Appendix 2

Biodiversity Enhancement and Management Plan (BEMP)

Derrynadarragh Wind Farm, County Kildare and County Offaly

Biodiversity Enhancement Management Plan (BEMP)

August 2025

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1 INTRODUCTION

This report presents a Biodiversity Enhancement and Management Plan (BEMP) that has been prepared for the proposed Derrynadarragh Wind Farm (hereafter referred to as the Proposed Development) in County Kildare and County Offaly. The Proposed Development proponent is committed to enhancing the condition and extent of certain habitats in the habitat management area.

The purpose of this BEMP is to ensure that biodiversity at the Proposed Development Site will be in a better condition after the development of the project than is currently the case, through the implementation of measures during the construction and operational stages. This document identifies the important habitats and environmental issues within the Proposed Development site and collates all relevant information on enhancement and management measures in relation to biodiversity within the site.

The habitat management area is defined as the Site Boundary as per Figure 1, corresponding to those lands under the control of the developer/landowners. Measures outlined in this document have been agreed with the individual landowners and will be implemented by the operator in conjunction with the landowners and overseen by a Project Ecologist and the Ecological Clerk of Works (ECoW). The Project Ecologist will undertake to report the success or otherwise of said measures via operational compliance to the National Parks and Wildlife Service (NPWS) and Offaly County Council or Kildare County Council, as relevant.

In addition there will be one Biodiversity Enhancement measure at node 29/30 of the Turbine Delivery Route accommodation works, to the north of the Philipstown River.

Measures that will be incorporated into the design of the Proposed Development to maintain and enhance the biodiversity value of the site are presented. The BEMP sets out to maintain and enhance ecological conditions of the site for the benefit of native flora and fauna. In developing the BEMP, a targeted approach has been adopted whereby consideration has been given to the physical and biological conditions that prevail at the site to ensure that the proposed measures are appropriate to the conditions of the site.

The management and enhancement measures outlined below will be of benefit to various habitats and species at the Proposed Development Site. This BEMP focuses on habitats and species which have been identified as Key Ecological Receptors (KERs) (i.e. habitats and/or species evaluated as Locally Important (higher value) or greater which are likely to be impacted significantly by the Proposed Development). The KERs were identified in Chapter 9 of the EIAR and are presented in Table 1 below). Based on the KERs and on the landowner agreements in place, the BEMP aims to positively impact as many of these KERs as possible.

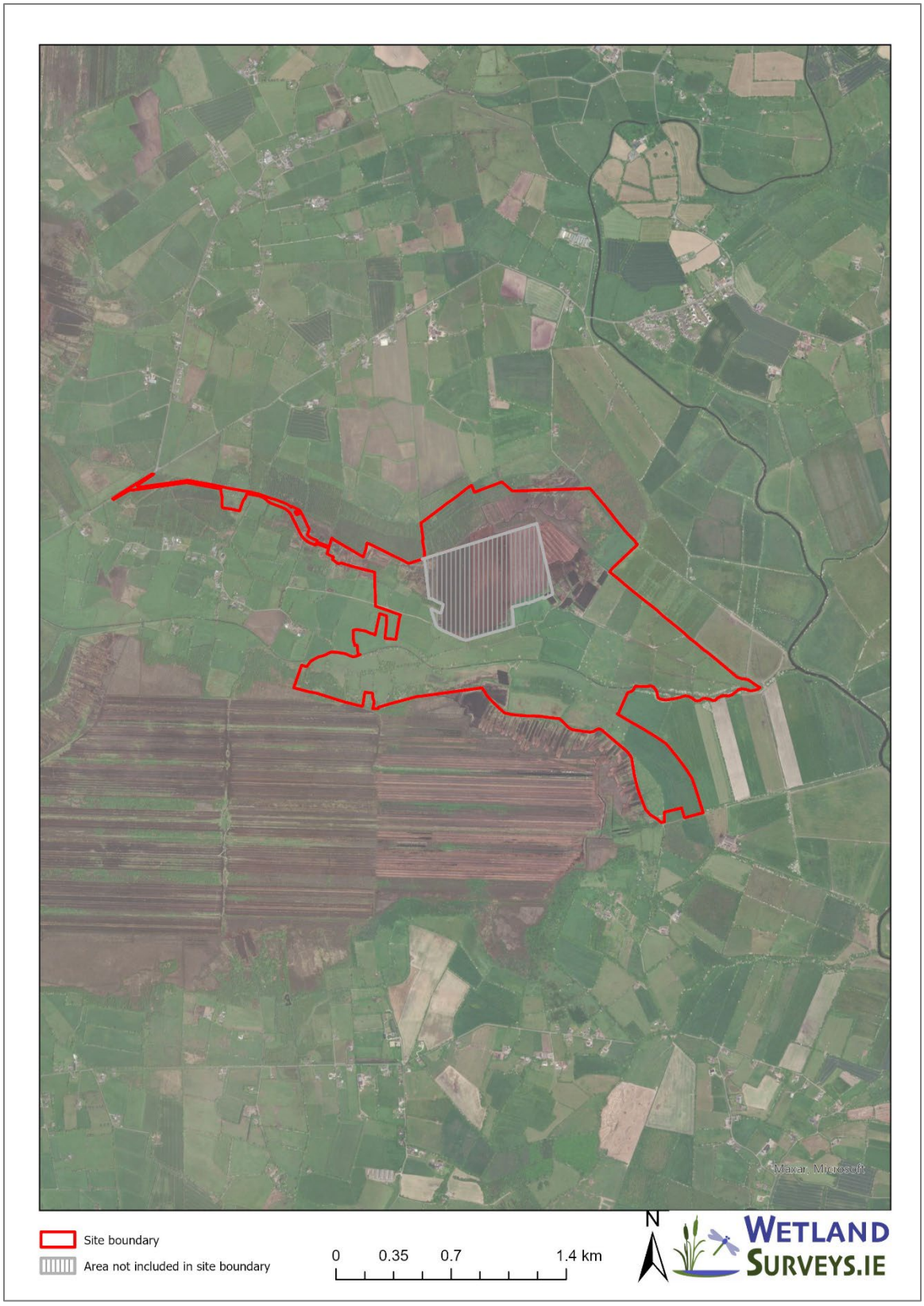

Figure 1 Site Boundary of lands under control of the developer/landowners at Derrynadarragh

Table 1 Summary of Key Ecological Receptors (KERs) at the Proposed Development Site.

