conditions influence those movements?

This submission does not suggest that the available evidence provides definitive answers to these questions.

Rather, it submits that these questions remain important because the conclusions regarding collision risk, displacement, cumulative effects and habitat compensation depend upon an adequate understanding of how the landscape functions throughout the annual cycle.

4.4 Seasonal movement and functional habitat

Hen Harrier do not use every part of a landscape equally throughout the year.

The ecological importance of particular areas may change depending upon breeding requirements, prey availability, vegetation structure, weather conditions and forestry operations.

Accordingly, the functional importance of the Knockshanvo landscape should be considered in seasonal terms rather than as a single, static ecological resource.

This becomes particularly relevant where the assessment relies upon:

- displacement assumptions;
- habitat-loss calculations;
- habitat compensation;
- cumulative interaction with neighbouring developments; and
- operational-life averages derived from the forestry cycle.

If habitat suitability changes materially over time, then the spatial relationship between suitable habitat and the fixed turbine array also changes.

The Applicant should therefore demonstrate not only how much suitable habitat is available throughout the operational period, but where that habitat is likely to occur and whether it remains functionally connected as forestry cycles progress.

4.5 The origin of wintering birds

An issue that receives relatively limited discussion within the planning documentation concerns the origin of the wintering birds recorded during survey work.

This submission does not assume that these birds originate from the Slieve Aughty Mountains SPA or from any other specific breeding population.

However, the origin of those birds is potentially relevant when considering:

- functional connectivity;
- cumulative effects;
- movement ecology;
- seasonal habitat use; and
- the ecological importance of the Knockshanvo landscape within the wider region.

If the origin cannot be determined from the available survey evidence, that uncertainty should be acknowledged when interpreting the significance of winter activity and the conclusions drawn from it.

Conversely, if sufficient evidence exists to demonstrate that the wintering birds are unrelated to neighbouring SPA populations or wider regional populations, the basis for that conclusion should be clearly explained.

4.6 The relationship between seasonal ecology and the Applicant's conclusions

The Applicant ultimately concludes that significant residual effects upon Hen Harrier will not arise following implementation of the proposed mitigation and habitat management measures.

That conclusion depends not only upon the quantity of habitat available but upon an understanding of how Hen Harrier actually use that habitat throughout the year.

Breeding, winter roosting, foraging and commuting are not independent ecological processes. They are interconnected aspects of the same functional landscape.

Where uncertainty remains regarding seasonal habitat use, movement patterns or landscape connectivity, that uncertainty has implications for the confidence that can properly be placed in later conclusions regarding displacement, collision risk, cumulative effects and habitat compensation.

Accordingly, before accepting that the proposed mitigation and compensation strategy adequately addresses the predicted ecological effects, the Commission should be satisfied that the underlying seasonal ecology has been fully characterised and that the Applicant has demonstrated how the recorded observations support the conclusions ultimately reached.

5. Gortacullin Bog: An Ecologically Important Area Requiring a Consistent Assessment

One of the most striking features of the Applicant's ornithological assessment is the prominence given to **Gortacullin Bog** within the wider ecological description of the Knockshanvo landscape.

Although Gortacullin Bog NHA is not designated for Hen Harrier, the Applicant's own documentation repeatedly identifies the surrounding open peatland habitat as ecologically important to the species. Hen Harrier is identified as a Key Ornithological Receptor, and the surveys extend beyond the turbine footprint to include adjacent peatland habitats, including Gortacullin Bog. The Applicant also relies upon the ecological significance of this wider landscape when discussing turbine layout, habitat management and biodiversity enhancement.

Accordingly, Gortacullin Bog is not treated within the planning documentation as an isolated feature lying outside the ecological assessment. Rather, it forms part of the wider landscape within which the Applicant assesses Hen Harrier activity.

The issue examined in this chapter is therefore not whether Gortacullin Bog itself will be directly affected by construction works. That question is addressed elsewhere in the

planning documentation through hydrological assessment and Natura Impact Assessment.

Instead, the issue considered here is whether the treatment of **Hen Harrier activity associated with Gortacullin Bog** remains consistent throughout the Applicant's ornithological assessment.

5.1 Gortacullin Bog is recognised as part of the wider Hen Harrier landscape

The planning documentation demonstrates that the Applicant regarded the area surrounding Gortacullin Bog as relevant to understanding Hen Harrier ecology within the study area.

The EIAR identifies Hen Harrier as one of the principal ornithological receptors for the project, and the surrounding peatland habitats were included within the wider survey programme. The ecological assessment therefore recognises that understanding how Hen Harrier use the broader landscape is necessary before conclusions regarding displacement, collision risk and habitat management can be reached.

This is an important starting point.

It means that the ecological significance of Gortacullin Bog is not introduced by objectors. It is recognised within the Applicant's own assessment.

5.2 Consistency between qualitative and quantitative assessment

One of the principles of good ecological assessment is that different components of the assessment should complement one another.

The qualitative description of species behaviour, the mapped survey observations, the collision-risk assessment, the displacement assessment and the proposed habitat enhancement strategy should all be based upon a coherent understanding of how the species uses the landscape.

Where the same ecological information is relied upon for one purpose but treated differently for another, the basis for that distinction should be clearly explained.

In the case of Gortacullin Bog, the Applicant refers to Hen Harrier activity associated with the surrounding peatland landscape when describing the ecological baseline and the importance of the area. However, Appendix 7-6 to the EIAR explains that Hen Harrier flight activity associated with Gortacullin Bog was excluded from the Collision Risk Model on the basis that those flights were considered representative of activity within open habitat surrounding the Wind Farm Site rather than activity within the proposed turbine layout.

The Applicant may ultimately be correct in adopting that methodology. However, the relationship between these two positions is not fully explained.

The Commission should therefore be able to understand:

- how Hen Harrier activity associated with Gortacullin Bog contributed to the overall ecological understanding of the site;
- why certain observations were considered relevant to the qualitative assessment but not to the quantitative collision-risk calculations;
- whether excluded flight records remained relevant to the assessment of displacement, commuting behaviour or barrier effects; and
- whether the exclusion of particular flight observations materially altered the Collision Risk Model or simply reflected the defined spatial limits of that model.

Without that explanation, it is difficult for a third party to follow the evidential pathway from the field observations to the final conclusions.

5.3 Landscape function rather than administrative boundaries

Hen Harrier do not organise their movements according to the boundaries of designated sites, forestry compartments or planning application boundaries.

The ecological importance of Gortacullin Bog therefore lies not only in its designation as an NHA, but in its position within the wider landscape used by Hen Harrier.

The planning documentation acknowledges that Hen Harrier utilise habitats extending beyond the immediate turbine footprint. It also accepts that habitat displacement will occur and that habitat enhancement is required elsewhere to compensate for that displacement. These conclusions necessarily recognise that the functional landscape extends beyond the turbine locations themselves.

Against that background, the Commission should be satisfied that the assessment has consistently considered how birds move between:

- open peatland;
- commercial forestry;
- breeding habitat;
- winter roosting areas;
- foraging habitat; and
- the proposed habitat enhancement areas.

The report does not clearly demonstrate how this wider functional landscape informed the different elements of the ornithological assessment.

5.4 Relationship to cumulative assessment

This issue also has implications beyond the individual project.

The Applicant concludes that cumulative effects with Oatfield and other relevant wind energy developments will not be significant. That conclusion depends upon an understanding of how Hen Harrier use the wider East Clare uplands.

If Gortacullin Bog forms part of that wider functional landscape, then the Commission should be satisfied that its relationship with Knockshanvo, Oatfield and the surrounding habitat network has been consistently assessed throughout the cumulative evaluation.

