GORTYRAHILLY WIND DAC

GORTYRAHILLY WIND FARM

CO. CORK

RESPONSE TO REQUEST FOR FURTHER INFORMATION

AN BORD PLEANÁLA APPLICATION REFERENCE ABP-314602-22

SEPTEMBER 2023

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GORTYRAHILLY WIND FARM
CO. CORK

RESPONSE TO FURTHER INFORMATION

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1 INTRODUCTION

This response to the Request for Further Information (RFI) has been submitted on behalf of Gortyrahilly Wind DAC to An Bord Pleanála.

This document provides responses to each of the RFI Items. For the reader's convenience, specific text of each RFI Item is reproduced herein followed by the corresponding response.

2 RFI ITEM 1 - LETTERS OF CONSENT

The Planning Statement and the Environmental Impact Assessment Report (EIAR) reference two residential buildings located 225m from T12. It is stated throughout the submitted documentation that should planning consent be given, these buildings will be in the control of the applicant and will not be inhabited for the operational period.

The applicant is requested to submit the following information:

(a) Identify the exact location of those dwellings on the Site Layout Key plan (Drawing No. 6225-PL-100).

(b) Confirm if these dwellings are located within the red and/or blue line of the proposed application.

(c) Provide letters of consent, and/or any other relevant information from the existing landowners agreeing to the information in the application.

2.1 Response to RFI Item 1

(a) Revised Drawings for 6225-PL-100 and 6225-PL-101 have been included as **Appendix A**.

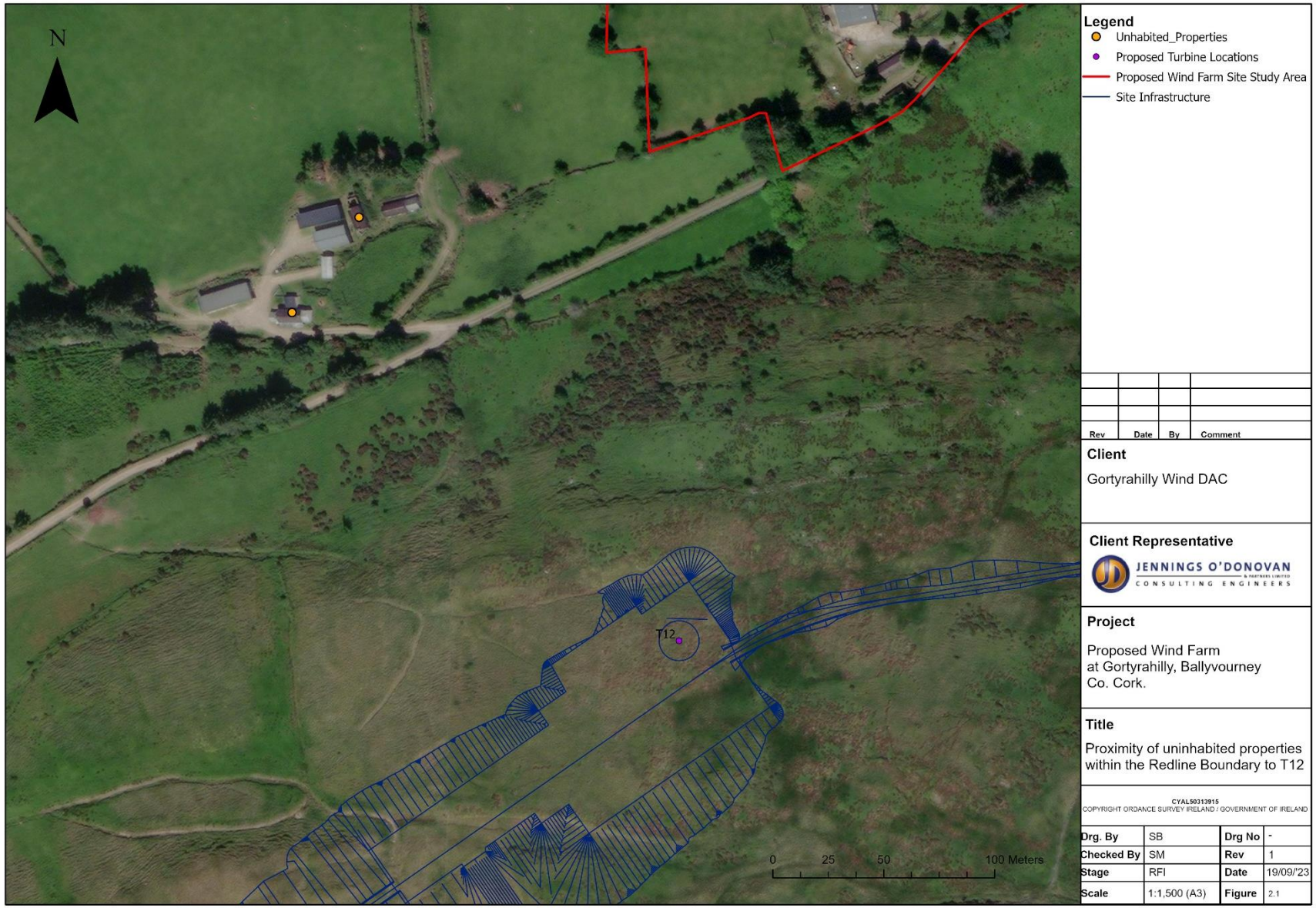

Figure 2.1: Aerial image of residential and agricultural buildings showing proximity to proposed T12.

(b) These properties are located within the red line of the proposed application.

(c) Section 2.3.1 of the EIAR Chapter 2 states the following:

There are 106 houses within 2km of the proposed turbines. This excludes a cluster of two residential buildings located 225m from T12. This can be seen in ***Figure 2.1****. In the event that planning consent is achieved, these buildings will be in control of the applicant and will not be inhabited for the operational period of the Development. These buildings are uninhabited and the landowner is in agreement with the above terms, therefore, this dwelling has been removed from the EIAR assessment.*

A letter of consent has been provided in **Appendix B** which has been agreed with and signed by the owner of the two residential buildings located 225m from T12 shown on Drawings 6225-PL-100-Rev A and 6225-PL-101-Rev A provided in Appendix A confirming that both buildings will be in control of the applicant and will not be inhabited for the operational period of the Development.

3 RFI ITEMS 2 (IMPACTS ON BLANKET BOG), 3 (BORROW PITS AND HABITAT LOSS), 4 HABITAT MAP AND 5 (HABITATS ENHANCEMENT PLAN)

Responses to the specific issues raised by An Bord Pleanála in relation to RFI Items 2 (Impacts on Blanket Bog), 3 (Borrow Pits and Habitat Loss), 4 (Habitat Map) and 5 (Habitats Enhancement Plan) in their request for further information dated 20th July 2023 are provided below and follow a brief introduction and context discussion set out in Section 3.1.

3.1 Introduction and Context

The Applicant, Gortyrahilly Wind DAC, commissioned AECOM in June 2023 to carry out a further habitat survey and condition assessment of habitats within the Proposed Gortyrahilly Wind Farm Site Boundary, referred to as "the Site" in the EIAR. The habitat survey was focused on assessing the condition of habitats that are listed on Annex I of the Habitats Directive (92/43/EEC) as amended. The habitat survey was carried out on foot between 11 and 14 July 2023 by Nick Dadds, an AECOM habitat specialist with extensive experience of upland as well as lowland habitats.

Nick is a knowledgeable ecologist with wide expertise in habitats and protected species, and specialist NVC skills with 23 years of experience. Nick holds a BSc (Hons) in Zoology and is a professional member of the Chartered Institute of Ecology and Environmental Management.

He has produced high quality EIA, HRA and BNG assessments for a variety of statutory and private clients, from large-scale infrastructure and energy schemes (e.g. wind farms, power lines, road schemes) to smaller sustainability and conservation-related projects (including commissioned habitat work for NatureScot). He has carried out detailed habitat and condition surveys of extensive upland sites (with blanket bog, heaths and woodland), and numerous lowland sites covering almost all habitat types, including assessments of designated sites.

Condition of Annex I habitat was recorded by making observations at various points during a walk through the habitat and recording the relevant condition criteria in a tablet using a semi-automated spreadsheet. The full AECOM habitat report for Gortyrahilly Wind Farm is provided at **Appendix C** of this submission. The condition assessment employed the criteria set out in Perrin *et al.* (2014).

Annex I of the Habitats Directive lists 233 European natural habitat types, including 71 priority (i.e. habitat types in danger of disappearance and whose natural range mainly falls within the territory of the European Union). Annex I was initially based on the hierarchical classification of European habitats developed by the CORINE Biotopes project 2 since that was the only existing

classification at European level[1] Under Article 11 of the Habitats Directive, each member state is obliged to undertake surveillance of the conservation status of the natural habitats and species in the Annexes and, under Article 17, to report to the European Commission every six years on their status and on the implementation of the measures taken under the Directive. In April 2019, Ireland submitted the third assessment of conservation status for 59 habitats and 60 species (including three overview assessments of species at a group level)[2].

It must be noted at this point that while the habitats within the proposed wind farm development may meet some, or all, of the criteria for classification under the Annex I system it does not automatically indicate that they all that meet the definition / classification under Annex I and are all of the same extent and quality.

Conservation assessments for Annex I habitats at a site level consist of three main aspects:

- Area,
- Future prospects, and
- Structure and functions (Perrin *et al*, 2014)[3].

Thus, evaluation of the importance of Annex I habitats using a geographic scale is established using these criteria to determine the condition of the habitat.

3.2 PROTECTION STATUS OF ANNEX 1 HABITATS OUTSIDE OF SPECIAL AREAS OF CONSERVATION (SAC'S)

Annex I of Directive 92/43/EEC, the Habitats Directive, identifies certain habitats which are considered to be in need of conservation. The Directive sets out the nature of the protection to be afforded these species and establishes a regime for their protection which involves the identification and designation of special areas of conservation (SAC's). The identification of SAC's for advancing the Directive's conservation objectives must be undertaken in a balanced way so as to further the conservation of these habitats having regard to wider "economic, social and cultural requirements" (Art 2(3)).

Outside of these SACs, the same level of protection for Annex 1 habitats under Directive 92/43/EEC does not apply. Outside of SACs, member states must "*endeavour, where they*

[1] *Interpretation Manual Of European Union Habitats EUR 28*, April 2013, European Commission, DG ENVIRONMENT, Nature ENV B.3 https://circabc.europa.eu/ui/group/3f466d71-92a7-49eb-9c63-6cb0fadf29dc/library/37d9e6d9-b7de-42ce-b789-622e9741b68f/details (last accessed 24/08/2023)
[2] https://www.npws.ie/sites/default/files/publications/pdf/NPWS_2019_Vol1_Summary_Article17.pdf
[3] Perrin, P.M., Barron, S.J., Roche, J.R. & O'Hanrahan, B. (2014). *Guidelines for a national survey and conservation assessment of upland vegetation and habitats in Ireland. Version 2.0.* Irish Wildlife Manuals, No. 79. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland. https://www.npws.ie/sites/default/files/publications/pdf/IWM79.pdf

consider it necessary,… to encourage the management of features of the landscape which are of major importance for wild fauna and flora" being features which "*by virtue of their linear and continuous structure… or their function as stepping stones are essential for the migration, dispersal and genetic exchange of wild species*" (Art 10).

The Development is not located within an SAC.

It is evident from the AECOM (2023) condition assessment provided in Appendix C and discussed further below that the Annex I habitat present on the development site is in a poor condition and lacking in peat-forming species. These areas of habitat are also very fragmented, non-contiguous pockets and cannot be regarded as being of major importance or essential for the migration, dispersal and genetic exchange of wild species (Art 10, Directive 92/43/EEC).

3.3 RFI Item 2 - Impact on Blanket Bog

Section 5.3.6.1 of the EIAR refers to the location of blanket bog on the southern half of the site with small pockets of active blanket bog throughout. It is noted that blanket bog has an Annex I designation while active blanket bog has priority status. The EIAR records a low representation of the priority habitat on site with an overall rating of local importance (higher value).

Having regard to the defined status of both blanket bog and active blanket bog in the EIAR it is considered the overall importance of this habitat may be considered greater than local. The applicant is required to provide exact details of the location of both the blanket bog and the active blanket bog, in conjunction with those areas which will be disturbed as part of this proposal.

Response to RFI Item 2

Figure 1 of the Gortyrahilly Wind Farm Annex I Habitat Condition Report (AECOM, 2023) shows the locations of the Annex I habitats H7130 Blanket bog and H7130* priority Blanket bog (priority H7130* is considered 'active' bog, and non-priority H7130 inactive bog, based on the presence or absence of key peat-forming species respectively), together with an overlaid outline of the footprint of the proposed wind farm (including borrow pits, temporary compound, etc. as well as all permanent infrastructure).

The condition assessment of Annex I habitats in the vicinity of the proposed wind farm included more detailed habitat mapping where this was found to be appropriate. As a result, a number of patches of H7130 and H7130* have been mapped within areas dominated by other habitats, or in mosaic with other habitats, some of which are impacted by the proposed wind farm.

However, the patches of H7130/H7130* tend to be very small, and the loss of these habitats to the wind farm footprint (accounting for estimated proportions where bog occurs in fine-scale mosaics with other habitats) is 0.8 ha for H7130 and 1.71 ha for H7130 * (i.e., total blanket bog within the footprint is 2.51 ha). There will therefore be 1.2 ha of retained H7130 and 12 ha of retained H7130* within the red line boundary but outside the wind farm footprint.

All of the H7130 is in poor condition (i.e. the 'structure and functions' criterion as per guidance on assessment of upland habitats in Ireland (Perrin *et al*, 2014) and is Unfavourable Bad.~~,~~ H7130/H7130* Blanket bog within the development footprint is lacking in peat-forming species that would confer active peat bog status with approximately 40% in unfavourable condition (mostly Unfavourable Bad) and 60% is in Favourable condition.

Land drainage, including some recent drain cutting has taken place through and beside some H7130* thus contributing to the unfavourable condition, in addition to insufficiency of key indicator species and/or over-abundance of purple moor-grass *Molinia caerulea*.

The patches of H7130/H7130* affected by the proposed wind farm infrastructure are isolated small pockets and not continuous expanses of Annex I 'blanket' bog of higher ecological value such as those designated within a Special Area of Conservation (SAC) and listed as a qualifying interest of a Natura 2000 site. Examples of H7130/H7130* occur within localised flatter zones amongst a topographically variable terrain dominated by wet heath (and, in places, other moorland habitats). There is one larger fragment of H7130* within the forestry plantation which is impinged upon by the proposed turbine T3 at the western edge as shown on Figure 1 of the Aecom Habitat Conditions Report 2023 provided in **Appendix C.** However, in this case the peripheral impingement is largely on cutover bog where much of the peat has been removed. The wet heath habitat in this area grades into the forestry plantation where some '*islands*' of deep peat are retained. Turf cutting, historical and more recent, has resulted in the removal of a significant amount of peat from the H7130/H7130*habitat where T3 is proposed.

The Annex I habitat H7150 Depressions on peat substrates of the *Rhynchosporion* was also found during the Annex I condition survey, and some localised H7130* can also be classified as H7150 by virtue of the presence of white beak-sedge *Rhynchospora alba*. The distribution of H7150 is shown on Figure 1 of the Gortyrahilly Wind Farm Annex I Habitat Condition Report (AECOM, 2023). The only locality in which H7150 would be lost is at turbine T2. However, there is only one or two square metres of H7150 at this locality and it is in poor condition owing to insufficiency of white beak-sedge and overabundance of deergrass *Trichophorum germanicum.* Much more extensive H7150 in good condition is present in H7130* pockets between proposed turbines T2

and T3, and locally on a large patch of H7130* within the forestry plantation west of proposed turbine T4. The H7150 in good condition is not within the development footprint and will not be affected by the development. The miniscule loss of H7150 in poor condition is therefore inconsequential.

