

Appendix 7.8 –Lapwing, Waterfowl and Wader Habitat Enhancement Plan

Derrinlough Wind Farm





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1. INTRODUCTION

Lapwing favour wet grassland as breeding habitat, however with the increase in agricultural intensification this is now a rare habitat. In the absence of this preferred habitat lapwing will breed in cutover bog. Breeding season surveys found lapwing utilised open sections of the proposed development area for breeding. During both the 2018 and 2019 breeding seasons the maximum number of breeding lapwing onsite or within 500m of the proposed development area, was 16 breeding pairs.

Hotker et al. (2006) undertook a meta-analysis of existing literature on disturbance distances. This review reported from the 13 studies examined the mean disturbance distance for breeding lapwing was 108m. There were a number of breeding lapwing pairs which held territories that would potentially be intersected by the proposed development footprint or fall within 108m of the turbine layout (see Figure 7.3.7.1 and 7.3.7.2 in Appendix 7-3).

The potential for effects on lapwing was assessed in full in the Ornithology chapter of the EIAR (Chapter 7) including potential loss of breeding habitat. In acknowledgement of the moderate habitat loss/displacement impact identified in Section 7.9.2 of the EIAR, a habitat enhancement plan has been prepared.

The enhancement plan will be undertaken as described in the sections below and follow a successful approach employed by Bord na Móna and BirdWatch Ireland previously in 2010 at Drinagh Co. Offaly. In 2010, Bord na Móna and BirdWatch Ireland rehabilitated a section of cutover bog for breeding waders. In 2011, following rehabilitation works the number of breeding waders increased significantly: a total of ten wader pairs were recorded in the rehabilitation area in 2011 compared to two pairs in 2010, i.e. prior to any management.

The proposed enhancement plan will have a positive impact on the species at the local level and ensures that the proposed development will not have any significant stand alone or cumulative habitat loss or displacement effects on lapwing during the operational phase of the proposed development.

2. IDENTIFICATION OF HABITAT ENHANCEMENT AREA

The following sections outline the methodology used to identify and quantify the quantum of habitat proposed for enhancement.

2.1 Identification of Habitat Enhancement Area

2.1.1 Quantification of potential habitat loss

Hotker et al. (2006) undertook a meta-analysis of existing literature on disturbance distances. This review reported from the 13 studies examined the mean disturbance distance for breeding lapwing was 108m. There were seven breeding lapwing pairs which held territories in 2019 that would be intersected by the proposed development footprint or fall within 108m of the turbine layout (see Figure 7.3.7.2 in Appendix 7-3). The estimated quantum of habitat required by seven breeding pairs of lapwing is 25.2ha. Details of the calculations undertaken are provided in Appendix I of this document.

2.1.2 Identification of Enhancement Area

The proposed enhancement area is located within the northern most reaches of the Drinagh wetlands (See Figure 1 in Appendix 7-8). Currently the dominant habitat within the area is poor-quality degraded bog, that has been colonised with birch scrub. The area as it is currently constituted does not provide suitable breeding habitat for lapwing.

The area selected for rehabilitation was chosen due to its proximity to the Drinagh wetlands and separation distance from the turbine infrastructure. The Drinagh wetlands is a large wetland (c. 217ha) containing a diverse mosaic of dry and wetland habitats that are likely to provide an important foraging resource for breeding lapwing. The rehabilitation area would abut the Drinagh wetlands, which would improve connectivity with this foraging habitat. Lapwing chicks require damp areas within or adjacent to the nesting field for foraging (Berg et al., 1992). Wetlands provide a greater diversity of invertebrate prey for lapwing chicks. This can be expected to have positive implications for lapwing breeding success (Beintema & Visser 1994).

Lapwing show high levels of natal philopatry (i.e. returning to breed in the site where a bird fledged). The enhancement area is considered sufficiently close to act as replacement breeding habitat for any lapwing potentially impacted by the proposed development. The furthest potentially impacted lapwing territories are c. 5.7km from the enhancement area (see Figure 7.3.7.1 and 7.3.7.2 in Appendix 7-4). The majority of lapwing (61%) from a British ringing study returned to breed within 10km from where they were ringed as chicks (Thomson *et al.*, 2008).

As outlined above, this site is considered to have several valuable attributes which make it a good choice for enhancement. The specific enhancement measures are discussed in further detail in subsequent sections of this report.

