APPENDIX 6.1

BAT SURVEY REPORT

Eire Ecology

Environmental Consultants

Bat Survey Report

Coolpowra Energy Development

DOCUMENT DETAILS

Client:	Halston Environmental & Planning Limited (Halston) on behalf of Coolpowra FlexGen Limited
Project Title:	Grid connected energy support projects
Document Title:	Bat Survey Report
Address:	Coolpowra, Co. Galway
Prepared By:	John Curtin - Consultant Ecologist
Date:	May 2024

TABLE OF CONTENTS

1 INTRODUCTION

This report details the findings of a bat survey carried out as part of a planning application for a proposed grid connected energy support project in Coolpowra, Co. Galway (53.131688, -8.263128).

This report aims to;

- Examine the area of works for the presence of bats or their roosts.
- Identify species of bats using the site.

The surveys undertaken are in line with the Bat Conservation Trust 'Good Practice Guidelines, 4th edition, 2023' (BCT Guidelines 2023) and The Irish Wildlife Manual No. 134' (Marnell, F. 2022). The survey was designed and carried out by John Curtin B.Sc. (Env.). John has over ten years' experience of carrying out bat surveys and has completed copious surveys during this time. John has also completed the Bat Conservation Ireland, Bat Detector Workshop and Bat Handling Workshop which are the standard training for the carrying out of bat surveys in Ireland. In addition, John is a longtime active member of Bat Conservation Ireland, which monitor bat populations in Ireland, and facilitate the education of bat communities to the public.

Surveys were assisted by Karolina Illien (MSc) an Eire Ecology ecologist since 2022.

The site of the proposed development primarily consists of improved agricultural grassland directly surrounded by treelines, hedgerows and drains. Improved grassland habitat typically does not support high diversity of bird species. The site also contains a small area of planted immature native trees, as well as several buildings, gravel tracks and roads.

A single occupied dwelling with some bat roosting potential and several sheds can be found on site. All buildings were examined for bat roosts. Trees within the site were also assessed with reference to (Andrews H. , 2018) "Bat Roosts in Trees. In addition, static detector surveys were conducted to establish bat activity levels within the site.

1.1 DEVELOPMENT PROPOSALS

Project 1: Reserve Gas Fired Generator

The CPFL Reserve Gas Fired Generator comprises three open cycle gas-fired generator (OCGT) units positioned within a building (OCGT Hall) along with auxiliary equipment. An OCGT unit consists of a turbine connected to an electric power generator and the three turbines are designed to operate independently of each other. The OCGT units will receive natural gas from the gas network via an underground pipeline to an Above Ground Installation (AGI) compound within the development lands. Gas Networks Ireland (GNI), as the designated competent authority, will

separately manage the process of delivering the underground gas transmission pipeline to the proposed AGI.

The proposed OCGT units are dual fuel units as required by system requirements specified by the Commission for Regulation of Utilities (CRU). Natural gas will be the primary and combustion fuel to each of the OCGT units when operating. Secondary fuel (gas oil) will be stored in a bunded structure outside the OCGT building along with ancillary items of electrical plant and machinery such as coolers and transformers. To ensure compliance with the requirements set by the CRU, the Reserve Gas-Fired Generator must be capable of running continuously for 72 hours using secondary fuel. This preparedness is crucial for scenarios involving an outage or interruption to the natural gas supply.

The Reserve Gas-Fired Generator is designed to operate intermittently and provide generation capacity during periods of high demand or when renewable energy generators cannot meet system demand. OCGT units are advantageous due to their operational flexibility and can be turned on quickly to match system demand. The selected turbines are capable of being converted to allow for the combustion of green hydrogen as a fuel in the future, which will allow for carbon free and climate-neutral plant operation.

Project 2: Energy Storage System (ESS)

The CPFL Energy Storage System (ESS) facility comprises (a) a Long Duration Energy Storage (LDES) static battery positioned within a secure outdoor compound, and (b) a Synchronous Condenser which will operate within a building in a separately secured compound. The LDES will provide peaking, active power and back start capability services o the electricity grid.

Battery storage is a technology that enables power system operators and utilities to store energy for later use. A battery energy storage system (BESS) is an electrochemical device that charges (or collects energy) from the grid or a power plant and then discharges that energy at a later time to provide electricity or other grid services when needed. A BESS facility is made up of batteries, a battery management system, a power conditioning system, and an energy management system. Battery storage is one of several technology options that can enhance power system flexibility and enable high levels of renewable energy integration. Studies and real-world experience have demonstrated that interconnected power systems can safely and reliably integrate high levels of renewable energy from variable renewable energy. Sufficient separation distance between enclosures is included within the design to allow for safe access and replacement of modules. Each module will include control equipment, to provide for ventilation, air conditioning and fire suppression equipment. MVPS (or PCS) units and small transformers will also be positioned in self-contained weather-proof enclosures.

At a system level, UL9540A1 is the recognised test method for evaluating thermal runaway in battery storage systems that reduces the risk of a single cell event spreading to the rest of the system. This is a global standard that technology suppliers test their products under to demonstrate compliance. As is the case within the existing BESS facility, the proposed

development will comply with the UL9540A standard industry and other recognised best practice and in terms of fire management.

The plant will absorb and inject energy as demanded by the power system numerous times over an annual period over short-duration events. Therefore, it should be distinguished that grid-connected BESS plants do not operate continuously like conventional power fossil fuel power plants. BESS plants are designed to economically and rapidly provide system support services when needed, allowing immediate system recovery.

As storage technologies continue to mature, and their costs continue to fall, they will be increasingly deployed as a flexible asset to support national decarbonisation goals. In June 2021, Baringa published 'Endgame – A zero-carbon electricity plan for Ireland'2, which projects up to 1,700 MW of large-scale battery storage will be needed on an allisland basis to meet 2030 RES-E targets and deliver a zero-carbon power system. According to Energy Storage Ireland, there is currently 700MW of battery storage now operational on the island of Ireland.

Synchronous condenser technology has been around since the mid 1900's and is demonstrated and mature technology having been formerly used by utilities worldwide. The rotating generator is connected to the transmission system via a step-up transformer. The synchronous condenser is started up and stopped by a frequency controlled electric motor (pony motor). When the generator has reached an operating speed that is synchronous to the system frequency, it is synchronised with the transmission network and acts as a motor providing reactive and short circuit power to the electricity network. There is no combustion or emissions from a synchronous condenser. The synchronous condenser will provide short-circuit power, inertia, and reactive power for dynamic loads and stabilise the network through voltage recovery during faults.

The project is designed to complement and support the reserve gas fired generator by providing zero carbon, instantaneous and balancing power to the grid.

Project 3: Gas Insulated Switchgear (GIS) Electricity Substation

The CPFL Gas Insulated Switchgear (GIS) Electricity Substation comprises a two-storey building positioned and secured within a palisade fenced compound. This component of the overall development will enhance and upgrade the existing Oldstreet AIS 400Kv substation and will provide for the connection of Project 1 and Project 2 to the electricity transmission network. The HV lines and electric plant associated with Reserve Gas Fired Generator and ESS facility, and which will connect the projects to the GIS substation, are included with the planning application for Project 3. Following consultations with the Board under Section 182A of the Act it is the opinion of the Board that the project falls with the meaning of Section 182A of the Act. Accordingly, the Board decided that the proposed development would be strategic infrastructure within the meaning of Section 182AA of the act and any application for permission for the project must be made directly to the Board under Section 37E of the Act.

2 DESKTOP STUDY

2.1 BATS IN IRELAND – LEGISLATIVE PROTECTION

There are two main pieces of legislation which cover wildlife protection in Ireland – the Wildlife Act and the Habitats Regulations. These are outlined below, with particular reference to the protection afforded to bat species in Ireland.

The Wildlife Acts 1976 and 2000

The primary pieces of national legislation for the protection of wildlife in Ireland are the Wildlife Act (1976) and the Wildlife [Amendment] Act (2000). All species of bats in Ireland are listed on 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
- Willfully interfere with any structure or place used for breeding or resting by a bat
- Willfully interfere with a bat while it is occupying a structure or place which it uses for that purpose

European Communities (Birds and Natural Habitats) Regulations 2011 to 2021

The EC (Birds and Natural Habitats) Regulations 2011-2021 provide strict protection for all of the Irish species listed on Annex IV of the EU's Habitats Directive. It does this by prohibiting certain activities which could impact on the conservation status of those species. Those activities may only be permitted by way of a derogation licence. All bat species found in Ireland are listed under Annex IV of the Directive, while the lesser horseshoe bat is afforded further protection under Annex II.

These regulations makes it an offence to:

- Deliberately capture or kill a bat
- Deliberately disturb a bat
- Damage or destroy a breeding site or resting place of a bat

Provision is made in the Regulations for the environment minister to grant, in strictly specified circumstances set out in that Regulation, a derogation license permitting any of the above activities "where there is no satisfactory alternative and the derogation is not detrimental to the maintenance of the populations of the species to which the Habitats Directive relates at a favourable conservation status in their natural range".

2.2 Site Location and Historical Data

The proposed site lies near Coolpowra, Co. Galway (Grid Ref: E582307 N709323).

2.2.1 Designated Sites Surrounding Subject Site

Four SAC's can be found within 6km (the probable max CSZ for an Irish bat species; Leister's bat); the Ardgraigue Bog SAC, Barroughter Bog SAC, River Shannon Callows SAC, Lough Derg, North-east Shore SAC. None of these sites are designated for bat species. The site synopsis of the two pNHA's found within 6km of the site do not refer to bats.

Table 2-1 Protected habitats with ornithological value in the vicinity of the proposed development

Name of Site	Site Code	Distance	Has the designated site a high value for bats?	Site within designated roost's CSZ?
Special Area of Conservation (SAC)				
Ardgraigue Bog SAC	002356	4.09km	Peatland. Lesser Horseshoe bats are not a Conservation objective. SAC has little value for bats baring potential feeding grounds. No bat roost mentioned in SAC documents	-
Barroughter Bog SAC	000231	5.75km	Peatland. Lesser Horseshoe bats are not a Conservation objective. SAC has little value for bats baring potential feeding grounds. No bat roost mentioned in SAC documents	-
River Shannon Callows SAC	000216	5.82km	Lesser Horseshoe bats are not a Conservation objective. SAC has some riparian zone which could provide roosting habitat for bats. No bat roost mentioned in SAC documents	-
Lough Derg, North-east Shore SAC	002241	5.86km	Contains high quality native woodland with good bat roosting potential trees. Lesser Horseshoe bats are not a Conservation objective. No bat roost mentioned in SAC documents.	-
National Heritage Areas (NHA)				
Capira/Derrew Bog NHA	001240	1.94km	Peatland with little value for bats baring potential feeding grounds. No bat roost mentioned in Site Synopsis documents	-
Cloonoolish Bog NHA	000249	5.56km	Peatland with Peatland with little value for bats baring potential feeding grounds. No bat roost mentioned in Site Synopsis documents	-

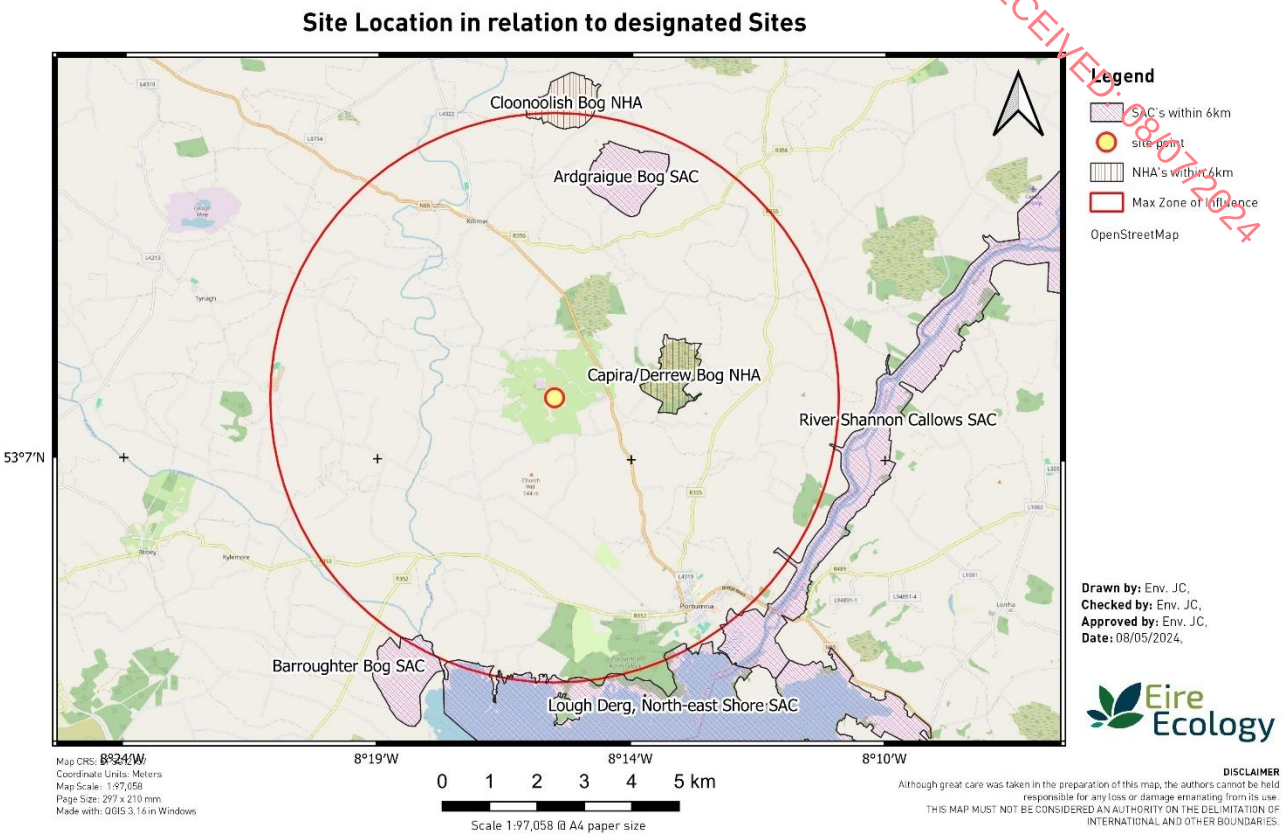

Figure 2-1: Location of proposed development

2.2.2 Bat Landscape

(Lundy, 2011) produced a landscape model by analysing data contained in the Irish National Bat Database, maintained by Bat Conservation Ireland and the National Lesser Horseshoe Bat database maintained by National Parks and Wildlife Service. The maps are a visualisation of the results of the analyses based on a 'habitat suitability' index. The index ranges from 0 to 100 with 0 being least favourable and 100 most favourable for bats.

Table 2-1 shows the BCI bat landscape model for the site. Overall suitability is moderate high with Common and Soprano Pipistrelle, Brown Long-eared Bat, Leisler's Bat, Daubenton's Bat and Natterer's having high favourability.

Table 2-2 Bat favourability

All Bats	Species	Suitability Result
35.33	Soprano Pipistrelle (*Pipistrellus pygmaeus)*	43
	Brown Long-eared Bat (*Plecotus auratus*)	47
	Common Pipistrelle (*Pipistrellus pipistrellus)*	49
	Lesser Horseshoe Bat (*Rhinolophus hipposideros)*	4
	Leisler's Bat (*Nyctalus leisleri)*	46
	Whiskered Myotis (*Myotis mystacinus*)	27

All Bats	Species	Suitability Result
	Daubenton's Bat (*Myotis daubentonii*)	38
	Nauthusis' Pipistrelle (*Pipistrellus nathusii*)	11
	Natterer's Myotis (*Myotis Natterii*)	49

2.2.3 Bat Species Recorded in the Surrounding Area

The NBDC database was consulted for details on bat records held for the site and the surroundings. The database was consulted on the 28/05/2024 for details on historical records from the site and the surrounding 6km given this is the furthest likely zone of influence for Irish bat roosts. Results are outlined in Table 2-2. No bat species were recorded within 2km, however six of the nine confirmed resident bat species known to occur in Ireland have been recorded within 6km of the subject site.

Table 2-3: Irish bat species recorded

Type of Record	Species name	Distance from site	Last record	Details	Designation	Potential connectivity with subject site
Roost	Unidentified Bat Species	4.7km	2002	Roost closest to site entrance road. Scattered droppings found.	EU Habitats Directive Annex IV Protected Species: Wildlife Acts	Lack of prominent connective features between roost and site location.
	Soprano Pipistrelle	5.0km	2021	Roost in Derelict Stone Building inside urban area. Single bat.		Lies outside the CSZ for this species. Small roost.
	Common Pipistrelle	5.3km	2005	Roost on border of broadleaf forest biodiversity area.		Soprano Pipistrelle maternity roost. Roost is located within Portumna forest park. The subject site is situated outside the CSZ for Soprano Pipistrelle, the main roost species. The main feeding habitat for the species located in this roost is the woodland.
	Soprano Pipistrelle					
	Leisler's Bat					
	Daubenton's Myotis					
	Whiskered Myotis					
	Natterer's Myotis					

Type of Record	Species name	Distance from site	Last record	Details	Designation	Potential connectivity with subject site
	Unidentified Bat Species	5.4km		Bat Boxes erected on mature deciduous woodland area.		Multiple clusters of bat boxes deployed in Coillte owned forestry. The main feeding habitat for the species located in this roost is the woodland.
	Unidentified Bat Species	5.5km				
	Unidentified Bat Species	6.0km				

2.3 ESB DEVELOPMENT NORTH

A planning application by ESB for the Oldstreet kV Substation Extension in 2023. The proposal involves the demolition of a derelict dwelling. Bat surveys conducted in 2022 found Common pipistrelle maternity roost (max of 28 bats observed emerging). As part of the application a purpose-built bat building was proposed. This application was granted, and the bat building has been built however the existing bat roost has yet to be demolished. The dwelling is located 56m to the north of the site while the new bat building is located 180m to the north. Both have good connectivity to the subject site.

3 SURVEY FINDINGS

3.1 SURVEY METHODOLOGIES

3.1.1 Habitats on site

The site of the proposed development primarily consists of improved agricultural grassland directly surrounded by treelines, hedgerows and drains. Improved grassland habitat typically does not support high diversity of bird species. The site also contains a small area of planted immature native trees, as well as several buildings, gravel tracks and roads.

3.1.2 Constraints and limitations

All surveys were conducted at appropriate times of year in good weather conditions.

- All surveys were conducted at appropriate times of year in good weather conditions.
- It is not always possible to identify a bat call to species level due to the recorded call not being clear. Recorded files from automated detectors may contain only fragments of a call, or the bat may be calling from a distance (in relation to the detector) in which case it may not be clear enough to assign the call to a specific species. In these cases, the call has been assigned to genus level.
- Some caution must be taken when comparing activity levels between species, as bias can be shown towards those species with 'louder' or 'lower frequency' echolocation calls. For example, Nyctalus species have louder and low frequency echolocation calls which carry further than the quieter and more broad-band brown long-eared bat echolocation calls;
- A bat contact is defined as a single detector file which contains at least one bat call. Multiple contacts at any given detector location do not necessarily indicate the presence of more than one bat and should therefore be interpreted as a level of activity rather than the number of bats recorded.

3.1.3 Assessment of Potential Roost Habitats

Buildings and trees within the site were examined. The aim of the surveys was to compile information on actual and potential access points and roosting locations. This was done by searching for evidence of bats including live and dead specimens, droppings, feeding remains, urine splashes, fur oil staining and noises.

Potential building roosts

An occupied dwelling (53.1302585, -8.2655434) with sheds can be found within the site. The house and two sheds have some roosting potential. A large metal shed to the rear (53.1305135 , -8.2647968) has low potential. In addition, a small derelict mobile home (53.1319012, -8.2657650) was examined and noted as having low bat roosting potential.

Potential tree roosts

Trees are a highly important feature of landscapes in that they provide roost sites throughout the year as well as being essential sources of insect prey. Therefore, the removal of such trees reduces the availability of shelter and feeding sites for bats (NRA 2005). The use of trees as roost sites is well established. Discovery of such roosts may be established by a variety of means including the use of a bat detector survey or alternatively by examination of all suitable crevices and cavities; commonly referred as Potential Roost Features (PRF's). Trees most likely to serve as bat roosts should be identified by a bat specialist from a walk-through of the route, from aerial photography or from a tree survey report.

Tree Category	Description
1	Trees with multiple, highly suitable features capable of supporting larger roosts
2	Trees with definite bat potential but supporting features suitable for use by singleton bats;
3	Trees have no obvious potential although the tree is of a size and age that elevated surveys may result in cracks or crevices being found or the tree supports some features which may have limited potential to support bats;
4	Trees have no potential.

Trees were examined for potential to host bat roosts on the 25th of January and the 23rd of February 2024 following guidelines set out in the Bat Tree Habitat Key (Andrews, 2016) and BCT Guidelines for professional ecologists ed 2 and 3. All trees were assessed from ground level using binoculars.

Examples of crevice features include:

- Natural holes;
- Cracks/splits in major limbs;
- Loose bark; and
- Hollows/cavities.

Each tree was assessed and ranked from category 1 – 4. A table of results can be found in Appendix A while a map is presented below as Figure 3-2.

Table 3-1 Categorize each tree according to Bat Conservation Trust 2 ed. (Hundt *et al*, 2012):

3.1.4 Night time bat detector surveys.

Dusk emergence and transects surveys were carried out within the site. These surveys used aspects from chapter 7 of (Collins, 2023) and (Marnell, 2022). Each contact with a bat was recorded. Where possible, a positive identification to species level was made. Information on the behavior was also recorded where available.

The bat detectors used during the surveys were Wildlife Acoustics Inc. (Massachusetts, USA) EM3 touch pro 2s which are triggered to record when a bat call is emitted louder than 18dB for 1sec. These detectors uses full spectrum sampling; detecting all frequencies simultaneously, meaning that multiple bat calls can be recorded at the same time. In addition NVA's were used to aid spot emerging bats;

- Cannon XA10 with two IR Nightfox torches
- Guidetrack Pro 19mm thermal scope
- Guidetrack Pro TK612 thermal scope

A contact as shown below describes a bat observed by the surveyor. This contact can range from a commuter passing quickly to a foraging bat circling a feature lasting for several minutes. Some observations contain multiple bats. When several bats of the same species are encountered together they are recorded under the one contact. A separate contact is recorded for each species. A contact finishes when the recorder assumes the bat is no longer present. It is likely that the same bat is recorded in several contacts throughout the night. This survey type cannot estimate abundance of bats, rather activity; the amount of use bats make of an area / feature

3.1.5 Static bat detector surveys

Song Meter Mini full spectrum bat recorders were deployed within the study area during May 2024. Five detectors were placed within the site;

- D1; along an East to West hedge line adjacent to the Oldstreet 400kV Station,
- D2; placed on a tree to the South of the site,
- D3; placed on a powerline pole in the center of the site,
- D4; located in open, actively-grazed grassland,
- D5; placed on the northern most hedge line with connectivity to a historical roost on the site.

The aim of this survey was to examine how bats utilize the various habitats within the site. Each bat pass does not correlate to an individual bat but is representative of bat activity levels. Some species such as the pipistrelles will continuously fly around a habitat and therefore it is likely that a series of bat passes within a similar time frame is one individual bat. On the other hand, Leisler's bats tend to travel through an area quickly and therefore an individual sequence or bat pass is more likely to be indicative of individual bats. Per SNH (2019) guidance, static units (SM-Mini) were programmed to commence half an hour before sunset and finish half an hour after sunrise to ensure that bat species that emerge early in the evening and return to roosts late are recorded. Detectors were left out for 10 nights in May 2024.

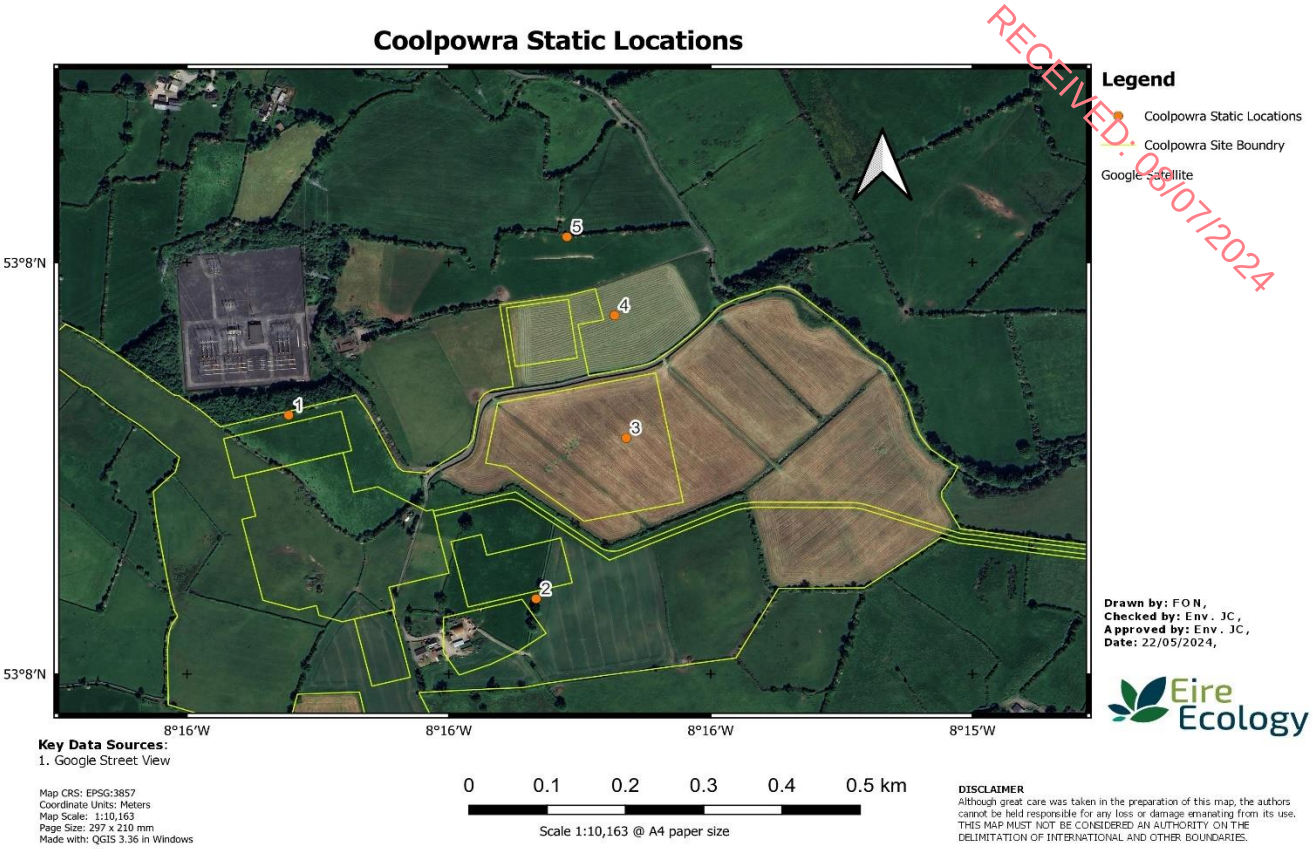

Figure 3-1: Static detector locations

3.2 Survey Results

3.2.1 Potential tree roosts

Each tree was assessed and ranked from category 1 – 4. In total 37 category 1 and 2 trees were recorded (See Appendix B for details). Very few trees of these most suitable categories for bat interaction are located to the West of the site, with highest concentrations of potential roost trees to the south and center of the site.

The majority of these trees will not be impacted by the proposed development.

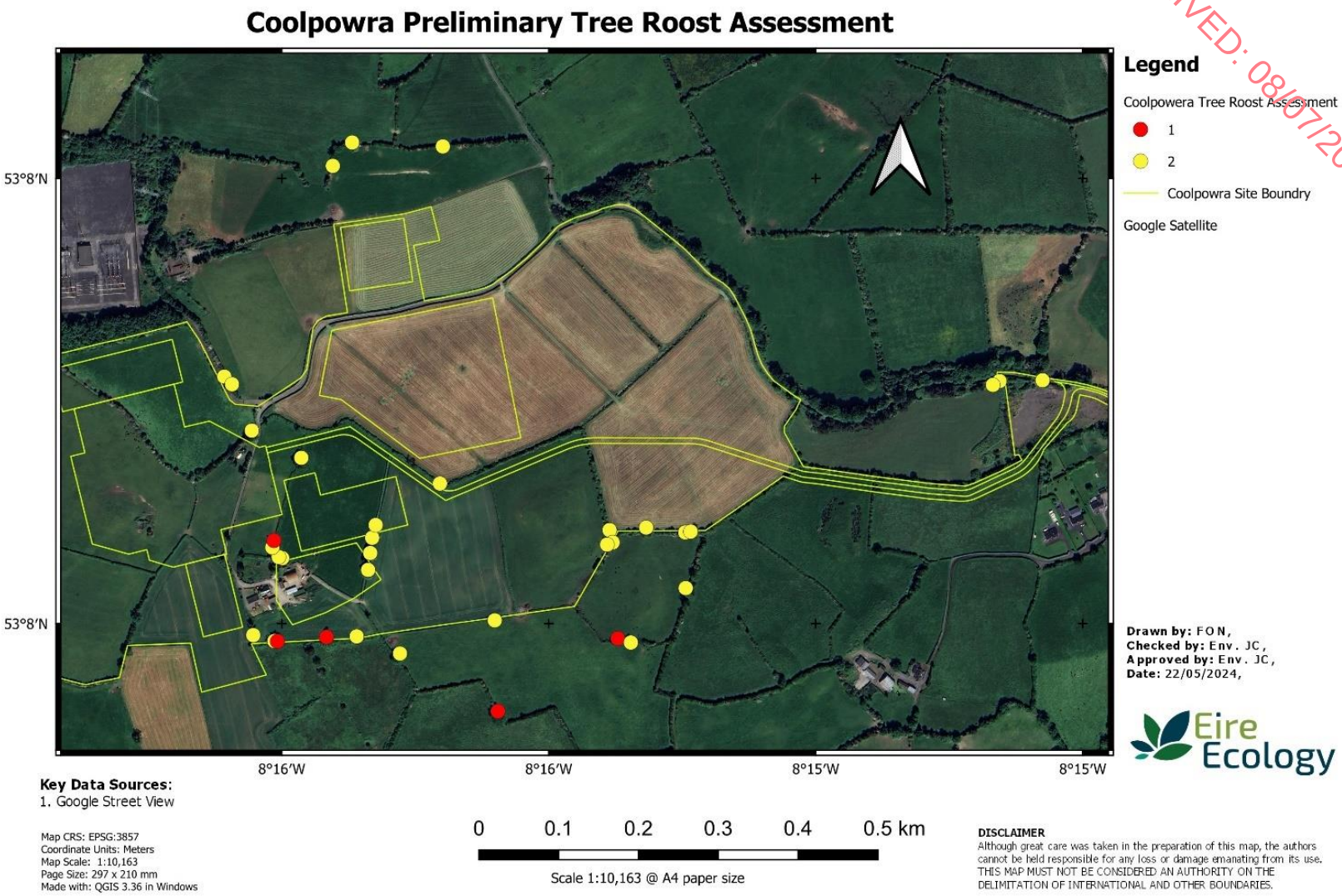

Figure 3-2: Location of category 2 and 3 trees

3.2.2 1st May 2024 Results

Survey was conducted on the dwelling house and adjoining sheds to the south of the site on 1st of May 2024. Emergence Survey was conducted with a surveyor using a Thermal Scope (guide track pro 19mm) facing the Northen face of the dwelling and an accompanying Ultrasonic Bat Detector, while another surveyor was positioned by the sheds to the rear to evaluate any roost potential in the four shed structures (using a Canon xa10). When the survey commenced at 20:30pm, temperature was 13.7 degrees with negligible wind conditions. Sunset fell at 21:04pm.

Location 1

Common and Soprano Pipistrelle, Leisler's bat and unknown Myotis bat were recorded.