The issue is not whether Gortacullin Bog itself experiences direct construction effects.

The issue is whether the ecological role of the surrounding landscape has been consistently represented in the assessment of movement, displacement, collision risk and cumulative habitat availability.

5.5 Remaining uncertainty

This chapter does not suggest that the Applicant intentionally omitted relevant ecological information or that the Collision Risk Model is necessarily incorrect.

Rather, it identifies a lack of transparency regarding the treatment of Hen Harrier observations associated with Gortacullin Bog.

The Commission should be able to identify, from the planning documentation alone:

- which Hen Harrier observations informed the qualitative ecological assessment;
- which observations were included within the Collision Risk Model;
- which observations were excluded;
- the methodological basis for those exclusions;
- whether excluded observations remained relevant to other components of the assessment; and
- how the resulting conclusions regarding displacement, collision risk and habitat enhancement were affected.

In the absence of that transparent evidential pathway, it is difficult to independently verify that all components of the ornithological assessment are based upon a consistent interpretation of the recorded Hen Harrier activity.

6. Collision Risk Assessment and Survey Confidence

The Applicant concludes that the proposed development will not give rise to a significant collision risk for Hen Harrier and that the predicted collision mortality would not adversely affect the conservation status of the species. This conclusion is supported by the ornithological surveys, the Collision Risk Model (CRM), the Applicant's interpretation of flight activity and the responses provided in the Further Information.

Collision-risk modelling is a recognised and widely accepted component of wind farm ornithological assessment. However, the reliability of any collision-risk prediction depends upon the quality and completeness of the underlying survey data, the representativeness of the recorded flight activity and the transparency with which survey observations are translated into model inputs.

For this reason, confidence in the CRM cannot be considered separately from confidence in the survey programme upon which it is based.

The issues discussed below do not seek to replace the Applicant's modelling with an alternative model. Rather, they examine whether the survey evidence provides a sufficiently transparent basis for the conclusions that have been reached.

6.1 The relationship between field observations and the Collision Risk Model

The planning documentation contains extensive ornithological survey information, including vantage point observations, mapped flight activity, breeding records and behavioural observations. The CRM represents one stage within that wider assessment rather than an assessment in its own right.

Accordingly, the Commission should be able to follow a clear evidential pathway from:

- the original field observations;
- the mapped flight lines;
- the classification of recorded flights;
- the selection of flights used within the Collision Risk Model;
- the treatment of observations excluded from the model; and
- the resulting collision-risk predictions.

The Further Information explains the Applicant's conclusions but does not always make this evidential pathway readily apparent to an independent reviewer. As a result, it can be difficult to determine precisely how individual observations influenced the final collision-risk assessment.

This is particularly relevant where recorded Hen Harrier activity contributes not only to collision-risk assessment but also to the evaluation of displacement, habitat use and cumulative effects.

6.2 Survey confidence and spatial coverage

The Applicant concludes that the ornithological survey programme provided sufficient coverage to characterise Hen Harrier activity within the study area. That conclusion is an important component of the overall assessment because every subsequent stage of the analysis relies upon the assumption that the surveys adequately represent how the species uses the landscape.

No survey programme can record every movement of every bird. The objective is not complete observation but a sufficiently representative dataset from which robust ecological conclusions can reasonably be drawn.

Where visibility is influenced by topography, forestry, weather conditions or survey geometry, however, the Commission should be satisfied that these limitations have been appropriately recognised and addressed.

The planning documentation demonstrates that the Applicant considered theoretical viewsheds and survey coverage. Nevertheless, greater clarity would assist in understanding how areas of reduced visibility, if any, were managed and whether those areas could have influenced the interpretation of recorded flight activity.

6.3 Turbine 7

Particular attention has been drawn by third-party observers to the area surrounding the proposed Turbine 7 and the extent to which that area was visible from the established vantage points.

The Applicant responds to these concerns in the Further Information and maintains that the survey coverage was adequate for the purposes of the ornithological assessment.

Having reviewed the available documentation, I do not suggest that Turbine 7 was unsurveyed. Nor do I conclude that the Applicant's survey methodology is necessarily deficient.

However, the documentation would benefit from a clearer explanation of:

- the theoretical viewshed associated with each relevant vantage point;
- the extent to which forestry or topography influenced actual visibility;
- whether the full rotor-swept envelope of Turbine 7 remained observable throughout the survey programme;
- whether overlapping vantage points compensated for any localised visibility constraints; and
- whether any recognised survey limitations were reflected within the interpretation of the survey results.

These questions are important because the reliability of the CRM depends upon confidence that the recorded flight activity adequately represents the use of the airspace through which birds may interact with the proposed turbines.

6.4 Interpreting absence of recorded activity

One of the inherent limitations of all ornithological survey work is that the absence of recorded activity is not necessarily equivalent to the absence of ecological use.

The Applicant's surveys provide an extensive record of observed Hen Harrier activity. Nevertheless, ecological interpretation should distinguish between:

- areas where activity was recorded;
- areas where activity was not recorded despite adequate survey coverage; and
- areas where the opportunity to observe activity may have been more limited because of survey constraints.

This distinction is particularly important when interpreting relatively low levels of observed flight activity in parts of the study area.

An absence of observations may legitimately reflect limited use by the species. Equally, where survey confidence varies spatially, the resulting level of certainty may also vary.

The planning documentation would therefore benefit from a more explicit discussion of survey confidence across different parts of the study area rather than presenting the survey dataset as possessing a uniform level of certainty throughout.

6.5 Collision risk within the wider ecological assessment

Collision risk should not be considered in isolation from the other components of the Applicant's ecological assessment.

The same survey information contributes to the assessment of:

- breeding activity;
- foraging behaviour;
- winter roosting;
- displacement;
- habitat compensation;
- cumulative effects; and
- functional habitat connectivity.

Consequently, confidence in the CRM is inseparable from confidence in the wider ecological interpretation of the survey data.

Where uncertainty exists regarding survey coverage, seasonal habitat use or the interpretation of recorded flight activity, that uncertainty may also influence the level of confidence that can properly be placed in the collision-risk conclusions.

This does not invalidate the Applicant's modelling. It does, however, reinforce the need for transparency regarding how the survey observations have been interpreted and how uncertainties have been incorporated into the assessment.

6.6 Confidence rather than certainty

The Applicant ultimately concludes that collision risk is not significant.

The issue raised in this submission is not whether that conclusion is impossible.

Rather, it is whether the Commission has been provided with sufficient information to independently evaluate the level of confidence that should properly be attached to that conclusion.

The ornithological surveys represent a substantial body of work, and there is no suggestion that they were undertaken other than professionally and in accordance with accepted practice. However, where the conclusions depend upon interpretation of complex ecological behaviour rather than direct measurement, it is reasonable to expect the underlying assumptions, survey limitations and methodological choices to be presented with sufficient clarity to permit independent scrutiny.

Accordingly, I respectfully submit that the Commission should carefully examine the relationship between the field observations, survey coverage, Collision Risk Model and the conclusions ultimately drawn from those data before accepting that collision risk has been characterised with sufficient certainty.

7. Cumulative Ecology: The Landscape as a Functional Ecological System

The Applicant concludes that the proposed development, both individually and in combination with other existing, permitted and proposed wind energy developments, will not give rise to significant cumulative effects upon Hen Harrier. This conclusion is supported by cumulative ornithological assessment, habitat management proposals and the Applicant's conclusion that sufficient suitable habitat will remain available throughout the wider landscape.