3. HABITAT MANAGEMENT

3.1 Grassland Establishment and Management

The area to the north of the Drinagh wetlands currently comprises of a mosaic of scrub, poor fen, rank grassland and bare peat. This area supported breeding Lapwing in the past. This area will be managed by the removal of scrub and the establishment of a mosaic of semi-natural grassland and poor fen mosaic more preferable to breeding Lapwing. The diversity of habitats will benefit breeding lapwing within the study area. In addition, the establishment of semi-natural grassland on areas of bare peat and scrub will also benefit a diverse range of pollinators and other ground nesting bird species as well as stabilising the bare peat. This will contribute to an overall biodiversity net gain associated with the proposed development given the size of the areas identified for semi-natural grassland creation (c. 25.7ha). Group nesting lapwing nests are typically separated by 10-150m. The enhancement area could therefore potentially support a large colony of breeding lapwing. Colony nesting lapwing are generally more successful than solitary nests (Berg et al., 1992).

Re-vegetation will be facilitated through the establishment of semi-natural grassland using a wild flower pollinator-friendly seed mix and/or by using ‘Green Hay’ in combination with fertiliser and/or lime and a nursery crop [sheep’s fescue (*Festuca ovina*), red fescue (*Festuca rubra*) or bent species (*Agrostis* spp.)]. The use of a one-off fertiliser treatment can be very effective in enhancing natural colonisation as one of the key limiting factors is poor nutrient status, particularly the lack of Phosphorus (Renou-Wilson 2008). Trials by the Bord na Móna Ecology Team have found that the use of green hay on bare peat can also be an effective aid to natural colonisation (Bord na Móna 2016). Annual mowing of the vegetation will also be important for the establishment and maintenance of this grassland habitat.

Where reseeded is required, the species mix will comprise of a variety of plant species that will grow on peatland habitats found within the proposed development study area and contribute to an enhancement in biodiversity. The use of wildflower/native species that are also locally common will be incorporated into the seed mixes. The management of the habitat in these areas in this way will be beneficial for other wildlife, particularly pollinators (bees, butterflies and other invertebrates) by providing more wildflowers, food and space. Such measures will also tie in with the objectives of the Lepidoptera Management Plan (refer to Appendix 6.6 of this EIAR) for the enhancement and creation of marsh fritillary supporting habitat. Where conditions allow, sensitive wild-flower meadow management will be employed along some of the new verges that will be created along access tracks. A combination of a suitable wildflower seed mix and a sensitive mowing regime could be used to manage particular portions of the site verges as pollinator friendly verges.

Management (e.g. mowing) will not be uniform. Where mowing is possible (and required to prevent the establishment of scrub/reedbeds on these grassland areas), an annual mowing cycle will be implemented as lapwing prefer a short open sward. This will ensure a suitably diverse sward is maintained as well as avoiding significant disturbance to invertebrate lifecycles. Mowing will also reduce the dominance of rushes, prevent the creation of dense rush swards and allow the establishment of other rhizomatous grasses and sedges, which is more suited to breeding lapwing. Different actions in different places will enhance the natural diversity of habitats already developing on site.

3.2 Additional Enhancement Measures

Breeding lapwing require open land that affords unbroken all-round views (fields less than 5ha are avoided (Cramp & Simmons, 1983)), vegetation that remains short in spring (below c. 5-8cm) and a mosaic of vegetation and bare ground. Management prescriptions to be implemented by the applicant to ensure suitable breeding habitat is provided include:

- › Timing: the prescribed measures would be put in place before the first breeding season of the construction phase of the proposed development. The rehabilitation area would then be available to breeding lapwing in advance of predicted impacts.
- › The rehabilitation area would be cleared of scrub to ensure open habitat is provided. The resulting open land would comprise c. 25.7ha. Group nesting lapwing nests are typically separated by 10-150m. The enhancement area could potential support a large colony of breeding lapwing. Colony nesting lapwing are generally more successful than solitary nests (Berg et al., 1993).
- › The rehabilitation area would be mowed annually in late winter (i.e. before mid-February) before earlier breeding birds arrive in March (Joys & Crick 2004). Mowing will only be required in dry areas. This would ensure vegetation is short in spring. The annual mowing is likely to produce permanent grassland, which is an important foraging resource for breeding lapwing (Galbraith, 1988).
- › To avoid reeds encroaching in wet areas low pressure tracking machinery will be used to mowing in these areas, as required.
- › The targeted area is slightly elevated above the Drinagh wetland which is located to the south and it contains drains with vertical edges. These drains would be re-profiled and in-filled to allow unfledged chicks to move between dry and damp areas within the enhancement area. There are existing culverts over the stream which separates the enhancement area and the Drinagh wetland. These culverts will allow lapwing to walk between the enhancement area and the Drinagh wetlands. Drains will be blocked, where appropriate, using peat dams or plastic dams, as appropriate.
- › The rehabilitation area would be rewetted by drain blocking such that the area would remain damp but would not become inundated with water. This would ensure nesting sites are not flooded.
- › To the south of the rehabilitation area within the Drinagh wetlands there are large water bodies which contain islands (See Figure 1 in Appendix 7-8). Scrub has encroached in many places. For the benefit of lapwing and other species of conservation concern noted in these wetlands (e.g. black-headed gull and redshank) this scrub would be cleared to provide open breeding habitat on these islands.
- › The shape of the enhancement area was also considered. The enhancement area is a single large block, rather than a long narrow strip. This means that the central sections of the enhancement area are as distant as possible from surrounding scrub/woodland that may contain predators. In addition, scrub located between the enhancement area and the Drinagh wetlands will be cleared. Corvids will use trees as vantage points to locate nests (Berg et al., 1992). Increased nest and chick predation are regarded as an important cause of declines which can be significant at the local level (Langgemach & Bellebaum, 2005).
- › Peat extraction within the proposed enhancement area will not be permitted.