Key Ecological Receptor (KER)	Description	Expected effects from the Proposed Development after mitigation	Likely Benefits from BEMP
Depositing/ Lowland Rivers (FW2)	The Cushina River flows through the Site Boundary and is hydrologically connected to the European designated site, the River Barrow and River Nore SAC [002162]. No significant impacts are expected from the Proposed Development, but it has been assessed as being degraded and having Poor water quality.	No significant effects	Yes
Drainage Ditches (FW4)	The drains on the site all drain to the River Barrow catchment via the Cushina River. They are man-made habitats, intensively managed through regular maintenance, but they do provide some aquatic habitat for local wildlife. They are evaluated to be of **Local importance (Lower Value)** but because of their hydrological connection to the River Barrow and River Nore SAC, further downstream, the Drainage Ditches are included as a KER. Some of them have very high sediment loads, which is likely contributing to the poor water quality in the River Cushina.	No significant effects	Yes
Wet Pedunculate Oak-Ash Woodland (WN4)	There is a small area of this habitat within the Site and it provides habitat for woodland species. It is well connected to the other woodlands within the Site by hedgerows and treelines. It was evaluated as being of **Local Importance (Higher Value)**.	No significant effects	Yes
Bog Woodland (WN7)	The Bog Woodland on the site has developed on cutover bog and does not correspond to the Annex I Bog Woodland habitat. It is dominated by Birch but does support other woodland and peatland species such as Willow, Holly, Bramble, Heather, Purple Moor-Grass and Honeysuckle. It likely supports breeding and foraging habitat for a variety of woodland species including Badger, Bats and other small mammals and birds. It was evaluated as being of **Local Importance (Higher Value)**.	Felling of approximately 1.8ha to accommodate peat deposition areas, tracks and bat buffers around T06 and T07.	Yes
Hedgerows (WL1)	Hedgerows onsite are mostly dominated by native species including Willow, Holly, Hawthorn and Gorse. They have been assessed as being of **Local Importance (Higher Value)**. There will be some felling of hedgerows associated with the Proposed Development.	Felling of approx. 887 linear metres to accommodate bat buffer zones around T04, T07 and T09, TDR accommodation works	Yes

Key Ecological Receptor (KER)	Description	Expected effects from the Proposed Development after mitigation	Likely Benefits from BEMP
		and wind farm infrastructure.	
Treelines (WL2)	Treelines onsite are generally dominated by native species and are likely providing habitat and an ecological corridor for native small mammals and invertebrates. They have been assessed to be of **Local Importance (Higher Value)**. There will be some felling of treelines associated with the Proposed Development.	Felling of approx. 524 linear metres to accommodate bat buffer zones around T01, T04, T05 and T06 and some felling to for TDR accommodation works.	Yes
Eurasian Badger (*Meles meles*)	Badger setts identified within the Site and within the footprint of the Proposed Development. This species is assessed as being of **Local Importance, Higher Value.** Iterative design of the proposed layout has ensured no direct effects on this species.	No direct effects. Some insignificant indirect effects such as loss of suitable foraging habitat, temporary disturbance during construction.	Yes
Eurasian Pygmy Shrew (*Sorex minutus*)	Likely to be present onsite and suitable habitat does occur within the footprint of the Proposed Development.	Possibly reduction in suitable habitat.	Yes
Eurasian Red Squirrel	Likely to be present on site and suitable habitat does occur within the footprint of the Proposed Development.	Possibly reduction in suitable habitat.	Yes
European Otter (*Lutra lutra*)	Present on Site. Dependent on aquatic habitat and uses the River Cushina to some extent. No evidence of frequent use. The River Cushina is within the Zone of Influence of the Proposed Development.	No expected significant effects.	Yes
Pine Marten (*Martes martes*)	No evidence was found to indicate the presence of this species on the Site but it is likely to be present based on the presence of suitable habitat and existing records from the surrounding area. Suitable habitat does occur within the footprint of the Proposed Development.	Possibly reduction in suitable habitat.	Yes
Bats	All bat species in Ireland are protected under both national legislation – (Wildlife Act, 1976, as amended in 2019) and European legislation – (Habitats Directive (92/43/EEC).	Some reduction in suitable foraging and	Yes

Key Ecological Receptor (KER)	Description	Expected effects from the Proposed Development after mitigation	Likely Benefits from BEMP
	Bat species that were recorded onsite are Leisler's Bat, Soprano Pipistrelle, Common Pipistrelle, Brown long-eared Bat and *Myosotis* species. The Proposed Development has the potential to result in direct and indirect effects on this receptor.	commuting habitat. No roosts were identified within 200m of turbines.	
Giant Hogweed (*Heracleum mantegazzianum*)	This invasive species was recorded onsite. It is a relatively small infestation within a hedgerow but due to the risk of High Impact, this species is of high local concern. It lies outside the footprint of any works associated with the Proposed Development.	None expected	Yes
Invasive species (general)	Other invasive species were recorded from within the Site, adjacent to the GCR and adjacent to the TDR. Snowberry, Ground Elder, Sycamore and Cherry Laurel have been found along the GCR route. Snowberry and Sycamore have been recorded within and immediately adjacent to one of the TDR accommodation works areas. There is potential for construction activities to cause an increase in the spread of these species.	No significant impacts expected	Yes

1.1 STATEMENT OF AUTHORITY

This report was prepared by Caroline Lalor with input from Patrick Crushell and Mary Catherine Gallagher, all Ecologists with Wetland Surveys Ireland (WSI) Ltd.

Caroline Lalor (BSc., MSc., MCEIEEM) received an honours degree in Applied Ecology from University College Cork and a Masters degree in Ecosystem Conservation and Landscape Management from National University of Ireland, Galway. She is a full member of the Institution of Ecology and Environmental Management (CIEEM). Caroline has 20 years of postgraduate experience, working in peatland conservation and ecological consulting. She has experience working on Biodiversity Action Plans, Conservation Management Plans, environmental impact assessment for various developments, including renewable energy projects, preparing chapters of the EIARs, preparing AA Screening and NIS reports.

Dr. Patrick Crushell (BSc., MSc., PhD., CEcol., MCIEEM) has been working in the area of nature conservation and ecological assessment since 2002. He has worked as a consultant ecologist in the preparation of Ecological Impact Assessments on over 500 different projects for a range of organisations including government agencies, engineering firms, local environmental groups and NGOs and has appeared as an expert witness on numerous occasions. Projects that he has been involved in include impact assessments of various development proposals; pre and post – construction monitoring; wetland surveys; evaluation of proposed designated sites; bird surveys; flora and fauna surveys; restoration and management of habitats and baseline ecological surveys. He established and managed three successful agri-environmental results-based schemes.

