

Appendix 6B

Non Volant Mammals Report

MWP

Non-Volant Mammal Survey Report
Ballycar Wind Farm

Ballycar Green Energy

January 2024

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Project No.	Doc. No.	Rev.	Date	Prepared By	Checked By	Approved By	Status
22156	3013	A	January 2023	MaK, HD, ÚW			DRAFT
22156	6008	B	12 Dec 2023	MaK, HD, ÚW	OS/MT	OH	FINAL

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1. Introduction

Ecologists from Malachy Walsh and Partners, Engineering and Environmental Consultants (MWP) were commissioned to produce an assessment of the potential impacts of the proposed Ballycar Windfarm on the flora and fauna of the receiving environment as part of an Environmental Impact Assessment Report (EIAR). As part of this assessment, non-volant mammal surveys were undertaken. Non-volant mammals are land-based mammals that cannot fly, *i.e.* excluding bats. Non-volant mammals will be referred to as ‘mammals’ from herein. The aims of these mammal surveys were to:

- Record baseline information on mammal activity within the study area.
- Record the location of potential resting and/or breeding places of protected mammal species.

1.1 Legislation and Guidance

Many mammal species in Ireland are protected under the provisions of the Wildlife Act, 1976, and the Wildlife Amendment Act, 2000, where it is an offence to intentionally kill or injure a protected species or to wilfully interfere with or destroy the breeding site or resting place of a protected wild animal.

Section 23 (5)(d) of the Wildlife Act 1976, as amended, states:

‘any person who wilfully interferes with or destroys the breeding place or resting place of any protected wild animal, shall be guilty of an offence’.

Some mammal species in Ireland, such as otter, are also protected under European Law. Otter is listed under Annex II and Annex IV of the EU Habitats Directive (92/43/EEC) which affords this species additional strict protection, including for breeding sites and resting places, both inside and outside designated Special Areas of Conservation (SACs).

1.2 Site Overview

The proposed development site encompassing approximately 104.7 hectares is situated approximately 3 kilometres north of Limerick City and suburbs in south-east County Clare. Moving west to east, the site encompasses the townlands of Glennagross, Ballycar North, Cappateemore East, Ballycannan West, Ballycannan East and Ballycar South.

Situated within a rural landscape (c. 60 m – 262 m OD), lands within the study area are primarily managed for agriculture and commercial forestry. The topography of the study area primarily slopes southwards, with lands typically less intensively managed for agriculture in the upland areas, which is also where the most commercial forestry is located.

The condition and ecological importance of habitats within the study area are varied. Remnant areas of upland blanket bog and wet heath occur but these areas are fragmented likely due to the expansion of commercial forestry and intensive agricultural practices. Wet grassland and dry-humid acid grassland habitats also occur and while most of these areas show signs of extensive cattle activity (trampling, over-grazing, exposed peat/soils), some areas are species-rich and not as intensively grazed.

2. Methodology

2.1 Desk Study

The desk study involved a comprehensive review of information and data available for the existing environment. The principal sources of information referred to during the desk review included:

- Ordnance Survey Ireland (OSI) aerial photography and 1:50,000 mapping;
- National Parks and Wildlife Service (NPWS) online datasets and literature;
- National Biodiversity Data Centre (NBDC) on-line databases.

Records of protected non-volant mammals from the NBDC database for hectad R56 which encompasses the study area, and information received from the NPWS data request for rare and protected species, were reviewed. These records are listed in **Table 1**, below.

Table 1. Desk Study Results (R56)

Common Name	Species Name	Level of Protection	Record Origin
Badger	<i>Meles meles</i>	Wildlife Act, 1976 (and Wildlife (Amendment) Act, 2000)	NBDC, NPWS data request
Fallow deer	<i>Dama dama</i>	Wildlife Act, 1976 (and Wildlife (Amendment) Act, 2000). Invasive Species - High Impact.	NBDC, NPWS data request
Hedgehog	<i>Erinaceus europaeus</i>	Wildlife Act, 1976 (and Wildlife (Amendment) Act, 2000)	NBDC
Irish hare	<i>Lepus timidus hibernicus</i>	Annex V, Wildlife Act, 1976 (and Wildlife (Amendment) Act, 2000)	NBDC, NPWS data request
Irish stoat	<i>Mustela erminea hibernica</i>	Wildlife Act, 1976 (and Wildlife (Amendment) Act, 2000)	NBDC, NPWS data request
Otter	<i>Lutra lutra</i>	Annex II & IV, Wildlife Act, 1976 (and Wildlife (Amendment) Act, 2000)	NBDC, NPWS data request
Pine marten	<i>Martes martes</i>	Annex V, Wildlife Act, 1976 (and Wildlife (Amendment) Act, 2000)	NBDC, NPWS data request
Pygmy shrew	<i>Sorex minutus</i>	Wildlife Act, 1976 (and Wildlife (Amendment) Act, 2000)	NBDC, NPWS data request
Red squirrel	<i>Sciurus vulgaris</i>	Wildlife Act, 1976 (and Wildlife (Amendment) Act, 2000)	NBDC

The NBDC species list generated on-line was also examined to assess the distribution of invasive terrestrial mammal species within the hectad R56. The following invasive species have been recorded in this area; American mink (*Mustela vison*) and bank vole (*Myodes glareolus*).

