



Islandmore Wind Farm

Environmental Impact Assessment
Report

Annex 5.7: Ornithological Baseline

Islandmore Wind Farm Limited

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1.1 INTRODUCTION

Islandmore Wind Farm Limited ('the Developer') has commissioned Galetech Energy Services (GES) to manage the preparation of an Environmental Impact Assessment Report (EIAR) for the Islandmore Wind Farm ('the project' and/or 'the project site') in County Roscommon. APEM Group Woodrow has been commissioned by GES to prepare a technical appendix which presents the baseline data for ornithology to accompany **Chapter 5** (Biodiversity) of the Environmental Impact Assessment Report (EIAR).

This technical appendix documents the results of the ornithological surveys undertaken at the project site, and where required by survey methodology, within the wider study area. The surveys span a five-year period and provide the data used to inform the ornithological baseline:-

- Non-breeding season 2019/20;
- Breeding season 2020;
- Non-breeding season 2020/21;
- Breeding season 2021;
- Non-breeding season 2021/22;
- Breeding season 2022;
- Non-breeding season 2022/23;
- Breeding season 2023; and,
- Non-breeding season 2024/25 (hen harrier only).

All surveyors and authors of this report are suitably qualified ecologists. As required by CIEEM, all APEM Group Woodrow staff are required to abide by a strict code of professional conduct in all aspects of their work.

1.2 SITE OVERVIEW

The project site is located c. 2 km to the north of Ballaghaderreen, Co. Roscommon, c. 13km east of Charlestown (Co. Mayo) and c. 6km southwest of Gorteen (Co. Sligo). Habitats within the project site include upland peat bog, unimproved/semi-improved grassland, wet grassland, commercial forestry and scrub. The surrounding landscape is a mixture of semi-improved agricultural land, peat bog and large wetland habitats.

1.3 DESK STUDY

An initial desk-based review was undertaken to collate existing ornithological information relevant to the project site and its surrounding landscape. A 15km radius was applied as the baseline search, based on Office of the Planning Regulator guidance. However, recognising that wider foraging ranges and functional linkages can extend beyond this distance, additional consideration was given to sites up to 20km that may have hydro-ecological connections or where potential species movements could create pathways of effect.

1.4 DATA SOURCES

A preliminary desk-based review was undertaken to assess the availability and suitability of avian habitats within and surrounding the project site. The review collated

existing ornithological and environmental information from a range of datasets and mapping resources as follows:-

- Aerial and Cartographic Data
 - Ortho-imagery and 6-inch mapping were examined using Bing Maps, Google Earth Pro, Google Maps, and Ordnance Survey Ireland GeoHive to identify potential habitat types and assess landscape connectivity.
- Designated Site Information (NPWS Designations Viewer)
 - The NPWS Designations Viewer was consulted to identify Special Protection Areas (SPAs) and their Special Conservation Interests (SCIs), as well as Natural Heritage Areas (NHAs) and proposed NHAs (pNHAs), to determine the presence of ornithologically important features.
- Hydrological and Connectivity Analysis
 - Scottish Natural Heritage (2016) guidance was followed to assess potential SPA connectivity. Core ranges of SCI species, including up to 20 km for geese species e.g., greylag goose (*Anser anser*) and pink-footed goose (*Anser brachyrhynchus*), Lough Gara and Lough Arrow fall within these ranges.
 - EPA map view was used to investigate potential hydrological connectivity to designated sites. The analysis confirmed there is a hydrological link between the project site and Lough Garra SPA on the river network, via the Lung River.
- Bird Sensitivity and Distribution Mapping
 - Bird Sensitivity Mapping for Wind Energy Development (McGuinness *et al.*, 2015) was reviewed using the National Biodiversity Data Centre (NBDC) Biodiversity Maps to assess potential species sensitivity.
- Ornithological Records
 - Ornithological records from the National Biodiversity Data Centre (NBDC) were analysed for the past ten years across the two 10km Irish national grid squares [M69] and [G60], which encompass the project site.
- Conservation Status and Target Species
 - Target species considered include red- and amber-listed Birds of Conservation Concern in Ireland (BoCCI) (Gilbert *et al.*, 2021).
 - Red-listed species are those of highest conservation concern, showing rapid declines, historic declines without recovery, or global threat.
 - Amber-listed species are those with unfavourable European status, internationally important populations, moderate declines, or small national populations.
- Hen Harrier Assessment
 - Hen harrier (*Circus cyaneus*) distribution and breeding range were reviewed using data from national surveys (Norris *et al.*, 2002; Barton *et al.*, 2006; Ruddock *et al.*, 2012, 2016, 2024) and NPWS (2022) roost mapping.
- Scientific Nomenclature
 - Bird species are presented using binomial nomenclature at first mention,

with scientific names italicised. Subsequent references use common names only. Nomenclature follows the British Ornithologists' Union (BOU) list, with geographic prefixes omitted where appropriate.

1.5 DESK STUDY FINDINGS

1.5.1 EUROPEAN AND NATIONAL DESIGNATED SITES

Site Name ¹	Distance to Development	Special Conservation Interests (SCI)
Lough Gara SPA [004048]	c. 3.2km	Whooper swan (<i>Cygnus cygnus</i>). Greenland white-fronted goose (<i>Anser albifrons flavirostris</i>)
Bellanagare Bog SPA [004105]	c. 11km	Greenland white-fronted goose <i>Anser albifrons flavirostris</i>
Lough Arrow SPA [004050]	c. 16.5km	Little grebe (<i>Tachybaptus ruficollis</i>). Tufted duck (<i>Aythya fuligula</i>) Wetland and Waterbirds [A999]

Table 1: Designated Sites with ornithological features within 20km

1.5.2 SENSITIVITY MAPPING FOR WINDFARMS

The National Biodiversity Data Centre (NBDC) map viewer was utilised to assess the 22 species presented in McGuinness *et al.* (2015); the project site and the surrounding landscape were classified as having low (14.1), medium (36.7) and high (51.8) areas of sensitivity as presented in **Figure 1**

Six of the species assessed in McGuinness, are present within the 2km site buffer (based on survey results) including: -

- Hen harrier (*Circus cyaneus*);
- Golden plover (*Pluvialis apricaria*);
- Whooper swan (*Cygnus cygnus*);
- Black-headed gull (*Chroicocephalus ridibundus*);
- Curlew (*Numenius arquata*); and,
- Red grouse (*Lagopus lagopus scotica*).

¹ Within the accessible pNHA records, there are no such sites listed for their bird species of interest.



1.5.3 ORNITHOLOGICAL RECORDS AND SPECIES OF CONSERVATION CONCERN

Analysis of records from the National Biodiversity Data Centre (NBDC) for the two 10km Irish national grid squares [M69] and [G60], which encompass the project site, identified 25 species of conservation concern, see Table 51 and **Table 51**: NBDC bird records from national grid square M69 2011-2024 (2011 retained due to it being the most up to date bird atlas for Ireland)

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1.5.4 WATERBIRDS

There are two main I-WeBS sites within 15km of the project site, each of which is further divided into sub-sites. The nearest, Lough Gara SPA, lies c. 3.5km to the east. The habitats within this site support significant populations of wintering waterbirds. Over the past five years, peak counts have exceeded the 1% national importance threshold for several waterbird species (**Table 1**).

Annex I species recorded at Lough Gara SPA include whooper swan and barnacle goose (*Branta leucopsis*), both of which are amber listed in Ireland. These species occur only during the non-breeding season.

NBDC records for squares M69 and G60 do not show any red-listed waterbird species. Between 2019 and 2020, amber-listed species recorded include cormorant (*Phalacrocorax carbo*), common tern (*Sterna hirundo*), common gull (*Larus canus*), black-headed gull, great, crested grebe (*Podiceps cristatus*), greylag goose, teal (*Anas crecca*), widgeon (*Mareca penelope*), mallard (*Anas platyrhynchos*), mute swan (*Cygnus olor*) and whooper swan.

Species	Peak count 2019-2024	Mean count 2019-2024	All Ireland 1% threshold for national importance (Burke <i>et al.</i> 2019)
Greenland white-fronted goose	135	135	100
Mallard	322	234	280
Mute swan	236	168	90
Pochard	342	342	110
Shoveler	23	23	20
Tufted duck	1,308	1,246	270
Whooper swan	333	256	150

Table 1: Waterbird species at Lough Gara SPA exceeding the national importance threshold

Ballyhaunis lakes are located c. 12km southwest of the project site. Over the past five years, whooper swan has exceeded the 1% national importance threshold (150 birds), with a peak count of 195 individuals. These lakes, together with other wetland sites in the surrounding landscape, provide essential habitats and resources that support substantial populations of ecologically significant species.

Full datasets for Lough Gara, Ballyhaunis Lakes, and their respective subsites are presented in **Appendix 1**, along with NBDC records for the 10km grid squares M69 and G60, which encompass the project site. The wider area supports wintering and breeding waterbirds through a diverse network of loughs, bogs, connected drainage

and river systems, surrounding agricultural fields, including the eastern tip of Lough Gara, which may support nationally important populations of waterbirds.

1.5.5 WADERS

Within the wider area of the project site, the following species were recorded in Irish grid squares M69 (**Table 51**) and G60 (**Table 51**: NBDC bird records from national grid square M69 2011-2024 (2011 retained due to it being the most up to date bird atlas for Ireland)

):-

- Red-listed - Snipe (*Gallinago gallinago*), curlew, lapwing (*Vanellus vanellus*), woodcock (*Scolopax rusticola*);
- Green-listed - Whimbrel (*Numenius phaeopus*);
- I-WeBS sites contain records for:-
 - Red-listed - Golden plover; and,
 - Amber-listed - Ringed plover (*Charadrius hiaticula*).

I-WeBS data does not indicate any wader species reaching nationally important population levels at these sites. The wider area supports wintering and breeding waders through a mix of bog, loughs, drainage ditches, river networks, forestry, and agricultural fields. The 5km turbine buffer encompasses a mosaic of habitats suitable for both wintering and breeding waders. The nearest breeding wader hot spot is over 20km away (Lauder & Lauder, 2020).

1.5.6 RAPTORS AND OWLS

Full NBDC records are presented for square M69 (Table 51) and G60 (**Table 51**: NBDC bird records from national grid square M69 2011-2024 (2011 retained due to it being the most up to date bird atlas for Ireland)

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1.5.6.1 Barn Owl

A historic record from 2015 exists in NBDC records for barn owl (*Tyto alba*), a red-listed species undergoing severe decline in Ireland due to agricultural intensification and expanding road network (Lusby and O'Cleary 2014). In Ireland, barn owls typically hunt within 1-2km of their nesting or roosting sites, though may range up to 6km (Lusby and O'Cleary 2014).

1.5.6.2 Kestrel

Kestrel (*Falco tinnunculus*), a red-listed, declining but widespread resident species throughout Ireland (Balmer et al, 2013), is recorded as present in the NBDC records for square G60. Its recent declines are driven by land use change in the rural landscape. The project site holds habitat suitable for hunting and foraging.

1.5.6.3 Hen Harrier

Hen Harrier is an Annex I species and is Amber-listed in Ireland (NPWS, 2022). NBDC records confirm its presence within grid square M69, which encompasses the project site. The 2022 national survey also identifies a regular winter roost in M69 (NPWS, 2022;

Balmer *et al.*, 2013), although the precise location is not provided. This indicates long-term use of the wider landscape during the non-breeding season.

Hen Harriers are highly mobile in winter, with individuals ranging up to 20km from communal roosts (NPWS, 2015a). The primary sensitivity relevant to wind farm developments is disturbance or displacement from winter roosts (NPWS, 2022).

No recent or confirmed breeding activity occurs within or near the project site. The nearest SPAs and non-designated breeding areas are located well outside ecological connectivity (>60 km) and therefore do not influence the baseline for the project site.

1.5.6.4 Buzzard and Sparrowhawk

Both species are green-listed and widely distributed throughout Ireland, NBDC records confirm the presence of buzzard (*Buteo buteo*) and sparrowhawk (*Accipiter nisus*) in grid squares M69 and G60. Suitable hunting and foraging habitat for both species available within the 2km buffer.

1.6 METHODOLOGY

Guidelines provided by SNH (2017) list recommended methodologies for the assessment of avian populations in the context of onshore wind farms. The methodology for each survey type conducted at the project site are outlined in the following sections.

1.6.1 OVERVIEW OF THE PROJECT SITE

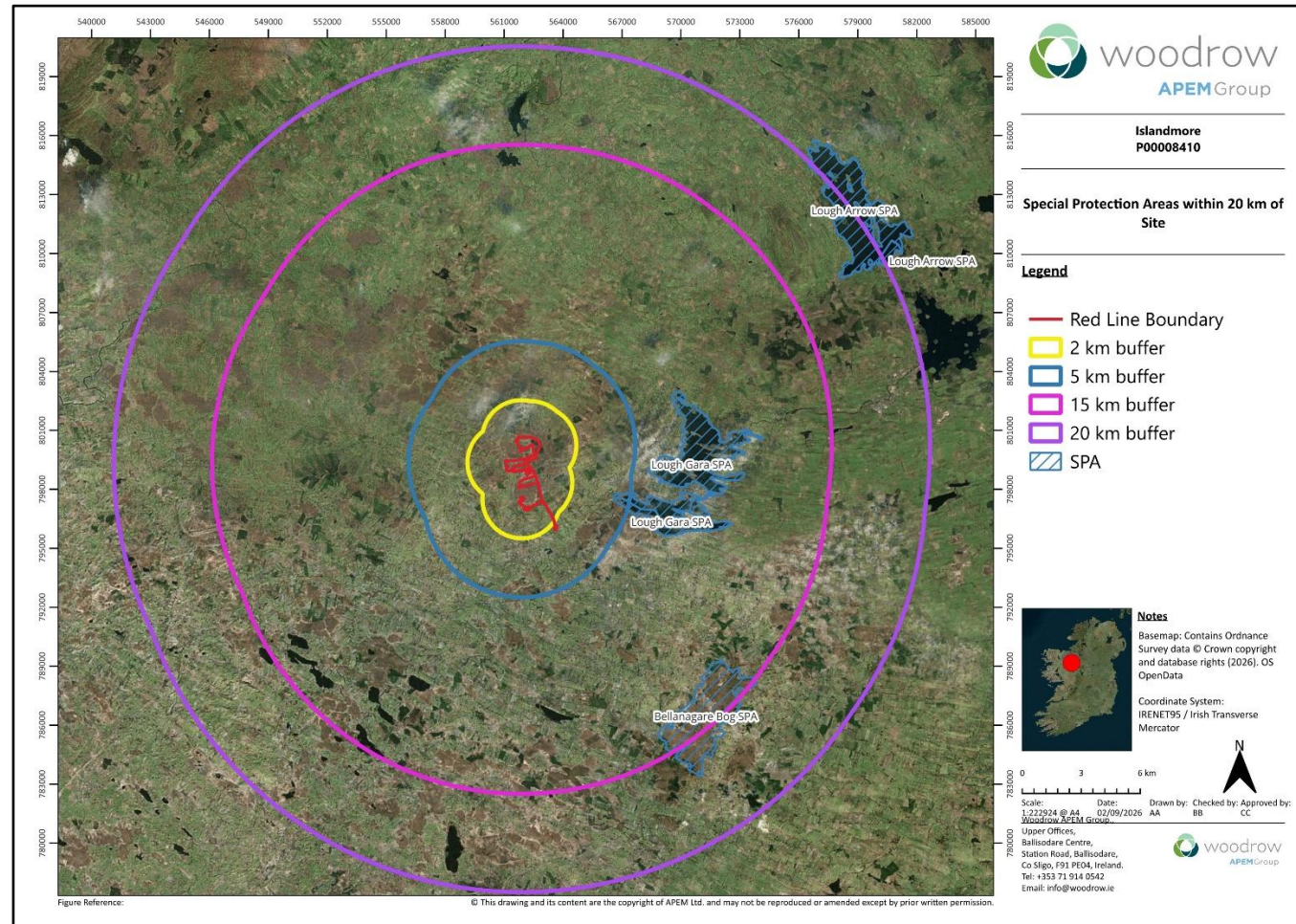


Figure 2: Site buffer of 2km, 5km, 15km with extended 20 km site buffer for potential connectivity with SPA species

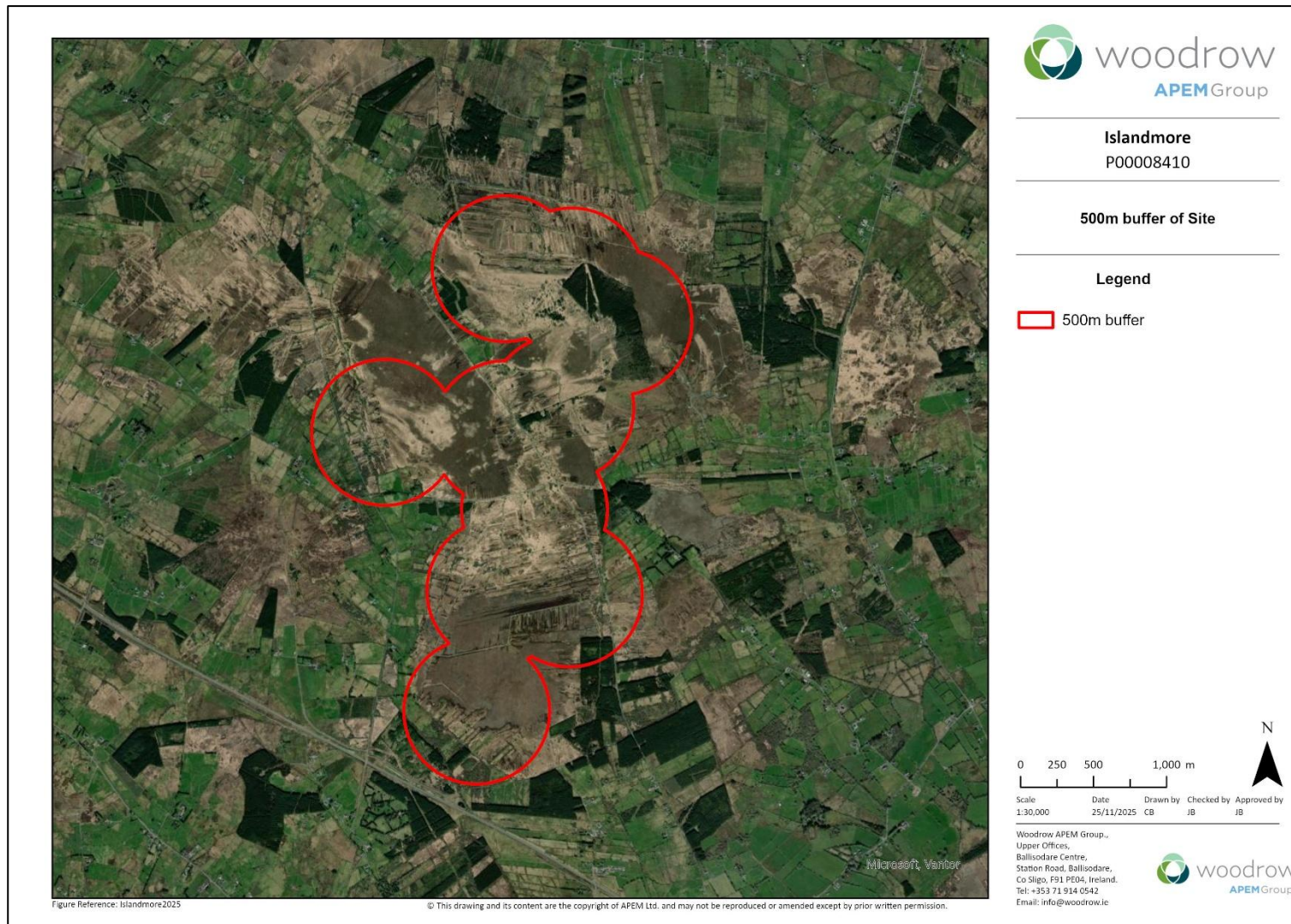


Figure 3: 500m Turbine Buffer



1.6.2 VANTAGE POINT (VP) WATCHES

Vantage point surveys were conducted between October 2019 to September 2023 in accordance with NatureScot (formerly SNH) guidance (2017), which outlines best practice methods for assessing bird flight activity and potential collision risk associated with wind energy developments.

The VP study area was defined as a 500m buffer surrounding the turbine layout, representing the core ornithological study area, initially three VPs were established to provide full coverage of this buffer. In 2022, an additional VP was added and VP1 was relocated 50m north to reflect a revised viable area and the enlarged 500m buffer.

All VP locations were ground-truthed to ensure unobstructed visibility and practical accessibility. A viewshed analysis confirmed that the combined VPs provided 100% coverage of the survey area. Individual VP viewsheds are presented in **Annex 5.7b** (Viewshed Analysis).

Surveys followed NatureScot (2017) guidance, with target species selected based on conservation status, susceptibility to collision or displacement effects, and potential functional connectivity to designated sites. Flight activity of target species was systematically recorded and digitised to inform the Collision Risk Model (CRM).

Target species during VP were as follows:-

- All waterbird species (including swans, geese, ducks, waders, herons and gulls);
- All raptors;
- Species listed as SCIs of any SPAs considered to be within the potential zone of influence of proposed turbine locations;
- Any species listed on Annex I of the Birds Directive; and,
- Any species listed as red-listed on the BoCCI 2020-26 (Gilbert *et al.*, 2021)

Each recorded flight path was numbered and cross-referenced, with the following data recorded:-

- Time on detection;
- Bird species, age and sex (where age and sex were determinable);
- Number of birds;
- Behaviour where applicable (e.g. foraging, commuting, display etc);
- Duration of flight within the VP viewshed; and,
- Height of flight.

In line with NatureScot guidance, surveyors aimed to complete 36 hours of survey at each VP location. Surveys were stratified to ensure coverage of all times of day, including dawn and dusk, to account for variation in bird activity. Each watch typically lasted three hours, with a 30-minute break between watches to minimise observer fatigue.

A summary of VP survey effort is provided in the tables below, with a full breakdown, including weather data, presented in **Annex 5.7a** (Survey Effort).

Non-breeding Season 2019/20			
Month	VP1	VP2	VP3
Oct 2019	5	6	5
Nov 2019	8	7	8
Dec 2019	9	9	7.45
Jan 2020	6	6	6
Feb 2020	8	8	8
Total	36	36	34.45 ²

Table 2: Survey effort non-breeding season 2019/20

Non-breeding Season 2020/21			
Month	VP1	VP2	VP3
Sep 2020	4	4	4
Oct 2020	6	6	6
Nov 2020	6	6	6
Dec 2020	6	6	6
Jan 2021	6	6	6
Feb 2021	4	4	4
Mar 2021	4	4	4
Total	36	36	36

Table 3: Survey effort non-breeding season 2020/21

Non-breeding Season 2021/22				
Month	VP1	VP2	VP3	VP4
Oct 2021	2.5	2	2	2
Nov 2021	3	10	6	6
Dec 2021	9	9	6	9
Jan 2022	9	8	9	6
Feb 2022	11.5	6	12	6
Mar 2022	4	1	3	8
Total	36	36	38	37

Table 4: Survey effort non-breeding season 2021/22

Non-breeding Season 2022/23				
Month	VP1	VP2	VP3	VP4
Dec 2022	5.75	3	3	6
Jan 2023	12	12	12	12
Feb 2023	12	12	12	12
Mar 2023	6.25	9	9	6
Total	36	36	36	36

Table 5: Survey effort non-breeding season 2022/23

² See Section 1.6.8

Breeding Season 2020			
Month	VP1	VP2	VP3
Mar	3	6	3
Apr	5	5	5
May	9	7	9
Jun	6	3	6
Jul	6	6	6
Aug	9	11	9
Total	38	38	38

Table 6: Survey effort breeding season 2020

Breeding Season 2021			
Month	VP1	VP2	VP3
Mar	3	3	3
Apr	3	2	3
May	4	6.25	4
Jun	7	6	11
Jul	9	9	9
Aug	10	9.75	13
Total	36	36	43

Table 7: Survey effort breeding season 2021

Breeding Season 2022				
Month	VP1	VP2	VP3	VP4
Mar	3	6	1	5
Apr	9		6	
May	6	9	7	6
Jun	6	6	6	6
Jul	6	6	9	9
Aug	6	9	7	10
Total	36	36	36	36

Table 8: Survey effort breeding season 2022

Breeding Season 2023				
Month	VP1	VP2	VP3	VP4
Apr	6	6	6	6
May	6	6	6	6
Jun	6	6	6	6
Jul	6	6	6	6
Aug	9	9	9	9
Sep	3	3	3	3
Total	36	36	36	36

Table 9: Survey effort breeding season 2023

1.6.3 BREEDING BIRD SURVEYS

The breeding bird study area was defined as a 500m turbine buffer. Breeding bird surveys were undertaken during Year 1 (breeding season 2020), Year 2 (breeding season 2021), Year 3 (breeding season 2022) and Year 4 (breeding season 2023).

Survey methodology combined elements of Smith and O'Brien (1992) for lowland breeding waders, Brown and Shepherd (1993) for upland and moorland species, and the Common Bird Census approach described by Gilbert *et al.* (1998). This combined approach provided systematic coverage of all representative habitat types within the study area, including grassland, wetland margins, moorland edge, and scrub.

In line with NatureScot guidance, survey effort focused on non-passerine species of conservation concern breeding within open habitats. All species encountered were recorded; however, passerine were not considered target species unless they were particularly sensitive to habitat change (e.g. yellowhammer).

Surveys were conducted along routes designed to provide comprehensive spatial coverage within the 500m buffer. Each route was walked at a steady pace, with all birds seen or heard recorded on field maps or digitally using Survey123, and routes tracked using GPS. Surveys were aimed to be undertaken in favourable weather conditions (wind speeds below Beaufort scale F5 and moderate to good visibility) to ensure optimal detectability.

Territory mapping followed the methods described in Bibby (2000) and Gilbert *et al.* (1998). A precautionary approach was followed, whereby a bird was considered to hold a territory if breeding behaviour (e.g. singing, alarm-calling, food carrying) was recorded, or if a pair was observed in suitable habitat during any survey visit.

Further details on survey effort and weather conditions for each season are provided in **Annex 5.7a** (Survey Effort).

Breeding Season 2020		
Date	Survey type	Surveyor
07/05/2020	Breeding Bird	KW ³
07/05/2020	Breeding Bird	KW
10/06/2020	Breeding Bird	KW
11/06/2020	Breeding Bird	KW
21/07/2020	Breeding Bird	KW
22/07/2020	Breeding Bird	KW
23/07/2020	Breeding Bird	KW

Table 10: Survey effort breeding season 2020

Breeding Season 2021		
Date	Survey type	Surveyor
16/06/2021	Breeding Bird	PD ⁴
24/06/2021	Breeding Bird	PD
05/07/2021	Breeding Bird	JB ⁵

³ Ken Westman

⁴ Patrick Devereux

⁵ Jamie Bliss

07/07/2021	Breeding Bird	JB
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Table 11: Survey effort breeding season 2021

Breeding Season 2022		
Date	Survey type	Surveyor
04/05/2022	Breeding Bird	DR ⁶
10/05/2022	Breeding Bird	DR
12/05/2022	Breeding Bird	DR
16/05/2022	Breeding Bird	DR
24/05/2022	Breeding Bird	DR
02/06/2022	Breeding Bird	DR
14/06/2022	Breeding Bird	DR
22/06/2022	Breeding Bird	DR
29/06/2022	Breeding Bird	DR
03/08/2022	Breeding Bird	DR
16/08/2022	Breeding Bird	DR
24/08/2022	Breeding Bird	DR
25/08/2022	Breeding Bird	DR
31/08/2022	Breeding Bird	DR

Table 12: Survey effort breeding season 2022

Breeding Season 2023		
Date	Survey type	Surveyor
17/04/2023	Breeding Bird	DR
18/04/2023	Breeding Bird	DR
20/04/2023	Breeding Bird	DR
25/04/2023	Breeding Bird	DR
02/05/2023	Breeding Bird	DR
12/05/2023	Breeding Bird	DR
22/05/2023	Breeding Bird	DR
30/05/2023	Breeding Bird	DR
09/06/2023	Breeding Bird	DR
19/06/2023	Breeding Bird	DR
20/06/2023	Breeding Bird	DR
21/06/2023	Breeding Bird	DR
04/07/2023	Breeding Bird	DR
09/07/2023	Breeding Bird	DR
11/07/2023	Breeding Bird	DR
25/07/2023	Breeding Bird	DR

Table 13: Survey effort breeding season 2023

⁶ David Russel

1.6.4 BREEDING RAPTOR SURVEYS

Breeding raptor surveys were undertaken in Year 1 March - July 2020, Year 2 March – July 2021, Year 3 March – August 2022, and Year 4 April to July 2023, following the methodologies detailed in Hardey *et al.* (2013) and consistent with NatureScot guidance (2017).

The study area was defined as a 2km buffer of the turbine layout to encompass all habitats suitable for breeding raptors. Surveys covered all accessible areas of suitable nesting and foraging habitat within this buffer.

Survey methods involved a combination of ad-hoc VP locations positioned to overlook key habitat features, and systematic walkover surveys to identify evidence of breeding activity. Surveyors looked for evidence including displaying, territorial, or nesting behaviour, as well as the presence of occupied nests, recently fledged young, or alarm-calling adults.

Although the surveys primarily targeted Annex I species and raptors red-listed under the Birds of Conservation Concern in Ireland 4 (BoCCI 2020-2026), other raptor species were also recorded where encountered.

All observations were recorded on large-scale field maps, with accompanying notes on behaviour, activity type, and habitat context.

Survey weather conditions for each season are provided in **Annex 5.7a** (Survey Effort).

