



BIODIVERSITY MANAGEMENT PLAN

CASTLEBANNY WIND FARM

18th December 2020

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1 INTRODUCTION

This Biodiversity Management Plan has been prepared to detail the measures to be taken to conserve and enhance biodiversity in the course of the Castlebanny Wind Farm project. This is a living document to be adapted, updated and amended during the lifetime of the project.

2 HABITAT CREATION AND ENHANCEMENT AREAS

Site 1

Condition

The site is a small (1.5 ha), species-poor, wet grassland field traversed by drainage ditches.

Objectives

- Diversify the sward
- Raise the water table
- Promote vegetation structure favourable for Snipe and other breeding waders

Management Measures

- Block drains with soil plugs
- Create shallow wet scrapes to enhance feeding opportunities for Snipe
- Manage sward by extensive cattle grazing or mowing with removal of cuttings in early spring and/or autumn
- No use of fertilisers or herbicides

Constraints

- May require adjacent landowner permission to block drains

Site 2

Condition

The site is a 12.4 ha complex of wet grassland, wet heath, improved grassland and gorse scrub. The grasslands are currently grazed by cattle. Two of the wet grassland fields are relatively species-rich with abundant *Holcus lanatus*, *Anthoxantum odoratum*, *Agrostis stolonifera* and *Juncus acutiflorus*. *Ranunculus acris*, *Rumex acetosa*, *Lotus uliginosus* and *Trifolium repens* are frequent, along with occasional *Cirsium palustre*, *Hypochaeris radicata*, *Ajuga reptans* and *Ranunculus repens*. *Carex demissa*, *C. panicea* and *Luzula multiflora* are locally frequent. The wet heath field is rank and apparently ungrazed, comprising mainly *Molinia caerulea*, *Ulex gallii*

and *Erica cinerea*. Gorse and bramble scrub is encroaching in places from field margins. Several drains and a small, more natural watercourse are present.

Objectives

- Diversify the sward and convert improved pastures to semi-natural grassland
- Raise the water table
- Promote vegetation structure favourable for Snipe and other breeding waders
- Improve the vegetation structure and condition of wet heath
- Control scrub encroachment

Management Measures

- Block drains with soil plugs
- Create shallow wet scrapes to enhance feeding opportunities for Snipe
- Manage grassland sward by extensive cattle grazing or mowing with removal of cuttings in early spring and/or autumn
- Introduce cattle grazing to wet heath; break up sward and lightly scarify if required
- No use of fertilisers or herbicides
- Clear encroaching scrub

Constraints

- None apparent

Site 3

Condition

The site consists of two wet grassland fields (totalling 1.6 ha) in the floodplain of the Arrigle River. It is currently grazed by horses, but is being encroached by hawthorn and willow scrub. *Juncus effusus* and *Holcus lanatus* are the most abundant species, with stands of *Iris pseudacorus* by the river. Also frequent were *Agrostis stolonifera*, *Anthoxanthum odoratum*, *Filipendula ulmaria*, the moss *Calliergonella cuspidata*, and in some places *Rumex obtusifolius*. To the south of the fields are 1.2 ha of hazel (*Corylus avellana*) woodland with frequent grey willow (*Salix cinerea*), alder (*Alnus glutinosa*) and hawthorn (*Crataegus monogyna*). The field layer consists mainly of *Hedera hibernica* and bramble (*Rubus fruticosus* agg.) with frequent *Dryopteris dilatata*, *Lonicera periclymenum* and *Viola riviniana/reichenbachiana*. Occasionally present are *Hyacinthoides non-scripta*, *Dryopteris affinis*, *Oxalis acetosella*, *Geum urbanum* and young ash (*Fraxinus excelsior*) and holly (*Ilex aquifolium*).

