

Shannon Technology and Energy Park (STEP) Power Plant

Appendix A.7B.1: Mammal Report

Shannon LNG Limited

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Shannon Technology and Energy Park (STEP)

Mammal Report

March 2024

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1. Introduction

1.1 Project Background

The information in this report was used to assess the potential impacts on mammal populations and also informed the conclusions of the ecological assessment of the Proposed Development.

1.2 Habitats

The Proposed Development is located along the southern coastline of the Shannon Estuary, c.4.5km from Tarbert and c.3.5 km Ballylongford in Co. Kerry. The site occupies part of two townlands, Kilcolgan Lower and Ralappane. The Proposed Development site is in a rural/agricultural setting and is bounded to the north by the Shannon Estuary.

The Lower River Shannon Special Area of Conservation (SAC) borders the Proposed Development site along the northern/north-western boundary and also along part of the eastern boundary of the site. The River Fergus Estuaries Special Protection Area (SPA) extends along the north-western shoreline boundary of the site. The proposed jetty extends into the Lower River Shannon SAC and the River Shannon and River Fergus Estuaries SPA. The Ballylongford Bay proposed Natural Heritage Area (pNHA) is adjacent to a part of the north-western boundary of the site. The location of the Proposed Development site relative to these designated areas is shown in **Figure 1**.

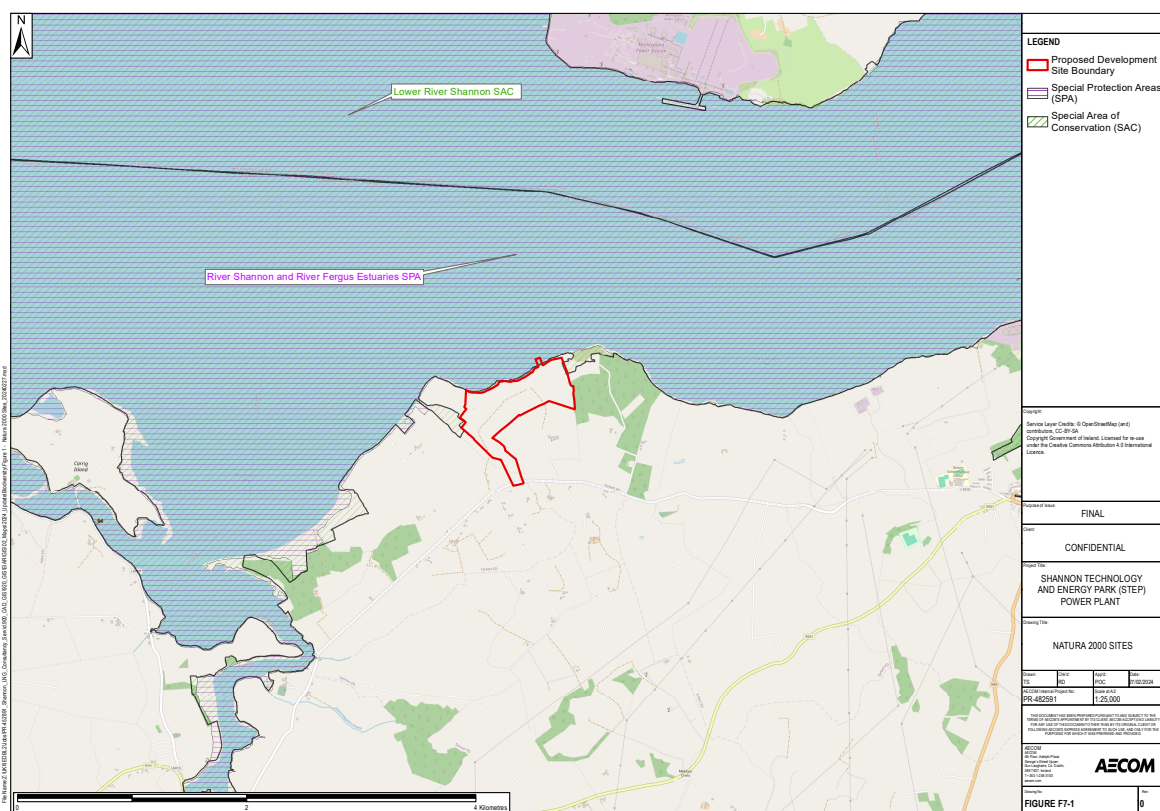


Figure 1. Natura 2000 sites in the vicinity of the Proposed Development site

The Proposed Development site is dominated by agricultural grassland which is grazed by cattle. The shoreline to the north of the site is relatively sheltered and composed of shingle or

low earthen cliffs. Habitat varies with topography. As a general pattern the fields in the eastern part of the site are larger, relatively dry and more intensively farmed. Smaller, wetter fields are located within the western section of the site. Outside the western boundary of the site there is a mixture of semi-natural habitats including a reedbed, lagoon and a small watercourse. There are two structures within the Proposed Development site boundary. As the site is relatively exposed, hedges and treelines are generally poorly developed. A habitat map of the Proposed Development site is included in **Figure 2**.



Figure 2. Habitat map

1.3 Report contributors

This report was prepared by Carl Dixon MSc (Ecological Monitoring) and Sorcha Sheehy PhD (Ecology/Ornithology).

Carl Dixon holds an Honours Degree (BSc) in Ecology and a Masters (MSc) in Ecological Monitoring from UCC. He is a senior ecologist who has over 25 years' experience in ecological assessment. Prior to setting up DixonBrosnan Environmental Consultants in 2000, Carl set up and ran Core Environmental Services which included REPS planning for landowners and ecological assessments.

Carl has particular experience in freshwater ecology including electrofishing fish stock assessments and water quality assessments. He also has considerable experience in habitat mapping and mammal ecology including survey work and reporting in relation to badgers and bats. Other competencies include surveys for invasive species and bird surveys.

Carl has extensive experience with regards to EIAR and NIS mitigation and impact assessment. He has particular experience in large-scale industrial developments with extensive experience in complex assessments as part of multi-disciplinary teams. Such projects include gas pipelines, incinerators, electrical cable routes, oil refineries and quarries. Carl was the lead ecologist for the Shannon LNG project and associated pipeline and CHP plant from 2007 to 2012 and is the lead terrestrial ecologist for the current project.

Sorcha Sheehy PhD (ecology/ornithology) is an ecologist and ornithologist who has worked for 15 years in environmental consultancy. She has worked on Screening/NISs for a range of small and large-scale projects with expertise in assessing impacts on birds.

Sorcha's PhD research focused on bird behaviour at airports, where she studied bird avoidance behaviour and collision risk to aircraft. Her research involved field observations, post-mortem analysis and radar surveys. Sorcha has worked on bird collision risk assessments at airports throughout Ireland including Dublin airport, Cork airport, Shannon airport and Kerry airport.

During her consultancy work Sorcha carried out field-based surveys and environmental reports including NIS, AA screening and EIARs. Notable projects include the Arklow Bank Wind Park, Indaver Ireland Waste Management Facility at Ringaskiddy, Irving Oil Whitegate Refinery (IOWR), Shannon LNG and Greenlink Interconnector.

2. Receiving Environment

2.1 Desktop Study

A desktop study was carried out to collate and review available information, datasets and documentation sources pertaining to the site's natural environment. It involved an examination of mammal records from the 10km grid square (hectad) within which the site is located using the National Biodiversity Data Centre (NDBC) mapping system. The Proposed Development site is located within the R04 hectad.

2.1.1 Badger

Badgers and their setts are protected under the provisions of the Wildlife Acts 1976, as amended. 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. The density of Badgers in Ireland is approximately one social group per km² in lowland areas with a high component of pasture. In upland areas where feeding is scarce Badgers are generally found at lower densities. Overall the average density in Ireland is approximately one social group per 2km². Badger setts are formed by a complex group of interlinked tunnels and therefore works in proximity to setts can potentially cause damage.

Badger has been recorded on 31 occasions within hectad R04 (Source NBDC March 2024). The most recent of these was in March 2023. There are no NBDC records of Badger within the Proposed Development site boundary. The closest Badger records are approximately 2.4km southeast of the Proposed Development site boundary.

2.1.2 Otter

Otters, along with their breeding and resting places, are protected under the provisions of the Wildlife Act 1976, as amended. Otters have additional protection because of their inclusion in Annex II and Annex IV of the Habitats Directive which is transposed into Irish law in the European Communities (Birds and Natural Habitats) Regulations 2011, as amended. Otters are also listed as requiring strict protection in Appendix II of the Berne Convention on the Conservation of European Wildlife and Natural Habitats and are included in the Convention on International Trade of Endangered species (CITES).

Although rare in parts of Europe, Otters are widely distributed in the Irish countryside in both marine and freshwater habitats. Otters are solitary and nocturnal and as such are rarely seen. Thus, surveys for Otters rely on detecting signs of their presence. These include spraints (faeces), anal gland secretions, paths, slides, footprints and remains of prey items. Spraints are of particular value as they are used as territorial markers and are often found on prominent locations such as grass tussocks, stream junctions and under bridges. In addition, they are relatively straightforward to identify.

Otters occasionally dig out their own burrows but generally they make use of existing cavities as resting places or for breeding sites. Suitable locations include eroded riverbanks, under trees along rivers, under fallen trees, within rock piles or in dry drainage pipes or culverts etc. If ground conditions are suitable the holt may consist of a complex tunnel and chamber system. Otters often lie out above ground especially within reed beds where depressions in the vegetation called "couches" are formed (NRA, 2008a). Generally, holts or resting areas can be located by detecting signs such as spraints or tracks.

In contrast, natal holts which are used by breeding females, can be extremely difficult to locate. They are often located a considerable distance from any aquatic habitats and Otters may also use habitats adjoining small streams with minimal or no fish populations. In addition, natal holts are usually carefully hidden and without obvious sprainting sites. Otters do not have a well-defined breeding season.