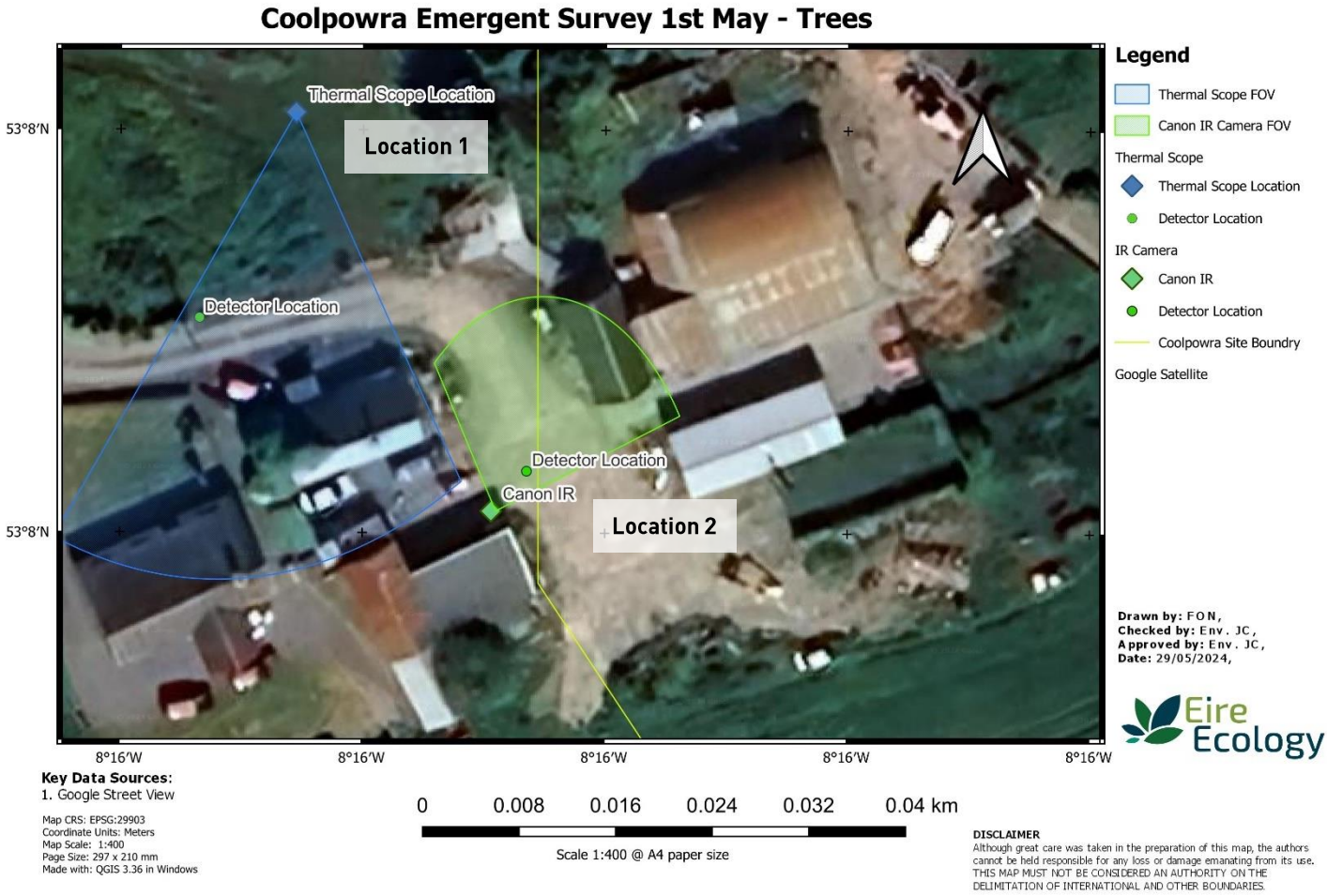

Figure 3-3: Location of surveyors 1st of May.

The first recording of a bat from location 1 (dwelling) occurred 33 minutes after sunset at 21:37pm when an unseen brief Soprano Pipistrelle was recorded. The first observed bat was noted at 21:43 (49 minutes after sunset). A number of Pipistrelle species were recorded from this point hunting above the house for a considerable amount of time before the survey was concluded. **No bats were found emerging from the dwelling.**

Location 2

The first recorded bat from the rear of the dwelling, by the sheds (location 2) coincided with location 1 and was probably the same bat; a Soprano Pipistrelle recorded at 21:35. This bat was noted flying from the south heading north past the sheds. This bat did not emerge from any buildings within the survey area.

The next recording did not occur until 21:58, 54 minutes after sunset when a Soprano Pipistrelle was recorded. No bat was found to emerge from the sheds or rear of the dwelling.

Overall activity was low until 22:35 when Common Pipistrelle were noted flying around the site hunting. In addition, occasional Soprano Pipistrelle and Leisler's bat were noted. Common Pipistrelle was the most frequently recorded bat.

Transect

A transect was walked in the tilled fields to the back of the survey area and occasional Common Pipistrelle were observed hunting on the tree line.

3.2.3 23rd May 2024 Results

Emergence surveys on the 23rd focused on trees with high roosting potential that have the potential to be impacted by the proposed development.

Location 3a and b focused on trees to the north of the farmstead (figure 3-4) while a second location by the eastern entrance was also surveyed (figure 3-5). Sunset was at 21:42. Temperature during this survey 9°.

Locations 3a and b.

A Canon IR Camera was deployed at 21:03 facing East towards the tree of highest potential, while Thermal Scope 1 was positioned facing northeast towards a category 2 Ash tree found to the northeast of the occupied dwelling.

No bat was found emerging from either tree. Common and Soprano Pipistrelle were recorded overflying however activity was low.

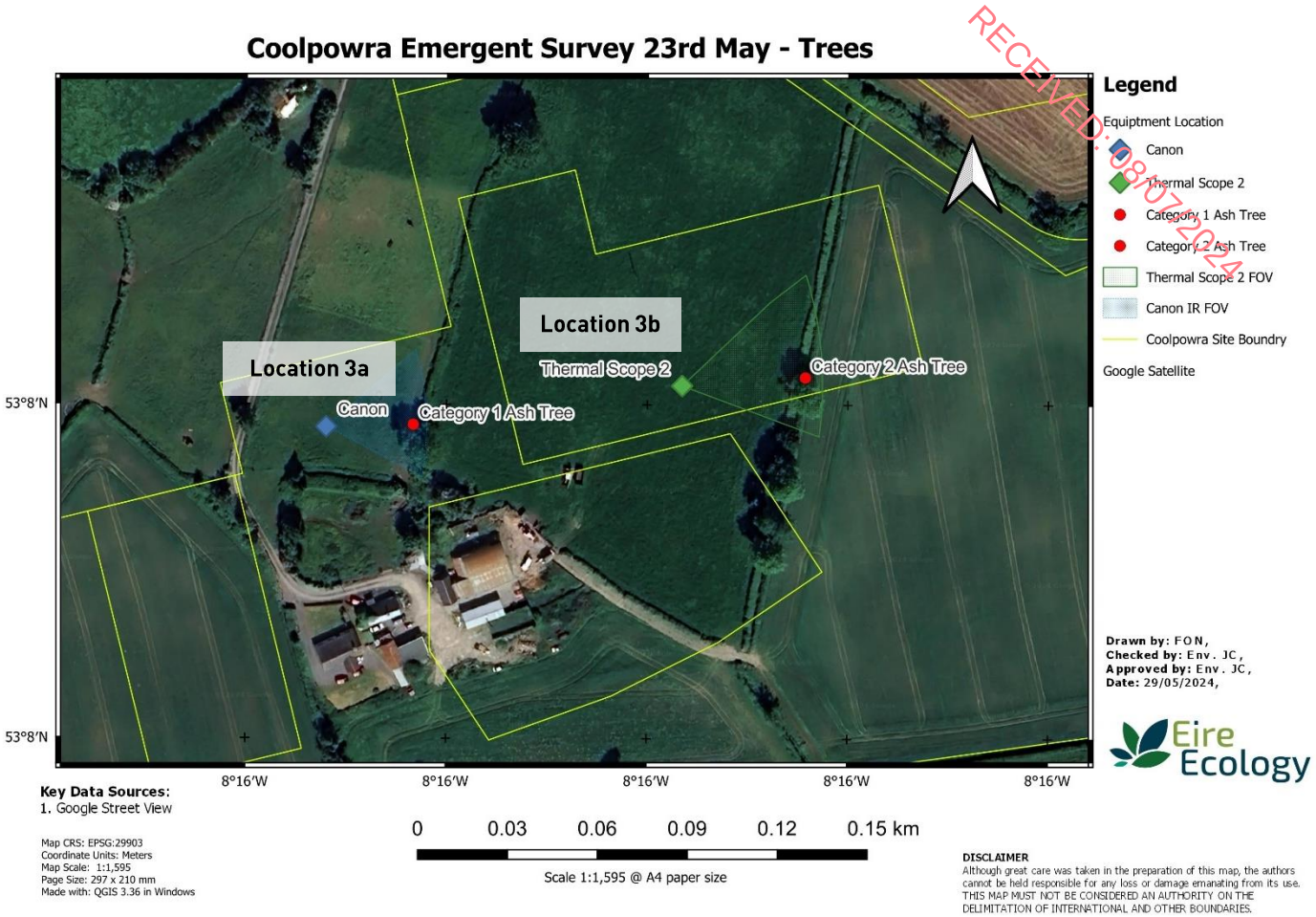

Figure 3-4: Location 3a and b.

Locations 4.

Location 4 was based to the east of the site by the entranceway and examined a Category 2 ash tree (PRF-I). **No emerging bat was found**. The first recorded bat was a Leisler's bat 40 minutes after sunset. Common Pipistrelle and Unidentified Myotis were recorded.

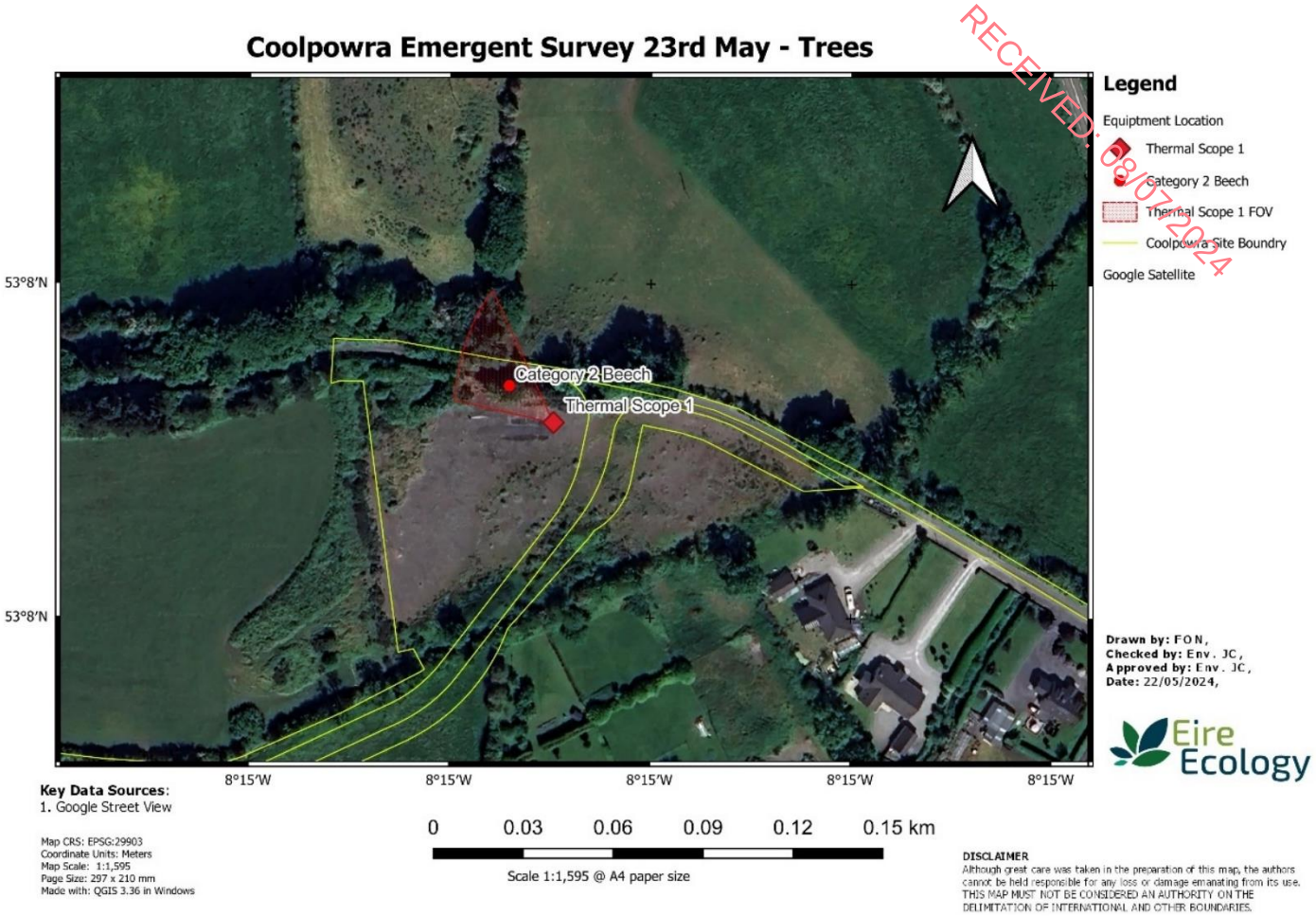

Figure 3-5: Location 4.

3.3 RESULTS OF STATIC DETECTOR SURVEY

Analysis of recorded registrations was made using Wildlife Acoustic's Kaleidoscope Pro; version 2.1.0. This software identifies many of the calls made by Irish bats. All calls were manually verified.

The results of the static detector survey are summarised in **Table 3-3** and displayed in graph form in **Figure 3-3** below. Over the course of the 10 nights a total of 739 registrations were recorded from detector 1, 106 from detector 2, 120 from detector 3, 185 for detector 4 and 2257 from detector 5. The most active location is at detector 5, which accounts for 66% of all bat registrations on the site.

The most common species recorded from detector 1 (Hedge line) was Common Pipistrelle with 287 registrations (8%*), followed by Leisler's Bat, Soprano Pipistrelle, and Natterer's Bat with 156 (35%), 121 (23%), and 24 (72%) respectively. Brown long-eared bat were also recorded. Unspecified Myotis Bats were mostly located at this detector with 116 (90%) calls registered.

Detector 5 had a total of 2757 registrations, with Common Pipistrelle most frequently recorded: 1702 (77%). Leisler's bat and Soprano Pipistrelle were recorded in lower numbers; 136 (31%) and 353 (67%) respectively. 35 registrations of 40 kHz (51%) were also recorded. Other species, particularly woodland species such as Brown Long-eared bats and Myotis were recorded in low numbers 16 (55%) and 7 (5%) despite the more suitable static location.

Detectors 2,3 and 4 represented only 12% of total bat activity recorded during the survey period, the majority of which are Common Pipistrelle and Soprano Pipistrelle calls. It should be noted that a single bat continuously circling a small stand of trees will produce numerous recordings, thus the number of registrations cannot quantify abundance, rather activity.

* Represents the percentage of bat registrations compared to the total population of each species. i.e. 8% of total Common Pipistrelle calls recorded.

Table 3-2: Summary of results

Detector	Leisler's Bat	Common Pipistrelle	Soprano Pipistrelle	Pipistrelle 40 kHz	Brown Long-eared	Natterer's Bat	Unidentified Myotis	Total	Minutes recorded	Bat passes per hour
1	156	287	121	27	8	24	116	739	5,716	7.8
2	1	99	5	0	0	0	1	106	5,716	1.1
3	55	39	22	3	0	0	1	120	5,716	1.3
4	86	67	20	3	5	1	3	185	5,716	1.9
5	136	1702	353	35	16	8	7	2,257	5,716	23.7
Total	**434**	**2194**	**521**	**68**	**29**	**33**	**128**	**3,407**	**28,580**	7.2

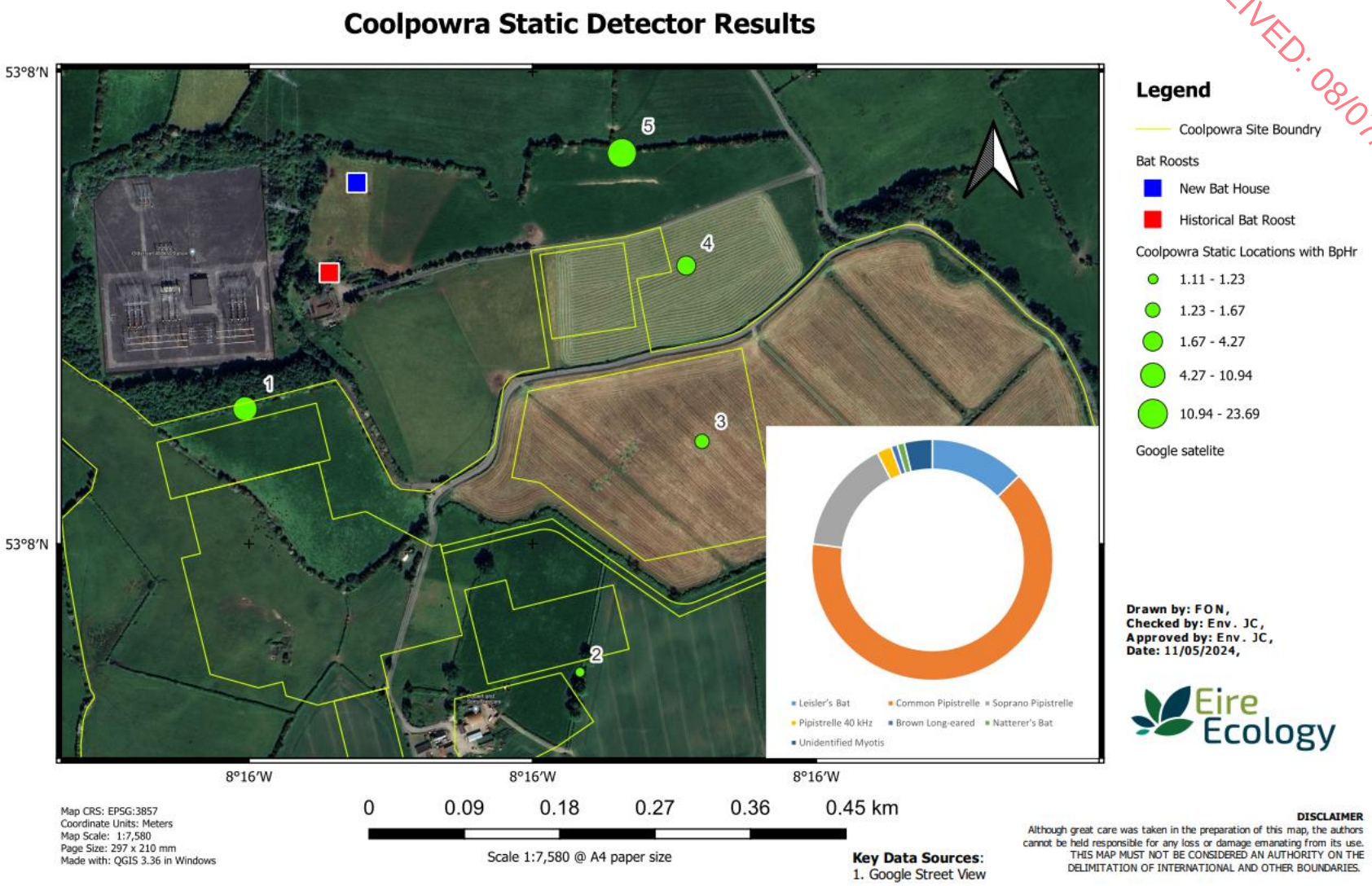

Figure 3-6: Static Detector Results with location of neighboring bat roosts.

4 Discussion

Five species of bat were positively identified during the various bat surveys: Common Pipistrelle (*Pipistrellus pipistrellus*), Soprano Pipistrelle (*Pipistrellus pygmaeus*), Natterer's Bat (*Myotis nattereri*), Leisler's bat (*Nyctalus leisleri*) and Brown Long-eared Bat (*Plecotus auritus*).

A number of contacts or recordings of Myotis sp. bats were also made. It can be very difficult to separate the three species of Myotis bat that are regularly found in Ireland and it was not possible in these instances. 68 registrations have been labeled as '40kHz Pipistrelle'. These bats will have been either Common or Nathusius's Pipistrelle and were not identified to species level because the recorded frequency of the CF tail was at about 40 kHz (the typical frequency for Common Pipistrelle is 45 kHz, whilst a Nathusius typical peak frequency is 39.3 kHz.

Over the 10 nights, each static detector was set recording for a total of 95 hours and 15.6 minutes or 5716 minutes (28580 minutes total), with a combined total of 3407 registrations logged. This equates to 7.2 bat passes per hour (Bp/Hr). This is a relatively low number from a lowland habitat.

Detectors 5 and 1 have marked higher activity levels with significantly more Common Pipistrelle activity than other locations. These locations have connectivity (via treelines and conifer edge) to the existing bat roost. Southern sections of the site have a marked lower activity level. Surprisingly, detector 2 located by the treeline to the south had lowest activity. Typically edge habitats have far higher activity than open areas (locations 3 and 4).

5 IMPACTS PRE-MITIGATION

The survey above provides a preliminary study of bat usage of an agricultural site located in Coolpowra, Co. Galway.

Disturbance

Works associated with development or building work are likely to lead to an increase in human presence at the site, extra noise and changes in the site layout and local environment. Of these, the most impactful is lighting, particularly in the operational phase.

Without appropriate design, there is a high likelihood of long term moderate impacts on commuting and foraging bats by illumination.

Loss of foraging and commuting habitat

The redevelopment of this site involves the removal of small sections of treelines and hedgerows that represent landscape features used primarily by Leisler's and Pipistrelle bats species. Activity by Myotis and brown long-eared bat was low. Given the amount of hedgerow and treeline features located in the surroundings the loss of the internal treelines and hedgerows will result in a low level permanent reduction of this habitat for local bat populations. It should be noted that activity within the site was low (baring norther treelines which won't be impacted by the development).

The proposed works will have a Low effect on receptors of Local Importance (Low Value). The loss of feeding habitat within the site is not significant at a county, national or international scale.

Loss of potential roosting habitats in trees.

Although no bats were found within buildings or trees on the site it is possible bats will occupy trees prior to feeling. The preliminary assessment of trees noted category 2 category 1 tree within the site. An at height survey will be required at each of these trees prior to felling.

The proposed works will have a Moderate effect on receptors of Local Importance (Low Value). The loss of trees within the site is not significant at a county, national or international scale.

Loss of potential roosting habitats within structures.

The only structure capable of hosting a bat roost found within the site is an occupied dwelling with associated sheds. A daylight inspection and night time survey shows no evidence of bats.

The proposed works will have a Moderate effect on receptors of Local Importance (Low Value). The loss of these structures within the site is not significant at a county, national or international scale.

6 MITIGATION AND COMPENSATION

6.1.1 Landscaping

A landscape plan has been produced by Macro works that will result in a net benefit for wildlife including bats.

The current bat usage within the site is low probably as much of the site is open pasture and tillage (see static results above). The landscape plan will see a large quantity of woodland and tree planting providing more landscape features usable by bats. Treelines and woodlands to the north where an existing bat roost is located (outside the site) will be protected and enhanced, linking up other areas of the site. The addition of two ponds will allow for higher amounts of invertebrate prey for bats.

6.1.2 Feling of trees

Trees will be felled in October to November or January to February. Any tree ranked category 1 or 2 will be examined 'at height' in order to ensure no bats are present.

Category 3 trees are defined as 'trees have no obvious potential although the tree is of a size and age that elevated surveys may result in cracks or crevices being found or the tree supports some features which may have limited potential to support bats'. Also included within this category are trees with thick ivy however the ivy root is not thick enough to form mats, thus it is possible but unlikely a single bat may be roosting here. Following the precautionary approach all category 3 trees to be felled within the site the following procedure will be undertaken:

Tree-felling to be undertaken using heavy plant and chainsaw equipment. Normally trees are pushed over, with a need to excavate and sever roots in some cases. In order to ensure the optimum warning for any roosting bats that may still be present, the tree should be pushed lightly two to three times, with a pause of approximately 30 seconds between each nudge to allow bats to become active. The tree should then be pushed to the ground slowly. A period of at least 24 hours, and preferably 48 hours, should elapse prior to such operations to allow bats to escape. Felling works should be overseen by an ecological clerk of works.

All trees ranked category 4 can be felled and removed immediately.

6.1.3 Demolition of Building

A dwelling house and sheds located within the site were examined for bat roosts. None were found. As bats are a mobile species and can avail of roosting structure a pre-demolition survey will be conducted on these structures. Should bats or their roosts be found a derogation license will be required before construction works begin.

6.1.4 Construction of wildlife tower.

The accompanying bird survey report requests the creation of a barn owl tower within the site. This structure can also serve as a bat roost with a lower floor dedicated to roosting bats. Bat boxes will be installed within this lower section with a slot opening providing access into this room (15mm high by 40mm wide) positioned at a height of 2m.

Figure 6-1 Sample roost house

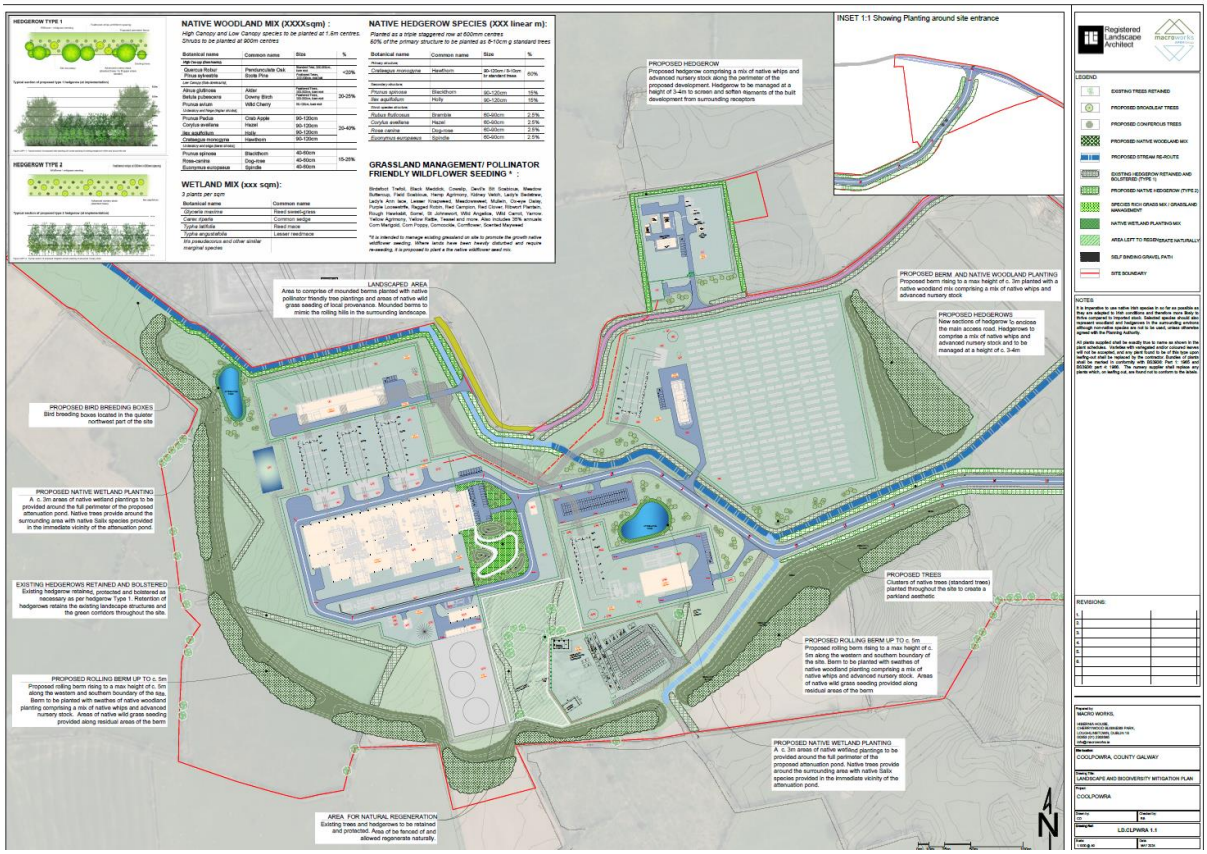

Figure 6-2 Purposed location of roost house

6.1.5 Lighting.

A lighting plan has been designed by Darkmack exterior lighting design. Lighting will be confined to entrance roads and built habitats. The battery storage area will not be lit. Similarly lights have been designed so that treelines are not illuminated. Lux diagrams submitted as

part of the application show lux levels of below 0.1 on treelines and hedgerows baring where access roads require entrance. Similarly, the attenuation wildlife ponds will remain unlit. The following measures will also be adhered to;

- Lux levels no greater than 3000k
- luminaires have been proposed with integral rear shields and a mounting tilt of 0° to reduce back spill lighting and upward light.
- photocell control to switch lights on and off at dusk and dawn and programmed off during the months May to September inclusive.

7 Conclusion.

The surveys above shows baseline bat surveys conducted on a site where Grid connected energy support projects are proposed.

The site is situated within the core sustenance zone of a known Common Pipistrelle maternity roost, located to the north of the site.

Static bat detector surveys demonstrate highest activity to the north, closest to the roost. Activity to the south is substantially lower.

No bat roost was found within the site. The report concluded that post mitigation the proposed development will have no negative impacts on the local bat populations.