2.1.1 Badger

Badger distribution is widespread throughout Ireland and their preferred habitats include a mixture of pasture grasslands, hedgerows, and areas of scrub and woodland which provide both foraging opportunities and adequate cover (Smal, 1995). Badgers form stable social groups that share a territory. An important resource within this territory is a sett, comprising a series of connecting underground tunnels and chambers accessible by ground-level entrance and exit points which are dug out and maintained by the badgers (Macdonald *et al.* 2004). Badgers are opportunistic feeders with a diet that includes fruit, plants, small invertebrates, fungi and carrion (Cleary *et al.* 2009). Badgers are legally protected under the Wildlife Act, 1976 (and Wildlife (Amendment) Act, 2000) and are listed under Appendix III of the Bern Convention.

Transport Infrastructure Ireland (TII) (formerly NRA) produced a guidance document for badgers titled '*Guidelines for the treatment of badgers prior to the construction of national roads schemes*' (NRA¹, 2005). The following guidelines are taken from that document.

Breeding Season (December – June, inclusive)

During the breeding season, no works will take place within 50 m of a sett. No blasting or pile driving will take place within 150 m of a sett. Works may take place during the breeding season within 50 m of a sett subject to consultation with the NPWS and providing adequate mitigation measures are in place. No active sett will be interfered with or disturbed during the breeding season as any sett category may contain cubs. Closure of setts during the breeding season would require monitoring to demonstrate no sett activity.

Non-Breeding Season (July – November, inclusive)

No heavy machinery will be used within 30 m of a sett. Lighter machinery (*e.g.* wheeled machinery) will not be used within 20 m of a sett. Light work (*e.g.* digging by hand, clearing scrub) will not take place within 10 m of a sett. Works may occur within 30 m of a sett subject to consultation with the NPWS and providing adequate mitigation measures are in place.

2.1.2 Otter

Otter are found throughout Ireland. They tend to occupy linear territories along watercourses and are rarely found far away from water. This species utilises under-ground dens known as holts for resting and breeding purposes, and above-ground resting places known as couches (Mason & Macdonald, 1986). As a top predator in the aquatic environment, an otter's diet is typically made up of aquatic species ranging from salmonids, eel and crayfish but they will also opportunistically take other prey items such as frogs, bird and small mammals (Ottino & Giller, 2004).

This species is listed under Annex II of the EU Habitats Directive and under Appendix II of the Bern Convention. It is also a legally protected species under the Wildlife Act, 1976 (and Wildlife (Amendment) Act, 2000). Otter is listed as one of the qualifying interests of the Lower River Shannon SAC (002165).

The National Roads Authority (NRA) produced a guidance document for otters titled '*Guidelines for the treatment of otters prior to the construction of national roads schemes*' (NRA, 2006). The following guidelines are taken from that document.

The following provisions will be in place during the construction phase of a development within the vicinity of active otter holts.

- No works within 150 m of an active holt utilised by breeding females and/or cubs.
- No wheeled or tracked vehicles to be used within 20 m of an active holt.

¹ National Roads Authority (NRA) are now known as Transport Infrastructure Ireland (TII)

- No light work (*i.e.* digging by hand or scrub clearance) to be undertaken within 15 m of an active holt.

2.1.3 Pine Marten

The pine marten is a semi-arboreal member of the mustelid family and, while it is typically associated with woodland habitats, in Ireland its range has been found to also encompass more open scrub habitats (O'Mahony *et al.*, 2006). This species is considered to be an opportunistic generalist predator with a diet that includes fruit, birds and rodents (Twining *et al.*, 2019). Pine marten is listed under Annex V of the EU Habitats Directive and under Appendix III of the Bern Convention; it is also a legally protected species under the Wildlife Act, 1976 (and Wildlife (Amendment) Act, 2000).

3. Field Surveys

The scope of mammal surveys was informed by the initial ecological surveys carried out on site in June 2021 and species previously recorded in the hectad R56 encompassing the study area. Non-volant mammal surveys, apart from dedicated badger and otter surveys, were completed in June (8th, 10th, 11th) and July (19th, 20th, 21st, 22nd) 2021. Dedicated badger surveys were completed in October (27th and 28th) 2021 and an otter survey at proposed stream crossing sites was completed on 23rd February 2022.

The surveys targeted species protected under the Wildlife Acts, species listed in Annex II, Annex IV and Annex V of the Habitats Directive, and Irish Red Listed species (Marnell *et al.* 2019). Particular focus was given to protected species such as badger (*Meles meles*), Irish hare (*Lepus timidus hibernicus*), pine marten (*Martes martes*), and otter (*Lutra lutra*) given the type of habitat features present within the study area and the species records listed by the NBDC for hectad R56 .