Breeding season 2020		
Date	Survey type	Surveyor
26/03/2020	Breeding raptor	KW
27/03/2020	Breeding raptor	KW
05/05/2020	Breeding raptor	KW
06/05/2020	Breeding raptor	KW
10/06/2020	Breeding raptor	KW
25/06/2020	Breeding raptor	KW
26/06/2020	Breeding raptor	KW
22/07/2020	Breeding raptor	KW
24/07/2020	Breeding raptor	KW

Table 14: Survey effort breeding raptor 2020

Breeding season 2021		
Date	Survey type	Surveyor
23/03/2021	Breeding raptor	JB
24/03/2021	Breeding raptor	JB
24/05/2021	Breeding raptor	PD
26/05/2021	Breeding raptor	PD
28/05/2021	Breeding raptor	PD
06/07/2021	Breeding raptor	JB
07/07/2021	Breeding raptor	JB
07/07/2021	Breeding raptor	DB
08/07/2021	Breeding raptor	JB

Table 15: Survey effort breeding raptor 2021

Breeding season 2022		
Date	Survey type	Surveyor
07/04/2022	Breeding raptor	DR
13/04/2022	Breeding raptor	DR
04/05/2022	Breeding raptor	DR
30/05/2022	Breeding raptor	DR
22/06/2022	Breeding raptor	DR
26/06/2022	Breeding raptor	DR
13/07/2022	Breeding raptor	DR
26/07/2022	Breeding raptor	DR
24/08/2022	Breeding raptor	DR

Table 16: Survey effort breeding raptor 2022

Breeding season 2023		
Date	Survey type	Surveyor
04/04/2023	Breeding raptor	DR
09/04/2023	Breeding raptor	DR
18/04/2023	Breeding raptor	DR
19/04/2023	Breeding raptor	DR
23/04/2023	Breeding raptor	DR
05/05/2023	Breeding raptor	DR
11/05/2023	Breeding raptor	DR
22/05/2023	Breeding raptor	DR
30/05/2023	Breeding raptor	DR
20/06/2023	Breeding raptor	DR
21/06/2023	Breeding raptor	DR
28/06/2023	Breeding raptor	DR
29/06/2023	Breeding raptor	DR
04/07/2023	Breeding raptor	DR
06/07/2023	Breeding raptor	DR
11/07/2023	Breeding raptor	DR
12/07/2023	Breeding raptor	DR

Table 17: Survey effort breeding raptor 2023

1.6.5 NON-BREEDING WALKOVER SURVEYS

Non-breeding walkover surveys took place in Year 1 (non-breeding season 2019/20), Year 2 (non-breeding season 2020/21), Year 3 (non-breeding season 2021/22) and Year 4 (non-breeding season 2022/23). Surveys were designed to ensure that no point within the 500m buffer was more than 250m from a transect route, providing comprehensive coverage of the project site. During these surveys, surveyors systematically walked the study area along predefined transects to sample all habitat types and record all bird species encountered, providing insight into species distribution and habitat use across the project site. Observations were recorded digitally using Survey 123 and geo referenced with behavioural notes added where appropriate.

Individual survey weather conditions can be found in **Annex 5.7a** (Survey Effort).

Non-breeding season 2019/20		
Date	Survey type	Surveyor
06/12/2019	Walkover	MH
12/01/2020	Walkover	MH
07/02/2020	Walkover	KW

Table 18: Survey effort non-breeding season 2019/20

Non-breeding season 2020/21		
Date	Survey type	Surveyor
23/10/2020	Walkover	JB
11/12/2020	Walkover	JB
27/02/2021	Walkover	JB

Table 19: Survey effort non-breeding season 2020/21

Non-breeding season 2021/22		
Date	Survey type	Surveyor
01/12/2021	Walkover	DR
03/12/2021	Walkover	DR
26/01/2022	Walkover	DR
28/01/2022	Walkover	DR
03/03/2022	Walkover	DR

Table 20: Survey effort non-breeding season 2021/22

Non-breeding season 2022/23		
Date	Survey type	Surveyor
23/01/2023	Walkover	DL
25/01/2023	Walkover	DL
31/01/2023	Walkover	DR
09/02/2023	Walkover	DR
13/03/2023	Walkover	DR
14/03/2023	Walkover	DR
19/03/2023	Walkover	DR
20/03/2023	Walkover	DR

Table 21: Survey effort non-breeding season 2022/23

1.6.6 NON-BREEDING WIDER AREA WINTERING WATERBIRD SURVEYS

Non-breeding waterbirds surveys were undertaken between November 2019 to January 2020 and October 2020 to March 2021. SNH guidance (SNH, 2017) recommends monitoring swan and geese foraging and roosting activity within the wider area of the project site, particularly where SPAs are designated for these species.

Surveys effort encompassed the wider landscape within a 5km buffer of the project site. Waterbird counts were conducted at all publicly accessible or observable wetland habitats, including bogs, ponds, canals, rivers, and other waterbodies.

Observations of incidental species, particularly raptors, were also recorded during these surveys.

Individual survey dates and weather conditions can be found in **Annex 5.7a** (Survey Effort).

Non-breeding season 2019/20		
Date	Survey type	Surveyor
07/11/2019	Waterbirds	KW
14/11/2019	Waterbirds	KW
10/12/2019	Waterbirds	KW
11/01/2020	Waterbirds	KW

Table 22: Survey effort non-breeding season 2019/20

Non-breeding season 2020/21		
Date	Survey type	Surveyor
15/10/2020	Waterbirds	KW
09/11/2020	Waterbirds	JB
09/12/2020	Waterbirds	JB
06/01/2021	Waterbirds	JB
08/02/2021	Waterbirds	JB
07/03/2021	Waterbirds	JB

Table 23: Survey effort non-breeding season 2020/21

Non-breeding season 2020/21		
Date	Survey type	Surveyor
09/02/2023	Waterbirds	DR

Table 24: Survey effort non-breeding season 2022/23

1.6.7 HEN HARRIER ROOST SEARCHES

Roost searches were undertaken in October 2019, October 2020 to March 2021, October 2021 to March 2022, December 2022 to February 2023 and October 2024 to March 2025.

SNH (2017) guidelines stipulate that communal raptor roosts, including those of hen harriers, within 2km of a proposed development should be identified.

The approach to surveying for hen harrier roosts is influenced by two main factors:-

1. Any hen harrier activity observed during VP watches, site walkovers, and wider area surveys; and,
2. The availability of potentially suitable roosting habitat near the proposed development, as outlined by Clarke & Watson (1990) and in the Irish national hen harrier winter roost survey guidelines (O'Donoghue, 2019).

SNH (2017) references Hardey *et al.* (2013) for specific roost survey methodology, which emphasises the use of professional judgment to identify and target potential roosts based on observed flight activity within or near the project site. Further recommendation for locating birds, is to find them in the late afternoon and track them back to their roosts. O'Donoghue (2019) suggests the optimal time for roost

watches is at least 40-minutes before sunset until dark, or 30 minutes before sunrise until at least 30-minutes after sunrise. The dates for hen harrier roost watches are provided in the **Annex 5.7a**.

Once a roost is identified, further monitoring is necessary to document roost attendance and track flight lines to and from the roost in relation to the project site. Additional monitoring is typically conducted based on the frequency of roost occupancy and the proximity of roosting birds to the project site.

Non-breeding season 2019/20		
Date	Survey type	Surveyor
12/01/2020	Hen harrier roost watch	MH ⁷

Table 25: Survey effort hen harrier roost watch non-breeding season 2019/20

Non-breeding season 2020/21		
Date	Survey type	Surveyor
21/10/2020	Hen harrier roost watch	JB
22/10/2020	Hen harrier roost watch	JB
07/11/2020	Hen harrier roost watch	JB
08/11/2020	Hen harrier roost watch	JB
09/12/2020	Hen harrier roost watch	JB
11/12/2020	Hen harrier roost watch	DB
11/12/2020	Hen harrier roost watch	JB
12/12/2020	Hen harrier roost watch	JB
12/12/2020	Hen harrier roost watch	DB
06/01/2021	Hen harrier roost watch	DB
06/01/2021	Hen harrier roost watch	JB
07/01/2021	Hen harrier roost watch	JB
07/01/2021	Hen harrier roost watch	DB
08/01/2021	Hen harrier roost watch	JB
08/01/2021	Hen harrier roost watch	DB
06/02/2021	Hen harrier roost watch	DB
06/02/2021	Hen harrier roost watch	JB
08/02/2021	Hen harrier roost watch	JB
09/02/2021	Hen harrier roost watch	DB
09/02/2021	Hen harrier roost watch	JB
25/02/2021	Hen harrier roost watch	JB
25/02/2021	Hen harrier roost watch	DB
06/03/2021	Hen harrier roost watch	JB
06/03/2021	Hen harrier roost watch	DB
07/03/2021	Hen harrier roost watch	JB

Table 26: Survey effort hen harrier roost watch non-breeding season 2020/21

Non-breeding season 2021/22		
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⁷ Mike Holt

Date	Survey type	Surveyor
20/10/2021	Hen harrier roost watch	PD ⁸
21/10/2021	Hen harrier roost watch	PD
23/11/2021	Hen harrier roost watch	DR ⁹
24/11/2021	Hen harrier roost watch	DR
09/12/2021	Hen harrier roost watch	DR
13/12/2021	Hen harrier roost watch	DR
14/12/2021	Hen harrier roost watch	DR
12/01/2022	Hen harrier roost watch	DR
18/01/2022	Hen harrier roost watch	DR
19/01/2022	Hen harrier roost watch	AM
19/01/2022	Hen harrier roost watch	JOC
20/01/2022	Hen harrier roost watch	JOC
20/01/2022	Hen harrier roost watch	AM
20/01/2022	Hen harrier roost watch	DR
26/01/2022	Hen harrier roost watch	DR
26/01/2022	Hen harrier roost watch	GO ¹⁰
27/01/2022	Hen harrier roost watch	GO
28/01/2022	Hen harrier roost watch	DR
11/02/2022	Hen harrier roost watch	DR
21/02/2022	Hen harrier roost watch	GO
22/02/2022	Hen harrier roost watch	GO
28/02/2022	Hen harrier roost watch	DR
01/03/2022	Hen harrier roost watch	AM ¹¹
01/03/2022	Hen harrier roost watch	JOC
03/03/2022	Hen harrier roost watch	DR

Table 27: Survey effort hen harrier roost watch non-breeding season 2021/22

Non-breeding season 2022/23		
Date	Survey type	Surveyor
14/12/2022	Hen harrier roost watch	DL ¹²
15/12/2022	Hen harrier roost watch	DL
17/01/2023	Hen harrier roost watch	DL
23/01/2023	Hen harrier roost watch	DL
25/01/2023	Hen harrier roost watch	DL
25/01/2023	Hen harrier roost watch	DL
09/02/2023	Hen harrier roost watch	DL
13/02/2023	Hen harrier roost watch	DL
13/02/2023	Hen harrier roost watch	DL

⁸ Patrick Devroux

⁹ David Russel

¹⁰ Geoff Oliver

¹¹ Aoife Moroney

¹² Daithi Lavelle

Non-breeding season 2022/23		
Date	Survey type	Surveyor
15/02/2023	Hen harrier roost watch	DL

Table 28: Survey effort hen harrier roost watch non-breeding season 2022/23

Non-breeding season 2022/23		
Date	Survey type	Surveyor
24/10/2024	Hen harrier roost watch	DL
24/10/2024	Hen harrier roost watch	AW, SPO
24/10/2024	Hen harrier roost watch	CB, AS ¹³
21/11/2024	Hen harrier roost watch	DL
21/11/2024	Hen harrier roost watch	AJ, SP
09/01/2025	Hen harrier roost watch	AJ ¹⁴
09/01/2025	Hen harrier roost watch	SPO ¹⁵
09/01/2025	Hen harrier roost watch	BM, CB, LMcS
17/01/2025	Hen harrier roost watch	JOC ¹⁶
29/01/2025	Hen harrier roost watch	BM ¹⁷
29/01/2025	Hen harrier roost watch	LMcS, DL
29/01/2025	Hen harrier roost watch	SPO
24/02/2025	Hen harrier roost watch	BM
24/02/2025	Hen harrier roost watch	CB ¹⁸
24/02/2025	Hen harrier roost watch	LMcS ¹⁹
24/02/2025	Hen harrier roost watch	SPO, DL
12/03/2025	Hen harrier roost watch	BM, CB
12/03/2025	Hen harrier roost watch	LMcS
12/03/2025	Hen harrier roost watch	SPO, JOSB ²⁰

Table 29: Survey effort hen harrier roost watch non-breeding season 2022/23

1.6.8 SURVEY LIMITATIONS

Methods followed SNH (2017) guidance and there were no significant limitations on the data gathered or approaches taken.

Vantage point survey in non-breeding season 2019-20, survey hours at VP3 were 34.45 falling short of the recommended 36 hours per VP. This does not represent a serious limitation.

Due to the length of survey period (5-years) digital recording methods for collecting data in the field were updated and surveyors working on the changed over time.

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¹⁵ Sammy Pooley

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¹⁸ Conn Barry

¹⁹ Leona McSharry

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During non-breeding season winter walk over surveys in 2022/23, two surveys were subject to data corruption and unusable. Additional surveys remedied this potential data loss, resulting in no overall limitation in these results.

1.7 SURVEY RESULTS

1.7.1 VANTAGE POINT (VP) WATCHES

A total of 21 target species, resulting in 467 flights, were recorded during VP watches conducted over four years of surveys between October 2019 and September 2023. Flight activity for these species within the 500m buffer is presented separately for the non-breeding and breeding seasons.

Collision risk modelling uses data from the most recent two years, spanning non-breeding season 2021-22 to the breeding season 2023 (see the CRM report for further details). Full flight line maps are provided in **Appendix 2** (hereto), with corresponding survey tables in **Annex 5.7c**.

VP results non-breeding season 2019/20			
Species ²¹	Number of flights	Max number. of birds	Flight seconds in 500m buffer
BoCCI (2020-2026) Red-listed			
Golden plover *	16	500	6340
Kestrel	12	1	3105
Snipe	1	1	13
BoCCI (2020-2026) Amber-listed			
Hen harrier *	7	1	2455
Lesser black-backed gull	1	1	48
Mallard	1	2	70
Merlin *	1	1	44
Whooper swan *	6	12	583
BoCCI (2020-2026) Green-listed			
Grey heron	1	2	83
Sparrowhawk	2	1	134

Table 30: VP results non-breeding season 2019/20

VP results breeding season 2020			
Species ²²	Number of flights	Max number. of birds	Flight seconds in 500m buffer
BoCCI (2020-2026) Red-listed			
Curlew	1	1	88
Golden plover *	2	60	676
Kestrel	24	2	6743
Red grouse	2	1	41
Snipe	9	2	314
BoCCI (2020-2026) Amber-listed			
Hen harrier *	2	1	401

²¹ * Denotes EU Annex 1 status.

²² * Denotes EU Annex 1 status.

Lesser black-backed gull	3	3	373
Mallard	6	2	249
Merlin *	2	1	36
BoCCI (2020-2026) Green-listed			
Buzzard	2	2	30
Sparrowhawk	1	1	10

Table 31: VP results breeding season 2020

VP results non-breeding season 2020/21			
Species²³	Number of flights	Max number. of birds	Flight seconds in 500m buffer
BoCCI (2020-2026) Red-listed			
Golden plover *	34	1000	2971
Kestrel	43	2	5088
Red grouse	2	1	0*
Snipe	2	2	280
BoCCI (2020-2026) Amber-listed			
Hen harrier *	9	1	189
Herring gull	2	2	206
Mallard	3	2	72
Merlin *	3	1	148
Whooper swan *	4	9	212
BoCCI (2020-2026) Green-listed			
Buzzard	2	1	250
Grey heron	3	1	220
*Species was recorded during surveys but not in flight (eg. Perched, on ground etc)			

Table 32: VP results non-breeding season 2020/21

VP results breeding season 2021			
Species²⁴	Number of flights	Max number. of birds	Flight seconds in 500m buffer
BoCCI (2020-2026) Red-listed			
Golden plover *	6	39	1192
Kestrel	27	1	4127
Red grouse	3	2	54
Snipe	11	4	1269
Swift	7	4	1059
BoCCI (2020-2026) Amber-listed			
Hen harrier *	1	1	30
Herring gull	1	1	18
Lesser black-backed gull	26	2	1961
Mallard	8	2	192
Merlin *	1	1	12

²³ * Denotes EU Annex 1 status.

²⁴ * Denotes EU Annex 1 status.

Whooper swan *	2	34	89
BoCCI (2020-2026) Green-listed			
Buzzard	1	1	10
Great black-backed gull	5	1	432
Grey heron	2	1	319
Sparrowhawk	3	1	86

Table 33: VP results breeding season 2021

VP results non-breeding season 2021/22			
Species²⁵	Number of flights	Max number. of birds	Flight seconds in 500m buffer
BoCCI (2020-2026) Red-listed			
Curlew	2	20	22
Golden plover *	12	500	930
Kestrel	6	1	34
Lapwing	1	15	5
Red grouse	3	2	0*
Snipe	2	2	9
Woodcock	1	1	0*
BoCCI (2020-2026) Amber-listed			
Hen harrier *	7	2	27
Lesser black-backed gull	1	1	10
Mallard	4	2	18
BoCCI (2020-2026) Green-listed			
Grey heron	1	1	1
Pheasant	4	1	7
Raven	4	3	135
Sparrowhawk	2	1	3
*Species was recorded during surveys but not in flight (eg. Perched, on ground etc)			

Table 34: VP results non-breeding season 2021/22

VP results breeding season 2022			
Species²⁶	Number of flights	Max number. of birds	Flight seconds in 500m buffer
BoCCI (2020-2026) Red-listed			
Kestrel	5	4	238
Snipe	1	1	0
Swift	1	1	12
BoCCI (2020-2026) Amber-listed			
Common gull	1	1	13
Lesser black-backed gull	8	3	77
Mallard	2	2	0*
Merlin *	1	1	9

²⁵ * Denotes EU Annex 1 status.

²⁶ * Denotes EU Annex 1 status.

BoCCI (2020-2026) Green-listed			
Buzzard	6	2	4
Pheasant	4	2	0*
Sparrowhawk	1	1	0*
*Species was recorded during surveys but not in flight (eg. Perched, on ground etc)			

Table 35: VP results breeding season 2022

VP results breeding non-season 2022/23			
Species ²⁷	Number of flights	Max number. of birds	Flight seconds in 500m buffer
BoCCI (2020-2026) Red-listed			
Curlew	2	3	5
Golden plover *	1	8	4
Kestrel	2	1	0*
Snipe	5	1	11
BoCCI (2020-2026) Amber-listed			
Black-headed gull	3	2	17
Common gull	1	1	9
Hen harrier *	10	1	180
Lesser black-backed gull	1	1	8
Mallard	5	2	34
Merlin *	2	1	25
BoCCI (2020-2026) Green-listed			
Buzzard	1	1	190
*Species was recorded during surveys but not in flight (eg. Perched, on ground etc)			

Table 36: VP results breeding non-season 2022/23

VP results breeding season 2023			
Species	Number of flights	Max number. of birds	Flight seconds in 500m buffer
BoCCI (2020-2026) Red-listed			
Curlew	1	6	8
Kestrel	15	1	98
Snipe	1	1	0*
Swift	2	1	11
BoCCI (2020-2026) Amber-listed			
Black-headed gull	1	1	0*
Lesser black-backed gull	8	2	48
Mallard	7	1	55
BoCCI (2020-2026) Green-listed			
Sparrowhawk	5	2	47
*Species was recorded during surveys but not in flight (eg. Perched, on ground etc)			

Table 37: VP results breeding season 2023

²⁷ * Denotes EU Annex 1 status.

1.7.2 BREEDING SEASON SURVEY RESULTS

1.7.2.1 Dusk Survey Results

Dusk surveys were undertaken in Year 1 (June 2020), Year 2 (June 2021), Year 3 (between March and August 2022). Snipe was the only target species recorded during dusk surveys in Year 1 and Year 2 with drumming behaviour observed on three occasions within the 500m buffer. Three indicative territories are presented in **Figure 54**.

Red grouse was recorded incidentally in two survey years; due to its cryptic behaviour, it is often underrepresented in surveys. Mallard, pheasant, and grey heron were also recorded incidentally, with Mallard observed flying over and using drainage ditches in the cut bog areas. Full survey tables are presented in **Annex 5.7d** (Walkover and Dusk Survey Data).

Species	No. individuals	BoCCI 2020-2026
	10/06/20	
Snipe	2	Red
Red grouse	1	Red

Table 38: Dusk results breeding season 2020

Species	No. individuals		BoCCI 2020-2026
	16/06/21	29/06/21	
Snipe	4	5	Red
Red grouse	-	1	Red

Table 39: Dusk results breeding season 2021

Species	No. individuals				BoCCI 2020-2026
	23/03/22	29/03/22	17/08/22	31/08/22	
Mallard	4	2	-	-	Amber
Grey heron	1	-	-	-	Green
Pheasant		1	-	-	Green

Table 40: Dusk results breeding season 2022

1.7.2.2 Breeding Birds

A total of six species of conservation concern were recorded exhibiting breeding behaviour during breeding bird surveys undertaken within the 500 m buffer across Year 1 (breeding season 2020), Year 2 (breeding season 2021), Year 3 (breeding season 2022) and Year 4 (breeding season 2023).

These included two red-listed and four amber-listed species. **Table 41** summarises the red-listed and amber-listed species recorded in each respective season. While some year-to-year variation in species presence was observed, overall population distribution and species ranges remained broadly consistent as shown in **Figure 5**, **Figure 6**, **Figure 7** and **Figure 8**. Notable breeding species include snipe observed in two of the four years.

Full results are presented in **Annex 5.7d** (Walkover and Dusk Survey Data).

Species	BTO Code	Breeding status 2020	Breeding status 2021	Breeding status 2022	Breeding status 2023
BoCCI (2020-2026) Red-listed					
Meadow pipit	MP	Observed once in June with one individual exhibiting breeding behaviour. Breeding status: Definite	Observed 29 times from May to July with a peak count of two individuals. Breeding behaviour ranged from display flights, alarm calling, and provisioning. Breeding status: Definite	Observed 18 times from May to June with a peak count of three individuals. Breeding behaviour ranged from alarm calling, courtship, singing, and sightings of fledging birds. Breeding status: Definite	Observed six times from April to June with a peak count of two individuals. Breeding behaviour included territorial, display flights and alarm calling. Breeding status: Definite
Snipe	SN	Observed four times between May – June with a peak count of one individual exhibiting display behaviour – chipping/drumming. Breeding status: Definite	Observed four times in May with a peak count of two individuals exhibiting display behaviour – chipping/drumming. Breeding status: Definite	No observations	No observations
BoCCI (2020-2026) Amber-listed					
Goldcrest	GC	A single individual was observed alarm calling in early May. Breeding status: probable.	No observations	A family party was observed once in late June comprising one adult and one fledged bird. Breeding status: Definite	Observed three times April to May with a peak count of three individuals. Breeding behaviour included courtship and observation of fledging birds. Breeding status: Definite
Skylark	S	Observed 13 times throughout the season in May to June with a peak count of 2 individuals. Breeding behaviour included singing and display flights. Breeding status: Definite	Observed 13 times throughout June to July with a peak count of one individual. Breeding behaviour included singing, display flights and provisioning. Breeding status: Definite	Observed 27 times throughout May to June with a peak count of five individuals. Breeding behaviour included singing, and alarm calling. Breeding status: Definite	Observed 32 times throughout April to June with a peak count of three individuals. Breeding behaviour included singing, and territorial behaviour. Breeding status: Definite
Swallow	SL	No observations	No observations	Four individuals were observed in early May in two separate nests at the old farmhouse.	No observations

Species	BTO Code	Breeding status 2020	Breeding status 2021	Breeding status 2022	Breeding status 2023
				Breeding status: Definite	
Willow warbler	WW	Observed eight times in early May exhibiting breeding behaviour – singing. Breeding status: Definite	Observed 36 times throughout June and July with a peak count of four individuals and breeding behaviour of singing and provisioning observed. Breeding status: Definite	Observed 27 throughout May to August with a peak count of 4 individuals. Breeding behaviour included singing, alarm calling and courtship. Breeding status: Definite	Observed 38 times throughout April to June with a peak count of three individuals. Breeding behaviour included singing and displaying. Breeding status: Definite

Table 41: Breeding bird survey results.

In addition, a typical assemblage of green-listed species, not of conservation concern and not typically affected by wind farm developments, was present throughout the breeding season. Species exhibiting breeding behaviour included blackbird (*Turdus merula*), blackcap (*Sylvia atricapilla*), blue tit (*Cyanistes caeruleus*), chaffinch (*Fringilla coelebs*), chiffchaff (*Phylloscopus collybita*), cuckoo (*Cuculus canorus*), dunnock (*Prunella modularis*), goldfinch (*Carduelis carduelis*), grasshopper warbler (*Locustella naevia*), great tit (*Parus major*), hooded (grey) crow (*Corvus cornix*), magpie (*Pica pica*), reed bunting (*Emberiza schoeniclus*), robin (*Erithacus rubecula*), sedge warbler (*Acrocephalus schoenobaenus*), siskin (*Spinus spinus*), stonechat (*Saxicola rubicola*), whitethroat (*Curruca communis*) and wren (*Troglodytes troglodytes*).