Objectives

- Diversify the wet grassland sward

- Promote vegetation structure favourable for Snipe and other breeding waders
- Control scrub encroachment
- Conserve native woodland and enhance where appropriate
- Protect riverbank

Management Measures

- Create shallow wet scrapes to enhance feeding opportunities for Snipe
- Maintain horse grazing with an ungrazed period in June/July to promote flowering
- Consider increasing grazing levels
- No use of fertilisers or herbicides
- Clear encroaching scrub
- Minimal woodland intervention other than removing any non-native tree species
- Consider planting alder along river and retaining naturally regenerating willows

Constraints

- Within SAC. Consult with NPWS on management measures

Site 4

Condition

The site is 2.3 ha and appears from aerial imagery to be blanket bog, wet heath and/or scrub. It has not yet been surveyed in the field.

Objectives

- Improve the conservation condition of the habitats present

Management Measures

- To be determined

Constraints

- To be determined

3 BAT BUFFER MANAGEMENT

3.1 Context

Significant areas of forest and hedgerow will have to be cleared and maintained as open space as mitigation against collision mortality of bats. The radius of a bat buffer zone on the ground depends on the height of the forest edge or hedgerow: taller trees require a broader buffer zone to maintain the 50 m distance from blade tip to treetop. To reduce the effects of the bat buffer zones on hedgerows, other linear features and scrub, two buffer zones, an outer and an

inner, were calculated. Where turbines are sited in or near forests, the **outer buffer zone** radius was calculated based on the predicted top height of the trees at felling. Within this outer buffer zone, all trees greater than 5 m tall (at present or at commercial maturity) will be felled. The **inner buffer zone** radius (74.2 m) was calculated based on a height of 5 m, which is the threshold between scrub and woodland given by Fossitt (2000). Within this buffer zone, all hedgerows, scrub and small trees/shrubs will be removed. This will discourage Common and Soprano pipistrelles from approaching turbines, as they generally commute and forage along linear features such as treelines and hedgerows. Between the outer and the inner buffer zone boundaries, hedgerows, scrub and small trees/shrubs less than 5 m tall will be retained. Within the forest matrix, areas of open space with low vegetation can be important habitats for plants, small mammals, and invertebrates such as the Red List dingy skipper. Regularly disturbed habitats can be important for insects that nest in bare soil, such as solitary bees, and early successional plant species. Areas of willow and gorse scrub can provide cover and foraging for passerines and small mammals. Formerly forested parts of bat buffer zones that are not occupied by turbine hardstands or access tracks will be managed for biodiversity.

3.2 Objectives

- To control regeneration and height growth of tree species, such as birch and naturally regenerating conifers. Trees will not be permitted to exceed 5 m in height.
- Maintain for the long-term patches of scrub totalling 25% of the bat buffer areas, where this does not conflict with the first objective. Permanent scrub will be situated outside the inner buffer zone.
- Maintain a proportion (50%) of open grassland or heathland habitats
- Maintain a proportion (25%) of disturbed habitat with high cover of bare soil, through machine disturbance during tree regeneration control, patch scarification and/or conversion of open habitats that become too scrubbed up

3.3 Management Measures

Overview

Management interventions will be required on the order of every 3-4 years, depending on tree growth. A patch dynamics approach will be used in which open grassland or heathland that has become rank or invaded by bramble, gorse, bracken or other scrub will be disturbed or cleared and converted to disturbed / bare soil habitats.

One-third of the bat buffer zone excluding permanent scrub, i.e. 25% of the total area, will be disturbed or cleared at each intervention. The target will be to create a *disturbed ground* (ED) habitat with at least 50% bare soil. Table 1 summarises the predicted total habitat area across all bat buffer zones currently occupied by forested habitats. It is predicted that after each

intervention, the 25% of each buffer zone that is disturbed or cleared will remain as *disturbed ground* (ED) habitats for 2-3 years. These patches will then naturally develop into *semi-natural grassland* (GS) or *heath* (HH) for the next two interventions, so that 50% of a bat buffer zone will be under these habitats at any one time.

The specific *semi-natural grassland* (GS) and *heath* (HH) habitats that will develop will depend on soil type, moisture and available seed sources but are likely to be mainly *dry meadows and grassy verges* (GS2), *dry-humid acid grassland* (GS3), *wet grassland* (GS4), *dry siliceous heath* (HH1) and *wet heath* (HH3). Predictions for the areas of *semi-natural grassland* (GS) or *heath* (HH) habitats in Table 1 were based on the vegetation at or near each turbine location.