These surveys involved a comprehensive search for mammal activity in the form of prints, scat, resting places, feeding signs, mammal trails and direct observations. These surveys had regard to the following guidelines:

- Muir & Morris (2013): The Mammal Society publication '*How to find and identify mammals*';
- NRA (2009): '*Guidelines Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes*';
- Bang & Dahlstrom (2004): '*Animal tracks and signs*';
- Chanin (2003a): '*Monitoring the Otter Lutra lutra*';
- Scottish Badgers (2018): '*Surveying for Badgers: Good Practice Guidelines*';
- SNH (2003): '*Best Practice Badger Survey Guidance Note*';
- JNCC (2004): '*Common Standards Monitoring Guidance for Mammals (August 2004)*'.

3.1 Target Surveys

3.1.1 Badger

Dedicated badger surveys were carried out on the 27th and 28th of October 2021; however, signs of badger activity were also recorded during other ecological surveys on-site, including the recording of an active badger sett which was confirmed by a trail camera set up in July 2021.

Evidence of activity by badgers including latrines, hair, foraging activity (snuffle holes), commuting movements (badger tracks) or setts and bedding were searched for and recorded.

3.1.1.1 Badger Sett Classification

When a badger sett was located, it was classified using guidelines set out in Scottish Badgers (2018). The following information was recorded:

- GPS coordinates:
- Photographs:
- Signs of recent or old activity such as tracks, digging, snuffle holes, bedding outside of sett, latrines, etc.:
- Number and size of entrances:
- The presence of mammal trails leading away from entrances, possibly connecting to other setts in the wider area.

Each sett entrance was classified as either Well-Used (WU), Partially-Used (PU) or Disused (DU) depending on the level of activity recorded (See **Table 2**, below).

Table 2. Sett Entrance Classification

Classification	Description
Well-Used (WU)	No vegetation growing in or around the entrance, signs of fresh digging/tracks, excavation heaps outside entrance.
Partially-Used (PU)	Some vegetation growing in or around the entrance, no signs of recent activity.
Disused (DU)	Collapsed entrance, overgrown vegetation covering the entrance and tunnel, blocked by debris (artificially or otherwise).

Badger setts were classified according to Scottish Badgers (2018) as either a Main Sett, Annexe Sett, Subsidiary, or Outlier Sett (See **Table 3**, below). It is noted that classifying setts can be difficult and setts can change classification over time according to degree of usage and changing sett characteristics.

Table 3. Sett Classification

Sett Type	Definition
Main	Several holes with large spoil heaps and obvious paths emanating from and between sett entrances.
Annexe	Normally less than 150 m from main sett, comprising several holes. May not be in use all the time, even if main sett is very active.
Subsidiary	Usually at least 50 m from main sett with no obvious paths connecting to other setts. May only be used intermittently.
Outlier	Little spoil outside holes. No obvious paths connecting to other setts and only used sporadically. May be used by foxes and rabbits.

3.1.2 Otter

Otter surveys were carried out with a particular focus on watercourses within the study area. Surveys of existing stream crossings, both animal-made and human-made, were completed as part of the mammal surveys conducted in June and July 2021. Proposed new stream crossings were visited in February 2022. Otter signs including spraints, footprints, tracks, couches and holts were searched for with regard to ‘*Ecology of the European Otter*’ by Chanin (2003b).

3.1.3 Pine Marten

Pine marten surveys were completed as part of the overall non-volant mammal surveys in July and August 2021. Surveys for this species primarily focused along the outskirts of the conifer plantation and woodland areas present within the study area. Surveys included searches for signs of pine marten such as droppings, footprints, checking for tunnels and dens.

3.2 Trail Cameras

To supplement walkover surveys, 5 No. trail cameras in total were deployed at locations that were noted as potentially suitable breeding/resting habitat and/or had evidence of mammal activity. Some of these cameras were set up in proximity to the entrances of badger setts under licence (Licence No. 55/2020). It is noted here that one of the trail cameras (Camera 2) was missing from where it was deployed and has not since been recovered. The duration that individual cameras were deployed is outlined in **Table 4**, below.

Table 4. Trail camera deployment description.

Camera Number	Duration	Comments
Camera 1	19 th July 2021 to 19 th August 2021	Set up in proximity to a badger sett entrance. Classified as a main entrance given size and how well used it is. Entrance in hedgerow to one side of a farm track. Trail camera clock reset so the time stamp is inaccurate.
Camera 2	19 th July 2021 (not recovered, see above)	Set up in proximity to a single entrance burrow within a shaded riparian linear woodland, adjacent to a stream. This camera was subsequently found to be missing and has not since been recovered.
Camera 3	22 nd July 2021 to 28 th August 2021	This camera was set up on a well-worn mammal trail along an established hedgerow bounding agricultural grassland.
Camera 4	21 st July 2021 to 28 th August 2021	Like Camera 3, this camera was set up on a well-worn mammal trail along an established hedgerow bounding agricultural grassland.
Camera 5	28 th Oct 2021 to 15 th Nov 2021	Camera set up in proximity to a badger sett entrance under a prominent beech tree.