Cumulative assessment is one of the most important aspects of ecological evaluation for highly mobile species such as Hen Harrier. Unlike species whose ecological requirements are confined to relatively small territories, Hen Harrier utilise extensive landscapes whose ecological value changes over time in response to breeding, prey availability, forestry operations and seasonal movement.

Accordingly, cumulative assessment should consider not only the combined footprint of individual developments but also their collective influence upon the functioning of the landscape as an ecological system.

This chapter considers whether the Applicant's cumulative assessment sufficiently demonstrates that broader ecological function.

7.1 Cumulative assessment is more than the sum of individual projects

The Applicant has considered Knockshanvo alongside other wind energy developments within the wider region, including Oatfield and other relevant existing, permitted and proposed developments. That approach is appropriate and consistent with accepted cumulative assessment methodology.

However, cumulative assessment should extend beyond compiling a list of developments and considering each in turn.

Hen Harrier experience the landscape as a connected ecological resource rather than as separate planning applications.

Consequently, the central ecological question is not simply:

What effect does each development have individually?

It is:

What is the resulting condition of the landscape after all relevant developments are considered together?

Those are different questions.

The first examines individual impacts.

The second examines ecological function.

It is the second question that is ultimately relevant to the conservation of a wide-ranging species such as Hen Harrier.

7.2 Habitat function changes through time

One of the recurring themes throughout the Applicant's assessment is the importance of commercial forestry in determining the availability of Hen Harrier habitat.

The Applicant recognises that habitat suitability changes continuously through the forestry cycle and incorporates operational-life averages when estimating habitat availability and compensation requirements.

This is an important acknowledgement.

However, if habitat availability changes through time, then cumulative ecological effects must also be expected to change through time.

The proposed turbine layout is effectively permanent.

The surrounding habitat is not.

Areas that presently provide relatively little ecological value may become suitable following felling or early regeneration. Conversely, habitat that is currently suitable may become unavailable following canopy closure.

Accordingly, cumulative assessment should examine not only the amount of habitat available but also its spatial distribution at different stages of the forestry cycle.

The ecological significance of the turbine array may therefore vary throughout the operational life of the project even though the physical infrastructure remains unchanged.

7.3 Connectivity is a cumulative characteristic

Throughout this submission reference has been made to breeding habitat, winter roosting, foraging areas, commuting behaviour and movement between different parts of the landscape.

These ecological functions are connected.

A landscape may contain sufficient total habitat while nevertheless functioning poorly if that habitat becomes increasingly fragmented or difficult to use.

Conversely, a smaller amount of well-connected habitat may function more effectively than a larger area divided by barriers or separated by unsuitable conditions.

Accordingly, cumulative assessment should not focus exclusively upon the quantity of habitat remaining after development.

It should also examine:

- how that habitat is arranged spatially;
- whether important habitat areas remain functionally connected;
- whether birds can continue to move efficiently between breeding, roosting and foraging areas;
- whether changes in forestry alter those relationships through time; and
- whether the combined influence of neighbouring developments alters landscape permeability.

These are ecological questions rather than mathematical ones.

The planning documentation addresses several of these matters individually but provides relatively limited explanation of how they interact across the wider East Clare landscape.

7.4 Knockshanvo and Oatfield should be considered together

The relationship between the proposed Knockshanvo and Oatfield developments is particularly important.

Although each project has been assessed separately for planning purposes, their geographical proximity means that Hen Harrier using the landscape are unlikely to distinguish between them.

The cumulative ecological influence of the two developments therefore depends upon how they function together rather than how each performs individually.

The Applicant has undertaken cumulative assessment and concludes that significant cumulative effects will not arise. Nevertheless, it remains difficult to identify within the planning documentation a single integrated assessment demonstrating:

- the combined area influenced by both turbine arrays;
- the relationship between those arrays and known breeding, wintering and foraging habitat;
- the interaction between turbine influence zones and changing forestry habitat;
- the availability of alternative habitat before compensation is considered; and
- the resulting functional ecological network after all predicted effects have been taken into account.

The CLG submission raised similar concerns regarding the need for a merged functional habitat assessment. My concern here is broader. It is whether the Applicant has demonstrated that the **landscape itself** continues to function as an integrated ecological system once both developments are considered together.

7.5 Compensation should not replace cumulative assessment

Throughout the Further Information, the Applicant places considerable reliance upon habitat enhancement and compensation when addressing cumulative ecological effects.

Habitat management may well contribute positively to Hen Harrier conservation.

However, compensation should not become a substitute for first understanding the cumulative ecological effect requiring compensation.

The logical sequence should be:

1. identify the ecological resource;
2. determine how that resource functions throughout the annual and forestry cycles;
3. assess the cumulative effects of all relevant developments upon that resource;
4. quantify the resulting functional ecological effect; and only then
5. determine the scale and nature of compensation required.

Where compensation is introduced before the underlying cumulative ecological effect has been fully characterised, it becomes difficult to determine whether the proposed measures are proportionate to the effect they are intended to address.

7.6 Landscape resilience

An aspect that receives relatively little attention within the planning documentation is the resilience of the wider Hen Harrier landscape.

Ecological systems possess varying capacities to absorb disturbance.

A landscape supporting extensive connected habitat may accommodate localised change without significant ecological consequence.

Conversely, a landscape already subject to multiple pressures may become increasingly sensitive to additional incremental effects.

The Applicant concludes that sufficient suitable habitat remains available within the wider landscape.

The Commission should therefore be satisfied not only that sufficient habitat presently exists, but that the landscape retains sufficient ecological resilience to continue supporting Hen Harrier throughout changing forestry conditions and alongside the cumulative influence of existing, permitted and proposed wind energy developments.

7.7 The wider ecological picture

One of the recurring impressions arising from the planning documentation is that individual components of the cumulative assessment have been examined in considerable detail.

Less attention appears to have been given to the broader ecological picture emerging from those individual components.

Hen Harrier experience:

- breeding habitat;
- winter habitat;

- foraging habitat;
- commuting routes;
- changing forestry;
- multiple wind energy developments;
- habitat enhancement;
- habitat loss; and
- landscape connectivity

as elements of a single ecological system.

The Commission should therefore consider whether the cumulative assessment demonstrates that this system, viewed as a whole, continues to provide a coherent and resilient landscape capable of supporting the species over the operational lifetime of the proposed development.

7.8 Conclusion

The Applicant has undertaken a substantial cumulative ecological assessment and has considered Knockshanvo alongside other relevant developments.

My concern is not that cumulative assessment has been omitted.

Rather, it is that the assessment remains largely project-centred, while the ecology of Hen Harrier is fundamentally landscape-centred.

The Further Information demonstrates that individual topics such as displacement, collision risk, habitat compensation and forestry have each been considered.

It is less clear that these topics have been brought together into a single, transparent assessment demonstrating how the cumulative landscape will function once all relevant developments are operating simultaneously.

In my opinion, this remains one of the principal areas of ecological uncertainty within the application.

8. Habitat Compensation: Identifying the Ecological Effect Before Assessing the Remedy

One of the central conclusions of the Applicant's ecological assessment is that the predicted effects of the proposed development upon Hen Harrier can be satisfactorily addressed through a combination of habitat avoidance, habitat enhancement and long-term habitat management.

The proposed Biodiversity Management Plan and associated habitat enhancement measures form a significant component of the Applicant's overall conclusion that the project will not result in significant residual or cumulative effects upon Hen Harrier. Throughout the Further Information, the Applicant relies upon these measures as evidence that the predicted habitat loss can be effectively offset over the operational life of the development.

There is no reason in principle why habitat enhancement should not contribute positively to Hen Harrier conservation.

Indeed, appropriately designed habitat management may provide genuine ecological benefits.

The issue considered in this chapter is therefore not whether habitat enhancement can work.