Figure 1 shows the indicative distribution of habitat targets at a sample turbine, T6. Permanent *scrub* (WS1) will be distributed around the buffer zone margin, outside the inner buffer zone. This will also provide a more natural forest edge transition to open habitats. On each side of the turbine hardstand, approximately one-third of the remaining target habitat at any time will be *disturbed ground* (ED). The remaining two thirds will be *heath* (HH) at any time.

Table 1. Predicted habitat creation in formerly forested bat buffer zones

Habitat Type	Area (ha)*
Scrub (WS1)	8.38
Disturbed ground (ED)	8.38
Semi-natural grassland (GS)	9.82
Heath (HH)	6.94
Total	33.53

*Excludes turbine hardstands and agricultural grassland.

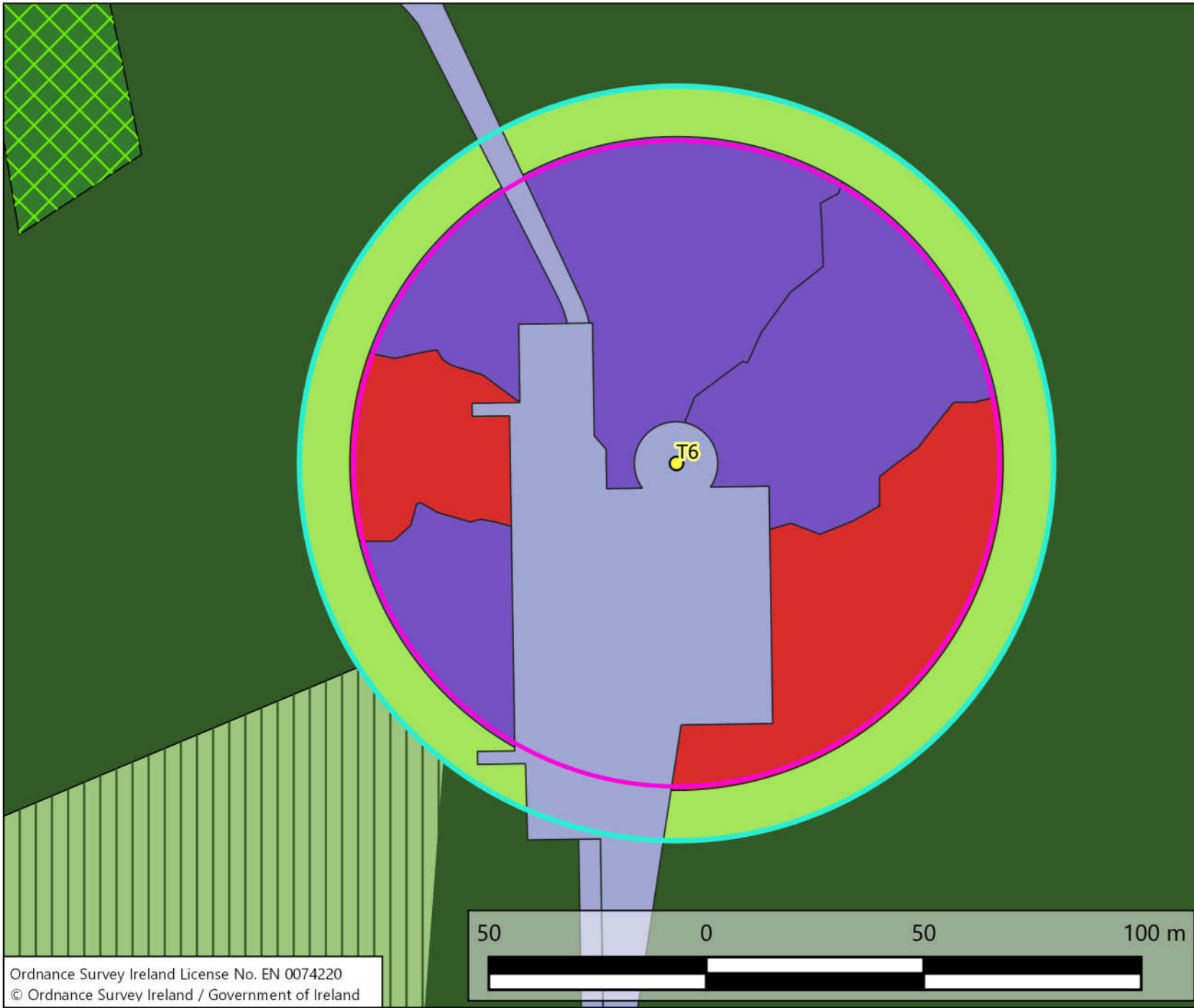
Programme

The programme for management interventions is specified in Table 2. Note that this programme should be amended as required on a turbine-by-turbine basis to take into account the vegetation dynamics at different locations. For example, less frequent interventions may be required in higher elevation locations where the soil is less fertile.

In this programme, one-third of the open habitat (ED, GS and HH) will be scarified at each intervention. Depending on the levels of machine traffic required to clear tree saplings and maintain an open bat buffer, this may be sufficient to create enough habitat with at least 50% bare soil. If not, then patch scarification will be used to create sufficient bare soil patches. Cleared saplings and excess harvested plant material will be removed from the management

zone to prevent a build-up of brash that would inhibit regeneration of species of open habitats and promote rapid growth of brambles. All soil will be retained within the buffer zone.

In Table 2, the intervention areas are designated A, B and C. At year 16, Area A scarified in year 4 will be scarified again. A similar rotation will be followed for Areas B and C. It is not essential that the areas remain identical throughout the programme; marking will not be necessary. At wind farm decommissioning, the land use may revert to plantation forest, or new turbines may be erected, in which case it is recommended that this programme continues.



Legend

-  Turbines
-  Hardstand and roads