For the above reasons, the patches of H7130/H7130* blanket bog that will be affected by the proposed wind farm are evaluated as important at the Local level and the loss of the patches of H7130/H7130* is significant at the Local level, as stated in EIAR Chapter 5.

3.4 RFI Item 3 - Borrow Pits and Habitat Loss

Section 5.4.5.1 of the EIAR states that the effect of the loss of 28 ha of wet heath, which includes areas of dry heath, outcropping rock, and blanket bog (all Annex I listed habitats), is considered Significant and of Permanent duration. Section 5.4.5.2 further states that the proposed borrow pit to the north of T2 will involve the removal of 26.3 ha of wet heath dominated by Molinia caerulea and with low heather cover.

The Board has some concerns in relation to the figures submitted in Chapter 5 of the EIAR with regard the quantum of loss of wet heath. In the interest of clarity and to fully understand the impact on this habitat from both the turbine sites, borrow pits, substation's locations etc the applicant is requested to clarify the following:

(a) Does the 28ha of wet heath include the 26.3ha for borrow pit A? If not, then the overall figure should be updated to address the same, if it is then Table 5.12 should be updated to include reference to borrow pits.

(b) Does Table 5.12 include that habitat removal for the borrow pits? If not, then this table should be updated, along with relevant reference in the EIAR to the loss of habitats for the borrow pits.

(c) If overall figure for removal of wet heath is greater the 28ha referenced through EIAR, please the habitat enhancement plan is sufficient to compensate for a greater proportion of habitat loss.

Response to RFI Item 3

The reference to 26.3 ha in Section 5.4.5.2 of the EIAR was a typographical error and this figure should in fact have been **2.63 ha.** The design of borrow pit A and the subsequent assessment within the EIAR was based on an area of 2.63 ha for borrow pit A.

Following submission of the planning application for the Development, a detailed Annex I habitat condition survey was completed by AECOM in July 2023. It further confirmed habitat conditions and potential habitat loss as a result of the Development.

The July 2023 survey refined mapping in the vicinity of the proposed wind farm footprint and most notably recorded that the area of H4010 wet heath that will be lost due to the proposed wind farm development is 17.85 ha, significantly lower than the 28 ha stated in section 5.4.5.1 of the EIAR and Table 5.12. This figure includes losses to all parts of the wind farm footprint including borrow pits.

The reasons why this figure is lower than previously reported are detailed in the AECOM report (2023), and include:

a) recent conversion of wet heath (and bog) to agricultural pasture beside proposed turbine T9 and to small extent elsewhere (such as near proposed turbine T8);
b) the refinement of habitat mapping to better detail and delineate areas of non-Annex I habitat (primarily acid/marshy grassland, but also including mapping of existing access tracks) amongst wet heath; and
c) the occurrence in several areas of wet heath as a mosaic component (sometimes a very minor one) in habitat mosaics that include non-Annex I habitats (again, primarily acid/marshy grassland).

The extents of wet heath and habitat mosaics including wet heath, and all other habitats, in the vicinity of the wind farm footprint is shown on Figure 1 of the 2023 AECOM report. In summary, the total loss of wet heath will be 17.85 ha including that lost to borrow pits. The total loss of wet heath is reduced by over 10 ha from the 28 ha previously reported in the EIAR and it is not deemed necessary to amend the habitat enhancement plan as a result.

3.5 RFI Item 4 - Habitat Map

Section 5.1 of the EIAR Figures includes a Habitat Map. Considering the additional information request above and the potential impact of the proposed development on Annex I habitats, the Board considers that the proposed development should be overlayed onto the Habitats Map. The applicant should note that the location of all works should be clearly illustrated on the map, including temporary and permanent works, i.e., grid connection, turbine location, construction compounds, borrow pits and delivery access.

In addition to the above, the applicant is required to clearly illustrate the area of Oak-birch-holly woodland (WN1), proposed to be removed, on the Habitats Map, along with the any works overlaid.

Response to RFI Item 4

Figure 1 of the Gortyrahilly Wind Farm Annex I Habitat Condition Report (AECOM, 2023) shows the locations of all Annex I habitats (and other habitats) with an overlaid footprint of the proposed wind farm(including wind turbines, roads, substation, borrow pits, temporary compound, etc. e). A separate map (**Appendix D**) is also provided showing a large-scale view of the Oak-birch-holly woodland (WN1) with overlaid footprint of the proposed wind farm. This shows that the access track almost entirely avoids this woodland – 30 m^2 of the woodland will be lost to the proposed wind farm, out of a total of 14,021 m2.

3.6 RFI Item 5 - Habitats Enhancement Plan

Chapter 5 of the EIAR lists mitigation measures for the permanent loss of c.40 ha of habitat on the site. A Habitat Enhancement Plan (HEP) is one such mitigation measure and includes the restoration of c. 9.5ha of bog and heath that has been degraded by afforestation. Appendix 5.5 includes details of the HEP where it is stated that works include tree cutting, pulling of seedlings and drain blocking.

- *The applicant is requested to confirm if the 9.5 ha for HEP includes the areas associated with T4 and the access road. In addition, the applicant should confirm if the actions included in Appendix 5.5 are sufficient to restore the current degraded area to a standard appropriate to mitigate against the habits which will be lost.*

Statement of Authority

This response was prepared by the author of EIAR Chapter 5: Terrestrial Ecology and EIAR Chapter 7: Ornithology, Dr. Brian Madden.

Brian Madden graduated in Natural Sciences from the University of Dublin in 1984 and earned a Ph.D. degree in 1990 from the National University of Ireland for his research on ecosystem processes in Mongan Bog, a raised bog in Co. Offaly (research work sponsored by Bord na Móna and Royal Irish Academy). Since then, he has carried out botanical surveys and habitat assessments for most terrestrial habitats which occur on the island of Ireland.

Brian is an experienced ornithologist, with particular interests in birds of prey and wetland birds. He has published a range of research papers, including papers on the birds of Mongan Bog, the impacts of wind farms on Hen Harriers, and the status of the Peregrine Falcon in Ireland.

Brian is the principal ecologist with BioSphere Environmental Services and is the main contact between the consultancy and the client.

Response to RFI Item 5

The 9.5ha for HEP does not include the areas associated with T4 and the access road.

The actions set out in the HEP are sufficient to enhance and improve the condition of the habitats within the 9.5 ha HEP area. Measures described in the HEP, such as drain blocking and removal of encroaching and self-seeding trees, are standard measures applied in peatland restoration projects as described by the Irish Peatland Conservation Council on their website[4] and International Peatland Society website[5]. The drain blocking will be informed by detailed and targeted hydrological studies as part of the restoration work.

The applicant has also committed to putting additional measures in place on lands within the wind farm site such as the cessation of burning vegetation and no further land drainage. Additionally, the creation of permanent turbine clearance areas in forestry around proposed turbines T3, T4, T5 and T10 will provide opportunities for re-establishment of new wet heath. Wet heath was the vegetation type prior to afforestation and is likely to begin to recover upon removal of trees. The additional habitat management and restoration measures the applicant has committed to are targeted at reducing / removing the existing pressures on Annex I habitats within the wind farm development site as discussed in more detail in the AECOM 2023 Annex I habitat report provided at Appendix C.

3.7 Conclusion

Gortyrahilly Wind Farm Annex I Habitat Condition Report (AECOM, 2023) provides a more detailed and refined overview of the habitats within the proposed wind farm development site.

The reference to 26.3 ha Section 5.4.5.2 of the EIAR was a typographical error and this figure should in fact have been **2.63 ha** for Borrow Pit A.

[4] http://www.ipcc.ie/advice/peatland-management-diy-tool-kit/restoration-of-drained-peatlands/
[5] https://peatlands.org/peatlands/peatland-restoration/#:~:text=Depending%20on%20the%20starting%20point,burning%2C%20water%20quantity%20and%20quality

The habitat survey and condition assessment carried out in July 2023 confirmed that the total area of wet heath habitat affected by the proposed development is 17.85 ha. The habitat survey and condition assessment also confirmed that wet heath within the development site is variable in quality, and many areas are not in good condition. This appears mainly to be due to overgrazing, although artificial drainage is also an issue in a number of places, and there is also evidence of possible historic burning that has contributed to the degraded state of some wet heath.

The actions set out in the HEP are sufficient to enhance and improve the condition of the habitats within the 9.5 ha HEP area and around the wind farm infrastructure as detailed earlier in this response.

The Habitats Directive does not afford Annex I habitat strict protection, this is reserved for Annex IV species. The consideration of the likely significant effects of the proposed project on such habitat and the decisions whether to grant planning permission for the proposed development must take cognisance of this important distinction and not elevate the status of Annex I habitat beyond the purpose and intention of the Habitats Directive.

This is particularly so when weighing these conservation objectives with the pressing need for projects such as the Development which are essential for Ireland to meet its EU and international commitments to address climate change, reduce greenhouse gas emissions and decarbonise its economy by 2050.

Ireland's commitments are affirmed in the Climate Action and Low Carbon Development (Amendment) Act, 2021 which commits Ireland to reach a legally binding target of net-zero emissions no later than 2050, and a cut of 51% by 2030 (compared to 2018 levels). To enable the achievement of these binding commitments, the 2021 Act requires the Government to put in place a Climate Action Plan (CAP) setting out the key actions required for delivery. The current CAP, Climate Action Plan 2023, highlights the central role electrification will play in the decarbonisation of other sectors including transport, heating, and industry, sets an ambitious 80% target for electricity production from renewable sources by 2030 and identifies the need to remove barriers to the development of renewables, including onshore wind.

Russia's war on Ukraine shone a light on the EU's over reliance of Russian Gas for electricity production and emphasised the need to accelerate the decarbonisation of our electricity market and achieve energy independence – the path to achieve this is to accelerate the deployment of renewable energy generation. In recognition of this the Council of the European Union adopted

Council Regulation (EU) 2022/2577 on the 22 December 2022, laying down a framework to accelerate the deployment of renewable energy (the "Regulation").

The Regulation introduces a number of measures aimed at streamlining and prioritising the permit granting processes relating to renewable energy developments and associated infrastructure. In particular, Article 3(1) establishes a presumption that renewable energy developments and associated infrastructure is "in the overriding public interest and serving public health and safety" when balancing the pressing need for such development with the environmental and species conservation objectives deriving from implementing the Habitats Directive, the Birds Directive and the Water Framework Directive.

The Regulation is directly effective in Ireland since the 30 December 2022 and Article 1 provides that the "Regulation applies to all permit-granting processes that have a starting date within the period of its application" and "Member States may also apply this Regulation to ongoing permit granting processes which have not resulted in a final decision before 30 December 2022, provided that this shortens the permit granting process and that pre-existing third party legal rights are preserved". The Regulation confirms the direction of European renewable energy policy and emphasises the urgency of delivering renewable energy in member states since the lodging of the Gortyrahilly Wind Farm planning application.

In all the circumstances, given the condition and fragmented nature of the Annex I habitat present on the site of the Development, the most limited area of proposed habitat loss and the proposed measures set out in the HEP, it is appropriate and consistent with Government and EU policy to grant permission for the Development.

4 RFI ITEM 6 - TEMPORARY STOCKPILES

Section 8.5.2.3 of the EIAR refers to the location of temporary stockpile areas as identified in the Construction Environmental Management Plan (CEMP) (Appendix 2.1). The Board notes that Appendix 2.1 does not include a plan illustrating those areas. The applicant is required to submit a plan clearly illustrating the location of all temporary stockpile areas.

Section 3.3.4 refers to mitigation for peat ground stability which states that "Draining of stockpiled peat in a controlled manner is recommended". The Board notes that details of stockpile draining have not been submitted. The applicant should clarify if a) it is proposed to drain any stockpile and b) if so, the measures and process involved with draining these areas including any mitigation to ensure that surface water run-off associated with the peats does not give rise to sediment-laden run-off.

Chapter 9 states that silt fencing will be erected around the base of any temporary stockpile to protect surface waters and plastic sheeting will cover the top of any stockpile. The applicant is requested to clarify, having regard to the additional information request above, if these measures are sufficient to prevent a landslide event. In this regard, the applicant shall have regard to the topography of the site, the size of stockpile areas, and the proposed locations of any temporary stockpile.

4.1 Statement of Authority

This response was prepared by the author of EIAR Chapter 8: Soils and Geology and Chapter 9: Hydrology and Hydrogeology, Sven Klinkenbergh.

Sven is a Project Manager/Environmental Consultant with over eight years' experience. He has obtained a Post Graduate Diploma in Environmental Protection from IT Sligo (2020) and a Bachelor of Science in Environmental Science from IT Sligo (2013).

Sven is a specialist in Hydrology, Hydrogeology, Land, Soils and Geology, Environmental Impact Assessment Reporting and associated field investigations. Sven has multiple years' worth of experience in Environmental Monitoring with a focus on surface water and groundwater in addition to soil classification as waste / bi-product. With a background in project management, Sven has carried out multiple Flood Risk Assessments (Stage 1) as well as Peat and Slope Stability Risk Assessments.

4.2 Response to RFI Item 6

Location of temporary stockpiles

A plan clearly illustrating the location of all temporary stockpile areas outside of the Development footprint and within the red line planning application boundary, is shown below and also provided on **Drawing number 603679** in **Appendix E**

The requirement for and extent of temporary stockpiles will be minimised through management of the materials arising at any particular part of the Site. For example, at a turbine location, the expected excavation volumes, management and movement of materials will be planned prior to excavation works commencing. This will include segregation of types of material arisings, for example, acrotelm peat, topsoil, subsoils and rock will be segregated and stored separately.

Rock will be re-used in the construction of hardstand and as ballast to a turbine. Subsoil will be used to create berms at the edge of handstands and site tracks. Topsoil will be place against cut slopes and to cover the subsoil berms at hardstands and site tracks.

The Management of temporary stockpiles is outlined in Drawing Number 603679 Gortyrahilly WF RFI Response - Subject: Suitable Locations for Temporary Stockpiles – Management of Excavation Arisings (**Appendix E**). It is expected that during excavation, arisings will be segregated and stored locally before being transported directly to a backfill / depsoit area or to a dedicated temporary stockpile area as necessary. Material stored in temporary storage areas will be reused elsewhere on site as backfill, berms, landscaping and resinstatement of construction areas, including the reinstatement of Borrow Pits. No permanent stockpiles will remain on site. Surplus material following the completion of the constrcution phase will be transported offsite and reused as a bi-product (for example; Greenfield Soil & Stone through Regulation 27 of the European Communities (Waste Directive) Regulations 2011, or as a waste to a licenced facility.

As per **Table 2.6** of **Management Plan 4 Appendix 2.1 CEMP**, **Peat and Spoil Management Plan** the estimated total volume to be excavated is 141,236m^3. Excavated materials for the Grid Connection (within roads) will be disposed of at a licensed facility (28,092m^3). However, 9,418m^3 of peat and soil within sections of the Grid Connection Route in fields and countryside will need to be re-used (**Appendix 2.1 CEMP Management Plan 4, Section 2.7**).

The volume of excavated material and its re-use on site is summarised in **Table 4.1** below.

Table 4.1: Volume of excavated material by infrastructure unit and re-use on site.