In the event of any invasive species being recorded within the area identified for enhancement measures, an invasive species management plan will be put in place to eradicate any stands of such species. A pre-commencement survey for invasive species will be undertaken as part of preparatory work and if any such species are recorded an invasive species management plan shall be prepared.

These proposed measures would be undertaken for the 30-year lifetime of the wind farm.

4. MONITORING

The plan will be the subject of ongoing monitoring to assess the effectiveness of the measures proposed and employed and to contribute to advances in habitat management methods, which can be applied to future similar projects.

The monitoring measures will include:

- › The area proposed for enhancement would be the subject of ongoing monitoring during the operational phase of the wind farm to ensure it is offering supporting habitat for breeding lapwing. The ongoing monitoring will take place during the breeding bird season. The monitoring will seek to identify whether lapwing are utilising the areas under active management for breeding and will be conducted by way of vantage point surveys. These surveys will be undertaken once a month March to August inclusive. This is discussed in detail in Appendix 7-9.

The efficacy of the habitat rehabilitation and enhancement measures employed will be reviewed in years 1, 2, 3, 5, 10 and 15 following commencement of the plan on the basis of the results of bird surveys. Analysis of the data collected will be the basis for a review of the measures and techniques employed. Should any adjustments to the plan be deemed necessary or advisable, these will be the subject of consultation with the NPWS prior to any alterations to the plan.

Reports detailing the monitoring works carried out, the results obtained and a review of their success, along with any suggestions for amendments to the plan will be prepared and submitted to the planning authority in years 1, 2, 3, 5, 10 and 15 following commencement of the plan.

5. **CONCLUSION**

The successful implementation of the measures outlined above will produce more favourable breeding habitat for local lapwing than is currently available within 108m of the development footprint. And most significantly the implementation of the proposed enhancement measures will safeguard a significant resource (Drinagh wetlands) for biodiversity for the 30-year lifespan of the proposed wind farm.

BIBLIOGRAPHY

Beintema, A. & Visser, G.H. (1994). - Factors affecting growth and survival of lapwing *Vanellus vanellus* chicks. – Pp. 39-40 in: Tucker, G.M., Davies, S.M.& Fuller, R.J. (eds.) The ecology and conservation of lapwings *Vanellus vanellus*. – Joint Nature Conservation Committee (UK Nature Conservation No. 9).

Berg, Å. (1993). - Habitat selection by monogamous and polygamous Lapwings on farmland – The importance of foraging habitats and suitable nest sites. – *Ardea* 81: 99-105.

Bord na Móna (2016) – Biodiversity Action Plan 2016 – 2021



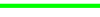



Cramp, S. & Simmons, K.E.L. (eds.) (1983). - The Birds of the Western Palearctic, Vol. III. – Oxford University Press, Oxford, UK.