It is noted that Otters are largely nocturnal, particularly in areas subject to high levels of disturbance as evidenced by the presence of Otters in the centre of Irish cities. Thus, they are

able to adapt to increased noise and activity levels; however, breeding holts are generally located in areas where disturbance is lower.

Otters are a qualifying interest for the Lower River Shannon SAC (site code 002165). The conservation objective for Otter within the SAC is “to restore the favourable conservation condition of Otter in the Lower River Shannon SAC, which is defined by the following list of attributes and targets” (listed in **Table 1**).

The range of Otter in the areas surveyed within the Lower River Shannon is 73.53% over an area of 684 km². This has fallen from 100% occurrence in 1980/1981. Otter’s main source of prey within the Shannon are frogs (42.9%), followed by stickleback (35.7%) and salmonids (21.4%) (Bailey and Rochford 2006). Coastal otters feed predominately on marine species but may also travel inland via estuaries to feed on brackish or freshwater food resources (Weir & Bannister, 1977). Reid *et al.* (2013) found otters living along coasts have a greatest niche breadth than those in freshwater systems which encompasses a wide variety of intertidal prey though pelagic fish are rarely taken.

Table 1. Conservation Objectives for Otter within the Lower River Shannon SAC

Attribute	Measure	Target
Distribution	Percentage positive survey sites	No significant decline
Extent of terrestrial habitat	Hectares	No significant decline. Area mapped and calculated as 596.8ha above high water mark (HWM); 958.9ha along river banks/ around ponds
Extent of marine habitat	Hectares	No significant decline. Area mapped and calculated as 4,461.6ha
Extent of freshwater (river) habitat	Kilometres	No significant decline. Length mapped and calculated as 500.1km
Extent of freshwater (lake) habitat	Hectares	No significant decline. Area mapped and calculated as 126.6ha
Couching sites and holts	Number	No significant decline
Fish biomass available	Kilograms	No significant decline
Barriers to connectivity	Number	No significant increase

Source: NPWS (2012) Conservation Objectives: Lower River Shannon SAC 002165. Version 1.0. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

Otter have been recorded on eight occasions in hectad R04. The most recent of these was in February 2015 (Source NBDC March 2024). There are no NBDC records of Otter within the Proposed Development site boundary. The closest records of Otter are approximately 1.2km southwest of the Proposed Development site boundary at Kilcolgan Lower, where three live Otters were recorded in February 2015 and Otter spraints were recorded in February 1981.

2.1.3 Bats

In Ireland, nine species of bat are currently known to be resident. These are classified into two Families: the Rhinolophidae (Horseshoe bats) and the Vespertilionidae (Common bats). The Lesser Horseshoe Bat *Rhinolophus hipposideros* is the only representative of the former Family in Ireland. All the other Irish bat species are of the latter Family and these include three pipistrelle species: Common *Pipistrellus pipistrellus*, Soprano *P. pygmaeus* and Nathusius' *P. nathusii*, four *Myotis*: Natterer's *Myotis nattereri*, Daubenton's *M. daubentonii*, Whiskered *M. mystacinus*, Brandt's *M. brandtii*, the Brown Long-eared *Plecotus auritus* and Leisler's *Nyctalus leisleri* bats.

Near threatened status is applied to those taxa that are close to being listed as vulnerable (facing a high risk of extinction in the wild in the medium-term future on the basis of a range of criteria defined by the IUCN). All bat species in Ireland, with the exception of Leisler's Bat are listed as "Least Concern". Leisler's bat which is "Near-threatened" (Marnell *et al.* 2009). The Irish population of the Lesser Horseshoe Bat is estimated at 14,000 individuals and is considered of International Importance because the species has declined dramatically and become extinct in many other parts of Europe. Data collected shows that the species increased significantly between from the early 1990s to present.

All bat species are protected under the Wildlife Act 1976, as amended, which make it an offence to wilfully interfere with or destroy the breeding or resting place of all species; however, the Acts permit limited exemptions for certain kinds of development. All species of bats in Ireland are listed in Schedule 5 of the 1976 Act and are therefore subject to the provisions of Section 23 which make it an offence to:

- Intentionally kill, injure or take a bat
- Possess or control any live or dead specimen or anything derived from a bat
- Wilfully interfere with any structure or place used for breeding or resting by a bat
- Wilfully interfere with a bat while it is occupying a structure or place which it uses for that purpose.

All bats are listed on Annex IV of the EU Habitats Directive. Lesser Horseshoe Bat is further listed in Annex II of the EU Habitats Directive. The level of protection offered to Lesser Horseshoe Bats effectively means that areas important for this species are designated as Special Areas of Conservation. The domestic legislation that implements this Directive gives strict protection to individual bats and their breeding and resting places. It should also be noted that any works interfering with bats and especially their roosts, including for instance, the installation of lighting in the vicinity of the latter, may only be carried out under a licence to derogate under the European Communities (Birds and Natural Habitats) Regulations 2011 (which transposed the EU Habitats Directive into Irish law) issued by NPWS.

Table 2 summarizes the protection given to bats by national and international legislation and conventions.

Table 2. Legislative protection for bats in Ireland

Legislation/Convention	Relevance to Irish bats
The Wildlife Act 1976, as amended	It is an offence to wilfully interfere with or destroy the breeding or resting place of bats, (with some exemptions for certain kinds of construction development). Provides for the creation of NHAs.
EC Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora (Directive 92/43/EEC), commonly known as the 'Habitats Directive, transposed into Irish law by the European Communities (Birds and Natural Habitats) Regulations 2011	Lists all the vesper bats in Annex IV as in need of strict protection and also encourages Member States to conserve landscape features such as river corridors, field boundaries, ponds and woodlands. It also requests that Member States establish a system to monitor the incidental capture and killing of the animals listed in Annex IV. The lesser horseshoe bat is further listed in Annex II of the EU Habitats Directive. The level of protection offered to lesser horseshoe bats effectively means that areas important for this species are designated as Special Areas of Conservation.
The Convention on the Conservation of European Wildlife and Natural Habitats, commonly known as the 'Berne Convention'.	It obliges states to protect and conserve animals and their habitats, especially those listed as endangered or vulnerable. Also obliges parties to promote national policies for the conservation of wild fauna and natural habitats
The Convention on the Conservation of Migratory Species of Wild Animals, commonly known as the 'Bonn Convention'.	This led to the European Bats Agreement (EUROBATS), which lists a wide range of objectives, including promoting research programmes relating to the conservation and management of bats, promoting bat conservation and public awareness of bats, and identifying and protecting important feeding areas of bats from damage and disturbance.

A review of existing bat records within a 10km radius of the Proposed Development site boundary (sourced from Bat Conservation Ireland's (BCI) National Bat Records Database via the NBDC) indicates that only one of the nine Irish bat species listed in **Table 3**, have been recorded within R04.

Table 3. Presence of Irish bat species within grid squares R04

Common name	Scientific name	Presence
Lesser Noctule	<i>Nyctalus leisleri</i>	Absent
Pipistrelle	<i>Pipistrellus pipistrellus sensu lato</i>	Absent
Soprano Pipistrelle	<i>Pipistrellus pygmaeus</i>	Absent
Daubenton's Bat	<i>Myotis daubentoniid</i>	Absent
Natterer's Bat	<i>Myotis nattereri</i>	Absent
Brown Long-eared Bat	<i>Plecotus auratus</i>	Absent
Whiskered Bat	<i>Myotis mystacinus</i>	Present
Lesser Horseshoe	<i>Rhinolophus hipposideros</i>	Absent
Nathusius's Pipistrelle	<i>Pipistrellus nathusii</i>	Absent

Source NBDC 04/03/24

A study by Lundy *et al.* (2011) examined the relative importance of landscape and habitat associations across Ireland. Maximum Entropy Models (MEM) were constructed for each bat species using records from the National Bat Database from 2000-2009. This method allows species' records that have not been collected in a systematic survey to be analysed. The results help explain patterns of species' occurrence and predict where species might occur. Landcover (CORINE), topography, climate, soil pH, riparian habitat and human bias factors were incorporated into the models. The analyses provide a picture of the broad scale geographic patterns of occurrence and local roosting habitat requirements for Irish bat species. This also provides a 'habitat suitability' index. The index ranges from 0 to 100, with 0 being least favourable and 100 most favourable for bats. The habitat indices for all Irish bats for the landscape around the Proposed Development site is shown in **Table 4**.

Table 4. Model Predicted Habitat suitability indices for All Irish bat species

Bat species	Common Name	Habitat indices
All Bats		30.33
<i>Pipistrellus pygmaeus</i>	Soprano pipistrelle	40
<i>Plecotus auratus</i>	Brown long-eared bat	43
<i>Pipistrellus pipistrellus</i>	Common pipistrelle	34
<i>Rhinolophus hipposideros</i>	Lesser horseshoe	19
<i>Nyctalus leisleri</i>	Leisler's bat	34
<i>Myotis mystacinus</i>	Whiskered bat	19
<i>Myotis daubentoniid</i>	Daubenton's bat	24

Bat species	Common Name	Habitat indices
<i>Pipistrellus nathusii</i>	Nathusius' pipistrelle	31
<i>Myotis nattereri</i>	Natterer's bat	29

Source: NBDC 03/03/24

2.1.4 Other Mammal Species

Nine other species of terrestrial mammal have been recorded within grid square R04, five of which are protected under the Wildlife Act 1976, as amended, namely Hedgehog, Irish Hare, Red Squirrel, Fallow Deer and Sika Deer.

Hedgehog (*Erinaceus europaeus*)

Hedgehog (*Erinaceus europaeus*), also listed on Appendix III of the Berne Convention, can be found throughout Ireland, with male Hedgehogs having an annual range of around 56 hectares. A number of factors are thought to influence the distribution of Hedgehogs in a habitat, with nest sites, food availability and the presence of predators believed to be major contributory factors. Generally, Hedgehogs prefer edge habitat and pasture but in recent years have begun to colonize urban areas. Due to the habitats recorded within the Proposed Development site and surrounding landscape, Hedgehog is likely to occur.

