Appendix 9.3 Breeding birds and barn owl survey

DixonBrosnan
environmental
consultants

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Authors:	Carl Dixon MSc.(Ecology) Ian McDermott (Ecology)

Dixon.Brosnan Environmental Consultants
12 Steam Packet House, Railway Street, Passage West, Co. Cork
Carl Dixon: 086 8511437
email: carl@dixonbrosnan.com

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Section 1 – Breeding Bird Survey

1. Introduction

Dixon.Brosnan Environmental Consultants was commissioned by Arup to undertake a breeding bird survey in order to address the potential impacts of the proposed development of the Greenlink project on birds utilising the proposed Converter Station location and proposed landfall at Baginbun beach. These locations were chosen as the sites with the potential for effects due to the removal of nesting habitat. The improved grassland at the temporary horizontal direction drill launch and reception pits at the Campile Estuary, the off-road and on-road cable routes all provide limited resources for breeding species. The Greenlink interconnector will connect to the British power network at Pembroke in Wales and to the Irish network at Great Island in County Wexford. The information in this report was used to help determine the impacts on bird populations.

This report presents ecological information from the breeding bird survey that took place in May and June 2018. The objectives of the survey and of this report are as follows:

- to establish the abundance of all breeding bird species, present at the site;
- to identify any breeding bird species of particular interest, such as any species of high conservation concern or any that are locally scarce;
- to identify any breeding bird species for which the site is of particular importance;
- to describe the breeding bird habitats that are present at the site and to identify any that are of particular importance;
- to provide details of any constraints on development of the site, relating to breeding birds.

2. Methodology

The breeding bird survey was undertaken on the 23rd May 2018 and 19th June 2018. This reflects the abundance of residents and early migrants, which tend to be more easily detected on the first visit, and later migrants, which are more abundant in the second visit. The survey methodology utilised a scaled down version of the British Trust for Ornithology's (BTO) Common Bird Census (CBC) Technique (Bibby et al., 2000 & Gilbert et al., 1998), with aspects of species-specific survey methodologies employed where required (Gilbert et al., 1998). All bird locations, numbers, behaviour were recorded by annotating field maps and by taking notes.

The transects were designed to give good views of all fields, hedgerows, scrub, woodland, coastal heath and grassland, waterbodies/courses and, where possible, cliffs present in the study area. Each transect was surveyed once per month between May and June during weather conditions favourable for bird activity. This included avoiding periods of persistent or heavy rain, high wind or fog, as birds tend to be less active and therefore less visible during such conditions. Survey visits commenced shortly after dawn and were completed before mid-day to coincide with the peak bird activity period.

Each transect was walked at a constant pace and all species of birds observed within and considered to be using the study area were recorded. Particular attention was paid ahead of the observer to ensure, where possible, that birds were recorded before they were flushed. Surveyors stopped periodically at certain locations to listen for calls and observe any behaviour.

All bird species encountered during the survey were mapped and coded using standard BTO 'Species Codes' and 'Categories of Breeding Evidence' e.g. singing male, agitated behaviour, carrying food, recently fledged downy young. No attempts were made to locate nests as bird behaviour is generally sufficient to determine probable or confirmed breeding. The British Trust for Ornithology (BTO) breeding bird codes are shown in **Table 1**. The breeding status of all species encountered during surveys were classified into four categories: Confirmed (Br), Probable (Pr), Possible (Po) and Non-breeder (N), based on BTO categories of breeding evidence.

Table 1. British Trust for Ornithology breeding bird survey codes

Breeding status	Confirmed breeder (Br)	Probable breeder (Pr)	Possible breeder (Po)	Non-breeder (N)
Observed behaviours	Distraction-display or injury feigning (DD)	Pair in suitable nesting habitat (P)	Observed in suitable nesting habitat (H)	Flying Over (F)
	Used nest or eggshells found from current season (UN)	Permanent Territory (T)	Singing Male (S)	Migrant (M)
	Recently fledged young or downy young (FL)	Courtship and Display (D)		Summering non-breeder (U)
	Adults entering or leaving nest-site indicating occupied nest (ON)	Visiting probable nest site (N)		
	Adult carrying faecal sac or food for young (FF)	Agitated Behaviour (A)		
	Nest containing eggs (NE)	Brood patch of incubating bird (I)		
	Nest with young seen or heard (NY)	Nest Building or excavating nest-hole (B)		

The survey route through and around the proposed development area is shown in **Figure 1**. The breeding bird surveys focused primarily on the proposed development area where there is the potential for permanent impacts due to the removal of nesting habitat.

Figure 1: Breeding bird survey- routes outlined in red.