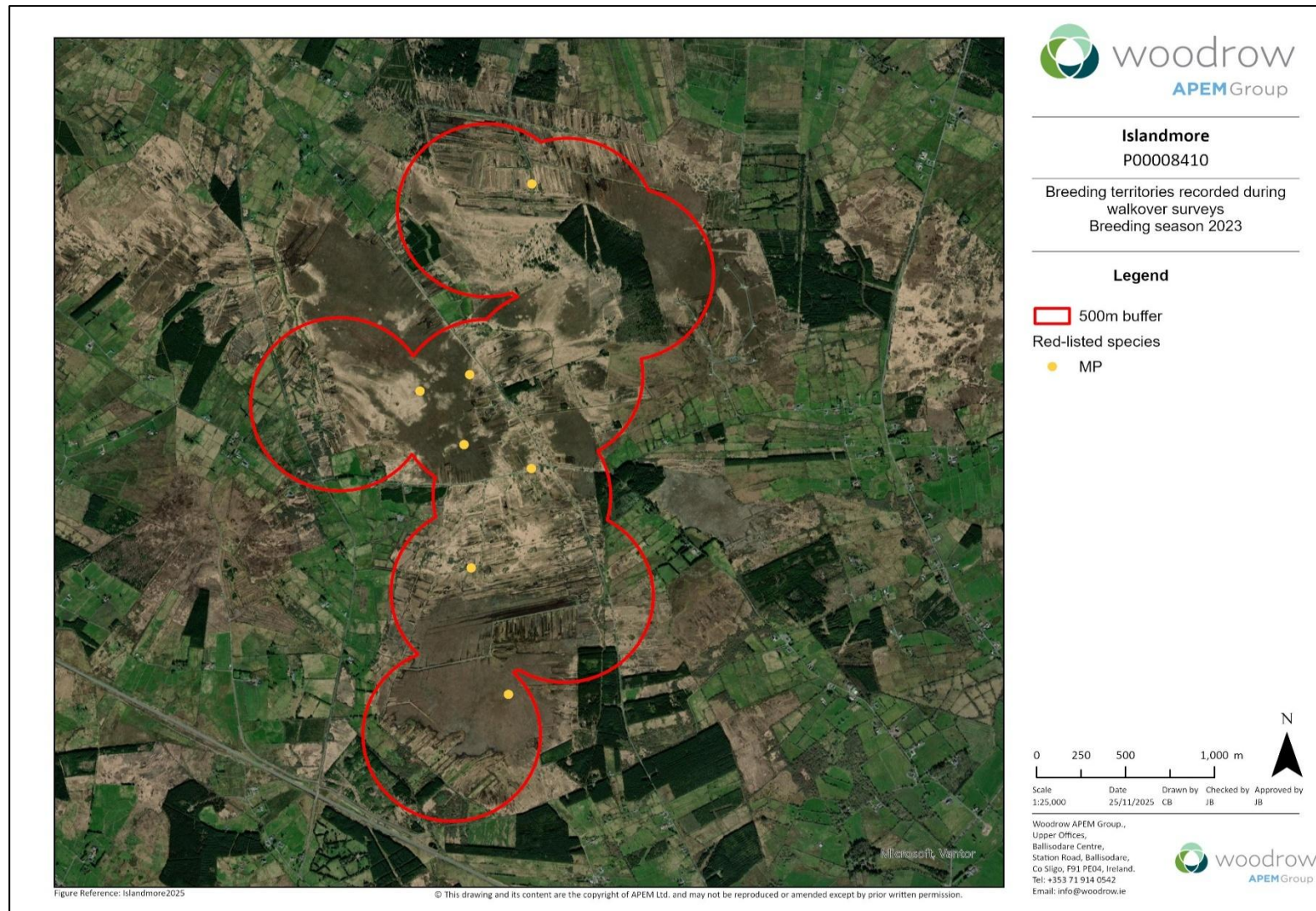


Figure 5: Indicative, red-listed species breeding territories 2023

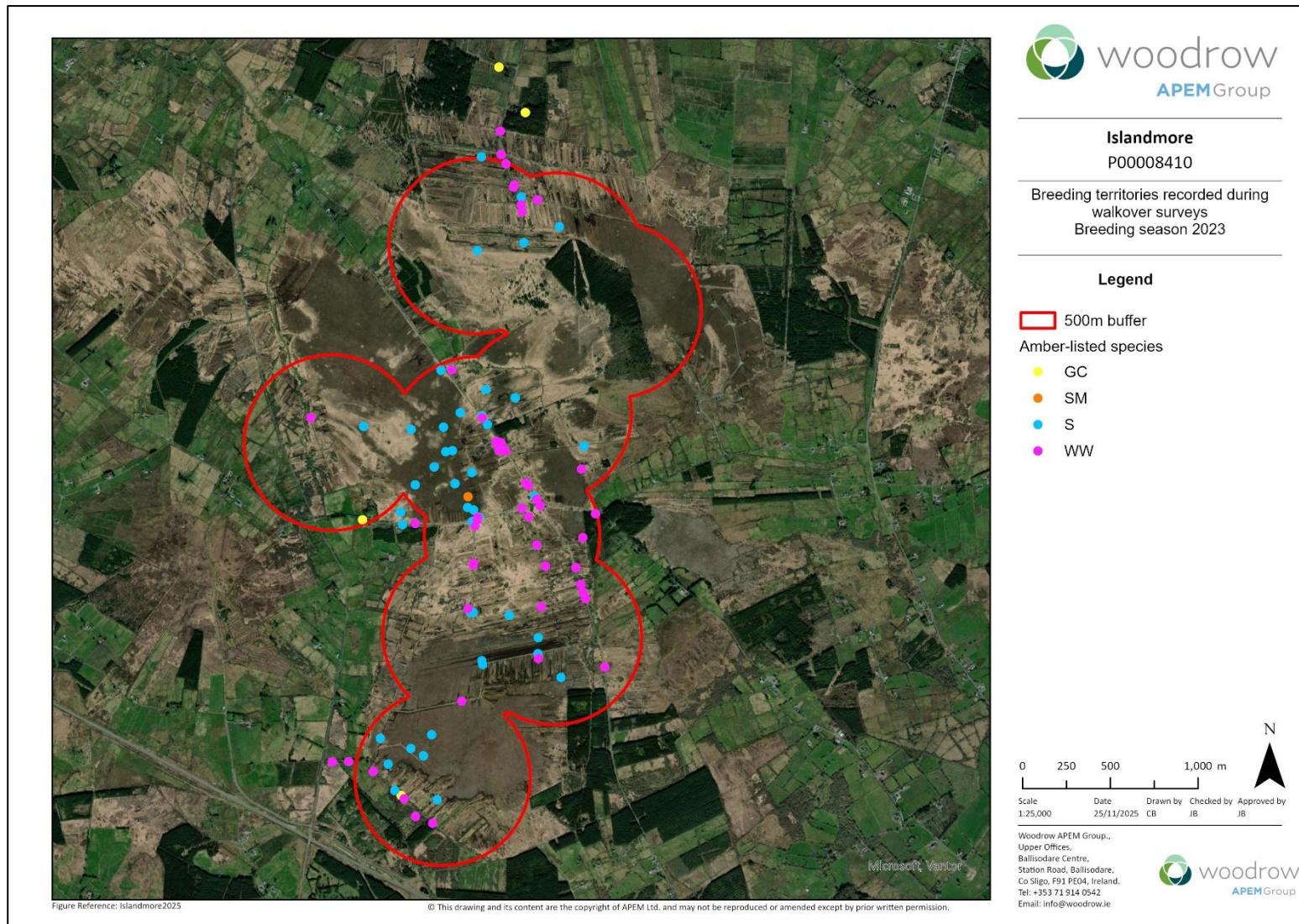


Figure 6: Indicative, amber-listed breeding territories 2023

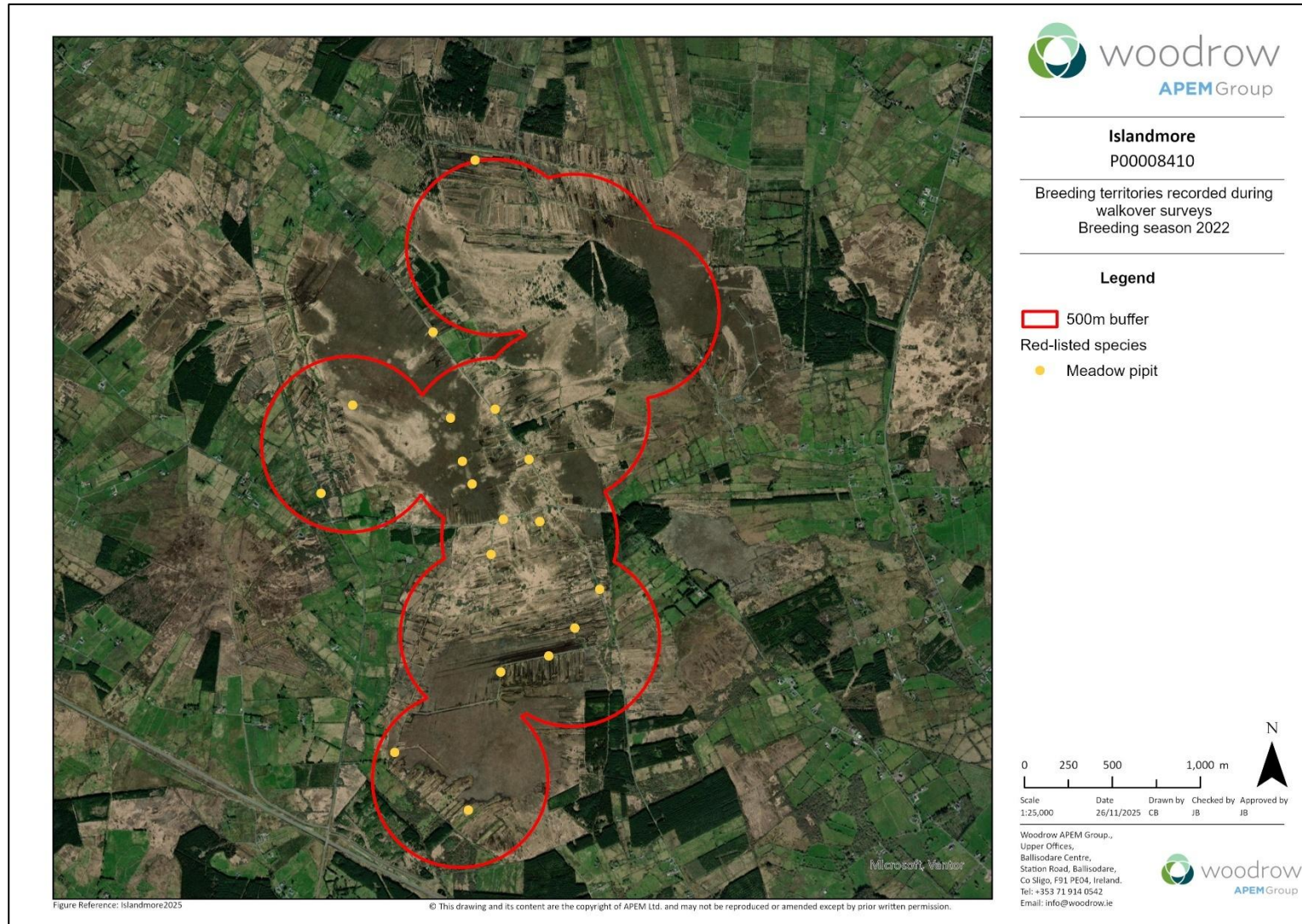


Figure 7: Indicative, red-listed species breeding territories 2022

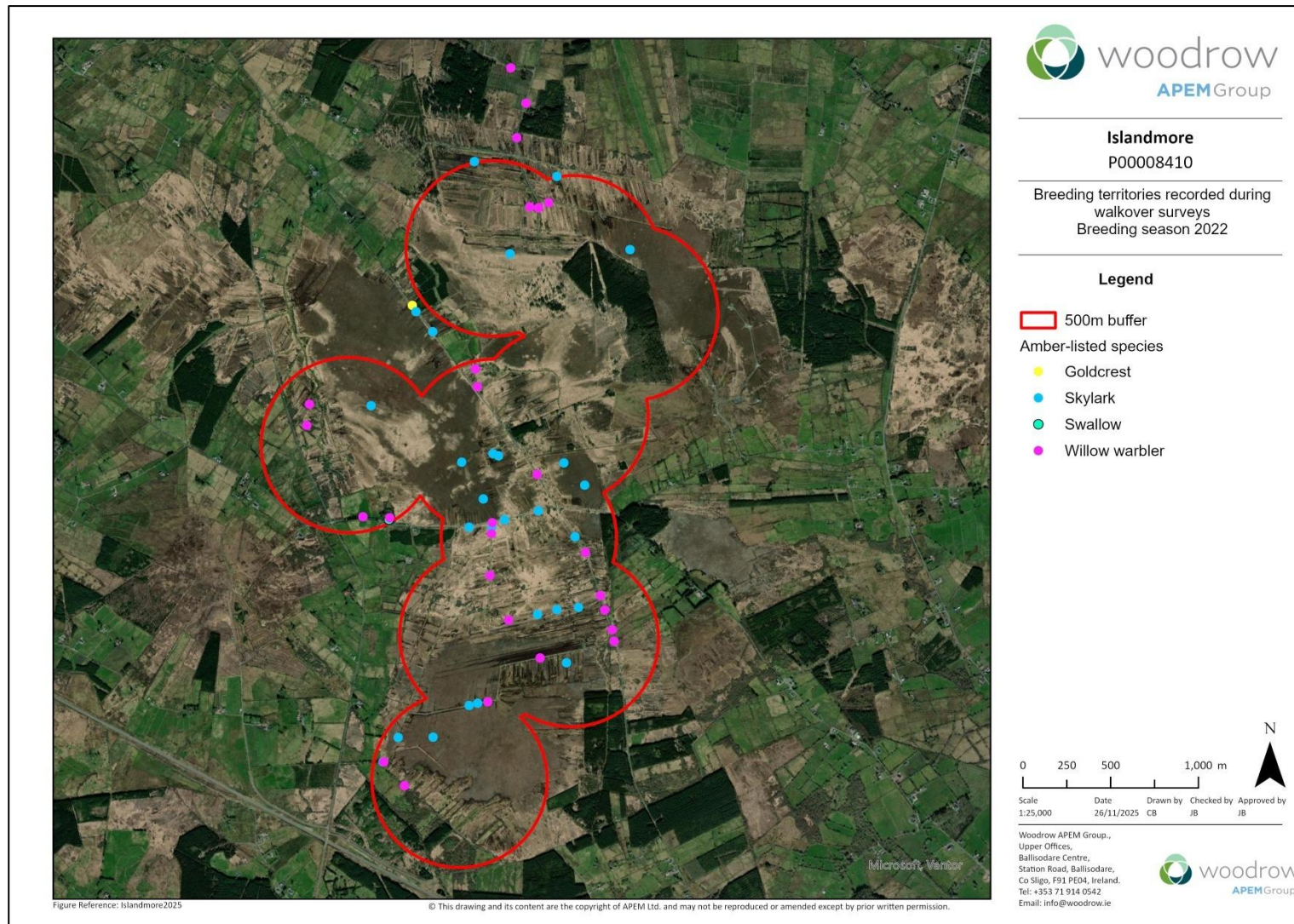


Figure 8: Indicative, amber-listed breeding territories 2022

1.7.2.3 Raptors

Breeding raptor surveys were undertaken in Year 1 (March and July 2020), Year 2 (March and July 2021), Year 3 (April and August 2022) and Year 4 (April and July 2023). Evidence of breeding raptors is limited to observations of late season juvenile sparrowhawk in 2020, a probable juvenile kestrel in 2021. Buzzard was observed in 2020 soaring over suitable habitats but there was no further observation. There was a single observation of Merlin alarm calling in 2021.

Full results are presented in **Appendix 3** hereto.

Species	BTO Code	Breeding status 2020	Breeding status 2021	Breeding status 2022	Breeding status 2023
BoCCI (2020-2026) Red-listed					
Kestrel	K	Observed 13 times between March and July with a speak count of two individuals. There was no breeding behaviour observed.	Observed three times between March and July. There was no breeding behaviour observed, but in July the sighting was of a probable juvenile individual.	Observed four times between July and August. There was no breeding behaviour observed.	Observed seven times between April and July with a speak count of two individuals. There was no breeding behaviour observed.
BoCCI (2020-2026) Amber-listed					
Hen harrier	HH	-	A single adult female individual was observed flying through the project site in July. There was no breeding behaviour observed.	-	-
Merlin	ML	Observed once in late March a female individual flew through the project site. There was no breeding behaviour observed,	A single individual was observed alarm calling in late March. There were no further observations.	-	-
BoCCI (2020-2026) Green-listed					
Buzzard	BZ	There was one observation of buzzard soaring over suitable habitat in late March. There were no further breeding related activity observed.	-	-	There were two observations of buzzard in April but there was no breeding behaviour observed.

Sparrowhawk	SH	There was one observation of fledgling individual calling in late July.	Observed four times between March to May with a peak count of two birds. There was no breeding behaviour observed.	A single individual was observed in April flying through the project site. There was no breeding behaviour observed.	There were two observations of sparrowhawk flying through the project site in July. There was no breeding behaviour observed.
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Table 42: Breeding raptor results summary table

1.7.2.4 Incidental Observations

2020 – Three observations of snipe exhibiting chipping/breeding behaviour on the bog. Three mallard and one wheatear were observed with no breeding behaviour.

2021 – There was a single observation of four whooper swans in late March flying north, two swift foraging in July and a great spotted woodpecker within the forestry plantation.

2022 – Two teal were flushed from the ditch network, two pheasant were observed, and a single lesser black-backed gull was also observed.

2023 – Two flocks of golden plover were observed early in the season of 16 and 25 birds; there was no breeding behaviour. Mallard was observed three times and red grouse once both with no breeding behaviour.

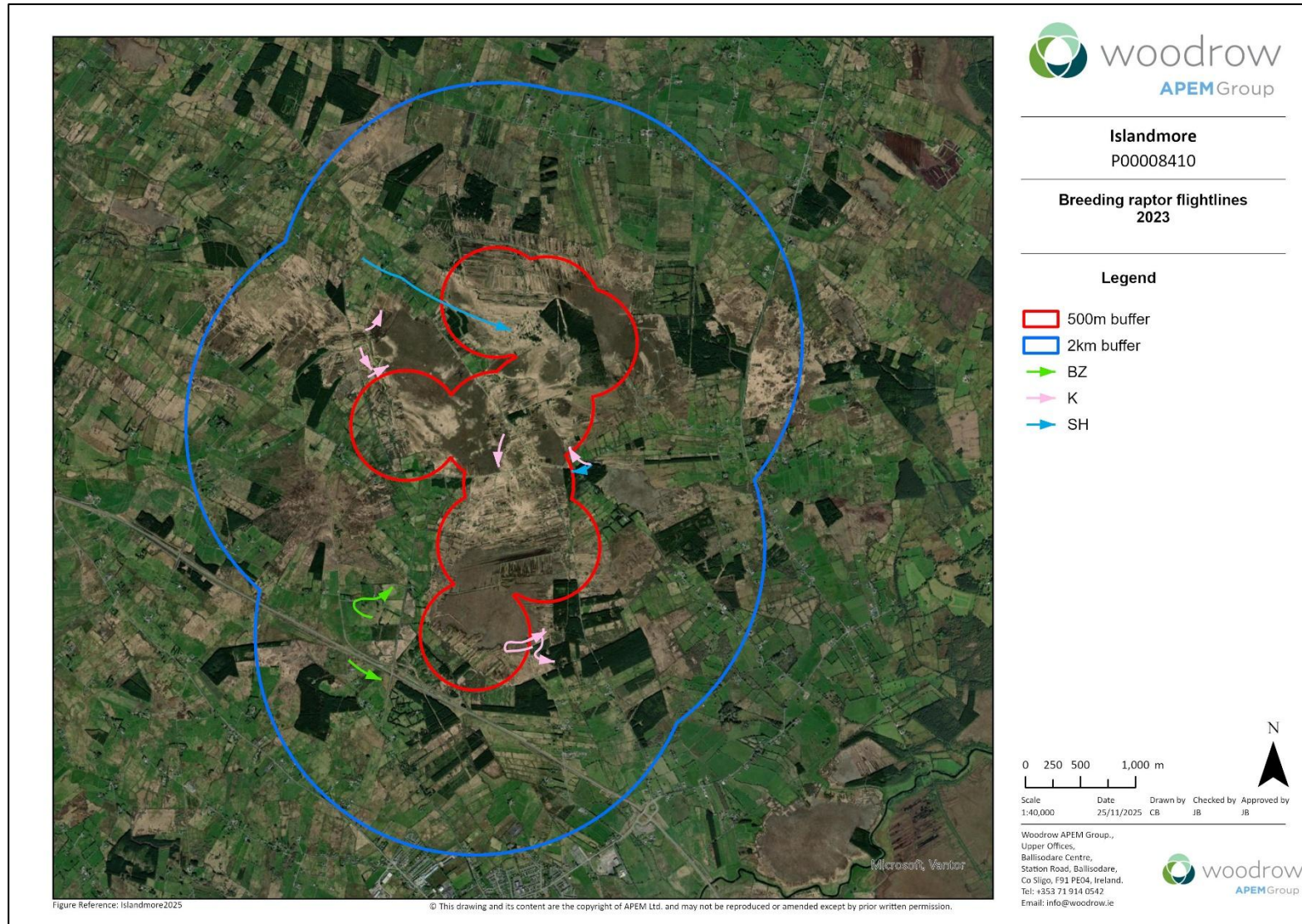


Figure 9: Breeding raptor flightlines 2023

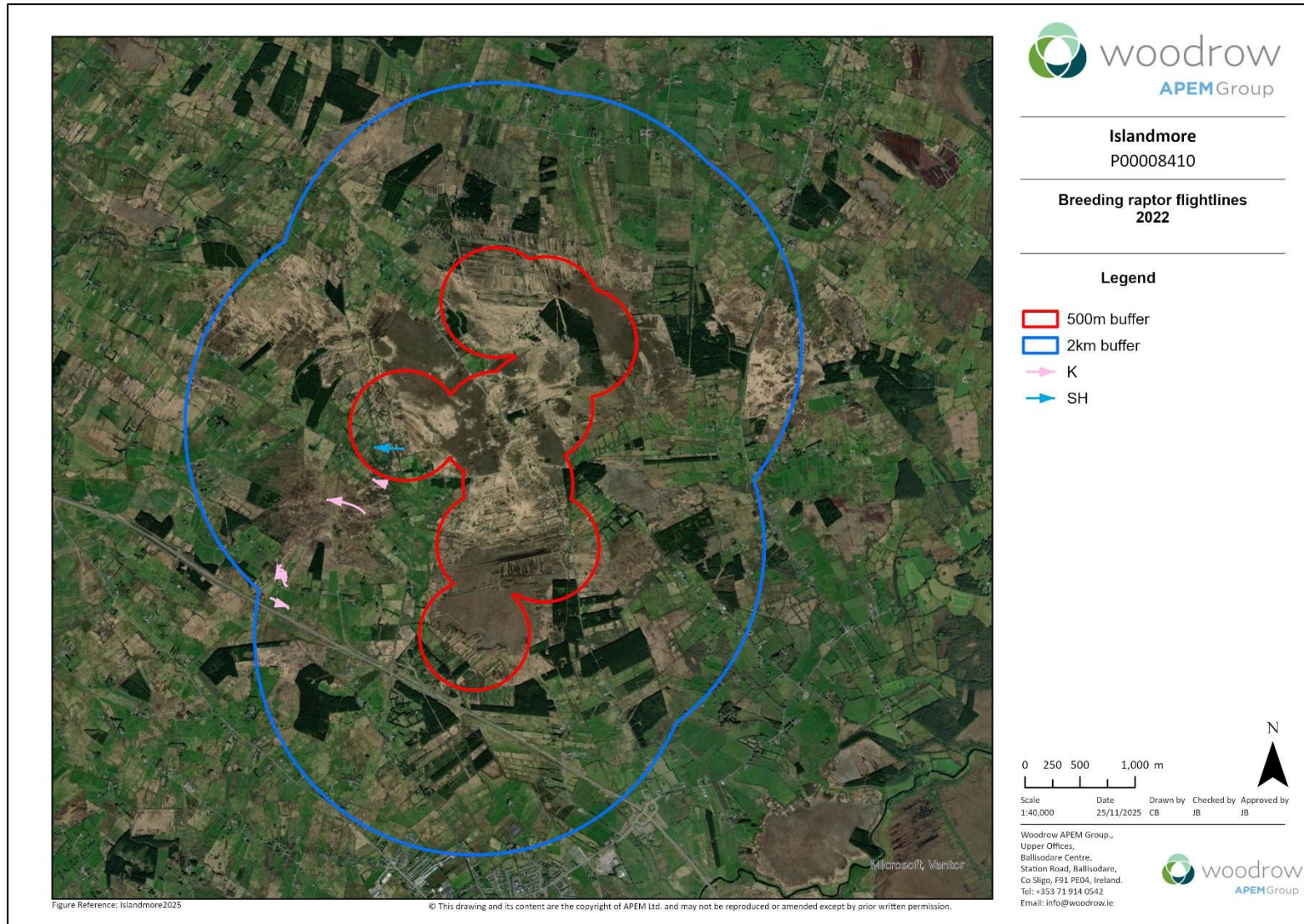


Figure 10: Breeding raptor flightlines 2022

1.7.3 NON-BREEDING SEASON SURVEY RESULTS

1.7.3.1 Walkover Survey Results

Surveys took place in Year 1 (non-breeding season 2019/20), Year 2 (non-breeding season 2020/21), Year 3 (non-breeding season 2021/22) and Year 4 (non-breeding season 2022/23). A total of 11 red-listed, 16 amber-listed and 29 green-listed species were recorded.

The range of species recorded between the survey years was broadly similar although yellowhammer was present in Year 3. Therefore the locations of species shown in **Figure 11**, **Figure 12**, **Figure 13** and **Figure 14** and considered broadly indicative of the project site.

Species	Number of individuals		
	Visit 1 06/12/19	Visit 2 12/01/20	Visit 3 07/02/20
BoCCI (2020-2026) Red listed species			
Golden plover	12	19	4
Meadow pipit			14
Red grouse	1		3
Snipe	3	2	5
BoCCI (2020-2026) Amber listed species			
Hen harrier		1	

Table 43: Walkover results non-breeding season 2019-20

Species	Number of individuals		
	Visit 1 23/10/20	Visit 2 11/12/20	Visit 3 27/02/21
BoCCI (2020-2026) Red listed species			
Golden plover		4	7
Grey wagtail			2
Kestrel		1	
Meadow pipit	33	20	49
Snipe	6	6	6
BoCCI (2020-2026) Amber listed species			
Goldcrest		2	2
Hen harrier		1	
Mallard			2
Ringed plover		2	
Skylark			3
Starling			12

Table 44: Walkover results non-breeding season 2020-21

Species	Number of individuals				
	Visit 1 01/12/21	Visit 2 03/12/21	Visit 3 26/02/22	Visit 4 28/01/22	Visit 5 03/03/22
BoCCI (2020-2026) Red listed species					
Curlew			1		1
Golden plover		1			
Meadow pipit		5	6	8	5
Red grouse			1		
Snipe		3			1
Yellowhammer				1	
BoCCI (2020-2026) Amber listed species					
Goldcrest				3	
Skylark					1

Table 45: Walkover results non-breeding season 2021-22

Species	Number of individuals				
	Visit 1 23/01/23	Visit 2 25/01/23	Visit 3 14/03/23	Visit 4 19/03/23	Visit 5 20/03/23
BoCCI (2020-2026) Red listed species					
Kestrel			1		
Meadow pipit	3	20	3	4	6
Snipe	6	5			
BoCCI (2020-2026) Amber listed species					
Black-headed gull			1		
Hen harrier		1			
Mallard	3	2	2	2	1
Goldcrest	1			2	2