Appendix A: Preliminary Tree Roost Assessment

Tree Number	Category	Species	PR details	Lat	Lon
1	3	7 whitethorns	Ivy growth	53.131	-8.267
2	4	Hedgerow	No potential - cut to 2m	53.131	-8.268
3	4	Hawthorn hedgerow with bramble	Cut short	53.131	-8.270
4	3	Hawthorn	Ivy cover	53.132	-8.270
5	3	Elder	Ivy cover	53.133	-8.270
6	4	Hawthorn	Immature hedgerow	53.133	-8.270
7	3	Hawthorn	Mature with ivy	53.133	-8.271
8	2	Sally	Mature with ivy and broken branches	53.133	-8.271
9	2	Sally	Crack in trunk	53.133	-8.271
10	3	Hawthorn	Section of hedge with 11 trees with ivy	53.133	-8.272
11	4	Ivy		53.133	-8.272
12	3	Sally	Ivy growth	53.134	-8.273
13	3	Beech	Ivy growth	53.134	-8.272
14	3	Hawthorn	Ivy	53.134	-8.272
15	4	Beech		53.134	-8.272
16	3	Hawthorn	Ivy cover	53.134	-8.272
17	3	Hawthorn	Ivy cover	53.134	-8.272
18	3	Hawthorn		53.134	-8.272
19	3	Hawthorn	Ivy	53.134	-8.272
20	4	Sally		53.134	-8.271
21	3	Mixed	Semimature wooded area outside of site	53.134	-8.271
22	3	Sally, hawthorn, birch	Hedgerow on far side of stream to site	53.134	-8.271
23	3	Hawthorn	Mature hedge with ivy across stream with mixed woodland behind it	53.133	-8.270
24	3	Sally	Mature with ivy	53.133	-8.268
25	3	Sally	Mature with ivy and broken bits	53.133	-8.268
26	3	Damson	Mature with ivy	53.132	-8.268
27	3	Hawthorn several mature with ivy		53.132	-8.268
28	3	Hawthorn	Mature with ivy	53.132	-8.268
29	3	Hawthorn	Mature with ivy	53.132	-8.267
30	3	Hawthorn	Mature with ivy	53.132	-8.267
31	3	Hawthorn	Mature with ivy	53.132	-8.267
32	3	Hawthorn	Mature with ivy	53.132	-8.267
33	3	Hawthorn	Mature with ivy	53.132	-8.267
34	3	Hawthorn	Mature with ivy	53.132	-8.267
35	4	Blackthorn		53.132	-8.267
36	3	Hawthorn	Mature with ivy	53.132	-8.267

Tree Number	Category	Species	PR details	Lat	Lon
37	4	Hawthorn	Mainly hawthorn hedgerow cut short	53.131	-8.267
38	4	Hawthorn	Hawthorn hedge cut short with bramble	53.131	-8.266
39	4	Birch		53.131	-8.266
40	4	Holly		53.132	-8.267
41	4	Sally		53.132	-8.267
42	3	Hawthorn	Mature hawthorn hedge with ivy	53.132	-8.266
43	4	Leylandii	No holes seen	53.132	-8.266
44	4	Leylandii	Hedge with bark stripped at bottom but no holes	53.132	-8.266
45	3	Hawthorn	Several hawthorns with ivy growth	53.132	-8.266
46	3	Spruce	Mature with ivy	53.132	-8.266
47	2	Ash	Mature with ivy, several broken branches with potential crevices	53.132	-8.266
48	3	Hawthorn	Mature with ivy	53.132	-8.266
49	3	Ash	Thick ivy	53.135	-8.264
50	3	Ash	Dead tree with ivy	53.135	-8.264
51	2	Ash	Mature trees with thick ivy and appear to have crevices	53.135	-8.264
52	3	Hawthorn	Mature hawthorn hedge with thick ivy	53.135	-8.263
53	4	Hazel		53.135	-8.263
54	4	Elder		53.135	-8.263
55	3	Hawthorn	Mature trees with thick ivy	53.135	-8.263
56	2	Elder	Elder in hawthorn tree line with thick ivy & crevices	53.135	-8.262
57	3	Hawthorn	Mature with ivy	53.135	-8.262
58	3	Hawthorn	Tree line with mature hawthorn and thick ivy	53.135	-8.261
59	3	Ash	Mature with ivy	53.135	-8.260
60	4	Snowberry	Hedge cut short. Snowberry, as, hawthorn	53.135	-8.260
61	4	Scots pine	Group of trees, no gaps and very little ivy	53.135	-8.260
62	4	Hawthorn	Hedges clipped short	53.134	-8.260
63	3	Beech	Mature tree with ivy cover	53.135	-8.260
64	4	Hawthorn	Hedge cut short	53.135	-8.259
65	3	Hawthorn	Mature with ivy	53.132	-8.255
66	3	Sally	Mature with ivy	53.132	-8.255
67	3	Sally	Ivy cover	53.132	-8.256
68	3	Hawthorn	Ivy cover	53.132	-8.256
69	3	Hawthorn	Ivy cover	53.131	-8.256
70	3	Sally	Ivy	53.131	-8.256
71	3	Hawthorn	Mature with ivy. Hawthorn and sally	53.131	-8.257
72	3	Hazel	Mature with ivy	53.131	-8.257

Tree Number	Category	Species	PR details	Lat	Lon
73	4	Ash		53.131	-8.257
74	3	Hawthorn	Thick ivy cover	53.131	-8.257
75	2	Hazel	Mature with crevices	53.131	-8.257
76	2	Sally	Large trunk crevice	53.131	-8.257
77	3	Hawthorn	Ivy cover	53.131	-8.258
78	3	Hawthorn	Ivy	53.131	-8.258
79	3	Hazel	Ivy	53.131	-8.258
80	3	Hazel	Ivy	53.131	-8.258
81	2	Ash	Mature tree with thick ivy	53.131	-8.258
82	3	Elder	Mature tree with ivy	53.131	-8.258
83	3	Hazel		53.131	-8.259
84	3	Elder	Mixed hedgerow, cut in past. Elder, hawthorn, hazel, blackthorn	53.132	-8.259
85	4	Blackthorn	Overall low cat 4 in this hedge row, as small trees and scrub with little ivy	53.132	-8.259
86	4	Hazel		53.132	-8.259
87	3	Hazel	Semi mature hedgerow cut low in the past. Some ivy growth. Mix of hazel, sally, whitethorn	53.132	-8.261
88	4	Hawthorn	Cut hedge	53.134	-8.261
89	4	Snowberry	Cut hedge	53.134	-8.261
90	3	Hawthorn	Mature	53.133	-8.266
91	2	Hawthorn	Crevices	53.133	-8.266
92	2	Hawthorn	Crevices	53.133	-8.266
93	3	Hawthorn	Whole tree line of mature hawthorn with potential crevices and some ivy	53.133	-8.266
94	3	Ash	Several mature ash with ivy	53.133	-8.266
95	4	Hazel	Hedgerow cut short	53.132	-8.264
96	3	Ash	Single ash in hedgerow. Ivy cover	53.132	-8.265
97	3	Ash	Mature ash with ivy	53.132	-8.265
98	2	Ash	Very mature tree with thick ivy. Holes from branches	53.132	-8.265
99	4	Hazel	Hedgerow of mainly hazel	53.132	-8.264
100	2	Yew	Very mature tree with crevices	53.131	-8.263
101	2	Ash	Very mature with crevices and ivy	53.131	-8.263
102	3	Ash	Mature with ivy	53.131	-8.263
103	2	Ash	Mature with ivy	53.131	-8.263
104	3	Ash	Mature with ivy	53.132	-8.263
105	2	Ash	Mature with ivy and crevices	53.132	-8.262
106	3	Ash	Ivy cover	53.130	-8.263
107	4	Whitethorn	Hedgerow with mainly whitethorn	53.130	-8.262
108	2	Ash	Mature with thick ivy and branch holes	53.130	-8.263

Tree Number	Category	Species	PR details	Lat	Lon
109	4	Hawthorn		53.129	-8.262
110	1	Ash	Very mature tree with thick ivy and cut branches with potential deep crevices	53.129	-8.261
111	3	Hawthorn	Mature hawthorn hedge with ivy	53.129	-8.261
112	3	Hawthorn	Mature hedge with ivy	53.129	-8.260
113	3	Hazel	Mature hedge with mainly hazel and ivy growth	53.128	-8.258
114	3	Whitethorn	Mature hedgerow with ivy	53.129	-8.258
115	4	Blackthorn		53.130	-8.258
116	2	Ash	Mature with branch holes	53.130	-8.258
117	1	Sally	Mature with thick ivy and crevices	53.130	-8.259
118	2	Sally	Mature sally with holes	53.131	-8.259
119	3	Sally	Shallow crevices	53.131	-8.259
120	2	Hawthorn	Crevices	53.131	-8.259
121	3	Fallen tree	Crevices	53.131	-8.259
122	2	Hazel	Deep crevices	53.131	-8.259
123	3	Holly	Mature with thick ivy	53.130	-8.259
124	2	Ash	Branch holes and ivy	53.130	-8.261
125	2	Ash	Mature tree with branch holes	53.130	-8.264
126	1	Ash	Appears to have large crevices from broken off branches	53.130	-8.264
127	1	Ash	Numerous crevices high up and ivy	53.130	-8.265
128	2	Ash	Mature with thick ivy and broken branches	53.130	-8.265
129	3	Hawthorn	Mature with ivy	53.130	-8.266
130	3	Spruce	Mature with ivy cover	53.130	-8.266
131	2	Leylandii	Mature with peeling bark and ivy	53.130	-8.266
132	3	Hawthorn	Ivy	53.130	-8.266
133	4	Willow		53.131	-8.266
134	4	Willow		53.131	-8.266
135	3	Leylandii	Loose bark	53.131	-8.266
136	3	Leylandii	Loose bark and ivy	53.131	-8.266
137	1	Ash	Very mature with branch holes	53.131	-8.265
138	2	Ash	Appears dead. With holes	53.131	-8.265
139	3	Elder		53.131	-8.265
140	2	Whitethorn	Crevices	53.131	-8.265
141	2	Whitethorn	Crevices	53.131	-8.265
142	3	Elder	Mature	53.131	-8.265
143	4	Beech		53.134	-8.258
144	3	Ash	Ivy cover	53.134	-8.258
145	4	Beech		53.134	-8.257
146	4	Beech		53.133	-8.256
147	4	Hawthorn	Hedge with mainly wispy hawthorn	53.131	-8.267

Tree Number	Category	Species	PR details	Lat	Lon
148	3	Blackthorn	Thick ivy	53.130	-8.268
149	3	Hawthorn	Ivy	53.130	-8.268
150	4	Elder	Hedge with elder, hawthorn. Cut short	53.130	-8.267
151	4	Hawthorn	Immature planted hedgerow	53.129	-8.267
152	2	Hazel	Very mature hazel with ivy cover	53.128	-8.265
153	3	Hazel	Mature hedgerow, cut to 3m height with ivy cover	53.128	-8.266
154	4	Sally		53.128	-8.267
155	3	Hawthorn	Mature with ivy	53.128	-8.267
156	3	Hawthorn	Mature with ivy	53.128	-8.267
157	4	Beech	Planted woodland of immature hardwood. Rowan, beech	53.127	-8.267
158	3	Hawthorn	Hedgerow surrounding planted wood consists mainly of mature hawthorn, with ivy	53.127	-8.267
159	3	Hawthorn	Mature hedge with ivy7	53.127	-8.267
160	3	Hawthorn	Mature hedge with ivy	53.127	-8.266
161	2	Ash	Mature with ivy, possible crevice	53.127	-8.265
162	3	Hawthorn	Mature hawthorn hedge with ivy	53.127	-8.265
163	4	Holly		53.128	-8.264
164	3	Hazel	Mature with ivy	53.128	-8.264
165	3	Hawthorn	Mature hawthorn cut into hedge. Ivy cover	53.128	-8.264
166	0			53.132	-8.269
167	3	Hawthorn	Ivy cover & broken branches	53.133	-8.270
168	4	Holly		53.132	-8.268
169	0		Point where stream crosses sides	53.132	-8.268
170	3	Hawthorn	Mature with ivy	53.132	-8.268
171	0	Hawthorn	Mature with ivy	53.132	-8.267
172	4	Birch		53.131	-8.266
173	3	Ash	Ivy cover	53.132	-8.266
174	3	Hawthorn	Ivy covered	53.135	-8.264
175	3	Hawthorn	Hedgerow of mature ivy-covered trees	53.135	-8.264
176	2	Hawthorn	Thick ivy & crevices	53.135	-8.264
177	3	Ash	Thick ivy and possible crevices	53.135	-8.264
178	4	Ash	Hedge clipped short	53.135	-8.260
179	4	Beech		53.135	-8.260
180	4	No trees		53.135	-8.262
181	3	Hawthorn	Ivy cover	53.132	-8.256
182	3	Elder	Little crevices	53.131	-8.258
183	4	Blackthorn	Blackthorn hedgerow	53.132	-8.265
184	2	Ash	Mature ash with branch holes and ivy	53.131	-8.263
185	2	Ash	Mature ash with thick ivy	53.130	-8.257

Tree Number	Category	Species	PR details	Lat	Lon
186	3	Ash	Stumps with thick ivy	53.130	-8.263
187	3	Leylandii	Thick ivy cover	53.130	-8.266
188	3	Leylandii	Mature with ivy	53.130	-8.266
189	4	No trees	Cut hedgerow	53.133	-8.256
190	4	Beech		53.133	-8.256
191	4	Beech		53.133	-8.255
192	3	Ash	Thick ivy	53.130	-8.268
193	3	Ash	Semi-mature with ivy cover	53.132	-8.251
194	3	Ash	Semi-mature with ivy	53.133	-8.250
195	2	Beech	Several branch holes	53.133	-8.251
196	4	Hazel		53.133	-8.251
197	2	Scots pine	Mature with thick ivy	53.133	-8.252
198	2	Scots pine	Mature with thick ivy	53.133	-8.252
199	3	Whitethorn	Ivy	53.131	-8.270
200	3	Whitethorn	Ivy	53.130	-8.270
201	3	Ash	Mature with thick ivy	53.130	-8.270
202	3	Ash	Mature, thick ivy	53.130	-8.270
203	3	Whitethorn	Mature, ivy	53.131	-8.270
204	3	Elder	Mature	53.132	-8.271
205	3	Whitethorn	Mature, ivy	53.132	-8.271
206	3	Whitethorn	Mature, ivy	53.132	-8.271
207	3	Whitethorn	Mature ivy	53.131	-8.271
208	3	Whitethorn	Tree line of mature whitethorn with ivy cover	53.132	-8.271
209	3	Whitethorn	Tree line of semi mature whitethorn with ivy	53.133	-8.266

Table 7-1: Emergence Survey: Location 1. 01st May 2024

Contact number	Date	Time	Species	Details
1	01/05/2024	21:37	Common Pipistrelle	First Recording; no Visual. (33 minutes after Sunset)
2	01/05/2024	21:43	Unknown, no audio	Initial pass, first Visual
3	01/05/2024	21:45	Soprano Pipistrelle	Passing by Gable end of House
4	01/05/2024	21:52	Common Pipistrelle	Hunting above opposite side of the house
5	01/05/2024	21:53	Soprano Pipistrelle	Same bats continue to display hunting behaviour
6	01/05/2024	21:53	Common Pipistrelle	
7	01/05/2024	22:19	Myotis Species	Recording without visual on thermal
8	01/05/2024	22:23	Leisler's Bat	Recording without any visual on thermal

Plate 7-1: Location1

Table 7-2: Emergence Survey: Location 2. 01st May 2024

Contact number	Time	Species	Details
1	21:35	Soprano Pipistrelle	First bat recorded flying N along yard
2	21:58	Soprano Pipistrelle	-
3	22:01	Leisler's	Unseen
4	22:03	Common Pipistrelle	-
5	22:05	Soprano Pipistrelle	-
6	22:06	Common Pipistrelle	-
7	22:11	Soprano Pipistrelle	-
8	22:15	Soprano Pipistrelle	-
9	22:22	Soprano Pipistrelle	-
10	22:23	Leisler's	-
11	22:28	Soprano Pipistrelle	-
12	22:31	Common Pipistrelle	-
13	22:35	Common Pipistrelle	hunting over yard
14	22:39	Common & Soprano Pipistrelle	both hunting

Plate 7-2: Location 2

Table 7-1: Location 3 23rd May

Contact number	Date	Time	Species	Details
1	23/05/2024	22:09:29	Soprano Pipistrelle	Heard and seen flying from SE to NW
2	23/05/2024	22:15:16	Common Pipistrelle	2 Pipistrelles flying around tree
3	23/05/2024	22:18:22	Common Pipistrelle	Flying around tree

Plate 7-3: Location 3a

Plate 7-4: Location 3b

Table 7-2: Location 4 23rd May

Contact number	Date	Time	Species	Details
1	23/05/2024	22:12:48	Leisler's Bat	Audio recording with no Visual (40 Minutes after Sunset)
2	23/05/2024	22:27:55	Common Pipistrelle	Common Pipistrelle calls heard but not observed.
6	23/05/2024	23:00:04	Unspecified Myotis	Myotis calls heard but not observed

Plate 7-5: Location 4

APPENDIX 6.2

BIRD SURVEY REPORT

Eire Ecology

Environmental Consultants

Bird Survey Report

Coolpowra, Co. Galway

DOCUMENT DETAILS

Client:	Halston Environmental & Planning Limited (Halston) on behalf of Coolpowra FlexGen Limited
Project Title:	Grid connected energy support projects
Address:	Coolpowra, Co. Galway
Document Title:	Bird Survey Report
Prepared By:	Karolina Illien – Ecologist
Reviewed By:	John Curtin – Consultant Ecologist
Date:	May 2024

EXECUTIVE SUMMARY

This document reports on the findings of bird surveys undertaken within and surrounding a proposed development at Coolpowra, Co. Galway. The surveys took place between January 2024 and May 2024. The objective of the surveys was to establish a baseline dataset of birds utilising the site and the surrounds.

A robust survey roster was followed in order to understand all aspects of breeding, wintering and migratory bird species within and surrounding the site.

Results show habitats on the site to be mainly agricultural land with built lands with low significance for rare and protected birds.

Robust mitigation and enhancement measures such as the creation of ponds, woods and a dedicated barn owl tower should result in a net benefit for birds overall.

Table of Contents

1 INTRODUCTION

1.1 Purpose of this report

Eire Ecology were commissioned to complete wintering and breeding bird surveys for a proposed grid connected energy support project. This report presents the results of these surveys, comprising of vantage point, transects (wintering and breeding) and hinterland surveys within and surrounding the proposed development in Coolpowra, Co. Galway (Grid Ref: E582307 N709323).

The report aims to:

- Identify species of birds using the site.
- Examine feeding and commuting routes.
- Identify breeding bird species on and adjacent to the site.
- Identify how bird species in the surroundings utilise the site.
- Potential impacts of birds by the proposed development.

Surveys were conducted from January to May 2024. The survey types were determined most appropriate to establish a baseline species assemblage, along with spatial and temporal distribution of species activity within the proposed planning boundary.

1.2 Landscape context

The site is situated within mixed habitats consisting of agricultural with associated hedgerows, treelines and built land. The majority of the site consists of improved grassland; which is highly managed with fertiliser and herbicides. Some fields are used as tillage fields. The site has mature hedgerows throughout.

1.3 Development proposals

Project 1: Reserve Gas Fired Generator
The CPFL Reserve Gas Fired Generator comprises three open cycle gas-fired generator (OCGT) units positioned within a building (OCGT Hall) along with auxiliary equipment. An OCGT unit consists of a turbine connected to an electric power generator and the three turbines are designed to operate independently of each other. The OCGT units will receive natural gas from the gas network via an underground pipeline to an Above Ground Installation (AGI) compound within the development lands. Gas Networks Ireland (GNI), as the designated competent authority, will separately manage the process of delivering the underground gas transmission pipeline to the proposed AGI.

The proposed OCGT units are dual fuel units as required by system requirements specified by the Commission for Regulation of Utilities (CRU). Natural gas will be the primary and combustion fuel to each of the OCGT units when operating. Secondary fuel (gas oil) will be stored in a bunded structure outside the OCGT building along with ancillary items of electrical plant and machinery

such as coolers and transformers. To ensure compliance with the requirements set by the CRU, the Reserve Gas-Fired Generator must be capable of running continuously for 72 hours using secondary fuel. This preparedness is crucial for scenarios involving an outage or interruption to the natural gas supply.

The Reserve Gas-Fired Generator is designed to operate intermittently and provide generation capacity during periods of high demand or when renewable energy generators cannot meet system demand. OCGT units are advantageous due to their operational flexibility and can be turned on quickly to match system demand. The selected turbines are capable of being converted to allow for the combustion of green hydrogen as a fuel in the future, which will allow for carbon free and climate-neutral plant operation.

Project 2: Energy Storage System (ESS)
The CPFL Energy Storage System (ESS) facility comprises (a) a Long Duration Energy Storage (LDES) static battery positioned within a secure outdoor compound, and (b) a Synchronous Condenser which will operate within a building in a separately secured compound. The LDES will provide peaking, active power and back start capability services o the electricity grid.

Battery storage is a technology that enables power system operators and utilities to store energy for later use. A battery energy storage system (BESS) is an electrochemical device that charges (or collects energy) from the grid or a power plant and then discharges that energy at a later time to provide electricity or other grid services when needed. A BESS facility is made up of batteries, a battery management system, a power conditioning system, and an energy management system. Battery storage is one of several technology options that can enhance power system flexibility and enable high levels of renewable energy integration. Studies and real-world experience have demonstrated that interconnected power systems can safely and reliably integrate high levels of renewable energy from variable renewable energy. Sufficient separation distance between enclosures is included within the design to allow for safe access and replacement of modules. Each module will include control equipment, to provide for ventilation, air conditioning and fire suppression equipment. MVPS (or PCS) units and small transformers will also be positioned in self-contained weather-proof enclosures.

At a system level, UL9540A1 is the recognised test method for evaluating thermal runaway in battery storage systems that reduces the risk of a single cell event spreading to the rest of the system. This is a global standard that technology suppliers test their products under to demonstrate compliance. As is the case within the existing BESS facility, the proposed development will comply with the UL9540A standard industry and other recognised best practice and in terms of fire management.

The plant will absorb and inject energy as demanded by the power system numerous times over an annual period over short-duration events. Therefore, it should be distinguished that grid-connected BESS plants do not operate continuously like conventional power fossil fuel power plants. BESS plants are designed to economically and rapidly provide system support services when needed, allowing immediate system recovery.

As storage technologies continue to mature, and their costs continue to fall, they will be increasingly deployed as a flexible asset to support national decarbonisation goals. In June 2021, Baringa published 'Endgame – A zero-carbon electricity plan for Ireland'2, which projects up to 1,700 MW of large-scale battery storage will be needed on an allisland basis to meet 2030 RES-E targets and deliver a zero-carbon power system. According to Energy Storage Ireland, there is currently 700MW of battery storage now operational on the island of Ireland.

Synchronous condenser technology has been around since the mid 1900's and is demonstrated and mature technology having been formerly used by utilities worldwide. The rotating generator is connected to the transmission system via a step-up transformer. The synchronous condenser is started up and stopped by a frequency controlled electric motor (pony motor). When the generator has reached an operating speed that is synchronous to the system frequency, it is synchronised with the transmission network and acts as a motor providing reactive and short circuit power to the electricity network. There is no combustion or emissions from a synchronous condenser. The synchronous condenser will provide short-circuit power, inertia, and reactive power for dynamic loads and stabilise the network through voltage recovery during faults.

The project is designed to complement and support the reserve gas fired generator by providing zero carbon, instantaneous and balancing power to the grid.

Project 3: Gas Insulated Switchgear (GIS) Electricity Substation

The CPFL Gas Insulated Switchgear (GIS) Electricity Substation comprises a two-storey building positioned and secured within a palisade fenced compound. This component of the overall development will enhance and upgrade the existing Oldstreet AIS 400Kv substation and will provide for the connection of Project 1 and Project 2 to the electricity transmission network. The HV lines and electric plant associated with Reserve Gas Fired Generator and ESS facility, and which will connect the projects to the GIS substation, are included with the planning application for Project 3. Following consultations with the Board under Section 182A of the Act it is the opinion of the Board that the project falls with the meaning of Section 182A of the Act. Accordingly, the Board decided that the proposed development would be strategic infrastructure within the meaning of Section 182AA of the act and any application for permission for the project must be made directly to the Board under Section 37E of the Act.

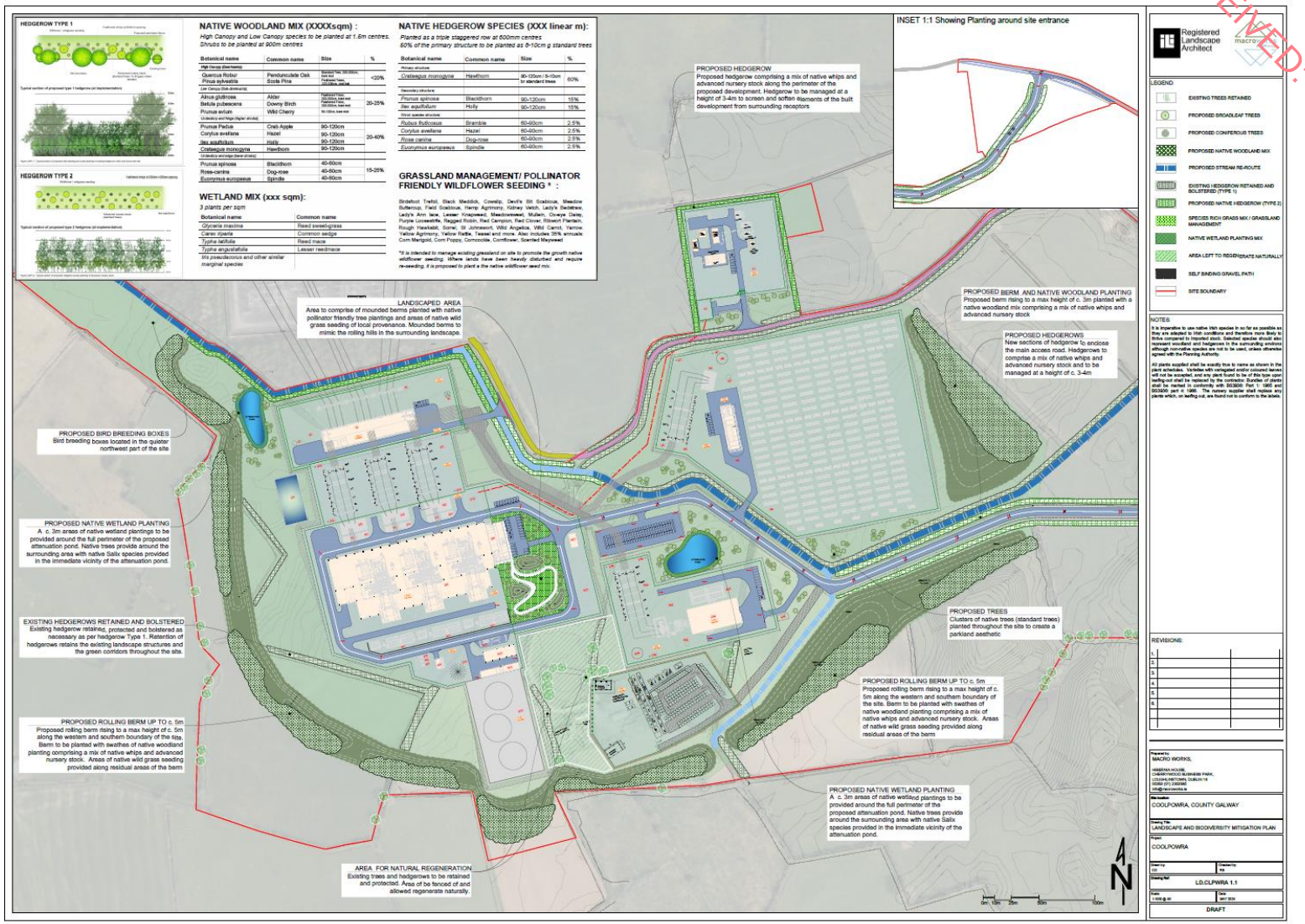

Figure 1-1: Proposed development

1.4 Survey and Assessment

A desk study which includes a review of the literature relevant to the avian ecology of the site is provided in section 2 of this report. The following sources of information are included: the most recent Bird Atlas 2007-2011 (the breeding and wintering birds of Britain and Ireland) (Balmer *et al* 2013). IWeBS survey data and NDBC data within 10km of the site.

Field surveys of the site were conducted from January to May 2024 and the findings of those surveys are presented in section 3 of this report. Walkover surveys (wintering and breeding) were undertaken during the survey visits which included the area within the site of the proposed development. All bird species observed or heard within the site and the surrounding area were recorded during the walkover survey.

Two vantage point surveys were conducted at site in January and May. Each VP was undertaken for 6 hours. All species were noted and target species were sketched onto field maps.

In order to better understand the relationship between the site and the surrounding areas, hinterland surveys were conducted from January to May. As there are no formal Irish guidance document on required bird surveys for powerplant developments, guidance on survey techniques was derived from windfarm developments (SNH, 2017). Hinterland surveys comprised of point counts around surrounding lands and encompassed waterbird distribution. In addition, vantage point surveys, dedicated Barn Owl survey and breeding bird transect surveys were conducted on site.

Target species for the surveys included designated species for the nearby SPA's, in addition to wintering swans and geese given the close proximity to peatland (roosting site) the site has the potential to be used as feeding ground given these species graze on grass. In addition, birds of prey, ducks, plovers, lapwings, sandpipers, gulls and terns. For the purposes of the survey raptors were also considered to be target species. In line with I-WeBS methodology, Cormorant, Shag, Little Egret, Grey Heron, and Kingfisher were also included (Lewis L. J., 2017)

1.5 Limitations of Survey

All of the surveys were carried out in weather conditions which were acceptable for bird survey. Winter bird surveys would normally start in October, however due to the late appointment of Eire Ecology, these surveys were not carried out.

The location of the VPs were chosen as they provided the optimum visibility of the study site (i.e. site of the proposed development and its immediate surrounds). The Vantage point surveys were conducted on the site itself, which could be considered a limitation as a possible source of disturbance to birds. It was, however considered that observer presence would not cause undue disturbance given the level of background disturbance on the site.

2 DESK STUDY

2.1 POLICY & GUIDANCE

2.1.1 EU Birds Directive

The "Birds Directive" (Council Directive 79/409/EEC as codified by 2009/147/EC) provides for a network of sites in all member states to protect birds at their breeding, feeding, roosting and wintering areas. This directive identifies species that are rare, in danger of extinction or vulnerable to changes in habitat and which need protection (Annex I species). Appendix I indicates Annex I bird species as listed on the Birds Directive. A "Special Protection Area" or SPA, is a designation under The Birds Directive.

SACs and SPAs form a pan-European network of protected sites known as Natura 2000 sites and any plan or project that has the potential to impact upon a Natura 2000 site requires Appropriate Assessment (AA). As outlined previously, an AA Screening Report was prepared for this project and is presented as a separate report to the planning application.

2.1.2 Wildlife Acts 1976 – 2012

The primary domestic legislation providing for the protection of wildlife in general, and the control of some activities adversely impacting upon wildlife is the Wildlife Act of 1976, as amended. The aims of the wildlife act according to the National Parks and Wildlife Service are "... to provide for the protection and conservation of wild fauna and flora, to conserve a representative sample of important ecosystems, to provide for the development and protection of game resources and to regulate their exploitation, and to provide the services necessary to accomplish such aims." All bird species are protected under the act. The Wildlife (Amendment) Act of 2000 amended the original Act to improve the effectiveness of the Act to achieve its aims.

2.2 Site Location in Relation to Protected sites with Ornithological Value

The proposed site lies near Coolpowra, Co. Galway (Grid Ref: E582307 N709323). The site for the proposed development lies approximately 5.84km from the Middle Shannon Callows SPA (Site Code: 004096) and approximately 5.90km from the Lough Derg (Shannon) SPA (site code: 004058) which are the closest protected sites for birds. The Slieve Aughty Mountains SPA (004168), the River Little Brosna Callows SPA & NHA (004086), and numerous other protected sites all lie within 15km of the site. These sites contain habitats which may support bird populations (see **Figure 2-1** and **table 2-1** below).