The breeding bird survey was undertaken at two locations; (1) proposed Converter Station and construction compound location within an agricultural field and (2) Baginbun beach i.e. on the beach front and adjoining roadside, as shown in **Figure 1**.

The proposed Converter Station site is primarily composed of improved agricultural grassland used for silage production and pasture. The site is bordered by a mixture of hedgerows, treelines and narrow bands of woodland.

A well-managed, mature, hedgerow will have a three-dimensional structure that provides a range of habitats for invertebrates, birds and mammals. Old hedgerow trees are often the most valuable because their many branches, fissured bark and holes provide nesting and roosting spaces for birds such as tits and tree creepers, and even, on occasion, the increasingly scarce barn owl.

Hedgerows are utilised by several common bird species for nesting and roosting: 55 of the 110 bird species recorded regularly in Birdwatch Ireland's Countryside Bird Survey use them during the breeding season. These include the linnet and yellowhammer, two species which have declined in Ireland.

Woodland in terms of bird usage is affected by several factors such as location, age, tree composition, field and understory vegetation structure and size of the woodland, all of which influence the species present. These factors tend to be more favourable for biodiversity in old native woodlands where animals and plants have evolved to thrive under the conditions present therein and species richness tends to be high. Less biodiversity, especially plant and invertebrate diversity, means that there are fewer feeding opportunities for birds and fewer nesting and roosting sites.

Situated in the centre of the proposed converter station site is a large expanse of gorse scrub. Scrub can provide ideal breeding habitat for many birds and like woodland habitats the bird species present depends on the location, size, plant species and structure of the scrub habitat.

Baginbun Beach is along a sand shore with the occasional rock outcrop, with sections of largely vegetated hard/sedimentary sea cliffs to the west. The cliffs transition to rocky sea cliff habitat to the south east. These sea cliff habitats can form an important component of the overall breeding seabird habitat in Europe and provide for a range of requirements i.e. wintering, breeding, staging, and moulting habitat as well as providing a nursery function for some species and protection from disturbance and ground predators.

The surrounding landscape is dominated by pasture and arable fields. Passerine species the most commonly seen farmland birds. Swallow, Starling, House Sparrow, Tree Sparrow, Linnet and Yellowhammer are all associated with agricultural areas and farmyards while Whinchat and Chough are more localised.

2.1 Legislation

Many resident breeding and migratory bird populations within Ireland are protected under the following European legislation;

The Wild Birds Directive 2009/147/EC (as amended) identifies and classifies SPAs for rare or vulnerable species, as well as for all regularly occurring migratory species, paying particular attention to the protection of wetlands of international importance as listed in Annex I of the Directive. The EU Birds Directive is one of the most important pieces of nature legislation that we have and has created an extensive protection scheme for all of Europe's wild birds. More formally known as Council Directive 79/409/EEC on the conservation of wild birds, the Birds Directive was the very first piece of nature legislation of the European Union and was adopted by Member States in 1979. The Birds Directive bans activities that directly threaten birds, such as the deliberate killing or capture of birds, the destruction of their nests and taking of their eggs, and associated activities such as trading in live or dead birds.

Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora, otherwise known as the 'Habitats Directive', was adopted in 1992. The directive is the means by which the European Union meets its obligations under the Bern Convention and highlights a legal obligation to protect over 500 wild plants and over 1000 wild animal species.

The Bonn Convention on Conservation of Migratory Species of Wild Animals 1979 aims to achieve effective management of migratory species across national or jurisdictional boundaries.

Nationally, other than a small number of 'excluded species' such as crows and pigeons, all breeding birds, their young, nests and eggs are protected under Articles 19 and 22 of the Wildlife Act of 1976. Under the provisions of the act it is inter alia an offence to destroy or interfere with bird's nests. In addition, it is an offence under Section 40 of the Act to remove hedgerows and other vegetation during the bird breeding season for purposes other than

agriculture or forestry (defined in Section 46 of the Wildlife (Amendment) Act of 2000 as running from the 1st of March to the 31st of October).

2.2 Survey Limitations

The breeding bird survey methodology as given in Bibby et al. (2000) and Gilbert et al. (1998) is designed to give estimates of bird density across a landscape by sampling bird communities. It is not intended for accurately mapping the total number of birds or individual territories within a given area. However, the aim of the report is to provide a quantitative summary of breeding bird presence and so this is not considered a limitation.

The entire site was accessible and weather conditions were suitable. No limitations to the survey were encountered. Please note that ecological reports provide only a photograph in time of the bird activity occurring on the site.