Table 46: Walkover results non-breeding season 2022-23

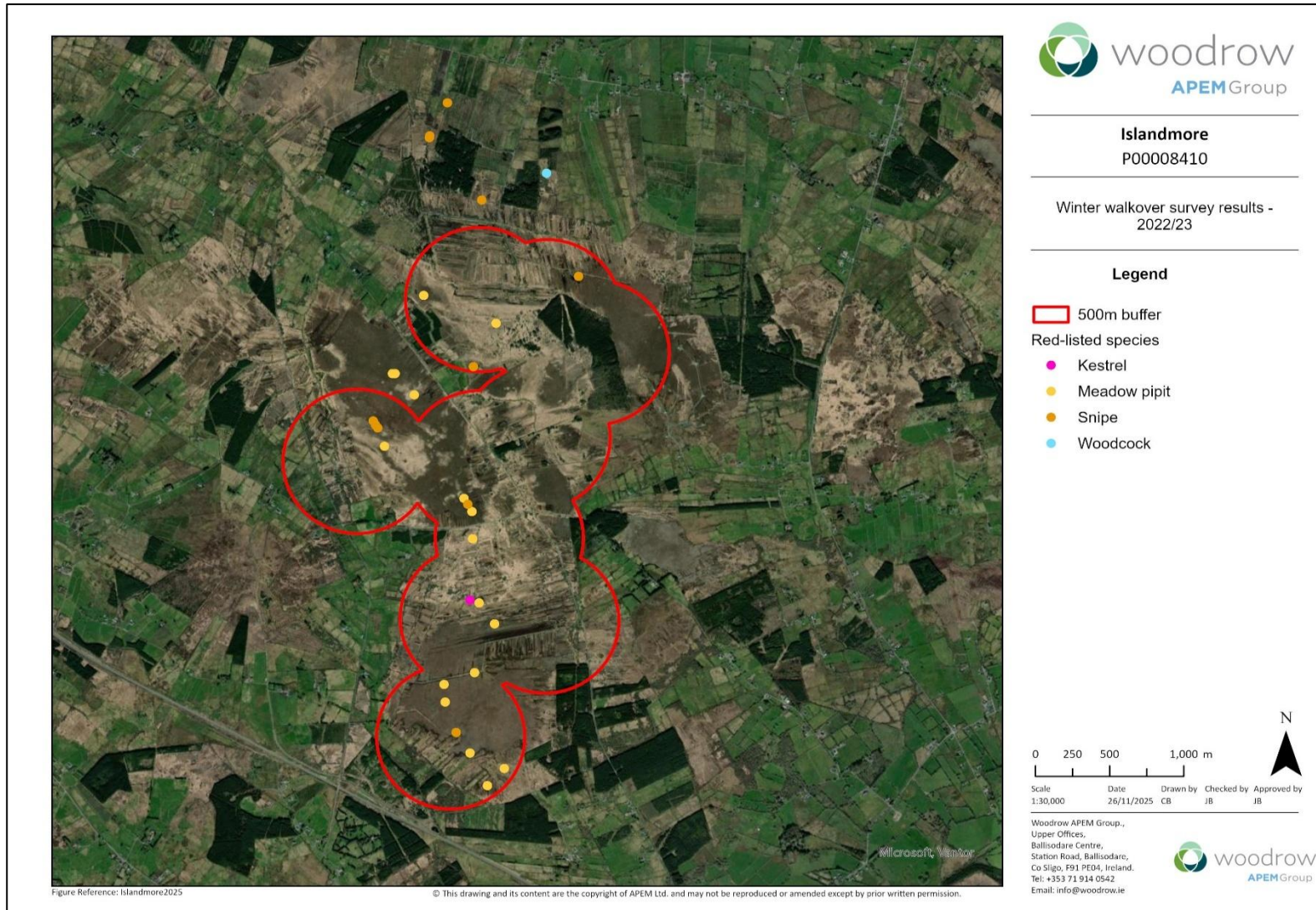


Figure 11: Winter walkover survey results red-listed species 2022/23

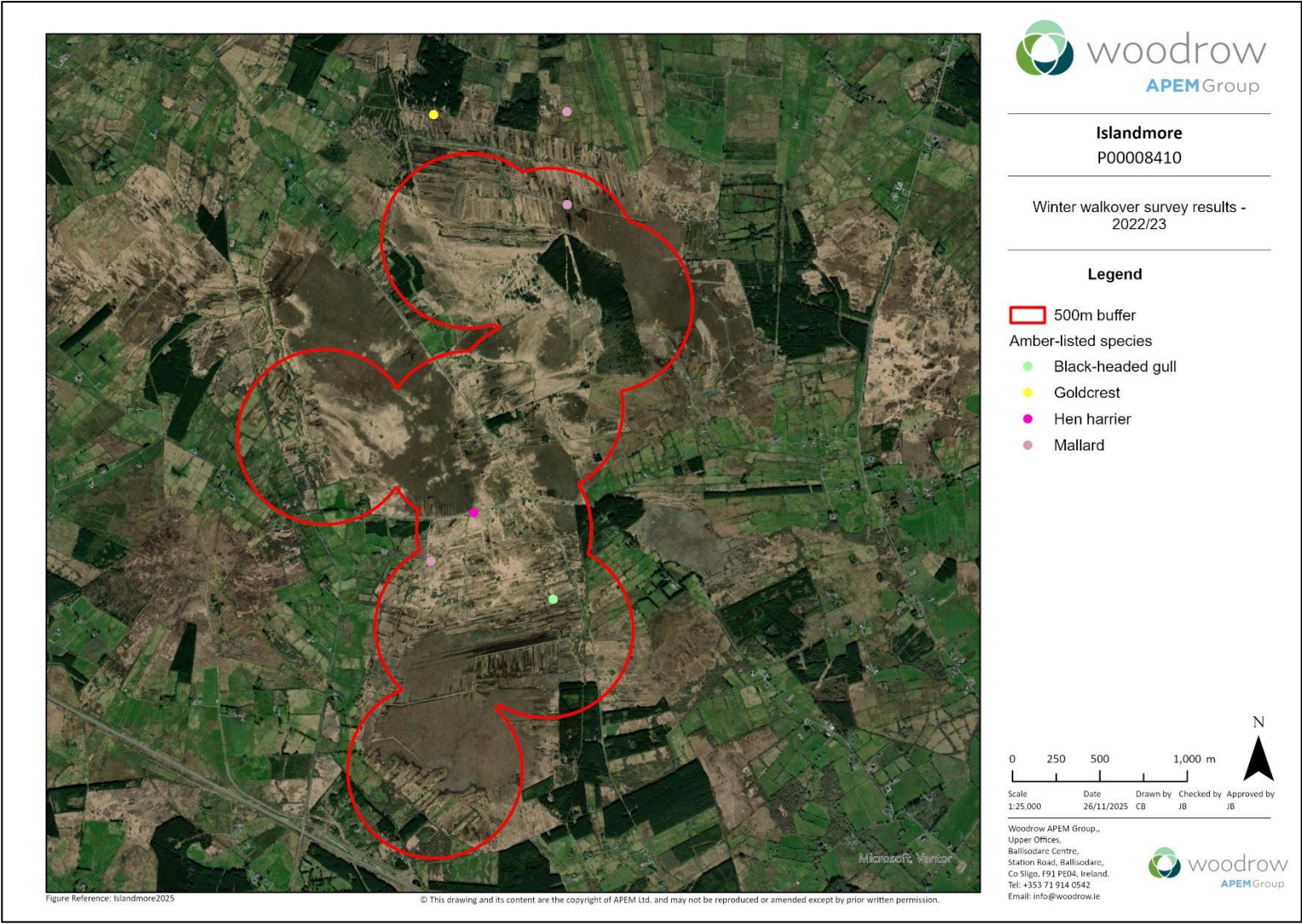


Figure 12: Winter walkover survey results amber-listed species 2022/23

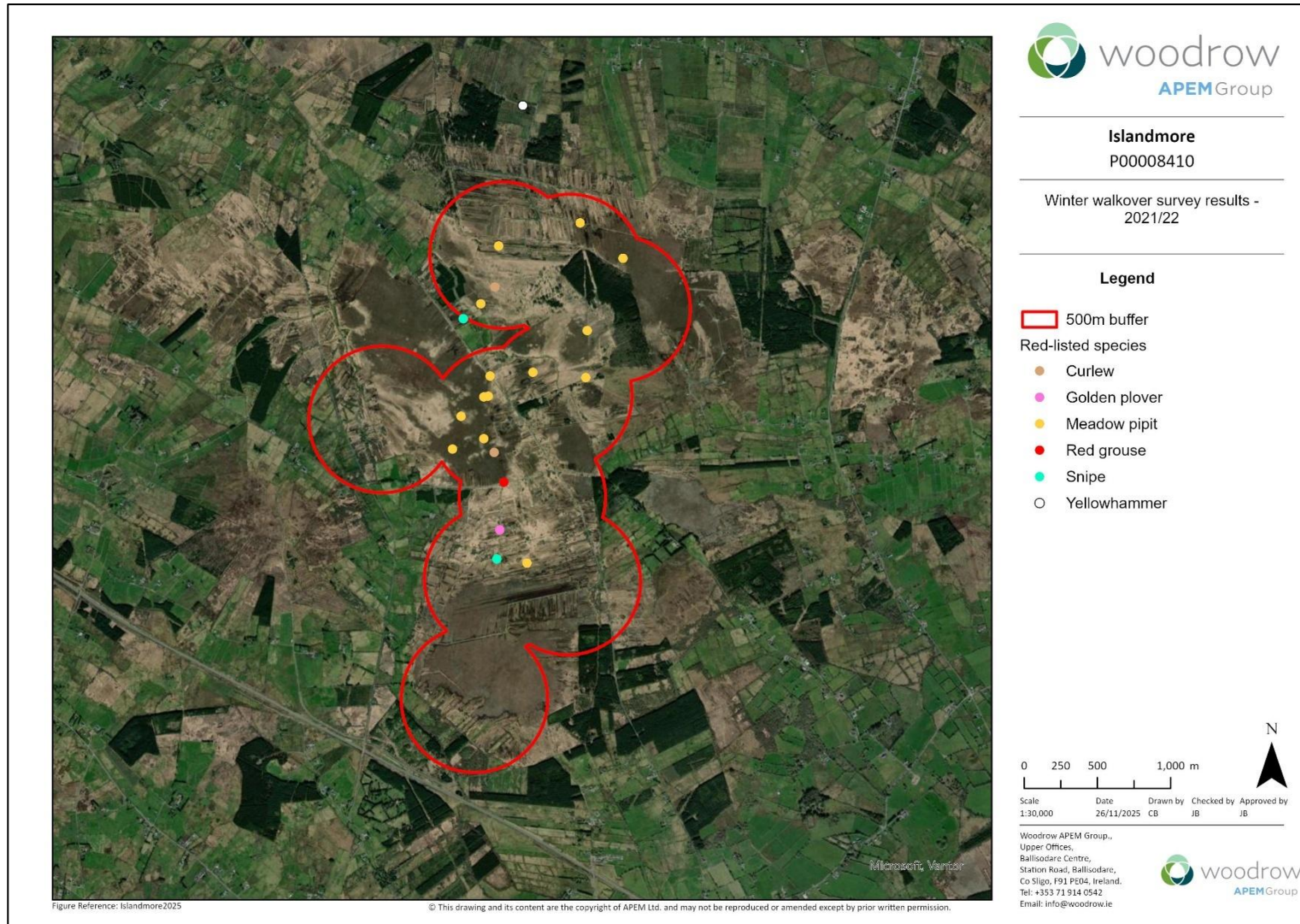


Figure 13: Winter walkover survey results red-listed species 2021/22

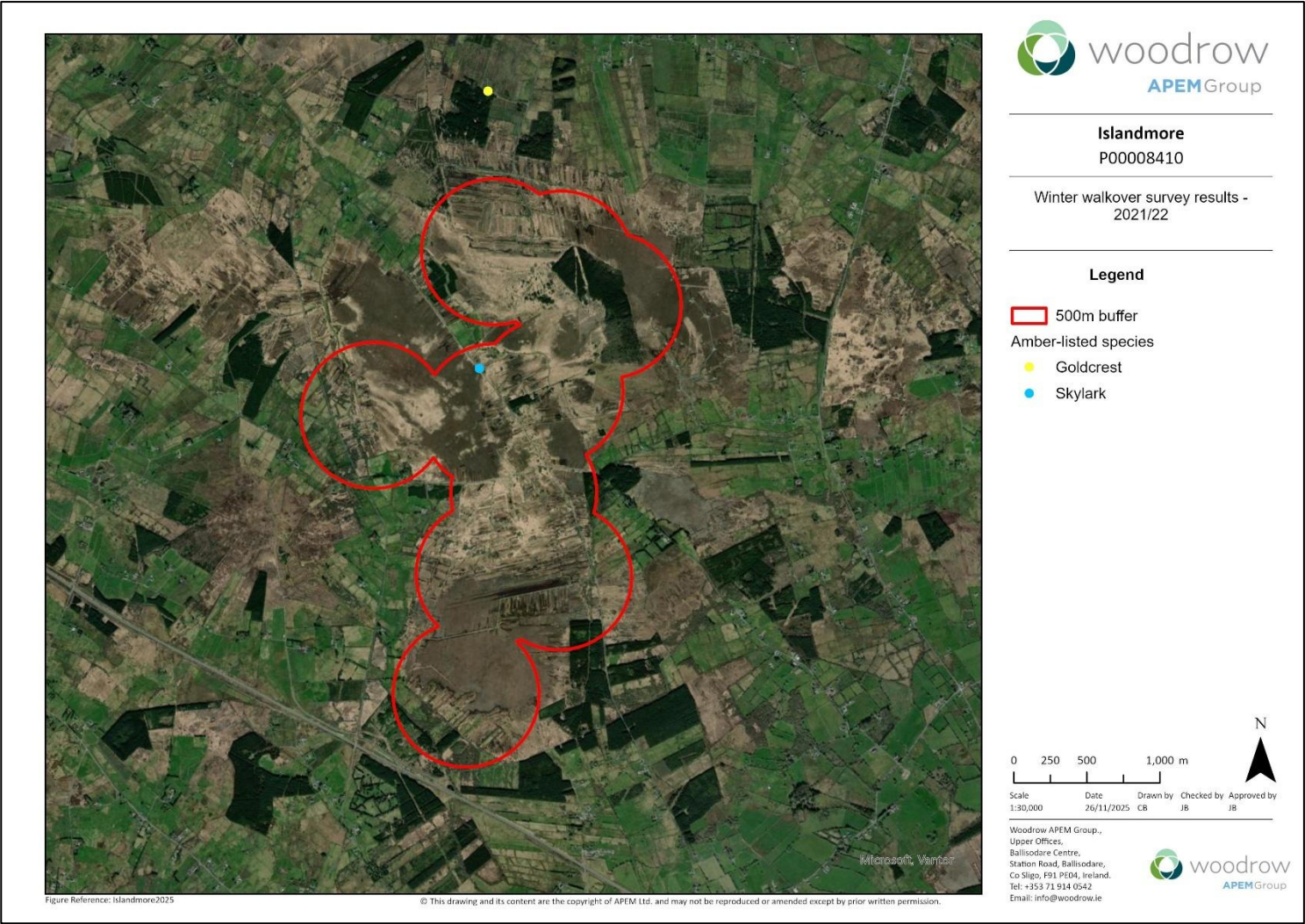


Figure 14: Winter walkover survey results amber-listed species 2021/22

1.7.3.2 Waterbird Survey Results

Surveys took place in Year 1 (non-breeding season 2019/20) and Year 2 (non-breeding season 2020/21). A total of nine red-listed, 20 amber-listed species and 7 green-listed species were observed.

Lough Gara SPA supports nationally important populations within its southwestern portion, which extends into the outer portion of the 5km buffer (Error! Reference source not found.). Notably, Greenland white-fronted goose and whooper swan, both qualifying interests of Lough Gara, were observed at Lough Gara during surveys. Waterbirds were only recorded at this location during surveys.

Species	Number of individuals	
	Visit 1 07/11/19	Visit 2 14/11/19
BoCCI (2020-2026) Red listed species		
Goldeneye		5
Pochard		3
BoCCI (2020-2026) Amber listed species		
Greenland white fronted goose		47
Great crested grebe		1
Mallard		51
Tufted duck		46
Whooper swan	14	32
Wigeon		32

Table 47: Wider area wintering water birds results non-breeding season 2019-20

Species	Number of individuals					
	Visit 1 07/11/19	Visit 2 14/11/19	Visit 3 09/12/20	Visit 4 06/01/21	Visit 5 08/02/21	Visit 6 07/03/21
BoCCI (2020-2026) Red listed species						
Curlew		33	48	46	46	1
Golden plover				7		75
Goldeneye		15	18	61	17	26
Lapwing		160	2	20	62	20
Pochard		145	321	315	185	145
Scaup (Greater)		1				1
Shoveler			7			21
Snipe				5		2
White-tailed eagle	1					
BoCCI (2020-2026) Amber listed species						
Greenland white-fronted goose	28			110	44	132
Black-headed gull						9
Common gull						4
Coot		40	23	40		
Cormorant		22	28	22	23	9

Gadwall			6			12
Goosander					4	
Great crested grebe	28	11	6	30	7	34
Greylag goose		116	103	58	47	34
Hen harrier				2		
Herring gull						1
Kingfisher						2
Mallard		86	129	199	66	82
Merlin		1		1		
Mute swan		46	12	11	24	27
Teal		97	63	241	14	49
Tufted duck		804	779	1259	843	410
Whooper swan	133	74	100	223	81	114
Wigeon		277	125	844	273	148
Willow warbler					35	

Table 48: Wider area winter waterbirds survey results non-breeding 2020-21

Species	Number of individuals
	Visit 1 07/11/19
BoCCI (2020-2026) Red listed species	
Curlew	18
Lapwing	28
Pochard	342
BoCCI (2020-2026) Amber listed species	
Coot	1
Cormorant	34
Great crested grebe	18
Greylag goose	42
Mallard	2
Mute swan	91
Teal	6
Tufted duck	558
Whooper swan	14
Wigeon	2

Table 49: Wider area winter waterbirds survey results non-breeding season 2022/23

1.7.3.3 Incidental Observations

In 2020/21 a white-tailed eagle was observed once, hen harrier, merlin and buzzard were observed twice, there were 35 willow warbler observed and there was a single observation of whitethroat.

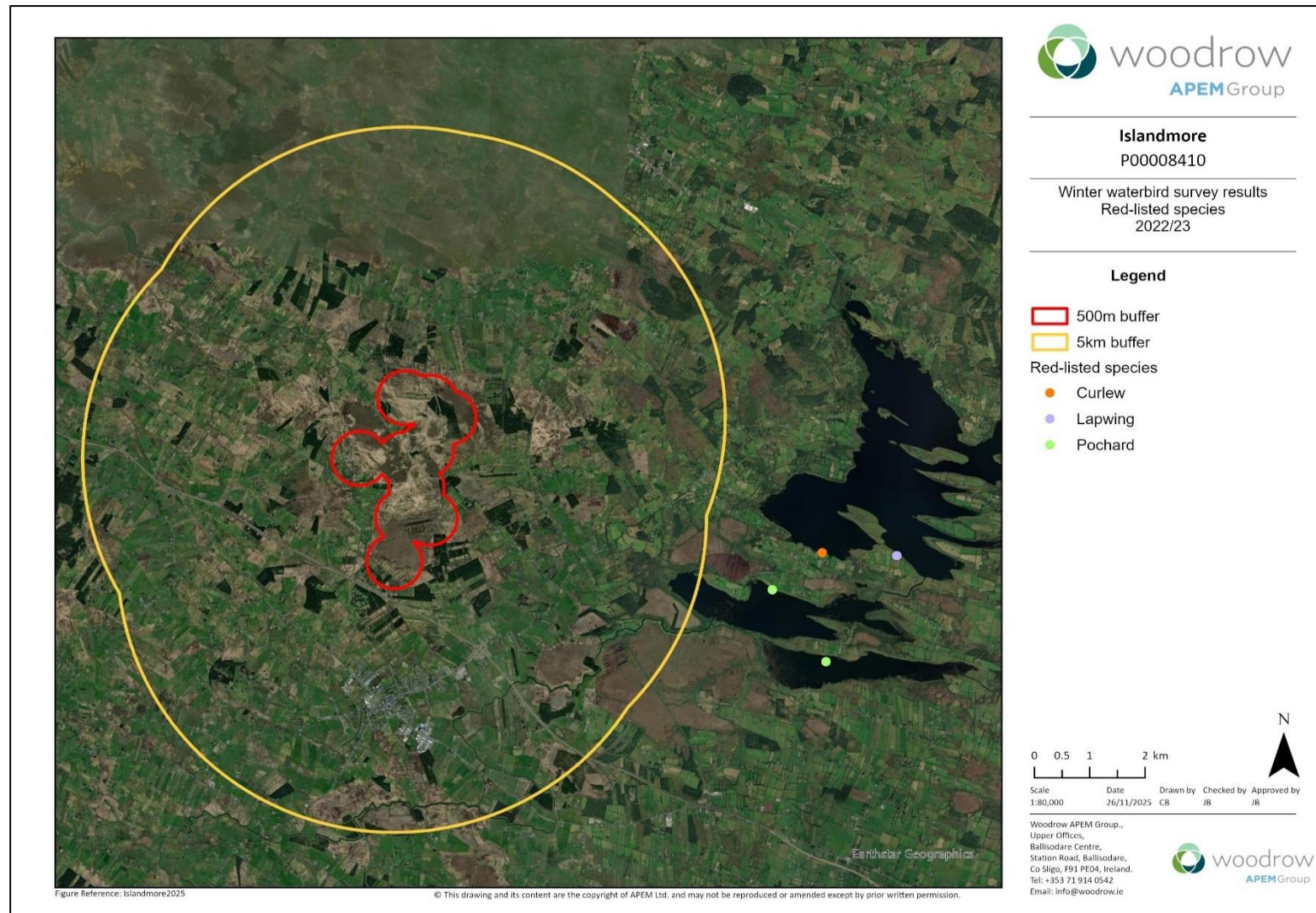


Figure 15: Winter waterbirds survey results red-listed species 2022/23

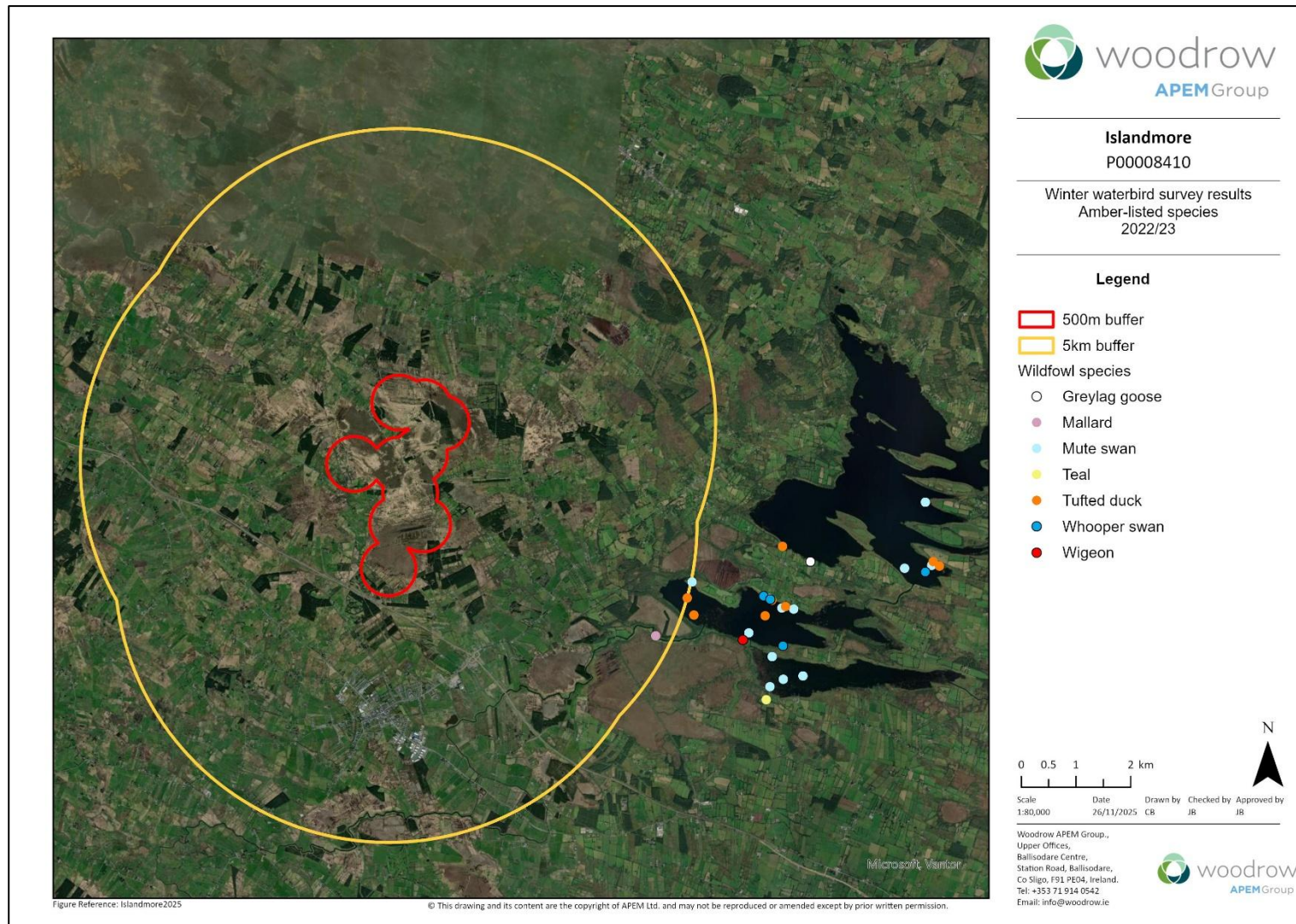


Figure 16: Winter waterbirds survey results amber-listed species 2022/23

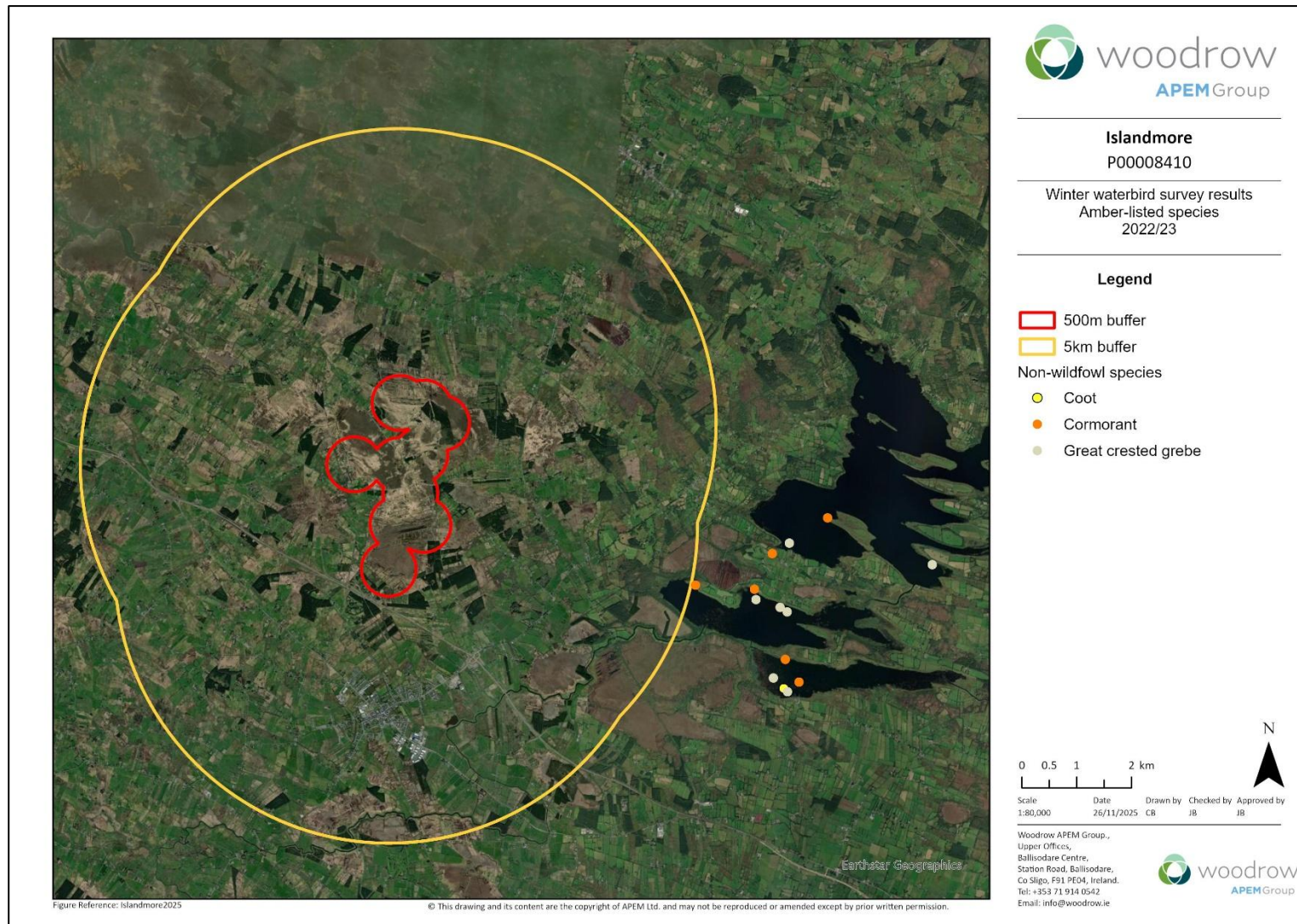


Figure 17: Winter waterbirds survey results amber-listed species continued 2022/23

1.8 HEN HARRIER ROOST SEARCHES

Surveys took place in Year 1 (non-breeding season 2019/20), Year 2 (non-breeding season 2020/21), Year 3 (non-breeding season 2021/22), Year 4 (non-breeding season 2022/23) and an additional Year 5 (non-breeding season 2024-25).

A regular hen harrier roost has been observed to the north-west and west of the project site, within the 2km site buffer, since the 2020-21 non-breeding season. Typically, two or more birds use the roost throughout the winter months. Two distinct locations are utilised, with further, detailed information from each year that roosts were recorded provided in the Confidential Hen Harrier **Annex 5.8**.

Species	Non-breeding season 2020-21	Non-breeding season 2021-22	Non-breeding season 2022-23	Non-breeding season 2024-25
Hen harrier	A total of 24 observations were recorded during the survey season between October and February. Flights were recorded throughout the non-breeding season, with two birds (a male and a female/juvenile) recorded roosting during a survey on the 8 th November 2020.	A total of 25 observations over the survey season October to March. Roost is regularly in used by at least two birds, with the occasional third bird recorded.	A total of 15 observations over the survey season December to February. Roost is in regular use. Two males were seen in a single visit. On a separate visit both male and ringtail were seen.	A total of 22 observations over the survey season October – March. Three males seen roosting together on two occasions. Ringtail birds also observed throughout the season.

Table 50: Hen harrier roost summary table

1.9 ORNITHOLOGICAL BASELINE

1.9.1 FLIGHT ACTIVITY ALL YEARS

A total of 467 flights were recorded during the VP surveys over the two-year period. Kestrel (134 flights), golden plover (71 flights), and lesser black-backed gull (48 flights) were the most frequently observed species, indicating relatively high activity levels within the project site and the 500 m turbine buffer.

Detailed information on modelled collision risk is provided in the Collision Risk Report.

1.9.2 SUMMARY OF WETLAND BIRD ASSEMBLAGE

1.9.2.1 Non-breeding Season (Year 1) 2019-20

Two red-listed species were recorded within the 500m buffer. Golden plover reached a peak count of 500 on two occasions, primarily flying over the project site (**Figure 26**). Snipe were also recorded, with a peak count of five individuals. The mixed habitats of bog and surrounding agricultural land provide roosting and winter-feeding opportunities for both species.

Three amber-listed species were observed within the 500m buffer. Whooper swan was recorded flying over or through the project site (**Figure 52**), with no regular flight paths

identified, and a total of four flights over the survey season. Mallard and Lesser-black backed gull were each recorded once (**Figure 40** and **Figure 38**, respectively). During the same period, the Green-listed grey heron was observed once during VP surveys.

1.9.2.2 Non-breeding Season (Year 2) 2020-21

Three red-listed species were observed within the 500m buffer.

Golden plover reached a peak count of 39 birds, transiting through the project site and roosting twice near VP2 (**Figure 26**). Snipe peaked at six individuals, using wetter habitats for winter feeding. Red grouse were heard twice during the survey season.

Four amber-listed species were observed within the 500m buffer. Whooper swan reached a peak count of nine birds, flying over the project site on four occasions without landing (Figure 52). Mallard was observed in flight, with a peak count of two birds (Figure 40). Herring gull was recorded twice in flight, with a peak count of two (**Figure 33**). Ringed plover was observed once on bog habitat within the 500m buffer with a peak count of two birds.

Green-listed grey heron was observed transiting through the project site on three occasions.

1.9.2.3 Non-breeding Season (Year 3) 2021-22

Five red-listed species were recorded within the 500m buffer. Curlew flocks were observed twice, with a peak count of 20 birds, flying through the project site and circling on one occasion (Figure 24), and landing once. Golden plover flocks were recorded through the season (Figure 28), ranging from 4-22 birds early in the season to 300-500 birds by late season (February) on two consecutive occasions. These flocks were mobile within the 500m buffer and wider area, using bog habitat for landing. Snipe reached a peak of three individuals, with short flights recorded close to the redline boundary (**Figure 47**). Lapwing were observed once, with a flock of 15 birds flying southwest through the 500m buffer (Figure 37), likely transiting through to breeding grounds. A single red grouse was heard, and one woodcock was flushed outside of the 500m buffer (Figure 53).

Two amber-listed species were recorded within the 500m buffer. Mallard was observed on two dates, with a peak count of two birds using ditch cuttings. A single lesser black-backed gull was observed flying through the project site without stopping (**Figure 39**).

Green-listed heron was observed once flying through the project site.

1.9.2.4 Non-breeding Season (Year 4) 2022-23

Three red-listed species were observed within the 500m buffer. Snipe was observed regularly throughout the season, with a peak count of six birds and typical observations of 1-2 individuals. Curlew were recorded on two occasions, with a peak count of three birds briefly flying through the 500m buffer on each occasion without stopping (Figure 24). Golden plover were observed once, with a flock of eight birds flying at speed through the 500m buffer (Figure 28).

Four amber-listed species were recorded within the 500m buffer. Black-headed gull was observed four times flying through the project site, with a peak count of two birds. Mallard was recorded throughout the season, utilising flooded peat cuttings and ditch habitats within the 500 m buffer. Lesser black-backed gull was observed once flying

through the project site (**Figure 39**). Common gull was also recorded once, flying through the project site (**Figure 22**).

1.9.2.5 Breeding Season (Year 1) 2020

Three red-listed species were recorded within the 500m buffer. Snipe were present throughout the season, with up to eight individuals recorded. Chipping and drumming were noted from wet bog habitats in both the northern and southern parts of the 500m buffer (**Figure 54**).

Golden plover was recorded twice in late March, with a peak flock of 60 birds briefly settling before continuing northward, likely undertaking passage flights to breeding grounds.

Curlew was recorded once, calling and flying within the southern portion of the 500m buffer (**Figure 23**) in early July. Given this single observation over the survey period, the species does not appear to be a regular user of the project site.

Two amber-listed species were recorded within the 500m buffer. Mallard had a peak count of seven birds, with no breeding behaviour observed; birds utilised a range of wet habitats throughout the 500m buffer (**Figure 40**). Lesser black-backed gull was observed on three occasions, with a peak count of three birds, flying through the project site (**Figure 38**).

1.9.2.6 Breeding Season (Year 2) 2021

Three red-listed species were observed within the 500m buffer. Snipe were seen throughout the season with a peak count of five birds. Breeding behaviour was observed, with chipping and drumming recorded during dusk surveys (**Figure 54**). As in the 2020 breeding season, suitable habitat for breeding snipe remains present across the project site. Golden plover was recorded on a single visit in late March, with 39 birds flying through the 500m buffer and attempting to land. Given the timing, these birds were on northward passage to breeding grounds and were not recorded again. Red grouse were observed roosting, and flying within, the 500m buffer, with a peak count of two birds.

Four amber-listed species were recorded within the 500m buffer. Whooper swan was observed in a single day, with two flocks observed and a peak count of 34 birds flying through the project site until out of view (**Figure 52**). These birds were seen in late March and were on northward passage to breeding grounds; none were seen landing or feeding within the project site. Lesser black-backed gull was recorded throughout the season, flying through the 500m buffer (**Figure 38**) while foraging and transiting the project site. One probable juvenile was observed, suggesting the presence of suitable breeding habitat in the wider region. Mallard was observed seven times during the survey period, with a peak count of two birds. Birds were recorded both flying through the project site (**Figure 40**) and landing, likely for opportunistic feeding. Herring gull was recorded once, transiting the project site (**Figure 33**).

1.9.2.7 Breeding Season (Year 3) 2022

One red-listed species was recorded within the 500m buffer. Snipe were present throughout the season, with a peak count of two birds. No definitive breeding activity was recorded.

Three amber-listed species were recorded within the 500m buffer. Mallard activity began early in the season, with a peak count of two birds. A juvenile accompanied by a female in mid-July indicates local breeding success, although a nest site was not identified. Lesser black-backed gull was recorded on four days in the latter half of the survey season, with a peak count of three birds, including a juvenile. No breeding behaviour was observed on site, and birds were recorded flying through the area without landing (Figure 39). Common gull was observed once, flying through the project site (**Figure 22**).

1.9.2.8 Breeding Season (Year 4) 2023

Three red-listed species were recorded within the 500m buffer. Snipe was observed on three occasions, with a peak count of one bird and no evidence of breeding activity. Red grouse were heard calling twice in the area, although no individuals were visually observed. A single flock of six curlew was recorded flying over the project site in late August (Figure 24), likely representing early autumn passage through the region.

Two amber-listed species were recorded within the 500m buffer. Mallard (peak count two birds) occurred throughout the season, utilising ditch habitats within the bog. Lesser black-backed gull was observed on eight occasions, with a peak count of two birds flying through the 500m buffer (Figure 39). Black-headed gull was recorded once, flying outside the 500m buffer (**Figure 19**).

1.9.3 SUMMARY OF BIRD OF PREY ASSEMBLAGE

1.9.3.1 Non-breeding Season (Year 1) 2019-20

One red-listed species was recorded within the 500m buffer. Kestrel was recorded on eight days during the season, with single birds observed either flying or hunting over the bog habitats within the project site (Figure 34).

Two amber-listed species were recorded within the 500m buffer. Both male and ringtail Hen harrier was observed flying (Figure 31) through the project site and hunting over bog habitats. However no roosts were identified. Merlin was recorded once during the survey period, hunting low over bog habitats (Figure 42).

Green-listed sparrowhawk was observed twice hunting within the 500m buffer.

1.9.3.2 Non-breeding Season (Year 2) 2020-21

One red-listed species was recorded in the 500m buffer. Kestrel was recorded 43 times across the season, regularly flying and hunting throughout the project site (Figure 35).

Two amber-listed species were recorded in the 500m buffer. Hen harrier was observed consistently throughout the season, with both female and male birds hunting over bog habitats (Figure 31). A regular communal roost was again present within the 2km buffer, with two birds frequently recorded together using the roost site. Due to the confidential nature of this record, it is discussed further in **Annex 5.8**. Merlin was observed three times over the season, flying through the project site without exhibiting hunting behaviour (Figure 42).

Two green-listed species were recorded within the 500m buffer. Sparrowhawk was recorded once in the northern part of the 500m buffer, where male and female birds were seen transiting; these observations just outside the 500m buffer, and no flight line

was therefore mapped. Buzzard was observed twice; first perched outside the 500m buffer, and later in the season circling over the project site (**Figure 20**).

1.9.3.3 Non-breeding Season (Year 3) 2021-22

One red-listed species was observed within in the 500m buffer. Both male and female Kestrel were recorded hunting and flying (**Figure 36**) on six occasions. Activity was less than in previous years, with greater use of areas outside the 500m buffer.

One amber-listed species was recorded within the 500m buffer. Hen harrier was recorded six times in flight (**Figure 32**), with a peak of two birds observed together within the 500 m buffer. The established roosting sites within the 2km buffer remained active throughout the season, with two birds regularly present. Both adult males and ringtail birds (female/juvenile) were observed at the roost. Due to the confidential nature of this record, it is discussed further in **Annex 5.8**.

One green-listed species was recorded within the 500m buffer. Sparrowhawk was recorded twice, with single birds observed on each occasion flying rapidly through the area; only one of these birds spent a brief period within the 500m buffer.