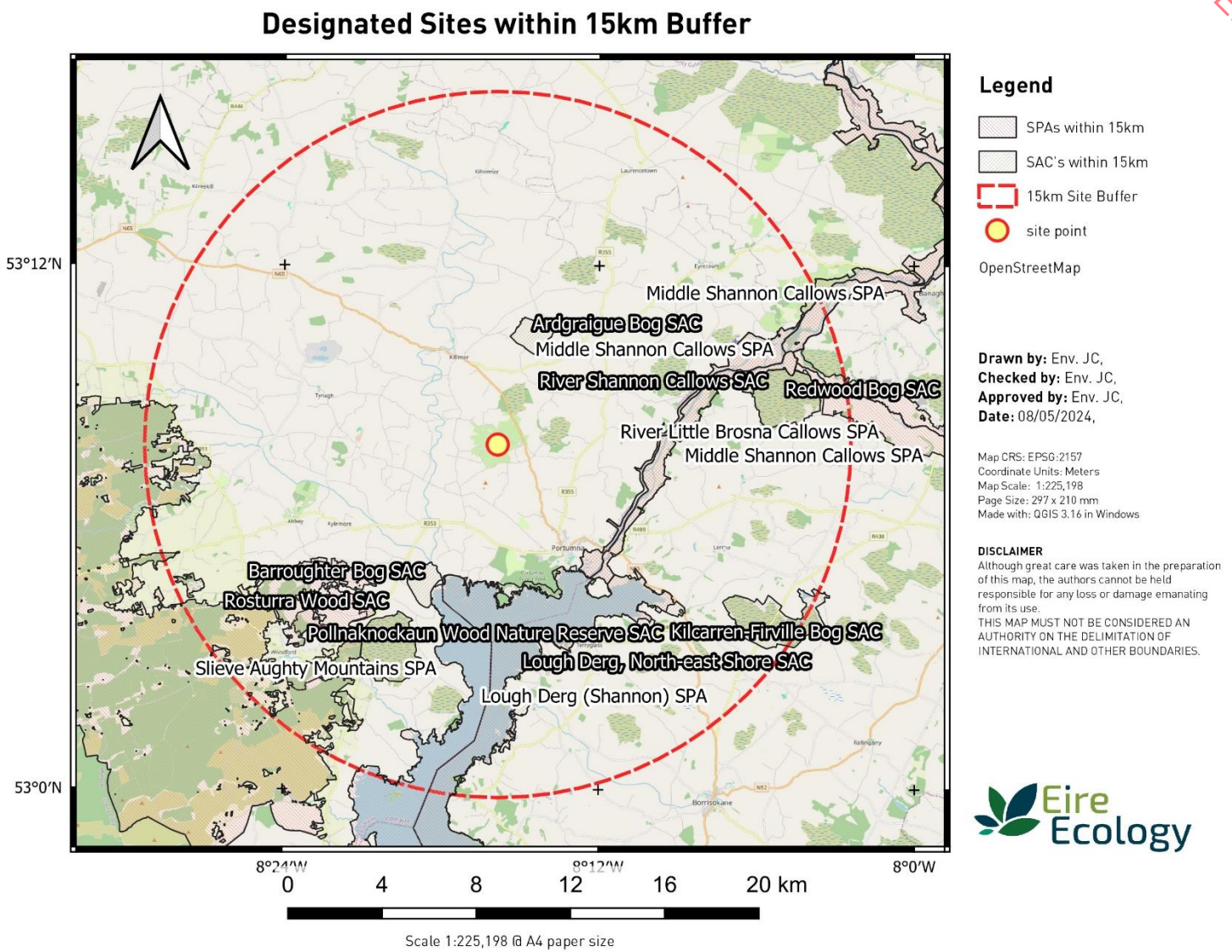

Figure 2-1 Site Location in Relation to designated sites

Table 2-1 Protected habitats with ornithological value in the vicinity of the proposed development

Name of Site	Site Code	Distance	Has the designated site a high ornithological value?	Has the site ornithological connectivity to the subject site?
Special Protection Areas (SPA's)				
Middle Shannon Callows SPA	004096	5.84km	Internationally important site that supports an assemblage of over 20,000 wintering waterbirds. It holds internationally important populations of two species - Whooper Swan and Black-tailed Godwit. In addition, there are four species that have wintering populations of national importance. The site also supports a nationally important breeding population of Corncrake. Of particular note is that several of the species which occur regularly are listed on Annex I of the E.U. Birds Directive, i.e. Whooper Swan, Corncrake and Golden Plover. Golden Plover, Lapwing, Black-tailed Godwit and Black-Headed Gull	Possibly. SPA lies to the east of site. River system provides an ecological corridor.
Lough Derg (Shannon) SPA	004058	5.90km	Lough Derg (Shannon) SPA is of high ornithological importance as it supports nationally important breeding populations of Cormorant and Common Tern. In winter, it has nationally important populations of Tufted Duck and Goldeneye, as well as a range of other species including Whooper Swan. The presence of Whooper Swan, Greenland White-fronted Goose, Hen Harrier and Common Tern is of particular note as these are listed on Annex I of the E.U. Birds Directive. Parts of Lough Derg (Shannon) SPA are a Wildfowl Sanctuary.	Possibly. SPA lies to the south of site. River system provides an ecological corridor
Slieve Aughty Mountains SPA	004168	7.86km	The Slieve Aughty Mountains SPA is of ornithological significance, as it provides excellent nesting and foraging habitat for nationally important breeding populations of Hen Harrier and Merlin, two species that are listed on Annex I of the E.U. Birds Directive. Some	No. SPA lies to the west and SW of site. Lack of relevant connectivity to the site
River Little Brosna Callows SPA & NHA	004086 000564	13.11km	The River Little Brosna Callows SPA is one of the top sites in the country for wintering waterfowl and part of the site is a Wildfowl Sanctuary. It is of international importance on account of the total numbers of birds that use it, as well as for its Greenland White-fronted Goose, Golden Plover and Black-tailed Godwit populations. In addition, there are a further seven species with nationally important populations, several of which are the largest in the country. Also of note is that three of the species which occur regularly, i.e. Whooper Swan, Greenland White-fronted Goose and Golden Plover, are listed on Annex I of the E.U. Birds Directive.	Unlikely. SPA lies to the NE of site. While river system provides an ecological corridor, this SPA lies a considerable distance from the site

Name of Site	Site Code	Distance	Has the designated site a high ornithological value?	Has the site ornithological connectivity to the subject site?
Special Area of Conservation (SAC)				
Ardgraigue Bog SAC	002356	4.09km	Peatland with wet pools with potential for wintering birds.	SAC lies to the north of the site. Possible connectivity to the site
Barroughter Bog SAC	000231	5.75km	Peatland with wet pools with potential for wintering birds.	Close proximity to the shores of Lough Derg, with its succession from open water through extensive reed beds and marginal scrub, to raised bog. River system provides ecological corridor
River Shannon Callows SAC	000216	5.82km	In winter the site is internationally important for numbers and species of waterfowl. In spring it feeds large numbers of birds on migration, and in summer it holds very large numbers of breeding waders, rare breeding birds and the endangered Corncrake, as well as a very wide variety of more common grassland and wetland birds.	SAC to the east of the site. River network provides ecological corridor
Lough Derg, North-east Shore SAC	002241	5.86km	Lough Derg (Shannon) is of high ornithological importance as it supports nationally important breeding populations of Cormorant and Common Tern. In winter, it has nationally important populations of Tufted Duck and Goldeneye, as well as a range of other species including Whooper Swan. Records of Whooper Swan, Greenland White-fronted Goose, Hen Harrier and Common Tern.	SAC to the south of the site. River network provides ecological corridor
Cloonmoylan Bog SAC	000248	8.24km	Peatland with wet pools with potential for wintering birds.	SAC located to the SW of the site. No connectivity
Rosturra Wood SAC	001313	8.74km	Almost half of Rosturra Wood is designated as a Statutory Nature Reserve.	SAC located to the SW of the site. No relevant connectivity to the site

Name of Site	Site Code	Distance	Has the designated site a high ornithological value?	Has the site ornithological connectivity to the subject site?
Pollnaknockaun Wood Nature Reserve SAC	000319	10.30km	Pollnaknockaun Wood represents an opportunity to recreate an oakwood with its associated fauna and a diverse ground flora. The wet woodland, stream and wet grassland add further interest to this site	SAC located to the SW of the site. No relevant connectivity to the site
Redwood Bog SAC	002353	11.09km	Peatland with wet pools with potential for wintering birds.	SAC located to the east of site. River system provides
Derrycrag Wood Nature Reserve SAC	00261	11.81km	Most of the site is also designated as a Nature Reserve. Kestrel, Sparrowhawk and Jay are a few of the more notable bird species present in the site	SAC located to the SW of the site. No relevant connectivity to the site
Kilcarren-Firville Bog SAC	000647	11.82km	Peatland with wet pools with potential for wintering birds.	SAC located to the SE of the site. Possible connectivity
National Heritage Areas (NHA)				
Capira/Derrew Bog NHA	001240	1.94km	Peatland with wet pools with potential for wintering birds.	Capira/Derrew bog located to the east of east. Connected by close proximity
Cloonoolish Bog NHA	000249	5.56km	Peatland with wet pools with potential for wintering birds.	NHA located to the north of the site. River network provides possible ecological corridor
Meeneen Bog NHA	000310	7.21km	Peatland with wet pools with potential for wintering birds.	NHA located to the NE of the site. Distance lowers potential.
Moorfield Bog NHA	001303	7.33km	Peatland with wet pools with potential for wintering birds.	NHA located to the NE of the site. Low connectivity to the site

Name of Site	Site Code	Distance	Has the designated site a high ornithological value?	Has the site ornithological connectivity to the subject site?
Eskerboy Bog NHA	001264	8.28km	Peatland with wet pools with potential for wintering birds.	NHA located to the NW of the site. Distance lowers potential.
Friar's Lough pNHA	000933	8.99km	Friars Lough is a small lake with adjacent woodland, situated near the village of Lorrah in north Tipperary, which may be used by wintering birds.	NHA located to the SE of the site. Distance lowers potential.
Ballymacegan Bog NHA	000642	9.33km	Peatland with wet pools with potential for wintering birds.	NHA located to the NE of the site. Distance lowers potential.
Lorrha Bog NHA	001684	10.97km	Peatland with wet pools with potential for wintering birds.	NHA located to the SE of the site. Low connectivity to the site
Derryoober Bog NHA	002379	14.52km	Peatland with wet pools with potential for wintering birds.	NHA located to the south of the site. Distance lowers potential.
Proposed National Heritage Areas (pNHA's)				
Spring Park Wetlands pNHA	000941	13.36km	Wetlands with potential for wintering birds	NHA located to the SE of the site. Low connectivity to the site
Lough Avan pNHA	001995	14.50km	Lake with potential for wintering birds	NHA located to the SE of the site. Low connectivity to the site

2.3 Historical Review of Data

2.3.1 National Biodiversity Data Centre (NBDC) information

A search was made of the NDBC for records of bird species recorded within the area of the site of the proposed development. There was only one bird species recorded within the two 2km squares (M80E and M80J), therefore a search in the 10km square was conducted (M80). Datasets used in compiling the list below include The Atlas of Breeding and Wintering Birds 2007-2011) (*Balmer et al 2013*) and the Irish Wetland Birds Survey (*I-WeBS*). A total of sixteen records for designated bird species was noted. It should be noted that I-WeBS records from the surrounding wetlands will have also been uploaded to the NBDC.

Table 2-2 Designated species recorded within the 10km squares; M80

Name	Last recorded	Designation
Arctic Tern (Sterna paradisaea)	31/07/1972	Wildlife Acts | EU Birds Directive > Annex I Birds of Conservation Concern - Amber List
Barn Owl (Tyto alba)	31/12/2011	Wildlife Acts > Birds of Conservation Concern - Red List
Barn Swallow (Hirundo rustica)	12/04/2018	Wildlife Acts |Birds of Conservation Concern - Amber List
Black-headed Gull (Larus ridibundus)	18/02/2020	Wildlife Acts > Birds of Conservation Concern - Red List
Common Coot (Fulica atra)	23/03/2022	Wildlife Acts |EU Birds Directive > Annex II, Annex III > Birds of Conservation Concern - Amber List
Common Goldeneye (Bucephala clangula)	31/12/2011	Wildlife Acts |EU Birds Directive > Annex II > Birds of Conservation Concern - Amber List
Common Grasshopper Warbler (Locustella naevia)	31/12/2011	Wildlife Acts > Birds of Conservation Concern - Amber List
Common Kestrel (Falco tinnunculus)	31/12/2011	Wildlife Acts > Birds of Conservation Concern - Amber List
Common Kingfisher (Alcedo atthis)	15/09/2020	Wildlife Acts |EU Birds Directive > Annex I > Birds of Conservation Concern - Amber List
Common Linnet (Carduelis cannabina)	31/12/2011	Wildlife Acts > Birds of Conservation Concern - Amber List
Common Pheasant (Phasianus colchicus)	31/12/2011	Wildlife Acts | EU Birds Directive > Annex II, Annex III
Common Pochard (Aythya ferina)	31/12/2011	Wildlife Acts | EU Birds Directive > Annex II, Annex III, > Birds of Conservation Concern - Amber List
Common Redshank (Tringa totanus)	31/12/2011	Wildlife Acts || > Birds of Conservation Concern - Red List
Common Sandpiper (Actitis hypoleucos)	31/12/2011	Wildlife Acts |> Birds of Conservation Concern - Amber List
Common Snipe (Gallinago gallinago)	30/01/2019	Wildlife Acts | EU Birds Directive > Annex II, Annex III > Birds of Conservation Concern - Amber List
Common Starling (Sturnus vulgaris)	31/12/2011	Wildlife Acts |> Birds of Conservation Concern - Amber List
Common Swift (Apus apus)	31/12/2011	Wildlife Acts || Threatened Species: Birds of Conservation Concern - Amber List
Common Tern (Sterna hirundo)	15/09/2020	Wildlife Acts | EU Birds Directive > Annex I > Birds of Conservation Concern - Amber List

Name	Last recorded	Designation
Common Wood Pigeon (Columba palumbus)	20/03/2022	Wildlife Acts |EU Birds Directive >> Annex II, Annex III
Corn Crake (Crex crex)	31/07/1972	Wildlife Acts || EU Birds Directive >> Annex I > Birds of Conservation Concern - Red List
Eurasian Curlew (Numenius arquata)	31/12/2011	Wildlife Acts || EU Birds Directive >> Annex II > Birds of Conservation Concern - Red List
Eurasian Teal (Anas crecca)	31/12/2011	Wildlife Acts || EU Birds Directive >> Annex II, Annex III, > Birds of Conservation Concern - Amber List
Eurasian Wigeon (Anas penelope)	31/12/2011	Wildlife Acts || EU Birds Directive >> Annex III, > Birds of Conservation Concern - Amber List
Eurasian Woodcock (Scolopax rusticola)	31/12/2011	Wildlife Acts || EU Birds Directive >> Annex II, Annex III, > Birds of Conservation Concern - Amber List
European Golden Plover (Pluvialis apricaria)	29/02/1984	Wildlife Acts || EU Birds Directive >> Annex I, Annex II, Annex III > Birds of Conservation Concern - Red List
Gadwall (Anas strepera)	31/12/2011	Wildlife Acts || EU Birds Directive >> Annex II Birds of Conservation Concern - Amber List
Great Black-backed Gull (Larus marinus)	29/02/1984	Wildlife Acts || Threatened Species: Birds of Conservation Concern - Amber List
Great Cormorant (Phalacrocorax carbo)	23/03/2022	Wildlife Acts || >> Birds of Conservation Concern - Amber List
Great Crested Grebe (Podiceps cristatus)	23/03/2022	Wildlife Acts || >> Birds of Conservation Concern - Amber List
Greater Scaup (Aythya marila)	31/12/2011	Wildlife Acts || >> Annex II, Annex III >> Birds of Conservation Concern - Amber List
Greater White-fronted Goose (Anser albifrons)	29/02/1984	Wildlife Acts || EU Birds Directive > Annex I, Annex II, Annex III. Birds of Conservation Concern - Amber List
Grey Partridge (Perdix perdix)	31/07/1972	Wildlife Acts || EU Birds Directive >> Annex II, Annex III, Birds of Conservation Concern - Red List
Greylag Goose (Anser anser)	31/12/2011	Invasive Species. EU Birds Directive || Annex II, Annex III. Birds of Conservation Concern - Amber List
Hen Harrier (Circus cyaneus)	31/12/2011	Wildlife Acts || EU Birds Directive >> Annex I Birds of Conservation Concern - Amber List
Herring Gull (Larus argentatus)	29/02/1984	Wildlife Acts || Birds of Conservation Concern >> Birds of Conservation Concern - Red List
House Martin (Delichon urbicum)	31/12/2011	Wildlife Acts || Birds of Conservation Concern - Amber List
House Sparrow (Passer domesticus)	31/12/2011	Wildlife Acts || Birds of Conservation Concern - Amber List
Lesser Black-backed Gull (Larus fuscus)	31/12/2011	Wildlife Acts || Birds of Conservation Concern - Amber List
Little Egret (Egretta garzetta)	31/12/2011	Wildlife Acts || EU Birds Directive >> Annex I Bird Species
Little Grebe (Tachybaptus ruficollis)	20/03/2022	Wildlife Acts || >> Birds of Conservation Concern - Amber List
Mallard (Anas platyrhynchos)	20/03/2022	Wildlife Acts || EU Birds Directive >> Annex II, Annex III
Mew Gull (Larus canus)	31/12/2011	Wildlife Acts || Birds of Conservation Concern - Amber List
Mute Swan (Cygnus olor)	20/03/2022	Wildlife Acts || Birds of Conservation Concern - Amber List

Name	Last recorded	Designation
Northern Lapwing (Vanellus vanellus)	04/02/2018	Wildlife Acts || Annex II. Birds of Conservation Concern - Red List
Northern Pintail (Anas acuta)	31/12/2011	Wildlife Acts || EU Birds Directive >> Annex III >> Birds of Conservation Concern - Red List
Northern Shoveler (Anas clypeata)	31/12/2011	Wildlife Acts || EU Birds Directive >> Annex II, Annex III, >> Birds of Conservation Concern - Red List
Northern Wheatear (Oenanthe oenanthe)	31/07/1972	Wildlife Acts || Birds of Conservation Concern - Amber List
Red-breasted Merganser (Mergus serrator)	18/04/2019	Wildlife Acts || EU Birds Directive >> Annex II
Rock Pigeon (Columba livia)	31/07/1972	Wildlife Acts || EU Birds Directive >> Annex II
Sand Martin (Riparia riparia)	31/07/1991	Wildlife Acts || Birds of Conservation Concern - Amber List
Sky Lark (Alauda arvensis)	31/07/1991	Wildlife Acts || Birds of Conservation Concern - Amber List
Spotted Flycatcher (Muscicapa striata)	31/12/2011	Wildlife Acts || Birds of Conservation Concern - Amber List
Stock Pigeon (Columba oenas)	31/07/1991	Wildlife Acts || Birds of Conservation Concern - Amber List
Tufted Duck (Aythya fuligula)	31/12/2011	Wildlife Acts || EU Birds Directive >> Annex II, Annex III, >> Birds of Conservation Concern - Amber List
Water Rail (Rallus aquaticus)	21/03/2022	Wildlife Acts || >> Birds of Conservation Concern - Amber List
Whinchat (Saxicola rubetra)	31/07/1972	Wildlife Acts || Birds of Conservation Concern - Amber List
White-tailed Eagle (Haliaeetus albicilla)	29/03/2018	Wildlife Acts
Whooper Swan (Cygnus cygnus)	29/02/1984	Wildlife Acts || EU Birds Directive >> Annex I Birds of Conservation Concern - Amber List
Yellowhammer (Emberiza citrinella)	04/07/2020	Wildlife Acts || Birds of Conservation Concern - Red List

2.3.2 I-WeBS

The closest I-WeBS point to the proposed development is listed as OG397 Portumna Bridge – Big Isle (Shannon Callows), located c. 5km to the east of the subject site. These counts were conducted using aerial overpasses with data from 2011/12 and 2012/13 only.

Table 2-3: I-WeBS peak counts – Shannon Aerial

Species	1% national	2011/12	2012/13	Peak Months	BoCCI4	Annex
Black-headed Gull	Unknown	745	145	Feb, Nov	Amber	-
Coot	190	760	1107	Feb, Nov	Amber	II & III
Cormorant	110	11	50	Feb, Nov	Green	-
Curlew	350	11	-	Feb	Red	II
Goldeneye	40	134	137	Feb, Dec	Red	II
Great Black-backed Gull	Unknown	-	5	Nov	Green	-

Species	1% national	2011/12	2012/13	Peak Months	BoCCI4	Annex
Great Crested Grebe	30	-	4*	Feb, Dec	Amber	-
Grey Heron	25	8	1	Feb, Nov	Green	
Greylag Goose	35	96	149*	Feb	Amber	II & III
Herring Gull	Unknown	-	8	Nov	Green	-
Lapwing	850	215	20	Feb, Dec	Red	II
Little Egret	20	-	2	Nov	Green	I
Mallard	280	263	219	Feb, Dec	Amber	II & III
Mute Swan	90	177	390	Feb, Dec	Amber	-
Pochard	110	30	24	Feb, Nov	Red	II & III
Scaup	25	42	--	Feb	Red	II & III
Shoveler	20	2		Feb	Red	II & III
Teal	360	445	448	Feb, Dec	Amber	II & III
Tufted Duck	270	962	1039	Feb, Dec	Amber	II & III
Whooper Swan	150	107	78	Feb, Dec	Amber	I
Wigeon	560	461	662	Feb, Dec	Amber	II & III

2.3.3 Ad-hoc records

Barn owl have been breeding within a derelict ruin to the south of the site. The site is managed by the Barn Owl Project. Surveys and impact assessment has been conducted for barn owls as part of the project.

3 Field Survey

3.1 Survey Personal

Bird surveys were conducted by Karolina Illien (MSc) and John Curtin (B.Sc.). John Curtin is an experienced ecologist having conducted plant, habitats, birds, bats and mammal surveys since 2010 including at windfarm and solar sites, while surveyor Karolina Illien has a range of ecological experience including conducting voluntary bird surveys since 2015 including Shannon estuary wintering wader surveys and commercial ornithology since 2022.

3.2 Birds in the ecological survey area

3.2.1 Habitats within the site

The site of the proposed development primarily consists of improved agricultural grassland directly surrounded by treelines, hedgerows and drains. Improved grassland habitat typically does not support high diversity of bird species. The site also contains a small area of planted immature native trees, as well as several buildings, gravel tracks and roads.

3.2.2 Birds within the site of the proposed development and undesignated surrounds

Species of note found within the site include Buzzard, Kestrel, Snipe, as well as red listed Redwing and Meadow pipit. Several amber listed passerines were present on-site including Goldcrest, Willow warbler, Skylark, Linnet, House martin and Barn swallow. Mallard, Black-headed Gull, Grey Heron and Whimbrel were observed flying over the site in small numbers. A White-tailed eagle was observed on one occasion flying adjacent to the site. The site was found to contain breeding Barn swallow, Starling, Linnet and possible breeding Willow Warbler.

Species of note found within the hinterland included; Barn Owl, Northern Lapwing, Black-headed gull, Teal and Mallard.

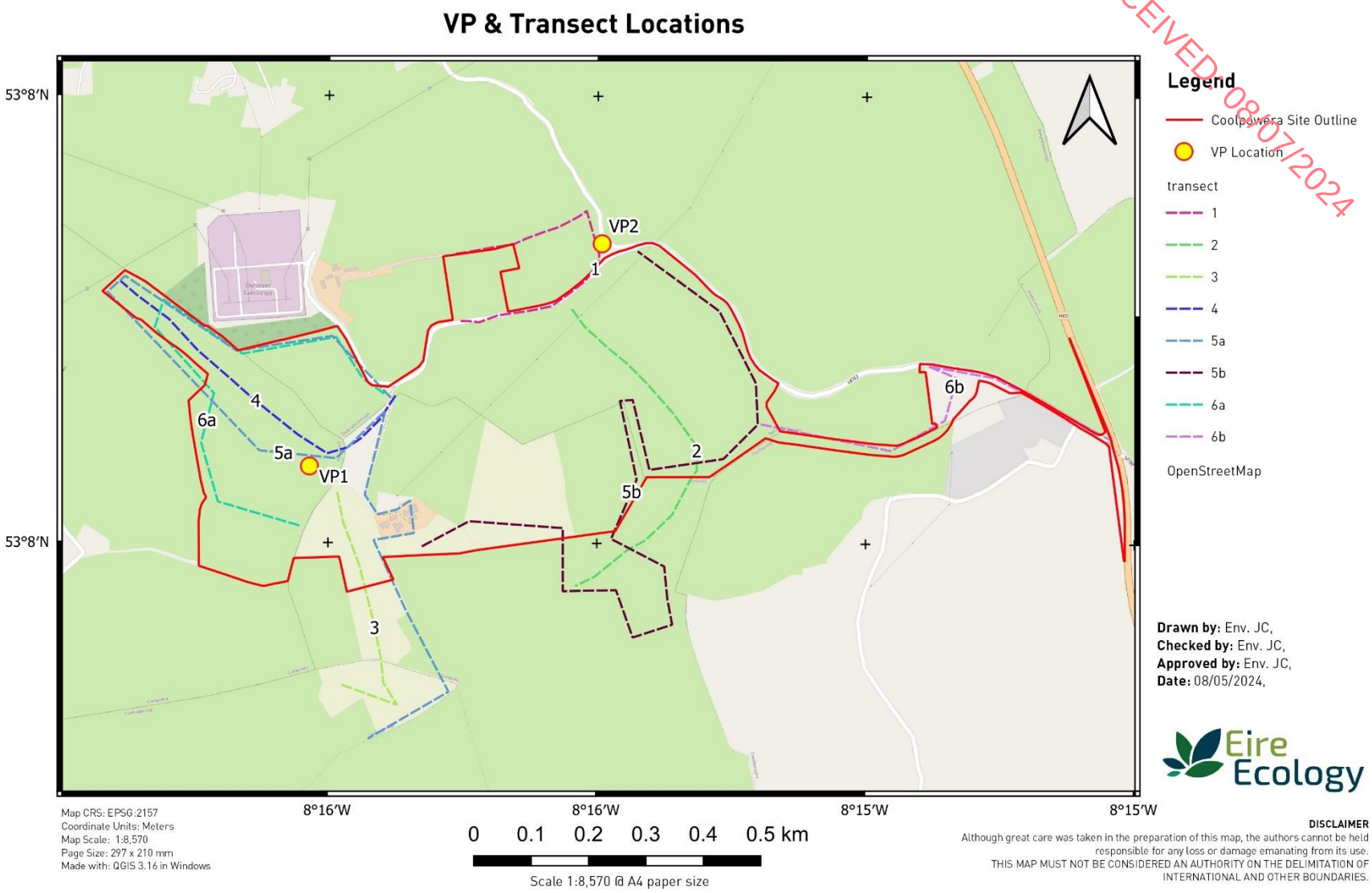

Figure 3-1: Vantage point & transect locations.

3.2.3 Onsite Results

Six hour vantage point surveys were conducted in January 2024 and May 2024. The location of vantage point surveys are shown in figure 3-1 below. During the surveys, the presence of target species and their flight lines were recorded. Data from flight lines observed during onsite walkover surveys are also included here. VP 1 (53.131208, 8.267513) is located on a hill overlooking the site with the surveyor looking NE. VP 2 (53.134671, -8.259881) is located by the north-eastern road.

Table 3-1: Summary of VP 'Species of interest'

Species	No. of obs.	Max no. observed	1% National Population	BoCCI4	Season for BOCCI4 designation
Buzzard	1	1	Unknown	Green	-
Grey Heron	3	2	25	Green	-
Kestrel	1	1	Unknown	Red	Breeding
Redwing	185	50	Unknown	Red	Wintering
Mallard	1	1	280	Amber	Breeding / Wintering

Table 3-2: Species list of non-target species recorded from VPs.

Species	No. of obs.	Max no. observed	BoCCI4	Species	No. of obs.	Max no. observed	BoCCI4
Barn Swallow	5	5	Green	Mistle thrush	2	1	Green
Blackbird	7	4	Green	Pheasant	3	1	Green
Blackcap	1	1	Green	Pied Wagtail	1	1	Green
Chaffinch	14	8	Green	Raven	4	2	Green
Chiffchaff	1	1	Green	Robin	4	1	Green
Dunnock	2	1	Green	Rook	19	15	Green
Goldcrest	1	1	Amber	Sky Lark	14	14	Green
Great Tit	1	1	Green	Song Thrush	3	1	Green
Hooded Crow	4	3	Green	Starling	52	30	Amber
Jackdaw	16	8	Green	Willow Warbler	2	1	Amber
Long-tailed Tit	5	5	Green	Winter Wren	3	1	Green
Magpie	7	4	Green	Wood Pigeon	10	5	Green

The aim of the wintering VP survey was to examine if the site is a feeding ground or on a regular flightpath for wintering waterbirds such as Whooper Swans or Curlew. The survey results shows the site is not used by these species.

Table 3-3 below summarises results from walked transects conducted during the wintering and breeding seasons. Breeding Barn Swallow, Linnet, Chaffinch, Song Thrush, Jackdaw, Starling and Wood pigeon were recorded. The only species of interest (red listed or Annex I) found probably breeding on site is Meadow pipit.

Table 3-3 Summary of Transect 'Species of interest' results

Species	No. of obs.	Max no. observed	Breeding Assessment	1% National Population	BoCCI4	Season for BOCCI4 designation
Black-headed Gull	3	6	Wintering	Unknown	Amber	Breeding/Wintering
Buzzard	7	2	Wintering	Unknown	Green	-
Grey Heron	1	1	Wintering	25	Green	-
Kestrel	2	1	Wintering	Unknown	Red	Breeding
Mallard	1	1	Wintering / Non-Breeding	280	Amber	Breeding/Wintering
Meadow Pipit	11	6	Probably Breeding	Unknown	Red	Breeding
Redwing	7	20	Wintering	Unknown	Red	Wintering
Snipe	7	3	Wintering	Unknown	Red	Breeding/Wintering
Whimbrel	1	10	Non-Breeding	Unknown	Green	-
White-tailed Eagle	1	1	Non-Breeding	Unknown	Red	Breeding

Table 3-4: Species list of non-target species recorded from Transects.

Species	No. of obs.	Max no. obs.	Breeding Assessment	No. of Breeding pairs	BoCCI4	Season for BOCCI4 designation
Barn Swallow	16	10	**Breeding Occupied nest**	9	Amber	Breeding
Blackbird	58	4	PRB Agitated behaviour	-	Green	-
Blue Tit	7	2	PRB Agitated behaviour	-	Green	-
Bullfinch	2	1	PSB Suitable Habitat	-	Green	-
Chaffinch	26	30	**Breeding Food / faecal sac**	1	Green	-
Chiffchaff	9	1	PSB Suitable Habitat	-	Green	-
Dunnock	5	1	PSB Suitable Habitat	-	Green	-
Fieldfare	9	43	Wintering	-	Green	-
Goldcrest	5	1	PRB Agitated behaviour	-	Amber	Breeding
Goldfinch	7	20	PRB Pair	-	Green	-
Great Tit	8	2	PSB Suitable Habitat	-	Green	-
Greenfinch	2	1	PSB Suitable Habitat	-	Amber	Breeding
Hooded Crow	8	7	PSB Suitable Habitat	-	Green	-
House Martin	3	3	PSB Suitable Habitat	-	Amber	Breeding
House Sparrow	15	20	PRB Pair	-	Amber	Breeding
Jackdaw	25	9	**Breeding Occupied nest**	1	Green	-
Linnet	7	15	**Breeding Food / faecal sac**	1	Amber	Breeding
Long-tailed Tit	6	4	PRB Pair	-	Green	-
Magpie	13	3	PSB Suitable Habitat	-	Green	-
Mistle Thrush	2	2	PSB Suitable Habitat	-	Green	-
Pheasant	7	3	PSB Suitable Habitat	-	Green	-
Pied Wagtail	2	3	Wintering	-	Green	-
Raven	3	5	PSB Suitable Habitat	-	Green	-
Reed Bunting	2	1	PSB Suitable Habitat	-	Green	-
Robin	24	1	PSB Suitable Habitat	-	Green	-

Species	No. of obs.	Max no. obs.	Breeding Assessment	No. of Breeding pairs	BoCCI4	Season for BOCCI4 designation
Rook	5	2	PRB Pair	-	Green	-
Siskin	1	2	Wintering	-	Green	-
Sky Lark	2	27	Wintering	-	Green	-
Song Thrush	6	2	Breeding Food / faecal sac	1	Green	-
Starling	12	30	Breeding Occupied nest	6	Amber	Breeding
Willow Warbler	9	1	PSB Singing male	-	Amber	Breeding
Winter Wren	48	2	PRB Agitated behaviour	-	Green	-
Wood Pigeon	28	4	Breeding Food / faecal sac	-	Green	-

3.2.4 Hinterland Results

Table 3-5 provides a summary of results from the hinterland surveys. Very low numbers of birds of interest were found during hinterland surveys. Lapwing were observed in a field beside the town of Portumna in January but were not there on subsequent visits. Teal and Mallard were at one location south of the site in a ponding area of a field, but these were also only seen once at this location.

No Nationally Important flocks of birds were recorded from the hinterland surveys.

Table 3-5 Summary of Hinterland 'Species of interest' results

Species	No. of obs.	Max no. obs.	1% National Population	BoCCI4	Season for BOCCI4 designation
Black-headed Gull	2	2	Unknown	Amber	Breeding/Wintering
Buzzard	1	1	Unknown	Green	Green
Kestrel	1	1	Unknown	Red	Breeding
Mallard	10	10	280	Amber	Breeding/Wintering
Northern Lapwing	30	30	Unknown	Green	Green
Teal	22	20	360	Amber	Breeding/Wintering
Water Rail	1	1	Unknown	Green	Green

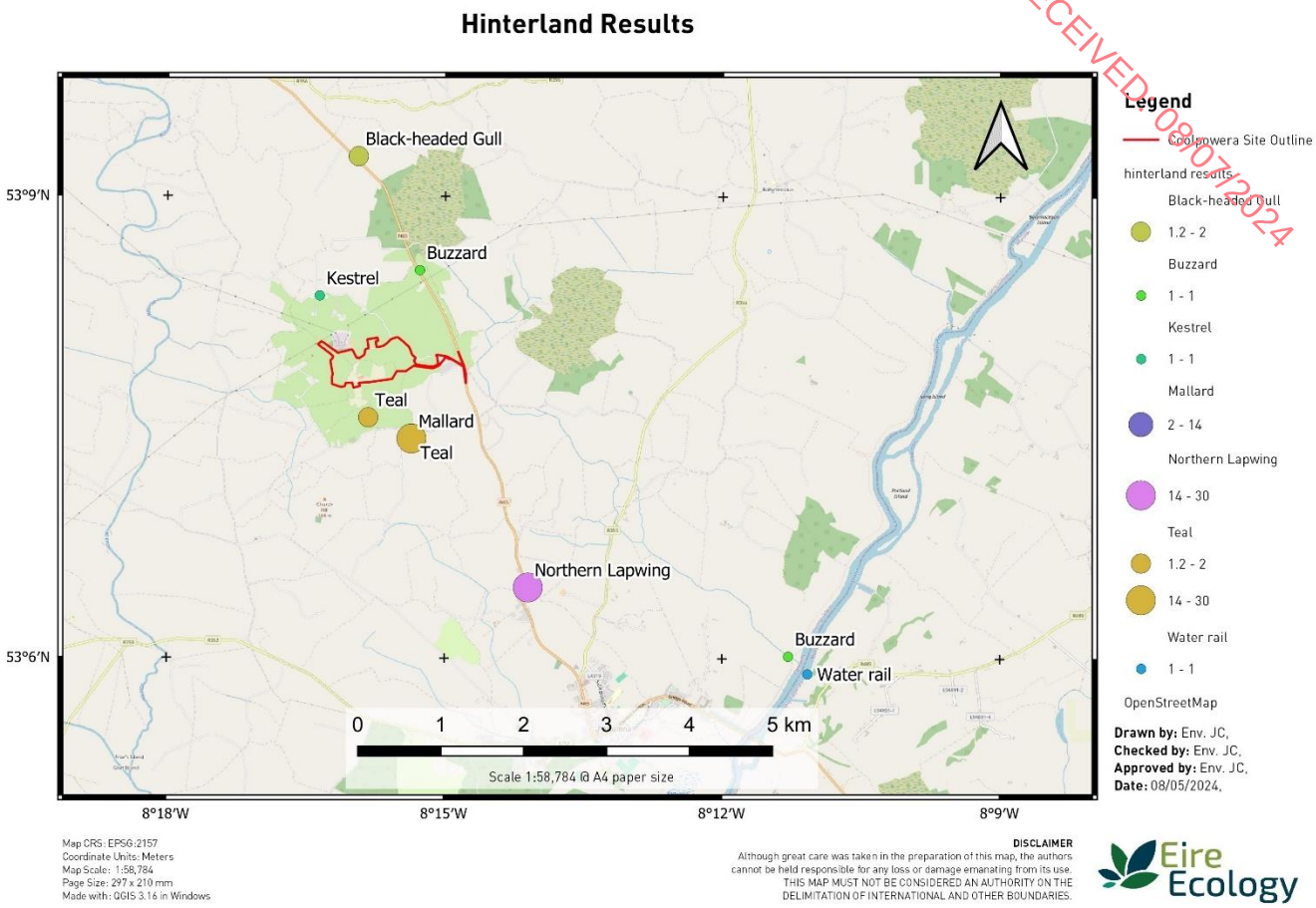

Figure 3-2: Hinterland map

3.2.5 Barn Owl

A scarce resident mainly in central and southern Ireland. No longer breeds in large patches of northern, western and eastern Ireland. Red-listed in Ireland due to a significant decline in the breeding population. The European population is currently evaluated as Declining. Due to a reported barn owl nest site close to the site, a survey was conducted on the 01st May 2024 to establish Barn owl presence at given location. A dusk watch was conducted from a distance in order to avoid disturbance. The survey was aided using Zeist binoculars and a Guide track 19mm thermal scope. (Shawyer, 2011). One barn owl was observed in the area, however a Nest site Verification Survey was not conducted as this would cause unnecessary disturbance to the species. No Barn owls were seen on site.