4. Survey Constraints

The proposed wind farm site contains areas of dense conifer forestry plantations. Due to the inaccessibility of conifer plantations, the internal forestry areas could not be surveyed. However, fire breaks, forestry clearings and the outskirts of the plantations were accessible for surveys.

A trail camera went missing from where it was deployed outside of a potential badger sett and has not been recovered. To avoid further risk to equipment, no additional trail cameras were set up in this location. This burrow has been identified as a badger sett for reasons outlined in **Section 5.1.1**, below, and the necessary protection measures outlined in '*Guidelines for the Treatment of Badgers Prior to the Construction of National Roads Schemes*' (NRA, 2005) will be applied in this case.

The placement of cameras generally was further restricted by the presence of cattle in various parts of the site. A trail camera was not set up in front of Sett D for example (see **Section 5.1.1**, below) due to cattle activity. In spite of restrictions, the surveys undertaken at the site and results obtained therein are regarded as representative of the study area.

5. Results

This section outlines mammal results of targeted mammal and other ecology surveys of the study area and describes any signs of mammal activity recorded. **Table 5**, below outlines all non-volant mammal activity recorded. **Plate 1**, below, shows examples of the different types of mammal signs recorded during surveys. **Plate 2**, below, shows examples of mammal observations recorded by the trail cameras.

5.1 Badger

No visual observations were made of this species. However, signs of badger activity were frequently recorded throughout the study area not only during the dedicated badger surveys completed in October 2021 but also during other ecology surveys. Evidence of badger activity in the form of scats, latrines, tracks and hair, was recorded throughout the study area, primarily within and in proximity to field boundaries comprised of hedgerows and treelines. Badger activity was also recorded by trail cameras (See **Table 6**, below).

5.1.1 Badger Setts

Four badger setts were located within the study area, referred to as Sett A, Sett B, Sett C and Sett D hereafter. Trail cameras were set up at three of the setts (Sett A – C).

None of the four setts identified are located within 30 m or 50 m of the proposed turbine locations, proposed access tracks, met mast, substation or grid connection (see **Figure 1**, below).

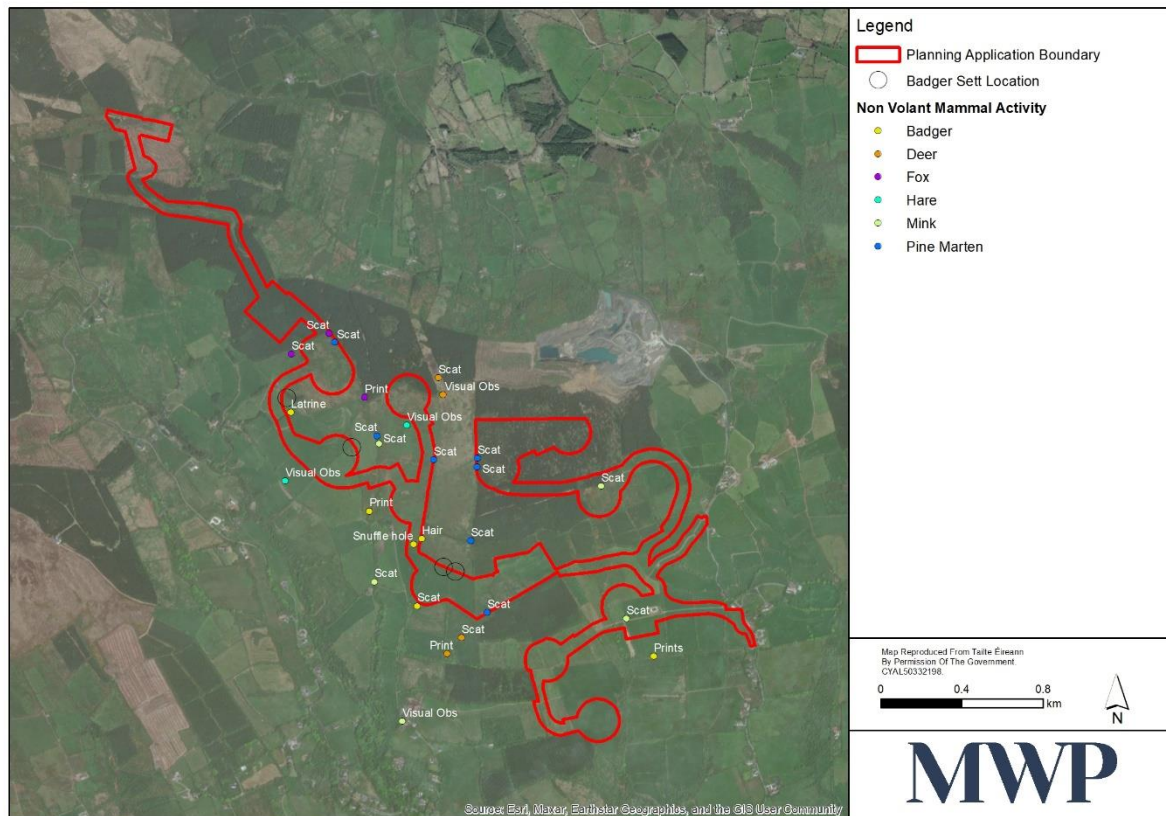


Figure 1: Badger setts and other non-volant mammal activity identified within the EIA study area

Sett A

Sett A is located within a hedgerow bounding a farm track in the northwest of the study area. The sett comprised two entrances that were between 30 – 40 cm in diameter with a flattened arch shape typically associated with badger sett entrances. The tunnels inside the entrances were clean and free of debris and vegetation. Fresh soil heaps were present outside both entrances, as was discarded bedding. A fresh latrine was located c. 50 m south of the sett and badger tracks were recorded along the farm track leading to the sett.