1.9.3.4 Non-breeding Season (Year 4) 2022-23

One red-listed species was recorded within the 500m buffer. Kestrel was recorded twice hunting within the 500 m buffer, although the majority of observed flights occurred outside the buffer.

Two amber-listed species were recorded within the 500m buffer. Hen harrier was recorded ten times, with hunting and roosting behaviours observed. Flight lines (**Figure 32**) show that most activity occurred outside the 500m buffer, concentrated towards one of the known roosting locations. The roost continued to be regularly used, with a male and ringtail observed together. On one occasion, two males were observed calling at each other before settling to roost. Due to the confidential nature of this record, it is discussed further in **Annex 5.8** Merlin was recorded twice, once hunting in the northern part of the 500m buffer, and once outside of the 500m buffer.

One green-listed species was recorded within the 500m buffer. Buzzard was observed being mobbed as it soared high over the project site.

1.9.3.5 Non-breeding Season (Year 5) 2024-25 (Hen harrier only)

The well-established roost continued to be in regular use throughout the season. Both male and ringtail birds have been observed, and notably, three male birds were recorded using the roost on two occasions, once in October, early in the season, and again in January during the peak of the non-breeding season. Due to the confidential nature of this record, it is discussed further in **Annex 5.8**.

1.9.3.6 Hen harrier Winter Roost Summary

A regularly occurring hen harrier roost is present within the 2km study area. As an amber-listed and Annex 1 species, hen harrier receives a high level of protection year-round. Dedicated winter roost surveys conducted between 2020 to 2025 have identified three consistently used roost locations. Due to the confidential nature of hen harrier roost sites, further information is provided in **Appendix 5.8**.

Breeding Season (Year 1) 2020

One red-listed species was recorded within the 500m buffer. Kestrel was regularly observed throughout the season (**Figure 34**), with birds hunting across the range of available habitats. Later in the season, up to two juvenile birds were seen together hunting over the bog on two separate days. This suggests the presence of suitable breeding habitat within the wider area and indicates that the project site provides appropriate conditions for juvenile birds during the post-fledging period.

Two amber-listed species were recorded within the 500m buffer. Hen harrier was recorded on a single day in late March (**Figure 31**) when a female was observed hunting over the bog. This individual was likely associated with the nearby communal winter roost and preparing to disperse to breeding grounds, as no further observations were made. Merlin was recorded twice early in the breeding season, with single birds flying through the project site on each occasion (**Figure 42**).

Two green-listed species were recorded within the 500m buffer. Sparrowhawk was observed once hunting within the bog habitats (**Figure 48**). During the wider breeding raptor surveys, both male and female sparrowhawks were recorded throughout the season, with fledglings observed within the northern part of the project site. Although no nest was located, the presence of fledglings indicates the project site's suitability for raising young raptors. Buzzard was observed twice, soaring high through the 500m buffer (**Figure 20**).

Breeding Season (Year 2) 2021

One red-listed species was recorded in the 500m buffer. Kestrel was regularly observed hunting throughout the season (**Figure 35**), with 33 observations made across the survey period. No juveniles were recorded during this season.

Two amber-listed species were recorded within the 500m buffer. Hen harrier was recorded once in July, when a single male was observed hunting over bog habitat. Merlin was observed once early in the season, hunting across the wider landscape.

Two green-listed species were recorded within the 500m buffer. Buzzard was observed once, flying along the southeastern edge of the buffer (**Figure 20**). Sparrowhawk was recorded three times throughout the season, including one repeat sighting of the same individual. On each occasion, sparrowhawks were observed flying within the buffer, with no hunting behaviour recorded.

Breeding Season (Year 3) 2022

One red-listed species was recorded within the 500m buffer. Kestrel was recorded eight times over the survey period (**Figure 36**), with a peak count of four birds forming a family party (male, female and two juveniles) in late August. This indicates suitable breeding habitat in the wider area, likely to the east where the birds later moved; no nest was observed on site. Hunting behaviour was recorded throughout the season.

One amber-listed species was recorded within the 500m buffer. Merlin was recorded once, flying at speed through the project site with no hunting activity observed.

Two green-listed species were recorded within the 500m buffer. Sparrowhawk was observed once being mobbed by small birds (**Figure 49**). Buzzard was recorded six times (**Figure 21**), with a peak count of two birds observed together; behaviour predominantly consisted of birds flying through the project site or soaring overhead.

Breeding Season (Year 4) 2023

One red-listed species was recorded within the 500m buffer. Kestrel was recorded four times over the season (**Figure 36**). Behaviour within the 500m buffer consisted mainly of hunting or transiting through the area, with the majority of flights occurring outside of the 500 m buffer. Unlike previous years, no juvenile birds were observed.

Two green-listed species were recorded within the 500m buffer. Sparrowhawk was recorded four times flying through the 500m buffer, with a peak count of two birds (male and female) observed on three of the four occasions, often being mobbed by smaller birds. Buzzard was recorded once within the 500m buffer, where a single bird was observed being mobbed.

1.9.4 SUMMARY OF PASSERINE/OTHER SPECIES OF CONSERVATION CONCERN

Typically, passerine species are not significantly impacted by wind farm developments, except for those that are particularly sensitive to habitat alteration, such as breeding yellowhammer. Concise summaries for passerines species of conservation concern are provided below. In all seasons, a range of green-listed species not of conservation concern was also present and breeding throughout the project site.

1.9.4.1 Breeding Season

Red-listed meadow pipit was recorded continually throughout the 500m turbine buffer, with evidence of an established breeding population. Red grouse was observed during dusk surveys, although the habitat is suitable for breeding pairs, no nests were detected due to the species' highly cryptic behaviour.

Among amber-listed species, goldcrest showed breeding activity in three of the four breeding seasons, while skylark exhibited breeding behaviour in all seasons. Swallow held two active nests in 2022, and willow warbler was assessed as having a breeding population throughout the project site.

1.9.4.2 Non-breeding Season

Red-listed meadow pipit was frequently recorded across all non-breeding seasons. Two grey wagtail were observed during the 2020/21 non-breeding season, and a single yellowhammer was recorded in the 2021/22 non-breeding season. Amber-listed goldcrest was present in 2021/22 and 2022/23, and skylark was observed once in 2021/22.

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APPENDIX 1 - NATIONAL BIODIVERSITY DATA CENTRE AND I-WEBS RECORDS

Species	BoCCI 2020-2026	Date of last record	Record database
Barn Owl	Red	07/05/2015	Birds of Ireland
Curlew	Red	01/05/2025	Birds of Ireland
Golden Plover	Red	02/04/2024	Birds of Ireland
Snipe	Red	30/05/2025	Birds of Ireland
Swift	Red	02/05/2025	Swifts of Ireland
Black-headed gull	Amber	10/05/2020	Birds of Ireland
Coot	Amber	31/12/2011	Bird Atlas 2007-2011
Cormorant	Amber	10/05/2020	Birds of Ireland
Common tern	Amber	10/05/2020	Birds of Ireland
Common gull	Amber	10/05/2020	Birds of Ireland
Greenfinch	Amber	19/09/2015	Birds of Ireland
Greenland white-fronted goose	Amber	31/12/2011	Bird Atlas 2007-2011
Great crested grebe	Amber	10/05/2020	Birds of Ireland
Greylag goose	Amber	10/05/2020	Birds of Ireland
Kingfisher	Amber	31/12/2011	Bird Atlas 2007-2011
Linnet	Amber	31/12/2011	Bird Atlas 2007-2011
Mallard	Amber	10/05/2020	Birds of Ireland
Merlin	Amber	31/12/2011	Bird Atlas 2007-2011
Mute swan	Amber	10/05/2020	Birds of Ireland
Sand martin	Amber	02/04/2024	Birds of Ireland
Whooper swan	Amber	28/03/2019	Birds of Ireland
Willow warbler	Amber	02/04/2024	Birds of Ireland
Blackcap	Green	02/04/2024	Birds of Ireland
Buzzard	Green	02/04/2024	Birds of Ireland
Chiffchaff	Green	02/04/2024	Birds of Ireland
Collared dove	Green	31/12/2011	Bird Atlas 2007-2011

Cuckoo	Green	05/05/2018	Birds of Ireland
Goldfinch	Green	29/11/2017	Birds of Ireland
Grasshopper warbler	Green	31/12/2011	Bird Atlas 2007-2011
Grey heron	Green	19/03/2016	Birds of Ireland
Jay	Green	02/04/2024	Birds of Ireland
Lesser redpoll	Green	31/12/2011	Bird Atlas 2007-2011
Mistle thrush	Green	30/05/2025	Birds of Ireland
Pheasant	Green	31/12/2011	Bird Atlas 2007-2011
Robin	Green	29/11/2017	Birds of Ireland
Reed bunting	Green	20/03/2016	Birds of Ireland
Sedge warbler	Green	05/05/2018	Birds of Ireland
Siskin	Green	31/12/2011	Bird Atlas 2007-2011
Treecreeper	Green	31/12/2011	Bird Atlas 2007-2011
Whimbrel	Green	10/05/2020	Birds of Ireland
Whitethroat	Green	30/05/2025	Birds of Ireland

Table 51: NBDC bird records from national grid square M69 2011-2024 (2011 retained due to it being the most up to date bird atlas for Ireland)

Species	BoCCI 2020-2026	Date of last record	Record database
Curlew	Red	31/12/2011	Bird Atlas 2007 - 2011
Grey Wagtail	Red	31/12/2011	Bird Atlas 2007 - 2011
Kestrel	Red	18/06/2018	Birds of Ireland
Lapwing	Red	31/12/2011	Bird Atlas 2007 - 2011
Meadow pipit	Red	31/12/2011	Bird Atlas 2007 - 2011
Redwing	Red	31/12/2011	Bird Atlas 2007 - 2011
Snipe	Red	31/12/2011	Bird Atlas 2007 - 2011
Swift	Red	18/07/2019	Birds of Ireland
Woodcock	Red	31/12/2011	Bird Atlas 2007 - 2011
Cormorant	Amber	31/12/2011	Bird Atlas 2007 - 2011
Greenfinch	Amber	31/12/2011	Bird Atlas 2007 - 2011

Goldcrest	Amber	16/07/2023	Heritage Council's Traditional Farm Buildings Scheme Fauna Records from 2016 to 2023
House martin	Amber	05/05/2018	Birds of Ireland
House sparrow	Amber	31/12/2011	Bird Atlas 2007 - 2011
Linnet	Amber	31/12/2011	Bird Atlas 2007 - 2011
Mallard	Amber	31/12/2011	Bird Atlas 2007 - 2011
Mute swan	Amber	31/12/2011	Bird Atlas 2007 - 2011
Sand martin	Amber	31/12/2011	Bird Atlas 2007 - 2011
Skylark	Amber	03/06/2019	Birds of Ireland
Spotted flycatcher	Amber	31/12/2011	Bird Atlas 2007 - 2011
Swallow	Amber	16/07/2023	Heritage Council's Traditional Farm Buildings Scheme Fauna Records from 2016 to 2023
Starling	Amber	04/04/2019	Birds of Ireland
Teal	Amber	31/12/2011	Bird Atlas 2007 - 2011
Whooper swan	Amber	31/12/2011	Bird Atlas 2007 - 2011
Wigeon	Amber	31/12/2011	Bird Atlas 2007 - 2011
Willow warbler	Amber	31/12/2011	Bird Atlas 2007 - 2011
Blackbird	Green	16/07/2023	Heritage Council's Traditional Farm Buildings Scheme Fauna Records from 2016 to 2023
Blackcap	Green	03/06/2019	Birds of Ireland
Blue tit	Green	03/06/2019	Birds of Ireland
Bullfinch	Green	30/12/2020	Birds of Ireland
Buzzard	Green	06/09/2025	Birds of Ireland
Chaffinch	Green	03/06/2019	Birds of Ireland
Chiffchaff	Green	31/12/2011	Bird Atlas 2007 - 2011
Coal tit	Green	31/12/2011	Bird Atlas 2007 - 2011
Collared dove	Green	31/12/2011	Bird Atlas 2007 - 2011
Cuckoo	Green	10/06/2019	Irish Vascular Plant Data - Robert Northridge
Dunnock	Green	31/12/2011	Bird Atlas 2007 - 2011
Fieldfare	Green	31/12/2011	Bird Atlas 2007 - 2011

Goldfinch	Green	16/07/2023	Heritage Council's Traditional Farm Buildings Scheme Fauna Records from 2016 to 2023
Grasshopper warbler	Green	16/07/2023	Heritage Council's Traditional Farm Buildings Scheme Fauna Records from 2016 to 2023
Great black-backed gull	Green	31/12/2011	Bird Atlas 2007 - 2011
Great spotted woodpecker	Green	31/01/2023	Birds of Ireland
Great tit	Green	20/03/2019	Birds of Ireland
Grey heron	Green	31/12/2011	Bird Atlas 2007 - 2011
Hooded crow	Green	31/12/2011	Bird Atlas 2007 - 2011
Jackdaw	Green	31/12/2011	Bird Atlas 2007 - 2011
Lesser redpoll	Green	03/06/2019	Birds of Ireland
Lesser white-fronted goose	Green	29/03/2019	Birds of Ireland
Little grebe	Green	31/12/2011	Bird Atlas 2007 - 2011
Long-tailed tit	Green	06/05/2018	Birds of Ireland
Magpie	Green	16/07/2023	Heritage Council's Traditional Farm Buildings Scheme Fauna Records from 2016 to 2023
Mistle thrush	Green	31/12/2011	Bird Atlas 2007 - 2011
Moorhen	Green	31/12/2011	Bird Atlas 2007 - 2011
Pheasant	Green	16/03/2019	Birds of Ireland
Pied wagtail	Green	16/03/2019	Birds of Ireland
Raven	Green	31/12/2011	Bird Atlas 2007 - 2011
Reed bunting	Green	31/12/2011	Bird Atlas 2007 - 2011
Robin	Green	16/07/2023	Heritage Council's Traditional Farm Buildings Scheme Fauna Records from 2016 to 2023
Rook	Green	27/03/2019	Birds of Ireland
Sedge warbler	Green	31/12/2011	Bird Atlas 2007 - 2011
Siskin	Green	31/12/2011	Bird Atlas 2007 - 2011
Song thrush	Green	16/07/2023	Heritage Council's Traditional Farm Buildings Scheme Fauna Records from 2016 to 2023
Sparrowhawk	Green	31/12/2011	Bird Atlas 2007 - 2011
Stonechat	Green	16/07/2023	Heritage Council's Traditional Farm Buildings Scheme

			Fauna Records from 2016 to 2023
Treecreeper	Green	31/12/2011	Bird Atlas 2007 - 2011
White wagtail	Green	31/12/2011	Bird Atlas 2007 - 2011
Whitethroat	Green	31/12/2011	Bird Atlas 2007 - 2011
Wren	Green	16/07/2023	Heritage Council's Traditional Farm Buildings Scheme Fauna Records from 2016 to 2023
Woodpigeon	Green	16/03/2019	Birds of Ireland

Table 52: NBDC bird records from national grid square G60 2011-2024 (2011 retained due to it being the most up to date bird atlas for Ireland)

Species Name	All Ireland 1% threshold	Peak count (last 5 years) 2019-2024
Mute swan	90	119
Whooper swan	150	78
Greenland white-fronted goose	100	28
Barnacle goose	160	27
Wigeon	560	31
Teal	360	23
Mallard	280	158
Shoveler	20	17
Tufted duck	270	68
Great crested grebe	30	4
Cormorant	110	11
Grey heron	25	2
Moorhen	-	21
Coot	190	17
Ringed plover	120	21
Lapwing	850	71
Jack snipe	-	13
Snipe	-	13
Whimbrel	-	21

Common gull	-	4
Herring gull	-	5
Great black-backed gull	-	6

Table 53: I-WeBS peak count data for last five years. Lough Gara: Callows Lough

Species Name	All Ireland 1% threshold	Peak count (last 5 years) 2019-2024
Mute swan	90	62
Whooper swan	150	168
Greylag goose	35	48
Wigeon	560	235
Gadwall	20	5
Teal	360	56
Mallard	280	96
Shoveler	20	6
Pochard	110	1
Tufted duck	270	542
Goldeneye	40	5
Great crested grebe	30	13
Cormorant	110	39
Moorhen		1
Snipe		3
Black-headed gull		1
Lesser black-backed gull		14
Greylag goose		18

Table 54: I-WeBS peak count data for last five years. Lower Lough Gara

Species Name	All Ireland 1% threshold	Peak count (last 5 years) 2019-2024
Mute swan	90	9
Whooper swan	150	6
Greylag goose	35	19

Wigeon	560	63
Teal	360	176
Mallard	280	17
Pochard	110	186
Tufted duck	270	402
Goldeneye	40	6
Great crested grebe	30	4
Cormorant	110	2
Curlew	350	24

Table 55: I-WeBS peak count data for last five years. Upper Lough Gara

Species Name	All Ireland 1% threshold	Peak count (last 5 years) 2019-2024
Whooper swan	150	81
Greenland white-fronted goose	100	107
Wigeon	560	91
Teal	360	48
Mallard	280	51
Pochard	110	155
Tufted duck	270	296
Goldeneye	40	24
Goosander		5
Great crested grebe	30	7
Cormorant	110	17
Grey Heron	25	4
Water Rail		1
Coot	190	3
Lapwing	850	71
Snipe		1
Curlew	350	3

Table 56: I-WeBS peak count data last five years. Upper Lough Gara & Callows Lake

Species Name	All Ireland 1% threshold	Peak count (last 5 years) 2019-2024
Mute swan	90	36
Whooper swan	150	128
Wigeon	560	92
Teal	360	5
Mallard	280	5
Pochard	110	4
Tufted duck	270	36
Cormorant	110	18
Little egret	20	1
Moorhen		2
Coot	190	1
Golden plover	920	180
Lapwing	850	57
Snipe		7
Curlew	350	37
Black-headed gull		26
Common gull		6

Table 57: I-WeBS peak count data last five years. Ballyhaunis Lakes -Bekan Lough

Species Name	All Ireland 1% threshold	Peak count (last 5 years) 2019-2024
Mute swan	90	2
Mallard	280	1
Tufted duck	270	2

Table 58: I-WeBS peak count data last five years. Ballyhaunis Lakes Cloonacurry Lough (Turlough Lake)

Species Name	All Ireland 1% threshold	Peak count (last 5 years) 2019-2024
Mute swan	90	4
Wigeon	560	3
Teal	360	4
Mallard	280	10
Tufted duck	270	3
Great crested grebe	30	1
Cormorant	110	1
Grey heron	25	1
Moorhen		2

Table 59: I-WeBS peak count data last five years. Ballyhaunis Lakes Cloonturnaun Lough & Lakehill Pond

Species Name	All Ireland 1% threshold	Peak count (last 5 years) 2019-2024
Mute swan	90	1
Whooper swan	150	20
Wigeon	560	40
Mallard	280	22
Lapwing	850	43

Table 60: I-WeBS peak count data last five years. Ballyhaunis Lakes Crossbeg Turlough

Species Name	All Ireland 1% threshold	Peak count (last 5 years) 2019-2024
Mute swan	90	2
Wigeon	560	7
Teal	360	1

Mallard	280	10
Cormorant	110	2
Grey Heron	25	1

Table 61: I-WeBS peak count data last five years. Ballyhaunis Lakes Cullentragh Lough

Species Name	All Ireland 1% threshold	Peak count (last 5 years) 2019-2024
Mute swan	90	2
Teal	360	4
Mallard	280	2
Little grebe	20	1
Cormorant	110	2
Grey heron	25	1

Table 62: I-WeBS peak count data last five years. Ballyhaunis Lakes Curragh Lough (Lake SE of Cullentragh L)

Species Name	All Ireland 1% threshold	Peak count (last 5 years) 2019-2024
Mute swan	90	3
Gadwall	20	3
Teal	360	9
Mallard	280	15
Tufted duck	270	3
Little grebe	20	2
Great crested grebe	30	1
Cormorant	110	2
Grey heron	25	1
Moorhen		1
Coot	190	1
Lapwing	850	85
Snipe		2
Curlew	350	37

Table 63: I-WeBS peak count data last five years. Ballyhaunis Lakes Derry Lough

Species Name	All Ireland 1% threshold	Peak count (last 5 years) 2019-2024
Mute swan	90	3
Cormorant	110	1
Grey heron	25	1
Snipe		2

Table 64: I-WeBS peak count data last five years. Ballyhaunis Lakes Derrykin Lough

Species Name	All Ireland 1% threshold	Peak count (last 5 years) 2019-2024
Mute swan	90	30
Whooper swan	150	47
Teal	360	11
Mallard	280	47
Tufted duck	270	17
Cormorant	110	4
Grey heron	25	2
Moorhen		11
Coot	190	7
Lapwing	850	11
Whimbrel		14

Table 65: I-WeBS peak count data last five years. Ballyhaunis Lakes Lough Glinn

Species Name	All Ireland 1% threshold	Peak count (last 5 years) 2019-2024
Mute swan	90	3
Mallard	280	1
Cormorant	110	6
Grey heron	25	1
Snipe		3

Table 66: I-WeBS peak count data last five years. Ballyhaunis Lakes Rowans Lough (Drum Lake)

Species Name	All Ireland 1% threshold	Peak count (last 5 years) 2019-2024
Mute swan	90	2
Wigeon	560	33
Teal	360	13
Mallard	280	46
Tufted duck	270	12
Little grebe	20	2
Cormorant	110	1
Grey heron	25	1
Lapwing	850	55
Snipe		2
Curlew	350	4
Black-headed gull		1

Table 67: I-WeBS peak count data last five years. Ballyhaunis Turloughs 4K West of Ballyhaunis

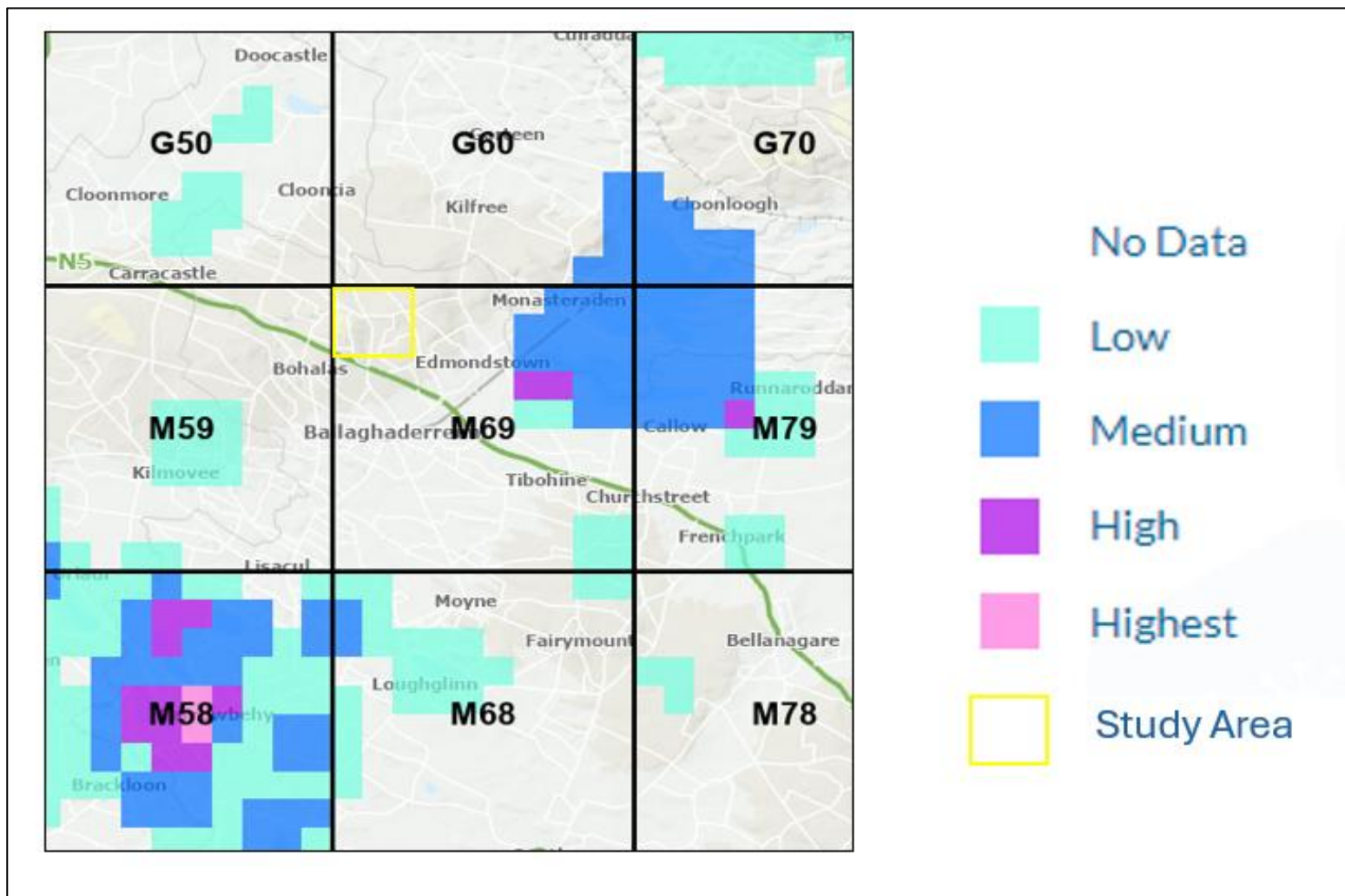


Figure 18: Birds sensitive to wind energy map (Mc Guinness *et al.* 2015)

APPENDIX 2 - VP FLIGHTLINES

Flight line maps are presented below each species has a map for Seasons 1-4 which were observed using 3 VPs on the original turbine layout. Seasons 5-8 were observed using 4 VPs covering a larger area and a different turbine layout. These maps are titled as such even if the species was not recorded in all seasons.

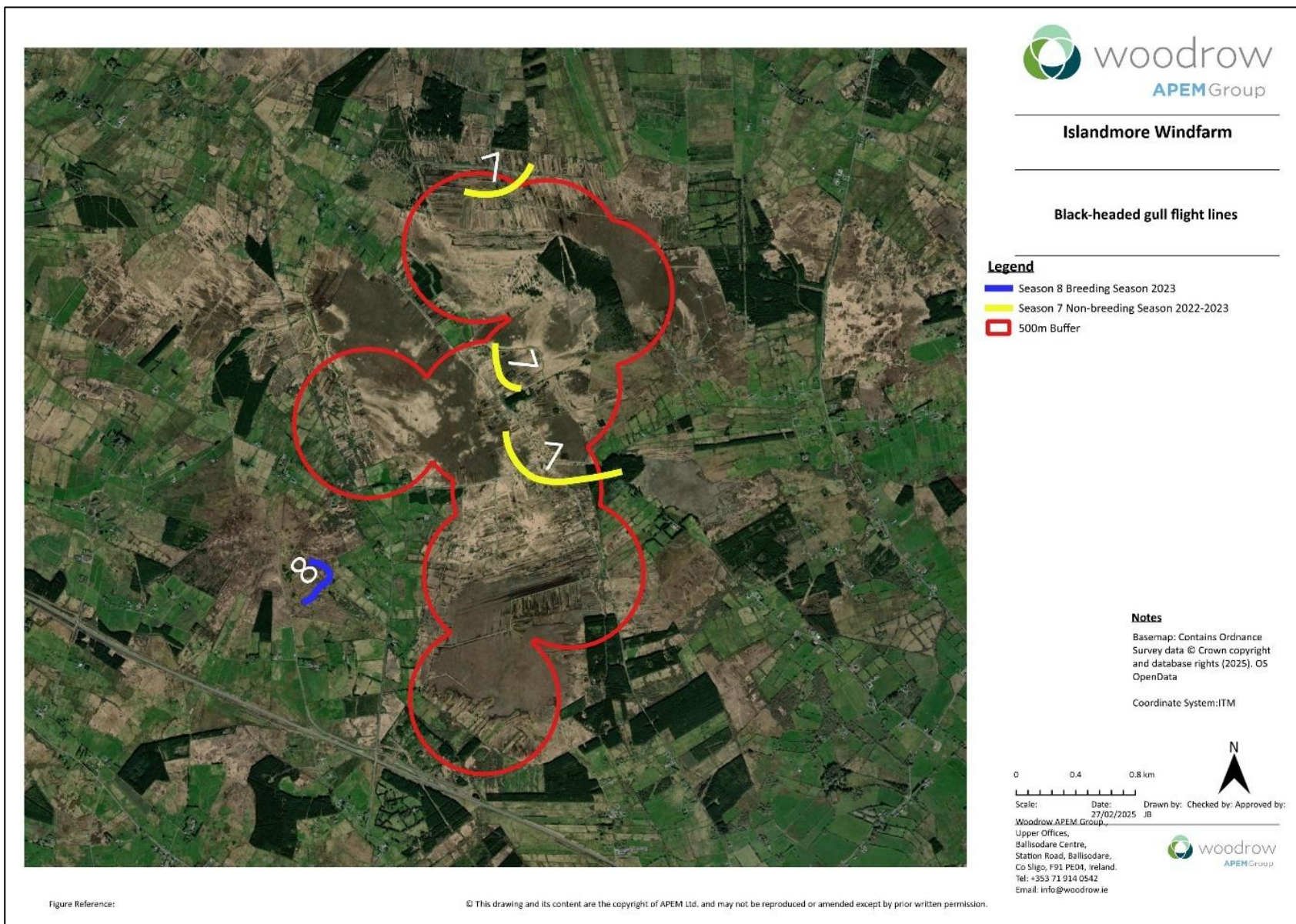


Figure 19: Black-headed gull flight lines season non-breeding season 2022/23 and breeding season 2023