Red Squirrel (*Sciurus vulgaris*)

Red Squirrel (*Sciurus vulgaris*), also listed on Appendix III of the Berne Convention, can be found throughout Ireland. Red Squirrels feed mainly on tree seeds, although they can utilise fungi, fruit and buds as they become available in the woodland. They are found in all types of habitat but typically are in higher densities in mature mixed broadleaved forests. They can also survive in monoculture coniferous woodland. Red Squirrel is known to occur in the wider area (NBDC records). However, no signs of Red Squirrel were recorded during site surveys and there will be no impact on high quality habitat for this species.

Irish hare (*Lepus timidus hibernicus*)

The Irish Hare (*Lepus timidus hibernicus*) is one of three lagomorphs found on the Island of Ireland and the only native lagomorph. It is listed on Appendix III of the Berne Convention, Annex V(a) of the EC Habitats Directive (92/43/EEC) and as an internationally important species in the Irish Red Data Book. Irish Hare was recorded within the Site boundary during the 2011 surveys, although not in the 2007 surveys. Two Hares were recorded foraging in grassland at the southeast (during general site surveys) of the Site on the 22nd of April 2021. A single Hare was also recorded along the shoreline (during winter bird surveys) to the east of the Site boundary on the 21st January 2019. The Site of Local importance (Lower value) for Irish Hare.

Sika Deer (*Cervus nippon*) and Fallow Deer (*Dama dama*)

Sika Deer (*Cervus nippon*) and Fallow Deer (*Dama dama*) are both non-native species to Ireland. Both species prefer forest with dense understorey, thickets, natural woodlands and commercial plantations, but will also forage in open grassy areas with dense cover nearby. Sika and Fallow Deer are highly opportunistic feeders, foraging on grasses to a range of

shrubs and tree species. However, no evidence for the presence of these species was recorded within the Proposed Development site.

3. Previous Mammal Surveys

During the initial constraints study in 2006, two mammal species were recorded from the site, namely Irish hare and Fox; although it was considered probable that other species were present. Based on the habitats noted on site, more detailed surveys were carried out in 2007 for Badgers, Bats and Otters. Additional survey work was also carried out in 2011 for the Shannon LNG CHP Plant Environmental Impact Statement. The results of these surveys are discussed below.

3.1 Badger Surveys 2007

DixonBrosnan surveyed the proposed site in January/February 2007. Sections of the site consist of wet grassland, which is generally unsuitable for Badger setts. However dry, semi-intensive pasture within the Proposed Development site did provide suitable habitat for Badgers. Feeding signs and paths were noted at various locations within the site and two setts (Setts 2 and 3) were located within the site boundary. A further sett (Sett 1) was located immediately outside the site boundary. The location of these setts is shown in **Figure 3**.

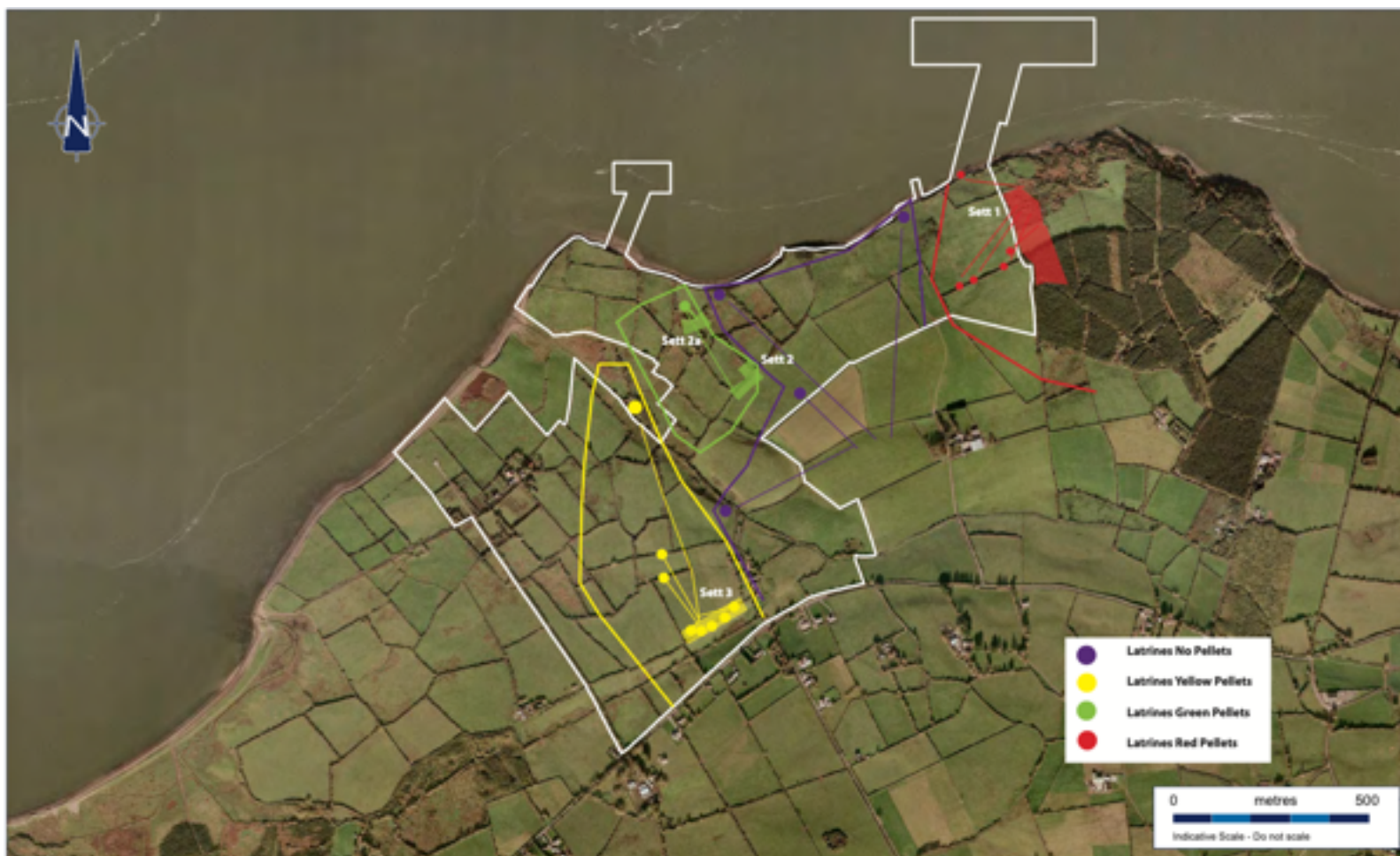


Figure 3. Location of Badger Setts recorded in 2007 and possible Badger territories as determined by bait marking survey in 2007 | White line shows Proposed Development site boundary for previous application.

Sett 3, which is a large main sett, was located within an existing hedgerow in the south western section of the site. There were signs of Badgers along the length of the hedgerow (100m approximately) including latrines, paths and sett entrances. There were a large number of sett entrances >20 only some of which were active.

Sett 1 which was immediately outside the eastern site boundary was also a large sett with a very well-worn path running along the boundary of the site.

Sett 2 was a smaller sett, which had been developed on a disused track. Although smaller than the other two setts, it appeared active with signs of bedding noted at one of the entrance holes.

Setts 1 and 3 were large setts with obvious paths, larger numbers of sett entrances and extensive signs of feeding activity. Both setts were therefore considered to be main setts. Sett 2 was located between setts 1 and 3 and although active was smaller and less developed. Following initial surveys, the status of Sett 2 was uncertain, therefore a detailed bait marking survey was carried out.

3.1.1 Badger Bait marking survey 2007 and 2011

The objective of the bait marking survey at the site was primarily to determine the status of Sett 2 i.e. whether this was the main sett of a third social group or an annexe/subsidiary sett associated with either of the other two setts. A secondary objective was to determine the distribution of territories of the different social groups.

The bait marking survey was carried out from the 25th March to April 5th, 2007. A mixture of peanuts, maple syrup and dyed pellets was placed under heavy stones (approximately 1-5 kg in weight) in the vicinity of the sett entrances and along the Badger runs at setts 2 and 3. Sett 1 was located outside the site boundary and therefore baits were placed along a very well defined Badger path which runs along the eastern boundary of the site. Red pellets were used at Sett 1, green at Sett 2 and yellow pellets at Sett 3 as shown on **Figure 3**. There was bait uptake at all three sites. During and after completion of the baiting programme an intensive latrine survey of the site was carried out. The survey was designed in consultation with Dr. Paddy Sleeman UCC who also assessed the results of same.

3.1.2 Bait Marking Survey - Conclusions 2007

A number of latrines were located which contained coloured pellets (See **Figure 3**). However the effectiveness of the survey was impaired by the unseasonally dry weather which occurred over the bait marking period. In dry periods Badgers can have serious problems in finding sufficient food and can lose a high proportion of their body weight. In such circumstances the production of faeces is significantly lowered (Dr. P. Sleeman pers. comm.). It is also noted that significant land clearance work by a local farmer was carried out adjacent to Sett 3 during Spring 2007. This may also have disrupted normal Badger activity. None the less certain tentative conclusions were reached.

The distribution pattern of the red pellets as shown on **Figure 3** suggests that the territory of Badgers from Sett 1 does not extend as far as Sett 2. Red pellets were found inside the site boundary however these latrines were located a considerable distance east of Sett 2.

There was significant bait uptake at Sett 3 suggesting a large Badger population as expected and yellow pellets were noted in latrines relatively close to the sett. However a latrine with yellow pellets was located on the eastern side of the watercourse.