Descripton	Excavated material volume (m^3)	Volume of Excavated Material to be Re-used On-Site			
		Berms (m^3)	Backfilled / Used as ballast (m^3)	Reinstate borrow pits (m^3)	Reinstate Temporary Compound Areas (m^3)
Roads	40,738	10,980		29,758	
Turbine and Met Mast Foundations (25.5m)	20,574	2,152	18,422		
Turbine Hardstands	45,267	1,008		44,259	
Electrical sub-stations and temporary compounds	8,665		6,300	215	2,150
Grid Connection*	28,092			9,418	
Drainage	3,308				3,308
Total	141,236	14,140		83,650	5,458
Volume of temporary storage required (m^3)					89,108
*To be disposed at a licensed facility					

It is estimated that 89,108m^3 of excavated material will need to be temporarily stored prior to reinstatement into either of the two onsite Borrow Pits or in the Temporary Compound Areas. It is anticipated that the two Borrow Pits will be able to store a total of 91,860m^3 based on a depth of 2m and a storage height of 1m (**Table 4.2**). It is expected that storage of excavated material would begin to be reinstated into the borrow pits once half of the volume of material has been extracted for use around the proposed development therefore an estimated 45,930m^3 of volume will need to be temporarily stored (**Table 4.2**).

Table 4.2: Summary of Borrow Pit excavation volume and potential spoil storage volume.

Borrow Pit	Area (m^2)	Depth (m)	Volume Extracted (m^3)	Height of storage (m)	Volume to be stored (m^3)	Temporary storage needed (m^3)
A	26,307	2	47,353	1	73,660	36,830
B	6,500	2	11,700	1	18,200	9,100
Total			**59,053**		**91,860**	**45,930**

A plan clearly illustrating the location of all temporary stockpile areas outside of the Development footprint and within the red line planning application boundary, is shown below and also provided on **Drawing number 603679** in **Appendix E**. The location of the temporary stockpiles are constrained by the information previously provided in **EIAR Appendix 8.1 - Appendix H (a) Geohazards Wind Farm Review** as well as the drainage buffers previously provided in **EIAR Chapter 9 Figure 9.8 a-k.**

The purpose of these temporary stockpiles is to provide temporary storage until the excavated material can be used elsewhere on site or reinstated into the onsite Borrow Pits. The location of

temporary stockpiles must take into the consideration of hazards and appropriate mitigation measures outlined in **EIAR Chapter 8 Section 8.5.2** and **Chapter 9 Section 9.5.2**

These measures include:

- Ensuring temporary stockpiles are not located in areas which are indicated as being geo-hazards, particularly in areas of unacceptable factor of safety / stability (**EIAR Appendix 8.1**). These geo-hazards and constraints are listed and mapped in **EIAR Chapter 8, including EIAR Appendix 8.1 – Appendix H Geo-Hazards**.
- Temporary stockpiles should not be placed in areas of deeper peat (**EIAR Appendix 8.1 - Appendix B**) due to the potential for localised stability issues.
- Reducing the potential for dedicated temporary stockpiles in general by reusing the material in so far as practical for restoration, fill or reinstatement (**CEMP Management Plan 4 Appendix 2.1, Peat and Spoil Management Plan**). This will include consideration for segregation of types of material arisings, for example, acrotelm peat, tops soils, subsoils and rock will be segregated and stored separately.
- Temporary stockpiles will be limited to 1m height and removed for reuse/remediation purposes or disposed offsite as soon as possible (**EIAR Chapter 8, Section 8.5.2.5**).
- Temporary stockpile locations will be situated outside Surface Water Buffer Zones (**EIAR Figure 9.8 a-k**).
- Temporary stockpiles will have side slopes battered back to a safe angle of repose (e.g., 1:1) with silt fencing around the base of the temporary stockpile. Temporary storage areas will require bunding and management of runoff likely contaminated with suspended solids as per the Construction Water Management Plan (**EIAR Appendix 9.6 – Tile 7**). This will be done through the implementation of Sustainable Drainage Systems.
- Earthworks will be limited to meteorologically dry periods and will not occur during sustained or intense rainfall events. At a minimum as part of the emergency response system there will be 24 hour advance meteorological forecasting linked to a trigger-response system, ceasing construction until the storm event has passed. Exposed temporary stockpiles will be covered with plastic sheeting during all heavy rainfall / storm events and during periods where works have temporarily ceased before completion at a particular area (e.g., weekends, overnight, etc) **EIAR Chapter 9, Section 9.5.2.2**. Following heavy rainfall events, and before construction works recommence, the Site will be inspected and corrective measures implemented to ensure safe working conditions.

Suitable areas outside of the Development footprint (but within the Redline Boundary) are presented in attached graphics (**Appendix E**).

- Drawing Number 603679 Gortyrahilly WF RFI Response - Subject: Suitable Locations for Temporary Stockpiles (Annotated, Ref. EIAR Chapter 8 – Appendix 8.1 – Appendix H (a) Geo-Hazards Wind Farm Overview) (SK 20/09/23) (File Ref. 603679 (00) RFI Response Graphics.ppt) (Print A3).

Temporary storage locations have been identified by screening the site in terms of stability and geo-hazards. Principally, the areas identified avoid locations with moderate to high landslide susceptibility. The low landslide susceptibility at these areas is driven to a large degree by the low incline i.e., the areas are relatively flat because of the low inclines combined with generally shallow peat / soil overburden and the presence of extensive bedrock outcrops in the areas along with peat and slope stability, it is considered that **peat landslides and other geological circular slip movements are low risk at the identified temporary storage areas.**

Description for suitable temporary storage locations identified in the figure above are summarised below and presented in **Table 4.3**:

- Temporary Storage Area 1: area adjacent to T3 and Borrow Pit A. This area is relatively flat, with stability data indicating Very Low risk (RR(D) Scenario B, **EIAR Appendix 8.1**). There is also minimal existing drainage to consider and protect.
- Temporary Storage Area 2: area adjacent to T11. This area is within coniferous forest and wetlands with mapped outcrop. The stability risk is Moderately Low. There is also minimal existing drainage to consider and protect.
- Temporary Storage Area 3: area east of T8. This area is within wetlands. The stability risk is Low. There is also minimal existing drainage to consider and protect. There is also minimal existing drainage to consider and protect.
- Temporary Storage Area 4: area to the southwest of T4. This area is in within coniferous forest and is relatively. Stability risk is Low to Moderately Low. There is also minimal existing drainage to consider and protect.
- Temporary Storage Area 5: area adjacent to T5. This area is in within coniferous forest and has shallow bedrock. Stability risk is Low to Moderately Low.

Table 4.3: Estimated area of suitable temporary stockpile locations within the redline boundary.

Id	Location	Area (m^2)	Land use	Slope	Landslide susceptibility	Geohazard risk*	Comment
1	T3	34,176	Forest and wetland	0-3	Low to moderately low	Very Low	Adjacent to Borrow Pit A. relatively flat, minimal drainage to consider
2	T11	9,092	Wetlands and forest	4-8	Low to moderately low	Low	Adjacent to Borrow Pit B. shallow bedrock, minimal drainage to consider
3	T8	5,171	Wetlands	3-6	Low	Very Low	Relatively flat, minimal drainage to consider
4	T4	12,806	Forest	0-3	Low to moderately low	Very Low	Relatively flat, minimal drainage to consider
5	T5	6,506	Forest	0-6	Low to moderately low	Very Low	Shallow bedrock, minimal drainage to consider
Total		**67,750**					

*inferred from the infrastructure risk assessment carried in Appendix 8.1 Table 17 and in further detail below in Response to RFI Item 7 (c)

Table 4.3 above indicates that the proposed temporary stockpile locations would provide enough space for stockpile storage provided the material is reinstated in Borrow Pit A or B as the material is excavated from these locations. Therefore, temporary stockpiling will be undertaken in a phased or sequenced approach.

For the purposes of clarifying the phased approach to the management of excavation arisings, a Phased Approach is presented 603679 Gortyrahilly WF RFI Response - Subject: Suitable Locations for Temporary Stockpiles – Management of Excavation Arisings – Conceptual Phased Approach 1-5) (SK 20/09/23) (File Ref. 603679 (00) RFI Response Graphics.ppt) (Print A3). This can be summarised as follows:

- Phased Approach 1 – Greenfield site with infrastructure outline presented.
- Phased Approach 2 - Excavate to competent ground and construct trafficable access tracks in areas to facilitate access to temporary storage and borrow pit locations. The borrow pit area will be excavated to bedrock and prepared for the extraction of material to be used for fill purposes i.e., crushed rock for construction of access tracks and construction compounds to prepare for next phase of works. Excavation arisings will be managed within the infrastructure layout and temporary storage locations.
- Phased Approach 3 - Construct initial sections of access track including deposit of engineering fill / crushed rock. The source of crushed rock is the borrow pit predominantly, but some crushed rock will arise at turbine locations.

  Excavate and prepare first turbine hardstand area to competent ground.

  Material arising will be managed within the infrastructure outline, reused directly where possible, and thereafter within temporary storage areas as necessary.

- Phased Approach 4 - Excavate and prepare next turbine hardstand area to competent ground. Material arising will be managed within the infrastructure outline, reused directly where possible including previously excavated hardstand areas, and thereafter within temporary storage areas as necessary for reuse later during the construction phase.
- Phased Approach 5 – Complete hardstand areas and reinstatement, backfill / landscaping etc using materials in temporary storage.
- Phased Approach 6 – Backfill and reinstate borrow pit areas and other effected areas using remaining material in temporary storage.
- No temporary stockpiles will remain on site, any residual material remaining once all reinstatement is complete will be removed off site as a waste / bi-product through appropriate procedures.

Implementation of the Peat and Spoil Management Plan will minimise the volume of arisings to be temporarily stockpiled at any given time during the construction phase.

Stockpile drainage

The CEMP **(EIAR Appendix 2.1, Section 3.4.3.1 and Chapter 9 Section 9.5.2.3)** details the management of construction water along with **EIAR Appendix 9.6, Tile 7, 8 and 9,** which will be implemented in full including for all temporary stockpiles.

The management of runoff and construction water is required for all parts of the Development, including and in particular when dealing with excavation arisings at source, all temporary storage areas, and deposit / backfill areas of the Site.

- Excavation management includes drainage prior to excavation by sumps in a phased approach where necessary. This will temporarily lower the groundwater levels allowing excavation to be carried out in dry and stable conditions. This will reduce the water content in excavated soils, in turn reducing the potential for release of solids (**EIAR Chapter 9, Section 9.5.2.3**).
- Dewatering (of stockpiles) will be controlled by an inline gate valve (or similar) to reduce the loading in the receiving drainage and attenuation network, therefore enhancing the attenuation and settlement of suspended solids. All pumped water will be discharged to constructed drainage (and in line treatment train / through a silt bag to a vegetated surface) outside of surface water buffer zone (**EIAR Chapter 9, Section 9.5.2.3**).
- Continuous Monitoring, Active Construction Water Management, and modification of systems as necessary as dewatering and the management of construction water is a dynamic process. Monitoring is detailed in **EIAR Chapter 9, Section 9.5.2.12.1** of the EIAR.

- In areas with slope and or stability risks or near to buffer zones will have limitations for the potential installation of engineered attenuation features. In these areas any water arising from dewatering activities will be:
    - Directed / pumped to a settlement tank before being discharged to vegetated area, or
    - Pumped to an area of the site where the installation of attenuation features is suitable.

The placement and management of stockpiles in suitable locations requires ongoing consideration and management of connectivity to the receiving drainage and surface water network. This includes isolating working areas, temporary blocking existing drains as necessary, and ongoing monitoring and emergency intervention / Active Construction Water Management as necessary.

The attached graphics present methods for the management and segregation of materials (**Appendix E** of this report).

- 603679 Gortyrahilly WF RFI Response Subject: Suitable Locations for Temporary Stockpiles (Annotated, Ref. EIAR Chapter 9 – Figure 9.8(f) Development Constraints (S)) (SK 20/09/23) (File Ref. 603679 (00) RFI Response Graphics.ppt) (Print A3)
- 603679 Gortyrahilly WF RFI Response Subject: Suitable Locations for Temporary Stockpiles (Annotated, Ref. EIAR Chapter 9 – Figure 9.8(d) Development Constraints (NE)) (SK 20/09/23) (File Ref. 603679 (00) RFI Response Graphics.ppt) (Print A3)
- 603679 Gortyrahilly WF RFI Response Subject: Suitable Locations for Temporary Stockpiles (Annotated, Ref. EIAR Chapter 9 – Figure 9.8(c) Development Constraints (NW)) (SK 20/09/23) (File Ref. 603679 (00) RFI Response Graphics.ppt) (Print A3)
- 603679 Gortyrahilly WF RFI Response Subject: Suitable Locations for Temporary Stockpiles – Management of Excavation Arisings) (SK 20/09/23) (File Ref. 603679 (00) RFI Response Graphics.ppt) (Print A3)

Temporary measures will be used to manage and mitigate against runoff from the Development footprint, including temporary storage areas. These will include the use of:

- **Silt fencing**
  Silt fencing will be used around all temporary stockpiles as part of the drainage system to mitigate against changes to the baseline water quality within or downstream of the Site.

- **Temporary Drainage / Temporary Blocking of Existing Drainage**
  Temporary interceptor drains, or swales will be used to intercept large volumes of runoff during storm events. At all temporary storage locations temporary dams will be used to isolate the area and to attenuate poor quality runoff as necessary.

- **Monitoring**

  Monitoring of runoff and water quality will be carried out on an ongoing and continuous basis. Where runoff quality is observed to be unacceptable, runoff will be intercepted and pumped to in line treatment train, this is referred to as active construction water management.

  All measures outlined in the Surface Water Management Plan (SWMP; **Appendix 2.1 CEMP, Management Plan 3**) will be fully implemented by the contractor and will be agreed to with the planning authority in advance of construction activities. The objective of the SWMP is to prevent pollution to watercourses and adverse impacts to sensitive fauna. The SWMP has provided sufficient detail so that all activities that could potentially lead to negative impacts on water quality have been identified. The SWMP is based upon a detailed understanding of the hydrology, hydrogeology and geology within and surrounding the proposed wind farm. All pumps, tanks, settlement ponds, dewatering bags and check dams used in the dewatering process will be regularly inspected and maintained as necessary to ensure surface water runoff is appropriately treated. The monitoring protocol will be devised so that sediment release (should it occur) from the Site is detected at an early stage. Sediment release to the watercourses from the Site will be restricted to <25 mg/L as per the European Communities (Quality of Salmonid Water) Regulations 1988.

- **Emergency Intervention and Active Construction Water Management**

  The performance of drainage and temporary systems such as silt screen fencing will be monitored on an ongoing basis and where runoff quality or the quality or the receiving surface water network is unfavourable and exceeding Environmental Quality Standards (namely Total Suspended Solids (TSS) with a threshold of 25 mg/L TSS), under the direction and scope of the appointed Environmental Clerk of Works (EnvCoW), works will be temporarily ceased, and emergency response and mitigation escalated, including intercepting and diverting runoff the Active Construction Water Management systems as necessary. This will be done urgently to achieve favourable water quality again in good time. This is in line with the objectives of mitigation, whereby; mitigation will be designed and implemented with a view to maintaining or improving water quality associated with the site, and where any adverse effect i.e., elevated TSS, will be detected through continuous monitoring, and rectified in good time. This will mean that any adverse effect to water quality will be temporary and slight.

- **Plastic Sheeting**

  Plastic sheeting on the top of temporary stockpiles is a measure which will be implemented to help mitigate against elevated concentrations of suspended solids in runoff during excavation activities i.e., the erosion of and entrainment of peat/soils by rain. This mitigation measure is for all heavy

rainfall / storm events and during periods where excavation activities temporarily cease (e.g., overnight / the weekend) (**Chapter 9 Section 9.5.2.2**).