3. Results

3.1 Desk-top Study Results

The National Biodiversity Centre online data base lists the species in **Table 2** as occurring within 2km of the application site. No records are shown to be for the application site itself. It is noted that the survey area around Baginbun falls with two 2km grid squares and thus both are included below.

Table 2 Bird species recorded within 2km of each survey location

Table 1 - NBDC records: Birds recorded within 2km of each survey		
	Baginbun Beach / Proposed Landfall Site	
Converter Station Site	Western Square	Eastern Square
Common Bullfinch (Pyrrhula pyrrhula)	Barn Swallow (Hirundo rustica)	Barn Swallow (Hirundo rustica)
Common Pheasant (Phasianus colchicus)	Black Guillemot (Cepphus grylle)	Black Guillemot (Cepphus grylle)
Common Redshank (Tringa totanus)	Black-billed Magpie (Pica pica)	Black-billed Magpie (Pica pica)
Common Wood Pigeon (Columba palumbus)	Black-headed Gull (Larus ridibundus)	Black-headed Gull (Larus ridibundus)
Eurasian Curlew (Numenius arquata)	Black-legged Kittiwake (Rissa tridactyla)	Common Blackbird (Turdus merula)
Great Cormorant (Phalacrocorax carbo)	Blue Tit (Cyanistes caeruleus)	Common Guillemot (Uria aalge)
Grey Heron (Ardea cinerea)	Brent Goose (Branta bernicla)	Common Linnet (Carduelis cannabina)
Hooded Crow (Corvus cornix)	Chaffinch (Fringilla coelebs)	Common Raven (Corvus corax)
Song Thrush (Turdus philomelos)	Coal Tit (Periparus ater)	Common Wood Pigeon (Columba palumbus)
Yellow-legged Gull (Larus michahellis)	Common Blackbird (Turdus merula)	European Shag (Phalacrocorax aristotelis)
	Common Guillemot (Uria aalge)	Great Black-backed Gull (Larus marinus)
	Common Kestrel (Falco tinnunculus)	Great Cormorant (Phalacrocorax carbo)
	Common Linnet (Carduelis cannabina)	Hedge Accentor (Prunella modularis)
	Common Pheasant (Phasianus colchicus)	Herring Gull (Larus argentatus)
	Common Raven (Corvus corax)	Meadow Pipit (Anthus pratensis)
	Common Redshank (Tringa totanus)	Northern Fulmar (Fulmarus glacialis)
	Common Starling (Sturnus vulgaris)	Northern Gannet (Morus bassanus)
	Common Whitethroat (Sylvia communis)	Red-billed Chough (Pyrrhocorax pyrrhocorax)
	Common Wood Pigeon (Columba palumbus)	Red-throated Diver (Gavia stellata)
	Eurasian Curlew (Numenius arquata)	Reed Bunting (Emberiza schoeniclus)
	Eurasian Jackdaw (Corvus monedula)	Rock Pipit (Anthus petrosus)
	Eurasian Oystercatcher (Haematopus ostralegus)	Ruddy Turnstone (Arenaria interpres)
	Eurasian Tree Sparrow (Passer montanus)	Sky Lark (Alauda arvensis)
	European Goldfinch (Carduelis carduelis)	Spotted Flycatcher (Muscicapa striata)
	European Greenfinch (Carduelis chloris)	Stonechat (Saxicola torquata)
	European Robin (Erithacus rubecula)	White Wagtail (Motacilla alba)
	European Shag (Phalacrocorax aristotelis)	Winter Wren (Troglodytes troglodytes)
	Great Black-backed Gull (Larus marinus)	
	Great Cormorant (Phalacrocorax carbo)	
	Great Tit (Parus major)	
	Grey Heron (Ardea cinerea)	
	Hedge Accentor (Prunella modularis)	
	Herring Gull (Larus argentatus)	
	Hooded Crow (Corvus cornix)	
	House Martin (Delichon urbicum)	
	House Sparrow (Passer domesticus)	
	Lesser Black-backed Gull (Larus fuscus)	
	Meadow Pipit (Anthus pratensis)	
	Mistle Thrush (Turdus viscivorus)	
	Northern Fulmar (Fulmarus glacialis)	
	Northern Gannet (Morus bassanus)	
	Northern Lapwing (Vanellus vanellus)	
	Razorbill (Alca torda)	
	Red-billed Chough (Pyrrhocorax pyrrhocorax)	
	Redwing (Turdus iliacus)	
	Reed Bunting (Emberiza schoeniclus)	
	Rock Pigeon (Columba livia)	
	Rock Pipit (Anthus petrosus)	
	Rook (Corvus frugilegus)	
	Sand Martin (Riparia riparia)	
	Sedge Warbler (Acrocephalus schoenobaenus)	
	Sky Lark (Alauda arvensis)	
	Song Thrush (Turdus philomelos)	
	Stock Pigeon (Columba oenas)	
	Stonechat (Saxicola torquata)	
	White Wagtail (Motacilla alba)	
	Winter Wren (Troglodytes troglodytes)	
	Yellowhammer (Emberiza citrinella)	