A trail camera set up outside one of the entrances between the 19th July and the 19th August 2021 recorded badger activity throughout the camera’s deployment. This sett was checked in October 2021 and again in March 2022 (during other ecology surveys) and showed signs of continuous activity.

The sett was confirmed Active at the time of surveys. While only two entrances were recorded here, it is considered likely that this is a Main Sett, given the continuous level of activity observed at different times of the year and taking into account the large main entrance and spoil heaps present. See **Plate 3**, below.

Sett B

Sett B is located within riparian woodland on a slope adjacent to a fast-running stream in the north-west of the study area. This sett comprised of a single entrance c. 20 – 25 cm wide. The shape of the entrance did not comprise the flattened arch shape that is typically associated with badger setts entrances. There was a small amount of leaf litter recorded in the tunnel and discarded bedding was recorded in front of this entrance. While the size and shape of the entrance is not typically associated with the entrance of a badger sett, the presence of discarded bedding in the vicinity of the entrance was considered in identifying this as a potential sett entrance. No latrines were located in the vicinity of this sett entrance; however, signs of badger foraging activity in the form of snuffe holes were located in the field adjoining the riparian woodland.

As outlined in **Section 3.2**, above, a camera was deployed at this location to confirm the presence of a badger sett. However, this trail camera went missing from this location and was not subsequently recovered by the surveyor. On a precautionary basis and based on the presence of bedding and the spoil heap, this burrow has been identified as a potential badger sett entrance.

Given the condition of the single entrance, this is likely an Outlier Sett. The sett is deemed to be Active. See **Plate 4**, below.

Sett C

Sett C is located among the roots of a mature beech tree, within a hedgerow field boundary, in the middle of the study area. The sett comprises of a single entrance c. 30 – 40cm wide with a flattened arch shape typically associated with badger sett entrances. An additional entrance to this sett was located on the other side of the hedgerow, but this entrance was caved in. The main entrance was relatively clean and free of vegetation with minimal leaf litter present inside the entrance. No latrine was located in the vicinity of the sett entrance. A trail camera set up outside one of the entrances between the 29th of October and the 15th of November 2021. This camera recorded badger activity inside the sett entrance on two occasions during the camera's deployment.

This sett corresponds somewhat with a Main Sett given the level of activity recorded here. This sett has been classed as an Active sett. See **Plate 5**, below.

Sett D

Sett D is located within a hedgerow field boundary, c. 60 m to the east of Sett C, in the middle of the study area. The sett comprised a single entrance c. 20 cm across. The entrance hole has a wide base, partially encompassing a tree root across the top of the entrance, with sufficient space to allow badgers entry. Minimal vegetation and leaf litter was found inside and around the entrance, and on the spoil heap in front. A latrine was located on the far side of the hedgerow. A trail camera was not set up here due to the presence of cattle in the field.

This sett is likely a Subsidiary Sett associated with Sett C. This sett has been classed as an Active Sett. See **Plate 6**, below.

5.2 Otter

No breeding or resting sites for otter were recorded within the study area, nor was any evidence of otter found, such as prints or spraints. The watercourses within the site are not considered optimal for breeding or foraging otter as they are too small to support fish in numbers that would make it energetically feasible for foraging otter. It is likely that the larger watercourses further downstream are suitable for breeding and foraging otter.

Should otter occur within the study area, it is likely to be on a transitional basis only.

5.3 Irish Hare

Visual observations were made of this species, particularly within the wet grassland and heath habitats present in the north and northwest sections of the study area.

There is suitable resting and breeding habitat for this species within the study area.

5.4 Pine Marten

While no direct observations of this species were made during surveys, evidence of pine marten was recorded throughout the study area. The primary signs of pine marten activity were scats located along treelines,

hedgerows and in proximity to the conifer plantation to the north and northwest. Pine marten were also recorded on two of the trail cameras deployed (See **Table 6**, below).

The study area is deemed to contain suitable resting and breeding habitat for this species.

5.5 Irish Stoat

An Irish stoat was recorded on a trail camera set up in proximity to a badger sett in the northwest of the study area (See **Table 6**, below). While no other signs of this species were recorded during ecological surveys undertaken, the study area is deemed to contain suitable resting and breeding habitat for this species.

5.6 Other Mammals

No breeding/resting sites, visual observations or evidence of other protected non-volant mammal species such as red squirrel, pygmy shrew or hedgehog were recorded within the study area during ecological surveys. However, the study area is deemed to contain suitable resting and breeding habitat for these species.