Dr. Mary Catherine Gallagher received an honours degree (BSc) in Zoology and a Master's degree (MSc) in Marine Biology from UCC. She followed this with a PhD on an invasive barnacle species. Mary Catherine has experience in project management, coastal and freshwater habitat and biodiversity surveys, monitoring surveys and mapping, Geographical Information Systems (GIS), report compilation and has created a range of public information resources and educational materials for various clients including the Pearl Mussel Project. Mary Catherine has prepared a Biodiversity Action Plans and Biodiversity Management Plans for a number of clients.

2 PROPOSED BIODIVERSITY ENHANCEMENT MEASURES

A range of biodiversity enhancement measures are included in this plan aiming to:

- improve the ecological condition of habitats that are currently degraded; or
- replace existing habitat that will be lost due to the Proposed Development.

These measures are outlined in the following sections. A map of the planned measures is presented in Figure 2. A summary of the planned biodiversity enhancement measures and their

expected benefits is given in Table 2. Note in Figure 2 the locations marked for In-ditch wetlands and hedgerow and treeline planting are indicative of the area in which they will occur. Final exact locations will be made at detail design stage.

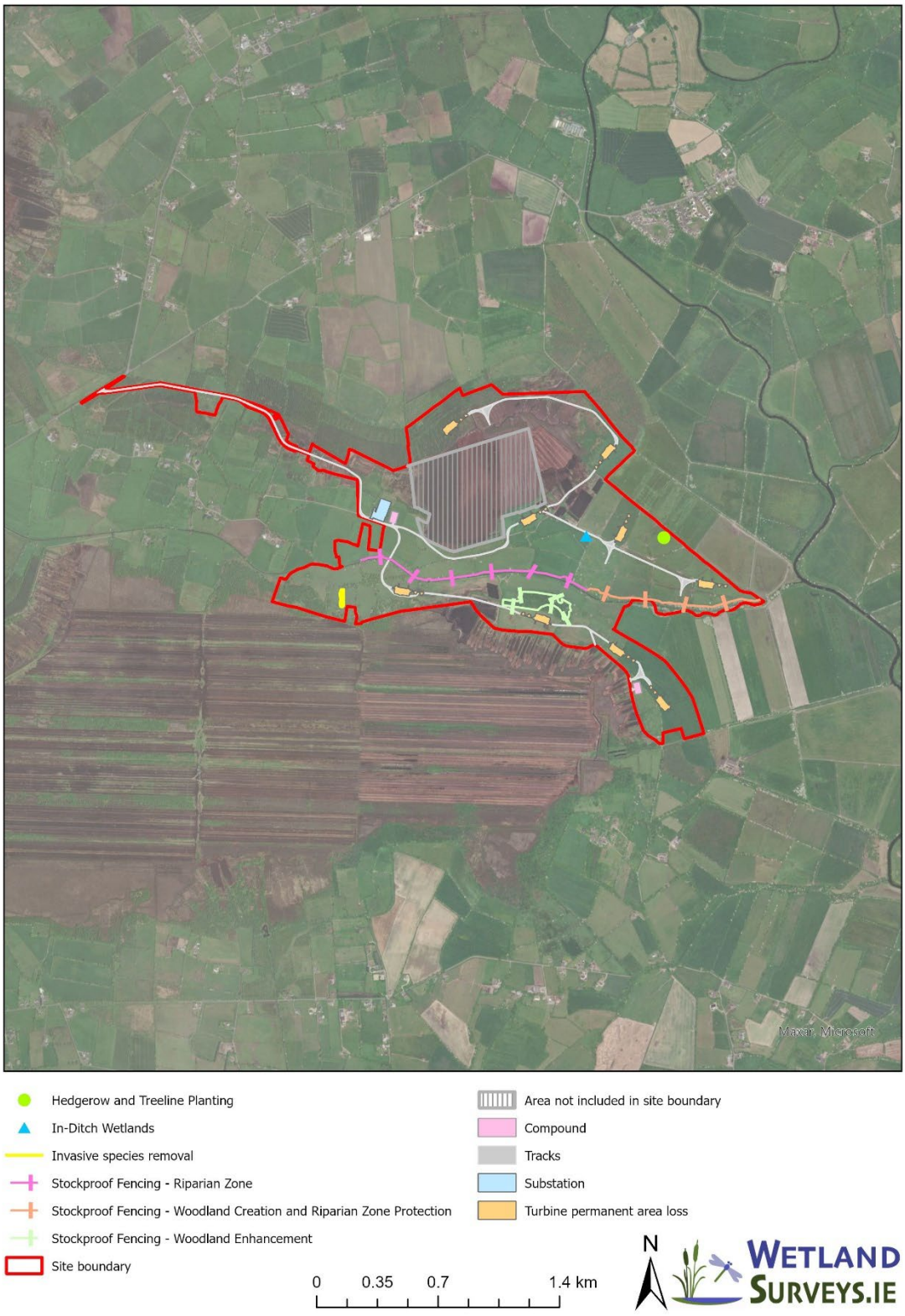

Figure 2. Map showing planned biodiversity measures at the Proposed Development Site. Proposed track and turbine layout also shown.

Table 2 Planned Biodiversity Enhancement measures, expected benefits and measurable gain

Biodiversity Enhancement Measure	Rationale and Summary	Expected benefits from implementation of the BEMP	Measurable area of creation /protection (ha/m)
1. **In-Ditch Wetlands – Water Quality improvement**	The drainage ditches onsite, particularly on the north of the Cushina River are, in general, intensively managed through regular maintenance and some were noted to be carrying significant loads of peat sediment. Discharge of this sediment-laden water into the River Cushina is likely contributing to the Poor water quality of the River Cushina. In-ditch wetlands will be installed within each of the main drains discharging from the north into the Cushina River. These will allow for sediment to be trapped in the created wetlands within the drains, therefore improving the water quality being discharged to the Cushina River.	• Improvement of water quality in the drains discharging to the Cushina River. • Reduced sediment load within the Cushina River. • Creation of wetland habitats and an associated increase in the biodiversity of wetland plants. • Suitable foraging area for Bats • Suitable breeding and foraging habitat for Dragonflies, Damselflies, Frogs and other aquatic species.	Approx. 200m of in-ditch wetlands habitat will be created corresponding to approximately 0.03 ha
2. Stockproof fencing – Riparian Zone and Lowland River (FW2) protection	The Cushina River flows through the Site. Its banks have been damaged through channel deepening and widening, in addition to stock access. Stockproof fencing is planned to be installed at least 2m back from the top of the riverbank in places where it is necessary to protect the riverbank from stock access. Both the north and south banks will be protected in this way. Fencing on the north bank is mapped in Figure 2. On the southern bank, fencing is currently present in places. Replacement and/or new fencing will be installed as necessary.	• Recovery of natural vegetation on the riverbanks, which will aid stabilisation of the riverbank. • The prevention of stock accessing the river should contribute to an improvement in water quality.	1.4km of lowland river and riverbank will be protected.
3. Stockproof fencing – Woodland creation and	A riparian area along the Cushina River in the east of the Site was identified as having potential for woodland creation. It comprises an earthen bank (created from past river dredging perhaps) which now supports Scrub	• Allow for natural succession to woodland habitat along the river • Protect and enhance habitat for Badger, Otter and other wildlife	• 1km of lowland river and riverbank will be protected