The barn owl nest location is withheld from this report as releasing locations of nest sites is not advisable. This information will be submitted separately and should not be available for public viewing.

3.3 Summary per species

The following sections provides a summary of sightings from species of note observed within the site. Further details can be found in Appendix 1.

3.3.1.1 Buzzard

Buzzard is a widespread bird of prey best adapted to hunt over lowland pasture. Multiple records were noted from this species throughout the site. The species typically breeds within treelines and hedgerows thus retention of these features will be important for Buzzards continued usage of the site. Buzzard are green listed with a secure Irish population. Multiple observations were noted during all survey periods. Buzzards were observed over the site on several occasions with a max of three soaring over the farm house on the 19th of April. While there is suitable breeding habitat for this species within the site, no evidence of breeding was found.

3.3.1.2 Kestrel

Similar to Buzzard, multiple observations of Kestrel were made during vantage point and walkover surveys. Birdwatch Irelands publication; *''Countryside Bird Survey: Status and Trends of Common and Widespread Breeding Birds 1998-2016"* states the kestrel population was estimated at 13,500, a decrease of 44.9% over the 18-year period, 1998-2016 and a 22.1% decrease in distribution over the 25-year period 1991-2016. Kestrel are a BoCCI red listed species. Both male and female Kestrel were recorded during surveys with records from both the breeding and wintering season. No breeding sites were found although there are suitable treelines for them within the site.

3.3.1.3 Snipe

Common snipe is a small cryptic wader mostly found in bog, marshy wetland, and rough ground in both upland, lowland regions, and lakeshores. Breeding takes place between April - June. Courtship ritual most often involves a male producing a drumming effect by filtering air over feathers ((RSPB)., 2021). There may be an aerial display to ward off competitors. As snipe is a crepuscular species, these behaviors are most likely observed in twilight. The lifespan of a snipe is typically 3 years, with breeding commencing at 2 years. The average clutch size is 4, which the female incubates 18-20 days. The fledgling period is 19/20 days ((BTO), 2021). Small invertebrates and seedlings form part of the diet.

Surveys conducted on site appropriate to Snipe include wintering transects, and breeding bird transects following O'Brien and Smith (1992) / Common Bird Census. Breeding transects included areas most likely used by snipe including along drains and wet areas. Snipe were seen numerous times on site from January until April 2024. The maximum number were four Snipe seen flying out of wet area in field to the east of farmhouse. No drumming or chirping were heard thus these birds were remnants of the winter flock. During Mays surveys, the surveyors checked fields with thermal scope and no Snipe were seen or heard. No Snipe were found during dawn breeding bird transect conducted in May.

3.3.1.4 Redwing

Widespread winter visitor to Ireland from October to March from Iceland and Scandinavia. A thrush which favours open fields in lowland areas, but tends to avoid urban areas. A red listed species for wintering (Bird watch Ireland,2023). Redwing were (up to 50) were seen flying over site in flocks along

with Fieldfare. Redwing were also observed perched in hedgerows and mature trees in the centre of site.

3.3.1.5 Meadow pipit

This species is Red-listed according to Birds of Conservation Concern in Ireland 2020-2026 and is of high conservation value as a result. The Meadow Pipit is amongst the most abundant bird species in the country and can be found in a plethora of habitat types such as rough pasture, upland scrub, bogs, saltmarshes, agricultural land and even parks and dune systems. This species was noticed within the site in both the winter and breeding season. This species is probably breeding as habitats are suitable.

3.3.2 Amber list observations

Several amber listed species were recorded on site during the breeding season:

3.3.2.1 Barn Swallow

Common summer visitor throughout Ireland from mid-March to late-September. Birdwatch Ireland's Countryside Bird Survey shows that the breeding population trend of Swallow in Ireland has remained relatively stable since 1998, however the numbers that breed here from one year to the next can fluctuate greatly. Despite these annual fluctuations the long-term trend shows a marginal decline of 1.4% since 1998. Barn swallows were confirmed breeding in farm sheds towards the centre of the site. A max of 10 barn swallow were noted breeding within sheds.

3.3.2.2 House sparrow

One of Ireland's Top 20 most widespread garden birds. BirdWatch Ireland's Countryside Bird Survey which monitors breeding birds shows that the breeding population of House Sparrow in Ireland has experienced a 39.6% increase over the 10 years between 2006 and 2016, and an ever larger 82.2% increase since 1998. House sparrow are probably breeding within sheds on site.

3.3.2.3 House Martin

Common and widespread summer visitor, mid-March to late September. House martins were seen along with barn swallows in low numbers around the farmhouse and sheds and are probably breeding within the sheds.

3.3.2.4 Starling

Birdwatch Ireland's Countryside Bird Survey show that the breeding population of Starling has remain stable since 1998. Starling have been confirmed breeding within sheds on the site.

3.3.2.5 Goldcrest

Goldcrests breed in a wide variety of habitats, including broadleaf forests, hedgerows and suburban gardens. It is also one of the few species that will breed in dense coniferous woodlands. There is suitable habitat within the site for this species.

3.3.2.6 Greenfinch

Widespread resident. One of Ireland's top-20 most widespread garden birds. Regularly visiting peanut feeders with other finches in suburban and rural areas. Resident birds most likely joined by wintering Greenfinches from continental Europe. This species was observed flying within the site.

3.3.2.7 Linnet

Widespread resident throughout Ireland. Bird noted carry food, confirming breeding.

3.3.2.8 Willow warbler

One of the commonest breeding birds in Ireland (about 1 million pairs), with the highest densities in stands of willows along the edges of bogs and marshes. Less frequently in hedgerows, forests and well-vegetated gardens.

3.3.2.9 Skylark

Common resident throughout Ireland in uplands and areas of farmland, especially cereal. Breeds in a variety of habitats including cultivated areas, ungrazed grasslands and upland heaths. Usually moves out of breeding areas to winter in flocks on stubble fields, grasslands and coastal areas. Birds from continental Europe arrive in variable numbers from September and depart March/April.

3.3.3 Other species of note observed outside site:

3.3.3.1 Barn Owl

This species is Red-listed according to Birds of Conservation Concern in Ireland 2020-2026 and is of high conservation value as a result. Scarce resident mainly in central and southern Ireland. No longer breeds in large patches of northern, western and eastern Ireland. Red-listed in Ireland due to a significant decline in the breeding population. The European population is currently evaluated as Declining (Bird watch Ireland,2023). Not observed on site, however seen at derelict house where there is a reported nest site. The species was not observed within the site.

3.3.3.2 White-tailed Eagle

This species is Red-listed according to Birds of Conservation Concern in Ireland 2020-2026 and is of high conservation value as a result. White tailed eagle is a reintroduced species in Ireland. Killarney National Park facilitated their reintroduction in 2007. This reintroduction programme saw 100 young eagles released in the National Park which were then free to disperse as they pleased. This programme produced mixed results in terms of establishing a strong breeding population (NPWS, 2021). As of July 2020, a small breeding population has successfully fledged chicks across Cork, Kerry, Clare, Galway and Tipperary (NPWS, 2021). Building on the original phase of this reintroduction programme (2007-2011), phase 2 saw the release of more young individuals from multiple sites across Ireland. Each individual was tagged for ease of tracking (NPWS, 2021). These individuals were shown to spread across Munster and northwards along the Shannon River (NPWS, 2021). There was one sighting of a juvenile White-tailed eagle flying over a neighbouring farm before flying out of sight behind trees to the NE of the site. The species did not associate with the site.

3.3.4 Teal

This species is amber-listed according to Birds of Conservation Concern in Ireland 2020-2026. Teal are resident and a winter migrant duck in Ireland and numbers have increased over the long-term although a recent short-term decline is now evident. Teal are very widespread in Ireland, occurring in

a wide range of inland and coastal wetland habitats, including small lakes and ponds, bogs, drainage ditches and rivers, all of which are under-represented during I-WeBS. (Lewis L. J., Irish Wetland Bird Survey: Waterbird Status and Distribution 2009/10-2015/16, 2019). Twenty Teal were seen in February in a field with a flooded area to the south of site. The area was checked on subsequent surveys but no Teal present. The species did not associate with the site.

3.3.5 Mallard

Mallard are the most widespread species, although not quite as numerous as Wigeon or Teal. They occur in almost all available wetland habitats in Ireland. Mallard that occur in Ireland belong to the population that breed across northern Europe and these have a non-breeding range that extends across north-west Europe, east to the Baltic. This population is stable (Wetlands International, 2018). Irish-breeding birds are resident, and are augmented each winter by migrants, possibly some from the Icelandic breeding population (Wernham et al., 2002). Numbers of Mallard have declined throughout I-WeBS, as well as in Northern Ireland and Britain. Frost et al. (2018) suggest that the declines in wintering Mallard could be related to fewer releases by shooting estates and/or perhaps short-stopping by Russian birds. (Lewis L. J., Irish Wetland Bird Survey: Waterbird Status and Distribution 2009/10-2015/16, 2019). Ten Mallard were seen in February in a field with a flooded area to the south of site. The area was checked on subsequent surveys but no Mallard present. One Mallard was seen flying over site in April. The species did not associate with the site.

3.3.6 Black-headed gull

The Black-headed Gull is our most widespread and numerous wintering gull, being found regularly on inland and coastal wetlands throughout the winter. Based on colour-ring resightings, the Irish wintering population is likely comprised of a mix of Irish-breeding birds as well as individuals from the UK, Scandinavia and Baltic states (Wernham et al., 2002). Most Irish-breeding Black-headed Gull remain here throughout the year but a small proportion of predominantly juvenile birds move south to Europe or north Africa (Wernham et al., 2002; McGreal, 2014). (Lewis L. J., Irish Wetland Bird Survey: Waterbird Status and Distribution 2009/10-2015/16., 2019). Three Black headed gull flew over site in February, one in April and six in May. The species did not associate with the site.

3.3.7 Whimbrel

The Whimbrel is a close relative of the Curlew, both being from the Numenius genus which contains nine 'Curlew/Whimbrel' species, two of which are extinct. The genus name 'Numenius' is derived from the words for 'new' and 'moon' – a reference to the crescent shape of the bill of this group of birds. Whimbrel look very similar to a Curlew – they're large as waders go, long legs and have a long, curved bill, and they put these to good use in the same way as our Curlew, by probing in soft sands and soils in wetlands to feed on invertebrates. Whimbrel fall into the category of 'passage migrant' however – none breed here, and they don't winter here either, but rather they stop off in Ireland in spring and autumn when making their journey between their Arctic breeding grounds and West African wintering areas. Their sudden and noticeable appearance at this time of year earned them the name of "May Bird" in years gone by.

Whimberel were heard during the bat survey in May. The fields on-site were checked with a thermal scope and no birds were seen. Ten Whimberel flew over the site in May, however they did not associate with the site any further.

3.3.8 Water rail

Resident at wetlands throughout Ireland. A secretive and skulking species which is more often heard than seen. One Water rail was observed during hinterland surveys.

3.4 Significance of Birds

The significance of potential ecological effects on birds was determined using Percival (2003) together with professional judgement. The effects were further described with reference to EPA (2017) and CIEEM (2019) criteria for characterising ecological impacts.

Table 3-6: Criteria for assessing impacts based on CIEEM (2019) and (EPA, 2017)

Parameter	Description	
Quality	Positive effect: A change which improves the quality of the environment (for example, by increasing species diversity; or the improving reproductive capacity of an ecosystem, or by removing nuisances or improving amenities).	
	Neutral effect: No effects or effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error.	
	Negative effect: A change which reduces the quality of the environment (for example, lessening species diversity or diminishing the reproductive capacity of an ecosystem; or damaging health or property or by causing nuisance).	
Extent	The area over which an impact occurs	
Duration	• Momentary – effects lasting from seconds to minutes • Brief – effects lasting less than a day • Temporary – effects lasting less than a year • Short-term – effects lasting 1 to 7 years • Medium term – effects lasting 7 to 15 years • Long term – effects lasting 15 to 60 years • Permanent – effects lasting over 60 years • Reversible	
Reversibility	Irreversible impacts: permanent changes from which recovery is not possible within a reasonable time scale or for which there is no reasonable chance of action being taken to reverse it. Reversible impact: temporary changes in which spontaneous recovery is possible or for which effective mitigation (avoidance/cancellation/reduction of effect) or compensation (offset/recompense/offer benefit) is possible.	
Frequency and Timing	Frequency –How often the effect will occur. (once, rarely, occasionally, frequently, constantly –or hourly, daily, weekly, monthly, annually) Timing –the timing of an activity or change may result in an impact if it coincides with critical life-stages or seasons e.g. bird nesting season.	
Describing the significance of effects (EPA, 2017)	Imperceptible	An effect capable of measurement but without significant consequences.
	Not significant	An effect which causes noticeable changes in the character of the environment but without significant consequences.
	Slight	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
	Moderate	An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.

Parameter	Description	
	Significant	An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment.
	Very Significant	An effect which, by its character, magnitude, duration or intensity significantly alters most of a sensitive aspect of the environment.
	Profound	An effect which obliterates sensitive characteristics

The desk study and the field study reveal that some species of high ecological importance are present in low numbers in the local environment. Wintering water bird species of interest were recorded utilising the fields in the surrounds. The threshold for inclusion of a bird species as a qualifying interest for an SPA is 1% of Irelands population. However, no such flock was recorded from within the site or during hinterland surveys.

3.4.1 Significance values for birds

Table 3-9 evaluates the importance of species of interest found within and surrounding the site. The table provides a sensitivity value based on (Percivel 2003) although this was designed to examine impacts on birds by wind energy.

Table 3-7 Determination of Sensitivity in study area

Sensitivity	Determining factor
Very High	Species that form the cited interest of SPAs and other statutorily protected nature conservation areas. Cited means mentioned in the citation text for the site as a species for which the site is designated.
High	Species that contribute to the integrity of an SPA but which are not cited as species for which the site is designated. Ecologically sensitive species including the following: divers, common scoter, hen harrier, golden eagle, red-necked phalarope, roseate tern and chough. Species present in nationally important numbers (>1% Irish population)
Medium	Species on Annex 1 of the EC Birds Directive Species present in regionally important numbers (>1% regional (county) population) Other species on BirdWatch Ireland's red list of Birds of Conservation Concern
Low	Any other species of conservation interest, including species on BirdWatch Ireland's amber list of Birds of Conservation Concern not covered above.

Table 3-8 Evaluation of importance for species of interest from within site and hinterland

Species	Species information	Found within site?	Found in Hinterland surveys?	Designation	Sensitivity (Percivel 2003)	Value of hinterland study area	Value of subject site
Barn Owl	Scarce resident mainly in central and southern Ireland. No longer breeds in large patches of northern, western and eastern Ireland. Red-listed in Ireland due to a significant decline in the breeding population. The European population is currently evaluated as Declining.	No	Yes, one nest site within1km from site boundary	Red	Medium	Local	Local Medium
Black headed Gull	Qualifying interest of the Middle Shannon Callows SPA. Amber listed in BoCCI 2020-2026 (breeding and wintering). Highest numbers recorded flying over was 6. Not observed associating (feeding or roosting) within the site. No impacts expected.	No, a total of seven flew over site	Yes, in low numbers	Amber	Very high	Local	Local Low
Buzzard	Green listed in BoCCI 2020-2026 Found both within and surrounding the site.	Yes, observed once feeding on site and occasionally soaring above the site	Yes. recorded perched and feeding in field	Green	Low	Local	Local Low
Grey Heron	Green listed in BoCCI 2020-2026. Observed flying over on three occasions. Not observed associating with the site. No impacts expected.	No, but flew over site	Yes, one sighting	Green	Low	Local	Local Low
Kestrel	Red listed (breeding) in BoCCI 2020-2026. Countryside bird survey shows an overall downward trend since 1998 however the index has trended up since a 2014 low (https://c0cre470.caspio.com/dp/4bae3000b62efcaae08e4f4da8bd). The 2011-2016 population was estimated at 13,500 (Lewis 2019). This species was found to hunt within the site on one occasion and twice hunting to the north of the site, which appears to be their preferred territory.	Yes	Yes	Red	Medium	Local	Local Medium
Northern Lapwing	Red listed in BoCC 2020-2026.Qualifying interest of the Middle Shannon Callows SPA. The SPA supports nationally important populations of Lapwing (13,240). No sighting of Lapwing was recorded from within the site during any survey. One recording was noted from hinterland survey, when 30 Lapwing were observed in field 2.6km to the south/SE of the site. Not observed associating with the site. No impacts expected.	No	Yes, one observation of 30 Lapwing during hinterland surveys	Red	Very High	Local	Local low

Species	Species information	Found within site?	Found in Hinterland surveys?	Designation	Sensitivity (Percivel 2003)	Value of hinterland study area	Value of subject site
Meadow Pipit	Red listed (breeding) in BoCC 2020-2026. The listing of this species as of high conservation concern is due to a large decline in population following the unusually cold winters of 2009/2010. According to BirdWatch Ireland, the species has undergone a significant recovery since that period (Countryside bird survey data trend showed 2019 with highest peak since index started in 1998. Slight decline occurred from this peak in 2020 and 2021; https://c0cre470.caspio.com/dp/4bae3000b62efcaae08e4f4da8bd). Low numbers of birds observed during winter and breeding season however one sighting conducted during breeding season suggests this species is probably breeding within the site.	Yes	No	Red	Medium	Local	Local Medium
Redwing	Red listed in BoCC 2020-2026. The species was observed on several occasions during the winter surveys using the treelines and flying over.	Yes, max number observed 50	Yes	Red	Medium	Local	Local Medium
Snipe	Red listed in BoCC 2020-2026 (breeding and wintering). The population trend for Snipe in Ireland remains uncertain as they are very difficult to monitor and are almost certainly undercounted (Lewis 2019). Ireland provides vital wintering grounds for the Icelandic population that numbers around 5,700 individuals. The subject site was found to host wintering snipe however all records were during the wintering period. No breeding Snipe were found.	Yes. 9 recordings from transects. Last records was on the 18th of April (crossover month). Not found breeding on site.	No	Red	Medium	Local	Local Medium
Mallard	Amber listed in BoCC 2020-2026 (breeding and wintering). And has shown a decline in population of 11.8% in the 5 years from 2015/20016 to 2009/2010 (Lewis 2019). The Irish population is estimated at 28,230. Not observed associating with the site. No impacts expected.	No, just flew over	Yes	Amber	Low	Local	Local Low
Whimbrel	Green listed in BoCC 2020-2026. Passage migrant in autumn (August/September) and spring (April/May).	No, just flew over	No	Green	Low	Local	Local Low
White-tailed Eagle	Red listed in BoCC 2020-2026 (breeding). Mixed success in terms of breeding in Ireland since the recent reintroduction at Mountshannon and Portumna. Historically a widespread breeding species, and formerly the last wild pair bred in County Mayo in 1912. One sighting during surveys when a juvenile flew over adjacent farm to the east of the site. Did not associate with the site, no impacts expected.	No	Yes, one observation flying over the neighbouring farm	Red	High	Local	Local low

4 ASSESSMENT OF IMPACTS

Determination of impacts is derived with guidance from (Percival, 2003). Table 4-1 provides definitions for magnitude of effect. This data alongside the previously assigned significance value is imputed into Table 4-2; significance matrix to provide a final significance impact of the development per species.

Table 4-1 Determination of Magnitude of Effects.

Magnitude	Description
Very High	Total loss or very major alteration to key elements/ features of the baseline conditions such that the post development character/ composition/ attributes will be fundamentally changed and may be lost from the site altogether. Guide: < 20% of population / habitat remains
High	Major loss or major alteration to key elements/ features of the baseline (pre-development) conditions such that post development character/ composition/ attributes will be fundamentally changed. Guide: 20-80% of population/ habitat lost
Medium	Loss or alteration to one or more key elements/features of the baseline conditions such that post development character/composition/attributes of baseline will be partially changed. Guide: 5-20% of population/ habitat lost
Low	Minor shift away from baseline conditions. Change arising from the loss/alteration will be discernible but underlying character/composition/attributes of baseline condition will be similar to pre-development circumstances/patterns. Guide: 1-5% of population/ habitat lost
Negligible	Very slight change from baseline condition. Change barely distinguishable, approximating to the "no change" situation. Guide: < 1% population/ habitat lost

Table 4-2 Significance matrix

Significance		Sensitivity			
		Very high	**High**	**Medium**	**Low**
Magnitude	**Very High**	Very high	Very high	High	Medium
	High	Very high	Very high	Medium	Low
	Medium	Very high	High	Low	Very Low
	Low	Medium	Low	Low	Very Low
	Negligible	Low	Very Low	Very Low	Very Low

Table 4-3 Impacts on species of interest

Species	Potential Impacts		Duration and Magnitude of potential impact	Frequency and reversibility	Magnitude and Significance of effect
Barn Owl	Direct Habitat Loss	Barn owl were not found to roost within the site. Although some lands will be converted from improved pasture to built lands the landscaping plan will create a multitude of semi natural habitats which will provide good hunting habitat. The proposed development will also create a breeding tower allowing for the expansion of the species within the site. (TII, 2017) states Barn owl are not strongly territorial, with home ranges regularly overlapping. Barn owl nest sites have been recorded less than 350m apart. See mitigation section below for further details.	Permanent, positive	Occurs once, irreversible	The magnitude of the impact is assessed as Very Low. moderate sensitivity species + Negligible Impact = Very Low effect significance. No likely significant effects at a local level are predicted
	Displacement and barrier effect	A breeding site was found during hinterland surveys. (Goodship, 2022) states Barn owl have a low sensitivity to disturbance and suggests a 50 to 100m buffer zone during the breeding season. (Shawyer, 2011) suggests a disturbance risk of 175 for heavy construction works noting. The subject site lies over 500m from the nest site thus disturbance from the development will not impact this species. There were no sightings of barn owl during night time bat surveys within the site. Given the lack of observations of this species interacting with the site, in addition to the distance between the site and the breeding location, no displacement or barrier effects are anticipated.	Temporary and of negligible magnitude and will not result in long-term adverse effects.	Occurs during construction phase	The magnitude of the impact is assessed as Very Low. Moderate sensitivity species + Negligible Impact = Very Low effect significance. No likely significant effects at a local level are predicted
Black headed gull	Direct Habitat Loss	This species did not associate itself with the site throughout the survey period with occasional observations noted. Based on baseline data the proposed development will have a negligible impact on the local Black-headed gull population	Long-term Imperceptible neutral	Occurs once, irreversible	The magnitude of the impact is assessed as Low. Very high sensitivity species + Negligible Impact = Low effect significance. No likely significant effects at a local level are predicted
	Displacement and barrier effect	Given the lack of observations of this species interacting with the site, no displacement or barrier effects are anticipated.	Temporary and of negligible magnitude and will not result in long-term adverse effects.	Occurs during construction phase	The magnitude of the impact is assessed as Low. Very High sensitivity species + Negligible Impact = Low effect significance. No likely significant effects at a local level are predicted
Buzzard	Direct Habitat Loss	The development footprint is dominated by improved grassland and tillage with associated hedgerows and treelines, providing suitable breeding and foraging habitat for the species. The final site outline will result in the creation of woodland and planted berm with scattered trees and wildflower mix providing habitat for prey species. The total area of proposed woodland / treeline creation of 1.4km substantially mitigates the cumulative loss of 540m of treelines and hedges.	Permanent, slight negative	Occurs once, irreversible	The magnitude of impact is assessed as Very Low. Low sensitivity species + Medium Impact = Very Low effect significance. No likely significant effects at a local level are predicted
	Displacement and barrier effect	There is the potential of disturbance to breeding Buzzard because the construction activities will disturb the birds and displace them from the area. Foraging and commuting birds may temporarily avoid construction areas owing to the noise and increased activity. Based on continued bird surveys through the construction phase it is proposed to identify breeding sites and	Temporary and of low magnitude and will not result in long-term adverse effects.	Occurs during construction phase	The magnitude of impact is assessed as Very Low. Low sensitivity species + Medium Impact = Very Low effect significance. No likely significant effects at a local level are predicted

Species	Potential Impacts		Duration and Magnitude of potential impact	Frequency and reversibility	Magnitude and Significance of effect
		create a 150m buffer surrounding the zone (Goodship, 2022). Construction will be avoided here until fledging has occurred.			
Grey Heron	Direct Habitat Loss	3 sightings of heron were made of an overflying bird, not interacting with the site. This species utilises rivers and wetlands for feeding, none of which can be found on the site. The creation of two ponds and wetland will increase the favourability of the site for this species.	Permanent, positive	Occurs once, irreversible	The magnitude of impact is assessed as Low. Low sensitivity species + Low Impact = Very Low effect significance. No likely significant negative effects at a local level are predicted
	Displacement and barrier effect	There is the potential of disturbance to breeding Heron through construction phase activities. Foraging and commuting birds may temporarily avoid construction areas owing to the noise and increased activity. Based on continued bird surveys through the construction phase it is proposed to identify breeding sites and create a 200m buffer surrounding the nest. Construction will be avoided here until fledging has occurred.	Temporary and of low magnitude and will not result in long-term adverse effects.	Occurs during construction phase	The magnitude of impact is assessed as Low. Low sensitivity species + Low Impact = Very Low effect significance. No likely significant effects at a local level are predicted
Kestrel	Direct Habitat Loss	The development footprint is dominated by improved grassland and tillage with associated hedgerows and treelines, providing suitable foraging habitat for the species. Kestrel can nest in a variety of substrates such as rock ledges, old corvid stick nests, bird boxes, buildings etc. Some breeding and foraging habitat will be removed from the site however a landscape plan is in place for woodland, wildflowers and scattered trees minimising long term impacts. The total area of proposed woodland / treeline creation of 1.4km substantially mitigates the cumulative loss of 540m of treelines and hedges.	Permanent, slight negative	Occurs once, irreversible	The magnitude of impact is assessed as Low. Medium sensitivity species + Low Impact = Low effect significance. No likely significant effects at a local level are predicted
	Displacement and barrier effect	There is the potential of disturbance to breeding Buzzard because the construction activities will disturb the birds and displace them from the area. Foraging and commuting birds may temporarily avoid construction areas owing to the noise and increased activity. Based on continued bird surveys through the construction phase it is proposed to identify breeding sites and create a 150m buffer surrounding the zone (Goodship, 2022) state the species has a Low/Medium sensitivity to disturbance and recommend a breeding zone of 100 – 200m. Construction will be avoided here until fledging has occurred.	Temporary and of low magnitude and will not result in long-term adverse effects.	Occurs during construction phase	The magnitude of impact is assessed as Low. Medium sensitivity species + Low Impact = Low effect significance. No likely significant effects at a local level are predicted
Lapwing	Direct Habitat Loss	This species was not found within the site during any survey with a single sighting found during hinterland surveys 2.6km from the site. Given the lack of interaction, impacts on habitat loss are not expected.	Long-term Imperceptible neutral	Occurs once, irreversible	The magnitude of the impact is assessed as Low. Very High sensitivity species + Negligible Impact = Low effect significance. No likely significant effects at a local level are predicted

Species	Potential Impacts		Duration and Magnitude of potential impact	Frequency and reversibility	Magnitude and Significance of effect
	Displacement and barrier effect	The IECS Toolkit26 (EU, 2010) suggests that lapwing is of moderate sensitivity to disturbance. There is the potential of disturbance to wintering Lapwing located in the hinterland through construction phase disturbance. Based on continued bird surveys through the construction phase it is proposed to identify wintering sites and create a 200m buffer surrounding the zone (200m buffer is based on IECS Toolkit26.)	Temporary and of low to negligible magnitude and will not result in long-term adverse effects.	Occurs during construction phase	The magnitude of impact is assessed as Low. Very high sensitivity species + Low Impact = Low effect significance. No likely significant effects at a local level are predicted
Mallard	Direct Habitat Loss	Amber listed Mallard were observed once overflying the site and once just outside. This species utilises rivers and wetlands for feeding and roosting, none of which will be impacted by the development. The creation of two ponds and wetland will increase the favourability of the site for this species.	Permanent, positive	Occurs once, irreversible	The magnitude of impact is assessed as Low. Low sensitivity species + Low Impact = Very Low effect significance. No likely significant negative effects at a local level are predicted
	Displacement and barrier effect	There is the potential of disturbance to breeding Mallard through construction phase solar panel arrays, or because the construction activities will disturb the birds and displace them from the area. Foraging and commuting birds may temporarily avoid construction areas owing to the noise and increased activity. Based on continued bird surveys through the construction phase it is proposed to identify breeding sites and create a 200m buffer (200m buffer is based on IECS Toolkit26.) Construction will be avoided here until fledging has occurred.	Temporary and of low magnitude and will not result in long-term adverse effects.	Occurs during construction phase	The magnitude of impact is assessed as Low. Low sensitivity species + Low Impact = Very Low effect significance. No likely significant effects at a local level are predicted
Meadow Pipit	Direct Habitat Loss	The development footprint is dominated by improved grass and tillage, which provides some suitable nesting, roosting and foraging habitat for the species. 7 sightings occurred over the winter period (max 4 birds) while 4 sightings were made during the breeding season. Probably breeding on site. The proposed development will result in an approx. loss of 30% of onsite breeding grounds for this species. It should be noted that numbers of these birds are low within the site and the locality has an abundance of similar habitats.	Permanent and of medium magnitude	Occurs once, irreversible	The magnitude of the impact is assessed as Low. Medium sensitivity species + medium Impact = Low effect significance. No likely significant effects at a local level are predicted
	Displacement and barrier effect	There is the potential of disturbance to breeding meadow Pipit because the construction activities will disturb birds and displace them from the area. Based on continued bird surveys through the construction phase it is proposed to identify breeding sites and create a 50m buffer surrounding the zone (50m buffer is based on IECS Toolkit26). Works will avoid key breeding periods with works continuing after fledging.	Temporary and of negligible magnitude and will not result in long-term adverse effects.	Occurs during construction phase	The magnitude of the impact is assessed as Very Low. Medium sensitivity species + Negligible Impact = Very Low effect significance. No likely significant effects at a local level are predicted
Redwing	Direct Habitat Loss	Widespread winter visitor to Ireland from October to March from Iceland and Scandinavia. This species does not breed in Ireland. There were 15 sightings of a redwing flock within the site over the winter period. Highest numbers seen on site was 50 birds. The majority of the site will still be used as grassland post construction thus this species ability to occupy the site will remain.	Permanent and of low magnitude	Occurs once, irreversible	The magnitude of the impact is assessed as Low. Medium sensitivity species + low to medium Impact = Low effect significance. No likely significant effects at a local level are predicted

Species	Potential Impacts		Duration and Magnitude of potential impact	Frequency and reversibility	Magnitude and Significance of effect
	Displacement and barrier effect	There is the potential of disturbance to redwing because the construction activities will disturb birds and displace them from the area. This however will be temporary in nature and given the quantity of suitable alternative lands in the surrounds, it is unlikely to impact the local population	Temporary and of negligible magnitude and will not result in long-term adverse effects.	Occurs during construction phase	The magnitude of the impact is assessed as Very Low. Low sensitivity species + Negligible Impact = Very Low effect significance. No likely significant effects at a local level are predicted
Snipe	Direct Habitat Loss	The development footprint is dominated by improved grassland, which provides some suitable wintering habitat for the species particularly close to drains and in tillage. Breeding Snipe has been conducted. While three sighting of snipe occurred in March and two in April, none of these were breeding birds, rather remnant overwintering. No drumming or chirping was recorded and no sign of snipe was recorded in May. Post construction, the hydrological regime of the site will remain the same thus little long term impacts are expected.	Long term slight Negative	Occurs once, irreversible	The magnitude of the impact is assessed as Low. Medium sensitivity species + Low Impact = Low effect significance. No likely significant effects at a local level are predicted
	Displacement and barrier effect	Some displacement may occur. Pierce-Higgins et al (2012) note that snipe densities declined to the order of ca. 50% within 500 metres of turbines at wind farms during construction. Construction activities will be limited to the development footprint so direct disturbance effects will not extend beyond the works areas. There is potential for indirect disturbance to roosting (snipe from noise and visual stimuli associated with construction activities. However, given the low number of snipe that use the site in the context of the estimated national breeding population of 4,275,it is not considered to be a significant effect.	Temporary and of low to negligible magnitude and will not result in long-term adverse effects.	Occurs during construction phase	The magnitude of impact is assessed as Medium. Medium sensitivity species + Low Impact = Low effect significance. No likely significant effects at a local level are predicted
Whimbrel	Direct Habitat Loss	Whimbrel were recorded on one occasion during transect surveys flying to the east of the site. This migratory bird passes over Ireland, peaking in May and again October each year. This species utilises wetlands for feeding and can roost in a variety of terrestrial habitats. No impacts are expected.	Long-term Imperceptible neutral	Occurs once, irreversible	The magnitude of impact is assessed as Low. Low sensitivity species + Low Impact = Very Low effect significance. No likely significant negative effects at a local level are predicted
	Displacement and barrier effect	There is the potential of disturbance to migratory Whimbrel through construction phase solar panel arrays, or because the construction activities will disturb the birds and displace them from the area. Foraging and commuting birds may temporarily avoid construction areas owing to the noise and increased activity. Based on continued bird surveys through the construction phase it is proposed to identify breeding sites and create a 200m buffer (200m buffer is based on IECS Toolkit26.) Construction will be avoided here until fledging has occurred.	Temporary and of negligible magnitude and will not result in long-term adverse effects.	Occurs during construction phase	The magnitude of impact is assessed as Low. Low sensitivity species + Low Impact = Very Low effect significance. No likely significant effects at a local level are predicted
White-tailed eagle	Direct Habitat Loss	White tailed eagles breeding sites have a strong correlation to the edges and islands on large lakes. A juvenile white tailed eagle was recorded on one occasion flying over the neighbouring farm to the south-east. There is no breeding habitat for this bird on or surrounding the site. Although mainly	Long-term Imperceptible neutral	Occurs once, irreversible	The magnitude of impact is assessed as Low. High sensitivity species + Low Impact = Low effect significance. No likely significant negative effects at a local level are predicted

Species	Potential Impacts		Duration and Magnitude of potential impact	Frequency and reversibility	Magnitude and Significance of effect
		persist on a fish and waterfowl diet this bird will also scavenge dead animals. Farms can often have dead animals particularly in Spring and White-tailed eagles have ben known to take advantage of this food source in east Galway. The proposed development will not result in any loss of habitat for this species.			
	Displacement and barrier effect	Foraging birds may temporarily avoid construction areas owing to the noise and increased activity.	Temporary and of low magnitude and will not result in long-term adverse effects.	Occurs during construction phase	The magnitude of impact is assessed as Low. High sensitivity species + Low Impact = Low effect significance. No likely significant effects at a local level are predicted

5 Mitigation & Enhancement measures

5.1.1 Monitoring

An Ornithologist ECoW will be employed during the construction phase to micromanage construction locations to avoid disturbance on key species. Whilst halting the construction to times outside the wintering period was considered the scale of works was not considered impactful enough to negatively impact wintering birds both within the site and in the surrounds. Rather an ECoW will be involved in the construction and limit construction in areas based on when they are of value to birds. The monitoring section above outlines how bird surveys will continue during the construction phase and based on these results micro exclusion zones can be put in place. Table 4-3 goes through potential buffer zones and timings when works may need to be halted here. This method based on co-operation between overseeing ornithologist, site manager and NPWS / Local Authority representative will allow works to continue throughout the year whilst also avoiding disturbances to key species at vulnerable times.