3.2 Breeding Bird Survey Results

A total of 25 species were recorded within the proposed converter station site while 28 species were recorded from the Baginbun Beach survey site. Of these species a total of 15 species i.e. Wren, Magpie, Dunnock, Blackbird, Robin, Great tit, Blue tit, Goldfinch, Herring Gull, Greater Black-backed Gull, Rook, Hooded Crow, Woodpigeon, Starling and Barn Swallow were recorded from both sites. A full list of bird species recorded during the 2018 surveys is provided in **Table 3** below.

Table 3. Breeding bird survey results

Proposed Converter Station Site				
Bird species	**Breeding status**	**Estimated No. of Pairs**	**No. Birds recorded per visit**	
			23/05/2018	**19/06/2018**
Wren	Br - FF	3 - 4	8	7
Magpie	Pr - P	1	1	2
Dunnock	Po - S	1 - 2	3	1
Blackbird	Po - S	2	4	2
Whitethroat	Br - FF	2	1	2
Robin	Br - FL	1 - 2	4	3
Great tit	Po - S	1	1	1
Blue tit	Po - H	1	2	1
Raven	N - F	0	1	0
Goldfinch	N - F	0	6	7
Chaffinch	Pr - P	1 - 2	4	4
Bullfinch	Po - H	1	1	2
Linnet	Po - H	1	0	2
Herring Gull	N-F	0	3	5
Greater Black-backed Gull	N-F	0	0	2
Rook	N-F	0	17	36
Hooded Crow	N-F	0	2	5
Woodpigeon	Po - H	1	2	1
Feral pigeon	N-F	0	0	7
Little egret	N-F	0	1	1
Starling	N-F	0	0	1
Barn Swallow	N-F	0	4	5
Chiffchaff	Po - S	0 - 1	0	1
Willow warbler	Po - S	0 - 1	0	1
Pheasant	Po - H	1	3	1
Baginbun Beach / Proposed Landfall Site				
Bird species	**Breeding status**	**Estimated No. of Pairs**	**No. Birds recorded per visit**	
			23/05/2018	**19/06/2018**
Wren	Po - S	1 - 3	3	1
Magpie	N - F	0	1	0
Dunnock	Br - FL	1 - 2	3	0
Blackbird	Pr - P	2 - 3	6	3
Robin	Br - FL	2	2	2

Great tit	Po - H	0 - 1	1	1
Meadow pipit	Po - S	1 - 2	2	1
Rock pipit	Br - FL	2	4	1
Chough	N - F	0	1	0
Pied wagtail	Br - FL	1	2	3
House sparrow*	Br - ON	1 - 10	31	53
Blue tit	Po - S	0 - 1	0	1
Goldfinch	Po - S	0 - 2	7	3
Greenfinch	N - F	0	1	0
Reed bunting	Po - S	0 - 1	0	1
Herring Gull	N - F	0	13	4
Greater Black-backed Gull	N - F	0	1	3
Lesser Black-backed Gull	N - F	0	2	0
Cormorant	N - F	0	2	1
Rook	N - F	0	6	2
Hooded Crow	N - F	0	2	1
Jackdaw	N - F	0	2	3
Woodpigeon	N - F	0	21	15
Sparrow hawk	N - F	0	1	0
Sand martin	Pr - N	0 - 2	0	4
Stonechat	Br - FL	1	0	2
Starling*	Br - ON	1 - 2	8	0
Barn Swallow	N - F	0	5	0
Notes	* House sparrows and Starling largely concentrated around area to northwest of Baginbun Beach. Private dwelling with large number of bird feeders within garden. Both species seen entering gap below tiles.			

With regard to the proposed Converter Station location, it was estimated that 3 species are definitely breeding, a further 2 are probably breeding, 10 are possibly breeding, while the remaining 10 species are non-breeding. Similarly, for the proposed Landfall location around Baginbun Beach, it was estimated that 7 species are definitely breeding, a further 2 are probably breeding, 6 are possibly breeding, while the remaining 13 species are non-breeding.

Species recorded as breeding or potentially breeding during the survey period included some resident species such as Wren, Robin, Rock pipit, Stonechat and House sparrow, and a number of breeding migrants, including Sand Martin, Chiffchaff, Willow Warbler and Whitethroat (**Table 4**).