Biodiversity Enhancement Measure	Rationale and Summary	Expected benefits from implementation of the BEMP	Measurable area of creation /protection (ha/m)
riparian zone protection	(WS1) habitat which is starting to somewhat succeed naturally to woodland. There are a number of active Badger setts in this area. Otter spraint was observed along this section of river. Cattle currently have access within this habitat and are likely contributing to the prevention of the natural regeneration of woodland flora.	• Protect riverbank and river habitat • The prevention of stock accessing the river should contribute to an improvement in water quality.	• 2.7ha woodland creation
4. Stockproof Fencing - Bog Woodland (WN7) protection	There will be a loss of approximately 1.8ha of bog woodland as a result of the Proposed Development. Cattle currently have access to most of the bog woodland onsite causing poaching and are likely contributing to the sparse field and ground layers of vegetation. An area of bog woodland to the north of T07, which currently has significant areas of bare peat caused by livestock, has been identified as part of the BEMP and stockproof fencing will be installed around this woodland to aid natural regeneration.	• The exclusion of cattle from this woodland should increase the habitat condition of the woodland by allowing the recovery of bare peat areas and an increase in the structural diversity of the woodland.	2.6ha
5. Hedgerow (WL1) planting	Approximately 887m of hedgerow habitat will be felled as part of the Proposed Development. Hedgerows will either be translocated or, where this is not possible, newly planted, at a location within the Site.	• Translocation of the hedgerows will ensure that much of the mature vegetation and seedbank for the hedgerow species will be transplanted to the new location. • Where translocation is not possible, the remaining length of hedgerow will be planted within the Site with whips of native species and of provenance. Species composition will be selected to create hedgerows with similar species to existing hedgerows.	950m

Biodiversity Enhancement Measure	Rationale and Summary	Expected benefits from implementation of the BEMP	Measurable area of creation /protection (ha/m)
6. Treeline (WL2) planting	Approx. 524m of treelines will be felled in the bat buffer zones. Planting new treelines outside of bat buffer zones will, in time, create habitat to replace these felled areas	• Over time, the planting of treelines with native trees of native provenance will result in the replacement of lost habitat.	550m
7. Invasive Species Control	The Third Schedule, High Impact non-native invasive species, Giant Hogweed (*Heracleum mantegazzianum*), has been identified onsite. An eradication programme will be implemented before the construction phase to safely eradicate this species from the Site. Snowberry, a Low Impact non-native invasive species, was identified at one location within the footprint of the Proposed Development. This is within a short length of hedgerow which will be felled to create a bat buffer zone around T04. This will be eradicated before felling to remove risk of spreading. Snowberry and Sycamore will be eradicated before TDR accommodation works commence, if these species are within the footprint. Invasive species removal will be undertaken by a licenced invasive species contractor. For any reason, should the GCR trench need to leave the road corridor, any invasive species found within the footprint shall be appropriately removed prior to trench digging. Invasive species removal will be undertaken by a licenced invasive species contractor. Strick biosecurity measures will be followed at all times by construction staff.	• Improve the ecological integrity of the native hedgerow where the Giant Hogweed occurs. • Remove risk of introducing or causing dispersal of any non-native invasive species.	90m

A total of :

- 2.4km of Lowland River and riverbank habitat will be protected and enhanced
- Approximately 60m-100m of wetland habitat will be created
- 2.7ha of woodland created in riparian zone through natural succession
- 2.6ha of Bog Woodland protected and enhanced
- 1.5km of linear woody habitat (hedgerow / treelines) creation
- 90m of linear habitat enhancement through the removal of Giant Hogweed.

The BEMP measures, when completed, will also benefit the KER species that use these habitats. It is important to note that the creation, enhancement or protection of wooded habitats including hedgrerows, treelines, and woodland will not be conducted within the identified bat buffer zones. The bat buffer zones have been identified as areas within 95m of each turbine. In order to ensure that bats are not attracted this close to the turbines, it will be necessary to remove all hedgerows, treelines and woodland within the bat buffer zones and to maintain these buffer zones throughout the operational lifetime of the Proposed Development.

Table 3 Overview of effects on KER species from the Proposed Development and the BEMP.

KER	Rationale and Summary	Expected benefits from implementation of the BEMP
Eurasian Badger (*Meles meles*) **Eurasian Pygmy Shrew (*Sorex minutus*)**	Badger setts identified within the site have been avoided by the Proposed Layout. There will be some loss of suitable (hedgerow and woodland) habitat. Some minor loss of grassland habitat.	• Suitable (woodland) habitat will be protected and enhanced. • Suitable (woodland and hedgerows) habitat will be created.
Eurasian Red Squirrel (*Sciurus vulgaris*) **Pine Marten (*Martes martes*)**	Likely to be present on site. Some suitable habitat loss (woodland)	• Protection, enhancement and creation of foraging and commuting habitat and potentially breeding habitats.
Bats	There will be some reduction in suitable foraging and commuting habitat as a result of the Proposed Development.	• Protection, enhancement and creation of foraging and commuting habitat and, potentially, roosting habitats.
European Otter (*Lutra lutra*)	Present on Site. Dependent on aquatic habitat and uses the River Cushina.	• There will be an increase in suitable habitat for natal dens (woodland on riverbank). • Otters may benefit from an improvement in water quality.

Further details on the measures and their implementation are provided in the following sections.

2.1 MEASURE: IN-DITCH WETLANDS

2.1.1 Objective: Water Quality and Biodiversity Enhancement

The Cushina River flows through the site for approximately 2.5km. This river discharges to the River Barrow and River Nore SAC, an internationally important site designated for the protection of many aquatic habitats and species. Hence, the water quality of the Cushina could indirectly affect the sensitive habitats and species which are protected within this site. In addition, the water quality of the Cushina River will determine, to an extent, the suitability of the habitat for many aquatic species within the Proposed Development Site. Among other factors, the water quality of the Cushina is impacted by the quality of the water being discharged to the river, either via the network of open field drains or via overland flow. During the ecological surveys of the Proposed Development Site, it was noted that the water quality within a number of the main drains discharging to the Cushina from the north was very poor and was carrying a high sediment load. These drains were selected for enhancement measures as an opportunity to improve water quality. In addition, there will be alteration to approximately 245m of drainage ditches (FW4) habitat due to the culverting of drains at crossing points.