At Sett 2 bait uptake was limited and an additional small sett (Sett 2a) was located northwest of Sett 2. This was a small sett which appears to have been only recently occupied. Due to dense scrub, locating latrines in this area was problematical, however one latrine with pellets was located adjacent to Sett 2a. Based on the 2007 bait marking survey, no evidence suggested that Setts 2 and 2a was associated with either Sett 1 or Sett 3. Based on the results it was concluded that Setts 2/2a were probably used by a separate, distinct social group.

A number of latrines were noted which did not contain any pellets. The distribution pattern of these un-pelleted latrines suggests that a fourth social group utilised part of the site. It was considered probable that the main sett for this social group was located outside the site boundary. Based on the available information some tentative conclusions were reached. These are detailed below and the most probable distribution pattern for Badgers on site as determined in 2007 is shown in **Figure 3**.

The evidence suggested that the territory associated with Sett 1 was largely outside of the Proposed Development site boundary.

1. Similarly the evidence suggested that some of the territory of Sett 3 was located outside of the Proposed Development site boundary.
2. Sett 2 and Sett 2a belong to the same social group. No evidence was noted that this social group is associated with either Sett 1 or Sett 3.
3. Based on the pattern of unpelleted latrines it was possible that a fourth social group utilised the site. If a fourth social group was utilising its sett it is almost certainly located outside the boundaries of the site. However the relationship between social group 2/2a and a possible social group 4 needs to be clarified.

It was noted that the results of the survey may have been distorted by site clearance works and in particular by unseasonably dry weather which may have impacted on feeding patterns and use of latrines. It was noted at the time that a less intensive short-term survey would be required in advance of construction to determine the exact status of Sett 2/2a and the possible presence of a fourth social group.

3.1.3 Badger Surveys 2011

A site visit on the 28th of November 2011 ascertained that three setts (Setts 1, 2 and 3) remained in place and activity levels remained similar to those recorded in 2007. The two largest setts, Sett 1 (outside the eastern boundary) and Sett 3 (in the south west section of the overall Shannon LNG site) are large main setts. The sett closest to the Proposed Development (of 2011) was Sett 2 which is a much smaller sett, which was developed on a disused track. Signs of activity were recorded at this sett in 2011. It was concluded in 2011 that a possible sett entrance nominated as Sett 2a in 2007 was no longer used by Badgers.

3.2 Otter Surveys 2007 and 2011

Initial Otter surveys were carried out in January 2007 with a more intensive survey for natal holts carried out in March 2007. The surveys indicated that Otters were present in the wider landscape. (Figure 4).

Initial Otter surveys within the overall Shannon LNG site were carried out in January 2007 with a more intensive survey for natal holts carried out in March 2007. A well-worn Otter track was recorded alongside the tidal section of the Ralappane Stream near the western boundary of the Proposed Development site. Along its length there were several sprainting sites and both spraints and anal gland secretions were noted. A path was also observed where Otters cross into the larger reed bed. Although the stream lacks salmonids it will provide some prey items such as European Eel. A site survey was carried out to locate any potential resting areas/holts or natal holts along the stream. The survey did locate one obvious holt/resting area at the base of an over-mature willow on the riverbank outside the site boundary.

A further survey was carried out an area of dense, impenetrable scrub vegetation in September 2007 (*Specialised Otter survey at Ballylongford, Co. Kerry, DixonBrosnan, 2007*). It used remote surveillance methods (Infra-red system to trigger a stationary camera) to determine if Otters were using this particular area. No evidence of Otter was recorded.

A DixonBrosnan Otter survey in 2011 did not find evidence of Otters along the stream or along the shoreline of the Proposed Development site and no evidence was recorded to indicate that the habitat identified as a resting site in 2007/2008 was still being utilised. There was no obvious track running alongside the stream and no spraint sites were recorded. There was sufficient indentation in the grass margin of the stream to suggest some possible sporadic usage.



Figure 4. Otter survey results 2007

3.3 Bat surveys 2007

The grassland areas, shoreline and river corridor around the Proposed Development site may be used by bats for feeding, however no large trees within the site boundary which could potentially support bat roosts were noted in the 2007 site surveys. Three disused farmsteads were noted, each with a number of outbuildings which could potentially provide suitable habitat for bat roosts. The locations of these buildings are shown on **Figure 5**.

Bat surveys were carried out at all three of the disused farmsteads (locations 1, 2 and 3) and a less intensive survey of two other structures (location 4 a disused building and location 5 a concrete pillbox) were also conducted.

The bat surveys at locations 1-3 were carried out using a standard bat detector (Batbox 3) in April 2007. Common Pipistrelle were detected in relatively small numbers (<20) at two of the farmsteads (locations 1 and 2). Thus it is probable that both of these locations support small summer roosts of these species. No bats were detected at location 3.

Pipistrelle are the most common species in the Irish countryside. Bats will generally use hedgerows and treelines for commuting and foraging. This species commonly occupy disused buildings and older trees with ivy holes and crevices. However, there were no mature or over-mature trees within the site boundaries which are likely to support significant bat roosts. Both The structures at locations 4 and 5 lacked the crevices and spaces which would make them suitable as roosting sites for bats and the presence of bat roosts at these locations was considered highly improbable. No additional bat surveys were carried out as part of the CHP application in 2012.



Figure 5. Bat survey locations

4. Mammal Surveys 2019-2021

Mammal surveys were carried out to inform the EIA preparation process between January 2019 and April 2021, details of which are included in **Table 6**. Surveys were carried out in accordance with the methodology outlined in the NRA guidelines (NRA 2005a, 2005b, 2005c, 2008a and 2008b). General mammal surveys consisted of a site walkover, with features such as field boundaries, stream banks and access tracks being closely searched for signs of mammals. Any tracks or signs (including droppings, prints, resting places, burrows and setts) of mammals occurring within or in the vicinity of the site were recorded using field notes and/or GPS. Identification of mammal field signs was undertaken with reference to; Lawrence & Brown (1973), Sargent & Morris, (2003) and Bang & Dahlstrom (2004). In addition, any direct sighting of mammals made during the walkover survey, trail camera surveys or specialised habitat and bird surveys were also recorded.

4.1 Badger Surveys 2019-2021

4.1.1 Badger Survey Overview

Badger surveys are significantly constrained by vegetational cover and season, and are best conducted from November to April. All areas have to be systematically searched for setts and both sides of hedgerows and boundaries checked. Badger territorial activity is high from mid-January to March and surveys at this time are most efficient in identification of Badger paths, latrines and feeding signs (NRA, 2005a). A secondary but less pronounced peak occurs in October. Surveys can be undertaken outside these favourable periods but field signs will be both less abundant and less obvious.

Within the survey area all fence lines, woodland and scrub habitats were systematically surveyed for evidence of Badgers in the form of:

- Faeces: Badgers usually deposit faeces in characteristic excavated pits, concentrations of which (latrine sites) are typically found at home range boundaries.
- Setts, comprising either single isolated holes or a series of holes, likely to be interconnected underground.
- Paths between setts or leading to feeding areas.
- Scratching posts at the base of tree trunks.
- Snuffle holes (small scrapes where Badgers have searched for insects, earthworms and plant tubers).
- Day nests (bundles of grass and other vegetation where Badgers may sleep above ground).
- Hair traces.
- Footprints

When found, activity levels at setts can be classified using the following criteria:

- Number of well used holes (with one or more of the features : well worn entrance; freshly excavated soil; bedding material)
- Number of partially used holes (leaves or twigs in entrance and/or mosses and other plants growing in or around entrance)
- Number of disused holes (partially or completely blocked, with considerable amount of excavation required for reoccupation)

Setts are classified using the conventions shown in **Table 5**.

Table 5. Sett Types

Sett type	Definition
Main	Several holes with obvious, large spoil heaps and obvious paths between the sett entrances
Annexe	Generally less than 150m from the main sett and consisting of several holes. May be used periodically.
Subsidiary	Usually at least 50m from main sett with no obvious paths. May be used intermittently
Outlier	Little spoil and no obvious paths. Intermittent use only

4.1.2 Badger Bait Marking Survey Methodology

Bait marking surveys can be extremely useful for establishing the limits of Badger social group territories. (SNH 2003). Bait-marking techniques rely upon the fact that Badgers mark the

boundaries of their territories with dung pits (or aggregations of these, known as 'latrines'). These are regularly maintained by a large proportion of the Badger social group, although most of the marking activity is thought to be undertaken by the adult males.

Bait-marking requires the placement of food (usually a mixture of peanuts and syrup) at a main Badger sett. This bait, containing harmless indigestible plastic markers, is then consumed by the resident Badgers. During subsequent defecation the Badgers deposit these coloured markers in dung pits throughout their range, including other setts used by the social group, and on the boundaries of their territory. Different coloured markers are used for each main sett. By undertaking systematic surveys of latrine and dung-pit sites, and noting the colour of the markers contained in each, the boundaries of adjacent Badger social groups can be determined.

Accurate delineation of territory boundaries requires that the study be undertaken at the correct time of the year (spring or autumn); that several adjacent Badger social groups are included; and that baiting continues for an adequate period. The results of the bait-marking needs to be interpreted by a person with appropriate expertise (i.e. someone who already has experience in the implementation and assessment of bait marking studies). Badger social organization is not always straightforward (e.g. certain adult males have been recorded using more than one otherwise separate social group) and this can confuse the bait-marking results.

An assessment of the 2007 bait marking survey was carried out prior to the implementation of the 2019 survey. Results from the 2017 survey were tentative and were considered uncertain due to agricultural works during the survey period and particularly dry weather. No such issues were recorded during the 2019 bait marking survey and results from this more recent study are considered more reliable. The primary purpose of the bait marking survey in 2019 was to more accurately determine the status of sett 2 which is within the Proposed Development area.