With regard to other non-volant mammal species, fox scat and tracks were recorded throughout the study area, particularly on farm tracks. Rabbit activity in the form of burrows and dropping were recorded along hedgerows.

Evidence of sika deer was recorded through visual observations, tracks and droppings throughout the study area, with a concentration of activity in the upland heath habitats and within proximity to the ash and conifer plantation. It was noted that the ash plantation in the centre of the site is demarcated by an existing deer fence.

Signs of American mink were recorded within the study area in proximity to watercourses. A mink was observed by a surveyor crossing a farm track and entering a field. This species is classed as an invasive species – ‘High Impact’. No signs of bank vole or wild boar were recorded.

Table 5. Results of non-volant mammal surveys (excluding badger sett locations)

Species	Date of Record	GPS (ITM)		Evidence of mammal activity
		X	Y	
Badger	8th June 2021	554992	663389	Snuffle hole
Badger	8th June 2021	555034	663417	Hair
Pine Marten	8th June 2021	555274	663406	Scat
Pine Marten	8th June 2021	555306	663770	Scat
Pine Marten	8th June 2021	555307	663814	Scat
Hare	8th June 2021	554959	663976	Visual Observation
Deer	8th June 2021	555137	664127	Visual Observation
Badger	10th June 2021	554773	663553	Print
Pine Marten	10th June 2021	554604	664385	Scat
Fox	10th June 2021	554576	664429	Scat
Fox	10th June 2021	554751	664113	Print
Fox	10th June 2021	554391	664327	Scat
Badger	10th June 2021	555010	663086	Scat
Mink	11th June 2021	554800	663205	Scat
Deer	11th June 2021	555228	662930	Scat
Deer	11th June 2021	555158	662852	Print
Badger	19th July 2021	554387	664040	Latrine
Pine Marten	19th July 2021	555091	663805	Scat

Species	Date of Record	GPS (ITM)		Evidence of mammal activity
		X	Y	
Mink	20th July 2021	554821	663885	Scat
Pink Marten	20th July 2021	554812	663924	Scat
Pine Marten	22nd July 2021	555356	663055	Scat
Mink	22nd July 2021	556041	663023	Scat
Mink	22nd July 2021	555916	663676	Scat
Mink	22nd July 2021	554937	662518	Visual Observation
Badger	22nd July 2021	556176	662838	Prints
Deer	27th October 2021	555115	664209	Scat

Table 6. Results of trail camera surveys

Camera 1		
Species	No. of Observations	Description
Badger	41	Badger activity was first recorded on the 25 th of July 2021 and was frequently recorded up until the camera was retrieved on the 19 th August 2021. Recorded badger activity included digging around the sett entrance and frequently entering and exiting the sett entrance. Activity was recorded primarily during the night, but some activity was also recorded during daylight hours.
Irish Stoat	1	One observation of this species was recorded on the 25 th of July 2021 during daylight hours, adjacent to the sett entrance.
Mouse spp.	10	Mice were frequently recorded running along the hedgerow. The species could not be identified due to the quality of the trail camera footage.
Pine Marten	2	Two observations of this species were recorded by the trail camera, the first time on the 24 th of July 2021 when an individual was observed running past the sett entrance. The second observation, recorded on the 27 th of July 2021, comprised an individual inspecting the camera. Both observations were recorded during daylight hours.
Rat	3	This species was recorded during the night only.
Shrew spp.	12	Shrew were frequently recorded running along the hedgerow. The species could not be identified due to the quality of the trail camera footage.
Other Species	32	Bird species were recorded by the trail camera including blackbird, chaffinch, dunnock, robin, song thrush and wren.
Camera 3		
Species	No. of Observations	Description
Badger (potential)	1	Camera field of view was reduced. A potential observation of badger was recorded once. This could not be confirmed due to the angle of the camera.
Other Species	-	Other species recorded included rat and dunnock.
Camera 4		
Species	No. of Observations	Description
Badger	2	Two observations of this species using the mammal trail were recorded, the 1 st on the 23 rd July 2021. Both observations were recorded at night.

Pine Marten	5	Pine marten was recorded, usually inspecting the camera. The first observation was recorded on the 24 th of July. All observations were recorded at night.
Other Species	2	Bird species recorded included blackbird and wren.
Camera 5		
Species	No. of Observations	Description
Badger	6	This camera underwent significant interference from cattle present in the field. This resulted in the field of view changing a great deal, as did the quality of the images. While badger was recorded here, it is likely that a lot of observations were missed due to this interference by livestock. The first observation of this species was recorded on the 29 th of October 2021 and the last observation was recorded on the 13 th of November 2021. Badger was recorded both inside the sett entrance as well as entering and exiting the sett entrance. All observations were recorded at night.
Fox	1	Observations of these species were recorded at night. All species were recorded just inside the entrance of the sett.
Mouse	2	
Rat	1	
Wren	1	



Plate 1. Evidence of mammal activity recorded during field surveys. Badger prints (top left), Pine Marten scat (top right), Mink scat (bottom right), Badger latrine (bottom left).