- **Avoiding Constraints and Receptors**

  The temporary stockpiles are not located in areas with slope of stability risks (a Site Investigation Report – Stability and Geotechnical Assessment has been appended to the EIAR as Appendix 8.1). The measures and or engineered attenuation features must also not be implemented in areas with slope or stability risk including the use of silt fences and plastic sheeting in the active construction water management system. Dewatering from construction works namely excavations and temporary stockpiling in these areas will be directed / pumped to a settlement tank (**EIAR Appendix 9.6 – Tile 8)** before being discharged, or pumped to an area of the Site where the installation of attenuation features is suitable (**Planning Drawings 6225-PL-100 – 107**). This helps to mitigate against the potential risk associated with management of construction water from excavations and temporary stockpiling in areas adjacent to higher risk of landslide susceptibility (**EIAR Appendix 8.1, Appendix H**).

  The use of check dams will help to reduce the velocity of run-off and the potential for erosion of drains (**EIAR Appendix 9.6 – Tiles 3 – 6**).

Risk of Landslide

Temporary storage areas are limited to within the infrastructure outline or within identified temporary storage areas. Landslide risk within the temporary storage areas is low. Temporary storage areas are within areas of low landslide susceptibility (GSI), are relatively flat, peat/soil depth is shallow with extensive bedrock outcrops also. The risk of a significant landslide event in terms of either a peat landslide or other geological movements e.g., circular slips, occurring at identified temporary storage locations is low.

With the full and proper implementation of the above-mentioned mitigation measures as part of the Active Construction Water Management Plan (**EIAR Appendix 9.6 Tile 7, 8 and 9)** which include:

- silt fencing,
- temporary drainage,
- monitoring,
- emergency intervention,
- plastic sheeting,
- avoiding receptors and buffers and,
- avoiding areas of Moderately High and High risk of landslides,

these are sufficient to prevent a landslide risk at the proposed temporary stockpile locations.

5 RFI ITEM 7 - PEAT STABILITY

During the scoping period the Department of Culture, Heritage and the Gaeltacht requested a thorough geotechnical stability risk and hydrogeological assessment, in areas of relatively deep peat soil, not just for turbine foundations, but also for access roads, borrow pits, drains, etc. It was noted in this submission that there are a number of cases of peat slides during upland wind-farm construction, and the scientific investigations of the causes of these should be taken into account in the EIAR.

Table 13 of the Peat Stability and Geotechnical Assessment notes acceptable peat stability at all turbines, with the exception of minor isolated pockets of deeper peat at T1, T6, T7, T11, T12, T13, T14 and Borrow Pit B.

Appendix 8.1 of the EAIR includes a Peat/soil stability risk assessment. Appendix H of this assessment further illustrates areas where peat stability risk is moderate to high. This stability risk matrices and ratings records a high-risk rating (accounting for distance to sensitive receptors) at T2, T12 and T13 with moderate risk Factor of Safety for peat stability at other locations.

From the information in the EIAR (Chapter 8 and Appendix 8.1) and the proposed location of turbines on steep inclines where there are pockets of deep peat, the Board considers that the submitted information does not definitely conclude no potential for impact on the hydrology and drainage on the site.

The Board notes that Section 8.5.2.5.4 of the EIAR states that peat stability monitoring programme will be undertaken in line with The Scottish Government (2017) "Peat Landslide Hazard and Risk Assessments: Best Practice Guide for Proposed Electricity Developments" Energy Consents Unit Scottish Government, whilst the Peat Stability and Geotechnical Assessment was undertaken in line with this guidance. This best practice guidance states that where the risk level for a zone is medium to high, avoidance or specification of mitigation measures would normally be the only measure by which the project can be considered.

Having regard to the above and to allow the Board to fully understand the impact on peat stability, the applicant is requested to submit site specific information for those areas considered at risk and/or with pockets of deep peat. The information submitted shall be presented in Chapter 8 of the EIAR in tabular format and include for T1, T2, T6, T7, T11, T12, T13, T14 and Borrow Pit B:

(a) Peat depth (including all areas over 2m)

(b) Peat Stability (including Factor of Safety for pockets of deeper peat).

(c) Alteration of Table 17 (Appendix 8.1) to include specific mitigation measures proposed for those areas with potential for localized stability issues.

(d) Details of all practices in place to ensure that any areas identified as having high stability risk per the GSI Landslide Susceptibility model will be avoided during construction.

(e) Any further site investigations required as per recommendation 4 in Section 6 of the Peat Stability and Geotechnical Assessment.

(f) Any site-specific mitigation measures proposed having regard to the location of each turbine and the Factor of Safety.

(g) A breakdown of the risk ranking and suggested actions for each of the above locations, with specific reference to Table 5.4 of the Peat Landslide Hazard and Risk Assessments: Best Practice Guide for Proposed Electricity Developments.

The applicant shall also confirm if the proposed access roads or construction traffic will be in areas as having high stability risk per the GSI Landslide Susceptibility or as ranked in the Peat Stability Assessment.

5.1 Statement of Authority

This response was prepared by the author of EIAR Chapter 8: Soils and Geology and Chapter 9: Hydrology and Hydrogeology, Sven Klinkenbergh.

Sven is a Project Manager/Environmental Consultant with over eight years' experience. He has obtained a Post Graduate Diploma in Environmental Protection from IT Sligo (2020) and a Bachelor of Science in Environmental Science from IT Sligo (2013).

Sven is a specialist in Hydrology, Hydrogeology, Land, Soils and Geology, Environmental Impact Assessment Reporting and associated field investigations. Sven has multiple years' worth of experience in Environmental Monitoring with a focus on surface water and groundwater in addition to soil classification as waste / bi-product. With a background in project management, Sven has carried out multiple Flood Risk Assessments (Stage 1) as well as Peat and Slope Stability Risk Assessments.

5.2 Response to RFI Item 7

(a) The peat depths at each of the main infrastructure units is presented in the modified **Table 17** below. It must be noted that, in general, peat depth at the Site is shallow, with some isolated pockets of deeper / deep peat detected in places. It is also important to note the Site is characterised by extensive bedrock outcrops across the site particularly at higher elevations. The relationship between these two geological components (peat and bedrock outcrops) is also important to note, that is the isolated pockets of deep peat are generally confined by rock outcrops.

(b) The peat stability risk assessment results (Risk Ranking (Distance) (RR_D)) for each of the main infrastructure units is presented in the modified **Table 17** below in line with The Scottish Government (2017*)*. The Risk Ranking (Distance) (RR_D) includes Factor of Safety multiplied by receptor sensitivity coefficient, multiplied by distance to sensitive receptor coefficient. That is; raw site data is used to calculate the Factor of Safety (FoS) at a particular sampling point. The FoS indicates the likelihood of a stability issue arising at a particular point under the risk assessment model conditions. The FoS score is then considered in terms of the sensitivity of the receptor (for example, non-critical infrastructure (low), environmental receptor i.e., river (medium), or dwellings / communities (high)), the resulting risk assessment data is referred to as Risk Ranking (Significant Feature) (RR_{SF}). The RR_{SF} is then considered in terms of distance to the identified Significant Receptor, the resulting data is referred to as Risk Ranking (Distance) (RR_D). This process considers the exposure of receptors in terms of stability. The RR_D risk assessment score presents the risk ranking in terms of consequences if stability issues were to occur.

Risk is defined as the likelihood times the magnitude of potential consequence, therefore the RR_D score presented in the qualified risk at a particular point, however it is important to note that at locations in close proximity to receptors e.g., within surface water buffer zones, the RR_D can be elevated by the short distance to the receptor despite the FoS potentially being acceptable or marginally stable. Therefore, it is important to consider all results of the peat stability risk assessment in terms of interpretating site conditions and providing summary conclusions. For example, at a location within a surface water buffer zone (50m), peat stability data can indicate acceptable or marginally stable FoS, but due to the close proximity of the receptor in the unlikely event a landslide does occur, the consequences are likely to be significant. This is true of any ground disturbing activity within close proximity to sensitive receptors such as rivers, and therefore proper care, panning and mitigation is

required in such areas, and all areas of the site to ensure all eventualities are covered and mitigated.

The numerical data resulting from the stability risk assessment numerical model has limitations and must be considered along with other site data and site understanding. In turn, the overall data and baseline description is interpretated, and in some instances 'outlier' or 'anomalous' data must be rationalised. In some instances, this will include where unfavourable FoS is observed. The Site possesses extensive areas characterised as having generally shallow peat, with extensive bedrock outcrops, but with elevated stability risk at sampling points associated with isolated pockets of deep peat. It is important to interpret this situation in full and not depend solely on the numerical data. That is; the FoS for isolated pockets of deep peat will likely be elevated at sampling points due to the increased mass input to the numerical system for those sampling points.

The stability risk assessment methodology uses a formula which does not consider toe or peak forces acting on the mass (keeping the mass in place), therefore it is important to consider the fact that the actual conditions include shallow bedrock and minimal continuous masses of deeper peat, and therefore, despite some indicators of unfavourable FoS, all considered and interpretated, **the general risk of a significant peat landslide occurring at the Site as a function of the development is low**.

Notwithstanding, isolated pockets of deep peat present local stability challenges which must be considered and mitigated, similar to all excavations in all soil types. This is compounded by proximity to receptor, whereby regardless of FoS (likelihood) the stability risk (likelihood x consequence) to receptors is elevated when in close proximity to those receptors, particularly within receptor buffer zones. As such, regardless of risk, mitigation will be applied to all construction activities, and are escalated within receptor buffer zones. A good example to emphasise this is presented in the following (in **Appendix E**):

- 603679 Gortyrahilly WF RFI Response Subject: Clarifying Stability Risk Assessment Results and Interpretation (Ref. EIAR Chapter 8 – Appendix 8.1 – Appendix A-1 and Appendix H(c)). (SK 20/09/23) (File Ref. 603679 (00) RFI Response Graphics.ppt) (Print A3)
- 603679 Gortyrahilly WF RFI Response Subject: Clarifying Stability Risk Assessment Results and Interpretation – T13 (Ref. EIAR Chapter 8 – Appendix 8.1 – Appendix A-1 and Appendix H(c)). (SK 20/09/23) (File Ref. 603679 (00) RFI Response Graphics.ppt) (Print A3)

(c) The following table (modified from **Table 17 Appendix 8.1**) includes the specific mitigation measures (as set out in the EIAR) at each part of the site to reduce the stability risk factor to negligible or low.

For the purpose of populating **Table 17**, mitigation measures are grouped in the following categories and referred to in the "Risk Reduction Factors Columns within the table):

A. Mitigation by avoidance – locating turbines in areas where the existing infrastructure is utilised, peat is shallow, and the topography is favourable **(EIAR Chapter 8, Section 8.5.2.2.1**). The EIAR process facilitated a phased approach to site assessment and surveys and layout iterations. This design process allowed for the identification of high-risk areas, geo-hazards and constraints, and for the Development layout to avoid these areas.
B. Drainage – suitably engineered drainage for peat/soil excavation and management of arisings (**EIAR Chapter 8, Section 8.5.2.5.1**)
C. Storage of stockpiles - limit height of stockpiles to 1 m within the development footprint (infrastructure outline). Higher stockpiling will be risk assessed in designated temporary storage areas (**EIAR Chapter 8, Section 8.5.2.5.1**).
D. Monitoring (peat particularly in areas >1 m; groundwater & drainage, meteorological) (**EIAR Chapter 8, Sections 8.5.2.5.1 and 8.5.2.5.4**, **Chapter 9, Sections 9.5.2.3 - 9.5.2.5**)
E. Limit vehicular movements to the development footprint (infrastructure outline) (**EIAR Chapter 8, Section 8.5.2.5.1**).
F. Supervising geotechnical engineer. This will include applying appropriate engineering controls as necessary (**EIAR Chapter 8, Section 8.5.2.2.2**).
G. Establish an emergency framework, CEMP, RAMS, onsite training and toolbox talks (**EIAR Chapter 8, Section 8.5.2.5.4**)

It is important to note mitigation measures prescribed in the EIAR and applied in Development management plans (CEMP, SWMP) are aimed to assess the residual effect of the Development and equip the eventual contracted construction companies with the methodology to achieve the expected residual effects of the Development. It is noted in the EIAR and in this response that the process of construction and mitigation will be a dynamic process. The process will be monitored, and mitigation escalated depending on observed site conditions as necessary. Mitigation will include careful consideration and planning for sensitive aspects of the construction phase, and those details will be included in an updated onsite CEMP and SWMP prior to the commencement of construction works as part of the

detailed design phase. Detailed design will therefore include detailed dig plans, detailed monitoring plans, detailed design of excavation and drainage engineered controls, etc.

With reference to **EIAR Chapter 8 – Appendix 8.1 GWF SI Report – Section 4.5 – Table 13**, interpretation and commentary on residual hazards at each infrastructure unit is included. Where anomalous FoS data is observed additional text is included characterising site conditions. Similarly, residual hazards identified will be addressed with relevant mitigation measures including avoiding high risk areas, and localised stability issues.

Modified Table 17 (Appendix 8.1) with peat depth, and risk level and mitigation at main infrastructure units

Turbine No. / Unit	Peat depth	Pre mitigation				Risk Reduction Factors							Post mitigation		
		Peat (RRD)	Subsoil (RRD)	Exposure	Risk Category	A	B	C	D	E	F	G	Geohazard Ranking	Exposure	Risk factor
T1	0.01-3.5m	Very low	Low	3	Low to Medium	Y	Y	Y	Y	Y	Y	Y	Very Low	3	Low
T2	0.01-2m	Very low	Low	3	Low to Medium	Y	Y	Y	Y	Y	Y	Y	Very Low	3	Low
T3	0.01-0.5m	Very low	Very Low	1	Negligible	Y	Y	Y	Y	Y	Y	Y	Very Low	1	Negligible
T4	0.01-3.5m	Very low	Low	1	Negligible to Low	Y	Y	Y	Y	Y	Y	Y	Very Low	1	Negligible to Low
T5	Bedrock	Very low	Low	1	Negligible	Y	Y	Y	Y	Y	Y	Y	Very Low	1	Negligible
T6	0.01-3.5m	Low	Low	1	Negligible to Low	Y	Y	Y	Y	Y	Y	Y	Very Low	1	Negligible to Low
T7	0.01-2m	Low	Very Low	1	Negligible to Low	Y	Y	Y	Y	Y	Y	Y	Very Low	1	Negligible to Low
T8	0.01-2m	Very low	Very Low	1	Negligible	Y	Y	Y	Y	Y	Y	Y	Very Low	1	Negligible
T9	0.01-0.5m	Very low	Very Low	1	Negligible	Y	Y	Y	Y	Y	Y	Y	Very Low	1	Negligible
T10	0.01-2m	Very low	Very Low	1	Negligible	Y	Y	Y	Y	Y	Y	Y	Very Low	1	Negligible
T11	0.01-2m	Low	Low to Moderate	3	Low to Medium	Y	Y	Y	Y	Y	Y	Y	Low	3	Low
T12	0.01-0.5m	Moderate to High	Low to Moderate	4	Medium to high	Y	Y	Y	Y	Y	Y	Y	Low	4	Low
T13	0.01-2m	Very low to Low	Low to Moderate	3	Medium	Y	Y	Y	Y	Y	Y	Y	Low	3	Low

Turbine No. / Unit	Peat depth	Pre mitigation				Risk Reduction Factors							Post mitigation		
		Peat (RRD)	Subsoil (RRD)	Exposure	Risk Category	A	B	C	D	E	F	G	Geohazard Ranking	Exposure	Risk factor
T14*	0.01-0.5 m	Very Low to High	Low to Moderate	3	Medium	Y	Y	Y	Y	Y	Y	Y	Low	3	Low
Substation	0.01-0.5 m	Low	Very Low to High	1	Negligible to Low	Y	Y	Y	Y	Y	Y	Y	Very Low	1	Negligible to Low
Met Mast*	Bedrock	Low to High	Low	3	Medium	Y	Y	Y	Y	Y	Y	Y	Low	3	Low
Borrow Pit A	0.01-2 m	Low	Very Low	1	Negligible to Low	Y	Y	Y	Y	Y	Y	Y	Very Low	1	Negligible to Low
Borrow Pit B	0.5-3.5 m	Very Low to Moderate	Low	1	Negligible to Low	Y	Y	Y	Y	Y	Y	Y	Very Low	1	Negligible to Low

* Inferred location – Data inferred from neighbouring sampling points where appropriate to do so.