The issue is whether the Applicant has first demonstrated, with sufficient certainty, **the ecological effect that the compensation is intended to address.**

8.1 Compensation follows impact assessment

Ecological compensation is the final stage of the assessment process.

It is not the starting point.

Before compensation can be evaluated, the assessment should first establish:

- the ecological resource that is affected;
- how that resource functions;
- the nature of the predicted impact;
- the spatial extent of that impact;
- the temporal duration of the impact;
- the cumulative interaction with other developments; and
- the residual ecological effect remaining after avoidance and mitigation measures have been considered.

Only then is it possible to determine whether the proposed compensation is proportionate, appropriate and sufficient.

This sequence is fundamental to ecological assessment.

If uncertainty remains regarding the ecological effect itself, then uncertainty necessarily extends to the adequacy of the proposed compensation.

8.2 Compensation is only as reliable as the underlying habitat-loss assessment

Throughout this submission I have identified a number of areas where uncertainty remains regarding the assessment of Hen Harrier ecology.

These include:

- functional connectivity;
- seasonal habitat use;
- displacement;
- survey interpretation;
- collision-risk assessment;
- cumulative landscape function; and
- the changing availability of habitat throughout the forestry cycle.

Each of these issues has a direct bearing upon the calculation of habitat loss.

The Applicant has adopted a methodology to quantify functional habitat loss and has subsequently designed habitat enhancement and compensation measures around that quantified loss.

That methodology may ultimately prove to be appropriate.

However, if the underlying habitat-loss calculation remains uncertain, then confidence in the scale of the compensation package must necessarily reflect that uncertainty.

The relationship is straightforward.

A compensation strategy cannot be more certain than the impact assessment upon which it is based.

8.3 Functional habitat is more than area alone

One of the recurring themes throughout the planning documentation is the quantification of habitat using hectares.

Area is an important ecological metric.

However, area alone does not determine ecological function.

For Hen Harrier, the value of habitat depends upon a range of interacting characteristics, including:

- vegetation structure;
- prey availability;
- seasonal suitability;
- disturbance levels;
- proximity to nesting and roosting areas;
- connectivity with surrounding habitat; and
- the ability of birds to move efficiently throughout the landscape.

Consequently, two habitat parcels of identical size may provide very different ecological value.

Similarly, replacing one hectare of habitat with another hectare elsewhere does not necessarily represent ecological equivalence.

The Applicant recognises many of these issues throughout the Biodiversity Management Plan.

The Commission should therefore be satisfied that the proposed enhancement areas have been evaluated not simply in terms of area, but in terms of their ability to perform the ecological functions attributed to them.

8.4 The importance of timing

Ecological compensation should also be considered in temporal terms.

The ecological effects arising from turbine operation commence once the development becomes operational.

The ecological benefit arising from habitat enhancement may require considerably longer to become established.

The planning documentation recognises that habitat enhancement depends upon future ecological management over an extended period. Habitat structure, prey communities and ecological function develop progressively rather than instantaneously.

The relevant question therefore is not simply whether habitat enhancement will eventually provide ecological benefit.

It is whether that benefit will become available at the time and in the manner assumed within the assessment.

Where ecological benefit depends upon future management, successful implementation and continued maintenance over many years, the degree of certainty associated with that benefit should be considered accordingly.

8.5 Long-term management and ecological certainty

The proposed Biodiversity Management Plan extends over a lengthy operational period and relies upon ongoing habitat management to maintain suitable conditions.

Such long-term management is entirely appropriate where properly secured and implemented.

However, the effectiveness of long-term ecological management depends upon a number of factors beyond the initial planning permission, including:

- continued implementation;
- appropriate ecological management;
- changing forestry operations;
- prey populations;
- weather conditions;
- habitat response; and
- the way in which Hen Harrier themselves respond to those habitats over time.

None of these considerations necessarily undermine the proposed management strategy.

They do illustrate why predictions regarding future ecological benefit should be distinguished from ecological conditions that already exist.

This distinction becomes particularly important where future habitat enhancement forms an important part of the justification for concluding that significant effects will not arise.

8.6 Monitoring and adaptive management

The Applicant proposes monitoring and adaptive management as components of the Biodiversity Management Plan.

Monitoring is an essential part of good ecological management.

It provides an opportunity to assess whether predicted ecological outcomes are being achieved and to modify management where necessary.

However, monitoring should not be regarded as evidence that mitigation has already been demonstrated to be effective.

Monitoring measures ecological outcomes after implementation.

They do not remove uncertainty at the decision-making stage.

Adaptive management is similarly valuable.

Nevertheless, adaptive management assumes that management can be modified if ecological outcomes differ from those predicted.

It does not necessarily demonstrate that adverse ecological effects can always be reversed once they have occurred.

The Commission should therefore distinguish between:

- measures which provide confidence before impacts occur; and
- measures intended to respond if predicted outcomes are not achieved.

Both have value, but they perform different functions within ecological assessment.

8.7 Legal context

The legal framework governing Appropriate Assessment requires that conclusions regarding the absence of adverse effects are supported by sufficient scientific certainty at the time the decision is made.

The judgments of the Court of Justice of the European Union in **People Over Wind**, **Grace and Sweetman**, **Holohan** and **Waddenzee** each emphasise, in different contexts, the importance of ensuring that ecological conclusions are based upon objective and sufficiently certain evidence.

This submission does not suggest that those judgments prohibit habitat enhancement or long-term ecological management.

Rather, they reinforce an important principle.

Where the conclusion that significant effects will not arise depends materially upon future ecological outcomes, the Commission should be satisfied that those outcomes have been demonstrated with an appropriate degree of certainty and that the assessment clearly distinguishes between existing ecological conditions and future predicted benefits.

8.8 Compensation within the wider cumulative landscape

The proposed habitat enhancement should also be viewed within the context of the wider East Clare landscape.

The Applicant relies not only upon the enhancement areas themselves but also upon the continued availability of suitable habitat elsewhere within the surrounding uplands.

Consequently, the effectiveness of the compensation strategy depends upon more than the management of individual parcels of land.

It also depends upon:

- the continued availability of suitable surrounding habitat;
- landscape connectivity;
- cumulative interaction with Oatfield and other developments;
- the changing forestry cycle;
- the movement ecology of Hen Harrier; and
- the ability of the wider landscape to continue functioning as an integrated ecological system.

The proposed compensation therefore cannot be considered independently of the cumulative ecological assessment discussed in the previous chapter.

8.9 Conclusions

I do not question the Applicant's commitment to habitat enhancement or the considerable work that has gone into preparing the Biodiversity Management Plan.

Nor do I suggest that habitat management cannot provide genuine ecological benefit.

My concern is a more fundamental one.

Before the adequacy of compensation can be assessed, the ecological effect requiring that compensation must first be demonstrated with sufficient clarity.

Throughout this submission I have identified a number of areas where uncertainty remains regarding the understanding of seasonal ecology, functional connectivity, survey interpretation, displacement, cumulative landscape function and the quantification of habitat effects.

Those issues do not merely affect the impact assessment.

They also influence confidence in the proposed compensation strategy.

Accordingly, I respectfully submit that the Commission should first be satisfied that the Applicant has correctly identified the full spatial, temporal and cumulative ecological effect upon Hen Harrier before concluding that the proposed habitat enhancement and compensation measures are sufficient to address that effect.

9. The Relationship Between Evidence and Ecological Conclusions

The purpose of this submission has not been to challenge every aspect of the Applicant's ornithological assessment or to suggest that each individual conclusion is necessarily incorrect. The Applicant has undertaken a substantial body of ecological work over a number of years, supported by extensive field surveys, technical reports and specialist assessments. That work provides an important evidential foundation for the Commission's consideration of the application.