The implementation of measures to improve the water quality of the River Cushina within the Site is therefore expected to have significant benefits for the aquatic ecology of the Site.

All main drains within the Site boundary flowing into the Cushina River from the north will have in-ditch wetlands installed. No in-ditch wetlands will be installed within the identified bat buffer zones. The final design of these in-ditch wetlands will be based on existing best practices and will be agreed with the Project Ecologist.

It is expected that one in-ditch wetland will be created per drain.

- Each in-ditch wetland will be installed along a minimum 10m length of drain. The depth of water across the majority of the ditch should be around 50 cm deep and approximately 75 cm deep.
- The aim of the in-ditch wetland is to slow the flow of water, allowing excess sediment to fall out of the water column, thereby enhancing the quality of the water that reaches the Cushina River.
- At the in-ditch wetland location, ditches should also be widened to enable water flow to slow and allow sediments to settle out.
- As part of the in-ditch wetland creation, small barriers are usually installed in the drain to slow the flow of water in the drain and allow sediments to settle out.
- Barriers can be either solid structures such as earth bunds with an outlet pipe, or simple wooden barriers to slow the flow of water and allow it to escape slowly.
- The barriers need to be carefully designed so that storm flows can be accommodated.

- At least one of the banks of the drain along this length of drain will be reprofiled, creating a graded bank and increasing the width of the drain.
- The graded bank allows for different depths of water and for the development of a variety of wetland vegetation along the bank, thus enhancing biodiversity and contributing to water quality enhancement.
- Both banks of each of the drains with in-ditch wetlands will be fenced with stock-proof fencing to prevent stock access.
- It is important not to create the in-ditch wetland too close to the discharge point to the Cushina River.
- Regular maintenance will be required throughout the lifetime of these in-ditch wetlands to remove the trapped sediment. The removal of sediment will be carried out according to existing best practices. It is possible to include a sediment trap in the design of the in-ditch wetland to allow for ease of sediment removal.
- It is recommended when removing wetland vegetation during maintenance, not to remove all vegetation at the same time as this would impair the effectiveness of the wetland and remove valuable habitat.

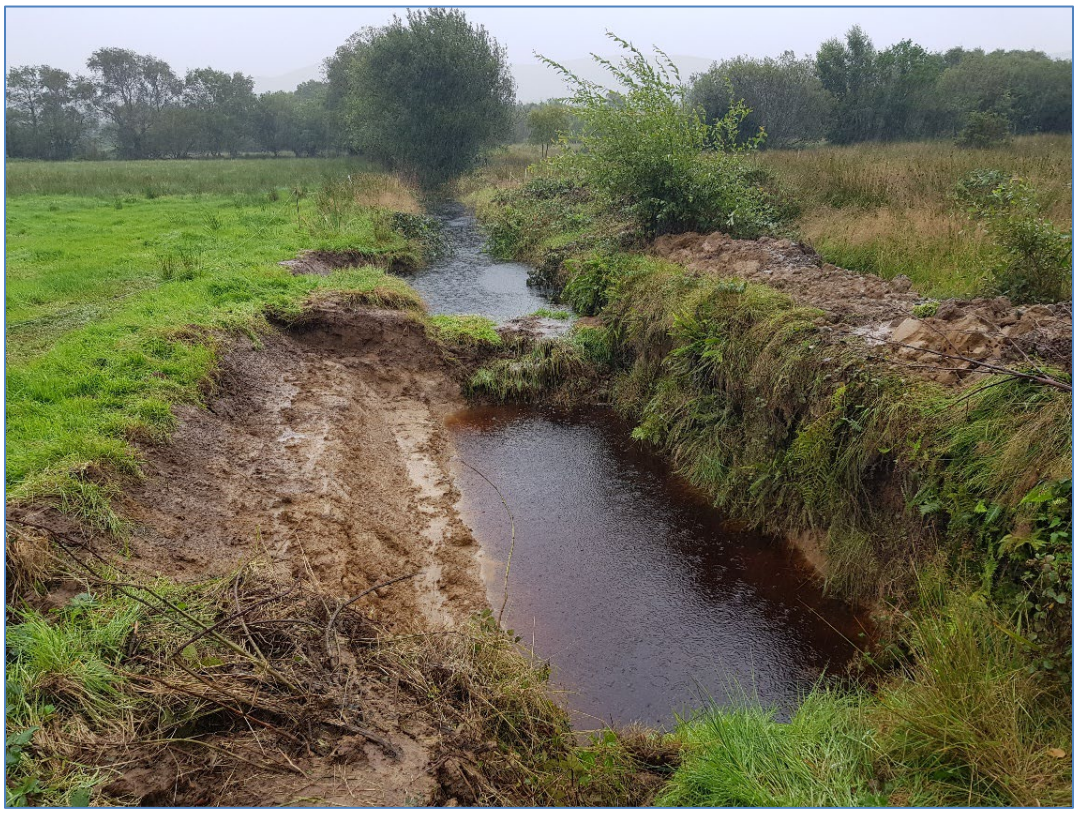

Figure 3 In-ditch wetland under construction. Note reprofiled drain with shelves of different depths creating different depths and widening the drain. Earth bunds are also visible as barrier to slow the flow of water within the drain. (source: Pearl Mussel Project)