Plate 2: Mammal observations recorded by trail cameras. An Irish stoat in proximity to a badger sett entrance - Sett A (top left), a badger exiting a sett entrance – Sett A (top right), Pine Marten on a mammal trail (middle right), Badger inside entrance of a sett – Sett C (bottom right), Pine Marten inspecting the trail camera (bottom left).



Plate 3. Sett A - comprising two entrances. Note fresh bedding and spoil heaps.



Plate 4. Sett B - Comprised a single entrance. Note bedding at the base of the stream bank, directly below entrance.



Plate 5. Sett C - Comprising a single entrance at the base of a beech tree



Plate 6. Sett D - Comprising a single entrance. Located c. 60 m east of Sett C.

6. Conclusion

Non-volant mammal species recorded within the study area comprised badger, pine marten, Irish stoat, Irish hare, sika deer, fox, mink, and rodent species including shrew. The habitats within the study area are considered suitable as breeding and resting habitat for a range of protected mammal species.

Signs of otter activity were not recorded within the study area, nor were any suitable resting/breeding places.

Badger setts, four in total, were recorded within the study area - Sett A (Main Sett), Sett B (Outlier Sett), Sett C (Main Sett), and Sett D (Subsidiary Sett). All four setts showed signs of badger activity and two setts, Sett A and Sett C, had badger activity confirmed by trail cameras. None of the setts are within 30 m or 50 m of a proposed turbine location, access track, met mast, substation or grid connection (see **Figure 1**). However, given the proximity of T9 to Sett C and Sett D, the proximity of T2 to Sett B, the proximity of a proposed access track to Sett A and the scale of the proposed works, the mitigation measures in the following sections will be implemented. Many of these measures will also safeguard other protected mammals.

6.1 Proposed General Mitigation Measures for the Treatment of Badgers on Site.

The following measures outlined below, adapted from NRA (2005), will be put in place prior to the commencement of construction activity and for the duration of site works.

- Prior to the commencement of construction-related works, a barrier will be put in place to demarcate the required buffer around each badger sett to ensure that contractors/operators on-site are aware that works are prohibited inside the buffer. The barrier will be long term and not prone to deterioration or damage. Bunting is an option on a temporary basis.
- All contractors/operators on-site will be made fully aware of the procedures pertaining to setts via a site induction prior to the commencement of construction-related works.
- For the entire site, all open excavations will be suitably covered and/or backfilled when not in use or a ramp provided to prevent the entrapment of badgers and other wildlife.
- Security fencing will not inhibit the movement of badgers and other wildlife. Where possible, a 20 to 30 cm gap will be retained between security fencing and ground level to allow wildlife to move through the site unhindered.

6.1.1 Pre-Construction Survey

Prior to the commencement of any works on-site and any measures being implemented, additional pre-construction badger surveys will be carried out. These will comprise of a survey of setts within 50 m of all works areas (150 m where piling or blasting will be undertaken) following guidance in NRA (2005). The habitats within the survey area will be walked by a suitably qualified ecologist to determine badger activity.

The aim of the pre-construction survey is to establish the current status of previously identified setts and also to identify any new setts within the survey area which have been created in the intervening period. During the survey, a detailed account of each sett will be taken, including GPS coordinates and photographs. All signs of badger activity, such as snuffle holes, digging, hair, trails, footprints, latrines and droppings within the survey area will be recorded.

The pre-construction survey will take place no more than 10 to 12 months in advance of construction. This will ensure that there is sufficient time to comply with all licensing requirements in advance of commencement of construction. This survey will be supplemented by an additional survey immediately prior to any works commencing to ensure that no new setts have been established in the intervening period and that setts identified previously continue to be used by badgers. The objective of the pre-construction surveys is to ensure that mitigation measures put forward are adequate to address any potential impacts to badgers and their breeding or resting places (NRA, 2005).

6.1.2 NPWS Wildlife Licence

As outlined in **Section 2.1.1**, above, no works will occur within 50 m of an active sett during the breeding season (December – June, inclusive), nor within 30 m of an active sett during the non-breeding season (July – November, inclusive). A Wildlife Licence for badger will be required from NPWS with regards to badger setts which have the potential to be directly/indirectly impacted by the proposal, including where works are necessary inside the buffers specified above, if required.

6.1.3 Badger Sett Destruction

The badger setts will be retained on site and no loss of setts are proposed as part of the works. Pre-construction surveys will determine badger activity prior to construction and establish current status of badger and setts at locations identified during surveys. For setts identified, fencing and soil mounds are proposed to be erected to provide a visual and audio screening of construction activity. Signs will be erected to alert construction workers to the exclusion zone. The exclusion zone will not be breached and working hours will be limited to daylight hours in the vicinity of the zone.