Certain bird species are listed by BirdWatch Ireland as Birds of Conservation Concern in Ireland (BOCCI). These are bird species suffering declines in population size. BirdWatch Ireland and the Royal Society for the Protection of Birds have identified and classified these species by the rate of decline into Red and Amber lists. Red List bird species are of high conservation concern and the Amber List species are of medium conservation. Green listed species are regularly occurring bird species whose conservation status is currently considered

favourable. Birds species listed in Annex I of the Birds Directive (2009/147/EC) are considered a conservation priority. The conservation status for bird species recorded is shown in **Table 4** below.

Table 4		Status in Ireland*	Birds Directive Annex			BOCCI		Status during surveys[1]
Species			I	II	III	Red List	Amber List	
Sturnusvulgaris	Starling	Resident, augmented by winter visitors					X	N/ Br
Egrettagarzetta	Little Egret	Resident	X					N / -
Sylvia communis	Common Whitethroat	Summer visitor						Br/ -
Erithacus rubecula	Robin	Resident					X	Br/ Br
Larus marinus	Great black-backed Gull	Largely resident					X	N/ N
Larus argentatus	Herring Gull	Resident, augmented by winter visitors				X		N/ N
Turdus merula	Blackbird	Resident, augmented by winter visitors						Po/Pr
Phasianus colchicus	Pheasant	Resident		X	X			Po/ -
Prunella modularis	Dunnock	Resident						Po/ Br
Carduelis carduelis	Goldfinch	Resident - some extra influx in winter						N/ Po
Troglodytes troglodytes	Wren	Resident						Br/Po
Corvus corax	Raven	Resident						N/ -
Pyrrhula pyrrhula	Bullfinch	Resident						Po/ -
Phylloscopus collybita	Chiffchaff	Summer visitor						Po/ -
Phylloscopus trochilus	Willow Warbler	Summer visitor						Po/ -
Corvus frugilegus	Rook	Resident						N/ N
Pica pica	Magpie	Resident						Pr/N
Columba palumbus	Woodpigeon	Resident		X	X			Po/N
Carduelis cannabina	Linnet	Resident, augmented by winter visitors					X	Po/ -
Fringilla coelebs	Chaffinch	Resident, augmented by winter visitors						Pr/ -
Corvus cornix	Hooded Crow	Resident						N/ N
Parus caeruleus	Blue Tit	Resident						Po/ Po
Hirundo rustica	Barn Swallow	Summer visitor					X	N/ N
Parus major	Great Tit	Resident						Po/ Po
Columba livia f. domestica	Feral Pigeon	Resident						N/ -

Pyrrhocorax pyrrhocorax	Chough	Resident	X				X	- /N
Accipiter nisus	Sparrowhawk	Resident					X	- /N
Anthus petrosus	Rock Pipit	Resident, augmented by winter visitors						- / Br
Emberiza schoeniclus	Reed Bunting	Resident						- / Po
Motacilla alba yarrellii	Pied Wagtail	Resident						- / Br
Riparia riparia	Sand Martin	Summer visitor					X	- / Pr
Corvus monedula	Jackdaw	Resident						- /N
Passer domesticus	House Sparrow	Resident					X	- / Br
Carduelis chloris	Greenfinch	Resident					X	- /N
Anthus pratensis	Meadow Pipit	Resident				X		- / Po
Larus fuscus	Lesser black-backed Gull	Resident, with some interchange between Ireland and west Britain					X	- /N
Saxicolatorquata	Stonechat	Resident					X	- / Br
Phalacrocorax carbo	Cormorant	Resident, some immigration during the winter					X	- /N
Symbol	**Description**							
*	The Migration Atlas: Movements of the Birds of Britain and Ireland (Wernham *et al.* (2002))							
1	Breeding Status: Proposed Converter Station Site shown first, Baginbun Beach shown second							
I	**Annex 1**: species and sub-species are particularly threatened. Member States must designate Special Protection Areas (SPAs) for their survival and all migratory bird species.							
II	**Annex 2**: bird species can be hunted. However, the hunting periods are limited and hunting is forbidden when birds are at their most vulnerable: during their return migration to nesting areas, reproduction and the raising of their chicks.							
III	**Annex 3**: overall, activities that directly threaten birds, such as their deliberate killing, capture or trade, or the destruction of their nests, are banned. With certain restrictions, Member States can allow some of these activities for species listed here.							

As can be seen from **Table 4**, two species classified as high conservation concern (BoCCI) were recorded during the breeding bird survey. Meadow pipit was recorded as a possible breeder at Baginbun Beach. Meadow pipits generally nest on the ground within well concealed vegetation with a preference for grass tussocks, heather and grass, rushes or in low gorse with grass growing through. Occasionally they will be found in cover on steep banks or rock faces (Ferguson-lees et al, 2011). Herring gull were recorded overflying the site at Baginbun Beach.