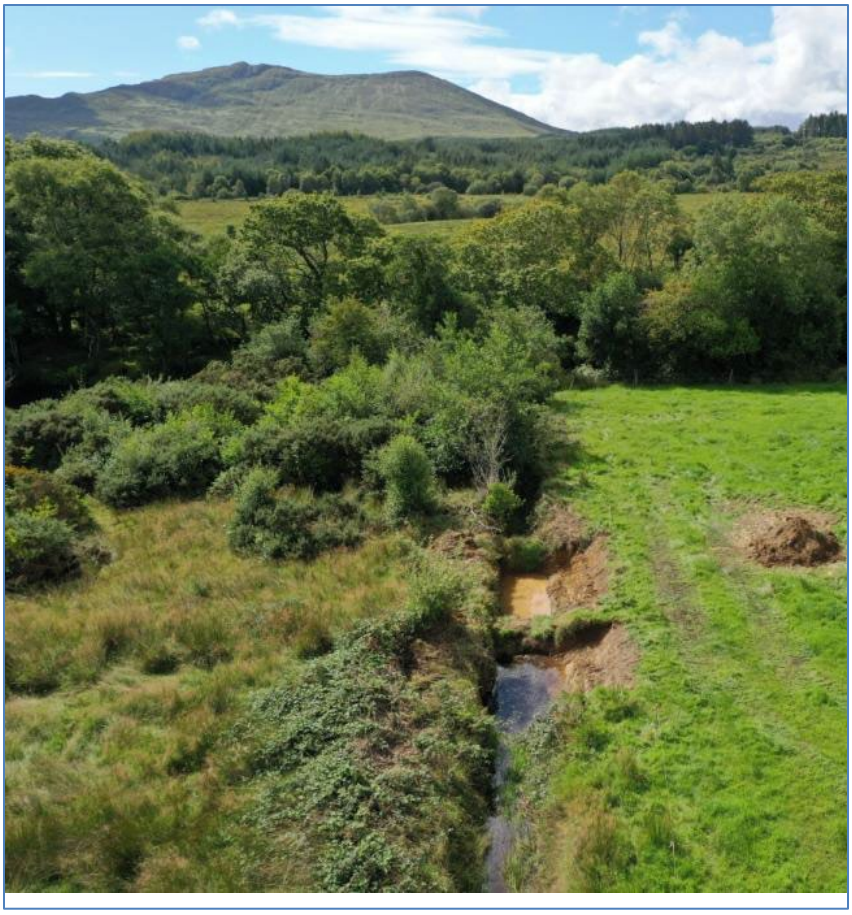

Figure 4 Note widened sections of the drain. There are usually two widened chambers connected by a dam with pipe to allow water to flow through. (source: Pearl Mussel Project)

2.2 MEASURE: STOCKPROOF FENCING

A number of habitats onsite are currently accessed by cattle and as a result are suffering varying levels of degradation and/or are not progressing with natural succession. The simple measure of installing stockproof fencing at strategic locations will greatly contribute to the creation, enhancement and protection of these habitats. Unless otherwise stated, the stockproof fencing used will be wooden posts with 3 strands of barbed wire. Further details of each of the objectives are given below.

2.2.1 Objective: Protection and Enhancement of River

One issue that was noted along the banks of the River Cushina during ecological surveys is that of cattle accessing the river. This can lead to erosion and degradation of the riverbank and a subsequent increase in sedimentation of the river substrate. The installation of stockproof fencing all along the northern bank of the river and as needed on the southern bank, will prevent further access to the river by cattle and other stock. This is expected to result in, over time, the recovery

of the riverbank, a reduction in erosion and increase in water quality. All fencing will be installed a minimum of 2m back from the top of the riverbank (except within the woodland creation area as outlined in Section 2.2.2), which will also allow the development of riparian vegetation along the riverbank. As needed, fencing of all the main drains discharging into the Cushina River will be repaired, replaced or installed. All fencing along drains will be installed a minimum of 1.5m back from the top of the drain. This will also contribute to improvement of water quality as drain-side vegetation will help trap sediments before discharging into the drain.

In certain places, it will be necessary to install water troughs to ensure cattle have adequate supply of drinking water. Where possible, this water will be sourced from a mains supply associated with a farmyard. However, where this is not possible, solar pumps will be used to pump water from the river. The troughs will be installed a minimum of 20m away from the bank of the river or drain.

2.2.2 Objective: Woodland Creation and Protection of River and Riparian Zone

The Proposed Development will result in the permanent felling of approximately 6.01ha of woodland within the Site to accommodate elements of the infrastructure of the Proposed Development including turbines, peat deposition areas and access tracks. Felling will be done to accommodate these and as part of environmental mitigation measures for bat species (see Chapter 9 and related Appendices). This felling will involve approximately 3.9ha of Coniferous Woodland (WD4) and 2.14ha of Bog Woodland (WN7).

The clear-felling of trees in Ireland requires a felling licence. The Forest Service of the Department of Agriculture, Food & the Marine is Ireland's national forest authority and is responsible for all forest licensing which is governed by the Forestry Act 2014 as amended and the Forestry Regulations 2017 (S.I. No. 191 of 2017). A felling licence will include the provision of relevant replant lands (afforestation area) to be planted in lieu of the proposed tree felling on the Site. The associated afforestation of alternative lands equivalent in area to those lands being permanently clear-felled is also subject to licensing ('afforestation licensing').

The area of trees to be felled will be the minimum required to accommodate the Proposed Development. However, for the purpose of the EIAR the area for felling has been identified as the maximum area that could be required to construct the Proposed Development.

The felling will be the subject of a Felling Licence Application to the Forest Service prior to construction as per the Forest Service's policy on granting felling licenses for wind farm developments. The Applicant commits to not commencing tree removal on site to accommodate the Proposed Development until both felling and afforestation licences are in place and this ensures the afforested lands are identified, assessed and licensed appropriately by the relevant consenting authority.

The measure for woodland creation onsite involves protecting an area of grassland and scrub in the riparian zone and allowing this to develop naturally into woodland. On the northern bank of the Cushina River for the last 1km before it leaves the Site in the east, there is Scrub habitat (WL1) which is already beginning to succeed to woodland. This habitat is accessible to livestock and natural succession seems to be impeded.

Stockproof fencing will be installed approximately 30m back from the riverbank along the last 1km stretch of the river within the Site. This will create approximately 2.7ha of scrub and grassland which will be fenced off from stock and is expected to naturally succeed to native woodland with a corresponding increase diversity and abundance of ground and field layer vegetation. Badger setts are present here and Otter also currently use this area. This measure will enhance the quality of the habitat available to them and other species including pollinators and invertebrates which utilise dead wood and other woodland features. The barbed wire fencing will facilitate the movement of small mammals within the landscape. This measure will ensure the last 1km of the River Cushina within the Site is not accessible to livestock and hence will protect the river, the riverbank and the wider riparian zone, leading to enhanced water quality and riparian habitat. It will result in approximately 2.7ha of woodland to be created in time.

2.2.3 Objective: Protection and Enhancement of Bog woodland

An area of Bog woodland (WN7) to the north of T07 is currently accessible by livestock. Clear signs of use by livestock were noted with resulting areas of bare soil, poaching and prevention of natural woodland field and ground layers within the woodland were noted. This measure will ensure the woodland will be protected from livestock, and it is expected that the habitat condition will improve once this happens. This measure should also make the woodland more suitable for wildlife onsite including Bats, Badgers and other woodland wildlife including birds such as Woodcock and invertebrates such as Bees. A total of 2.6ha will be protected in this way.