(d) The first practice to ensure avoidance of any areas identified as having high stability risk as per the GSI Landslide Susceptibility model is mitigation by avoidance whereby the proposed turbines and infrastructure layout was dictated to a large degree by the peat depths and the topography, locating turbines and site roads and ancillary infrastructure where peat is shallow, and the topography is favourable, that is; avoiding areas of elevated or high risk.

The risk of a major landslide or mass movement to occur as a function of the Development at the Site is low (**EIAR Appendix 8.1**). But the areas, both of which are outside of the Development footprint, which have been identified as particularly sensitive include (**Chapter 9 Section 9.5.1.3**) the following:

- The portion of the Site north of T1 and T2. This area possesses high landslide susceptibility (GSI), extensive existing drainage channels, evidence of deeply eroded drainage channels in till with evidence of iron pan.
- The portion of the Site north of T12. This area is characterised similar to the above scenario but without deep till deposits.

It is noted that these areas are within the Development red line boundary and will be control by the Developer.

In both areas the Turbine Hardstands and associated drainage will divert runoff away from these higher risk areas with the drainage designed to divert to more favourable areas. As discussed above, a range of other mitigation and good practice procedures include, *inter alia*; limiting vehicular movements to the Development footprint (Infrastructure Outline) or areas of low risk, for example, areas identified as suitable temporary stockpiles or areas which avoid identified geo-hazards / constraints. Careful planning, ongoing monitoring including by a competent geologist / geo-engineer, and adaptive mitigation including escalating emergency response as necessary will ensure that excavations and management of peat/soils/rock will be managed with a view to minimising disturbance, minimise localised stability issues, and ensure areas identified as being high risk are not impacted in terms of stability.

(e) The recommendation for further site investigation in Section 6 of **EIAR Appendix 8.1** is a consideration for confirming investigations prior to construction commencing at the Development in line with best practice. This will include boreholes and geophysics. Based on the results, the thickness at the hardstands and site tracks can be refined to suit local conditions. Additional site investigation will also serve to refine construction plans and methodology in terms of refining excavation quantities, detailed dig plans, detailed

temporary storage and drainage design, and other details which will inform the detailed design of the Development including mitigation and inform the chosen contractor and associated competent supervisors (geological / EnvCoW) in terms of detailing phases and sequence of the construction phase.

(f) The Factor of Safety considers the depth, quality/composition, moisture content, surface topography, shear strength and bulk weight of the peat / subsoil. The Factor of Safety adjusted considers the history of landslides at the proposed Site, the topology of the substrate compared to the surface topology. The Factor of Safety at peat probe locations on the Gortyrahilly site is generally acceptable with the exception of marginally stable / unstable point locations associated with isolated deeper peat and/or steeper inclines (the locations of which are shown in **EIAR Appendix H (a – c)** of **EIAR Appendix 8.1)**. The Factor of Safety at trial pit locations on the Gortyrahilly site is 'Acceptable' (Factor of Safety (FoS) values of 1.0 or greater). As discussed previously, the Factor of Safety at the Site is generally acceptable, and where unfavourable data is observed at infrastructure units, interpretation of all relevant data indicates that those particular locations are generally associated with isolated deeper pockets of peat, and/or elevated incline. As noted, the Site is characterised as having generally shallow peat and is low risk in terms of a significant peat slide occurring, and residual hazards in terms of localised stability during excavation works will be managed and mitigated using a broad suite of measures including monitoring and dynamic application.

As discussed above in response to RFI Item 7 Point (c), the proposed Development infrastructure layout is designed to avoid areas with increased risk following the identification of geohazards. This was done through mitigation by design and mitigation by avoidance. In areas which are adjacent to geohazards, monitoring by competent supervisors (geological, EnvCoW) will be conducted and localised stability, dewatering and runoff quality issues will be managed in real time and mitigation escalated where necessary to achieve the objective of mitigation and expected residual effects. Mitigation specific to particular infrastructure units include special considerations for the drainage design (**Management Plan 2: Surface Water Management Plan (SWMP) of EIAR Appendix 2.1**) whereby runoff will be diverted from the hardstand and away from elevated risk areas including in terms of stability of proximity to surface water receptors. This is also true of any excavation dewatering, construction water management and temporary storage locations. Construction works will not occur during or immediately after storm events and there will also be constant monitoring during construction activities. Temporary stockpiles will be

limited to areas of low risk and 1 m height in constrained areas (within infrastructure outline) (shown in the drawings provided in **Appendix E**).

(g) The modified Table 17 of EIAR Appendix 8.1 (response (c) provided above) includes the pre mitigation risk ranking and suggested mitigation measures to reduce the risk to negligible to low in line with the *Peat Landslide Hazard and Risk Assessments: Best Practice Guide for Proposed Electricity Developments*. The Guidance indicates that the Development is acceptable with the proposed monitoring and mitigation of peat landslide hazards as set out above and in the EIAR.

The proposed access tracks have been assessed using inferred peat thickness and RR_D for peat and subsoil stability and consideration of proximity to geohazards to assess the risk category pre and post mitigation taking into account the proximity to sensitive receptors. This is notwithstanding the requirements for all mitigation measures outlined in the EIAR and discussed further in this report, including; monitoring by competent supervisors (geological, EnvCoW), emergency response and escalation of mitigation, dynamic management of localised stability and runoff quality.

As presented in **EIAR Chapter 8 – Appendix 8.1 GWF SI Report**, namely **Appendix H – Geo-Hazards,** the Development footprint (infrastructure outline) avoids areas mapped (GSI) as having High Landslide Susceptibility. This includes proposed tracks and ancillary infrastructure such as Borrow Pits etc.

The following table shows the peat depth, risk level and mitigation measures for the portions of the proposed access tracks (between infrastructure units). The assessment of which follow the Turbine Unit (**Response to RFI Item 7 (c)**) in line with The Scottish Government (2017) "Peat Landslide Hazard and Risk Assessments: Best Practice Guide for Proposed Electricity Developments".

Table with peat depth, and risk level and mitigation inferred for portions of the proposed track.

Turbine No. / Unit	Peat depth	Pre mitigation				Risk Reduction Factors							Post mitigation		
		Peat (RRD)	Subsoil (RRD)	Exposure	Risk Category	A	B	C	D	E	F	G	Hazard Ranking	Exposure	Risk factor
T9 - T8	1 m	Low	Low	1	Negligible to Low	Y	Y	Y	Y	Y	Y	Y	Very Low	1	Negligible to Low
T2-T1	0-1 m	Low	Low	3	Low to Medium	Y	Y	Y	Y	Y	Y	Y	Very Low	3	Low
T4-T5	0-2 m	Low	Low	1	Low	Y	Y	Y	Y	Y	Y	Y	Very Low	1	Negligible to Low
T7-T6-T11	0-2.6 m	Low to moderate	Low to moderate	2	Low to Medium	Y	Y	Y	Y	Y	Y	Y	Low	2	Low
T11-T14-T13	0-1.5 m	Low to high	Low to moderate	3	Medium	Y	Y	Y	Y	Y	Y	Y	Low	3	Low
T13-T12-T10	0-2 m	Low to high	Low to moderate	4	Medium to high	Y	Y	Y	Y	Y	Y	Y	Low	4	Low

6 RFI ITEM 8 - IRISH WATER

The submission received from Uisce Éireann (Irish Water) has raised concerns in relation to the information contained in the EIAR, in particular Chapter 9. The applicant is requested to submit a response to those issues raised in this submission (as summarized below).

(a) Provide details of any the assimilative capacity in the receiving waters, based on the 95%ile flow statistic, that may be impacted by the proposed development.

(b) Provide details of any baseline data for organic carbon (dissolved, particulate, or total) all of which have the capacity to impact the treatability of raw drinking water. In addition, include evidence to ensure the Board is satisfied that any dissolved organic carbon (DOC) will not have an adverse effect on drinking water.

(c) Provide an assessment of the proposed development in relation to the potential impact on the operational treatment of any treatment systems and the implications it may have for Trihalomethanes (THMs).

(d) Provide details of the potential for a pollution episode during the construction phase which may deliver high organic matter and the implications for the operation of any water treatment infrastructure.

(e) Outline and assess the implications on water treatment having regard to dissolved organic carbon (DOC) and particulate organic carbon (POC) losses.

6.1 Statement of Authority

This response was prepared by the author of EIAR Chapter 8: Soils and Geology and Chapter 9: Hydrology and Hydrogeology, Sven Klinkenbergh.

Sven is a Project Manager/Environmental Consultant with over eight years' experience. He has obtained a Post Graduate Diploma in Environmental Protection from IT Sligo (2020) and a Bachelor of Science in Environmental Science from IT Sligo (2013).

Sven is a specialist in Hydrology, Hydrogeology, Land, Soils and Geology, Environmental Impact Assessment Reporting and associated field investigations. Sven has multiple years' worth of experience in Environmental Monitoring with a focus on surface water and groundwater in addition to soil classification as waste / bi-product. With a background in project management, Sven has

carried out multiple Flood Risk Assessments (Stage 1) as well as Peat and Slope Stability Risk Assessments.

6.2 Response to RFI Item 8

(a)

Direct discharge into the receiving surface water network is an EPA licenced activity and is not proposed. Assessment of assimilative capacity would be required where a discharge licence is required.

There is one surface water body within the redline boundary which is designated for drinking water (**EIAR Figure 9.7b**) viz. the River Lee (Lee (Cork) 030 IE_SW_19L030200) is located to the south east of the Site and is and has an WFD status as 'not at risk'. This designation continues along the Lee (Cork) river up to Lough Allua. Lough Allua is not designated for drinking water however the lake discharges to the downstream section of the Lee (Cork) 030 river which is designated for drinking water.

The closest downstream water treatment facility associated with the above-mentioned river is Ballingeary Water Supply Scheme, which is located in the town of Ballingeary, 6 km south of Site. There are multiple tributaries which are designated as drinking water rivers feeding into this location. It is noted that only one of the three rivers are associated with draining the site. This represents c. 15% of the catchment draining to the water treatment plant.

There are other drinking water designations in neighbouring catchments but downstream from the site, for example, the Toon 010 river, which drains some southern portions of the site, flows into the Lee (Cork) 050 river approximately eight kilometres east of the site. The Lee (Cork) 050 river continues east and flows into Carrigadrohid Reservoir and Inniscarra Reservoir which are not designated however the reservoir discharges to the downstream section of the Lee (Cork) river (090) which is designated for drinking water. The Lee (Cork) 050 has a WFD status as 'not at risk' but further downstream the Lee (Cork) 090 has a WFD status as 'at risk'.

The next downstream water treatment plant is the Lee Road Water Treatment Facility (under construction) approximately 50 km east of the Site, which there are a number of rivers feeding into.

No extracted or pumped water will be discharged directly to the existing drainage or surface water network associated with the Site (This is in accordance with the Local Government (Water Pollution) Act, 1977 as amended). It is noted that all runoff on the Site will eventually discharge to the receiving surface water network, however with appropriate management the quality of runoff discharging to the surface water network via the proposed drainage system, the quality will be acceptable e.g., <25 mg/L Suspended Solids as per the European Communities (Quality of Salmonid Water) Regulations 1988. In terms of water quality, the objective of mitigating measures to mapped surface water bodies will be to ensure no more than neutral to temporary slight adverse effects occur throughout construction, operation and decommissioning phases.

Surface water runoff will be controlled using an established drainage network and Surface Water Management Plan (**Appendix 2.1 CEMP Management Plan 3**). All mitigation measures will be implemented to avoid and/or minimise any potential adverse impacts to water quality in the receiving surface water network. Including the prescription of surface water and groundwater buffer zones as is in line with relevant guidance relating to forestry, agriculture, water resources, direct discharges and wind farm development guidance documents (**EIAR Chapter 9, Section 9.5.1.3**). Monitoring and emergency management planning will allow for the detection of temporary, accidental and minor releases of runoff. This will maintain the baseline hydrological and drainage regime at the Site.

The Development will not impact on assimilative capacity. The assimilative capacity of the receiving surface water network will not be relied upon as a mitigation measure for water quality. However, it is worthwhile noting that the closest downstream water treatment facility (approximately 6km downstream) is fed by three no. tributaries, only one of which is associated with draining the site representing c. 15% of the overall catchment. Considering the relatively broad catchment for the treatment facility relative to the Development site area, and the distance downstream in the catchment, assimilative capacity of the receiving surface water network will likely reduce any potential effect arising at the Site, which are anticipated to be slight i.e., an effect which causes noticeable (measurable) changes in the character of the environment without affecting its sensitivities (ecological attributes or resources).

(b)

Peatlands emit carbon on an ongoing basis through two principal mechanisms: to atmosphere (methane) and as particulate or dissolved carbon in runoff. Therefore, in a peatland environment it is normal to see dissolved organic carbon in the runoff / river water associated with the area.

"Peatland drainage has been identified as a primary driver of environmental degradation with a cascade of impacts: greenhouse gas emissions, biodiversity loss, increased fire frequency, land

degradation and not least, increased carbon loss and nutrient leaching via water (Biancalani & Avagyan, 2014)"

Baseline conditions at the Site include extensive peatland degradation, including extensive existing drainage channels. To maintain the baseline hydrological regime, mitigation measures including implementing buffer zones, adopting an appropriate drainage network and reusing excavated material immediately where practical to reduce the need to stockpile material (**Appendix 2.1, Management Plan 3 Surface Water Management Plan and 4 Peat and Spoil Management Plan**).

The colour and turbidity are a good indication of the level of DOC in the water. It is noted that in samples obtained at SW6 (Toon 010) Apparent Colour (Platinum Cobalt (Pt/Co) Scale) ranges from 11.2 to 74.3 mg/l Pt/Co, and Turbidity 0.343 to 6.16 ntu. On site water quality monitoring particularly after dry periods where an increase in colour is likely will provide mitigation for treatment should the level of DOC rise above baseline conditions.

During the operational phase of the Development, effects on water quality are anticipated to be neutral to beneficial. Beneficial effects are attributed largely to the fact that all proposed Sustainable Drainage Systems (SuDS) (check dams, stilling ponds) will provide passive treatment to water quality and therefore an improvement compared to baseline conditions.
The proposed Development will not cause a decline in water quality in surface waters or drinking water. A neutral effect is anticipated, with the potential for temporary slight adverse effects during the construction phase only.

(c)
The formation of Trihalomethanes (THMs) in drinking water occurs as a result of chlorination of organic matter present in raw water supplies.

As discussed in previous sections, the baseline concentration range for Colour and Turbidity ranges up to a peak of 73 mg/l Pt/Co and 6.16 ntu respectively (SW6). It is noted that the corresponding TSS values are generally below the limit of detection of <2 mg/L, with the exception of the peak in range which has a corresponding TSS value of 2.95 mg/L, far less than the prescribed threshold or Environmental Quality Standard for TSS of 25.0 mg/L.

It is noted that the Surface Water Regulation 'limit' for Colour and turbidity is "Acceptable to consumers and no abnormal change", the limit for Colour under WHO guidance is 5 ntu, therefore

the requirement to remove these baseline concentrations (DOC/POC/TSS (generating Colour and Turbidity)) from runoff associated with the site is part of baseline conditions in the catchment.