-  Outer buffer zone
-  Inner buffer zone
- Predicted habitats
-  Disturbed ground (ED)
-  Heath (HH)
-  Scrub (WS1)
- Existing habitats
-  Mixed broadleaved/
conifer woodland (WD2)
-  Conifer plantation
(WD4)
-  Immature woodland
(WS2)

Bat Buffer Management Zone
Indicative Habitats

Biodiversity Management
Plan
Castlebanny Wind Farm

Scale 1:1,250
16-12-2020
Rev 1



Table 2. Bat buffer zone management programme

Year	Management
0	Clearfell forest within bat buffer and allow to regenerate naturally
4	Clear tree saplings from open habitats and permanent scrub if required Scarify 1/3 of open habitat area to create <i>disturbed ground</i> (ED) – Area A; allow remainder to develop as grassland or heath
8	Clear tree saplings from open habitats and permanent scrub if required Scarify 1/3 of open habitat area to create <i>disturbed ground</i> (ED) – Area B; allow remainder to develop as grassland or heath
12	Clear tree saplings from open habitats and permanent scrub if required Scarify 1/3 of open habitat area to create <i>disturbed ground</i> (ED) – Area C; allow remainder to develop as grassland or heath
16	Clear tree saplings from open habitats and permanent scrub if required Scarify 1/3 of open habitat area to create <i>disturbed ground</i> (ED) – Area A
20	Clear tree saplings from open habitats and permanent scrub if required Scarify 1/3 of open habitat area to create <i>disturbed ground</i> (ED) – Area B
24	Clear tree saplings from open habitats and permanent scrub if required Scarify 1/3 of open habitat area to create <i>disturbed ground</i> (ED) – Area C
28	Clear tree saplings from open habitats and permanent scrub if required Scarify 1/3 of open habitat area to create <i>disturbed ground</i> (ED) – Area A
32	Clear tree saplings from open habitats and permanent scrub if required Scarify 1/3 of open habitat area to create <i>disturbed ground</i> (ED) – Area B
35	Wind farm decommissioning

4 BADGER MANAGEMENT AT T18

4.1 Context

A large breeding badger sett is present in the environs of turbine T18. The location of T18 is 79.1 m from the nearest sett entrance; the closest point of the T18 hardstand is located 48.7 m from the nearest sett. Because of the proximity of the sett to T18, the following special mitigation measures will be undertaken in this area.