The question considered throughout this submission is a different one.

It is whether the ecological evidence presented within the planning documentation sufficiently demonstrates the conclusions that the Applicant ultimately asks the Commission to accept.

Having reviewed the Environmental Impact Assessment Report, Natura Impact Statement, Biodiversity Management Plan, Collision Risk Assessment and the Further Information, a number of recurring themes emerge.

9.1 The distinction between observation and interpretation

One of the clearest themes is the distinction between recorded ecological observations and the interpretation placed upon those observations.

The planning documentation contains a considerable volume of survey data, including breeding records, winter roost observations, flight activity, habitat mapping and collision-risk modelling. Those observations represent the factual foundation of the assessment.

The conclusions reached by the Applicant, however, require a further interpretative step.

For example, the assessment concludes that:

- functional connectivity with the Slieve Aughty Mountains SPA can be excluded;
- recorded Hen Harrier activity has been adequately characterised;
- survey coverage provides sufficient confidence in the Collision Risk Model;
- displacement effects have been appropriately quantified;
- cumulative ecological effects remain acceptable; and
- habitat enhancement and compensation will offset the predicted ecological impacts.

These conclusions may ultimately prove to be correct. However, the evidential pathway linking the recorded observations to those conclusions is not always fully explained.

Throughout this submission I have sought to identify those areas where that interpretative process would benefit from greater transparency.

9.2 Confidence should reflect uncertainty

Ecological assessment necessarily involves uncertainty.

Hen Harrier are highly mobile, utilise dynamic habitats and respond to changing environmental conditions over time. No survey programme can observe every movement or predict every future ecological response.

Recognising uncertainty is therefore not a weakness of ecological assessment; it is an inherent characteristic of it.

The important question is how that uncertainty is treated.

Where uncertainty exists, confidence in the resulting conclusion should reflect that uncertainty.

In several areas discussed within this submission, including functional connectivity, seasonal habitat use, collision-risk interpretation and cumulative landscape function, the planning documentation appears to present conclusions with a degree of certainty that is not always accompanied by an equivalent explanation of the assumptions upon which those conclusions depend.

The issue is not whether uncertainty exists.

The issue is whether that uncertainty has been sufficiently acknowledged, examined and incorporated into the assessment.

9.3 The landscape functions as an integrated ecological system

Another recurring theme is the tendency for different components of the assessment to be considered separately.

The planning documentation contains individual chapters dealing with:

- breeding ecology;
- winter surveys;
- collision risk;
- habitat loss;
- displacement;
- compensation;
- cumulative effects; and
- forestry.

Each of these topics is important.

However, Hen Harrier do not experience these matters individually.

From the perspective of the species, they are interconnected components of the same landscape.

A breeding territory cannot be considered independently of surrounding foraging habitat.

Winter roosts cannot be considered independently of commuting routes.

Habitat compensation cannot be evaluated independently of the ecological effect it is intended to address.

Similarly, cumulative effects cannot be understood solely by examining individual projects if the combined functioning of the landscape has not first been established.

The planning documentation demonstrates considerable technical analysis of each individual component.

The broader question is whether those components have been brought together in a manner that fully explains how the landscape will function throughout the operational life of the proposed development.

9.4 Ecological conclusions depend upon earlier assumptions

Another feature that emerged during this review is that later stages of the assessment frequently depend upon assumptions made earlier in the process.

For example:

- confidence in habitat compensation depends upon confidence that habitat loss has first been correctly identified;
- confidence in habitat-loss calculations depends upon confidence in displacement assumptions;
- confidence in displacement assumptions depends upon confidence in survey interpretation;
- confidence in survey interpretation depends upon confidence that the survey programme adequately represents the way Hen Harrier use the landscape; and
- confidence in cumulative assessment depends upon confidence that each of those preceding stages has been correctly characterised.

This creates a chain of ecological reasoning.

Where uncertainty remains at an earlier stage of that chain, the implications of that uncertainty may extend into later conclusions.

This observation should not be interpreted as criticism of the assessment methodology itself.

Rather, it emphasises the importance of ensuring that each stage of the reasoning process is supported by a clear and transparent evidential basis.

9.5 The importance of transparency

Throughout this submission I have deliberately avoided proposing an alternative ecological model.

My purpose has not been to replace the Applicant's professional judgement with my own.

Instead, I have sought to understand how the Applicant moved from field observations to ecological conclusions.

Where that process is clearly explained, independent review becomes possible.

Where important assumptions remain implicit, it becomes considerably more difficult for the Commission, statutory consultees or members of the public to evaluate the robustness of the conclusions reached.

Transparency therefore serves an important purpose.

It allows ecological judgement to be examined, understood and tested.

Given the importance of Hen Harrier as an Annex I species, and the Applicant's reliance upon ecological prediction to support its conclusions, this level of transparency is particularly important.

9.6 A precautionary approach

The Applicant has clearly sought to minimise ecological effects through project design, habitat management and compensation measures.

Those efforts are recognised.

Nevertheless, where conclusions depend upon predictive ecological judgement rather than direct observation, the Commission should be satisfied that the remaining uncertainties have been fully examined before accepting that significant effects have been excluded.

This submission does not argue that uncertainty alone requires refusal of the application.

It does suggest that uncertainty should be proportionately reflected in the level of confidence attached to the conclusions reached.

Where important aspects of the ecological assessment remain dependent upon assumptions that are not fully demonstrated, it is appropriate that those assumptions receive careful scrutiny before they are relied upon in the final determination.

9.7 Overall observations

Having considered the planning documentation as a whole, I remain concerned that the assessment demonstrates considerable confidence in a series of ecological conclusions while providing less explanation of the evidential steps by which those conclusions have been reached.

This observation applies consistently across several of the principal issues examined within this submission, including:

- functional connectivity;
- seasonal habitat use;
- survey interpretation;
- collision-risk assessment;
- cumulative ecological function; and
- habitat enhancement and compensation.

Taken individually, each issue may appear relatively limited.

Taken collectively, however, they raise a broader question regarding whether the Applicant has demonstrated, with sufficient transparency, that the predicted ecological effects upon Hen Harrier have been fully characterised before concluding that those effects can be adequately avoided, mitigated or compensated.

For that reason, I respectfully invite the Commission to examine not only the individual technical conclusions contained within the planning documentation, but also the evidential pathway by which those conclusions have been reached.

10. Conclusions

This submission has examined the Applicant's assessment of potential effects upon Hen Harrier following a detailed review of the Environmental Impact Assessment Report (EIAR), Natura Impact Statement (NIS), Biodiversity Management Plan, Collision Risk Assessment and the Further Information submitted in response to observations.

The purpose of the submission has not been to dispute the importance of renewable energy, nor to suggest that every conclusion reached by the Applicant is necessarily incorrect. Equally, it has not sought to present an alternative ecological assessment or to substitute one professional judgement for another.

Rather, the submission has considered whether the Applicant has demonstrated, with sufficient transparency and scientific rigour, that the conclusions reached in relation to Hen Harrier are adequately supported by the available evidence.

Having completed that review, I remain concerned that a number of important ecological questions have not been satisfactorily resolved.