The levels of DOC or TSS cannot be monitored in real time, however colour and turbidity can be monitored in real time and are a good indicator of DOC, TSS and water quality generally. Colour and turbidity will be monitored on site as outlined above in Response to RFI Item 8(b). Variations in runoff hydrochemistry data will be monitored and where significant variations from baseline conditions occur mitigation will be escalated. Further details in the following sections in relation to pollution incident control. Therefore, the Development will not cause a significant decline in surface water or drinking water quality, on downstream water resources or water treatment facilities when appropriate mitigation measures are implemented.

(d)

As discussed previously, the anticipated effects of the Development on water quality (including high organic matter discharge) range from neutral to temporary slight adverse during the construction phase, and neutral to beneficial during the operational phase.

If activities such as excavation, storage and reuse of peat during the construction phase (as outlined in **EIAR Chapter 9, Section 9.4.5.1**) are left unmitigated, it is possible for there to be an impact of the surface water network associated with and downstream the Development. A pollution event due to increased runoff, or an increased hydrological response to rainfall could lead to a high volume of high organic matter becoming intercepted by surface water networks associated with the Development. In the event of a large increase in organic matter, water quality in the receiving surface water body and use of that water as a drinking water resource would be significantly adversely affected. Without water quality monitoring, water with high levels of organic matter, designated for drinking could lead to significant negative effects at water treatment facilities which may be unable to remove it. However as stated, these significant effects such as uncontrolled runoff from a temporary peat stockpile will not occur as a result of the Development as the proposed appropriate environmental engineering controls and mitigation measures, will mitigate potential effects.

As outlined in **EIAR Chapter 9, Section 9.5.2.12** monitoring of pollution prevention and mitigation undertaken by the Environmental Clerk of Works (ECoW) assigned by the Developer will include:

- Monitoring site pollution prevention plan.
- Water quality monitoring. This will include monitoring or suspended solids, turbidity, colour, and other useful hadrochemical parameters where necessary.

- Advising on required pollution prevention measures (as described in this EIAR) and monitoring their effectiveness.
- Where necessary construction water will be actively managed. This includes intercepting runoff, diverting to mobile water treatment facilities, and discharging to favourable areas of the site (for example, discharging to a vegetated area and allowing infiltration to ground and further attenuation through kinetic storage within vegetation itself). Where necessary the treatment facility will include dosing with coagulant to promote the settlement of suspended solids and removal of humic and fulvic acids, but similarly other treatment techniques can be implemented such as activated carbon filtration or activated carbon dosing to remove and reduce dissolved contaminants / pollutants.
- Liaison with local authorities in relation to pollution instances if applicable.

In addition to this, an emergency response plan has been prepared as part of the EIAR as Management Plan 1 of **EIAR Appendix 2.1: Construction Environmental Management Plan**.

With the full and proper implementation of the above mitigation measures, the potential for a significant pollution episode during the construction phase which may deliver high organic matter such as unmitigated drainage from a temporary peat stockpile is unlikely to occur. This combined with the assimilative capacity between the site and the downstream water treatment facility (Ballingeary) means the likelihood or risk of significantly effecting the operation of any water treatment infrastructure is low or not significant.

(e)

As discussed previously, the level of DOC and colour will be monitored on Site. Dissolved Organic Carbon (DOC) or Particulate Organic Carbon (POC) is present in surface water draining peatland areas and is likely part of baseline conditions at the Site, particularly when considering the extensive degradation of peatland at the Site. Through successful implementation of mitigation measures, the residual effects of the Development will not include significantly contribute DOC or POC to receiving surface water bodies. The Development will therefore not have significant effects on downstream water resources or water treatment facilities.

7 RFI ITEM 9 - AVIAN SPECIES

The Board received a submission from the Department of Housing, Local Government and Heritage (DHLGH) in relation to the impact of the proposed development on several species listed in Annex I of the EU Birds Directive. The DHLGH recommended that further information be sought on, inter alia,

(a) The impact on breeding meirliúin (Merlin),

(b) Impact on wintering feadóg shlébhe.

(c) Impact on iolar mara (White Tailed Eagle) (removal of sheep carcasses and location of T1, T2, T7, T10 and T12 on steep inclines).

(d) Impact on screachóg reilige (Barn Owl) and its emission from chapter 7 of the EIAR,

(e) Impact on the cearc fhraoigh (Red Grouse),

(f) Impact on ialtóg leisler (Leisler's Bat),

(g) Summary of the ecological mitigations.

It is also noted that concerns have been raised in relation to the impact of Avian Species by the Ecology Section of Cork County Council, inter alia,

(a) *Impact on the Golden Plover and Whooper Swan,*

(b) *Cumulative Impact of birds redirecting towards the proposed development due to other wind farm locations,*

(c) *The additional impact on the iolar mara (White-Sea Eagle) population having regard to avian flu.*

The applicant shall submit a detailed response to both the DHLGH submission and the Cork County Council submission in relation to the potential impact on the above Avian species.

7.1 Statement of Authority

This response was prepared by the author of EIAR Chapter 5: Terrestrial Ecology and EIAR Chapter 7: Ornithology, Dr. Brian Madden.

Brian Madden graduated in Natural Sciences from the University of Dublin in 1984 and earned a Ph.D. degree in 1990 from the National University of Ireland for his research on ecosystem processes in Mongan Bog, a raised bog in Co. Offaly (research work sponsored by Bord na Móna and Royal Irish Academy). Since then, he has carried out botanical surveys and habitat assessments for most terrestrial habitats which occur on the island of Ireland.

Brian is an experienced ornithologist, with particular interests in birds of prey and wetland birds. He has published a range of research papers, including papers on the birds of Mongan Bog, the impacts of wind farms on Hen Harriers, and the status of the Peregrine Falcon in Ireland.

Brian is the principal ecologist with BioSphere Environmental Services and is the main contact between the consultancy and the client.

7.2 Part A: DHLGH Submission, Response

The impact on breeding meirliúin (merlin)

Item 1a of the DHLGH recommendation for further information (pg. 7) states as follows:

a) The lowest height of the wind turbine blades at Smola wind farm in Norway, where four merlins were killed by collision;

As noted by DHLGH, Watson et al. (2018) reported four merlin collisions at the Smøla wind farm, though the details and circumstances of the occurrence of the four merlin collisions are not given in the source paper.

Smøla wind farm is owned and operated by Statkraft. The Statkraft website[6] provides the turbine dimensions for Smøla as rotor diameter of 76 to 82.4 m and towers 70 m high. These dimensions would give an estimated lowest rotor sweep of 28.8 m above ground level (which answers the specific query raised by DHLGH "*The height of the lowest turbine-tip at the Smola wind farm has not been ascertained*"). This rotor sweep is within the range (25 m – 36 m) for the candidate turbines at Gortyrahilly as shown in Fig. 1.4 of EIAR (it is noted that a figure of 74 m is incorrectly given as the lowest height of the rotor sweep on page 4 of the DHLGH submission).

Notwithstanding the four reported merlin collision casualties from the Smøla Wind Farm, the available evidence from monitoring studies, including the US study by Diffendorfer *et al*. (2021) as referenced in the DHLGH submission, indicate that merlin is not in the high-risk collision category. The CRM carried out for Gortyrahilly project further supports the evidence that merlin is not in the high-risk collision category, with an estimate of 0.025 collisions per year or 1 bird every 33 years (see EIAR Section &.4.1.1 Collision). Thus, the significance of the effect of risk of collision to Merlin as a result of the project is given as a Slight, Negative, Long-term Effect.

Item 1b of the DHLGH recommendation (regarding merlin) for further information (pg. 7) is as follows:

b) An estimate of the disturbance displacement of merlin from hunting habitat due to the wind farm;

On page 5 of their submission, DHGLG specifically refer to disturbance displacement of breeding merlin while foraging or during the sensitive egg-laying period.

[6] https://www.statkraft.com/about-statkraft/where-we-operate/norway/smola-wind-farm/

In response to the DHGLG query, for completeness, the issue of disturbance/displacement to breeding merlin is addressed during both the construction and operational phases of the project.

The issue of disturbance to breeding merlin during the construction phase was addressed in Section 7.4.2.2 of EIAR "Disturbance to breeding birds during construction".

NatureScot published (in 2022) "*Disturbance Distances Review: An updated literature review of disturbance distances of selected bird species*" (NatureScot Research Report 1283) prepared by Goodship and Furness. The 2022 publication included 65 bird species. This updated review (since Ruddock & Whitfield 2007) rated merlin as of 'medium sensitivity' to disturbance, with a buffer zone of 300-500 m from construction works (including felling) suggested for breeding birds.
The recommended disturbance distance of 500 m for merlin was applied in the Gortyrahilly EIAR, and the potential effect of the project on the species was predicted to be "Significant Adverse Effect of Short-term Duration".

In Section 7.5.1.3 of the EIAR "*Measures to minimise potential disturbance to sensitive bird species*", it is stated that a 500 m buffer zone will be established around the expected location of a merlin nesting area, and works, including tree felling, will be entirely restricted until it can be demonstrated by an ecologist that the species has completed breeding in the identified area. The location of the breeding area will be identified during pre-construction and construction phase monitoring (see Section 7.5.2.3 of EIAR).

With this mitigation in place, which follows best practice guidance, it is considered that the risk of disturbance to breeding merlin from construction works is not significant.

The potential displacement effect on birds as a result of operating turbines is discussed in section 7.4.11 of the EIAR. Displacement of birds from otherwise suitable habitat as a result of the presence of wind turbines occurs as a result of behavioural responses that prevent or decrease the use of an area for activities such as nesting or foraging. However, the results of studies on potential displacement of foraging birds has varied widely and in an overall review of the literature Madders & Whitfield (2006) concluded that displacement effects of wind turbines on raptors are negligible for the most part. While merlin was not one of the 20 species of raptors that was included in the review, four species of the genus *Falco* are included (*Falco tinnunculus, F., sparverius, F. mexicanus, F. peregrinus*) and all are given a 'Low' sensitivity to displacement value (on scale of Low / Medium / High).

Item 1c of the DHLGH recommendation (re. merlin) for further information is as follows:

c) An estimate of the loss of hunting habitat due to drying out of wetland soils as a result of the wind farm construction and drainage;

As noted by DHLGH, areas of bog and wet heath adjoining the wind farm infrastructure (hardstands, new roads etc) and the supporting drainage system may become drier as a result to disturbance to the hydrology of the peat soils. The extent of any drying effect would vary according to local conditions, such as wetness, slope etc., but could extend to several hundred metres in peatland soils (Lindsay et al. 2014)[7]. Such areas would be expected to support more vigorous growth of ling heather *Calluna vulgaris* and less development of bog mosses.

In Ireland, during the breeding season Merlin is largely associated with open and semi-open habitats, principally peat bogs, heathland and natural grassland habitats (Lusby et al. 2022)[8]. Sale (2016)[9] notes that studies in Britain have shown that dry heather moor was the most common habitat in the vicinity of Merlin nest sites as a whole, with mixed dry and wet moorland the next most common. In a detailed long-term study of the Merlin breeding population in Co. Wicklow, McElheron[10] (2005) described the hunting habitat of a pair in the Cloghoge Valley as follows: "*The Cloghoge Brook is a vast expanse of low-lying, mainly dry areas. Large tracts of heather of various ages were interspersed with pockets of rough grass and occasional patches of* Juncus." McElheron notes that the breeding habitat of Merlin in Co. Kildare is very different to that in Wicklow, with the Kildare sites consisting of rough pasture and degraded grassland on cutaway raised bogs. He notes further that in Co. Sligo, much of the habitat used by breeding Merlin was dominated by large tracts of cutaway bog and wet rough grazing.

At Gortyrahilly, while there is likely to be a localised drying effect, the vegetation within open peatland habitats will remain dominated by bog / heath species particularly heather (*Calluna vulgaris*). Based on the range of habitats used by breeding Merlin (as discussed above), and the preference in some regions for dry heather, it is considered that breeding birds would still hunt over the areas of peatland where the vegetation composition may be slightly altered by a drying effect as a result of the wind farm construction.

Item 1d of the DHLGH recommendation (re. merlin) for further information is as follows:

d) Data on whether parts of the proposed wind farm site were burned during the baseline survey years.

[7] Lindsay, R., Birnie, R. & Clough, J. (2014) IUCn UK Committee Peatland Programme Briefing Note No. 3: Impacts of Artificial Drainage on Peatlands.
[8] Lusby, J., O'Brien, I., Lauder, A., Wilson-Parr, R., Breen, D., Cummins, S. & Tierney, D. (2022) Survey of breeding Merlin in Special Protection Area network 2018. Irish Wildlife Manuals No. 139. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Ireland.
[9] Sale, R. (2016) Falcons. New Naturalist No. 132. Collins, London.
[10] McElheron, A. (2005) Merlins of the Wicklow Mountains. Currach Press, Dublin.

Apart from some evidence of recent burning between Turbines T8 and T9, we are not aware of any extensive burning episodes on site during the baseline surveys from 2017 to 2022.

The dominance of the dense, tussock-forming grass *Molinia caerulea* (purple moor-grass) over parts of the Site is indicative of past burning events.

During the operation of the wind farm, burning of the bog and heath on site will be prohibited by the wind farm operator. This will be an overall positive effect for the ecology of the site, including ground nesting breeding birds and other important species such as the Kerry slug.

Impact on wintering feadóg shléibhe (golden plover)

The DHLGH query relates to the in-combination assessment of total mortality in the region from existing, under construction and planning-granted wind farms (the submission notes that "171 turbines are listed within 20 km radius in Table 5.13") – it is noted that the DHLGH made a mis-calculation and the total number of turbines existing, under construction and planning-granted given in Table 5.13 is in fact 235 rather than 171.

RESPONSE

Upon review of the planning applications and permitted developments associated with the surrounding wind farm projects, it was found that the majority of the wind farm projects considered in the cumulative assessment had not included CRM for golden plover as opposed to Gortyrahilly Wind Farm, for which a full suite of CRM was completed. Because of the absence of CRM data for other projects, it is proposed that an extrapolation from the Gortyrahilly figure is made to get a (albeit) crude figure of the total number of birds that might be prone to collision with turbines.

On a basis of c.15 No. collisions for the 14 No. turbine Gortyrahilly Wind Farm Project (see section 7.4.1.1. EIAR & Appendix 7.17) over the lifetime of the wind farm, this gives an average of 1.07 collisions per turbine per year.

With a total of 235 turbines within a 20 km radius, the estimate of total collisions for golden plover is 251 birds per year.

While 251 collisions is a substantial number, it is still relatively low (0.27%) in the context of the estimated All-Ireland wintering population for golden plover at 92,060 birds for period 2011-12 to 2015/16 (after Burke *et al*. 2019)[11] , and the residual effect is still rated as Long-term Moderate Negative.

[11] Burke, B., Lewis, L.J., Fitzgerald, N., Frost, T., Austin, G. & Tierney, D. (2019). Estimates of waterbird numbers wintering in Ireland, 2011/12 – 2015/16. Irish Birds 41: 1-12.

Impact on iolar mara (White-tailed Eagle)

The DHLGH query relates to two issues, item 3 and Item 4 (page 8 of submission).

Item 3 reads: "*More detail on the procedure for the removal of sheep carcasses, and whether drones could be used after poor weather events in winter to assist the detection of injured or dead sheep by management. Confirmation that the search* will *be (rather than* would *be) every week, so it is a clear responsibility if conditioned*."

RESPONSE

The outline of the programme for the removal of sheep carcasses is given in the EIAR (Section 7.5.2.1). The programme will be co-ordinated by the wind farm manager and will be carried out in association with the landowners who graze sheep within the wind farm site.

The wind farm manager, or a representative when the manager is off site, will patrol the site on a given day each week to search for sheep carcasses or injured animals (often due to getting caught in wire fences). The search will be aided by the use of binoculars. As noted in section 7.5.2.1 of the EIAR, the presence of crows (principally hooded crow & raven but also magpie) gathering at a location is invariably a sign that a carcass or a dying animal is present. In addition, the manager and other regular wind farm personnel will be alert to the presence of carcasses or injured sheep whilst travelling through the wind farm on their normal business.