4.2 Pre-construction survey

As above, the setts at T18 will be checked for activity and sett status prior to construction commencing in the vicinity. The setts may have been expanded or perhaps have become disused. Additional setts may be present in the construction areas.

4.3 Exclusion zones

An exclusion zone of 20 m minimum is required from the breeding sett entrances. In practice, this refers to a distance of 20 m from the extremity of the sett at its west but also to its north (and also in the case of tree felling to the south and east also – when this might be required in the future) (Figure 2).

A post and rail fence will be erected at 20 m from the western and northern sett entrances or at the edge of forest, whichever is larger. This will be erected before any other construction or tree felling takes place in this area, and suitable hazard signs will be erected (e.g. *Keep Out. No Construction Traffic. Wildlife Protection Zone*).

In accordance with the NRA badger mitigation guidelines (National Roads Authority, 2005), no heavy machinery will be used within 30 m of badger setts (unless carried out under licence); lighter machinery (generally wheeled vehicles) will not be used within 20 m of a sett entrance (Figure 2).

4.4 Tree retention

The mature trees within 20 m of the breeding sett will be left in situ and not felled in order to maintain a non-interference zone of 20 m. The calculated area of the bat buffer zone around T18 has been adjusted to take this restriction into account. There are also small areas of trees north and south of the sett within the calculated bat buffer zone. These will also be retained and the buffer zone has been adjusted accordingly (Figure 2). The turbine blade tips will be 35 m from the retained trees at their closest point (c.f. recommended distance of 50 m). This minor adjustment of the buffer zone will have little impact on foraging bats.

4.5 Seasonality and construction exclusion zones

Where possible, any construction works or tree felling in the vicinity of the breeding sett will be conducted outside of the badger breeding season, which is 1st December to end June (hence operations may be conducted from 1st July to 30th November).

If construction work is necessary at T18 within the badger breeding season, then no works will be conducted within 50 m. Where the works involve blasting, rock piling, rock breaking or similar very noisy work during the breeding season, this zone will be expanded to 150 m (Figure 2). In particular, blasting or rock breaking will not be used to excavate the turbine base at T18 during the breeding season.



Figure 2. Badger exclusion zones at T18





4.6 Tree felling in future years

Any tree felling or clear felling in future years whether by Coillte or by the wind farm project will require a badger licence from NPWS if such is within 30 m of the sett (or 50 m if such felling is to be conducted during the breeding season). If any badger sett is known to those responsible for tree felling, then impacts on the breeding or resting place of a protected species *cannot be considered as unintentional*. If the need for tree felling arises as part of the wind farm project, a badger license will be applied for beforehand. In addition, it is recommended that a badger licence be applied for prior to any tree felling in the course of conventional forest management so that adequate mitigation measures can be taken to ensure the welfare of badgers present at the breeding sett or any other setts present on site. These measures will form mitigation for cumulative effects on badgers.

4.7 NPWS license requirements

- 1) NPWS will not entertain a request for a badger licence prior to planning approval for any development scheme.
- 2) It is considered that a badger licence is required if works or tree felling operations are conducted within 30 m of the breeding sett at T18 (and other known setts).
- 3) It is considered that a badger licence is required if works or tree felling operations are conducted within 50m (the estimated distance of 48.7m from the nearest sett entrance to the T18 hardstand at its closest point is acceptable according to the specialist badger survey report) of the main sett during the badger breeding season.
- 4) It is considered that a badger licence is required if blasting or rock piling works or similar are conducted within 150 m of the main sett during the badger breeding season (National Roads Authority, 2005).

NB: the license application is made by a badger expert involved in oversight of such works or tree felling and not by the developer or forestry company. The conditions of a licence granted by NPWS may require additional mitigation measures to be taken.