Table 6. Badger survey details

Survey Date	Details of Survey
8 th January 2019	Walkover survey
24 th January 2019	Bait marking
26 th January 2019	Bait marking/latrine survey
30 th January 2019	Bait marking/latrine survey
3 rd February 2019	Bait marking/latrine survey
4 th February 2019	Bait marking/latrine survey
5 th February 2019	Bait marking/latrine survey
6 th February 2019	Bait marking/latrine survey
9 th February 2019	Bait marking/latrine survey
11 th February 2019	Bait marking/latrine survey – new sett 4 identified and white pellets added to bait marking survey at site 4

Survey Date	Details of Survey
13 th March 2019	Bait marking/latrine survey
16 th March 2019	Bait marking/latrine survey
20 th March 2019	Bait marking/latrine survey
23 th March 2019	Bait marking/latrine survey
31 March 2019	Bait marking/latrine survey
10 th April 2019	Bait marking/latrine survey
24 th January to April 10 th 2019	Trail camera at sett 2 to ascertain usage
28 th January to 30 th March 2021	Trail camera at sett 2 to ascertain usage

4.1.3 Badger Results 2019-2021

Badger Sett 3

Badger Sett 3 is located within hedgerow habitat to the southwest of the Proposed Development site and will not be directly impacted by the Proposed Development. The sett contains numerous entrances which extend approximately 100m along hedgerow habitat. A number of entrances were recorded close to this hedgerow within an agricultural field used as pasture. The sett had obvious paths to and from it, with large spoil heaps at some of the sett entrances. Fresh bedding was recorded at a number of the entrance holes. Surrounding the sett, numerous foraging signs were noted including snuffle holes along with a single latrine within a hedgerow to the northeast of the sett. As in 2007, when this sett was first surveyed, this is a significant main sett which remains active and no significant changes in usage pattern has occurred in the intervening period.



Photographs 1 & 2. Sett entrances along with spoil heaps and bedding



Photographs 3 & 4. Latrine pit/Territory demarcation and foraging sign i.e. snuffle hole

Badger Sett 2

Sett 2 is located near the centre of the site within hedgerow habitat and approximately 560m northeast of the main Sett 3 (See Photographs 5 & 6). The sett contains two visible entrance holes along the southern side of the hedgerow with a large spoil heap noted in front of one of the entrances. The northern side of the hedgerow is dominated by dense thickets of Blackthorn and thus it is impossible to tell if other entrances exist. However, tracks were noted entering the thicket. A large number of snuffle holes were also recorded in this area.

Trail cameras were placed at Sett 2 from 24/1/2019 to 10/4/2019 and from 28/01/21 to 30/03/21, as this sett which will be directly affected by the Proposed Development. A Bushnell Trophy Cam HD Aggressor was used for camera surveys. The Bushnell Trophy Cam HD Aggressor is a digital scouting camera. It can be triggered by any movement of game in a location, detected by a highly sensitive Passive Infra-Red (PIR) motion sensor, and then take high quality pictures (up to 20MP or 24MP still photos), or video clips. Trail camera footage indicates that this sett was in active usage in 2019 and in 2021 (See Photograph 7). However, this remains a relatively small sett in comparison to Sett 3.



Photographs 5 & 6. Sett 2 – active sett entrance and thick scrub



Photograph 7. Adult Badger recorded at sett 2 by trail camera 2021

Badger Sett 1

Sett 1 is located along the eastern boundary of the Proposed Development site. During the original survey in 2007 this was noted to be a large sett with very well-worn paths. However, the main sett has contracted during the intervening years. No obvious cause for this change in usage pattern has been identified, however Badger populations are often dynamic and changes in usage patterns are not uncommon. A single entrance was noted within an agricultural grassland field, a few metres west of the former main sett (See Photograph 8) and a potential latrine was also noted in proximity to the entrance. This entrance is located within the Proposed Development site boundary. Due to the fact a single entrance was noted, with no obvious paths and no spoil present, it is probable that this is an outlier sett.

Located to the east of the Proposed Development site and approximately 155m south of Badger Sett No. 1 is a potential single entrance Badger sett within hedgerow habitat (See

Photograph 9). This is considered a potential, disused outlier sett. Outlier setts are only used sporadically and thus can show little sign of use. When not in use by Badgers, they are often taken over by foxes or even rabbits. No evidence was recorded of active usage during site surveys in 2019.

A possible Badger day bed was recorded east of the Proposed Development site and approximately 115m from the site boundary (See Photograph 10). The potential day bed was located within an area of Blackthorn scrub at the edge of a pasture field which showed multiple signs of Badger foraging. Fresh bedding was noted within this scrub habitat, which had been dragged from outside and laid along the edge of an old stone wall.



Photograph 8. Single sett entrance (Sett 1) located in close proximity to a former main sett and within the site boundary.



Photograph 9. Potential inactive outlier sett within site boundary lines.



Photograph 10. Potential Badger day bed

Badger Sett 4

The main sett of this social group is located approximately 630m east of Sett 1, outside the Proposed Development boundary. This area, which is a considerable distance outside the site boundary, was not surveyed in 2007. However, it was surveyed in 2019 based on a re-assessment of possible Badger territories and having identified a possible Badger track running towards this area. This site was subsequently added into the bait marking survey in March 2019. This sett was recorded within an area of dense bracken along the raised coastline, at the northern edge of the conifer plantation. The sett was noted to contain at least 13 entrances and span an area of approximately 40m east to west. Numerous snuffle holes were noted scattered throughout the plantation including feeding signs such as ripped bark from tree stumps.



Photographs 11-14. Main sett (Sett 4) of social group located outside development boundary.

4.1.4 Results of bait marking survey

The results of the bait marking survey which was carried out in 2019 were considered conclusive and provided a relatively clear picture of Badger usage patterns. A number of latrines were located which contained colored pellets and a relatively clear picture of Badger social groups was provided. Bait marking was carried out as outlined in **Table 7**.

Table 7. Bait marking survey 2019

Sett	Description of sett	Colour of pellets
Sett 1	Active sett in 2007, however usage very limited in in 2019. Probable outlier sett.	Blue pellets
Sett 2	Active in 2007 and in 2019. Smaller subsidiary sett	Yellow pellets
Sett 3	Very large main sett with numerous entrance holes	Red pellets
Sett 4	Outside the site boundary and not identified in 2007. Main sett.	White pellets

Based on the results of the bait marking survey it was concluded that Sett 3 and Sett 2 belong to the same social group and that Sett 2 is a subsidiary sett of Sett 3. Uptake of bait at Sett 3 was high, as expected at this large main sett. Uptake of bait was much lower at Sett 2, which was expected as this is a smaller subsidiary sett. The presence of yellow and red pellets in latrines (See Photographs 15 & 16) indicates that these setts are linked as the main and

subsidiary sett of the same social group. An overview of Badger sett distribution from the 2019 survey is provided in **Figure 6**.



Photographs 15 & 16. Latrines containing both red and yellow pellets from Sett 2 and Sett 3.

Bait uptake at Sett 1, which was much larger in 2007, showed relatively low levels of activity. Following identification of a large sett (Sett 4) outside the site boundary white and blue pellets were identified in latrines indicating that setts are linked as a main sett outside the site boundary and a sett close to the eastern boundary with very limited usage.



Photographs 17 & 18. Latrines containing blue pellets and white pellets located within conifer plantation, approximately 480m east of Sett 1 (Blue sett) and 145m west of sett 4.



Figure 6. Badger Latrine with recorded pellets and sett locations (relative to proposed development site)

4.2 Otter Results 2019-2021

Otter usage was confirmed through field sign surveys including searches for spraints, footprints and slides (NRA 2008a). While Otter surveys focused on the shoreline and watercourse within the study area, all habitats within the Proposed Development site were surveyed for the presence of Otter. The extent of Otter surveys between 2019-2021 is shown in **Figure 7**. General walkover surveys for Otter were carried out on the 22nd July 2019, 27th July 2019, 10th April 2020, 30th May 2020, 22nd April 2021, 1st July 2021. Trail Camera Surveys were carried out from the 24th January to 10th April 2019 and 28th January to 30th March, 2021.

Each adult Otter has its own home range, which it marks with its faeces (spraints) at prominent locations. When groups of Otters are evident, they usually consist of a female and her young. Range sizes vary widely according to the quality of the foraging habitat and other resources, such as suitable sites for Otter dens (holts). Their ranges may alter seasonally to include sites of abundant prey. The average distribution density of Otters is approximately one Otter per 10 km on many Irish watercourses, but this will vary from as little as one Otter per 50 km of river to, perhaps, as much as one Otter per 2 km of river or coastline (NRA,2008a).

An Otter sprainting site was recorded along the tidal section of the stream within the site on the 21st October 2019 (See Photograph 19). An Otter was recorded foraging along the shoreline near Knockfinglas Point and to the west of the site on the 21st of October 2019 (See Photograph 20). An Otter was also recorded on 30th of January 2020 moving along the upper shoreline approximately 900m south west of the Proposed Development site, in a field above the upper shoreline. An Otter was recorded on the 25th of October 2019 foraging close to the lagoon to the west of the Proposed Development site. On the 12th of December 2018 (during winter bird counts) a dead female Otter was noted floating within the coastal waters to the east of the site (See Photograph 21).

Two Bushnell Trophy Cam HD Aggressor were used for camera surveys from the 1st of June 2019 to the 7th of October 2019. The cameras recorded two Otters close to the confluence of the stream and the shoreline, outside the Proposed Development site boundary, on the 4th of June 2019 (See Photograph 22 and **Figure 7**). Otters are generally solitary and therefore the presence of two adults may be indicative of breeding behaviour. However, no holts were recorded within 150m of the Proposed Development site. It is also noted that Mink and Fox was also recorded by the trail cameras (See Photograph 23). A trail camera was put in place in the eastern section of the site near the proposed jetty location (See **Figure 7**) from the 28th of January to the 30th of March 2021. No Otter were recorded.