When a carcass is identified or an animal in distress is located, the relevant landowner will be contacted to remove the carcass or tend to the injured animal. Any costs to a landowner will be at the expense of the wind farm operator.

It is noted that a programme for the removal of carcasses and injured animals (as mitigation for White-tailed Eagle) has been in operation at the Grousemount Wind Farm since operation commenced in 2019. The proposed programme for Gortyrahilly follows the approach and method in use at Grousemount Wind Farm.

DHLGH has asked whether drones could be used after poor weather events to assist in the detection of carcasses or injured animals. It is noted that the proposed method of site coverage from the internal track system is a simple and robust approach and it is expected that there would be few situations where coverage of the site could not be achieved due to weather events. However, the latest available drone technology will be considered during the operation of the wind and if found practical to use as part of the monitoring will be adopted as a back-up when coverage by road is not possible.

It is confirmed that searches will be carried out on a weekly basis from the commencement of the operation of the wind farm to the decommissioning stage.

Item 4 reads: "*Turbines T1, T2, T7, T10, T12 appear to be located on the top of steep ridges. Assess whether models, such as that in Hanssen et al. (2020), are applicable at this wind farm in detecting microsite susceptibility to generating 'orographic lift' which may attract eagles into the rotor-swept zones of these turbines."*

RESPONSE

While the locations of Turbines T1, T2, T7, T10 & T12 are on steep ridges and may be in areas of higher 'orographic lift' relative to the remainder of the Site, the scarcity of white-tailed eagles in the Site area would not have justified the project design to consider the micro-siting of turbines to avoid such areas.

It is considered that the use of modelling of uplift from high resolution remote sensing data to inform micro-siting of turbines, as described by Hanssen et al. (2020), is appropriate in areas where there is a high breeding density of eagles, which is not the case at Gortyrahilly Wind Farm. The study by Hassen et al. was on Hitra Island, Norway. Hitra has a land area of 680.4 km^2 and its surrounding archipelago provides an important habitat for white-tailed eagles. The terrain on Hitra is relatively rugged, with 16 No. mountain peaks (the highest being 345 m above sea level). The land cover on Hitra is comprised of lakes and rivers, bogs, forests, farmland and open areas. The modelling study monitored up to 71 white tailed eagles which had been fitted with GPS backpack tracking devices as nestlings on the neighbouring island of Smøla.

In contrast, the Gortyrahilly site does not provide breeding or roosting habitats for white-tailed eagles, with only one sighting made within the wind farm site during the 24 months of systematic baseline bird activity surveys from 2017 to 2019. Hence, its status within the wind farm can only be considered as Rare. The only reason why eagles may visit the Site with any regularity is to feed on carrion and, as detailed in the EIAR, mitigation will be implemented to ensure that the presence of carrion or dying animals within the site is minimised. Even with future population increases as a result of the re-introduction programme, the possible presence of eagles within the wind farm is unlikely to increase so long as the mitigation to remove carrion is in force.

In general, it is noted that White-tailed Eagle is a large and highly mobile raptor species which can cover hundreds of kilometres in a short space of time. The eagles are versatile and opportunistic feeders and, as well as carrion, will take fish, small mammals (rabbits etc) and various bird

species. At this stage of the re-introduction programme, eagles could be expected to pass through virtually any location within the southwest region where sheep farming is practised in search of carrion.

White-tailed Sea Eagle are rare in the area and do not typically occur locally. Due to the duration and intensity of the survey effort it is to be expected that uncommon, or rarely occurring species such as these were recorded on a small number of occasions during site surveys. These are isolated records of birds of prey that do not breed in the locality and were observed very rarely on site. White tailed eagle are species that could occur in the area from time to time for foraging, but the habitats on site are not attractive for breeding of white-tailed eagle. The size of the population of the reintroduced species such as White-tailed Sea Eagle will influence the likelihood and frequency of these observations. However, it is likely that any future occurrence would also be occasional at most. In this context it is concluded that the construction, operation and decommissioning of the wind farm does not have the potential to significantly affect these infrequently occurring and highly mobile species.

Impact on screachog reilige (Barn Owl) and its emission from Chapter 7 of EIAR

DHLGH requested a clarification as to why barn owl was not considered in the EIAR as there is a 2008-11 breeding record from the 10 km grid square in which the proposed wind farm is located.

RESPONSE

While there is a barn owl breeding record in the 10 km square (W 17) in which the Gortyrahilly site is located, barn owl was not identified as a receptor as the site largely comprises heath and commercial conifer plantation, which are not habitats used regularly by barn owl. Barn owls require prey-rich hunting habitats with a plentiful supply of small mammals and are largely associated with agricultural lands. Rough grassland, species rich grassland or unmanaged grassland at the edge of fields, hedgerows and mixed woodlands are all optimal foraging habitats, with wetlands also important and in some areas cereal crops will be used (Lusby & O'Clery 2014)[12].

It should also be noted that there was no evidence of barn owl presence in the study area during any of the baseline surveys carried out on site between 2019 and 2021, which included some flight activity surveys in the early morning and late evening periods.

[12] Lusby, J. & O'Clery, M. (2014) Barn Owls in Ireland. Information on the ecology of Barn Owls and their conservation in Ireland. BirdWatch Ireland, Wicklow.

During search of local buildings for bat roosts (see EIAR section 5.3.4.3 Bat roost inspection survey), the bat surveyors did not observe signs of barn owl (pellets etc) within any of the buildings checked.

From the above, it is considered that barn owl is not likely to occur at the Gortyrahilly site.

Surveys for the presence and location of sensitive breeding bird species (primarily red grouse, merlin & snipe) will be undertaken prior to and during the construction phase (see EIAR section 7.5.2.3) and barn owl will be included as a precautionary measure. Should the presence of any of these species be confirmed, the location of the nest will be identified (as far as is possible without causing disturbance to the birds) and a suitable buffer zone will be applied to restrict works within disturbance distance of the species concerned until after breeding is complete.

Impact on cearc fhraoigh (Red Grouse)

The DHLGH request comprises further consideration on three items as follows: a) greater fox predation impact due to access tracks, b) disturbance due to greater human access for shooting due to access tracks, and c) disturbance due to greater human access for off-road vehicles due to access tracks.

RESPONSE

Item a) of the DHLGH recommendation:

a) greater fox predation impact due to access tracks;

During the baseline surveys, signs of fox were observed through much of the site and an individual fox was seen within the easternmost sector of site. Foxes are likely to be attracted to the site especially when sheep are lambing. Undoubtedly foxes use the existing tracks within the site when traversing areas and will use the wind farm tracks when the wind farm site is operational.

While the fox is primarily a carnivore, it is a non-specialist and its diet is extremely varied, depending on the location and the time of year (Hayden & Harrington 2000)13. The principal prey items are rabbits, young hares, brown rats, wood mice, and a range of bird species which includes game birds such as red grouse and domestic poultry. In many areas, foxes scavenge carcasses and especially sheep.

Predation of red grouse, probably more the nests and young birds rather than adults (though latter can be taken), would generally be a minor part of the diet of fox. In an examination of the stomachs

[13] Hayden, T. & Harrington, R. (2000) Exploring Irish Mammals. Duchas The Heritage Service, Dublin.

of 340 adult foxes and 163 cubs, Fairley (1975)14 found that poultry and game birds made up 16% of food items in the adults and 17% in the cubs. Based on feather characters, a high proportion of the remains were of domestic fowl.

At Gortyrahilly, where red grouse is present but relatively scarce, it would not seem likely that the species is a regular or important part of the diet of the local fox population and may only be taken opportunistically. On this basis, it is considered that while the presence of new roads will assist foxes in traversing the site, the effect of extra predation on red grouse is not likely to be significant.

Item b) of the DHLGH recommendation:

b) disturbance due to greater human access for shooting due to access tracks;

The existing level of shooting on the Site is unknown but is not perceived to be a particular problem and was not noted as a disturbance issue during the various bird surveys from 2017 to 2022. Shooting is not allowed on lands controlled by Coillte.

There are various existing tracks through the Site used by landowners. The Beara to Breifne Ways traverse a section of the site and will remain open to the public.

Apart from the existing trackways used by landowners and the Beara to Breifne Ways route, access along all other sections of track, such as leading across open heath towards T1, will be gated to prevent public access. Shooting on lands controlled by the wind farm operator will be prohibited.

On the basis of the above, it is considered that the existence of the trackways associated with the wind farm will not result in a greater level of disturbance to Red Grouse from human access associated with unauthorised shooting activities.

Item c) of the DHLGH recommendation:

c) disturbance due to greater human access for off-road vehicles due to access tracks;

The response given above in relation to access for shooting activities also applies to the use of off-road vehicles and potential for causing disturbance to Red Grouse.

Apart from the existing trackways used by landowners and the Beara to Breifne Ways route, access along all other sections of track will be gated to prevent unauthorised vehicle access.

[14] Fairley, J.S. (1975) An Irish Beast Book. Blackstaff Press, Belfast.

Based on the above, it is considered that the existence of the new trackways associated with the wind farm will not result in a greater level of unauthorised off-road vehicles on site.

Impact on ialtog leisler (Leisler's Bat)

The DHLGH request is as follows: "Clarification as to how the implementation of higher cut-in speeds of these turbines (a mitigation measure) can be verified."

RESPONSE

For time related turbine cut offs for particular logged times such as "30 minutes before sunset" etc, the turbine supplier will create a turbine shut down calendar listing the exact dates and times of shutdowns and restarts – similar to a shadow flicker shut off system.

The turbines will also have illuminance sensors which can override the shutdown calendar should weather/light conditions differ on a particular day and levels of darkness increase at an earlier time in the day. This provides a double lock system to ensure curtailment measures have the flexibility to address climatic variations from those forecasted.

All of these measures will be pre-programmed into the individual turbine operating system. They will be implemented and monitored via the turbine remote monitoring system (scada).

The same will be implemented for temperature controls. All turbines contain a number of external and internal temperatures to monitor any operational issues and also to ensure turbines stop spinning when temperatures approach freezing conditions to avoid ice throw. The same temperature related shut down system will be utilised for the purposes of bat/bird curtailment/shut down.

The operator will maintain a written log of the dates and times of curtailment/shut down implemented to minimise effects on Leisler's bat.

Summary of the ecological mitigations

Appendix 17.1 of the EIAR contains a schedule of mitigation measures for the pre-construction, construction, operational, decommissioning and monitoring of the Development and relates to all potential impacts on the environment. These mitigation measures are also included in specifically related EIAR chapters. Mitigation measures relating to ecology have been extracted and included as **Appendix F**.

7.3 Part B: Cork County Council submission, Response

Impact on the Golden Plover and Whooper Swan,

Reference to Golden Plover and Whooper Swan is made on pages 77 - 78 of the Cork County Council Ecology Report under Avian Species, and states as follows:

"As with Hen Harrier, the availability of suitable habitat for species such as Golden Plover within the surrounding landscape is diminishing. I note that the occurrence of the Annex I species Golden Plover at the site and surrounding land is largely focused on wintering season and as a stopover point on migration.

Golden Plover abundance has been shown to be significantly reduced by up to 79% by operational windfarms and significantly displaced by the same by up to 400m. Therefore, given the degree of existing turbines in the area, factored in with what is proposed and the potential limited availability of suitable habitat in the immediate area, I consider that there is a risk of significant cumulative displacement effects to this species.

Furthermore, it is my opinion that the Bord should request a more detailed assessment regarding the barrier effect of turbines on birds such as Golden Plover and Whooper Swan. The EIAR states that the site has not been identified as being along a migration route for birds such as wetland species or birds of prey and as such the issue of a possible barrier effect does not arise. However, it should be noted that numerous species are known to migrate at night or during periods of low light when ornithological surveys will not be undertaken. Therefore, without further assessment/ surveys at appropriate times for all species it cannot be decisively concluded that the site does not form part of a migration route."

Response to paragraph 1 above:

The Cork County Council Ecology Report notes that the "*the occurrence of the Annex I species Golden Plover at the site [Gortyrahilly] and surrounding land is largely focused on wintering season and as a stopover point on migration*".

The occurrence of Golden Plover at the Site is entirely in winter and to a lesser extent during migration. In Ireland, Golden Plover is a rare breeding species that is confined largely to the extensive boglands from County Galway to County Donegal (see Balmer et al. 2013)[15]. Even in the early 1950s, breeding birds were considered to have abandoned Cork and probably Kerry (Kennedy et al. 1954)[16].

[15] Balmer, D. et al., Eds. (2013) Bird Atlas 2007-11: The Breeding and Wintering Birds of Britain and Ireland. BTO Books, Thetford.
[16] Kennedy, P.G., Ruttledge, R.F. & Scroope, C.F. Birds of Ireland. Oliver & Boyd, Edinburgh.

Golden Plover *Pluvialis apricaria* is polytypic, with two subspecies and four populations (Wetlands International 2002)[17]. The population which breeds in Ireland is considered to be of the nominate subspecies *P. a. apricaria,* which breeds in northwest Europe and winters in west and southwest Europe (Crowe 2005)[18]. The majority of birds which winter in Ireland are immigrants of the *P. a. albifrons* population breeding in Iceland and the Faroes. In winter, Golden Plover is a widespread species throughout the island of Ireland, occurring largely on coastal wetlands such as estuaries, inland lakes and river valleys, as well as on agricultural lands (damp pasture, newly ploughed lands). Small numbers may be found in upland areas (such as at Gortyrahilly). Thus, breeding and wintering Golden Plover in Ireland are of different populations and have very different distributions, population sizes and behaviours. At the Site of the Proposed Development, it is reiterated that the Golden Plover recorded are strictly wintering and/or migratory birds, with no breeding population known in the southwest region.

Response to paragraph 2 above:

The Cork County Council Ecology Report refers to a study by Sansom et al. (2016) regarding negative impacts of wind energy development on breeding Golden Plover. From this, it concludes that the Gortyrahilly project involves '*a risk of significant cumulative displacement effects to this species*.' It is considered that this inference is not correct as the Sansom *et al*. study is entirely from studies on breeding Golden Plover (which as noted are of a different population from the wintering birds). During the breeding season, Golden Plover are considered birds of wilderness areas frequenting open boglands or (in case of UK) moorlands and are highly sensitive to disturbance at distances up to 500 m (NatureScot 2022)[19]. In winter, however, they often occur in areas of high background human activity, such as in Dublin Bay and Cork Harbour, and are less sensitive to disturbance. The birds are also very mobile during winter often occurring in large flocks, which frequently move location such as in response to tidal movement. Golden Plover are also highly affected by cold weather and cold weather usually results in large-scale movements, with birds even leaving Ireland during severe spells (Crowe 2005). Thus, the claim made in the Cork County Council Ecology Report that the Gortyrahilly project involves '*a risk of significant cumulative displacement effects to this species*' has no basis as it is made on evidence relating to breeding Golden Plover, which is not applicable to the Proposed Development site.

Response to paragraph 3 above:

The third point made in the Cork County Council Ecology Report relates to the barrier effect of turbines on birds such as Golden Plover and Whooper Swan. It makes the point that numerous

[17] Wetlands International (2002) Waterfowl population estimates – Third Edition. Wetlands International Global Series No. 12. Wageningen, The Netherlands.
[18] Crowe, O. (2005) Irelands Wetlands and their Waterbirds: Status and Distribution. BirdWatch Ireland, Wicklow.
[19] NatureScot (2022) Disturbance Distances in Selected Scottish Bird Species – NatureScot Guidance.

species migrate at night or during periods of low light when ornithological surveys will not be undertaken and hence it cannot be decisively concluded that the site does not form part of a migration route.