Thirteen amber listed species were recorded during the breeding bird survey; five species from the proposed converter station site and twelve from Baginbun Beach. Three species i.e. Robin, Greater Black-backed Gull and Barn swallow were recorded at both sites. Sand martin were noted to be probable breeders due to up to two pairs visiting a potential nest site within a section of the cliff face in proximity to the car park at Baginbun Beach. A large number of breeding House sparrows were recorded however these were concentrated around a private dwelling which will be unaffected by the proposed works.

Of the two Annex I species recorded i.e. Chough and Little Egret, both were recorded as non-breeders. It is assumed however that Chough are breeding within the wider landscape due to the amount of potential breeding habitat along the coastline on cliff faces. Most Choughs build their nests on ledges in crevices and caves of coastal cliffs.

4. Conclusions

The study area provided widespread breeding and foraging habitat that supported a diverse bird population. Whilst a large proportion of the species recorded during the surveys are generally considered to be common and widespread, certain habitats provided nesting and foraging resources for notable species. The most important habitats within the study area that provided resources for local populations of breeding species were considered to be those that were less intensively managed. These include scrub, hedgerows, treelines, woodland and coastal cliffs and crevices with ledge vegetation mosaics. The improved grassland at the temporary horizontal direction drill launch and reception pits at the Campile Estuary, the off-road and on-road cable routes all provide limited resources for breeding species.

No significant populations of breeding birds have been recorded at Baginbun and most species recorded here are common and widespread within the county although a few species were noted to be Red and Amber listed. However, these were recorded in low numbers.

The nature conservation value of the breeding bird assemblage onsite is considered to be of no greater than ‘local’ value. Through appropriate timing of works outside of the bird breeding season, it is thought that the majority of breeding bird species recorded using the onsite habitats will not be impacted.

5. References

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Section 2 Barn Owl Survey

1. Introduction

Dixon.Brosnan was commissioned by Arup to conduct a Barn owl (*Tyto alba*) survey at an abandoned and derelict old building in close proximity to the existing Great Island substation and proposed converter station.

2. Methodology

2.1 Desktop Review

A desktop review was carried out to identify potential Barn owl in the surrounding landscape with particular emphasis on any potential breeding sites which may be impacted by the proposed development. From the information provided in the desktop review and a site inspection, it was concluded that Barn owl survey would be required on an abandoned and derelict old building in close proximity to the proposed converter station site location to accurately assess any potential ecological impacts on Barn owls which might accrue from the proposed development.

2.2 Site location and description

As part of the proposed development of the Irish converter station and construction compound a site footprint is likely to be at least 1.85 hectares within an existing improved agricultural field, with the requirement for potential additional land take for site access, landscaping and stormwater infrastructure. There is an existing abandoned and dilapidated former dwelling to the southwest of the main development footprint.

The general landscape is dominated by pasture, arable crops and tillage with large patches of scrub habitat to south of the development. The River Barrow and River Suir form integral and dominating characteristics in the surrounding landscape with numerous smaller tributaries dissecting the land to the south of the proposed development i.e. within 1km of the proposed development site. The adjacent land directly to the west of the proposed development consists of Great Island Power Station with associated landscaping.

3. Barn Owl Ecology

The Barn Owl (*Tyto alba*) is a characteristic farmland bird which has undergone a documented decline in its geographical range in recent times. Within Ireland the core breeding range is now centred on the south-west of the country. Barn Owls are primarily associated with open countryside, and occupy a range of landscapes, provided there are suitable nesting sites and sufficient prey-rich, open foraging habitat. Favoured habitats contain areas of rough grassland

i.e. species rich, rough and low-intensity or unmanaged grassland habitats suitable for small mammals, which include grass margins, wetland habitats and edge habitats i.e. field boundaries, hedgerows, ditches, road-side verges, and woodland edge. Barn Owls can be found in intensively managed landscapes, provided there are suitable foraging habitats in the form of rough grassland and field margins.

Barn Owls are highly efficient predators, perfectly adapted to locate and catch small ground-dwelling mammals such as rats, mice, voles and shrews, but will also take small birds, and occasionally frogs may also be taken. The availability of small mammal prey shapes breeding behaviour; breeding may be delayed or not take place at all in those years when small mammal populations are at a low.