In the event that the pre-construction survey finds badger setts within the proposed development site, the evacuation and/or exclusion of badgers from setts may be considered. The evacuation and exclusion of badgers from a sett should only be carried out where a development will unavoidably destroy a sett, any part of its underground tunnel and chamber system, or its immediate surroundings making it unsuitable for continued occupancy. Such works must be carried out under licence. The evacuation and exclusion of badgers from active setts should only be carried out during the non-breeding season (July to November, inclusive). The methodology set out in *'Guidelines for the treatment of badgers prior to the construction of national roads schemes'* (NRA, 2005) should be followed in the case where sett destruction is necessary.

6.2 Proposed Mitigation at Identified Setts.

The proposed location of a windfarm access track is c. 55 m from Sett A, at its closest point. The proposed location for T2 is c. 75 m from Sett B. The proposed location of T9 is c. 90 m from Sett C and c. 95 m from Sett D. There is a proposed access track that will go in front of T9, that is c. 65 m from Sett B and c. 73 m from Sett D.

Depending on the level of activity recorded at Sett B, Sett C and Sett D during pre-construction surveys undertaken by a Project Ecologist/Ecological Clerk of Works, turbine-related construction activity closest to the setts will be conducted outside the breeding season, where possible, so as to reduce potential disturbance of badgers. Additionally, fencing will be erected, and a soil mound installed between the proposed works and the setts. These will be located as close to the 30 m sett buffer as possible to ensure that the intervening buffer distance between the proposed works and the setts are maximised as much as possible. The fence and soil mound will be of sufficient length and height to provide visual screening of construction activity from the full extent of each sett. These measures will also assist in attenuating noise generated from the works. This will ensure that a separation distance of approximately 30 m between construction activity and each sett is maintained for the duration of the works (non-breeding season). Signs will be erected to alert construction workers that this exclusion area must not be breached. Construction activity and working hours will be restricted to standard daytime working hours in this area.

Where it is not possible to carry out turbine-related construction activity closest to the setts during the non-breeding season exclusively, fencing/soil mound buffers, as described above, will be installed at the 50 m sett buffer. This will ensure a separation distance of approximately 50 m between construction activity and each sett is maintained for the duration of the works (breeding season).

The implementation of all mitigation measures will be overseen by the Project Ecologist/Ecological Clerk of Works (ECoW).

7. References

- Bang, P. and Dahlstrom, P. (2004). *Animal Tracks and Signs*. Oxford University Press.
- Chanin, P. (2003a). *Monitoring the Otter* *Lutra lutra*. Conserving Natura 2000 Rivers Monitoring Series No. 10, English Nature, Peterborough, England.
- Chanin, P. (2003b). *Ecology of the European Otter*. Conserving Natura 2000 Rivers Ecology Series No. 10. English Nature, Peterborough, England.
- Cleary, G.P., Corner, L.A.L., O’Keeffe, J. and Marples, N.M. (2009). The diet of the badger *Meles meles* in the Republic of Ireland. *Mammalian Biology*, 74 (6), 438–447.
- Fossitt, J.A. (2000) A Guide to Habitats in Ireland. The Heritage Council, Kilkenny.
- Joint Nature Conservation Committee (JNCC) (2004). Common Standards Monitoring Guidance for Mammals (August 2004). Joint Nature Conservation Committee, Quay House, 2 East Station Road, Fletton Quays, Peterborough, England. [Available at: [Common Standards Monitoring Guidance for Mammals \(jncc.gov.uk\)](http://jncc.gov.uk)].
- Macdonald, D.W., Newman, C., Dean, J., Buesching, C.D. and Johnson, P.J. (2004). The distribution of Eurasian badger, *Meles meles*, setts in a high-density area: field observations contradict the sett dispersion hypothesis. *Oikos*, 106(2), pp.295-307.
- Marnell, F., Looney, D. and Lawton, C. (2019). Ireland Red List No. 12: Terrestrial Mammals. *National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland*.
- Mason, C.F. and Macdonald, S.M. (1986). *Otters: ecology and conservation*. Cambridge University Press, Cambridge.
- Muir, G. and Morris, P. (2013). *How to find and identify mammals*. Mammal Society.
- National Roads Authority (NRA) (2005). *Guidelines for the Treatment of Badgers Prior to the Construction of National Roads Schemes*. National Roads Authority, Dublin.
- National Roads Authority (NRA) (2006). *Guidelines for the Treatment of Otters Prior to the Construction of National Roads Schemes*. National Roads Authority, Dublin.
- National Roads Authority (NRA) (2009). *Guidelines Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes*. National Roads Authority, Dublin.
- O’Mahony, D., O’Reilly, C. and Turner, P. (2006). National pine marten survey of Ireland 2005. *COFORD Connects Environment*, 8.7:1–8.
- Ottino, P. and Giller, P. (2004). Distribution, density, diet and habitat use of the otter in relation to land use in the Araglin valley, Southern Ireland. In *Biology and Environment: Proceedings of the Royal Irish Academy* (Vol. 104, No. 1, pp. 1-17). Royal Irish Academy.
- Scottish Badgers (2018). *Surveying for Badgers: Good Practice Guidelines*. Version 1. [Available at: [Surveying-for-Badgers-Good-Practice-Guidelines_V1-2020-2455979.pdf \(scottishbadgers.org.uk\)](http://scottishbadgers.org.uk)].