In particular, I am not persuaded that the planning documentation has fully demonstrated:

- that functional connectivity with the Slieve Aughty Mountains Special Protection Area can be excluded with the degree of confidence suggested by the Applicant;
- that the recorded breeding, winter-roosting, commuting and foraging activity has been brought together into a sufficiently complete understanding of how Hen Harrier use the Knockshanvo landscape throughout the annual cycle;
- that the treatment of survey observations, including those associated with Gortacullin Bog and the Collision Risk Model, has been presented with sufficient transparency to enable independent verification of the conclusions reached;
- that the available survey evidence fully supports the level of confidence placed upon the collision-risk assessment;
- that the cumulative interaction between Knockshanvo, Oatfield and the wider pattern of wind energy development has been evaluated as a functioning ecological landscape rather than principally as a collection of individual projects; and
- that the proposed habitat enhancement and compensation measures are founded upon a sufficiently complete understanding of the functional ecological effects that they are intended to address.

None of these issues should be viewed in isolation.

Throughout this submission I have sought to demonstrate that they are interrelated components of a single ecological assessment. Confidence in habitat compensation depends upon confidence in the habitat-loss assessment. Confidence in habitat-loss calculations depends upon confidence in the understanding of seasonal habitat use and displacement. Confidence in those conclusions depends upon confidence in the survey evidence and its interpretation. Confidence in cumulative effects depends upon the robustness of each of those preceding stages.

For that reason, the issues identified in this submission should not be regarded as a series of unrelated technical observations. They concern the overall reliability of the evidential pathway by which the Applicant concludes that significant effects upon Hen Harrier will not arise.

I fully acknowledge that ecological assessment necessarily involves professional judgement and that complete scientific certainty is rarely attainable in relation to highly mobile species such as Hen Harrier. Equally, where conclusions rely upon predictive modelling, assumptions regarding future habitat use and long-term ecological

management, the basis for those conclusions should be capable of independent examination and should be supported by a clear and transparent chain of evidence.

In my opinion, the Further Information has added significantly to the volume of ecological material before the Commission. However, it has not removed all of the material uncertainties identified within this submission. In several important respects it provides additional explanation of the Applicant's conclusions without fully demonstrating why alternative ecological interpretations can be confidently discounted.

I therefore respectfully invite the Commission to examine these matters carefully before accepting that the proposed development will avoid significant effects upon Hen Harrier, either individually or cumulatively, or that the proposed habitat enhancement and compensation measures have been demonstrated to address the full ecological effects identified by the assessment.

Hen Harrier is one of Ireland's most important upland bird species and is afforded a high level of protection under European and national legislation. Where an assessment depends upon ecological prediction, landscape-scale interpretation and the long-term effectiveness of habitat management, it is appropriate that the supporting evidence is comprehensive, transparent and capable of withstanding close scientific scrutiny.

For the reasons set out in this submission, I remain unconvinced that the current planning documentation provides that level of confidence.

Accordingly, I respectfully request that **An Coimisiún Pleanála** give careful consideration to the matters raised in this submission when determining the application. If, having considered those matters, the Commission is not satisfied that the identified uncertainties have been adequately resolved, I respectfully submit that the application should not be approved.

ADDENDUM

As Discussed With Davina on (01) 8737275 I omitted a point that I wanted to make in relation to this case and I will attach it below.
It is written as a standalone observation to the text above.

Apologies for the error and many thanks for being so agreeable.
Willie

ADDENDUM TO SUBMISSION TO AN BORD PLEANÁLA

RE: Strategic Infrastructure Development (SID) Application for the Proposed Knockshanvo Wind Farm (and Associated Grid Infrastructure)

This submission has been prepared specifically in response to the Further Information submitted by the Applicant in support of the proposed Knockshanvo Wind Farm. It should be read as a technical critique of the Applicant's updated ornithological assessment, Natura Impact Statement, Appropriate Assessment Screening and associated ecological documentation, rather than as a new or unrelated objection.

The Further Information maintains the Applicant's conclusion that the proposed development will not give rise to significant adverse effects on Hen Harrier, either individually or cumulatively, and that the Slieve Aughty Mountains Special Protection Area (SPA) can be excluded from Stage 2 Appropriate Assessment. It also relies upon updated ecological surveys, collision-risk assessment, habitat-loss calculations, cumulative assessment and habitat enhancement measures in support of those conclusions.

The purpose of this submission is to examine whether the additional information provided by the Applicant adequately supports those conclusions. The issues discussed throughout this report—including functional connectivity, seasonal ecology, winter habitat use, survey interpretation, collision-risk assessment, cumulative effects and habitat compensation—are addressed because they are directly relevant to the reasoning adopted in the Further Information and to the scientific certainty upon which the Applicant's conclusions depend.

Accordingly, this submission does not seek to introduce unrelated matters. Rather, it identifies areas where the Further Information remains incomplete, insufficiently explained or unsupported by the available scientific evidence, and respectfully invites the Commission to consider whether those matters have been resolved to the standard required before the Applicant's conclusions can properly be accepted.

1. Introduction and Core Ground of this Addendum

It is submitted that the Environmental Impact Assessment Report (EIAR) and the Screening for Appropriate Assessment submitted by the applicant are fundamentally deficient under Article 6(3) of the EU Habitats Directive (92/43/EEC) *(Council Directive 92/43/EEC)* and the European Communities (Birds and Natural Habitats) Regulations 2011 *(S.I. No. 477/2011)*.

The applicant relies heavily on the premise that the proposed wind farm site boundary sits approximately 11.9 km or 11.0 km from the Slieve Aughty Mountains Special Protection Area (SPA 004160) *(NPWS, 2022)*. Because standard, non-statutory administrative guidance frequently references a 10.0 km threshold for breeding Hen Harrier (*Circus cyaneus*) foraging connectivity, the applicant has applied a rigid, mathematical cutoff to screen out the SPA from Stage 2 Appropriate Assessment.

This narrow approach fails the *Waddenzee* legal standard *(Case C-127/02)*, which establishes that an Appropriate Assessment is legally mandatory where there is a probability or reasonable scientific doubt regarding significant adverse effects. The applicant treats an administrative guidance threshold as an absolute biological wall. In doing so, it fails to adequately account for:

- **Specific Irish landscape and ecological constraints.**

- **Advanced empirical telemetry data proving longer foraging and dispersal capabilities** *(Irwin et al., 2012)*.

- **Critical non-breeding and life-cycle connectivity** (including post-fledging natal dispersal and winter roosting) *(Redpath et al., 2001; Ruddock et al., 2012)*.

- **The inherent scientific uncertainty of relying on unproven habitat management lands outside protected boundaries.**

2. The Misapplication and Misinterpretation of NatureScot Guidance to Knockshanvo

The applicant's baseline screening relies heavily on the 10.0 km maximum foraging range of male harrier when provisioning for chicks. This threshold was adopted from Scottish guidance (NatureScot, formerly Scottish Natural Heritage). Applying this generic threshold to East Clare constitutes a major ecological error that ignores both the explicit qualifications

within the guidance itself and the fundamental differences in landscape ecology between Scotland and Ireland. Furthermore it is extremely reductionist in its assessment of connectivity.

- **NatureScot Mandates Local Site Data:** The NatureScot guidance explicitly states that generic distance thresholds are administrative proxies. It mandates that local, site-specific field data and regional ecological factors must always take precedence over standardized buffers.

- **What does the 10km value represent?** The 10km value taken from NatureScot is the maximum male harrier flight range while provisioning for fledglings**.** Fledgling Hen Harriers are reliant on their parents for **7 to 9 weeks**. This measure of connectivity relates to this period of 7-9 weeks only. It looks at less than 13 to 17% of the annual activity of Hen Harrier. This is a period when hen harrier stay as close to the nest as possible while provisioning for fledglings. A period of time when the are least connected to the wider landscape. It says nothing about connectivity for the remaining 43 to 45 weeks of the year. Its strict application in this case allows the developer to avoid any deep analysis during the screening stage for Appropriate Assessment, including but not limited to juvenile dispersal flights and winter roosting and associated migration.