5.1.2 Planting of native woodland

Planting of native tree species in linear features as well as woodland patches will provide ecological corridors, nest sites and will compensate for the loss of hedgerows as part of the development.

- Native providence tree species to be sourced from nurseries such as "Wild Oaks nursery".

5.1.3 Sustainable Drainage Systems – ponds for wildfowl

Sustainable Drainage Systems (SUDS) are widely used to reduce the impact of urban runoff on the aquatic environment. They can also provide new still water habitats and water-based recreational facilities. As part of the design plan two attenuation pond on site will be designed to enhance biodiversity value of the provision of new wetland habitats. These new habitats will provide a breeding site for waterbirds such as Mallard, as well as a roost site for wintering waterbirds such as Teal, Widgeon or Lapwing.

The attenuation ponds will be created with gentle sloping side slopes that cover a large area, planted with a variety of suitable native wetland species.

Landscaping around SUDS ponds can add pollutants to the system. To prevent this:

- Do not use nutrient rich topsoil in the catchment area of the SUDS pond and especially not in the pond margins.
- During the SUDS establishment phase, runoff from bare soils should be minimised. For example: (i) green cover on slopes should be rapidly established (ii) base-ofslope trenches should be used to intercept runoff and sediments, (iii) construction should be timed to avoid autumn and winter when high runoff rates are to be expected.
- Planting schemes which require biocide or fertiliser treatment should be avoided
- Tall emergent plants will be planted in most SUDS schemes to take-up pollutants. However, much planting of marginal, floating-leaved and aquatic plant species in SUDS ponds is unnecessary in terms of either function or visual affect, and appears

to be done merely to help the ponds 'colonise rapidly'. Natural colonisation is valuable because:

- The new pond stage is ecologically valuable in its own right in that it supports species which are not seen at later stages of colonisation.
- Planting also fills up space in ponds that could otherwise be exploited by self-colonising local species, and in doing so reduces the potential ecological value of the pond.

Contractors should have specific instructions to ensure that non-native aquatic or marginal are not included in planting schemes. SUDS schemes are part of the natural drainage system of a catchment, all planting should be regarded as de facto release to the wild. This means that there should be a general presumption against all forms of ornamental planting of aquatic and wetland plants. In assessing SUDS effectiveness, each non-native species occurring represents a negative impact on the environment.

Focus particularly on the more inconspicuous, but ecologically valuable, aquatic grasses, especially creeping bent (Agrostis stolonifera) and the sweetgrasses (Glyceria species) which provide good invertebrate habitats.

Ensure that an experienced botanist assesses planting schemes before projects are signed-off to check what has actually been planted (as opposed to specified). Check again for the presence of invasive species after one year

5.1.4 Purpose built roost house – barn owl & bat roost

Sheds will be demolished as part of the development. The sheds are used as breeding site for Barn swallow, House martin and Starling. Although no Barn Owls were seen on site, they are breeding within 1km of the site, therefore a purpose built building will be erected on site which will provide a suitable nest site for Barn Owl, kestrel and other roosting birds. The "house" will also contain an area suitable for bat species found on site and follow methodologies as provided at https://www.barnowltrust.org.uk/barn-owl-nestbox/wildlife-tower

- The barn owl tower will consist of a 2x2m block and faced in stone with a minimum hight of 4.5m and an upper and lower internal space.
- The A-frame roof should have an overhang to the east with the barn owl entrance located at a height of 3.5m.
- The west faced wall should provide a shallow open fronted cavity suitable for nesting kestrel (male and female recorded in the surrounds).
- South faced wall should have numerous cavities in the mortar for invertebrates and nesting passerines.
- All walls will have sparrow sized opening for hole nesting bird species
- Bats: the lower half of the building is a hibernation area for bats, designed to be permanently dark, cool and damp with a simple earth floor. A variety of bat species can access this through a wide horizontal slot situated just below the level of an internal floor, which separates the top half of the building from the hibernation area.

Figure 5-1 Sample roost house

Figure 5-2 Barn Owl feature in roost house

The location has been carefully selected to be in a area not frequented by personnel working on the site post construction. The area will also be a dark zone, with no artificial lighting.

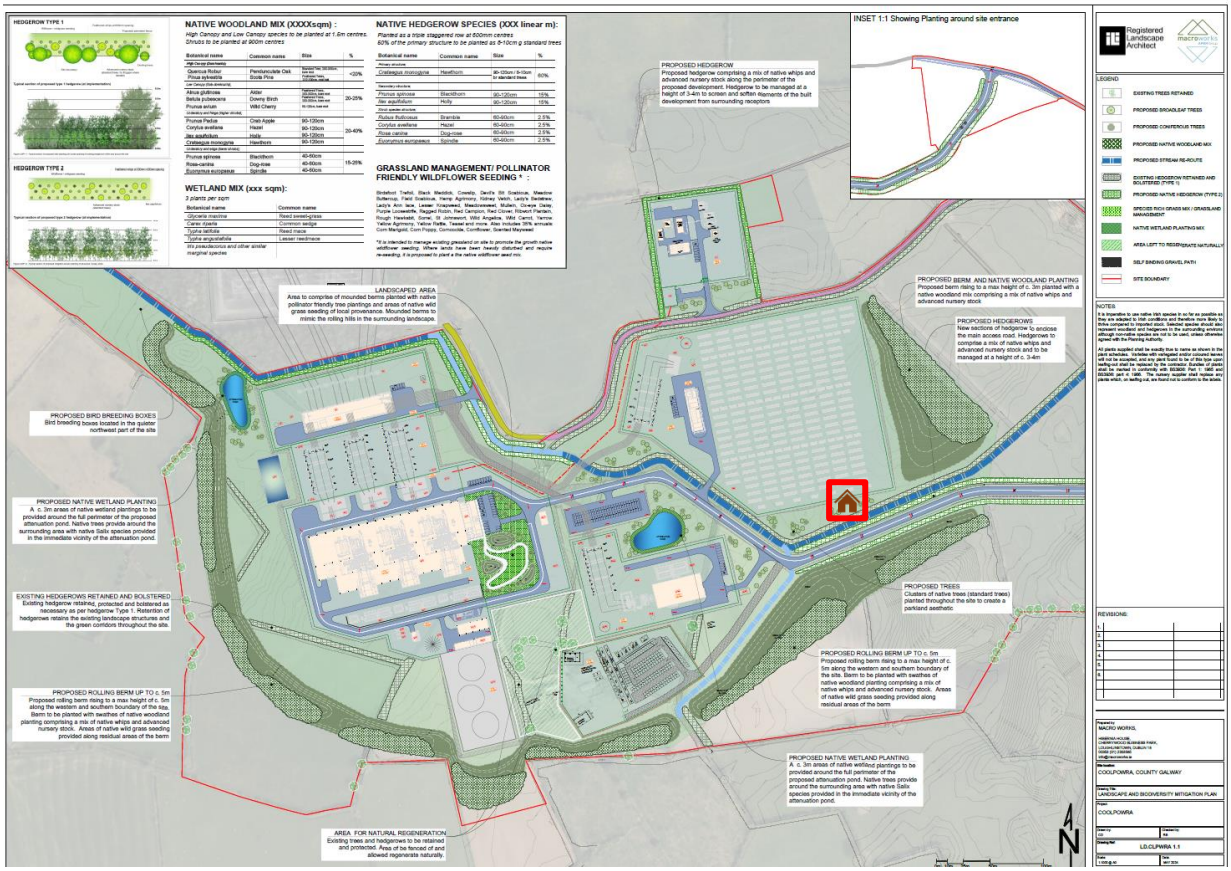

Figure 5-3 Purposed location of roost house

5.1.5 Barn swallow, house martin, swift boxes nest boxes

Barn swallow (added internally to suitable shed building), house martin and swift box nests will be added to suitable proposed buildings within the site.

6 Residual Impacts after Mitigation

Residual impacts are those that occur after the mitigation measures have taken effect. The mitigation measures outlined in section 5 will minimise impacts associated with the construction phase of the proposed development.

No significant indirect impacts on the habitats associated with rare and protected birds found utilising the site in the wintering and breeding seasons as long as best practice measures such as those outlined in section 5 are implemented fully.

As such residual Impacts on bird species will be low.

7 Conclusion

This report provides details from bird surveys conducted at Coolpowra, Co. Galway.

14 no. species of birds of interest were observed during fieldwork. 6 no. of these were identified as being red-listed; Barn owl, Kestrel, Meadow Pipit, Redwing and White tailed eagle. Of these species the value of the subject site was identified as local medium for; Barn Owl, Kestrel, Meadow pipit, redwing and snipe.

Lapwing and Black-headed gull; conservation objectives of the middle Shannon Callows SPA were observed either flying over or in the hinterland. These were not interacting with the site. A juvenile White-tailed eagle was also observed. Impacts on these species will be negligible.

Mitigation measures proposed will reduce the impact on all bird species while enhancement measures should result in a net overall benefit for the local bird population. The proposed development will not have a significant impact on any bird species on a local or county basis.

8 Figures

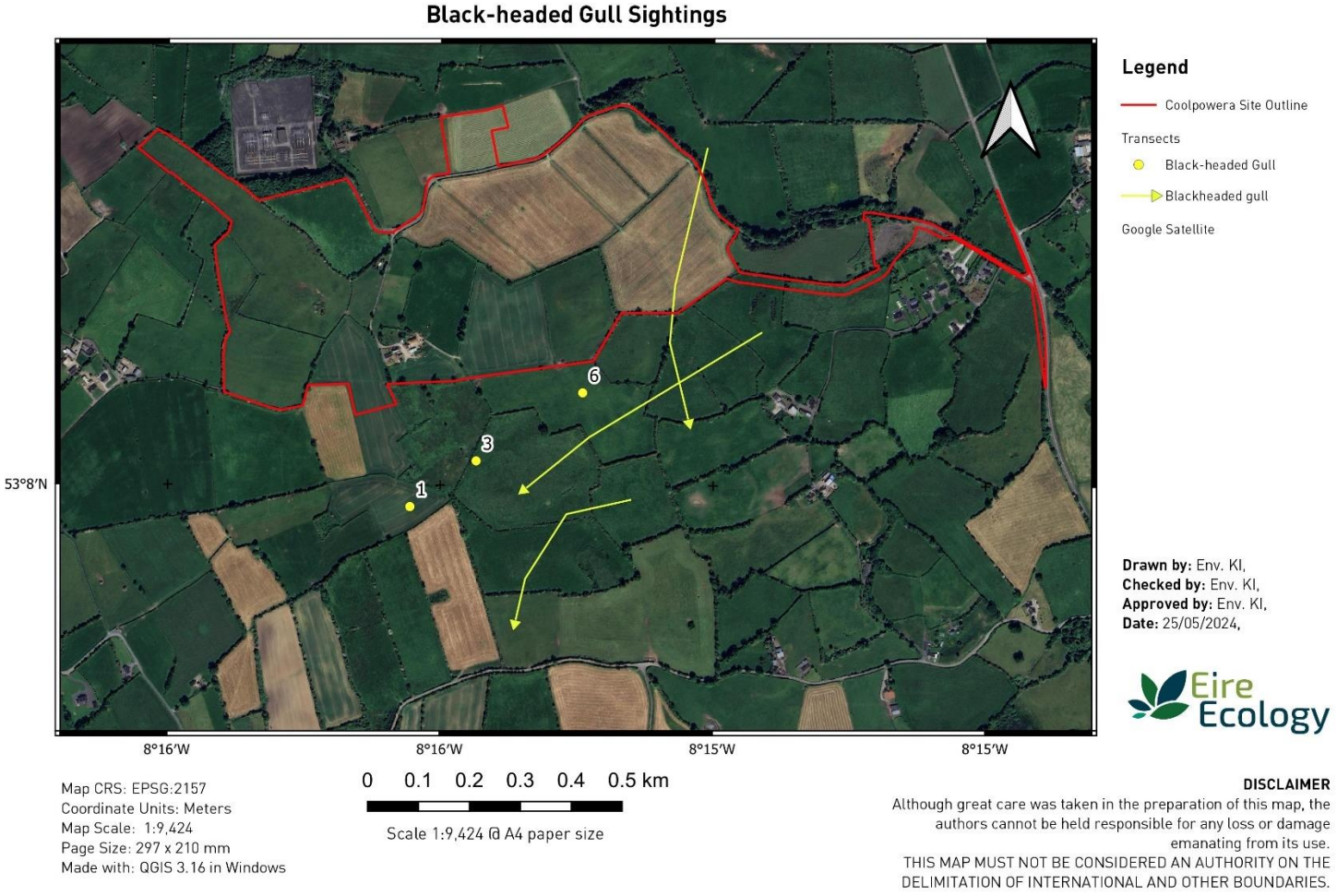

Figure 8-1 Black-headed gull sightings

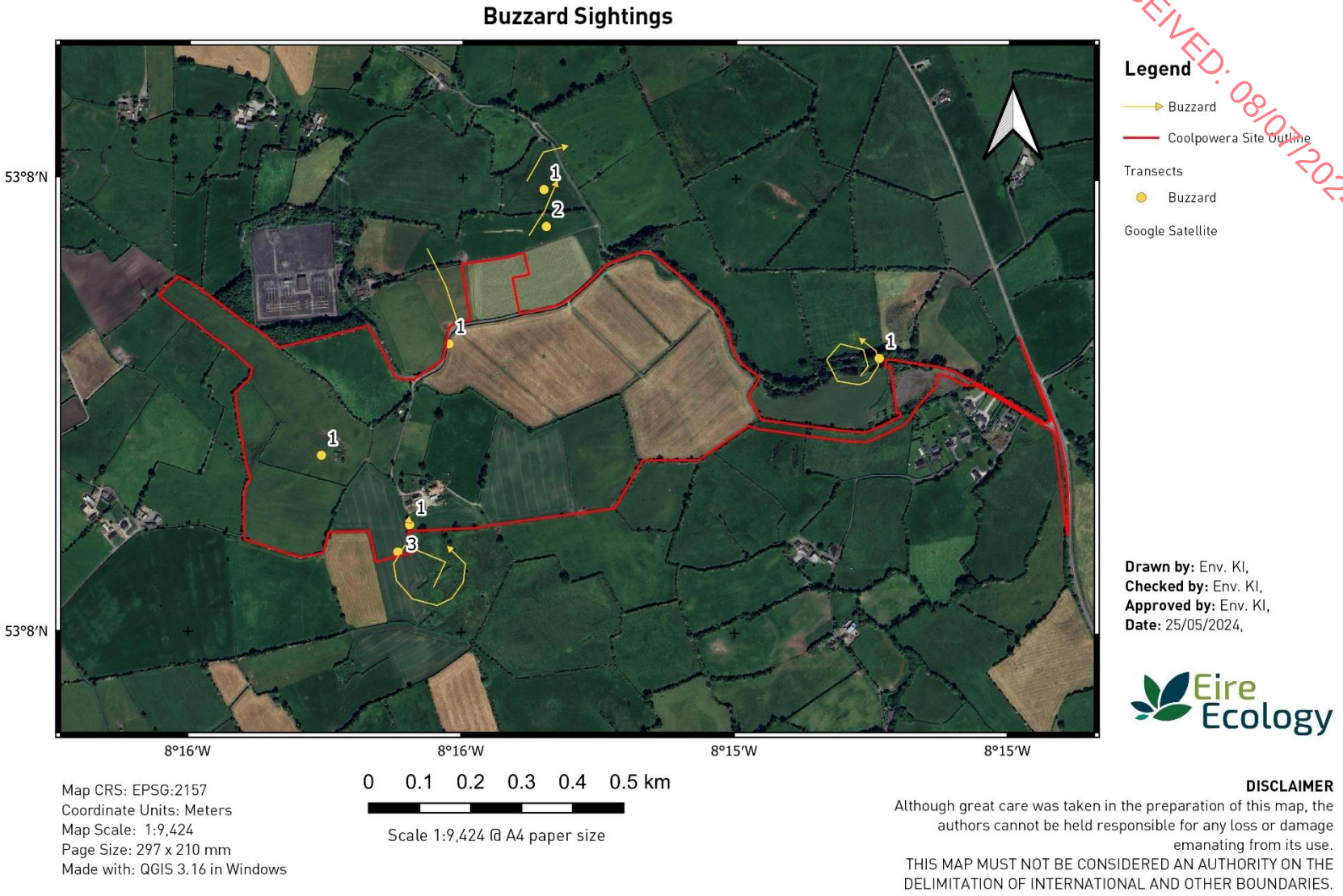

Figure 8-2: Buzzard sightings

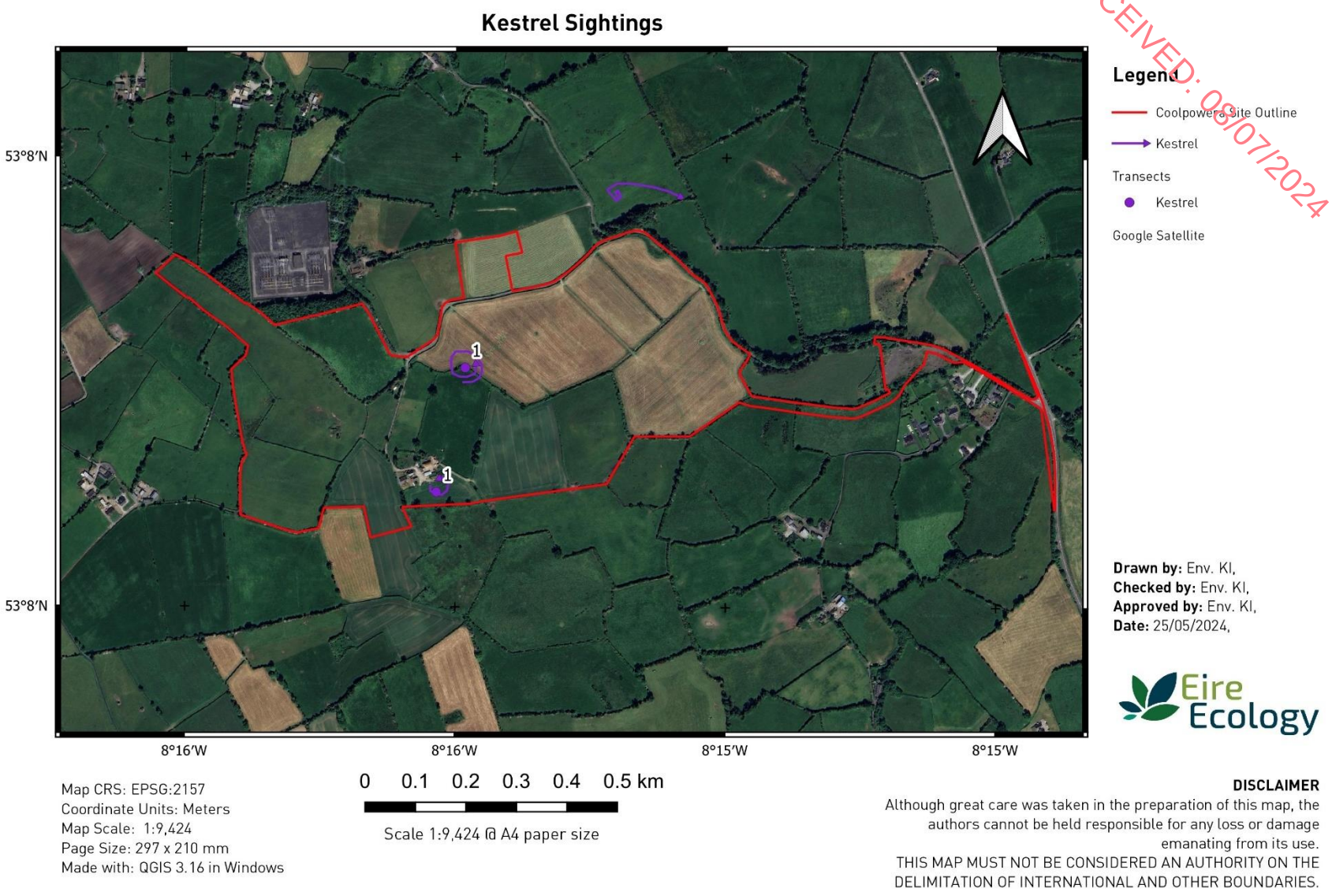

Figure 8-3: Kestrel Sightings

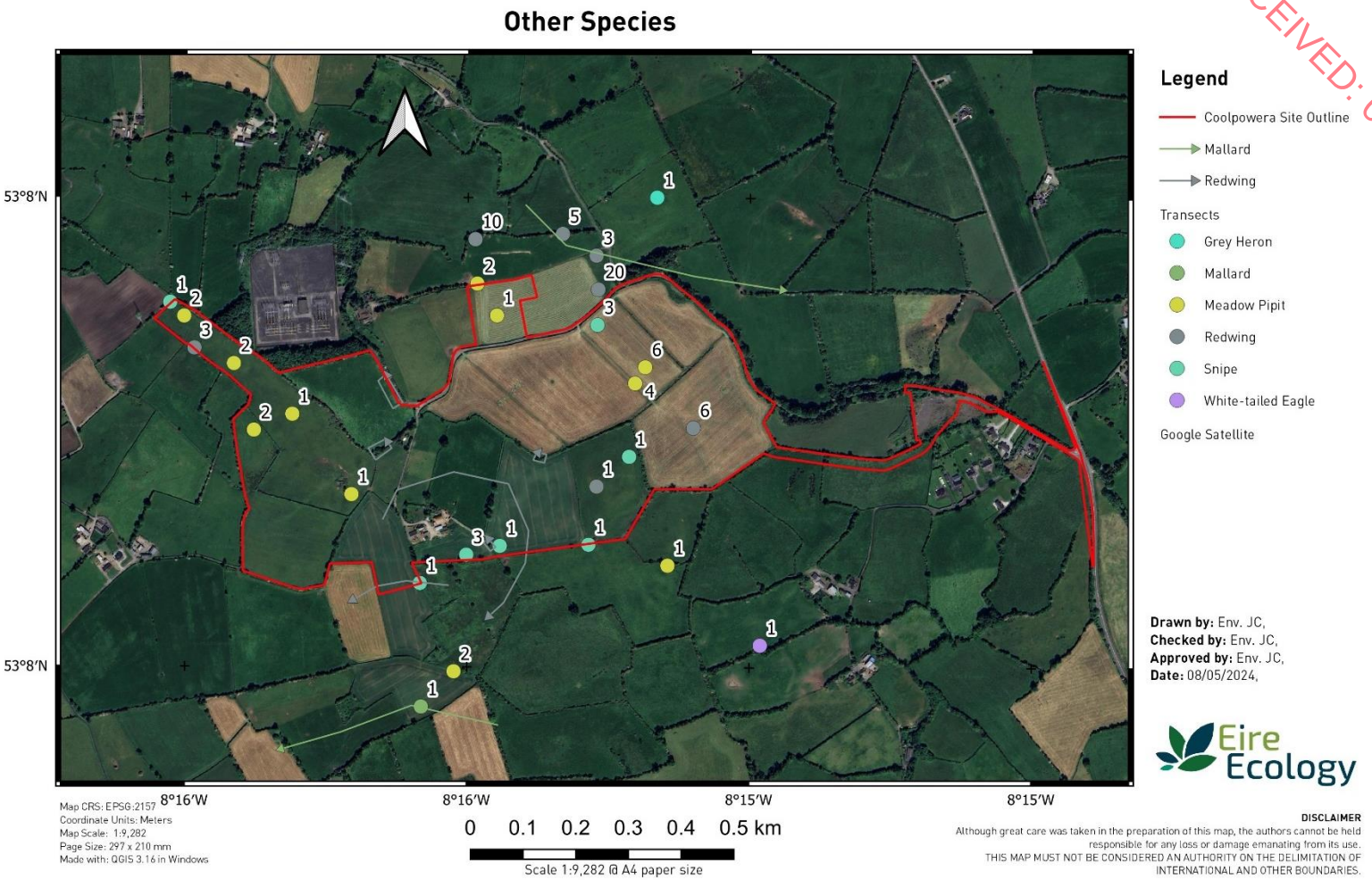

Figure 8-4: Other sightings

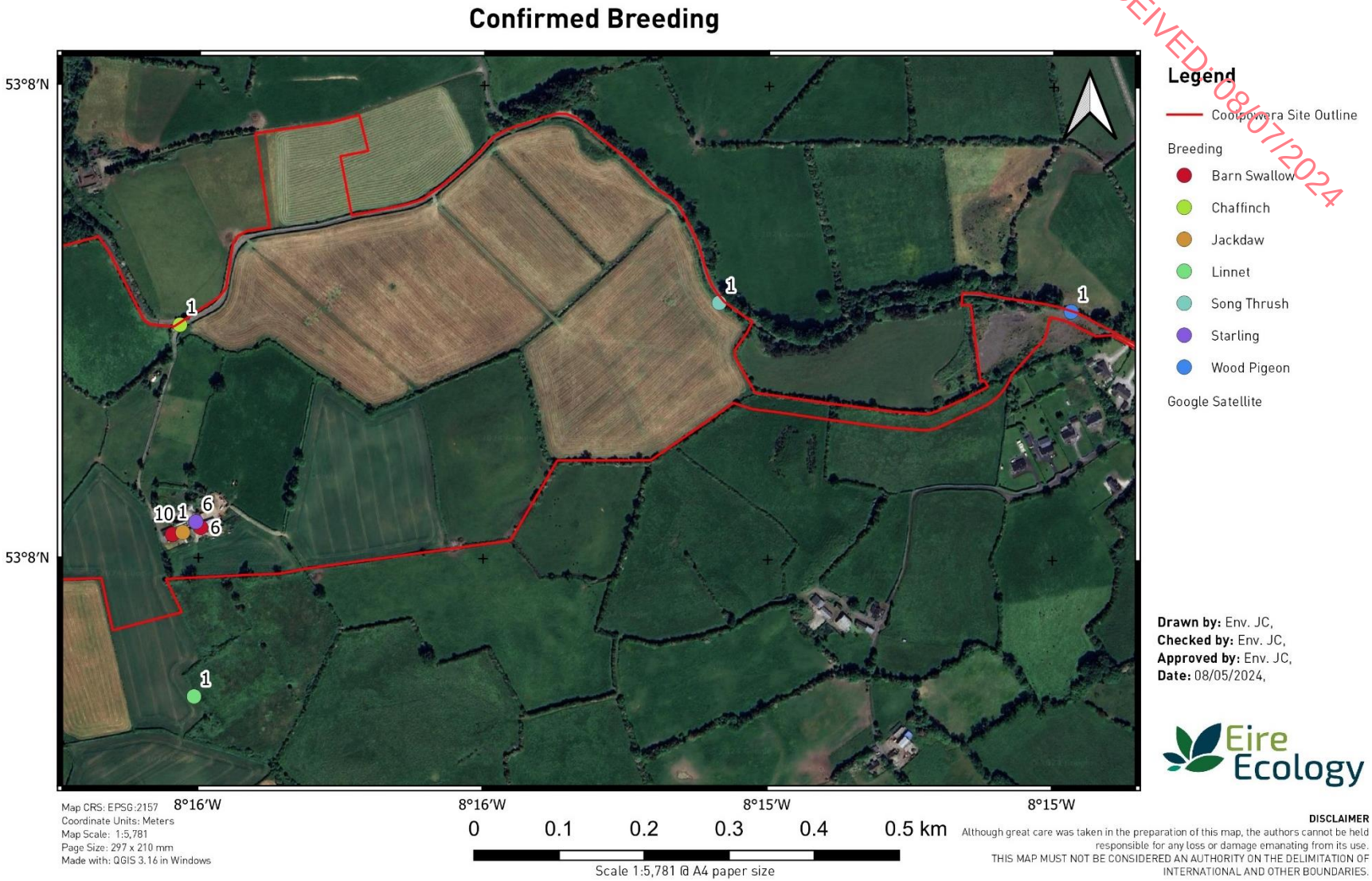

Figure 8-5: Confirmed Breeding

9 References

Balmer, D.E., Gillings, S., Caffrey, B. J., Swann, R.L., Downie, I.S. & Fuller, R.J. (2013) Bird Atlas 2007-11: the breeding and wintering atlas of Britain and Ireland. BTO Books, Thetford.