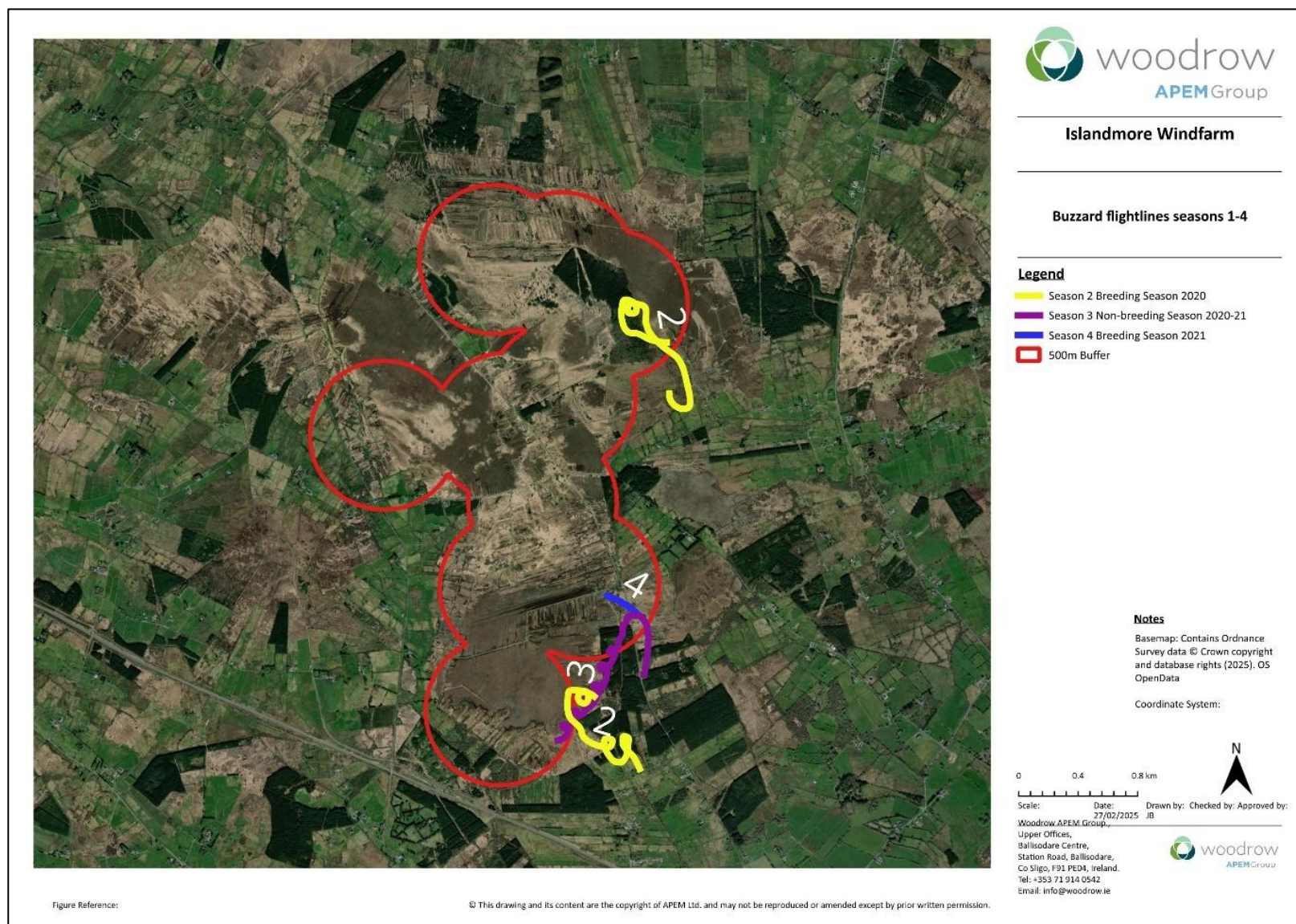
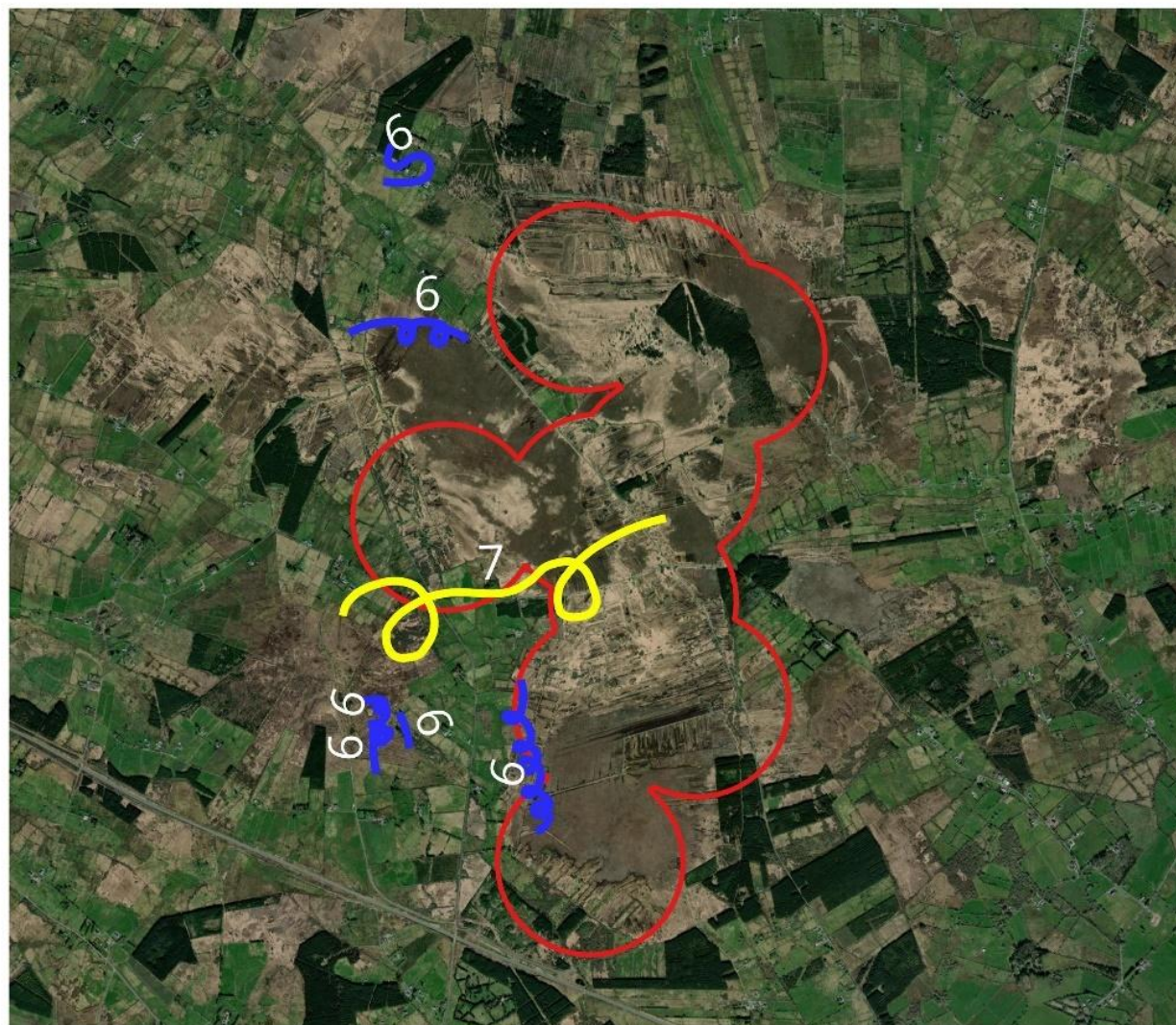


Figure 20: Buzzard flight lines seasons 1-4 breeding season 2020, non-breeding season 2020/21 and breeding season 2021



Islandmore Windfarm

Buzzard flightlines seasons 5-8

Legend

- Season 6 Breeding Season 2022
- Season 7 Non-breeding Season 2022-2023
- 500m Buffer

Notes

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Coordinate System:



Figure Reference:

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Figure 21: Buzzard flight lines season 5-8 breeding season 2022 and non-breeding season 2022/23

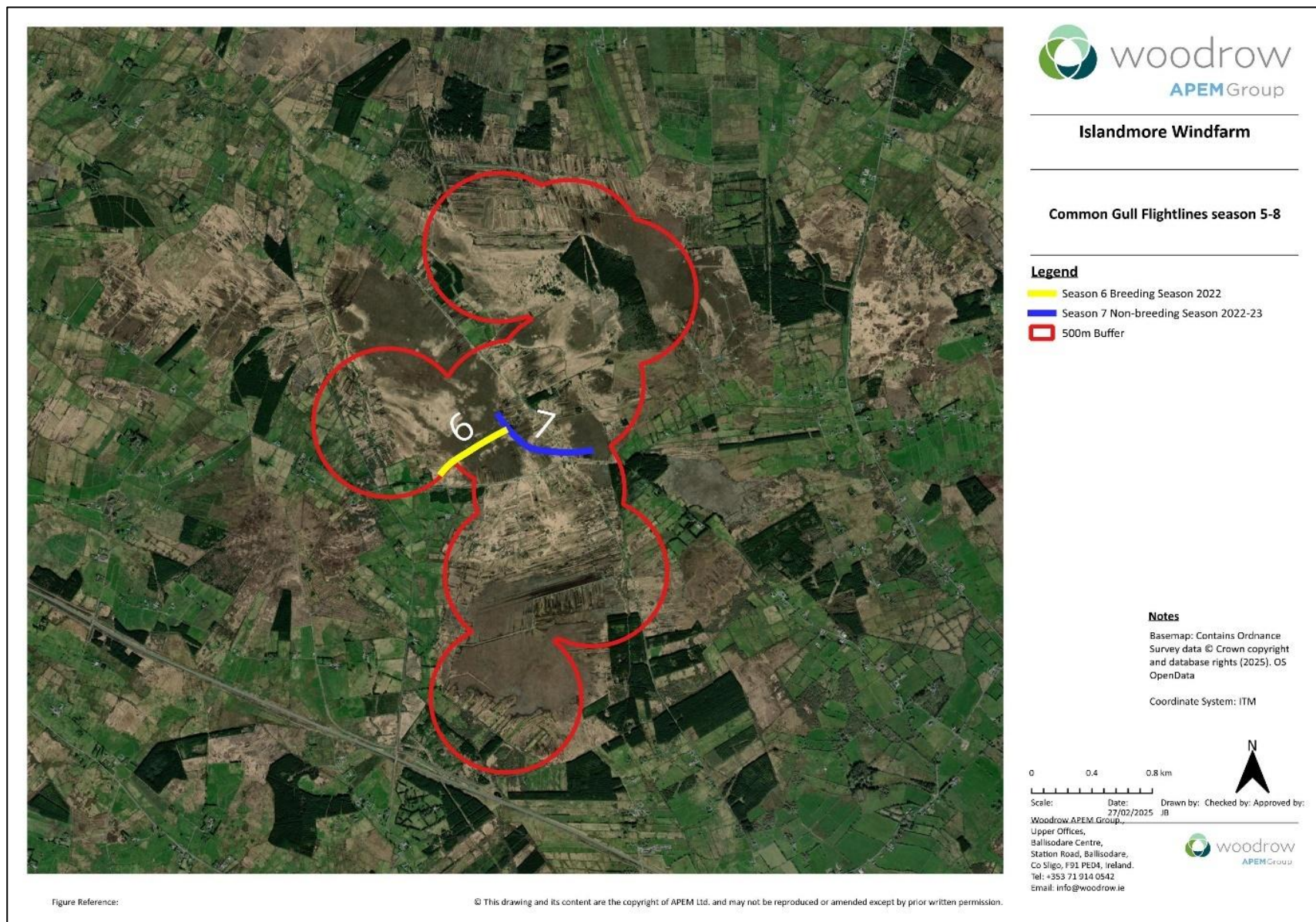


Figure 22: Common gull flight lines season 5-8 breeding season 2022 and non-breeding season 2022/23

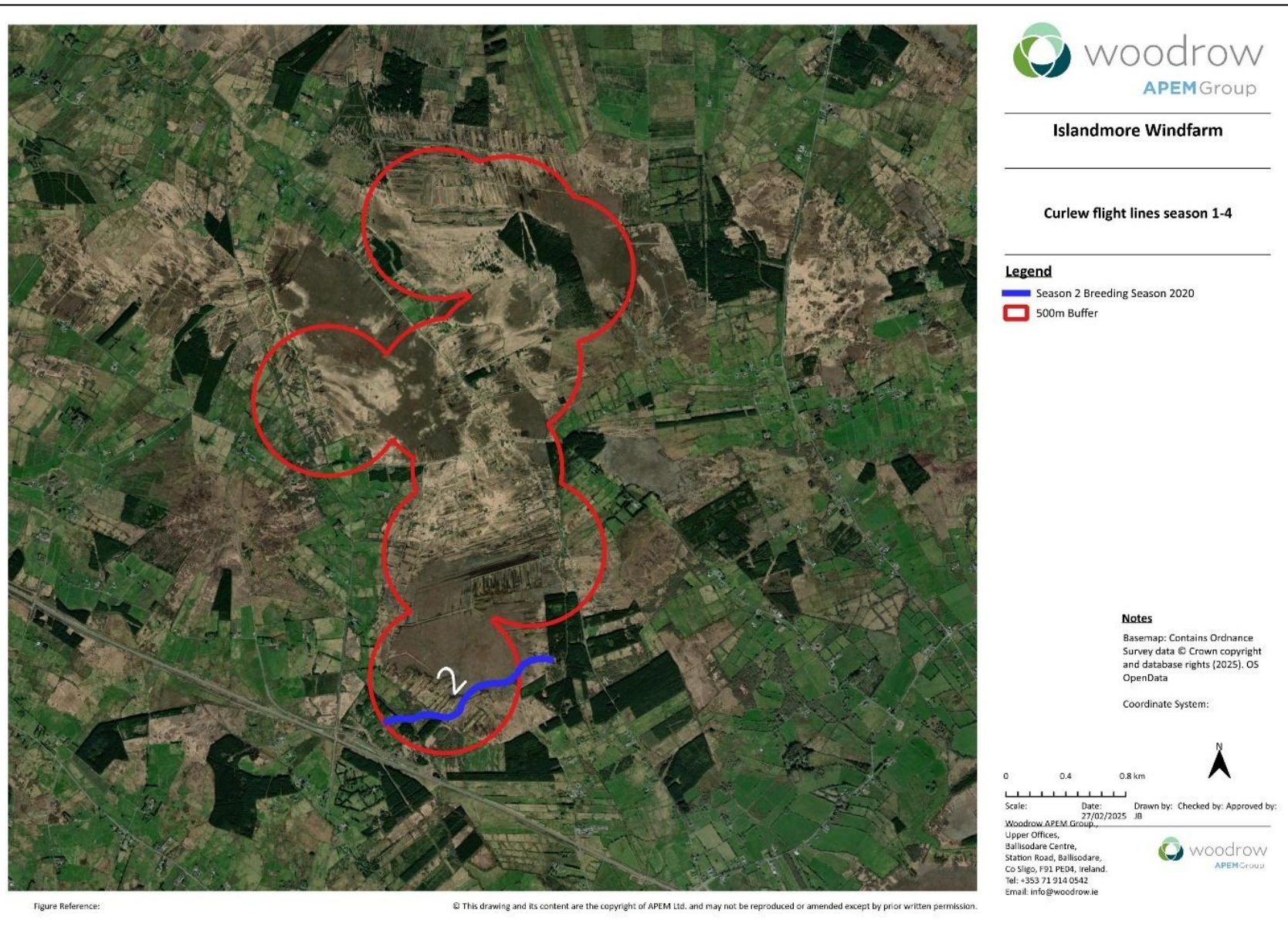


Figure 23: Curlew flight lines seasons 1-4 breeding season 2020

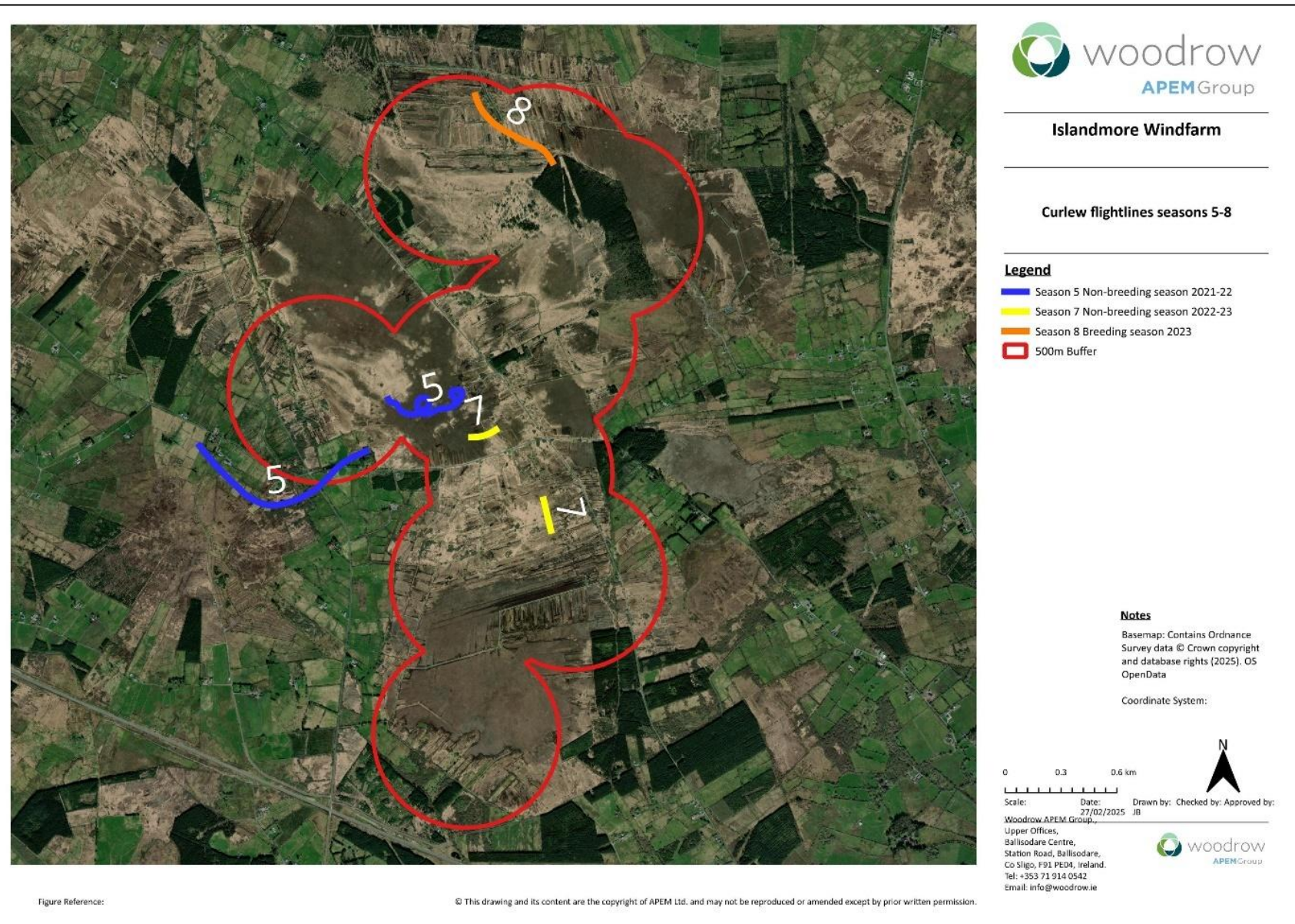


Figure 24: Curlew flight lines season 5-8 non-breeding season 2021/22, non-breeding season 2022/23 and breeding season 2023

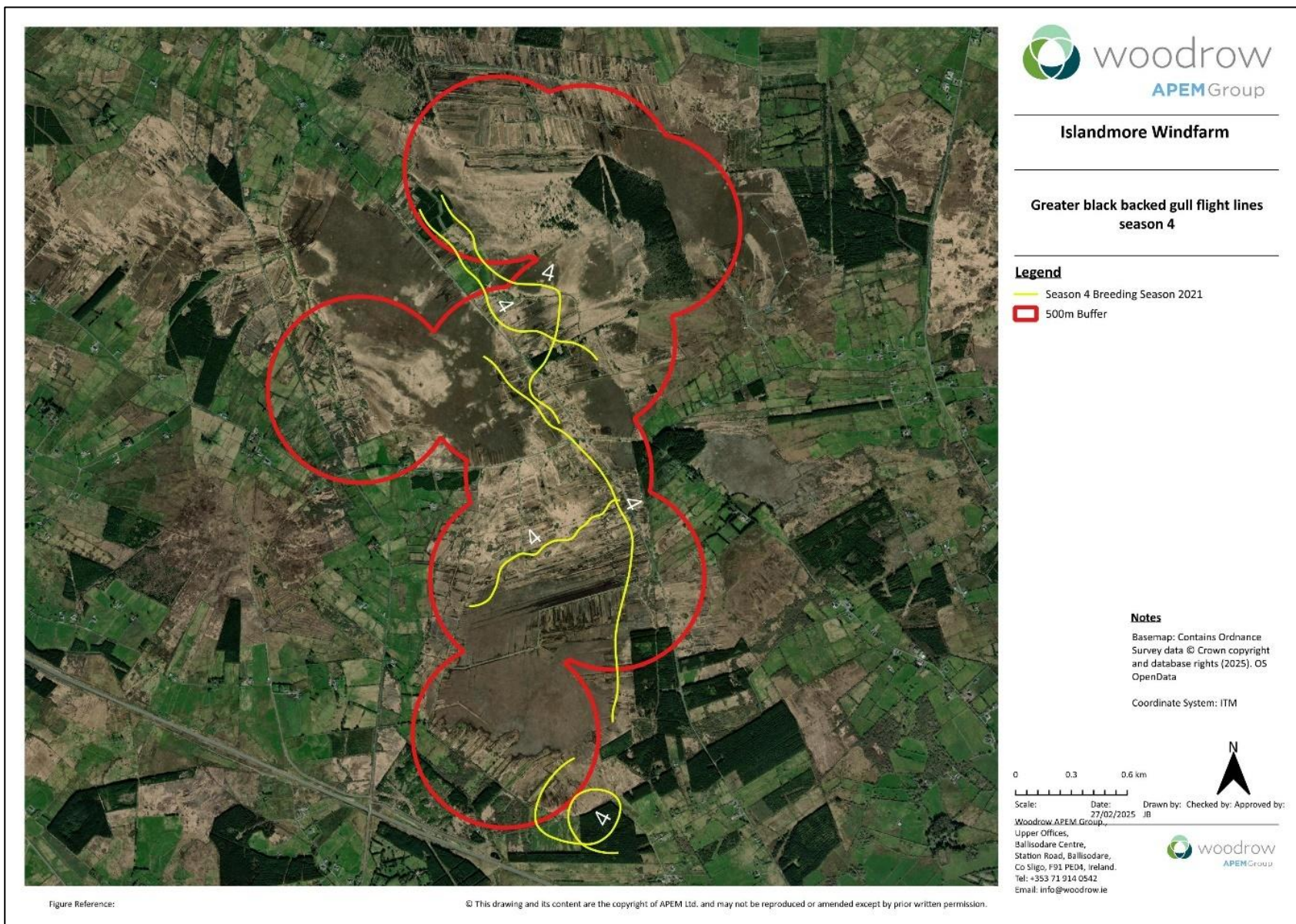
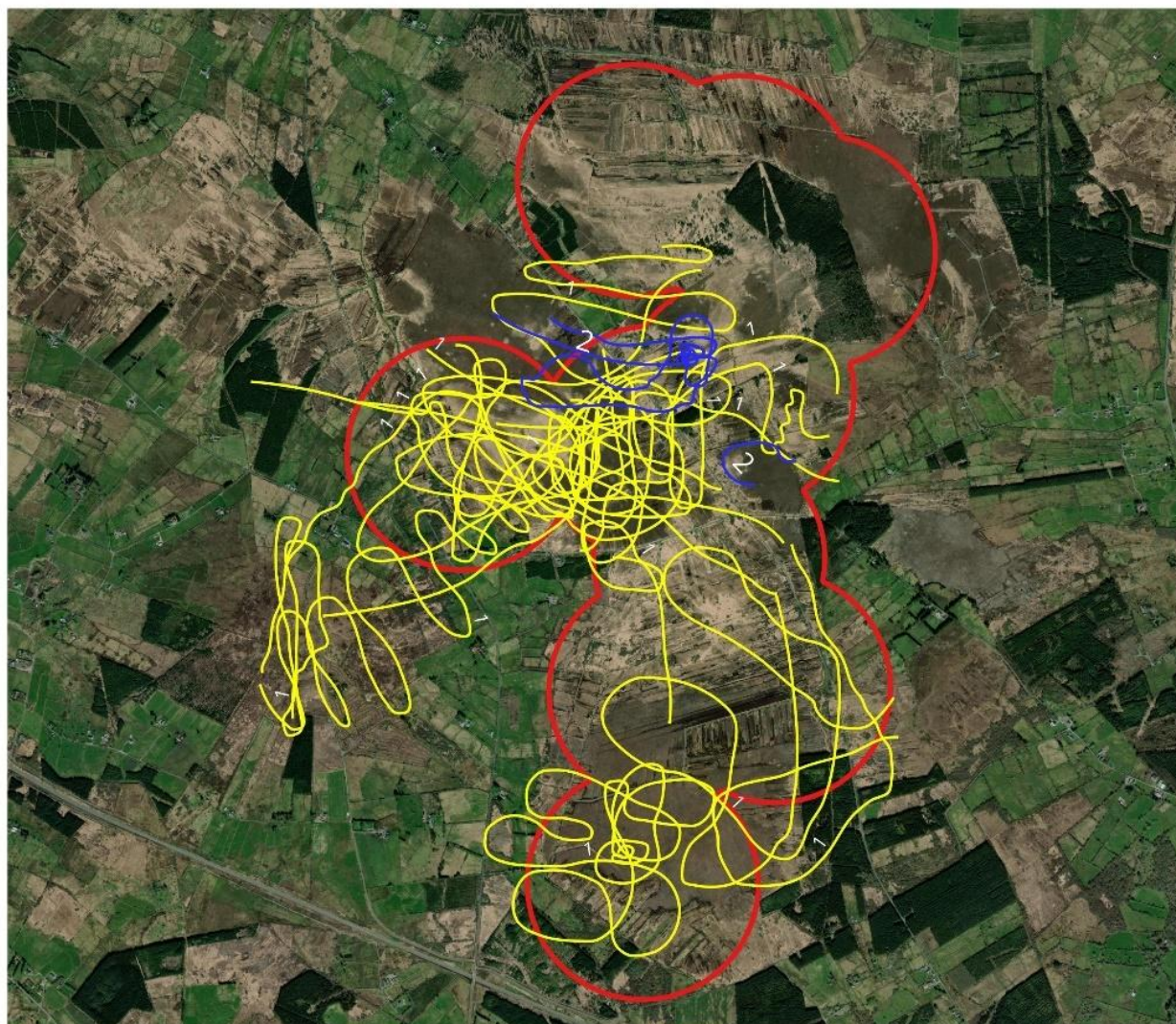


Figure 25: Greater black backed gull season 1-4 breeding season 2021



Islandmore Windfarm

Golden plover flight lines season 1-2

Legend

- Season 2 Breeding Season 2020
- Season 1 Non-breeding 2019-20
- 500m Buffer

Notes

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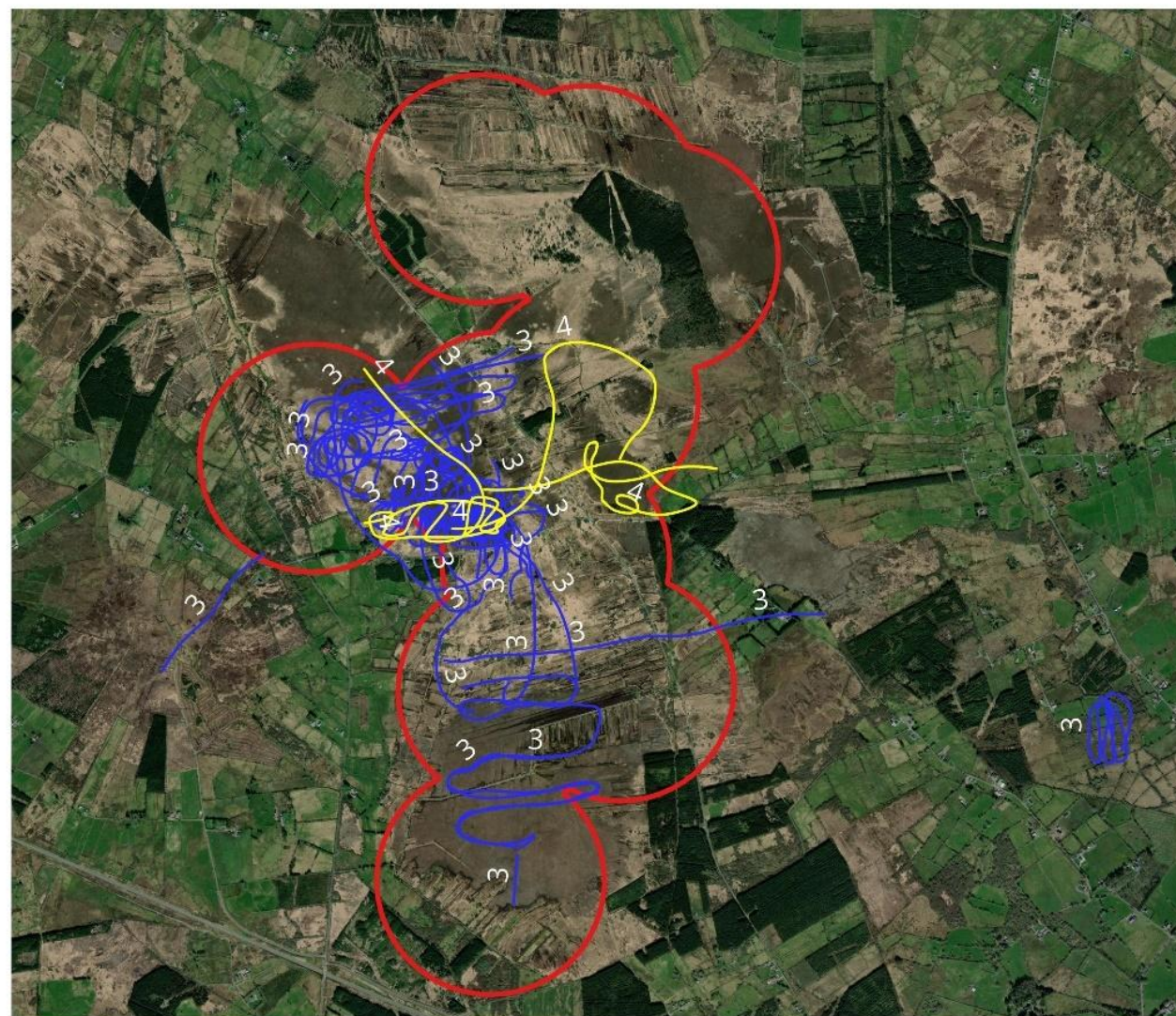
Coordinate System: ITM



Figure Reference:

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Figure 26: Golden plover flight lines season 1-2 (1-4) breeding season 2020 and non-breeding season 2019/20



Islandmore Windfarm

Golden plover flight lines season 3-4

Legend

- Season 4 Breeding season 2021
- Season 3 Non-breeding season 2020-21
- 500m Buffer

Notes

Basemap: Contains Ordnance Survey data © Crown copyright and database rights (2025). OS OpenData

Coordinate System: ITM

0 0.3 0.6 km

Scale: Date: 27/02/2025 Drawn by: JB Checked by: Approved by:
 Woodrow APEM Group
 Upper Offices,
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 Station Road, Ballisodare,
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 Tel: +353 71 914 0542
 Email: info@woodrow.ie

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Figure 27: Golden plover flight lines season 3-4 (1-4) breeding season 2021 and non-breeding season 2020/21