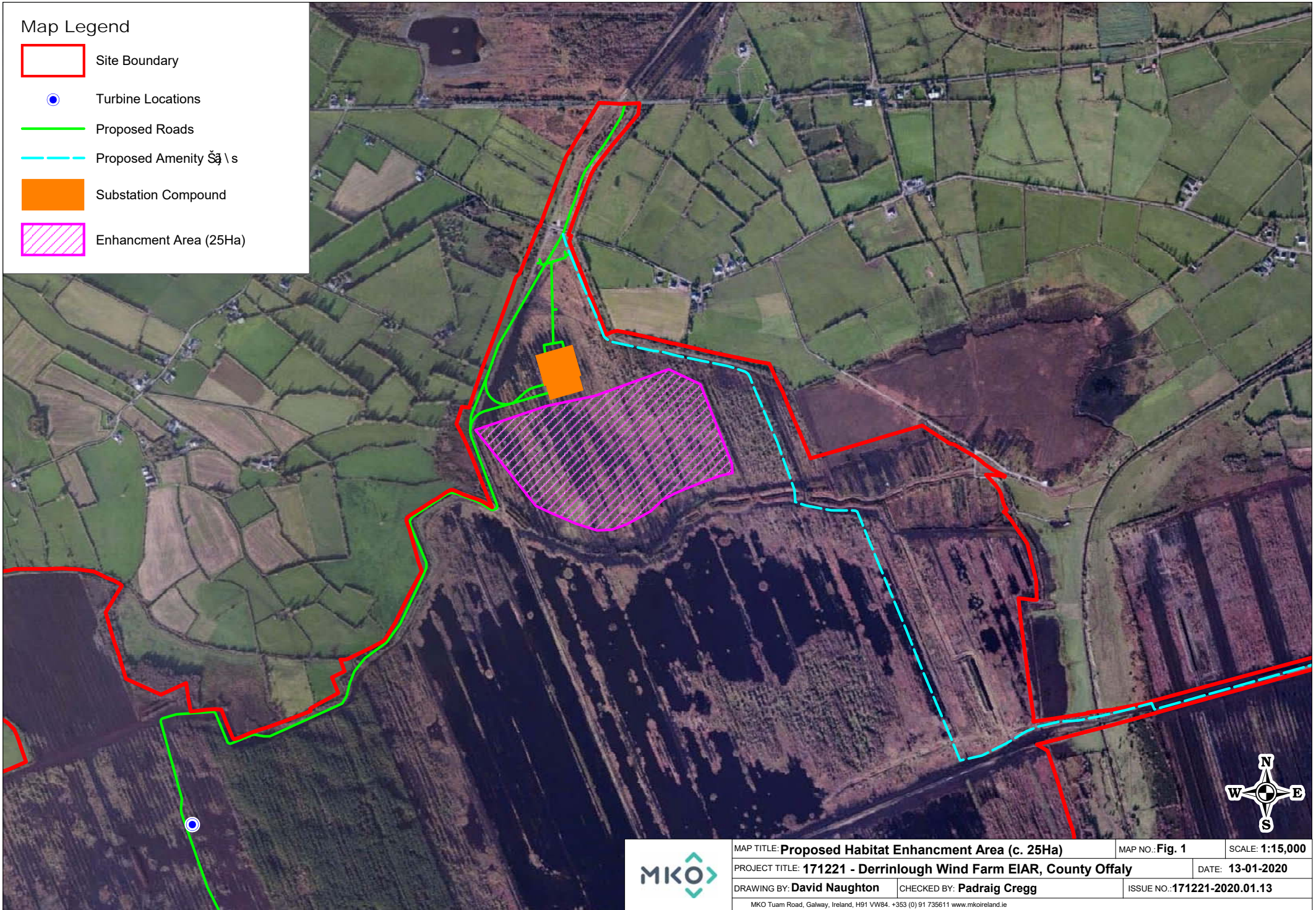
Galbraith, H. (1988). - Effects of agriculture on the breeding ecology of Lapwings *Vanellus vanellus*. – *J. Appl. Ecol.* 25: 487-503.

Hötker, H., Thomsen, K.-M. & H. Jeromin (2006): Impacts on biodiversity of exploitation of renewable energy sources: the example of birds and bats - facts, gaps in knowledge, demands for further research, and ornithological guidelines for the development of renewable energy exploitation. Michael-Otto-Institut im NABU, Bergenhusen.

Thomas, P. S., Baines D., Coulson J. C. & Longrigg G. (2008) Age at first breeding, philopatry and breeding site-fidelity in the Lapwing *Vanellus vanellus*. *Ibis* 136(4):474 - 484

Map Legend

-  Site Boundary
-  Turbine Locations
-  Proposed Roads
-  Proposed Amenity Screens
-  Substation Compound
-  Enhancement Area (25Ha)



	MAP TITLE: Proposed Habitat Enhancement Area (c. 25Ha)		MAP NO.: Fig. 1	SCALE: 1:15,000
	PROJECT TITLE: 171221 - Derrinlough Wind Farm EIA, County Offaly			DATE: 13-01-2020
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APPENDIX I

HABITAT ENHANCEMENT PLAN CALCULATION

1. INTRODUCTION

Lapwing favour wet grassland as breeding habitat, however with the increase in agricultural intensification this is now a rare habitat. In the absence of this preferred habitat lapwing will breed in cutover bog. Breeding season surveys found lapwing to utilise open sections of the proposed development area for breeding. During both the 2018 and 2019 breeding seasons the maximum number of breeding lapwing onsite or within 500m of the proposed development area, was 16 breeding pairs.