Bibby, C.J., Burgess, N.D. & Hill, D.A. & Mustoe, S. (2000) Bird Census Techniques (Second edition). Academic Press, London.

Bottalico, P., Spoglianti, D., Bertetti, C. & Falossi, M.(2015) Effect of Noise Generated by Construction Sites on Birds. Department of Communicative Sciences and Disorders, Michigan State University, East Lansing (MI), USA Studio Progetto Ambiente S.r.l., Torino, Italy.

(BTO), B. T. (2021, 7 5). *https://www.bto.org*. Retrieved from Understanding birds- Bird Facts- Snipe.

(RSPB)., R. S. (2021). *https://rspb.org.uk*. Retrieved from Birds A-Z. .

BTO. (2013). *Woodcock survey resources.* Retrieved from British Trust for Ornithology: chrome-extension://oemmndcbldboiebfnladdacbdfmadadm/https://www.bto.org/sites/default/files/u203/downloads/Annual%20breeding%20woodcock%20monitoring%20instructions%20Final.pdf

EU. (2010). *Waterbird Disturbance & Mitigation Toolkit.* Retrieved from https://www.tide-toolbox.eu/tidetools/waterbird_disturbance_mitigation_toolkit/

Fossitt, J. (2000). *A Guide to Habitats in Ireland.* Kilkenny: The Heritage Council.

Goodship, N. a. (2022). *Disturbance Distances Review: An updated literature review of disturbance distances of selected bird species.* NatureScot Research Report 1283.

Hardey, J. C. (2013). *Raptors: a field guide to survey and monitoring.* TSO.

Harrison, C. L. (2016). *Evidence review of the impact of solar farmson birds, bats and general ecology.* Natural England.

Hoodless, A. B. (2006). Effects of weather and timing on counts of breeding snipe Gallinago gallinago. *Birdstudy 53*, pp205-212.

Hoodless, A., Lang, D., Aebischer, N., & Fuller, R. &. (2009). Densities and population estimates of breeding Eurasian Woodcock Scolopax rusticola in Britain in 2003.

Horvath, G. &. (2010). Reducing the Maladaptive Attractiveness of Solar Panels to Polarotactic Insects. *Conservation biology : the journal of the Society for Conservation Biology.* , 1523-1739.

John Lusby, I. C.-B. (2017). Breeding ecology and habitat selection of Merlin Falco columbarius in forested landscapes. *Bird Study, 64:4,*, 445-454.

Lewis, L. J. (2017). Waterbird populations on non-estuarine coasts of Ireland: results of the 2015/16 Non-Estuarine Coastal Waterbird Survey (NEWS-III). *Irish Birds 10*, 511-522.

Lewis, L. J. (2019). Irish Wetland Bird Survey: Waterbird Status and Distribution 2009/10-2015/16. *rish Wildlife Manuals, No. 106. National Parks and Wildlife Service, Department of Culture,Heritage and the Gaeltacht, Ireland.*

Lewis, L. J. (2019). Countryside Bird Survey: Status and trends of common and widespread breeding birds 1998-2016. *Irish Wildlife Manuals, No. 115. National Parks and Wildlife Service, Department of Culture,Heritage and the Gaeltacht.*

Lewis, L. J. (2019). *Irish Wetland Bird Survey: Waterbird Status and Distribution 2009/10-2015/16.* Dublin: NPWS, Department of Culture, Heritage and the Gaeltacht.

MKO. (2020). *Appendix 7.8 – Lapwing, Waterfowl and Wader Habitat Enhancement Plan Derrinlough Wind Farm.* Galway: MKO .

Percival. (2003). *BIRDS AND WIND FARMS IN IRELAND:A REVIEW OF POTENTIAL ISSUES AND IMPACT ASSESSMENT.* NPWS.

Shawyer, C. R. (2011). *Barn Owl Tyto alba Survey Methodology and Techniques for use in Ecological .* Winchester: IEEM.

Smallwood, K. (2022). Utility-scale solar impacts to volant wildlife. *The journal of Wildlife Management*.

Smallwood, K. S. (2010). Novel Scavenger Removal Trials Increase Wind Turbine-Caused Avian Fatality Estimates. *The Journal of Wildlife Management, Vol 74.*, 1089-1097.

Smith, O. a. (1992). Method for censusing lowland breeding wader population. In *Bird monitoring methods* (pp. pp396-396.).

SNH. (2017). *Recommended bird survey methods to inform impact assessment of onshore wind farms.* Nature.scot.

SNH. (2021). *Bats and Onshore Wind Turbines – Survey, Assessment and Mitigation.*

TII. (2017). *Barn Owl Surveying Standards for National Road Projects.* Dublin.

Walston, L. &. (2016). A preliminary assessment of avian mortality at utility-scale solar energy facilities in the United States. *Renewable Energy Volume 92*, Pages 405-414.

10 APPENDIX 1 – Tables and Figures

Table 10-1 Survey dates and environmental data

Date	Sunset / sunrise	Start	Finish	Cloud	Wind speed (F)	Wind direction	Visibility	Precipitation	Survey method
09/01/2024	08:45	09:10	12:15	3	1	W	2	1	Transects
09/01/2024	16:37	12:30	15:30	3	1	W	1	0	Hinterland
25/01/2024	08:29	07:30	10:30	3	1	W	1	0	VP - Dawn survey
25/01/2024	17:04	11:00	14:00	3	1	W	1	0	VP 2
26/02/2024	07:29	08:20	12:00	3	1	W	1	0	Transects
26/02/2024	18:06	12:05	15:00	3	1	W	1	0	Hinterland
28/03/2024	06:16	09:40	12:55	3	1	W	1	0	Transects
28/03/2024	19:02	13:00	15:00	3	1	W	1	0	Hinterland
19/04/2024	06:25	08:30	12:10	3	1	W	1	0	Transects
19/04/2024	20:42	12:15	14:15	3	1	W	1	0	Hinterland
01/05/2024	21:03	20:30	22:30	3	1	W	1	0	Barn Owl survey
07/05/2024	21:13	15:15	21:45	1	1	SW	1	0	Dusk VP - Raptor
10/05/2024	05:43	05:15	11:15	1	0	N/A	1	0	Dawn Breeding transects
23/05/2024	05:24	06:00	11:00	1	2	W	1	0	Dawn Breeding transects

Table 10-2: Weather legend

Rain		Visibility		Cloud Cover	
0	None	1	Good (>2km)	1	0-32
1	Drizzle Mist	2	Moderate (1-2km)	2	33-65
2	Light Showers	3	Poor (<1km)	3	66-100
3	Heavy Showers	4	Limited (<500m)		
4	Heavy Rain	5	N visibility		

Table 10-3 Summary of surveys conducted

Visit No	Date	Survey type	Location	Start Time	End Time	Details	Sunset / sunrise
1	09/01/2024	Transects	-	09:10	12:15	4 Buzzard and 1 Kestrel observed. High levels of Field fare on site and other birds include 27 Skylark.	08:45
1	09/01/2024	Hinterland	-	12:30	15:30	Focused on bog areas, open fields and wetland areas in the surrounding vicinity of the site. 30 Lapwing in GA1 field close to Portumna town, also Buzzard and Black headed gull. No other birds of interest seen.	16:37
2	25/01/2024	VP - Dawn survey	582102 / 708993	07:30	10:30	No species of note recorded. Numerous Redwing on site (red listed) .	08:29
2	25/01/2024	VP 2	582102 / 708993	11:00	14:00	No species of note recorded. Flocks of Redwing flying over.	17:04
3	26/02/2024	Transects	-	08:20	12:00	1 Buzzard on site and Redwing. 3 Black-headed gulls flew over. No other birds of interest recorded	07:29
3	26/02/2024	Hinterland	-	12:05	15:00	Checked surrounding habitats, mainly to the south, SE and NE. Teal and Mallard found flooded areas of fields south of site.	18:06
4	28/03/2024	Transects	-	09:40	12:55	Buzzard and four Snipe (possibly still wintering) seen on site	06:16
4	28/03/2024	Hinterland	-	13:00	15:00	Checked areas within the SPA closest to the site. One water rail observed flying. No other birds of interest seen.	19:02
5	19/04/2024	Transects	-	08:30	12:10	1 black headed gull flew high over site, 5 buzzard, 1 male Kestrel huntung, 4 snipe seen on site. Juvenile White tailed eagle seen flying over neighbouring farm.	06:25
5	19/04/2024	Hinterland	-	12:15	14:15	Checked all areas where previous birds of interest were found. Checked fields north of site, to see where White tailed eagle landed but could not find it. No birds of interest seen.	20:42
6	01/05/2024	Barn Owl	581807 / 708197	20:30	22:30	Dusk watch of reported barn owl nest site. Barn Owl observed at derelict house and shed. Only observed at a distance to avoid disturbance	21:03

Visit No	Date	Survey type	Location	Start Time	End Time	Details	Sunset / sunrise
7	07/05/2024	Raptor VP	582096 / 708990	15:15	18:15	Dedicated raptor VP following on fron the white tailed eagle observed within buffer zone of site on 19/04/24. One Buzzard observed near site	05:48
7	07/05/2024	Raptor dusk VP	582596 / 709430	18:45	21:45	One Kestrel observed hunting north of site	21:13
8	10/05/2024	Transects	-	05:15	11:15	Transects starting at dawn. Ten Whimbrel and six black headed Gull flew over site but did not associate with site. No Snipe on site and no other birds of note recorded	05:43
9	23/05/2024	Transects	-	06:00	11:00	Transects conducted focusing on sections of site to the east where a new road entrance is required. Single sighting of flying Buzzard, two sightings of Meadow pipit one of which was probably breeding.	05:24

Table 10-4: Vantage Point Results: Target Species

Date	VP	Season	Species Name	No. of Birds	Time of flight	Duration of flight (s)	Habitat Code	Activity	Inside / outside of site
25/01/2024	1	winter	Redwing	20	07:40	not recorded	BC3	Flying	O
25/01/2024	1	winter	Redwing	25	08:30	not recorded	BC3	Flying	I
25/01/2024	1	winter	Redwing	5	09:11	not recorded	WL1	Flying, then perched in tree	I
25/01/2024	1	winter	Redwing	40	09:22	not recorded	GA1	Flying	I
25/01/2024	1	winter	Redwing	5	09:23	not recorded	WL1	Perched in tree	I
25/01/2024	1	winter	Redwing	10	09:24	not recorded	WL1	Perched in tree	I
25/01/2024	1	winter	Redwing	30	09:37	not recorded	WL2	Perched in tree	I

Date	VP	Season	Species Name	No. of Birds	Time of flight	Duration of flight (s)	Habitat Code	Activity	Inside / outside of site
25/01/2024	2	winter	Goldcrest	1	not recorded	not recorded	WL1	in hedgerow	I
25/01/2024	2	winter	Redwing	50	11:00	not recorded	GA1	Flying	I
07/05/2024	1	breeding	Mallard	1	17:15	50 seconds	GA1	flew over N / NW corner of site	I
07/05/2024	1	breeding	Buzzard	1	17:24	60 seconds	GA1	soaring high, to the north of site (not on site)	O
07/05/2024	1	breeding	Willow Warbler	1	not recorded	not recorded	WL1	in hedgerow	I
07/05/2024	1	breeding	Barn Swallow	5	not recorded	not recorded	BL3	nesting in sheds by the farmhouse	I
07/05/2024	2	breeding	Kestrel	1	18:30	180 seconds	GA1	Male, to north of site flying, then perched and flew off after 3 mins	O
07/05/2024	2	breeding	Grey Heron	2	19:11	180 seconds	GA1	flew east to west over site	I
07/05/2024	2	breeding	Grey Heron	1	19:14	50 seconds	GA1	one flew back west to east	I
07/05/2024	2	breeding	Willow Warbler	1	not recorded	not recorded	WL1	in hedgerow	I

Table 10-5: Vantage Point Result Non-Target

Date:	VP No.	Species	Est no. individuals	Notes
25/01/2024	1	Robin	1	
25/01/2024	1	Blackbird	4	
25/01/2024	1	Song Thrush	1	
25/01/2024	1	Magpie	4	
25/01/2024	1	Rook	2	
25/01/2024	1	Jackdaw	8	Numerous on site
25/01/2024	1	Chaffinch	8	
25/01/2024	1	Mistle thrush	1	
25/01/2024	1	Sky Lark	14	
25/01/2024	1	Long-tailed Tit	5	
25/01/2024	1	Starling	30	Flocks on field
25/01/2024	1	Pheasant	1	
25/01/2024	1	Wood Pigeon	5	
25/01/2024	1	Raven	2	
25/01/2024	1	Dunnock	1	
25/01/2024	1	Winter Wren	1	
25/01/2024	1	Rook	2	
25/01/2024	2	Rook	15	
25/01/2024	2	Pheasant	1	
25/01/2024	2	Great Tit	1	
25/01/2024	2	Wood Pigeon	2	
25/01/2024	2	Starling	20	
25/01/2024	2	Robin	1	
25/01/2024	2	Chaffinch	6	
25/01/2024	2	Jackdaw	3	
25/01/2024	2	Hooded Crow	1	
25/01/2024	2	Song Thrush	1	
25/01/2024	2	Pied Wagtail	1	
07/05/2024	1	Hooded Crow	3	
07/05/2024	1	Pheasant	1	
07/05/2024	1	Blackbird	2	
07/05/2024	1	Chiffchaff	1	
07/05/2024	1	Jackdaw	5	
07/05/2024	1	Winter Wren	1	
07/05/2024	1	Robin	1	
07/05/2024	1	Dunnock	1	
07/05/2024	1	Wood Pigeon	2	
07/05/2024	1	Starling	2	
07/05/2024	1	Blackcap	1	
07/05/2024	1	Raven	1	
07/05/2024	1	Magpie	2	
07/05/2024	2	Raven	1	
07/05/2024	2	Robin	1	
07/05/2024	2	Winter Wren	1	
07/05/2024	2	Song Thrush	1	
07/05/2024	2	Magpie	1	
07/05/2024	2	Blackbird	1	
07/05/2024	2	Wood Pigeon	1	
07/05/2024	2	Mistle Thrush	1	

Table 10-6: Barn Owl results

Obs No.	Date	time	Notes
1	01/05/24	21:35	Barn Owl flew out of shed into upstairs window of house
2	01/05/24	22:07	Flew over van towards the house
3	01/05/24	22:09	Made sound

Table 10-7 Transects Results

T. no.	Date	Start time	Finish	Species	No's.	Observations	Breeding Code if applicable	Lat	Lon
1	09/01/2024	09:00	09:39	Blackbird	2		N/A	53.133704	-8.261852
1	09/01/2024	09:00	09:39	Buzzard	1	Flew into tree	N/A	53.13308	-8.264384
1	09/01/2024	09:00	09:39	Buzzard	2	In field, flew off on disturbance	N/A	53.135154	-8.261547
1	09/01/2024	09:00	09:39	Fieldfare	43		N/A	53.13407	-8.261916
1	09/01/2024	09:00	09:39	Fieldfare	2	Feeding	N/A	53.133809	-8.259621
1	09/01/2024	09:00	09:39	Hooded Crow	7		N/A	53.134938	-8.263042
1	09/01/2024	09:00	09:39	House Sparrow	1		N/A	53.134939	-8.260999
1	09/01/2024	09:00	09:39	Kestrel	1	Female	N/A	53.132256	-8.263715
1	09/01/2024	09:00	09:39	Magpie	3		N/A	53.134949	-8.262459
1	09/01/2024	09:00	09:39	Meadow Pipit	2	Flying over	N/A	53.134535	-8.263738
1	09/01/2024	09:00	09:39	Meadow Pipit	1	Flying	N/A	53.133992	-8.263179
1	09/01/2024	09:00	09:39	Pied Wagtail	3		N/A	53.135052	-8.260672
2	09/01/2024	09:50	10:49	Blackbird	2		N/A	53.133515	-8.26295
2	09/01/2024	09:50	10:49	Fieldfare	40		N/A	53.133139	-8.263339
2	09/01/2024	09:50	10:49	Meadow Pipit	4	Flying over	N/A	53.132842	-8.259256
2	09/01/2024	09:50	10:49	Pied Wagtail	2		N/A	53.133979	-8.260615
2	09/01/2024	09:50	10:49	Raven	5		N/A	53.133619	-8.262398
2	09/01/2024	09:50	10:49	Snipe	3	Flew up when disturbed by observer	N/A	53.133836	-8.260327
2	09/01/2024	09:50	10:49	Starling	7		N/A	53.132731	-8.264564
2	09/01/2024	09:50	10:49	Wood Pigeon	3		N/A	53.130959	-8.257427
3	09/01/2024	10:50	11:38	Blackbird	1		N/A	53.133438	-8.270364
3	09/01/2024	10:50	11:38	Chaffinch	1		N/A	53.13374	-8.271119
3	09/01/2024	10:50	11:38	Fieldfare	20	In hedge outside of site	N/A	53.134741	-8.274939
3	09/01/2024	10:50	11:38	Great Tit	1		N/A	53.133866	-8.271418
3	09/01/2024	10:50	11:38	Hooded Crow	2	Flying	N/A	53.133231	-8.270664
3	09/01/2024	10:50	11:38	Jackdaw	2		N/A	53.133089	-8.269615
3	09/01/2024	10:50	11:38	Jackdaw	5	Flying over	N/A	53.133563	-8.271419
3	09/01/2024	10:50	11:38	Magpie	1		N/A	53.127835	-8.264574
3	09/01/2024	10:50	11:38	Meadow Pipit	1	Flying over	N/A	53.132306	-8.268971
3	09/01/2024	10:50	11:38	Pheasant	1	Male	N/A	53.129188	-8.265381

T. no.	Date	Start time	Finish	Species	No's.	Observations	Breeding Code if applicable	Lat	Lon
3	09/01/2024	10:50	11:38	Robin	1		N/A	53.133529	-8.270575
3	09/01/2024	10:50	11:38	Robin	1		N/A	53.132466	-8.265291
3	09/01/2024	10:50	11:38	Sky Lark	27		N/A	53.128443	-8.265768
3	09/01/2024	10:50	11:38	Snipe	1	Flew out of drain	N/A	53.134207	-8.272444
3	09/01/2024	10:50	11:38	Starling	3		N/A	53.130068	-8.266285
3	09/01/2024	10:50	11:38	Winter Wren	1		N/A	53.133115	-8.269796
3	09/01/2024	10:50	11:38	Wood Pigeon	2		N/A	53.133429	-8.270087
1	26/02/2024	08:20	08:50	Blackbird	1		N/A	53.13516	-8.260294
1	26/02/2024	08:20	08:50	Buzzard	1	Being chased by hc	N/A	53.135804	-8.261621
1	26/02/2024	08:20	08:50	Chaffinch	1		N/A	53.135206	-8.260793
1	26/02/2024	08:20	08:50	Fieldfare	12		N/A	53.135002	-8.264009
1	26/02/2024	08:20	08:50	Fieldfare	5		N/A	53.134169	-8.260509
1	26/02/2024	08:20	08:50	Fieldfare	4		N/A	53.134548	-8.261236
1	26/02/2024	08:20	08:50	Great Tit	1		N/A	53.134948	-8.260101
1	26/02/2024	08:20	08:50	Hooded Crow	1		N/A	53.1356	-8.262003
1	26/02/2024	08:20	08:50	Jackdaw	3		N/A	53.135293	-8.262915
1	26/02/2024	08:20	08:50	Redwing	10		N/A	53.135292	-8.263793
1	26/02/2024	08:20	08:50	Redwing	20	Singing in trees	N/A	53.134442	-8.260307
1	26/02/2024	08:20	08:50	Redwing	5		N/A	53.135387	-8.261317
1	26/02/2024	08:20	08:50	Redwing	3		N/A	53.135019	-8.260361
1	26/02/2024	08:20	08:50	Winter Wren	1		N/A	53.135348	-8.260547
1	26/02/2024	08:20	08:50	Wood Pigeon	2	Flying over	N/A	53.135038	-8.260878
2	26/02/2024	08:52	09:30	Blackbird	1		N/A	53.130814	-8.25917
2	26/02/2024	08:52	09:30	Fieldfare	15	Flying over	N/A	53.130443	-8.258619
2	26/02/2024	08:52	09:30	Goldfinch	20		N/A	53.129988	-8.26176
2	26/02/2024	08:52	09:30	Great Tit	1		N/A	53.130354	-8.259433
2	26/02/2024	08:52	09:30	House Sparrow	3		N/A	53.13188	-8.260607
2	26/02/2024	08:52	09:30	Long-tailed Tit	2		N/A	53.129401	-8.261532
2	26/02/2024	08:52	09:30	Magpie	2		N/A	53.130137	-8.259151
2	26/02/2024	08:52	09:30	Redwing	6	Flying over	N/A	53.132084	-8.257602
2	26/02/2024	08:52	09:30	Robin	1		N/A	53.131081	-8.258587
2	26/02/2024	08:52	09:30	Winter Wren	1		N/A	53.132146	-8.259915
3	26/02/2024	09:37	11:20	Blackbird	3		N/A	53.129084	-8.265693

T. no.	Date	Start time	Finish	Species	No's.	Observations	Breeding Code if applicable	Lat	Lon
3	26/02/2024	09:37	11:20	Black-headed Gull	3	Flying over outside of site	N/A	53.128428	-8.26295
3	26/02/2024	09:37	11:20	Bullfinch	1		N/A	53.127452	-8.267278
3	26/02/2024	09:37	11:20	Chaffinch	30	Flock on ground	N/A	53.130034	-8.267445
3	26/02/2024	09:37	11:20	Chaffinch	24	Flock of male and female chaffinch	N/A	53.129732	-8.266732
3	26/02/2024	09:37	11:20	Chaffinch	1		N/A	53.128088	-8.266812
3	26/02/2024	09:37	11:20	Chaffinch	1		N/A	53.132215	-8.265601
3	26/02/2024	09:37	11:20	Goldfinch	3		N/A	53.132343	-8.2655
3	26/02/2024	09:37	11:20	Great Tit	1		N/A	53.128071	-8.26697
3	26/02/2024	09:37	11:20	Greenfinch	1	Flew over	N/A	53.127549	-8.265028
3	26/02/2024	09:37	11:20	Hooded Crow	3		N/A	53.127974	-8.267166
3	26/02/2024	09:37	11:20	House Sparrow	1		N/A	53.129592	-8.266696
3	26/02/2024	09:37	11:20	House Sparrow	20	Flying over	N/A	53.128532	-8.265541
3	26/02/2024	09:37	11:20	Meadow Pipit	2	Flew over	N/A	53.127926	-8.264374
3	26/02/2024	09:37	11:20	Robin	1		N/A	53.132067	-8.265612
3	26/02/2024	09:37	11:20	Siskin	2	In tree	N/A	53.12734	-8.26722
3	26/02/2024	09:37	11:20	Sky Lark	5		N/A	53.128848	-8.266184
3	26/02/2024	09:37	11:20	Starling	30	Flying	N/A	53.130308	-8.266691
3	26/02/2024	09:37	11:20	Winter Wren	1		N/A	53.128043	-8.265143
3	26/02/2024	09:37	11:20	Winter Wren	1		N/A	53.127586	-8.267262
3	26/02/2024	09:37	11:20	Winter Wren	1		N/A	53.128318	-8.26492
3	26/02/2024	09:37	11:20	Winter Wren	1		N/A	53.131908	-8.265482
3	26/02/2024	09:37	11:20	Wood Pigeon	2		N/A	53.129883	-8.265137
3	26/02/2024	09:37	11:20	Wood Pigeon	2		N/A	53.127857	-8.267153
3	26/02/2024	09:37	11:20	Wood Pigeon	2		N/A	53.131956	-8.265844
4	26/02/2024	11:22	12:00	Blackbird	1		N/A	53.131877	-8.26569
4	26/02/2024	11:22	12:00	Blue Tit	2		N/A	53.132098	-8.267632
4	26/02/2024	11:22	12:00	Dunnock	1		N/A	53.133636	-8.270797
4	26/02/2024	11:22	12:00	Fieldfare	7	Flew out of hedge	N/A	53.132245	-8.267842
4	26/02/2024	11:22	12:00	Goldfinch	1		N/A	53.131616	-8.266596
4	26/02/2024	11:22	12:00	Great Tit	1		N/A	53.133711	-8.272415
4	26/02/2024	11:22	12:00	Grey Heron	1	Flew over outside of site	N/A	53.136011	-8.258647

T. no.	Date	Start time	Finish	Species	No's.	Observations	Breeding Code if applicable	Lat	Lon
4	26/02/2024	11:22	12:00	Jackdaw	2		N/A	53.13289	-8.270259
4	26/02/2024	11:22	12:00	Jackdaw	9		N/A	53.134061	-8.27145
4	26/02/2024	11:22	12:00	Jackdaw	4		N/A	53.133495	-8.271414
4	26/02/2024	11:22	12:00	Jackdaw	2		N/A	53.133954	-8.272256
4	26/02/2024	11:22	12:00	Meadow Pipit	2		N/A	53.133973	-8.272046
4	26/02/2024	11:22	12:00	Meadow Pipit	2	Flying	N/A	53.133166	-8.270632
4	26/02/2024	11:22	12:00	Mistle Thrush	2		N/A	53.131713	-8.267098
4	26/02/2024	11:22	12:00	Redwing	3		N/A	53.133431	-8.271753
4	26/02/2024	11:22	12:00	Robin	1		N/A	53.133735	-8.27121
4	26/02/2024	11:22	12:00	Robin	1		N/A	53.131663	-8.266719
4	26/02/2024	11:22	12:00	Winter Wren	1		N/A	53.133861	-8.270664
4	26/02/2024	11:22	12:00	Wood Pigeon	2	Flying	N/A	53.133713	-8.271925
5	25/03/2024	09:50	12:50	Pheasant	1	-	N/A	53.132026	-8.265495
5	25/03/2024	09:50	12:50	Starling	4	Starling	N/A	53.130424	-8.264939
5	25/03/2024	09:50	12:50	Buzzard	1	Pretty sure its hidden in tree	N/A	53.12989	-8.265523
5	25/03/2024	09:50	12:50	Snipe	1	Flew out of Hedge	N/A	53.129429	-8.265339
5	25/03/2024	09:50	12:50	Winter Wren	2	-	N/A	53.128866	-8.265128
5	25/03/2024	09:50	12:50	Robin	1	-	N/A	53.127765	-8.263621
5	25/03/2024	09:50	12:50	Blackbird	1	-	N/A	53.127121	-8.265214
5	25/03/2024	09:50	12:50	Chaffinch	1	-	N/A	53.127067	-8.265508
5	25/03/2024	09:50	12:50	Pheasant	3	-	N/A	53.128609	-8.266243
5	25/03/2024	09:50	12:50	Linnet	15	-	N/A	53.129146	-8.266346
5	25/03/2024	09:50	12:50	Magpie	1	Nest in tree.	N/A	53.129681	-8.267907
5	25/03/2024	09:50	12:50	Winter Wren	1	-	N/A	53.130188	-8.265705
5	25/03/2024	09:50	12:50	Blue Tit	1	-	N/A	53.129798	-8.265447
5	25/03/2024	09:50	12:50	Chaffinch	3	-	N/A	53.129942	-8.265554
5	25/03/2024	09:50	12:50	Winter Wren	1	-	N/A	53.131711	-8.259222
5	25/03/2024	09:50	12:50	Winter Wren	1	-	N/A	53.129757	-8.258315
5	25/03/2024	09:50	12:50	Chaffinch	1	-	N/A	53.128573	-8.257726
5	25/03/2024	09:50	12:50	Wood Pigeon	1	-	N/A	53.128433	-8.259218
5	25/03/2024	09:50	12:50	Great Tit	1	-	N/A	53.128598	-8.259475
5	25/03/2024	09:50	12:50	Robin	1	-	N/A	53.129027	-8.259728
5	25/03/2024	09:50	12:50	Great Tit	2	-	N/A	53.128981	-8.260949

T. no.	Date	Start time	Finish	Species	No's.	Observations	Breeding Code if applicable	Lat	Lon
5	25/03/2024	09:50	12:50	Winter Wren	1	-	N/A	53.128907	-8.260639
5	25/03/2024	09:50	12:50	Snipe	1	-	N/A	53.130091	-8.260564
5	25/03/2024	09:50	12:50	Blue Tit	1	-	N/A	53.1301	-8.263348
5	25/03/2024	09:50	12:50	Snipe	3	Possibly still wintering	N/A	53.129914	-8.264026
5	25/03/2024	09:50	12:50	Winter Wren	1	-	N/A	53.130756	-8.265053
5	25/03/2024	09:50	12:50	Winter Wren	1	-	N/A	53.130717	-8.265104
5	25/03/2024	09:50	12:50	Blackbird	1	-	N/A	53.132099	-8.264558
5	25/03/2024	09:50	12:50	Winter Wren	1	-	N/A	53.130578	-8.263461
5	25/03/2024	09:50	12:50	Starling	3	Starling flew out of shed	N/A	53.130354	-8.264673
5	25/03/2024	09:50	12:50	Robin	1	-	N/A	53.132745	-8.264526
5	25/03/2024	09:50	12:50	Blackbird	1	-	N/A	53.13191	-8.265837
5	25/03/2024	09:50	12:50	Blackbird	2	-	N/A	53.131933	-8.265912
5	25/03/2024	09:50	12:50	Song Thrush	2	-	N/A	53.131764	-8.265669
5	25/03/2024	09:50	12:50	Magpie	1	Flying	N/A	53.130434	-8.265907
5	25/03/2024	09:50	12:50	Hooded Crow	2	Perched on ground	N/A	53.131283	-8.266866
5	25/03/2024	09:50	12:50	Raven	1	Sound of Raven in distance	N/A	53.135301	-8.267981
5	25/03/2024	09:50	12:50	Jackdaw	2	Feeding on ground	N/A	53.131644	-8.269993
5	25/03/2024	09:50	12:50	Winter Wren	1	-	N/A	53.132472	-8.270086
5	25/03/2024	09:50	12:50	Dunnock	1	-	N/A	53.134024	-8.272711
5	25/03/2024	09:50	12:50	Robin	1	-	N/A	53.133294	-8.269883
5	25/03/2024	09:50	12:50	Chiffchaff	1	-	N/A	53.133219	-8.269578
5	25/03/2024	09:50	12:50	Hooded Crow	1	-	N/A	53.134122	-8.272736
5	25/03/2024	09:50	12:50	Blackbird	1	-	N/A	53.133338	-8.267419
5	25/03/2024	09:50	12:50	Robin	1	-	N/A	53.133097	-8.26895
5	25/03/2024	09:50	12:50	Winter Wren	3	-	N/A	53.133315	-8.267789
5	25/03/2024	09:50	12:50	Blackbird	1	-	N/A	53.132538	-8.268302
5	25/03/2024	09:50	12:50	Wood Pigeon	2	-	N/A	53.133138	-8.268417
5	25/03/2024	09:50	12:50	Jackdaw	2	Flying over	N/A	53.132198	-8.26615
5	25/03/2024	09:50	12:50	Robin	1	-	N/A	53.132049	-8.265675
5	25/03/2024	09:50	12:50	Magpie	1	-	N/A	53.134551	-8.264928
5	25/03/2024	09:50	12:50	Robin	1	Patch of Scots pine	N/A	53.134595	-8.259797
5	25/03/2024	09:50	12:50	Blackbird	1		N/A	53.134914	-8.258801