The Barn owl is a cavity nester, favouring large cavities within mature trees, bale stacks, fissures in rocks or the ledges found in old agricultural buildings. Within buildings, nest sites are most frequently located within chimney structures, roof spaces, wall cavities and chutes. They require a dry, dark and secluded space with a flat surface greater than 30cm x 30cm for nesting. To use any site, the owl has to be able to get in, but the absolute minimum hole size required is only 70 x 70mm.

Potential Nest Sites typically include:

- Agricultural or old industrial buildings with suitable access and possessing an upper floor, loft, roof void, blocked chimney, wide wall plate, bale-stack, empty water tank, ducting or large nest box;
- Disused or derelict cottages or industrial buildings such as aircraft hangers, which possess an open joist, broken ceiling panel, water tank, disused chimney or large nest box;
- Mature trees, isolated or in clusters in open fields, hedgerow or on the woodland edge, containing a hole >70 mm backed by a large, dark cavity, including those which have rotted-out to ground level but which offer no obvious access to ground predators through an open root structure;
- Outdoor nest boxes on poles, trees, buildings or owl towers, which offer a dark chamber;
- Outdoor bale-ricks;
- Cliffs and quarries with caves or fissures;
- Waterway, rail or road bridges containing suitable cavities within their structure; and
- Churches, mainly rural, and the chimneys of intermittently used holiday homes.

Evidence of breeding can be defined in the following ways:

1. Confirmed Breeding: breeding can be described as confirmed when a pair of owls is recorded occupying a potential nest site during the breeding season or when eggs, eggshells, chicks and/or juvenile down are identified at or near to a potential nest site.

2. Probable Breeding: breeding can be described as probable at a potential nest site when a barn owl is observed carrying prey into the site, a pair is seen or heard calling during the breeding season or when a collection of active roost sites, food cache and/or female moulted wing feathers are identified at or near the site.
3. Possible Breeding: breeding can be described as possible when an occasionally used spring or summer roost has been identified in an area containing one or more potential nest sites, but where there is no other evidence of breeding.

The home range size of breeding Barn Owls in Ireland varies according to habitat quality and prey availability, ranging from 950 to over 9,000 hectares, with the majority of foraging concentrated within 4 to 5km of the nest site. In mixed farming landscapes Barn owls like those in proximity to the proposed converter station site, Barn owls need 17 to 26 hectares of rough grass within 2km of a suitable nest site. This equates to about 43km of rough grass field margin, 4 to 6 metres wide. In pastoral (intensively grazed grassland) landscapes Barn Owls need 31 to 47 hectares of rough grass within 2km of a suitable nest site. This equates to 78km of rough grass field margin, 4 to 6 metres wide (The Barn Owl Trust).

4. Legislation and Conservation Status

The legislative framework under the Wildlife (Amendment) Act, 2000 provides for the protection of all wild birds and their nests, eggs and young (www.npws.ie/legislation). Barn Owls are a Schedule II species under the Wildlife (Amendment) Act, 2000. It is an offence to intentionally cause disturbance at a nest site or to breeding Barn Owls. All Barn Owl survey operations outlined in this standard require a licence (Section 22 9(d)) from the National Parks and Wildlife Service.

The Barn owl qualified under international criteria as a Species of European Conservation Concern, SPEC Category 3 (BirdLife International 2015, Burfield et al. submitted) because of its 'moderate decline' in Europe. The Barn Owl is also a Red-listed Bird of Conservation Concern in Ireland due to extensive declines in their breeding population over recent decades (Colhoun and Cummins, 2013). The Breeding Birds Atlas (2007-2011) highlighted a decline of 39% in the breeding range of Barn Owls in Ireland over the 40-year period since the original Breeding Birds Atlas of Britain and Ireland (1968 – 1972) (Sharrock, 1976; Balmer et al., 2013). The intensification of agriculture, in particular the reduction of prey rich foraging habitat, is likely to be the main driver of long-term Barn Owl population declines in Ireland. The loss of nesting sites, increases in the use and exposure to rodenticides, and the expansion of the major road network have also been recognised as factors which may impact Barn Owl populations.

5. Barn Owl Survey Methodology

This report presents the results of an onsite daytime building visual inspection of external and internal structures, undertaken on the 1st of February 2019. This survey follows the guidelines set out in '*Barn Owl Surveying Standards for National Road Projects*' (Transport Infrastructure Ireland (TII) Publications, 2017) and '*Barn Owl Tyto alba Survey Methodology and Techniques*

for use in Ecological Assessment: Developing Best Practice in Survey and Reporting' (Shawyer, 2011).

Although barn owl nest verification surveys are best undertaken during the breeding season, they can also be conducted successfully by experienced Barn owl ecologists after the owls have vacated their nest site, during the late autumn and winter months.