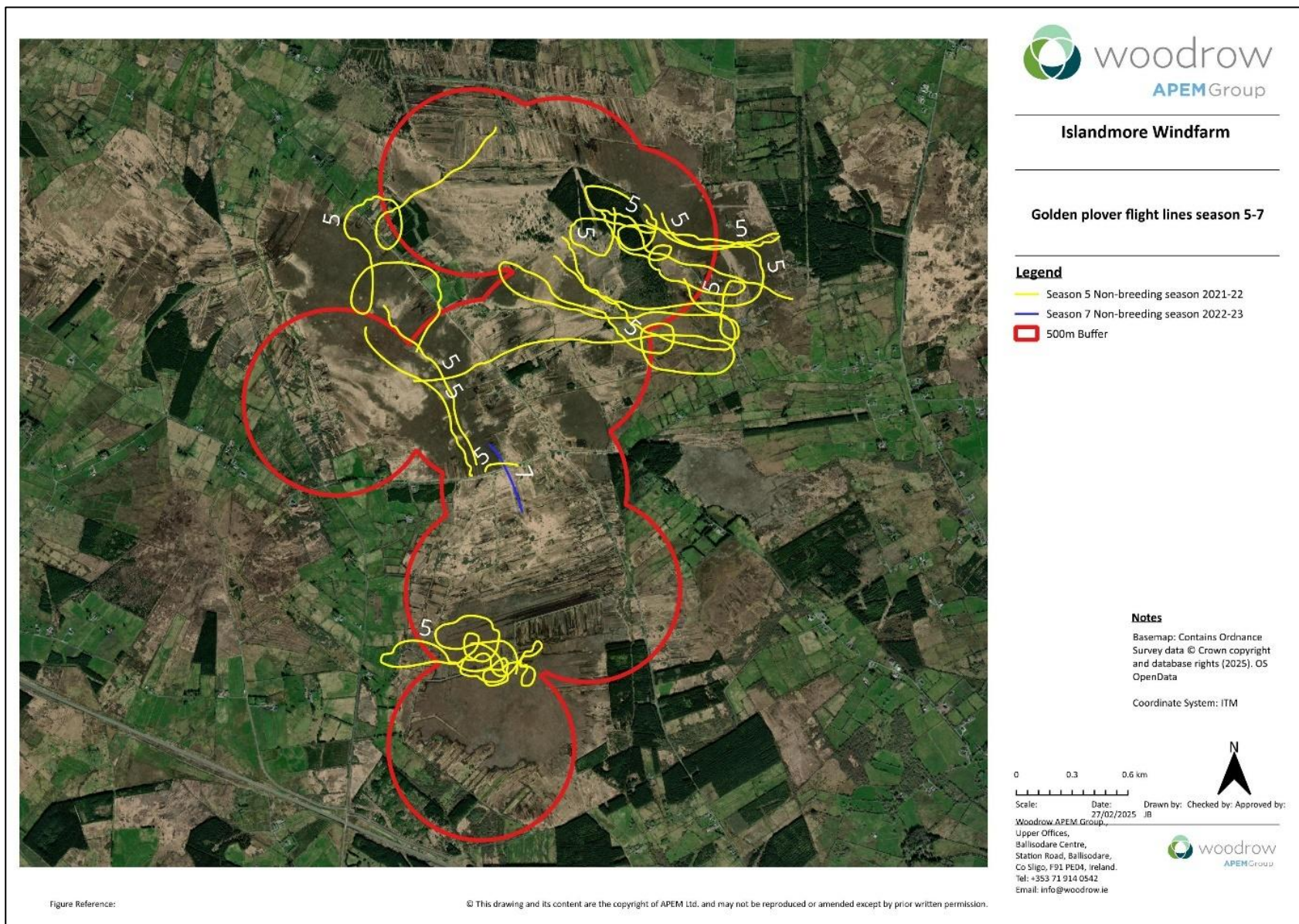


Figure 28: Golden plover flight lines season 5-8 non-breeding season 2021/22 and non-breeding season 2022/23

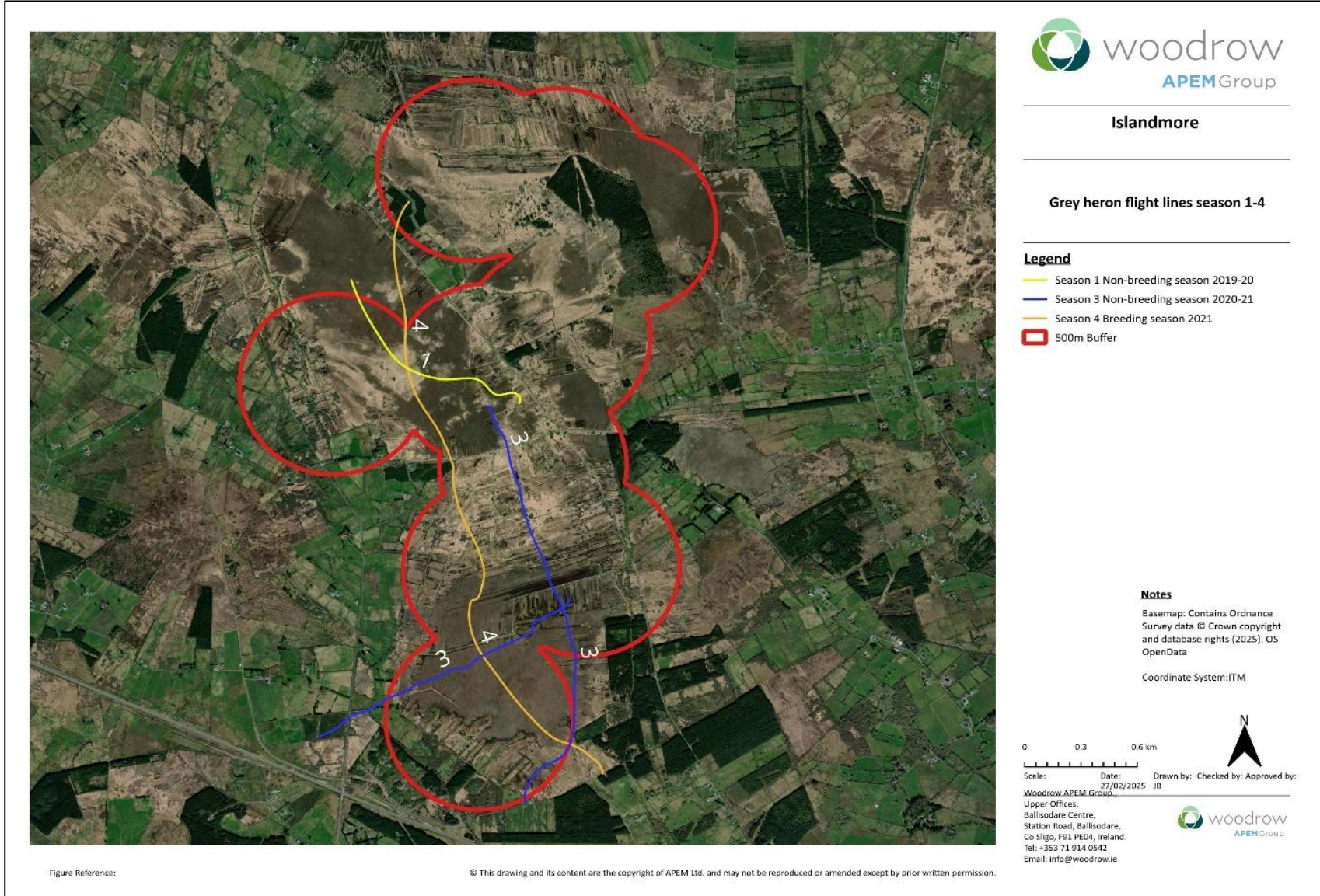


Figure 29: Grey heron flight lines season 1-4 non-breeding season 2019/20, non-breeding season 2020/21 and breeding season 2021.

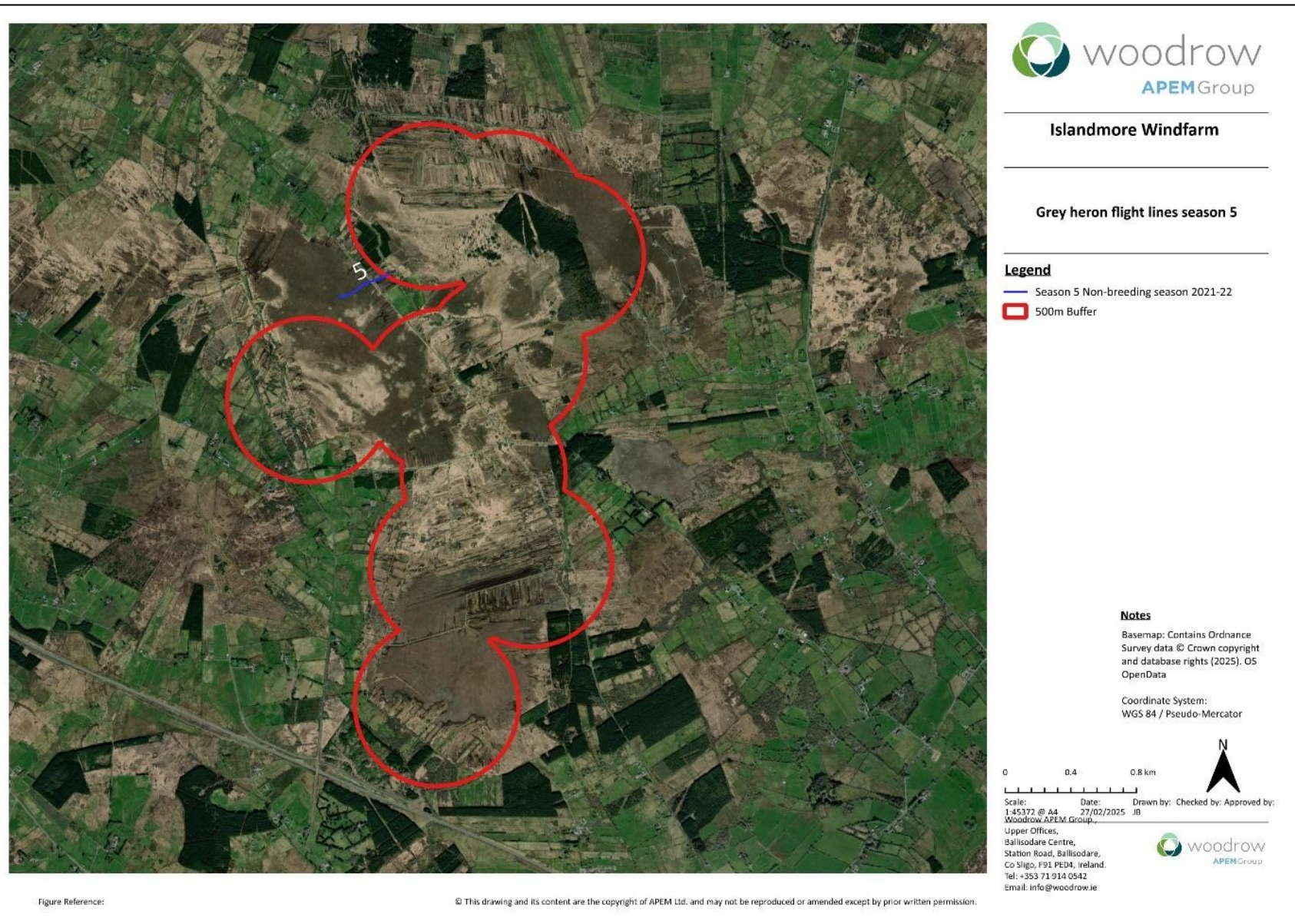


Figure 30: Grey heron flight lines season 5-8 non-breeding season 2021/22

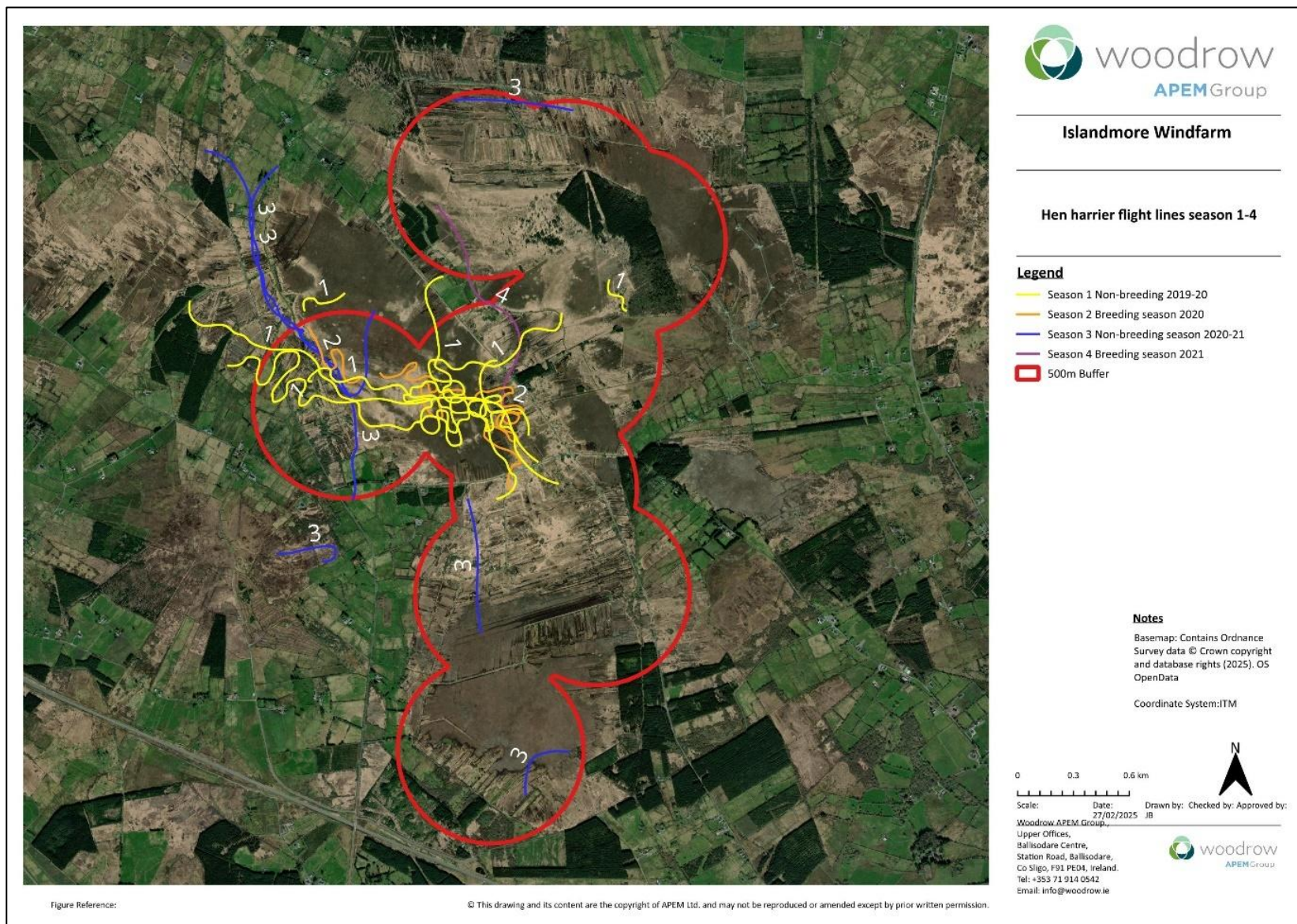


Figure 31: Hen harrier flight lines season 1-4 non-breeding season 2019/20, breeding season 2020, nonbreeding season 2020/21, breeding season 2021

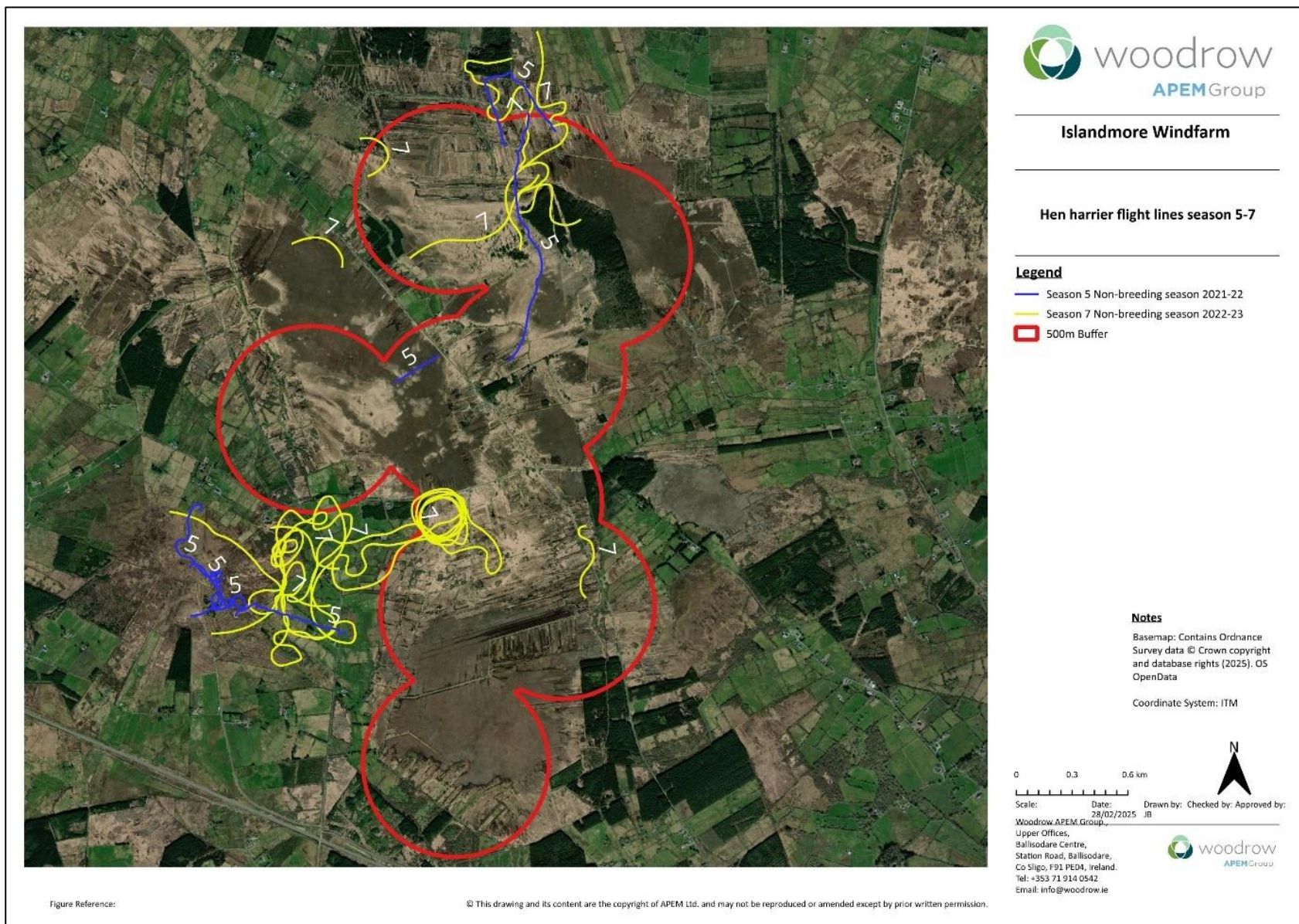


Figure 32 Hen harrier flight lines season 5-8 non-breeding season 2021/22 and non-breeding season 2022/23

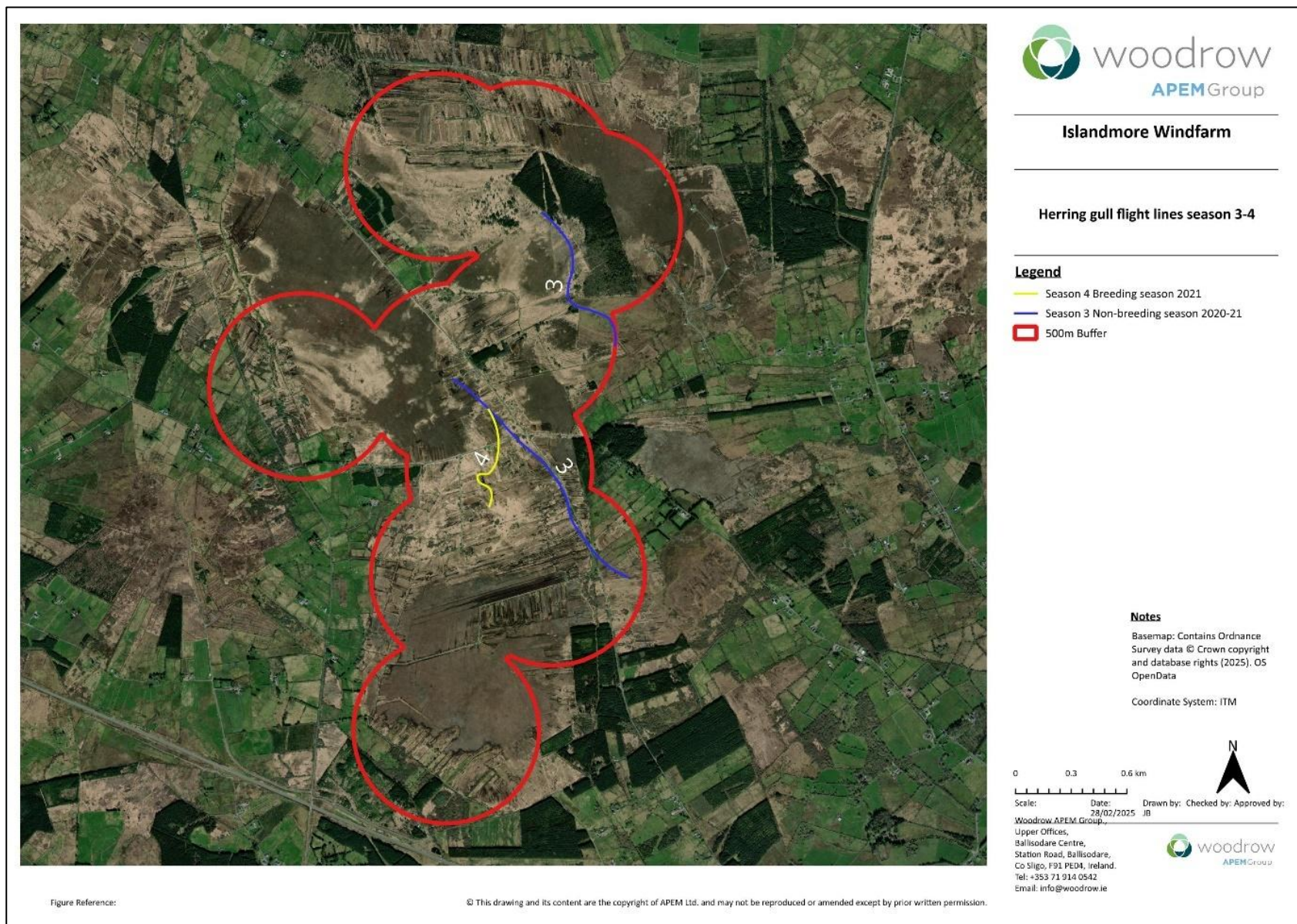


Figure 33: Herring gull flight lines season 1-4 breeding season 2021 and non-breeding season 2020/21

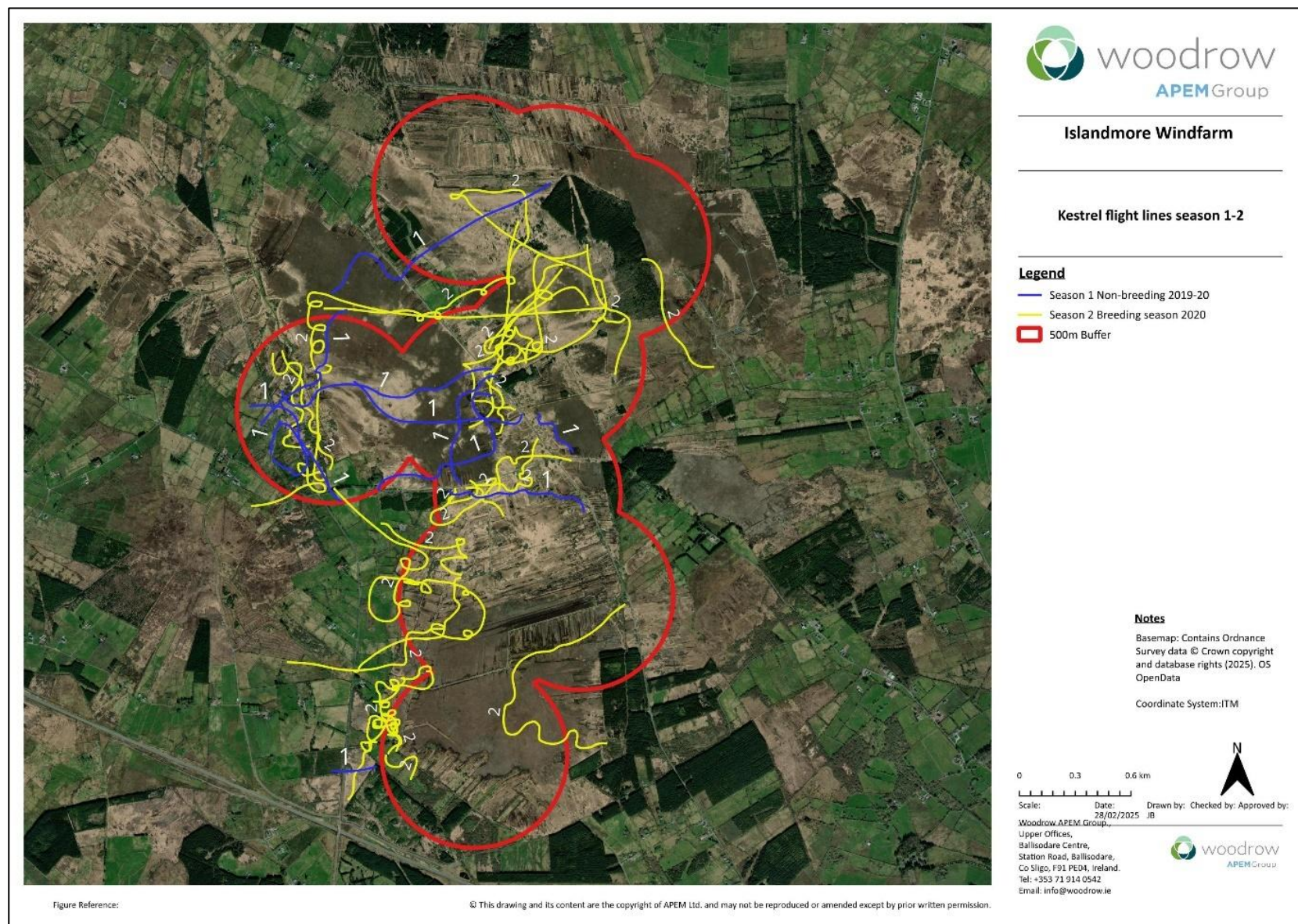


Figure 34: Kestrel flight lines season 1-2 (1-4) non-breeding season 2019/20 breeding season 2020

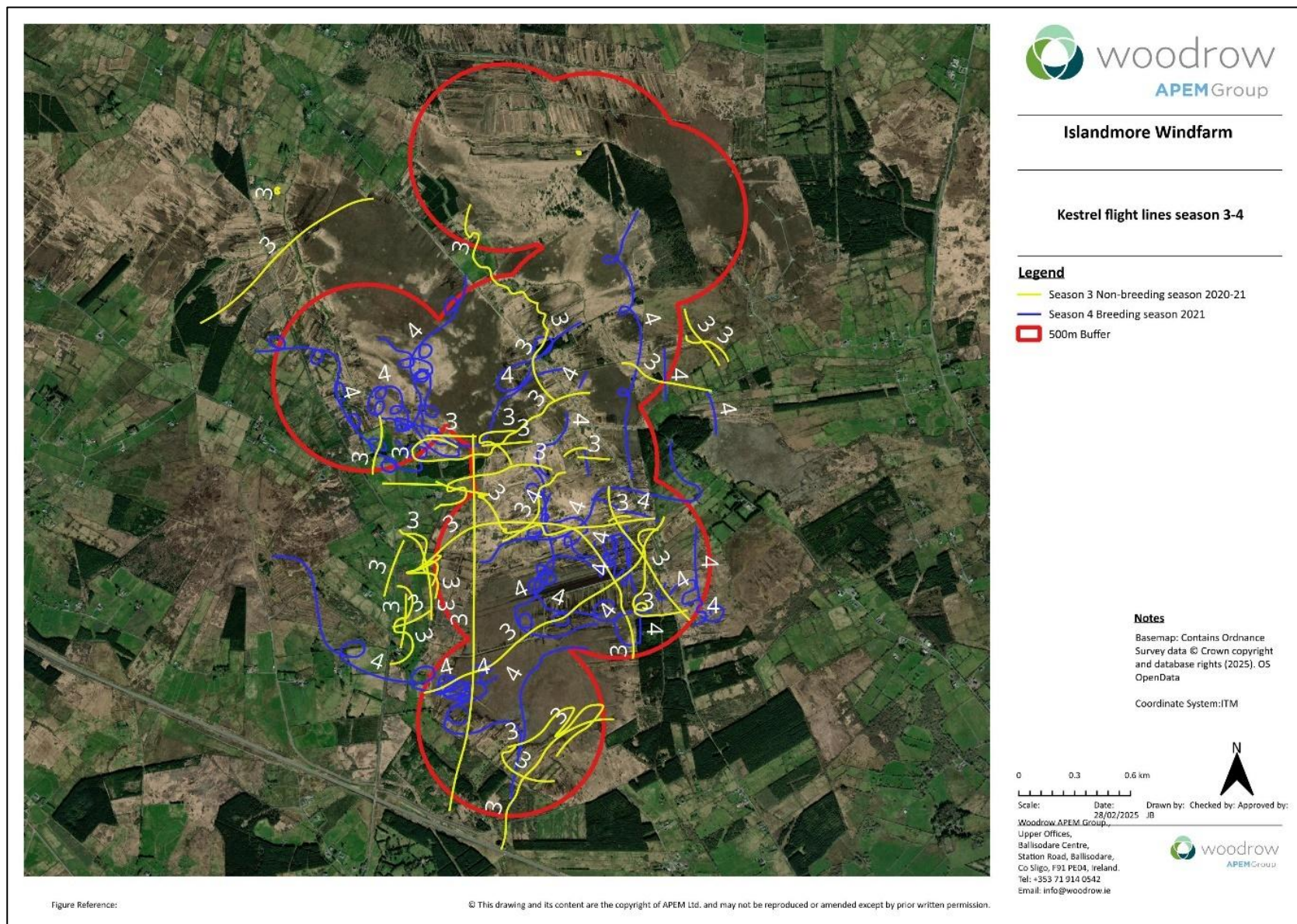


Figure 35: Kestrel flight lines season 3-4 (1-4) non-breeding season 2020/21 and breeding season 2021