2.3 MEASURE: HEDGEROW TRANSLOCATION AND HEDGROW / TREELINE PLANTING

The Proposed Development will result in the removal of approximately 887m of hedgerow and 524m of treeline habitats to facilitate the proposed tracks, substation and the Bat buffer zones and TDR accommodation works. The BEMP however, will result in the creation of 950m of hedgerow and 550m of treeline outside of the bat buffer zones within the Site.

- Hedgerows / treelines will **not** be planted on peat soils.
- Where possible, hedgerows from the bat buffer zones will be translocated to suitable areas identified and prepared within the Site. Translocation will follow existing best practice guidance such as that given by Hedgerows Ireland (https://hedgerows.ie/wp-content/uploads/2024/06/Guidance-Note-Hedgerow-Translocation.pdf.)
- Where translocation is not possible, the remaining length of hedgerow will be planted using native species of native provenance. Species common in the vicinity will be planted.

- Treelines will be planted with native species of native provenance. Trees suited to for the conditions onsite will be chosen. It is likely that it will be necessary to select species suited to wet conditions. Such species would include Alder (*Alnus glutinosa*), Pedunculate Oak (*Quercus robur*), Willow (*Salix* spp.), and Downy Birch (*Betula pubescens*).
- It may be necessary for these to be ordered from a nursery well in advance to ensure availability of native provenance hedgerow and tree species.

2.4 MEASURE: INVASIVE SPECIES CONTROL

A qualified ecologist will be employed to develop an Invasive Species Management Plan for the Site. As part of this, a pre-construction survey will be conducted to determine if there are any changes from the baseline, particularly with regard to Giant Hogweed within the Site and in relation to the presence of any non-native invasive species within the footprint of the development. In addition to the measures outlined below, there will be strict adherence to the measures outlined in the Chapter 9 of the EIAR which outline preventative measures to be undertaken in order to prevent the spread of invasive species along the TDR, GCR and/or into the Site.

2.4.1 Objective: Eradication of Giant Hogweed

A Third Schedule, High Impact non-native invasive species, Giant Hogweed (*Heracleum mantegazzianum*) is present in a hedgerow in the south-west of the Proposed Development Site. This is not within the footprint of the development. However, the proponent of the wind-farm has agreed with the landowner to remove this invasive species as a positive action for the environment. A detailed Invasive Species Management Plan will be developed in conjunction with the Project Ecologist, in order to detail how to eradicate this species. The implementation of this measure will prevent the future spread of this invasive species from the Site and improve the habitat condition of the hedgerow in which it currently occurs.

- It is advisable to implement this measure at the earliest opportunity in order to reduce the risk of this species increasing from its current level. The smaller the infestation, the easier it will be to control and eradicate.
- A qualified ecologist will be employed to develop an Invasive Species Management Plan
- This will include plans for eradicating Giant Hogweed from the site
- A survey will be conducted to ascertain if the occurrence of this species has changed since the baseline or indeed if any other third schedule, non-native species have become established within the Site.
- A detailed method statement will be produced and this will be followed.
- Methodology will follow best practice guidelines.
- Contaminated areas will be marked out clearly. These areas will include a 4m buffer around the plants to account for seeds in the soil.
- All construction personnel will be made aware of the contaminated area and will avoid it.

- Methods may be mechanical, chemical or a combination of both.
- Follow-up work will be necessary to ensure regrowth and seedings are also controlled. This is likely to be necessary for about 7 years.

2.4.2 Objective: Eradication of Snowberry in Construction Footprint

Snowberry (*Symphoricarpos albus*) is not a Third Schedule species and according to the National Biodiversity Data Centre has a Low risk of Impact. However, as the aim of the BEMP is to enhance the biodiversity at the Site and there is a risk, when creating the Bat buffer zones, of causing a degradation of biodiversity if by clearing the hedgerow in which the Snowberry is growing, this causes it to become established elsewhere. Snowberry can spread via seed and root fragments. Hence, as part of the BEMP, the Snowberry within the footprint of the Proposed Development, will be eradicated before construction. This will be done following best available guidance. There are two main options currently recommended (source JKI Environmental):

1. **Mechanical:** Snowberry can be excavated and moved to a deep cell on-site or to a licensed waste facility.
2. **Chemical:** Snowberry can be treated by foliar spraying with herbicide or by drilling the base of the plant and applying herbicide into drill holes in April / May, this will be followed up with a second treatment in August. This treatment will have to be repeated on a yearly basis for 4-5 years.

3 MONITORING

A monitoring programme will be put in place to document and record the results for comparison to the expected benefits. Monitoring will focus on areas of habitat enhancement and other biodiversity enhancement measures as well as some other mitigation measures outlined in various chapters of the EIAR. A BEMP monitoring report will be compiled at the end of each monitoring year detailing the progress and findings of all management and monitoring activities. Monitoring and reporting will be undertaken by independent, suitably experienced and qualified ecologists employed by the wind farm operator. The BEMP will be considered as a dynamic document and will be reviewed at the end of each monitoring year and modified as required, pending submission to and approval by Kildare and Offaly County Councils and NPWS.

3.1 WATERCOURSES

Monitoring of watercourses will include monitoring of water quality protection measures as outlined in Chapter 12 (Hydrology) and those measures aimed at protecting and enhancing water quality outlined in this BEMP. This will include visual inspections of the outfalls of cross drains and settlement ponds as well as all in-ditch wetlands. When inspecting the in-ditch wetlands, it is important to monitor the structural integrity of the barrier structures as well as the clarity of the water within, and flowing out of, the wetlands. If visual inspections give rise to concerns regarding

water quality, field-testing and laboratory tests will be carried out to clarify if the measures are working properly. Any improvement works necessary will be carried out in a timely manner. Or, if the concerns are regarding the structural integrity of any features, these will be immediately addressed and if repairs are deemed necessary, repairs will be done in a timely manner. Surface water quality mitigation measures will be visually inspected daily during the construction stage and more frequently (up to several times a day) if there is significant surface water onsite after heavy rainfall events/periods.

As part of the monitoring of the in-ditch wetland monitoring, annual surveys of the wetland plants and aquatic faunal species will also be undertaken. Pre-construction surveys of the drains at the points where in-ditch wetlands will be created will be undertaken so that subsequent monitoring surveys can document the results and report on the expected benefits.

Inspection of the approx. 2.5km length of stockproof fencing will be undertaken regularly and especially after flooding events. Inspections should note the location of any issues to be resolved such as damaged posts, erosion around posts, damaged wires etc. Any damage that causes a breach in the fence will need to be repaired immediately. Annual inspections of the riverbank will monitor the progress of riverbank recovery.