Figure 7. Otter Survey Area 2019-2024 (relative to proposed development site)



Photographs 19-21. Otter spraint along stream, Otter offshore recorded during bird surveys and dead Otter found to the east of the site.



Photograph 22. Pair of Otter recorded. Photograph 23: Mink recorded by trail camera

4.3 Bat Surveys 2020/2021

Bats also often use features such as hedgerows, treelines, woodland edges and waterways as commuting pathways between roosts and foraging areas. Sheltering vegetation, such as treelines and woodland, not only acts as cover from potential predators and the weather, but also provides structure for acoustic orientation and navigation. Sheltered areas also allow insects to gather and therefore support bat foraging.

Linear features within the Proposed Development site boundary, including treelines, hedgerows and the Ralappane stream, have the potential to link roost sites to foraging areas and facilitate the dispersal of bats into the wider landscape. Large areas of pasture with hedgerows and treelines within the Proposed Development site boundary and outside the Proposed Development site boundary, have the potential to provide feeding habitat.

No mature trees or buildings, with the potential to be used as significant bat roosting sites, have been recorded within the Proposed Development site boundary. Overall, it has been

concluded that the habitats within the Proposed Development site boundary are of low to moderate value for foraging bats. Linear features, i.e., treelines, hedgerows, watercourse and grassland and scrub, provide moderate potential bat foraging habitat.

Bat surveys were carried out on site buildings and linear features within and adjacent to the Proposed Development site on the 9th September 2020, 26th May 2021, 27th May 2021, 14th June 2021, 30th June 2021, 13th July 2021, 14th July 2021, 20th July 2021 using a Batbox Duet bat detector and Echo Meter Touch 2 PRO bat detector (**Figure 10**). A visual inspection was carried out on site buildings and structures (Refer to **Figure 9**) during daylight hours prior to commencement of bat surveys to assess bat roosting potential of structures and trees within the Proposed Development area.

4.3.1 Bat tree survey

A tree forms an essential part of an often-complex ecosystem that provides a variety of habitats for a range of different wildlife species, including bats. Exactly which features are most important will depend on the woodland type and the species of bats present. Although woodlands are used in some way by all Irish bat species. Some bat species rely exclusively on trees for roost sites, whilst others use them for part of the year. All Irish bat species are known to forage in woodland and along woodland edges. Any tree can be used as a bat roost, as long as it provides shelter, e.g. in the form of splits, cracks, holes and cavities in the trunk and branches, loose bark and ivy cover. Roosts can be at any height in the tree, although upper trunk and branches are probably more common. Evidence of bat activity associated with potential roost sites includes bat droppings, urine staining, feeding remains and dead/alive bats. Indicators that potential roost locations and access points are likely to be inactive include the presence of cobwebs and general detritus within the apertures. Trees provide shelter and attract a diverse range of insect species for bats to feed on. Since bats are not able to bore holes or make nests, they use whatever gaps are available – including cavities and crevices made by other animals, the natural decay of the wood or arboricultural methods.

Bats use different parts of the tree for different reasons, depending on the time of year and temperature. For example, in the summer bats might use the higher canopy sites to have their young in warmer temperatures. In winter, they might move deeper and lower into the tree to hibernate. Male bats and non-breeding females tend to prefer cooler conditions throughout the year. Breeding females prefer warmer roosts in spring and summer, when raising their baby (pup) places high demands on their energy levels. Breeding females cluster together to retain body heat, but they also get through this challenging time by gaining “free” heat from tree roost’s in two ways:

- Selecting naturally warm sites, such as sheltered trees receiving some sunshine during the day;
- Selecting highly insulated sites, such as a tree hole with a small space and thick wood.

As the site is relatively exposed trees are generally limited in size. Almost all of the trees occur within existing treelines or hedgerows. No mature or overmature trees with the potential to provide significant bat roosts were recorded within the site boundary.

4.3.2 Bat Buildings/Detector Survey

Bats generally require a variety of elements, that need to be taken into consideration when roosting within a building, these range from temperature and humidity regime within the roost, aspect and orientation of the roost, size of roost, access points, lighting, materials and perching points. Important roosting sites for bats in buildings include crevices in stone work of old and modern structures, crevices in brick work of chimneys, attics of buildings – old and modern buildings – often behind roofing felt, under ridge tiles or in wall cavities and underground structures associated with older buildings (**Figure 8**).

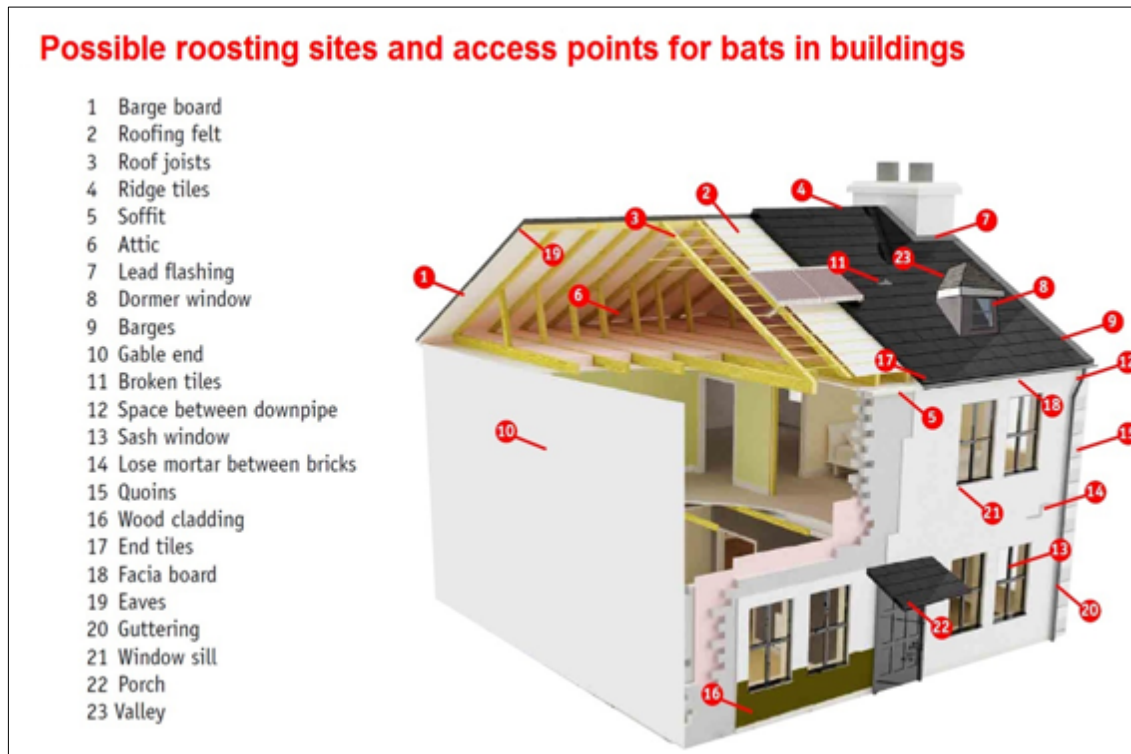


Figure 8. Possible roosting sites for bats in buildings.

To maximise warmth, maternity roosts for example are often located on the south and west of houses or close to sources of heat such as chimneys and boilers. Most species prefer to roost in quite small spaces and are not usually found in open draughty areas like barns. Common and Soprano Pipistrelle, for example, are generally found in the inaccessible parts of the roof structure and around its edges and rarely enter the loft space. Where bats are seen in buildings during the winter, they tend to be alone or in small scattered groups, hidden in crevices or under slates and away from sources of heat.

Buildings within the Proposed Development site boundary are considered of low suitability as potential bat roosts (Potential Roost Feature (PRF)) under the guidelines set out in '*Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd end)*' (Collins, J. (ed.), 2016). Bats were recorded emerging from a disused farm building located outside the proposed Development Site boundary.

Bat activity surveys were conducted within the Proposed Development site under suitable weather conditions on several dates outlined above. Dusk activity surveys commenced at 15 minutes before sunset and ended a minimum of two hours after sunset (Collins 2016). Survey

were carried out during suitable weather conditions. The primary purpose of bat surveys was to assess usage of structures, located within or in close proximity, to the site boundary. All buildings located within Proposed Development site boundary were surveyed. Activity surveys were also carried out to assess foraging behaviour along boundary habitats within the Proposed Development site boundary and in proximity to it.

No buildings with the potential to support significant bat roosts were recorded within the redline boundary for the project. A pillbox (Location C, **Figure 9**) close to the coast lacks suitable crevices for bats and the disused farmhouse within the redline boundary (Location B, **Figure 9**, Photograph 25) is considered of low potential for bats as it is now in an advanced state of disrepair. Three Common Pipistrelle, one Soprano Pipistrelle and one Leisler's Bat were recorded foraging in the vicinity of the building at Location B. However, no bats were recorded emerging from the building. Following a daytime visual search it was concluded that Location B is of low potential value as a roosting site for bats and no signs of bat usage (i.e. staining, dropping etc) were recorded.

A small derelict building is located closer to the shoreline west of the Site boundary. However, this building lacks the crevices and spaces which would make it suitable as a roosting site for bats and the presence of bat roosts at this location is considered highly improbable (Location D **Figure 9**).

A derelict farmhouse, part of a complex of farm buildings (Location A, **Figure 9**) which are now outside the redline boundary, was previously assessed for the 2007 application and a small colony of Common Pipistrelle (<20) was recorded. Although this building (See Photograph 24) is outside the Proposed Development site boundary, this site was re-surveyed on the 9th of September 2020. Approximately eight Common Pipistrelle bats were recorded emerging from a disused farmhouse with a slate roof and feeding activity post emergence was recorded around the building complex. A second farm building within the same farm complex, was also considered of moderate value as a PRF. Although feeding activity by Common Pipistrelle was recorded in proximity to this building, no bats were recorded emerging from it during the bat survey.