- In choosing to use and strictly applying the 10km maximum range as a surrogate for an actual analysis of connectivity between the Site and Hen Harrier SPAs: The applicant has avoided any analysis of how the windfarm interacts with hen harrier for the remaining 43 to 45 weeks of the year. This is when flight ranges of hen harrier increase as they make greater use of the wider landscape. This period of greatest connectivity to the wider landscape is not considered by applying an arbitrary 10km test of connectivity during the screening process for an Appropriate Assessment. This introduces serious scientific doubt in the overall year long effects of the proposed windfarm on protected birds in the neighbouring SPAs of Slieve Aughty and Slieve Phelim/Keeper Hill. Simply put the applicant has failed to properly assess connectivity between the proposed Windfarm and SPAs during the screening process

- **The Prey Density Discrepancy:** The 10.0 km guideline was developed in Scottish upland environments, which feature different baseline prey availability due to high field vole (*Microtus agrestis*) densities—a species historically absent from Irish Hen Harrier habitats. INature Scot says small mammals, primarily field voles make up around 10% prey. (Brian Etheridge, *Heads Up for Harriers: Image Analysis 2015–2019,* NatureScot Research Report No. 1209 (Project No. 115542)

- **The Caloric Requirement Reality:** Irish Hen Harriers navigate a heavily fragmented landscape dominated by mature, closed-canopy commercial forestry and intensive

agriculture—habitats that are functionally sterile for hunting. Due to severe habitat fragmentation and lower baseline prey availability (no field vole), Irish Hen Harriers must fly significantly longer foraging distances to satisfy their basic caloric requirements and provision chicks *(Irwin et al., 2012; NPWS Hen Harrier Threat Response Plan, 2024)*.

3. Technological Obsolescence: Irwin et al. vs. Legacy Scottish Data

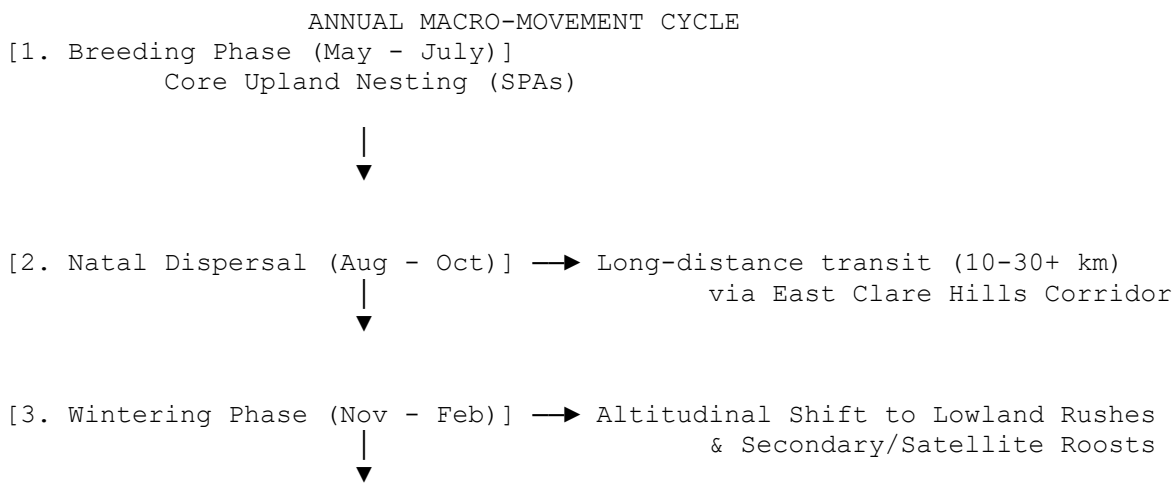
The generic 10.0 km threshold is based on historically conservative estimates dictated by legacy wing-tagging and early VHF radio-tracking methods used in older Scottish studies. This reliance is scientifically obsolete when evaluated against modern Irish telemetry research:

- **Superior Telemetry Accuracy:** The definitive Irish study on the species by Irwin et al. (University College Cork / Hen Harrier Project) utilized modern, high-resolution GPS-GSM transmitters. These devices captured fine-scale spatial movement data and long-distance foraging flights that legacy technologies routinely missed.
- **The Verified Biological Range:** Through GPS telemetry, Irwin et al. (2012) definitively recorded male Irish Hen Harriers travelling up to 11.4 km from their nests to forage *(Irwin et al., 2012)*.
- **The Legal Defect:** The proposed Knockshanvo site boundary sits 11.0 km from the Slieve Aughty SPA—a mere 1.0 km outside the generic 10.0 km administrative line, but well within the documented 11.4 km biological capability proven by empirical tracking in Ireland. Under the Precautionary Principle, the planning authority must consider if an adverse impact is possible based on objective scientific doubt. Because Hen Harriers actively forage and roost within the Knockshanvo study area, the applicant cannot objectively prove that these birds have zero functional connectivity to the Slieve Aughty SPA population.

4. Reductionist Use of Foraging Range Versus Macro-Ecology Connectivity

Using a single breeding foraging radius as the sole test of ecological connectivity ignores established raptor biology regarding non-breeding life-cycle phases. NPWS monitoring frameworks and telemetry data demonstrate that Hen Harriers exhibit predictable macro-movements outside the breeding season:

Plaintext



[4. Pre-Breeding Return (Mar - Apr)]
Recruitment into SPA Metapopulations

Post-Breeding Natal Dispersal (August–October): Following fledging in July, juvenile harriers remain near the nest for 2–4 weeks during post-fledging dependency. By August and September, young harriers almost universally undertake natal dispersal flights completely away from their home nest. Satellite tracking under the Irish Hen Harrier Tracking Programme (NPWS / Golden Eagle Trust) confirms that juveniles fledged in the Slieve Aughties disperse 10 km to >50 km within days, using low-elevation hill corridors in East Clare as crucial stepping-stones.

Non-Breeding Wintering Phase (November–February): High upland plateaus (such as Cappaghabaun in the Slieve Aughties, 378 m, or Keeper Hill in Slieve Felim, 694 m) become cold, exposed, and prey-scarce. Harriers execute an altitudinal shift to lower-elevation hills (80 m–180 m), and lowland river valleys. The elevation of the proposed Knockshanvo Windfarm is 140m to 307m. Irish raptor research establishes that >53% of recorded winter roosts in Ireland occur below 100 m elevation *(Ruddock et al., 2012, Irish Wildlife Manuals No. 59)*.

Pre-Breeding Return (March–April): Surviving sub-adults return to prospect breeding territories, exhibiting metapopulation exchange between adjacent mountain ranges.

5. Temporal Synergy and Year-by-Year Roost Dynamics

5.1 Analysis of Multi-Year Baseline Survey Data

A systematic examination of the winter survey data presented across the multi-season baselines of the Knockshanvo Wind Farm EIAR (and adjacent Oatfield Wind Farm EIAR) demonstrates a clear seasonal influx during the non-breeding period *(FuturEnergy Knockshanvo DAC / MKO, 2024)*:

Survey Cycle	Summer Breeding Baseline	Following Winter Baseline	Empirical Net Shift	Ecological Interpretation
2018/19	2 – 4 birds(1 – 2 pairs)	2 birds	Baseline Equal	Core local territorial occupation.
2019/20	2 – 4 birds(1 – 2 pairs)	9 birds	+5 to + 7 birds	Major autumn/winter influx.
2020/21	2 – 4 birds(1 – 2 pairs)	3 birds	+1 bird	Winter population expansion.
2021/22	2 – 4 birds(1 – 2 pairs)	6 birds	+2 to + 4 birds	Significant seasonal expansion.
2022/23	2 – 4 birds(1 – 2 pairs)	3 birds	+1 bird	Winter population expansion.