Aquatic ecology surveys that were completed in the Cushina River within or downstream of the Site as part of the EIA process to monitor water quality will be repeated every 3-5 years for the first 15 years. In addition, there will be a pre-construction assessment of the biological water quality approximately 10m downstream of the watercourse crossing points of the Cushina River (within the Site) and the Philipstown River (at node 29/30 of the TDR accommodation works). These assessments will use the EPA Q-value methodology and will be carried out once prior to the commencement of construction and on a six-month basis until 6 months after construction works cease.

3.2 WOODLANDS

The woodland habitats protected as part of the BEMP will be monitored. The stockproof fences will be monitored regularly for signs of damage or any breaches. If found, these will be repaired immediately. The Bog Woodland that is protected in the BEMP and the riparian area where woodland creation is expected, will be resurveyed to monitor habitat condition in the first year of the operational phase of the wind farm and every 3-5 years thereafter. Monitoring will focus on species and structural diversity, damage, and threats.

3.3 HEDGEROWS AND TREELINES

Ecological surveys of the hedgerows and treelines to monitor the success of hedgerow translocation and the success of treeline and hedgerow establishment will be undertaken in the

first, second and third years after translocation or planting. Any issues such as failure of hedgerows or trees to establish, shall be rectified as soon as possible. Thereafter, monitoring for any failure/damage will be conducted annually while full ecological surveys will be undertaken every 3-5 years.

3.4 INVASIVE SPECIES

Invasive species monitoring will be undertaken annually for the first 10 years after eradication and full follow-up treatment/control work will be undertaken if invasive species are still present (as outlined in Chapter 9, Volume 2 of the EIAR). Once there has been full eradication of Giant Hogweed from the Site and Snowberry from the construction footprint as outlined in the BEMP and Chapter 9, then monitoring can be reduced to every 3-5 years. If monitoring reveals the need for follow-up treatment, this will be undertaken following best practice guidelines and methods outlined in Chapter 9.

3.5 BIRDS

Post-construction bird monitoring will take place to establish whether the construction and operation of the Proposed Development has had effects on the bird species associated with the Site identified prior to construction (as shown by the baseline surveys in the 2017-2025 period). The monitoring programme will comprise the following:

- Flight activity surveys
- Transect survey within the site
- Water bird surveys at nearby wetland sites as identified in the baseline surveys
- Collision searches

3.6 BATS

Post-construction monitoring surveys will be carried out in order to assess the effectiveness of the mitigation measures for bats (see Chapter 9, Volume 2 and Appendix 9-1, Volume 3 of this EIAR). Post-construction surveys will take place on the first, second, third, tenth and fifteenth year of the operational phase and will include the following elements:

- Detector surveys of bat activity near turbines
- Detector surveys to determine the continuing status of any nearby roosts
- Corpse-search regime. This can be undertaken in conjunction with bird corpse-searches and should take place over a number of consecutive days.
- Existing best practice guidelines will be followed.

Following the completion of Year 1 monitoring the requirement for turbine curtailment to minimise/avoid impacts to bat species will be identified. In the event that curtailment is required the curtailment scheme will be informed by the results of the Year 1 monitoring. This will facilitate

targeting of curtailment to the turbines and times of years where bat fatalities were identified during the monitoring.

4 CONCLUSION

The overall effect of the BEMP after implementation and over time will be a positive benefit on the water quality, native woodland cover and aquatic habitat cover. It is expected that there will be a corresponding increase in biodiversity. Although the Proposed Development will result in some habitat loss of KERs, the BEMP will result in a greater amount of corresponding habitat creation. In addition, through the removal of the Third Schedule Invasive species, Giant Hogweed, the ecological integrity of the habitats in the vicinity will be improved and protected.

An overall summary and comparison of the expected habitat loss and habitat gains of KER habitats as a result of the Proposed Development, including the BEMP, are presented in Table 4 and Table 5 below.

Table 4 Area of KER habitats and woodland habitats to be removed and gained from the Proposed Development

Habitat Type	Area of habitat to be removed (ha)	Habitat gain /benefit (ha)	Net gain (ha)	Description / rationale
Drainage Ditches (FW2)	0.0245	0.0300 (minimum)	0.0055	A small amount of net gain will be achieved in terms of area but the actual gain is likely to be greater due to expected higher quality of habitat created in the in-ditch wetlands in comparison to the drains that will be culverted. At worst, no net loss is expected.
Scrub (WS1) / native woodland	0	2.7	2.7	An area of scrub habitat will be fenced off in the riparian zone to protect it from livestock, deer and other large animals. The area of scrub will increase and eventually succeed to woodland.
Bog Woodland (WN7)	(2.1)	2.6	2.6	An area of woodland will be planted offsite subject to felling and forestry licences to replace the 2.1ha of bog woodland that will be felled. Hence, the protection and enhancement of 2.6ha of bog woodland onsite corresponds to 2.6ha of net gain. This area of bog woodland will be fenced and there will be positive effects on overall woodland ecology.

Conifer Woodland (WD4)	(3.9)	N/A	N/A	An area of woodland will be planted offsite subject to felling and forestry licences to replace the 3.9ha of conifer woodland that will be felled.

The total Net Gain from the implementation of the BEMP as part of the Proposed Development will be 5.31ha.

Table 5 Length of KER habitats to be removed and gained from the Proposed Development

Habitat Type	Length of habitat to be removed (m)	Habitat gain /benefit (m)	Net gain (m)	Description / rationale
Lowland/ depositing River (FL2)	0	2400	2400	The 2.4km stretch of the Cushina River within the Site is expected to benefit from the BEMP in terms of water quality, condition of substrate and integrity of riverbank. This will be achieved through the fencing off of livestock and the installation and maintenance of the in-ditch wetlands in drains.
Hedgerows (WL1)	887	950	63	The main reason for the hedgerow loss is the implementation of bat foraging buffers. Translocation and/or planting of native hedgerows onsite will only be carried out on non-peat soils. Where possible, hedgerows will be translocated/planted to reconnect severed habitats. The planned planting will yield a net gain of 63m of hedgerow.
Treelines (WL2)	524	550	26	524m of treelines will be lost to accommodate the Proposed Development, mainly to facilitate the bat buffers. Planting of trees suited to the conditions on-site, likely to include mostly species suited to wet soils.
Other Feature				
Invasive Species	n/a	98	98	Giant Hogweed will be removed from a hedgerow of approximately 98m in length. This hedgerow will improve in its overall ecology. Snowberry will be removed from a 34m length of hedgerow, but as this hedgerow will be felled to accommodate bat buffers, it will not result in a corresponding gain. (The gain from hedgerow planting has already been accounted for above).

The total Net Gain of linear habitat from the Proposed Development following the implementation of the BEMP will be 3.99km of linear habitat.