Figure 9. Structures surveyed for bats

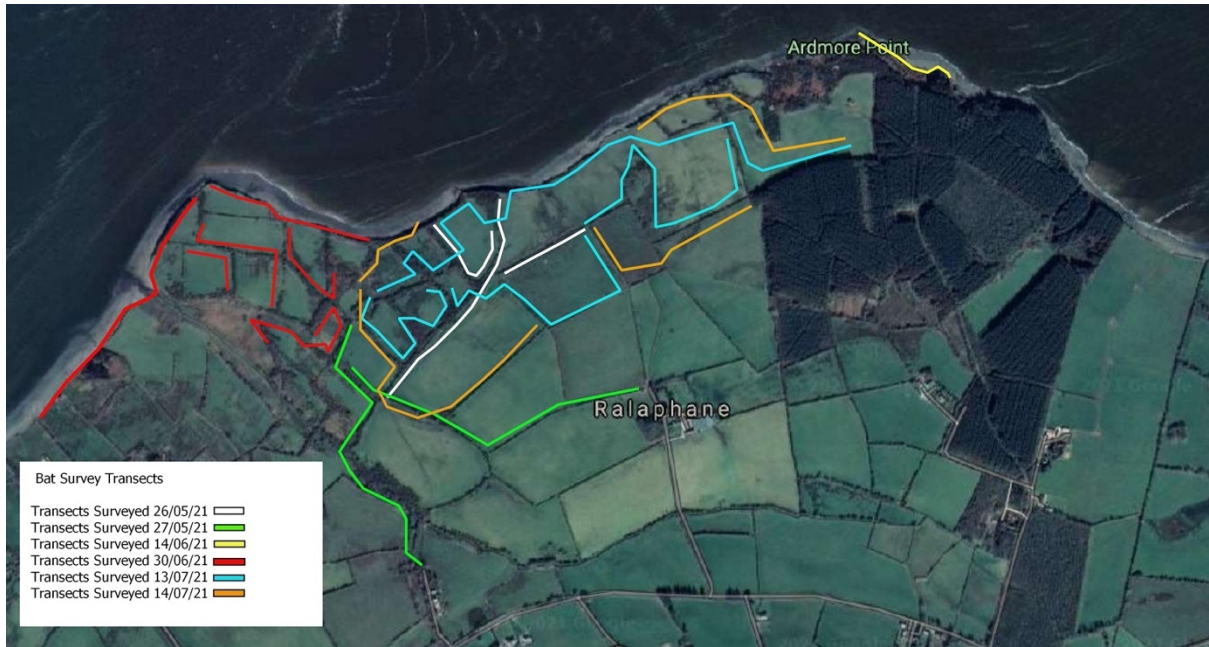


Figure 10. Location of bat transect surveys 2021

Bat transect surveys were carried out along linear habitats within and in the vicinity of the Proposed Development site (**Figure 10**). Surveys focused on internal treelines/hedgerows, coastal habitats, reed bed habitat to the west of the site and sections of the Ralappane Stream. Small numbers of three species of bat were recorded foraging within and the in the vicinity of the Proposed Development site boundary i.e. Common Pipistrelle, Soprano Pipistrelle and Leisler's Bat.



Photograph 24. Old dwelling within farm complex outside the site boundary with small colony of Common Pipistrelle (Location A).



Photograph 25. Old dwelling within proposed development site boundary with no bats recorded (Location B).

5. Mammal Surveys 2022-2024

5.1 Badgers 2023 to 2024

Detailed badger surveys including bait marking had previously identified the different social groups/clans utilizing this general area. Field surveys were carried out on the 21st May 2023 and 19th February 2024 to confirm that there had been no significant changes in Badger activity or in the distribution of badger social groups/clans in the intervening period.

No changes in the distribution of Badger setts or significant changes in activity patterns associated with sett 2,3 and 4 were recorded in 2023 and 2024. All three setts were in active usage and it is considered highly improbable that any significant changes in the distribution of social groups has occurred in the intervening period. Sett 1 was identified as an active sett in 2007 but activity levels have significantly declined since then. No evidence of active usage was recorded in 2019 and likewise surveys in 2023 and 2024 did not record any usage of this sett or any active sett entrances. Overall it has been concluded that the distribution of social groups and activity patterns has not changed for setts 2,3 and 4. Sett 1 is no longer considered active.



Photograph 26. Sett 4 with active entrances.



Photograph 27. Latrines sett 4



Photograph 28. Active entrance at sett 2



Photograph 29. Evidence of badger foraging in grassland close to sett 2



Photograph 30. Active entrance at sett 3



Photograph 31. Active latrine sett 3

5.2 Otter surveys 2022 to 2024

Additional surveys for Otters were carried out on the 27th of June 2022, 21st of May 2023 and the 19th February 2024. No significant changes in usage of the site by Otters was recorded during either survey. On the 30th of June 2021 an Otter was observed swimming approximately 200m offshore to the west of Ralappane Point (during estuarine bird surveys). The track along the lower section of the Ralappane Stream is still in active usage with an active sprinting site recorded in 2022 and footprints and a slide recorded in 2024. No couches or holts were recorded during the site surveys.

Overall the results are indicative of consistent usage of the lower section of the Ralappane Stream and there is likely to be foraging within intertidal and offshore habitats. The distribution of coastal dwelling Otters is strongly associated with the occurrence of freshwater streams, as this is an essential requirement for maintenance of healthy fur for thermoregulation (McCafferty, 2005)

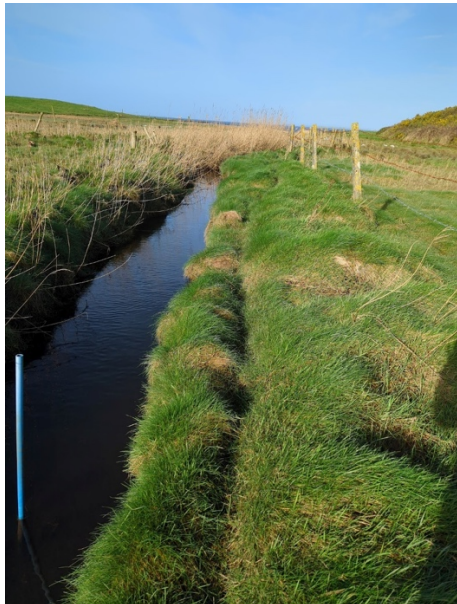


Photo 31. Track used by otter along lower section of the stream.



Photo 32. Slide/crossing point on stream with otter footprints evident.

5.3 Bat Surveys 2023 to 2024

Bat surveys were carried out in 2023 and 2024 to ascertain if there had been any changes in activity levels and in particular roosting sites in the intervening period. In general surveys focused on location B which it is within the red line boundary.

5.3.1 Building Surveys 2023-2024

As outlined in **Section 4.3**, two other structures at Locations C and D are considered of negligible potential value for bats and were not resurveyed. No mature trees with the potential to be used as significant bat roosts were recorded within the proposed development boundary and no surveys of trees was considered necessary.

As detailed in **Section 4.3**, small colony of Common Pipistrelle was previously recorded at Location A which is outside but relatively close to the current site boundary and therefore this site was resurveyed in 2023/2024 (See **Figure 9**).

A combination of bat activity surveys, roosts surveys and emergence surveys were carried out on the 11th May 2023, 12th May 2023, 4th September 2023, 5th September 2023, 6th September 2023, 8th September 2023 and 19th of February 2024 using Elekon Batloggers (static and active mode), EchoMeter Touch 2 PRO (active and static mode) and Bat Box duet bat detectors. A visual inspection of Location A was also carried out on 19th February 2024. Locations A and B are indicated on **Figure 9**.

This complex of dwellings and farmyard buildings is located approximately 170m west of the proposed development boundary. It consists of a number of buildings including a disused cottage with a corrugated iron roof (Building 2), a disused dwelling with a slate roof (Building 1) and a number of out buildings with minimal bat potential. Two buildings (Location A, Buildings 1 and 2) were found to support bats as indicated below in **Figure 10**.



Figure 10. Buildings supporting bats at Location A.

A search Location A, Building 2 within this complex of buildings on 11th May 2023 recorded two Lesser Horseshoe Bat within the dwelling. One was recorded within a downstairs hallway and the second was recorded in a downstairs room. Both were attached to the ceiling. Approximately four Common Pipistrelle were recorded emerging from the roof close to the chimney at the same location on the 11th May.

Searches of the Building 2 later in the survey season on the 4th September 2023 and 9th September 2023 did not record any roosting Lesser Horseshoe bats within the same structure.

A static detector left *in situ* in Building 2 on 4th/5th September 2023 recorded four brief signals for Lesser Horseshoe bat (23.04, 00.58, 02.10) indicating sporadic usage. A night time survey on the 6th of September 2023 recorded one Lesser Horseshoe Bat flying around within the cottage.

An internal survey of both buildings on 19th February 2024 outside the summer activity season did not record any usage of the building by bats.

It is noted that this building (Location A, Building 2) has a sod roof which has been covered with corrugated iron and it is therefore quite well insulated. However, there are open windows and doors and the structure is likely to deteriorate over time. Security fencing has been put in place subsequent to the previous surveys in 2020/2021 and now this structure is less disturbed than it previously was. There is large amount of rubbish within all of the rooms which makes access difficult. The lack of disturbance is likely to have facilitated usage by a small number

of Lesser Horseshoe Bat and it is noted that nesting Barn Owl were also recorded within this building in the spring/summer 2023 season.

Approximately eight Common Pipistrelle were recorded emerging from the disused farmhouse with a slate roof (Location A, Building 1) with some feeding activity recorded post emergence. As noted in **Section 4.3**, approximately eight Common Pipistrelle were previously recorded emerging in September 2020 and a small colony of Common pipistrelle bats was also recorded at this location in 2007. No significant change was recorded in 2023 when approximately five Common Pipistrelle bats were recorded emerging from the same cottage on the 8th September 2023.