T. no.	Date	Start time	Finish	Species	No's.	Observations	Breeding Code if applicable	Lat	Lon
5	25/03/2024	09:50	12:50	Wood Pigeon	2	Perched on young ash to small for roost	N/A	53.131821	-8.259242
5	25/03/2024	09:50	12:50	Blackbird	1	-	N/A	53.131432	-8.256208
5	25/03/2024	09:50	12:50	Winter Wren	1	-	N/A	53.13245	-8.256022
1	19/04/2024	11:33	12:30	Blackbird	2	P	PRB Pair	53.135433	-8.260466
1	19/04/2024	11:33	12:30	Blackbird	1		PSB Suitable Habitat	53.134631	-8.259896
1	19/04/2024	11:33	12:30	Barn Swallow	1	Flying over old farmstead	PSB Suitable Habitat	53.134254	-8.2662
1	19/04/2024	11:33	12:30	Blue Tit	1		PSB Suitable Habitat	53.135067	-8.260498
1	19/04/2024	11:33	12:30	Black-headed Gull	1	Flew over, high over site	Flying	53.127618	-8.26489
1	19/04/2024	11:33	12:30	Buzzard	3	3 buzzards soaring over farm, then moved off down the valley	Flying	53.129411	-8.265863
1	19/04/2024	11:33	12:30	Chaffinch	1		PSB Suitable Habitat	53.135034	-8.26066
1	19/04/2024	11:33	12:30	Chiffchaff	1		PSB Suitable Habitat	53.13376	-8.263557
1	19/04/2024	11:33	12:30	Kestrel	1	Seen hunting. Single male	PSB Suitable Habitat	53.130043	-8.264562
1	19/04/2024	11:33	12:30	Robin	1		PSB Suitable Habitat	53.135251	-8.262408
1	19/04/2024	11:33	12:30	Robin	1		PSB Suitable Habitat	53.134768	-8.260015
2	19/04/2024	10:28	10:54	Blackbird	1		PSB Suitable Habitat	53.131414	-8.258984
2	19/04/2024	10:28	10:54	Blackbird	1	Flying	PSB Suitable Habitat	53.132524	-8.257644
2	19/04/2024	10:28	10:54	Buzzard	1	Circling over trees	PSB Suitable Habitat	53.132851	-8.251786
2	19/04/2024	10:28	10:54	Hooded Crow	1	Feeding	PSB Suitable Habitat	53.132629	-8.256522
2	19/04/2024	10:28	10:54	Pheasant	1	Female	PSB Suitable Habitat	53.133655	-8.260994
2	19/04/2024	10:28	10:54	White-tailed Eagle	1	Juvenile, flying over the neighbouring farm	Flying	53.12838	-8.255696
2	19/04/2024	10:28	10:54	Wood Pigeon	1	P	PRB Pair	53.131961	-8.258336
3	19/04/2024	09:03	10:20	Blackbird	1	Flying	Flying	53.129716	-8.2599
3	19/04/2024	09:03	10:20	Blackbird	2	P	PRB Pair	53.128774	-8.259566
3	19/04/2024	09:03	10:20	Blackbird	2	P	PRB Pair	53.129391	-8.265243
3	19/04/2024	09:03	10:20	Blackbird	2	P	PRB Pair	53.12767	-8.264038
3	19/04/2024	09:03	10:20	Blackbird	1		PSB Suitable Habitat	53.1306	-8.259275
3	19/04/2024	09:03	10:20	Blackbird	1		PSB Suitable Habitat	53.129874	-8.264919
3	19/04/2024	09:03	10:20	Blackbird	1		PSB Suitable Habitat	53.127548	-8.266119
3	19/04/2024	09:03	10:20	Barn Swallow	6	Nest building in sheds	Breeding Occupied nest	53.130321	-8.264961

T. no.	Date	Start time	Finish	Species	No's.	Observations	Breeding Code if applicable	Lat	Lon
3	19/04/2024	09:03	10:20	Barn Swallow	1	Flying	PSB Suitable Habitat	53.130811	-8.263639
3	19/04/2024	09:03	10:20	Blue Tit	1	Alert	PRB Agitated behaviour	53.130444	-8.263524
3	19/04/2024	09:03	10:20	Bullfinch	1		PSB Suitable Habitat	53.129944	-8.261898
3	19/04/2024	09:03	10:20	Chaffinch	1	Alert	PRB Agitated behaviour	53.130873	-8.263186
3	19/04/2024	09:03	10:20	Chaffinch	1	Alert	PRB Agitated behaviour	53.129874	-8.262904
3	19/04/2024	09:03	10:20	Chaffinch	2	Courtship	PRB Display	53.12995	-8.262868
3	19/04/2024	09:03	10:20	Chaffinch	2	P	PRB Pair	53.130909	-8.258805
3	19/04/2024	09:03	10:20	Chaffinch	2	P	PRB Pair	53.130163	-8.263356
3	19/04/2024	09:03	10:20	Chaffinch	2	P	PRB Pair	53.129746	-8.265506
3	19/04/2024	09:03	10:20	Chaffinch	2	P	PRB Pair	53.129234	-8.265228
3	19/04/2024	09:03	10:20	Dunnock	1		PSB Suitable Habitat	53.129085	-8.260961
3	19/04/2024	09:03	10:20	Dunnock	1		PSB Suitable Habitat	53.128736	-8.265098
3	19/04/2024	09:03	10:20	Goldfinch	1	Flying	Flying	53.127276	-8.26752
3	19/04/2024	09:03	10:20	Goldfinch	1	Flying over	Flying	53.129824	-8.266335
3	19/04/2024	09:03	10:20	Goldfinch	2	P	PRB Pair	53.129055	-8.260085
3	19/04/2024	09:03	10:20	Goldfinch	1		PSB Suitable Habitat	53.130735	-8.264357
3	19/04/2024	09:03	10:20	Great Tit	1	Singing male	PSB Suitable Habitat	53.130624	-8.264573
3	19/04/2024	09:03	10:20	Jackdaw	1	Flying	Flying	53.130087	-8.264084
3	19/04/2024	09:03	10:20	Jackdaw	1	Flying	Flying	53.130939	-8.266921
3	19/04/2024	09:03	10:20	Linnet	1	Bringing food to nest	Breeding Food fecal sac	53.128535	-8.265069
3	19/04/2024	09:03	10:20	Linnet	2	P	PRB Pair	53.127305	-8.266796
3	19/04/2024	09:03	10:20	Magpie	1	On field	PSB Suitable Habitat	53.130159	-8.266799
3	19/04/2024	09:03	10:20	Mallard	1	Flying	Flying	53.127323	-8.265297
3	19/04/2024	09:03	10:20	Mistle Thrush	1		PSB Suitable Habitat	53.129916	-8.263171
3	19/04/2024	09:03	10:20	Pheasant	1	Male sitting in field	PSB Suitable Habitat	53.129725	-8.261763
3	19/04/2024	09:03	10:20	Pheasant	1	Male	PSB Suitable Habitat	53.127322	-8.267245
3	19/04/2024	09:03	10:20	Redwing	1		PSB Suitable Habitat	53.131083	-8.26034
3	19/04/2024	09:03	10:20	Robin	1		PSB Suitable Habitat	53.131412	-8.264945
3	19/04/2024	09:03	10:20	Robin	1		PSB Suitable Habitat	53.131932	-8.26025
3	19/04/2024	09:03	10:20	Robin	1		PSB Suitable Habitat	53.130712	-8.267078
3	19/04/2024	09:03	10:20	Rook	2	P	PRB Pair	53.127484	-8.267373
3	19/04/2024	09:03	10:20	Snipe	1	Flew up from wet area in field	Migration	53.131591	-8.259419

T. no.	Date	Start time	Finish	Species	No's.	Observations	Breeding Code if applicable	Lat	Lon
3	19/04/2024	09:03	10:20	Snipe	1	Flew up out of field when spproached	Migration	53.130066	-8.263077
3	19/04/2024	09:03	10:20	Starling	1	Flying	Flying	53.130571	-8.261333
3	19/04/2024	09:03	10:20	Starling	1		PSB Suitable Habitat	53.130699	-8.265251
3	19/04/2024	09:03	10:20	Willow Warbler	1	Singing	PSB Singing male	53.130095	-8.260735
3	19/04/2024	09:03	10:20	Willow Warbler	1	Singing	PSB Singing male	53.128862	-8.265092
3	19/04/2024	09:03	10:20	Winter Wren	1	Alert	PRB Agitated behaviour	53.129358	-8.26128
3	19/04/2024	09:03	10:20	Winter Wren	1	Alert	PRB Agitated behaviour	53.127371	-8.265803
3	19/04/2024	09:03	10:20	Winter Wren	1	Alert	PRB Agitated behaviour	53.130604	-8.267298
3	19/04/2024	09:03	10:20	Winter Wren	1	Singing	PSB Singing male	53.12986	-8.264276
3	19/04/2024	09:03	10:20	Winter Wren	1		PSB Suitable Habitat	53.129073	-8.265093
3	19/04/2024	09:03	10:20	Winter Wren	1		PSB Suitable Habitat	53.127136	-8.26736
3	19/04/2024	09:03	10:20	Winter Wren	1		PSB Suitable Habitat	53.129601	-8.266663
3	19/04/2024	09:03	10:20	Wood Pigeon	1	Flying	Flying	53.130689	-8.262049
3	19/04/2024	09:03	10:20	Wood Pigeon	1	Flying	Flying	53.12949	-8.259097
3	19/04/2024	09:03	10:20	Wood Pigeon	1		PSB Suitable Habitat	53.128757	-8.267681
3	19/04/2024	09:03	10:20	Wood Pigeon	1		PSB Suitable Habitat	53.127466	-8.266659
4	19/04/2024	08:30	09:03	Blackbird	1	Alert sound	PRB Agitated behaviour	53.133232	-8.269865
4	19/04/2024	08:30	09:03	Blackbird	2	P	PRB Pair	53.131719	-8.267174
4	19/04/2024	08:30	09:03	Blackbird	2	P	PRB Pair	53.131921	-8.265926
4	19/04/2024	08:30	09:03	Blackbird	1		PSB Suitable Habitat	53.131967	-8.269557
4	19/04/2024	08:30	09:03	Blackbird	1		PSB Suitable Habitat	53.130838	-8.267392
4	19/04/2024	08:30	09:03	Blue Tit	1		PSB Suitable Habitat	53.131833	-8.267252
4	19/04/2024	08:30	09:03	Chaffinch	1		PSB Suitable Habitat	53.131933	-8.267376
4	19/04/2024	08:30	09:03	Chiffchaff	1		PSB Suitable Habitat	53.133272	-8.269166
4	19/04/2024	08:30	09:03	Chiffchaff	1		PSB Suitable Habitat	53.132248	-8.26775
4	19/04/2024	08:30	09:03	House Sparrow	1	Flying	Flying	53.132077	-8.267412
4	19/04/2024	08:30	09:03	House Sparrow	2	P	PRB Pair	53.13253	-8.268557
4	19/04/2024	08:30	09:03	House Sparrow	1		PSB Suitable Habitat	53.132949	-8.269381
4	19/04/2024	08:30	09:03	Magpie	1	Flying	Flying	53.131141	-8.268869
4	19/04/2024	08:30	09:03	Magpie	1	Flying	Flying	53.132782	-8.269041
4	19/04/2024	08:30	09:03	Magpie	1	Flying	Flying	53.130978	-8.268783
4	19/04/2024	08:30	09:03	Meadow Pipit	1	Flying	Flying	53.130939	-8.267286

T. no.	Date	Start time	Finish	Species	No's.	Observations	Breeding Code if applicable	Lat	Lon
4	19/04/2024	08:30	09:03	Rook	1		PSB Suitable Habitat	53.13294	-8.269374
4	19/04/2024	08:30	09:03	Song Thrush	1		PSB Suitable Habitat	53.132824	-8.26914
4	19/04/2024	08:30	09:03	Song Thrush	1		PSB Suitable Habitat	53.131751	-8.266288
4	19/04/2024	08:30	09:03	Willow Warbler	1		PSB Suitable Habitat	53.13397	-8.271895
4	19/04/2024	08:30	09:03	Winter Wren	1	Pair	PRB Pair	53.133575	-8.270481
4	19/04/2024	08:30	09:03	Winter Wren	1		PSB Suitable Habitat	53.132197	-8.269894
4	19/04/2024	08:30	09:03	Wood Pigeon	1	Flying	Flying	53.130862	-8.268046
4	19/04/2024	08:30	09:03	Wood Pigeon	1	Flying	Flying	53.133902	-8.272496
4	19/04/2024	08:30	09:03	Wood Pigeon	1	Flying	Flying	53.13096	-8.26812
1	10/05/2024	08:45	11:15	Blackbird	2		PRB Pair	53.133232	-8.264497
1	10/05/2024	08:45	11:15	Blackbird	2		PRB Pair	53.135343	-8.261637
1	10/05/2024	08:45	11:15	Blackbird	2		PSB Suitable Habitat	53.133757	-8.260835
1	10/05/2024	08:45	11:15	Barn Swallow	1		PSB Suitable Habitat	53.13498	-8.263255
1	10/05/2024	08:45	11:15	Chaffinch	1		Breeding Food fecal sac	53.132461	-8.26534
1	10/05/2024	08:45	11:15	Chiffchaff	1		PSB Suitable Habitat	53.134462	-8.259699
1	10/05/2024	08:45	11:15	House Sparrow	1		PSB Suitable Habitat	53.135054	-8.260346
1	10/05/2024	08:45	11:15	House Sparrow	4		PSB Suitable Habitat	53.13437	-8.260775
1	10/05/2024	08:45	11:15	Robin	1		PSB Suitable Habitat	53.133423	-8.264193
1	10/05/2024	08:45	11:15	Robin	1		PSB Suitable Habitat	53.135336	-8.262504
1	10/05/2024	08:45	11:15	Song Thrush	2		PRB Display	53.134796	-8.259939
1	10/05/2024	08:45	11:15	Winter Wren	1		PSB Singing male	53.13542	-8.260598
1	10/05/2024	08:45	11:15	Winter Wren	1		PSB Suitable Habitat	53.133022	-8.264577
2	10/05/2024	05:15	06:30	Blackbird	3		PRB Pair	53.133885	-8.260863
2	10/05/2024	05:15	06:30	Blackbird	2		PRB Pair	53.132095	-8.258943
2	10/05/2024	05:15	06:30	Blackbird	2		PRB Pair	53.132831	-8.258306
2	10/05/2024	05:15	06:30	Blackbird	3		PRB Pair	53.132501	-8.257669
2	10/05/2024	05:15	06:30	Chaffinch	1		PRB Agitated behaviour	53.13284	-8.257264
2	10/05/2024	05:15	06:30	Chiffchaff	1		PSB Suitable Habitat	53.133253	-8.25606
2	10/05/2024	05:15	06:30	House Sparrow	3		PRB Pair	53.132949	-8.259396
2	10/05/2024	05:15	06:30	Rook	2		PSB Suitable Habitat	53.132025	-8.257036
2	10/05/2024	05:15	06:30	Song Thrush	1		Breeding Food fecal sac	53.132713	-8.255867
2	10/05/2024	05:15	06:30	Song Thrush	2		PRB Pair	53.132131	-8.255683
2	10/05/2024	05:15	06:30	Whimbrel	10		Flying	53.12975	-8.255843

T. no.	Date	Start time	Finish	Species	No's.	Observations	Breeding Code if applicable	Lat	Lon
2	10/05/2024	05:15	06:30	Willow Warbler	1		PSB Suitable Habitat	53.132331	-8.259331
2	10/05/2024	05:15	06:30	Winter Wren	1		PRB Agitated behaviour	53.133482	-8.256408
2	10/05/2024	05:15	06:30	Winter Wren	1		PSB Suitable Habitat	53.132504	-8.258998
2	10/05/2024	05:15	06:30	Winter Wren	1		PSB Suitable Habitat	53.131794	-8.259198
2	10/05/2024	05:15	06:30	Wood Pigeon	4		PSB Suitable Habitat	53.132658	-8.255473
3	10/05/2024	06:40	07:50	Blackbird	1		PRB Agitated behaviour	53.129292	-8.258059
3	10/05/2024	06:40	07:50	Blackbird	2		PRB Pair	53.130002	-8.262568
3	10/05/2024	06:40	07:50	Blackbird	3		PSB Suitable Habitat	53.130645	-8.263443
3	10/05/2024	06:40	07:50	Blackbird	2		PSB Suitable Habitat	53.130894	-8.260612
3	10/05/2024	06:40	07:50	Blackbird	1		PSB Suitable Habitat	53.130133	-8.259652
3	10/05/2024	06:40	07:50	Blackbird	1		PSB Suitable Habitat	53.128468	-8.258812
3	10/05/2024	06:40	07:50	Barn Swallow	10		Breeding Occupied nest	53.130245	-8.265458
3	10/05/2024	06:40	07:50	Barn Swallow	1		PSB Suitable Habitat	53.129163	-8.258946
3	10/05/2024	06:40	07:50	Barn Swallow	3		PSB Suitable Habitat	53.132429	-8.261284
3	10/05/2024	06:40	07:50	Black-headed Gull	6		Flying	53.129634	-8.25983
3	10/05/2024	06:40	07:50	Chaffinch	2		PRB Pair	53.132271	-8.263768
3	10/05/2024	06:40	07:50	Chaffinch	2		PRB Pair	53.130243	-8.263494
3	10/05/2024	06:40	07:50	Chaffinch	2		PRB Pair	53.129982	-8.263144
3	10/05/2024	06:40	07:50	Dunnock	1		PSB Suitable Habitat	53.129962	-8.259301
3	10/05/2024	06:40	07:50	Greenfinch	1		PSB Suitable Habitat	53.130826	-8.265903
3	10/05/2024	06:40	07:50	Hooded Crow	2		PSB Suitable Habitat	53.131516	-8.261547
3	10/05/2024	06:40	07:50	House Martin	3		PSB Suitable Habitat	53.130062	-8.264746
3	10/05/2024	06:40	07:50	House Sparrow	2		PSB Suitable Habitat	53.13009	-8.263208
3	10/05/2024	06:40	07:50	House Sparrow	2		PSB Suitable Habitat	53.129244	-8.259865
3	10/05/2024	06:40	07:50	House Sparrow	3		PSB Suitable Habitat	53.130351	-8.258649
3	10/05/2024	06:40	07:50	Jackdaw	1		Breeding Occupied nest	53.130268	-8.265276
3	10/05/2024	06:40	07:50	Linnet	2		PRB Display	53.130081	-8.259435
3	10/05/2024	06:40	07:50	Linnet	2		PRB Pair	53.130111	-8.263865
3	10/05/2024	06:40	07:50	Linnet	2		PRB Pair	53.130042	-8.260947
3	10/05/2024	06:40	07:50	Linnet	1		PSB Suitable Habitat	53.132044	-8.264886
3	10/05/2024	06:40	07:50	Magpie	1		PSB Suitable Habitat	53.131707	-8.263844
3	10/05/2024	06:40	07:50	Magpie	1		PSB Suitable Habitat	53.132805	-8.261168

T. no.	Date	Start time	Finish	Species	No's.	Observations	Breeding Code if applicable	Lat	Lon
3	10/05/2024	06:40	07:50	Meadow Pipit	1		PSB Suitable Habitat	53.129738	-8.258321
3	10/05/2024	06:40	07:50	Pheasant	1		PSB Suitable Habitat	53.131486	-8.262668
3	10/05/2024	06:40	07:50	Robin	1		PSB Suitable Habitat	53.131556	-8.263346
3	10/05/2024	06:40	07:50	Robin	1		PSB Suitable Habitat	53.129999	-8.258902
3	10/05/2024	06:40	07:50	Rook	2		PSB Suitable Habitat	53.130733	-8.26215
3	10/05/2024	06:40	07:50	Starling	6		Breeding Occupied nest	53.130379	-8.265047
3	10/05/2024	06:40	07:50	Willow Warbler	1		PSB Suitable Habitat	53.130139	-8.260528
3	10/05/2024	06:40	07:50	Winter Wren	1		PRB Agitated behaviour	53.131439	-8.263195
3	10/05/2024	06:40	07:50	Winter Wren	1		PSB Suitable Habitat	53.132015	-8.263329
3	10/05/2024	06:40	07:50	Winter Wren	1		PSB Suitable Habitat	53.130466	-8.263372
3	10/05/2024	06:40	07:50	Winter Wren	1		PSB Suitable Habitat	53.130162	-8.260389
3	10/05/2024	06:40	07:50	Wood Pigeon	2		PRB Pair	53.129722	-8.258329
3	10/05/2024	06:40	07:50	Wood Pigeon	3		PSB Suitable Habitat	53.128877	-8.259447
4	10/05/2024	07:55	08:40	Blackbird	1		PSB Suitable Habitat	53.132249	-8.26555
4	10/05/2024	07:55	08:40	Blackbird	1		PSB Suitable Habitat	53.133153	-8.269966
4	10/05/2024	07:55	08:40	Blackbird	1		PSB Suitable Habitat	53.133852	-8.271864
4	10/05/2024	07:55	08:40	Blackbird	1		PSB Suitable Habitat	53.13081	-8.266382
4	10/05/2024	07:55	08:40	Blackbird	1		PSB Suitable Habitat	53.130918	-8.266966
4	10/05/2024	07:55	08:40	Barn Swallow	1		PSB Suitable Habitat	53.133851	-8.273001
4	10/05/2024	07:55	08:40	Barn Swallow	2		PSB Suitable Habitat	53.133577	-8.271025
4	10/05/2024	07:55	08:40	Barn Swallow	3		PSB Suitable Habitat	53.129122	-8.265926
4	10/05/2024	07:55	08:40	Blue Tit	1		PSB Suitable Habitat	53.130744	-8.266151
4	10/05/2024	07:55	08:40	Chaffinch	1		PSB Singing male	53.131624	-8.266884
4	10/05/2024	07:55	08:40	Chiffchaff	1		PSB Suitable Habitat	53.132878	-8.267925
4	10/05/2024	07:55	08:40	Goldcrest	1		PSB Suitable Habitat	53.132101	-8.265465
4	10/05/2024	07:55	08:40	Goldcrest	1		PSB Suitable Habitat	53.131221	-8.267912
4	10/05/2024	07:55	08:40	House Martin	1		PSB Suitable Habitat	53.131475	-8.266424
4	10/05/2024	07:55	08:40	House Martin	2		PSB Suitable Habitat	53.128479	-8.26568
4	10/05/2024	07:55	08:40	House Sparrow	1		PSB Suitable Habitat	53.132878	-8.267925
4	10/05/2024	07:55	08:40	House Sparrow	1		PSB Suitable Habitat	53.131088	-8.266626
4	10/05/2024	07:55	08:40	Jackdaw	2		PRB Pair	53.129108	-8.265216
4	10/05/2024	07:55	08:40	Jackdaw	2		PSB Suitable Habitat	53.133877	-8.272056
4	10/05/2024	07:55	08:40	Jackdaw	2		PSB Suitable Habitat	53.13132	-8.267136

T. no.	Date	Start time	Finish	Species	No's.	Observations	Breeding Code if applicable	Lat	Lon
4	10/05/2024	07:55	08:40	Jackdaw	3		PSB Suitable Habitat	53.133591	-8.271565
4	10/05/2024	07:55	08:40	Jackdaw	1		PSB Suitable Habitat	53.132604	-8.267438
4	10/05/2024	07:55	08:40	Jackdaw	3		PSB Suitable Habitat	53.133863	-8.272293
4	10/05/2024	07:55	08:40	Jackdaw	5		PSB Suitable Habitat	53.133687	-8.272102
4	10/05/2024	07:55	08:40	Jackdaw	5		PSB Suitable Habitat	53.128747	-8.265882
4	10/05/2024	07:55	08:40	Raven	1		PSB Suitable Habitat	53.133294	-8.269576
4	10/05/2024	07:55	08:40	Robin	1		PSB Suitable Habitat	53.132341	-8.265482
4	10/05/2024	07:55	08:40	Starling	2		PRB Pair	53.129638	-8.26624
4	10/05/2024	07:55	08:40	Starling	3		PSB Suitable Habitat	53.129901	-8.265498
4	10/05/2024	07:55	08:40	Willow Warbler	1		PSB Suitable Habitat	53.133427	-8.271823
4	10/05/2024	07:55	08:40	Winter Wren	1		PSB Singing male	53.131123	-8.26752
4	10/05/2024	07:55	08:40	Winter Wren	1		PSB Suitable Habitat	53.132134	-8.265566
4	10/05/2024	07:55	08:40	Winter Wren	1		PSB Suitable Habitat	53.132841	-8.269403
4	10/05/2024	07:55	08:40	Winter Wren	1		PSB Suitable Habitat	53.13095	-8.266606
4	10/05/2024	07:55	08:40	Wood Pigeon	2		PRB Pair	53.130053	-8.26658
4	10/05/2024	07:55	08:40	Wood Pigeon	1		PSB Suitable Habitat	53.133231	-8.271252
4	10/05/2024	07:55	08:40	Wood Pigeon	1		PSB Suitable Habitat	53.133747	-8.270621
6	23/05/2024	06:00	11:00	Blackbird	4	On tilled field	PSB Suitable Habitat	53.130025	-8.267583
6	23/05/2024	06:00	11:00	Blackbird	2	-	PRB Pair	53.130821	-8.269094
6	23/05/2024	06:00	11:00	Blackbird	1	-	PSB Suitable Habitat	53.131828	-8.270592
6	23/05/2024	06:00	11:00	Blackbird	1	-	Flying	53.132485	-8.249137
6	23/05/2024	06:00	11:00	Blackbird	1	-	PSB Suitable Habitat	53.132693	-8.250814
6	23/05/2024	06:00	11:00	Blackbird	1	-	PSB Suitable Habitat	53.132706	-8.266133
6	23/05/2024	06:00	11:00	Blackbird	1	-	PSB Suitable Habitat	53.13275	-8.249957
6	23/05/2024	06:00	11:00	Blackbird	1	-	PSB Suitable Habitat	53.132833	-8.25169
6	23/05/2024	06:00	11:00	Blackbird	1	-	PSB Suitable Habitat	53.132881	-8.251411
6	23/05/2024	06:00	11:00	Barn Swallow	2		Flying	53.130345	-8.269727
6	23/05/2024	06:00	11:00	Barn Swallow	2		Flying	53.130709	-8.269554
6	23/05/2024	06:00	11:00	Barn Swallow	2		Flying	53.13227	-8.250788
6	23/05/2024	06:00	11:00	Barn Swallow	1		Flying	53.132933	-8.267078
6	23/05/2024	06:00	11:00	Barn Swallow	2	-	Flying	53.133043	-8.267804
6	23/05/2024	06:00	11:00	Barn Swallow	2	-	Flying	53.133194	-8.267372

T. no.	Date	Start time	Finish	Species	No's.	Observations	Breeding Code if applicable	Lat	Lon
6	23/05/2024	06:00	11:00	Buzzard	1	Flying over site for 30 secs, then flew off	Flying	53.13111	-8.268111
6	23/05/2024	06:00	11:00	Chaffinch	1	-	PSB Suitable Habitat	53.132003	-8.251282
6	23/05/2024	06:00	11:00	Chaffinch	1	On fence	PSB Suitable Habitat	53.133097	-8.266863
6	23/05/2024	06:00	11:00	Chiffchaff	1	-	PSB Suitable Habitat	53.132752	-8.251102
6	23/05/2024	06:00	11:00	Chiffchaff	1	-	PSB Suitable Habitat	53.13277	-8.250094
6	23/05/2024	06:00	11:00	Goldcrest	1		PSB Suitable Habitat	53.131912	-8.25143
6	23/05/2024	06:00	11:00	Goldcrest	1		PRB Agitated behaviour	53.132092	-8.250475
6	23/05/2024	06:00	11:00	Goldcrest	1		PSB Suitable Habitat	53.132862	-8.26637
6	23/05/2024	06:00	11:00	Jackdaw	3	-	Flying	53.130346	-8.268938
6	23/05/2024	06:00	11:00	Jackdaw	5	-	Flying	53.130542	-8.267636
6	23/05/2024	06:00	11:00	Jackdaw	1	-	Flying	53.131888	-8.251227
6	23/05/2024	06:00	11:00	Jackdaw	2	-	Flying	53.13219	-8.270315
6	23/05/2024	06:00	11:00	Jackdaw	2	-	Flying	53.132624	-8.250137
6	23/05/2024	06:00	11:00	Long-tailed Tit	2	-	PRB Pair	53.132473	-8.251272
6	23/05/2024	06:00	11:00	Long-tailed Tit	4	At least 4 pairs of long-tailed tits in scrub and sally patch	PRB Pair	53.132506	-8.251081
6	23/05/2024	06:00	11:00	Long-tailed Tit	2	-	PRB Pair	53.132587	-8.251141
6	23/05/2024	06:00	11:00	Long-tailed Tit	2	-	PRB Pair	53.132591	-8.251239
6	23/05/2024	06:00	11:00	Long-tailed Tit	1	Long tailed tit	Flying	53.132703	-8.250634
6	23/05/2024	06:00	11:00	Magpie	1	Perched in tree	PSB Suitable Habitat	53.13028	-8.267604
6	23/05/2024	06:00	11:00	Meadow Pipit	2	Flying over	Flying	53.132033	-8.270058
6	23/05/2024	06:00	11:00	Meadow Pipit	6	Flew out of long grass, then hoovering, flying in area	PRB Agitated behaviour	53.133119	-8.25897
6	23/05/2024	06:00	11:00	Reed Bunting	1	Reed bunting	PSB Suitable Habitat	53.131125	-8.270196
6	23/05/2024	06:00	11:00	Reed Bunting	1	Reed bunting in rushes	PSB Suitable Habitat	53.131308	-8.269873
6	23/05/2024	06:00	11:00	Robin	1	-	PSB Suitable Habitat	53.132748	-8.252016
6	23/05/2024	06:00	11:00	Rook	1	Rook	Flying	53.131974	-8.266072
6	23/05/2024	06:00	11:00	Starling	8	Flock starling flew over into hedge	Flying	53.130011	-8.268083
6	23/05/2024	06:00	11:00	Starling	3	-	Flying	53.133261	-8.266838
6	23/05/2024	06:00	11:00	Willow Warbler	1	-	PSB Suitable Habitat	53.13175	-8.255505
6	23/05/2024	06:00	11:00	Willow Warbler	1	-	PSB Suitable Habitat	53.131922	-8.250868

T. no.	Date	Start time	Finish	Species	No's.	Observations	Breeding Code if applicable	Lat	Lon
6	23/05/2024	06:00	11:00	Willow Warbler	1	-	PSB Suitable Habitat	53.132749	-8.251262
6	23/05/2024	06:00	11:00	Winter Wren	1	-	PSB Suitable Habitat	53.131594	-8.270445
6	23/05/2024	06:00	11:00	Winter Wren	1	-	PSB Suitable Habitat	53.132061	-8.250672
6	23/05/2024	06:00	11:00	Winter Wren	1	-	PSB Suitable Habitat	53.132163	-8.250216
6	23/05/2024	06:00	11:00	Winter Wren	1	-	PSB Suitable Habitat	53.132733	-8.250389
6	23/05/2024	06:00	11:00	Winter Wren	1	-	PSB Suitable Habitat	53.132794	-8.250997
6	23/05/2024	06:00	11:00	Winter Wren	2	-	PRB Agitated behaviour	53.132869	-8.251147
6	23/05/2024	06:00	11:00	Winter Wren	1	-	PSB Suitable Habitat	53.133068	-8.266497
6	23/05/2024	06:00	11:00	Wood Pigeon	3	-	Flying	53.132275	-8.251102
6	23/05/2024	06:00	11:00	Wood Pigeon	1	-	Breeding Food fecal sac	53.132631	-8.249681
6	23/05/2024	06:00	11:00	Wood Pigeon	1	-	Flying	53.132671	-8.249946
6	23/05/2024	06:00	11:00	Wood Pigeon	1	Flew out of trees	Flying	53.133121	-8.268026

Table 10-8 Transect description

Transect No	Description of habitats along transect
1	Northeast of site- improved grassland with hedgerows and treelines
2	Southeast of site - improved grassland with hedgerows and treelines
3	Northwest of site - improved grassland with hedgerows and treelines
4	Southwest of site - improved grassland with hedgerows and treelines. One field of tillage and one small field planted with native tree saplings
5	Transect conducted throughout the site
6	Transect to West and East

Table 10-9 Hinterland Results

Date	Species	Numbers	Observations	lat	long
09/01/2024	Northern Lapwing	30	in field	53.10765627	-8.234963045
09/01/2024	Black-headed Gull	2	feeding on fresh slurry field	53.15430925	-8.26568272
09/01/2024	Fieldfare	20	-	53.14446983	-8.28693157
09/01/2024	Buzzard	1	perched on post	53.14198317	-8.254580386
26/02/2024	Teal	2	in ponding on field	53.12603339	-8.26381322
26/02/2024	Mallard	10	in ponding on field	53.12373882	-8.255959377
26/02/2024	Teal	20	in ponding on field	53.12376075	-8.256023079
25/03/2024	N/A	-	Private property. as close as I can get to SPA	53.1245033	-8.18390342
25/03/2024	N/A	-	closest I can get to spa. flock of rook	53.13169858	-8.194012083
25/03/2024	N/A	-	nothing of note	53.12376296	-8.256035484
25/03/2024	N/A	-	nothing of note	53.12603601	-8.264008686
25/03/2024	Buzzard	1	-	53.1002369	-8.18808869
25/03/2024	Water Rail	1	-	53.09833663	-8.184592836
19/04/2024	Kestrel	1	Male, hunting over field	53.13920837	-8.272607848