There were a number of breeding lapwing pairs which held territories that would potentially be intersected by the proposed development footprint (see Figure 7.3.7.1 and 7.3.7.2 in Appendix 7-4).

The potential for effects on lapwing was assessed in full within the Ornithology chapter of the EIAR (Chapter 7) including potential loss of breeding habitat. In acknowledgement of the moderate habitat loss/displacement impact identified in Section 7.9.2 of the EIAR, a lapwing, waterfowl and wader habitat enhancement plan has been prepared.

This short report details how the estimated quantum of habitat required by seven breeding pairs was calculated.

2. QUANTIFICATION OF POTENTIAL HABITAT LOSS

2.1 Background

Hotker et al. (2006) undertook a meta-analysis of existing literature on disturbance distances. This review reported from the 13 studies examined the mean disturbance distance for breeding lapwing was 108m. There were a number of breeding lapwing pairs which held territories that would potentially be intersected by the proposed development footprint or fall within 108m of the turbine layout (see Figure 7.3.7.1 and 7.3.7.2 in Appendix 7-4).

2.2 Calculation Procedure

2.2.1 Rationale

In 2018, there were 16 breeding lapwing territories recorded onsite or within 500m of the development boundary. In addition, there was one breeding pair at Derrybrat more than 1km to the east of the proposed development infrastructure.

In 2019, there were 16 breeding territories recorded onsite or within 500m of the development boundary. In addition, there were three pairs at Derrybrat and ten lapwing pairs at Noggus, more than 500m to the east and north of the development infrastructure respectively. The location of all 2018 breeding lapwing territories is provided in Figure 7.3.7.1, while the 2019 breeding territories are provided in Figure 7.3.7.2 in Appendix 7-4.

As previously discussed, there were a number of breeding lapwing pairs which held territories that would potentially be intersected by the proposed development footprint or fall within 108m of the turbine layout (see Figure 7.3.7.1 and 7.3.7.2 in Appendix 7-4). The area occupied by each territory was considered to have been reported in greater detail for the 2019 breeding season as the surveyor was more familiar with the areas utilised by breeding lapwing during the second breeding season surveyed. It was for this reason that the area of these territories from 2019 was used in the calculation.

Lapwing require open habitat in which to breed, birds avoid fields of less than 5ha (Cramp & Simmons, 1983). While the minimum area of breeding habitat required by one pair of lapwing is 5ha, lapwing regularly breed in loose colonies. Group nesting lapwing nests are typically separated by 10-150m. Therefore, a 5ha plot could host more than a single pair. The lapwing that were recorded breeding within the study area of this proposed development were recorded to nest as single pairs and in loose colonies. The following calculation was undertaken to estimate the amount of land required by local breeding pairs.

2.2.2 Calculation

The total area within the lapwing territories recorded during 2019 was calculated. There were 29 territories identified in 2019: 16 pairs onsite/within 500m of the site, three pairs at Derrybrat (offsite) and ten pairs at Noggus bog (offsite). The total area occupied by these 29 territories was 104.4ha. The average territory occupied an area of 3.6ha.

To calculate the quantum of habitat required by the seven potentially impacted breeding pairs from 2019, the area occupied by an average territory was multiplied by seven. Therefore, the estimated quantum of habitat required by seven breeding pairs of lapwing is 25.2 ha.

3. **CONCLUSION**

It is considered that with the creation of a 25.2ha enhancement area there will be no net loss of lapwing breeding habitat locally. The proposed enhancement measures have identified an area of 25.7ha to the north of the Drinagh wetlands for the creation of suitable lapwing breeding habitat (see Figure 1, Appendix 7-8).

BIBLIOGRAPHY

Cramp, S. & Simmons, K.E.L. (eds.) (1983). - The Birds of the Western Palearctic, Vol. III. – Oxford University Press, Oxford, UK.

Hötker, H., Thomsen, K.-M. & H. Jeromin (2006): Impacts on biodiversity of exploitation of renewable energy sources: the example of birds and bats - facts, gaps in knowledge, demands for further research, and ornithological guidelines for the development of renewable energy exploitation. Michael-Otto-Institut im NABU, Bergenhusen.