A static detector left *in situ* overnight on the 8th/9th September 2023 recorded some sporadic signals for Lesser Horseshoe Bat (01.35, 01.36, 01.40, 01.44) which is indicate of some sporadic nighttime usage. No bats were recorded during a daytime search of the building in September 2023 or in February 2024. Unidentified Myotis was also recorded on the static detector at this location on the 8th of September.



Photograph 33. Location (Location A, building 1) Common Pipistrelle and Lesser Horseshoe bat usage was detected.



Photograph 34. Location (Location A, building 1) interior in poor state of repair.



Photograph 35. Loft in disused cottage with open window. Lesser Horseshoe Bat were recorded within this structure (Location A, building 2)



Photograph 36. Door to upstairs loft (Location A, building 2)



Photograph 37. (Location A, Building 2) with corrugated iron roof.

Location B it's located within the red line boundary for the proposed development. It consists of an old disused cottage in poor condition with open windows and dense ivy on the roof. There are a small number of outbuildings in a very poor state of repair. A search of the building did not record any evidence of bat usage such as staining droppings etc and no bats were recorded emerging from this building during the dusk emergence survey. This site is considered of low potential for roosting bats. Activity surveys recorded several species, namely Leisler's bat, Common pipistrelle, Soprano Pipistrelle, Brown Long-eared and Myotis species foraging in this general area. In general the buildings are in a poor state of repair and relatively open and drafty and are considered of low potential value as bat roosts. No roosting

bats were recorded. The mixture of grassland and scrub in the surrounding landscape is of some value for foraging bats.



Photograph 38. Old dwelling with open window (Location B).



Photograph 39. Old shed in poor state of repair (Location B)



Photograph 40. Fireplace in old dwelling Location B.

5.3.2 Bat Activity surveys 2023

Activity surveys were carried out on 11th May 2023, 12th of May 2023, 5th September 2023 and 6th September 2023 to assess general activity patterns (commuting/foraging) within the proposed development site boundary. Activity surveys also extended to lands in proximity to Location A where Lesser Horseshoe bats were detected as well as along the Rappalane Stream which could potentially provide preferential foraging and commuting habitat.



Figure 11. Approximate transect routes yellow= within proposed development, blue = outside proposed development site boundary

In general patterns of activity in 2023 were similar to those previously recorded (in 2020/2021) with Common Pipistrelle and Soprano Pipistrelle the most common species recorded. Activity levels were general low along linear features within the eastern section of the proposed development site and along the more exposed fields close to the coast. A moderate level of activity was recorded in the smaller fields in the western section of the study area (and at the west of the proposed development site). It is noted that these smaller fields are now farmed less intensively with more scrub development around the margins of the fields. This may have improved habitat foraging quality in more sheltered areas for some bat species. Leisler's Bats were regularly recorded foraging and commuting within the the survey area. Brown Long-eared bat was sporadically recorded in fields close to Location B and an unidentified Myotis bat (probably Whiskered bat) was recorded on one occasion foraging in the same area.

No Lesser Horseshoe Bats were detected during activity surveys within the proposed development site boundary. Surveys along the Rappalane Stream, which is relatively close to Location A (where Lesser Horseshoe Bats were detected), were specifically carried out during the emergence period for this species on the 5th September 2023 and 6th September 2023 to determine if there was any commuting along this watercourse. No Lesser Horseshoe Bat activity was recorded and it is not considered probable that this linear feature connects important habitats/roosts in the context of the local landscape.

6. Conclusion

Badger

One Sett, Two main Badger setts occur in proximity to the Proposed Development site, namely Sett 3 and Sett 4. However, neither sett will be directly impacted by the Proposed Development. Bait marking surveys indicate that Sett 2 is a subsidiary sett and the main sett for this social group is Sett 3, which will be unaffected by the Proposed Development. Sett 1, which is an outlier sett, has contracted since initial surveys in 2007. This now consists of one unused sett entrance and on outlier sett just within the site boundary. Neither of the main setts (Sett 3 and Sett 4) will be impacted by the Proposed Development and exclusion of the Badgers from subsidiary or outlier setts is a viable option in relation to the Proposed Development.

Otter

Otter activity is generally confined to areas to the west of the Proposed Development. Spraints were recorded along the Ralappane Stream which is to the west of the Proposed Development. A pair of Otters were recorded close to the stream by trail cameras. No signs of Otter were recorded in the eastern section of the site where shoreline works are proposed. No breeding holts were recorded during site surveys between 2019 and 2024.

Bats

The complex of buildings at Location B are within the redline boundary for the proposed development. No evidence of bat roosts were recorded. The complex of buildings at Location A is used as a roost by Common Pipistrelle (probable maternity roost) and are used by a small numbers of Lesser Horseshoe Bats (probable night roost). This site is not located within the redline boundary and surveys at this site will be continued in 2024. No direct impact on bat roosts at this location will occur. No trees of potential value as bat roosts were recorded within the Proposed Development site.

In general activity surveys indicate that the habitats within the proposed development site boundary are used by a mix of bat species which are relatively common in the Irish countryside. Due to less intensive agricultural management, there has been some scrub encroachment in smaller fields which may be benefiting some bat species. Whilst Common Pipistrelle, Soprano Pipistrelle and Leisler's Bat remain the most common species (in 2021/2022), Brown Long-eared and Myotis bats were also recorded during the 2023 surveys.

Lesser horseshoe bat is confined to six counties along the Atlantic seaboard: Mayo, Galway, Clare, Limerick, Kerry and Cork Summer roosts are typically in derelict rural buildings. Lesser Horseshoe bat is listed on Annex II of the Habitats Directive and 41 SACs have been designated in Ireland for its protection.

Patterns of roost use by Lesser Horseshoe Bat can be complex (Marnell *et al.* 2022) but a basic starting point is to consider whether bat usage of a site falls clearly into one or more of the following categories:

- Maternity site, where pups are born and raised to independence;
- Hibernation site, where bats may be found during the winter;

- Mating site, where males and females gather during the autumn;
- Feeding site (night roost), where bats rest between feeding bouts during the night but are rarely present by day;
- Transitional (or swarming) site, where bats may be present during the spring or autumn;
- Satellite roost, used by males and non-breeding females.

During the 2023 surveys, all of the Lesser Horseshoe bats were recorded at night and usage was generally variable within both Building 1 and Building 2. It is therefore considered probable that the buildings are used as night roosts by a small number of Lesser Horseshoe Bats. It is noted that this complex of buildings will not be affected by the proposed development. As usage patterns can be complex and can vary over time, ongoing surveys will be carried out.

The closest recorded Lesser Horseshoe Bat is near Glin approximately 9km east of the proposed development site. This was a record of eight bats in 1987. In a detailed study of roosts between Galway and Cork, VWT (2020), did not record any Lesser Horseshoe roosts along the southern shoreline of the Shannon Estuary or in any lands within 20km of the proposed development site.

Lesser Horseshoe bats normally forage in woodlands/scrub within 2.5km of their roosts (Bontadina *et al.* 2002); Consequently, in order to link roosting and foraging sites, linear features such as hedgerows, treelines and stone walls provide vital connectivity for this species, most importantly within 2.5km around each roost (Schofield, 2008).

According to NPWS & VWT (2022) maintaining the genetic diversity of the Lesser horseshoe bat in Ireland is crucial for its long- term survival. The retention of existing linear landscape features within at least 2.5km but preferably 5km of lesser horseshoe bat roosts with 20 bats or more is essential to counteract the documented genetic differentiation that has already occurred within the species throughout its Irish distribution. Large waterbodies such as the Shannon Estuary are believed to create a barrier to movement. Lenihan *et al.* (2021) identified a potential pathway to link the largest maternity roost in Limerick with two maternity roosts in north Kerry that ran to the west of the Stacks and Mullagharirk Mountain Ranges and then along the Shannon Estuary. The results of that study pointed to potential commuting pathways within low lying agricultural land, bordered with hedgerows and adjacent to broadleaved woodland and mixed forestry, and avoiding the upland areas. The location of the proposed development site, bounded to the north by the Shannon Estuary and to the southeast by the Stacks and Mullagharirk Mountain Ranges means it is largely cutoff from this commuting corridor. In a modelling exercise to identify connectivity between Lesser Horseshoe Roosts between northern and southern populations, VWT (2020) identified the area along the southern boundary of the Shannon Estuary (including lands around the proposed development site) as an area of low functional connectivity.

Lesser Horseshoe bat was not recorded foraging or commuting within the proposed development site boundary. Lesser horseshoe bats preferentially feed in woodlands close to the ground (Marnell *et al.* 2022)) a habitat which is absent from the proposed development site boundary. An assessment of habitat preference based on a land class assessment in the UK, (Schofield 2008) notes that Lesser horseshoe bats preferred areas of deciduous

woodland, whilst avoiding urban areas, dense shrub cover and sea. It is noted that scrub has become more prevalent within the Shannon LNG landholding due to less intensive management. However, coastal sections of the landholding and the large fields in the eastern end of the proposed development site are relatively exposed. Based on the above, the proposed development site is unlikely to provide high value foraging habitat for Lesser Horseshoe Bat, although taking a worst case scenario, some limited foraging by this species could potentially occur.

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Appendices

Appendix 1. Noise modelling

Receptor	Construction noise levels (dB)	
	Construction Peak 1	Construction Peak 2
R8 (ralappane stream)	58	57
R9 Knockfinglas Point	60	59
Badger Set 3	51	46
Badger Set 4	45	43

Receptor	Operational noise levels (dB)	
	Operational Unmitigated	Operational Mitigated
R8 (ralappane stream)	55	35
R9 Knockfinglas Point	55	34
Badger Set 3	48	26
Badger Set 4	44	23