While bird species such as Whooper Swan will indeed migrate during darkness, it is noted that migrant birds will normally be flying at heights considerably greater than the turbine height. The migration of the Whooper Swan has been studied in detail (see Brazil 2003)[20] and it has been shown that the swans may undertake extremely high-altitude migratory flights, with an exceptional height of over 8,000 m being recorded on radar. Satellite-tracking studies have recorded swans flying at an average speed of 97.2 kph. Whooper Swans may fly direct from Iceland to Ireland in one flight although this may depend on weather conditions and energy reserves. On arrival in Ireland in October, the swans often congregate on Lough Foyle and Lough Swilly though some may continue southwards to other regular wintering sites (McElwaine et al. 1995)[21].

While Whooper Swans and other wetland bird species were recorded during the baseline surveys at sites such as The Gearagh, it is reiterated that there are no wetland sites that regularly support species such as Whooper Swan or Golden Plover within a radius of at least 10 km of the Gortyrahilly site. Therefore, it is considered that there is little or no likelihood of migrating birds passing at low altitudes over the Gortyrahilly area at night. Further, even if species which migrate on a broad front, such as winter thrushes, starlings etc., were passing over, the altitude of flight would typically be considerably higher than the height of the turbines.

In Ireland, there are no regular migration routes used by birds of prey. Internationally, mass migrations of species such as eagles, vultures, hawks, etc occur along narrow straits between land masses, such as at the Bosphorus (Europe & Asia) and Gibraltar (Europe & Africa).

It is concluded that based on the available baseline information, including the known migration patterns of migratory birds in Ireland, there is not likely to be a barrier effect to migrating birds at night as a result of the Development.

Cumulative Impact of birds redirecting towards the proposed development due to other wind farm locations

Reference to the above item is on page 78 of the Cork County Council Ecology Report under Avian Species, as follows:

[20] Brazil, M. (2003) The Whooper Swan. Poyser, London.
[21] McElwaine, J.G., Wells, J.H. & Bowler, J.M. (1995) Winter movements of Whooper Swans visiting Ireland: preliminary results. Irish Birds 5: 265-278.

Given the proliferation of windfarms both permitted and under consideration in the wider area, there is the potential that birds may be pushed towards the site due to barrier effects or vice verse and taking the cumulative effect into consideration, migrating birds many be pushed off traditional staging points which may result in increased flight times, increase energy expenditure and reduced foraging and roosting time which may in turn have a detrimental impact on a bird's survival.

RESPONSE

Taking into account the following:

- The previous response regarding the absence of any evidence of migrating routes in the study area and the consideration that there is not likely to be a barrier effect to migrating birds as a result of the Development,
- The absence of any evidence of local movements of birds, such as wetland species commuting daily between feeding and roost sites, during the baseline surveys from 2017 to 2022, and
- The wide scatter of other wind farms in the area, i.e., apart from Derragh Wind Farm (6 turbines) located 189 m to the south, all others are at least 3 km from the Gortyrahilly site,

it is considered that the Development would not result in any significant cumulative effect of birds being redirected towards the Development due to other wind farm locations.

The additional impact on the iolar mara (White-Sea Eagle) population having regard to avian flu

Reference to the above item is on page 78 of the Cork County Council Ecology Report under Avian Species, as follows:

Additionally, as per the EIAR, White-tailed Sea Eagle is a species that is prone to collision with turbines. While the collision risk has been assessed as 1 bird every 20 years, the risk to this Annex I species is considered significant in the context of the national population. It is my opinion that a cumulative assessment of the potential operational impacts of the proposal along with the emerging threat of avian flu should be considered. It is noted that approximately two White-tailed Sea Eagles have perished from the virus in the last year, further adding an additional stress factor to an already vulnerable population.

RESPONSE

Avian flu is indeed a concern for many bird species in Ireland and globally, including species of high conservation importance such as breeding terns and seabirds in general. The confirmation of two known deaths of White-tailed Eagle to avian influenza (H5N1) in Counties Kerry and Tipperary is of concern.

The RAPTOR (Recording and Addressing Persecution and Threats to Our Raptors) Programme coordinated by NPWS issued a review report of known casualties of all raptor species for period

2007-2019 inclusive (NPWS 2020)[22]. In that period, a total of 18 confirmed incidents were recorded for White-tailed Eagle, broken into the categories:

- Secondary poisoning,
- Direct poisoning,
- Shooting
- Wind turbine strike.

Direct poisoning was the causative factor for the highest numbers of casualties, while collision with wind turbines resulted in three casualties.

While the use of poisons has been greatly restricted under EU law, it is clear that particular poisons are still causing serious damage to wildlife throughout Ireland. Similarly, while the shooting of birds of prey is strictly prohibited under Irish legislation, it is still happening in parts of the country. With greater enforcement of the laws relating to use of poisons and to illegal shooting of wild birds, it is likely that such incidences will become less of a problem in the coming years.

With losses from the above factors continuing since the review period, the recent losses from avian flu are significant.
However, avian flu is a global issue relevant to both wild bird populations and the poultry industry. The disease in Ireland is being closely monitored by the Department of Agriculture, Food and the Marine, by the National Parks and Wildlife Service and by BirdWatch Ireland, with advice and guidance being issue at regular intervals by all these bodies.

In the context of the White-tailed Eagle population and the proposed Gortyrahilly wind farm, it has been demonstrated that while a minor risk of collision exists, the following points are noted:

- White-tailed Sea Eagle is a rare species in the area and does not typically occur locally, as shown by only one sighting being made within the wind farm site during the 24 months of systematic baseline surveys from 2017 to 2019. Hence, its status within the wind farm can only considered as Rare.
- The Gortyrahilly Site does not contain habitat suitable for breeding eagles, i.e., waterbodies, or large trees or cliffs suitable for roosting by eagles. The only reason why eagles may visit the site is to feed on carrion and mitigation will be implemented to ensure that the presence of carrion or dying animals within the site is minimised. Even with future population increases as a result of the re-introduction programme, the possible presence of eagles

[22] O'Donoghue, B.G. et al. (2020) Recording and Addressing Persecution and Threats to Our Raptors (RAPTOR): a review of incidents 2007-2019. Irish Wildlife Manuals, No. 126. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Ireland.

within the wind farm is unlikely to increase so long as the mitigation to remove carrion is in force.

Cumulatively, the issues of illegal poisoning and shooting are likely to remain the greatest threats to the species in Ireland but the impacts from both of these issues can be lessened by stricter enforcement of existing legislation. As with any virus, the effect of avian flu will reach a peak and its effects on wild birds will invariably be less at some stage. While the proposed wind farm development will contribute to a negligible cumulative effect on the White-tailed Eagle (predicted collision rate of 1 bird in 20 years), the contribution is low compared to the main driving factors, including avian flu at present, having impacts on the population.

8 RFI ITEM 10 - NOISE AND VIBRATION

The submission received from the Environment Section of Cork County Council has requested clarification on information contained in Chapter 11 in relation to noise and vibration assessment, in this regard the applicant is requested to submit the following information:

(a) The number and distance of all noise sensitive receptors within 500m, 1,000m, 1,500m and 2,000m for the turbines. The information should be presented in tabular format.

(b) Confirmation that those dwellings on Fig 11.1 (H1, H2, H4, H21 and H37) are the most representative noise monitoring locations. Submit a rationale why the use of any noise sensitive locations to the north and west where not considered appropriate. Any additional information should be quantified and illustrated on a map suitably scaled.

8.1 Statement of Authority

This response was prepared by the authors of EIAR Chapter 11: Noise and Vibration, Brendan O'Reilly of Noise and Vibration Consultants Ltd and Shane Carr of Irwin Carr Ltd.

Brendan has a Master's degree in noise and vibration from Liverpool University and over 40 years' experience in noise and vibration control (many years' experience in preparation of noise impact statements) and have been a member of a number of professional organisations including the SFA, ISEE and IMQS. Brendan was a co-author and project partner (as a senior noise consultant) in 'Environmental Quality Objectives, Noise in Quiet Areas' administered by the EPA. Brendan has considerable experience in the assessment of noise impact and has compiled studies for more than 100 wind farm developments. Brendan carried out the baseline study and contributed to the EIAR report.

Shane Carr carried out the noise modelling in this assessment and contributed to the EIAR report. Shane is a Director in Irwin Carr Consulting, primarily responsible for environmental noise and noise modelling. He has over 22 years' experience working in both the public and private sectors having previously obtained a BSc (Hons) Degree in Environmental Health and a Post-Graduate Diploma in Acoustics. Shane has been responsible for undertaking and reviewing noise impact assessments on numerous large scale wind farms throughout the UK and Ireland.

8.2 Response to RFI Item 10

(a) There are a total of 106 noise sensitive receptors within 2 km of the proposed Gortyrahilly Wind Farm turbines. No noise sensitive receptors are within 750 m of a proposed turbine location. There are 16 No. noise sensitive receptors within 1000 m, 56 No. noise sensitive

receptors within 1,500 m and 33 No. noise sensitive receptors within 2,000 m. The location of each 'current house ID' listed in the Tables below is available in EIAR Chapter 11 and in Figures 11.1 and 11.2.

Table 11.1: Noise sensitive receptors within 1,000 m of a proposed turbine location

Current House ID	Easting_ITM	Northing_ITM	Closest Turbine	Closest Distance to Turbine (m)
H1	517410	571864	T5	753
H2	517402	573794	T13	756
H3	517734	572119	T14	756
H4	515736	571186	T3	759
H5	515395	574092	T9	763
H6	517462	571790	T5	804
H7	517467	571806	T5	809
H8	515487	574211	T9	833
H9	516372	574046	T12	859
H10	517533	571990	T11	874
H11	515143	574094	T9	915
H12	515896	574342	T9	924
H13	517811	571946	T11	942
H14	514534	572878	T8	957
H15	516142	574318	T9	966
H16	514510	572872	T8	982

Table 11.2: Noise sensitive receptors between 1,000 m and 1,500 m of a proposed turbine location

Current House ID	East_ITM	North_ITM	Closest Turbine	Closest Distance to Turbine (m)
H17	516223	574321	T9	1003
H18	514997	574130	T9	1044
H19	515702	570880	T3	1056
H20	514411	572890	T2	1072
H21	518556	572363	T14	1085
H22	517923	573934	T14	1122
H23	517883	573984	T13	1146
H24	514830	574098	T9	1154
H25	517613	571154	T5	1163

Current House ID	East_ITM	North_ITM	Closest Turbine	Closest Distance to Turbine (m)
H26	514887	574194	T9	1169
H27	514265	570703	T1	1203
H28	518705	572403	T14	1204
H29	514728	570617	T1	1216
H30	517670	571142	T5	1216
H31	514223	570697	T1	1224
H32	518774	572454	T14	1250
H33	518384	573830	T14	1251
H34	514633	570556	T1	1277
H35	514379	570581	T1	1287
H36	514814	570551	T1	1288
H37	514777	570545	T1	1291
H38	515088	570586	T1	1311
H39	514187	570609	T1	1319
H40	514433	570535	T1	1320
H41	517124	574610	T12	1332
H42	518824	572353	T14	1333
H43	518107	574098	T14	1339
H44	516773	574652	T12	1340
H45	517869	574232	T13	1346
H46	514750	570477	T1	1357
H47	518434	573927	T14	1358
H48	517605	574420	T12	1358
H49	516256	574698	T9	1361
H50	517850	571155	T5	1363
H51	517890	571229	T5	1365
H52	514698	570464	T1	1368
H53	517210	574625	T12	1369
H54	514485	570469	T1	1377
H55	514590	570438	T1	1397
H56	518528	573917	T14	1410
H57	515290	570548	T3	1411
H58	514512	570431	T1	1411
H59	518930	572410	T14	1412
H60	516878	574725	T12	1413
H61	517955	571250	T5	1416
H62	514394	573903	T8	1419

Current House ID	East_ITM	North_ITM	Closest Turbine	Closest Distance to Turbine (m)
H63	514059	570556	T1	1420
H64	518941	572403	T14	1425
H65	518321	574087	T14	1426
H66	518957	572447	T14	1427
H67	518976	572514	T14	1427
H68	518097	574217	T14	1446
H69	518989	572432	T14	1462
H70	519003	572456	T14	1468
H71	518987	572390	T14	1473
H72	519042	572577	T14	1478
H73	519032	572454	T14	1497

Table 11.3: Noise sensitive receptors between 1,500 m and 2,000 m of a proposed turbine location

Current House ID	East_ITM	North_ITM	Closest Turbine	Closest Distance to Turbine (m)
H74	518159	574273	T14	1521
H75	517248	574791	T12	1539
H76	514292	570334	T1	1548
H77	519031	572269	T14	1556
H78	514600	574467	T9	1565
H79	519083	573399	T14	1585
H80	518088	574393	T13	1599
H81	514828	574738	T9	1614
H82	515800	575045	T9	1618
H83	514232	574023	T8	1621
H84	516832	574974	T12	1661
H85	515011	570183	T1	1682
H86	516572	574987	T12	1692
H87	514991	574930	T9	1692
H88	516684	575011	T12	1703
H89	518743	574118	T14	1704
H90	514914	574938	T9	1736
H91	514204	570162	T1	1737
H92	514308	574396	T9	1753
H93	515847	575193	T9	1768
H94	517147	575057	T12	1775
H95	514310	574440	T9	1776
H96	516360	570045	T5	1797
H97	515285	570118	T1	1817
H98	517237	575083	T12	1819
H99	518853	574198	T14	1837
H100	514172	569993	T1	1908
H101	514126	574409	T9	1914
H102	519337	573772	T14	1968
H103	515882	575406	T9	1982
H104	519423	572097	T14	1984
H105	515128	575313	T9	1992
H106	519384	571987	T14	1994

(b)

The environment surrounding the proposed wind farm is controlled by the noise levels generated by the abundance of small streams which frequent the surrounding area, a waterfall and wind affected vegetation (mainly trees). As wind speed increases so do the noise levels generated by the wind affected vegetation. There is no industrial noise generated in the area that will significantly influence the background noise levels (LA90 dB).

The dominant wind direction (as is the case in most of the country) is from southerly and westerly directions so the side of a hill/ mountain exposed to these winds will generate higher wind speeds and higher noise levels than in the wind shadow of the same hills/mountain.

Locations H1, H21 and H37 have background noise levels influenced by the dominant prevailing winds (S to W) and by numerous streams in the area. H4 background noise levels are influenced by the noise generated by a waterfall. H16, H14 and H20 are also influenced by the dominant wind direction and the effects on vegetation. H9, H7, H15 are in the shadow zone of the dominant wind directions and would be expected to give similar levels to H2.

Therefore, the five monitoring locations (H1, H2, H4, H21 and H37) present the range of background noise levels surrounding the proposed wind farm (Refer to Figure 11.1 drawn with scale incorporated) on the following page where all house locations are presented The monitoring locations chosen are best representative of the existing noise environment surrounding the proposed wind farm as the locations represent the full range of background noise levels.

Furthermore, the assessment was based on the lowest background noise levels which were recorded at Location H2. Lower background noise levels would not be expected at any other location surrounding the proposed wind farm.

Location H2, north of the development which gives the lowest background noise levels was used for all receptors surrounding the proposed wind farm, thereby allowing for a more robust assessment.

APPENDIX A:

REVISED DRAWINGS

(separately attached)

APPENDIX B:

LETTER OF CONSENT

APPENDIX C:

GORTYRAHILLY WIND FARM ANNEX I HABITAT CONDITION REPORT

APPENDIX D:

OAK BIRCH HOLLY WOODLAND MAP

APPENDIX E:

GRAPHICS

APPENDIX F:

SCHEDULE OF ECOLOGICAL MITIGATION MEASURES

APPENDIX G:

NOISE MONITORING LOCATIONS