Key Metric: In 4 out of 5 recorded survey cycles, the non-breeding winter population at Knockshanvo expands beyond the summer baseline *(FuturEnergy Knockshanvo DAC / MKO, 2024; Ruddock et al., 2012)*. This empirical increase is unlikely to be explained by local productivity alone; because juvenile harriers universally embark on long-distance natal flights away from their home nest site in August/September, this winter influx could represent an influx of dispersing birds arriving from wider regional breeding grounds—potentially the Slieve Aughty SPA *(Irwin et al., 2012; NPWS, 2024)*.

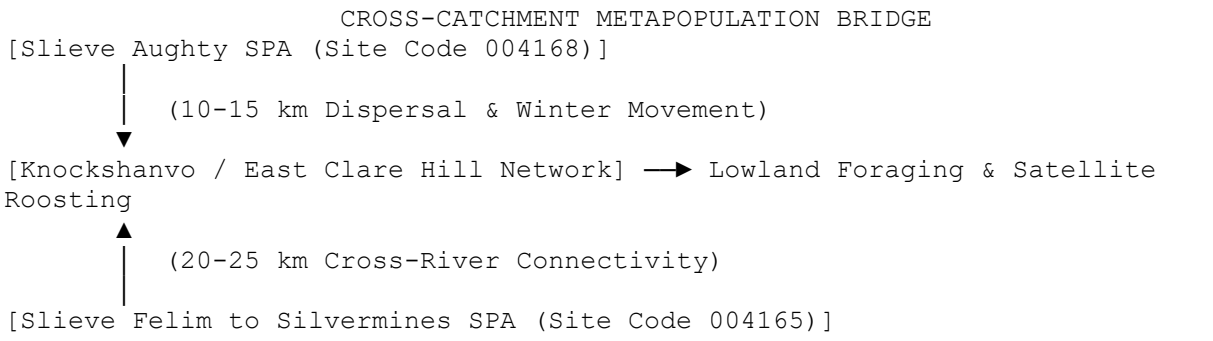
5.2 Satellite / Secondary Roost Function vs. Microclimate

While certain survey years logged single-bird roosting points during mild winter spells (e.g., 2019/2020), this reflects a typical satellite or secondary roosting strategy *(Redpath et al., 2001; Ruddock et al., 2012)*. Wintering harriers do not rely on a single, static communal roost; they utilize a dynamic network of satellite roosts across East Clare *(Ruddock et al., 2012)*. During severe winter storms or freezing conditions on the Slieve Aughty plateaus, intermediate hill sites like Knockshanvo offer essential sheltered rushy pasture and young forest cover *(Redpath et al., 2001)*. Interpreting low single-date counts as "low ecological value" fundamentally misrepresents wintering raptor ecology.

6. Ecological Connectivity Between Slieve Aughty and Slieve Felim SPAs

Knockshanvo is situated directly inside an established ecological corridor bridging two protected European sites *(NPWS, 2022)*:

- **Slieve Aughty Mountains SPA (Site Code 004168):** 10–15 km to the north *(NPWS, 2022)*.
- **Slievefelim to Silvermines Mountains SPA (Site Code 004165):** 20–25 km to the east/southeast across the Shannon catchment *(NPWS Conservation Objectives)*.



6.1 Habitat Matrix & Stepping-Stone Mechanics

Hen Harriers avoid flying across sterile, intensive agricultural grass or unbroken closed-canopy forestry. They depend on semi-natural habitat networks composed of:

- **Wet pasture** dominated by soft rush (*Juncus effusus*) for small mammal and farmland bird foraging *(Irwin et al., 2012)*.

- **Pre-thicket commercial forestry** (<12 years old) for temporary hunting ground *(Barton et al., 2006)*.
- **Remnant heath, bog, and scrub patches** for nocturnal shelter *(Redpath et al., 2001)*.

The Knockshanvo ridge forms part of the continuous East Clare hill system (Slieve Bernagh extending toward Cratloe) *(NPWS, 2022)*. Harriers naturally follow these linear contours to conserve energy during transit flights between mountain blocks *(Irwin et al., 2012)*.

6.2 Proportional Significance to the National Population

The NPWS Hen Harrier Threat Response Plan highlights that the national breeding population has declined dramatically to an estimated 85–106 breeding pairs *(NPWS Threat Response Plan, 2024)*. In this context of severe national decline, any winter habitat in East Clare holding 3 to 9 harriers represents a nationally significant proportion (3%–8%) of the entire Irish population *(Ruddock et al., 2012; NPWS, 2024)*.

7. Statutory & Legal Planning Grounds for Refusal

Ground A: Ex-Situ Adverse Effects under Article 6(3) of the EU Habitats Directive

Under Case C-142/16 (*Commission v Germany*) and European Commission Guidance (*Managing Natura 2000 Sites*, 2019), the legal scope of Appropriate Assessment extends to ex-situ habitats outside an SPA boundary if those habitats functionally support the Qualifying Interest (QI) species *(European Commission, 2019; Case C-142/16)*. Because Knockshanvo potentially provides winter foraging and roosting grounds for Hen Harriers originating from the Slieve Aughty SPA, direct habitat loss or disturbance on site threatens the favorable conservation status of the SPA population *(NPWS, 2024)*.

Ground B: Failure to Preserve Landscape Connectivity under Article 10

Article 10 of the EU Habitats Directive (92/43/EEC) mandates that Member States incorporate the management of ecological corridors and "stepping-stone" habitats into land-use planning *(Council Directive 92/43/EEC)*. Severing the Knockshanvo corridor risks genetically isolating the Slieve Aughty and Slieve Felim SPA metapopulations *(NPWS Threat Response Plan, 2024)*.

Ground C: Cumulative Impact and Barrier Hazards

The placement of 9 industrial wind turbines with tip heights reaching 185 metres across the Knockshanvo ridge introduces two major operational hazards:

1. **Collision Risk & Operational Displacement:** Blade sweeps and maintenance infrastructure displace harriers from hunting over wet pasture, compounding habitat fragmentation across East Clare *(FuturEnergy Knockshanvo DAC / MKO, 2024)*.

2. **Cumulative Barrier Effect:** When evaluated alongside operating and proposed wind developments in the same mountain corridor (e.g., Oatfield, Fahybeg), the development constructs a major industrial barrier to natural avian movement between the Slieve Aughty and Slieve Felim SPAs *(NPWS Threat Response Plan, 2024)*.

Conclusion & Relief Sought

The applicant's reliance on a rigid 10.0 km buffer to screen out the Slieve Aughty SPA is scientifically obsolete and legally invalid under the Precautionary Principle *(Case C-127/02 Waddenzee)*. Multi-year survey data suggest that Knockshanvo functions as an occasional winter refuge and regional stepping-stone for Hen Harriers dispersing from designated SPAs *(FuturEnergy Knockshanvo DAC / MKO, 2024; Ruddock et al., 2012)*.

An Bord Pleanála is respectfully requested to refuse planning permission for the proposed Knockshanvo Wind Farm on the grounds that it violates Article 6(3) and Article 10 of the EU Habitats Directive, causes unmitigated ex-situ impacts on the Slieve Aughty SPA, and threatens the long-term conservation status of the Hen Harrier in Ireland *(Council Directive 92/43/EEC; NPWS, 2024)*.

Formal References (Scientific & Statutory)

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- Case C-142/16, *European Commission v Federal Republic of Germany* (Moorburg power plant) [2017] ECLI:EU:C:2017:301.

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