The presence of Barn owls is often shown by pellets (regurgitate undigested remains of prey), white-wash and moulted feathers. Confirmation of a recent breeding attempt can usually be determined from subtle signs left behind. These can include the confetti-like scattering of scales from the quills of developing wing feathers over compacted nest debris, matted dirty-grey down caught on rough surfaces, or the more obvious clues, such as unhatched white eggs, adult female wing feathers or the remains of dead young. Confirmation of signs indicates that a site has been used by Barn Owls; however, it is necessary to conduct a nocturnal watch to establish current occupancy and breeding status. The presence of blowflies around the entrance of a potential nest which are attracted by food remains within the nest, can also be indicative of an occupied breeding site.

Potential roosting/nesting sites in cavities/chambers were examined from the ground and aided by close focusing binoculars for at higher elevations. Where necessary an endoscope was used to examine crevices deep enough to house hiding owls. This piece of equipment is fitted with a camera and allows visibility of confined spaces and narrow passages potentially used by Barn owls. A torch was also used to view cavities/chambers and other spaces potentially used by owls.

5.1 Survey constraints

The Survey was conducted outside the main nesting period for Barn owls. Barn owl surveys to determine occupancy and breeding status should be ideally carried out during the main nesting period (April to July) when the population is sedentary and when it is possible to detect and confirm nesting sites.

Barn owls do not venture into their nest chamber after the breeding season and during the winter months they will often maintain an occasional presence near the breeding site. In the case of outdoor nest boxes and trees an occasional pellet or dropping can sometimes be seen on the roof, beneath the landing ledge or under a nearby branch, but outside the breeding season these signs are rarely discovered inside the nest chamber itself.

6. Building Description (Photographs 1 – 6)

A former dwelling exists to the southwest of the proposed converter station footprint. The dwelling has long since been abandoned and left in a state of disrepair and has been overgrown by scrub and woodland vegetation.

The former two-storey building is of a solid concrete construction and has a pitched roof with slate tiles. Both the northern and southern elevations contain two upper and ground floor windows and a single doorway. The eastern and western elevations of the building are of solid

concrete, with no gaps or crevices noted. A light to moderate covering of ivy (*Hedera helix*) envelops the building. It is noted that only the frames of the windows and doorways remain thus offering Barn owl potential access and egress points into the building.

The ceiling of the ground floor no longer remains. A large unobstructed fireplace and chimney exists along the eastern wall of the building. A smaller obstructed chimney i.e. potential corvid nests, is located along the western wall of the building. A small section of remaining wooden cladding still exists on the upper floor ceiling, however, overall the structure of the roof is exposed; i.e. wooden rafters, ridge plate, tile battens and joists. Exposed wooden rafters etc offer potential roosting sites for Barn owls as the species seem to prefer perching on wood (such as roof timbers) or equally stone (such as a wall-top) rather than metal. In addition, small sections of the remaining wooden cladding form ledges which may conform to the requirements of nesting Barn owls.

A smaller one-storey structure exists to the rear of the building i.e. along the southern elevation. This building is of a similar construction to the main house however the roof of the building no longer exists and scrub has engulfed the building internally.

The building is surrounded by treelines, narrow bands of woodland, hedgerows, scrub, agricultural grassland habitat and a small wetland area to the south which have some Barn owl foraging potential.

Photographs 1 – 4: External elevations of the former dwelling

Photographs 5 – 6: Internal structure of building along with exposed roof beams and small sections of wooden cladding.

7. Discussion of Results

Barn owl activity was not recorded at the abandoned and derelict old building and the site was deemed to be unoccupied during the survey period and probably during the previous breeding season. There was no evidence (signs including pellets, white-wash and moulted feathers) of Barn owl observed during the daytime inspection in and around the building. Assessment of the building and potential nesting opportunities within indicate that the site remains of limited suitability but has the potential to support a breeding pair.

8. Mitigation Measures

A full survey for evidence of Barn owl occupation should be conducted, by a suitably qualified person before development works start to ensure no offence is committed under the Wildlife Act.

If evidence of Barn owl is found within the building, no building and construction work shall take place within 30 metres of any part of the site containing material evidence of Barn Owl occupation unless survey-based evidence has been provided to the Local Planning Authority that no birds are nesting at the development site to which the consent applies.

If a nesting site were to be removed it would be necessary to create as a minimum the same amount of suitable Barn owl foraging habitat to that which is being lost to ensure no net loss in biodiversity. This can be on or off-site. A habitat management plan should specify a topping regime of not more than once a year and not before 15th July. Annual topping on a rotational basis can help ensure there is always some optimum foraging habitat available for the barn owls**.**

9. References

https://www.barnowltrust.org.uk

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