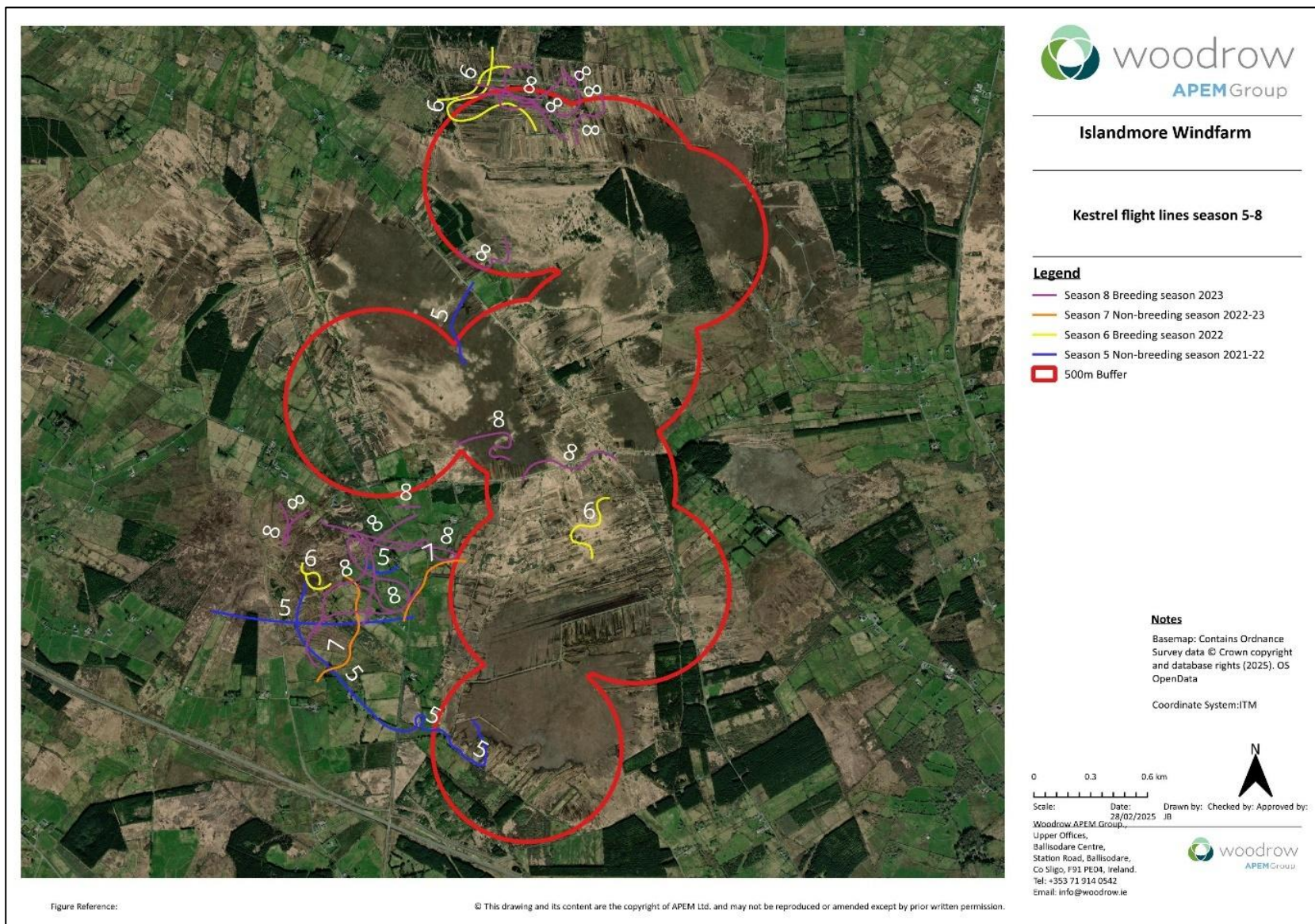


Figure 36: Kestrel flight lines season 5-8 non-breeding season 2021/22, breeding season 2022, non-breeding season 2022/23 and breeding season 2023

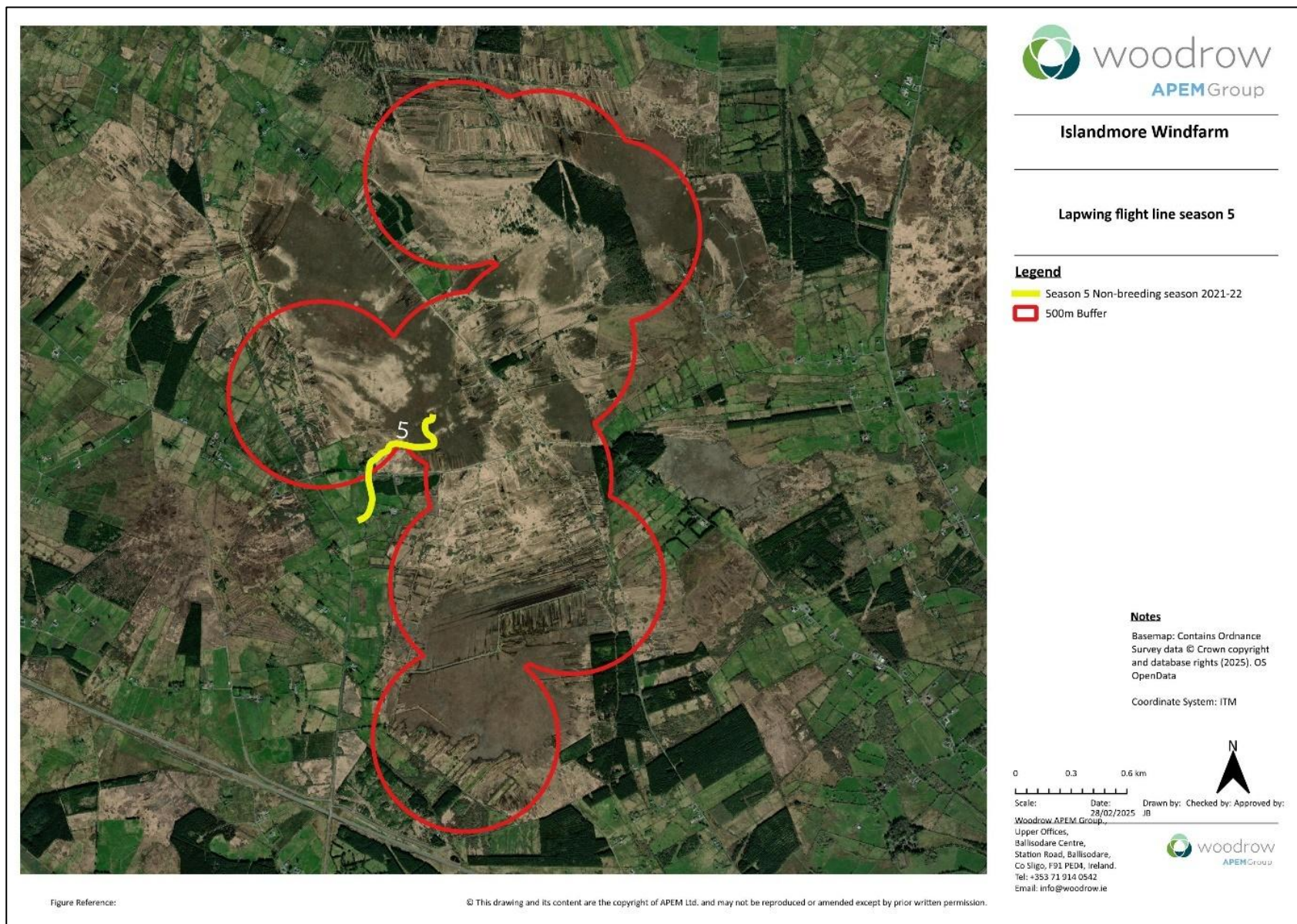


Figure 37: Lapwing flight lines season 5-8 non-breeding season 2021/22

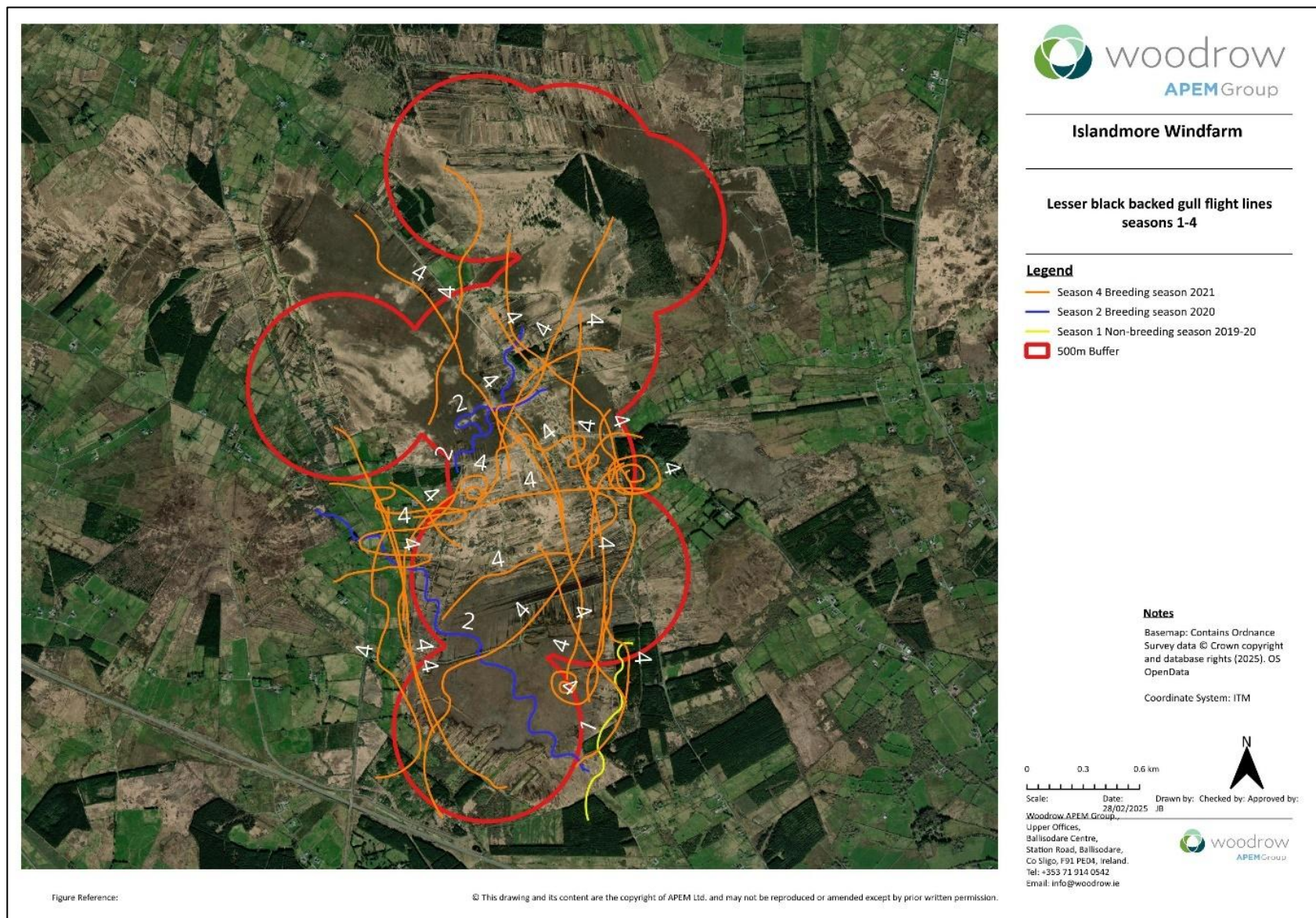


Figure 38: Lesser black backed gull flight lines season 1-4 non-breeding season 2019/20, breeding season 2020, breeding season 2021

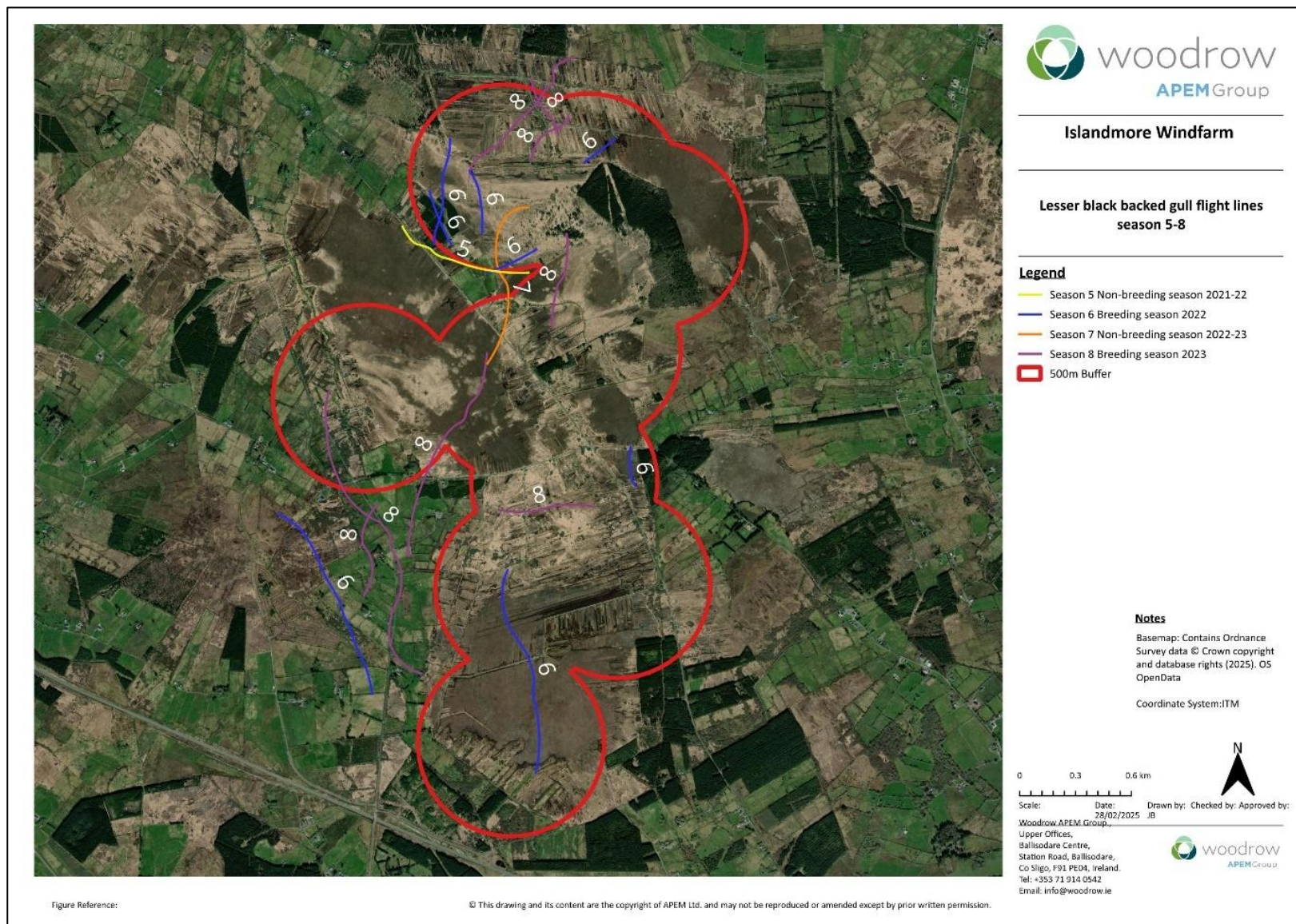
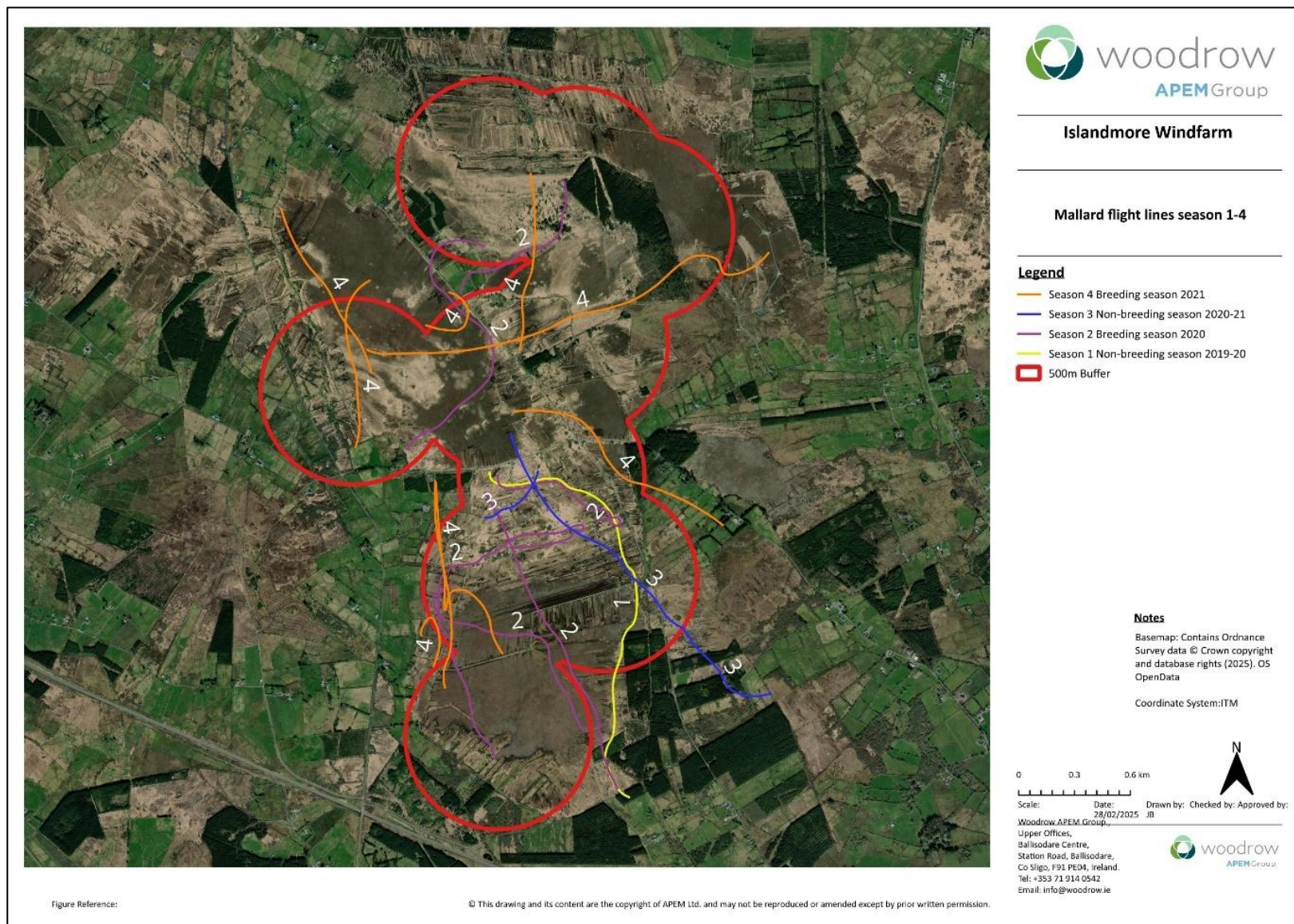


Figure 39: Lesser black backed gull season 5-8 non-breeding season 2021/22, breeding season 2022, non-breeding season 2022/23, breeding season 2023



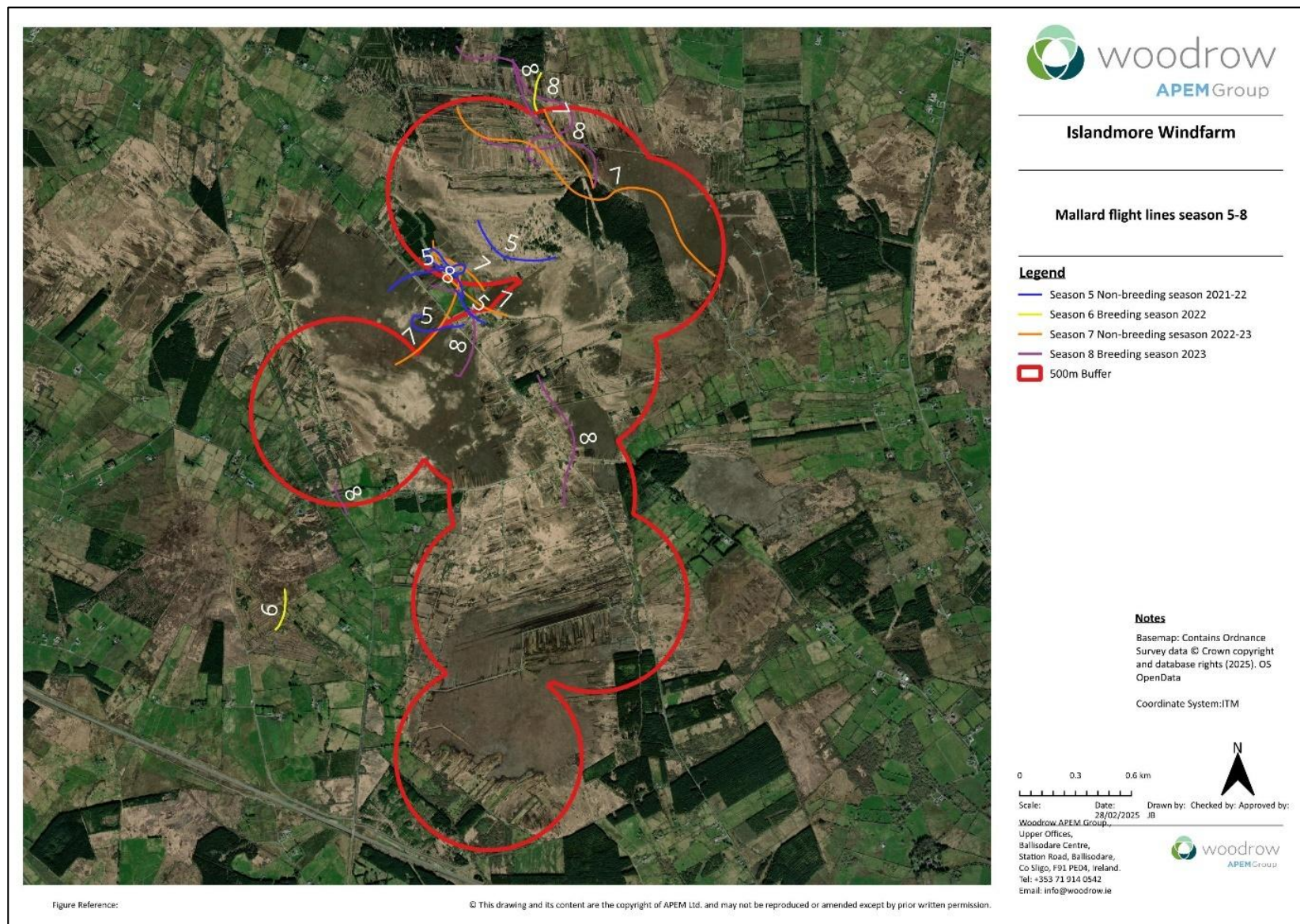


Figure 41: Mallard flight lines season 5-8 no-breeding season 2021/22, breeding season 2022, non-breeding season 2022/23 and breeding season 2023

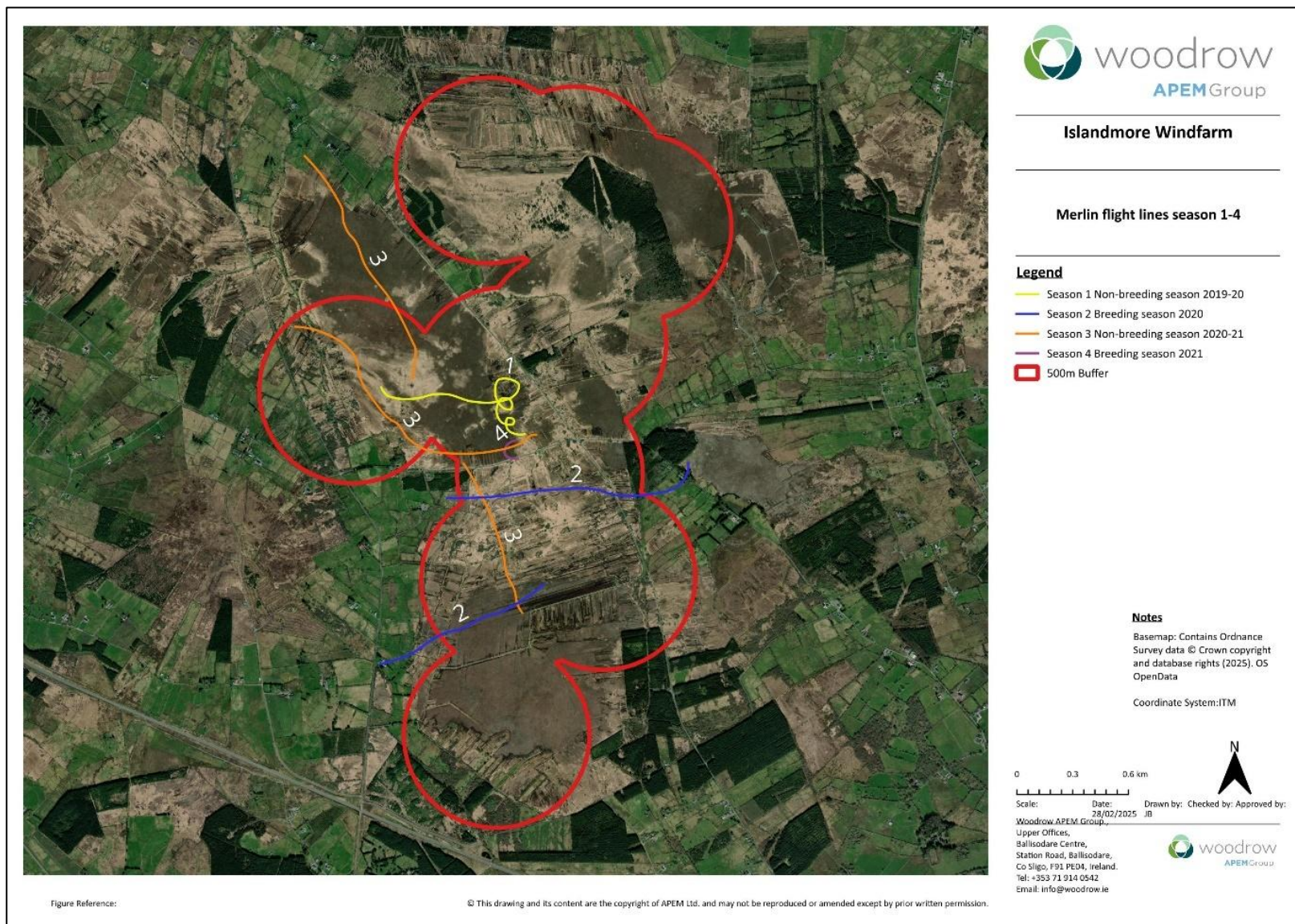


Figure 42: Merlin flight lines season 1-4 non-breeding season 2019/20, breeding season 2020, non-breeding season 2020/21 and breeding season 2021

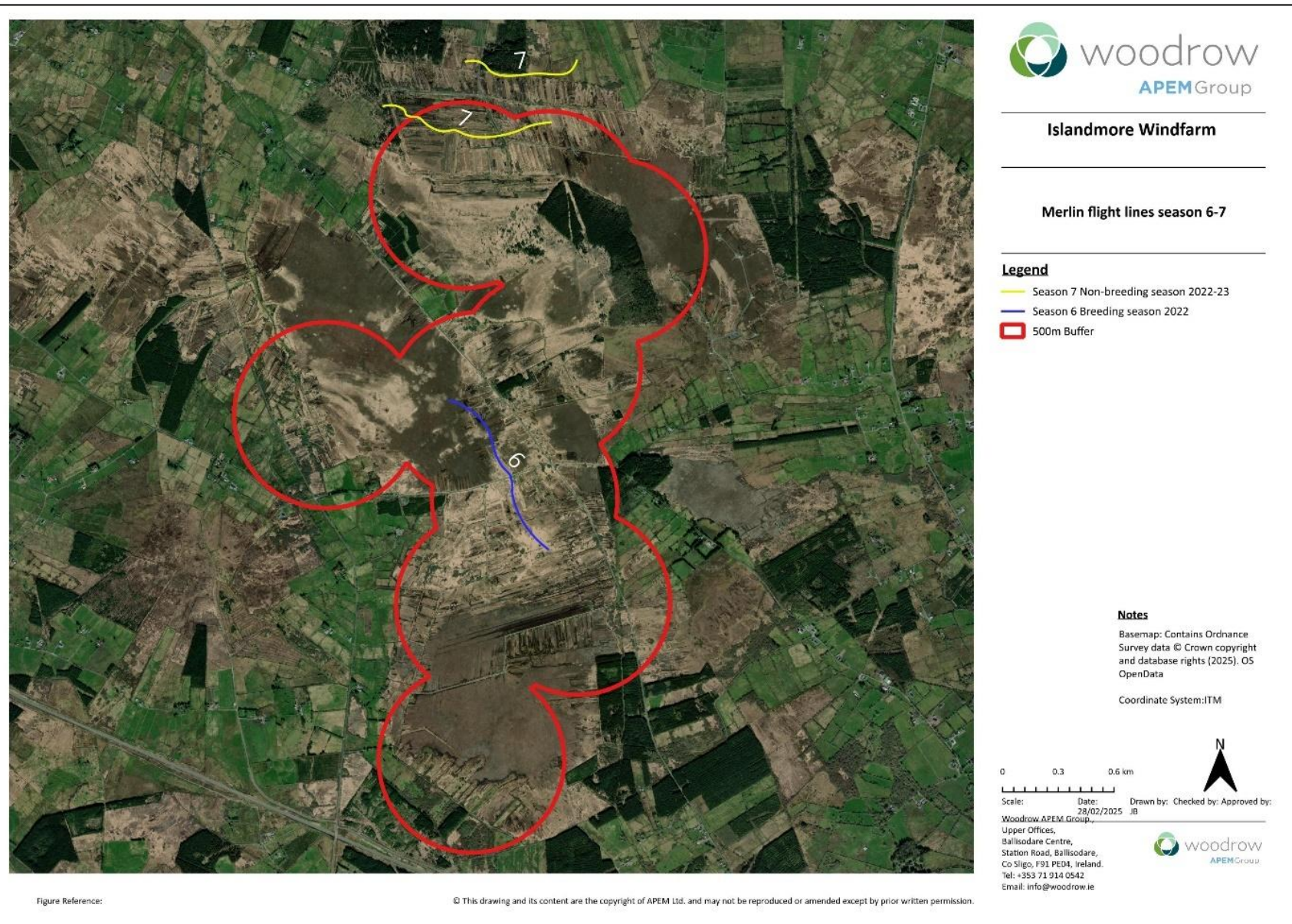


Figure 43: Merlin flight lines season 5-8 breeding season 2022 and non-breeding season 2022/23

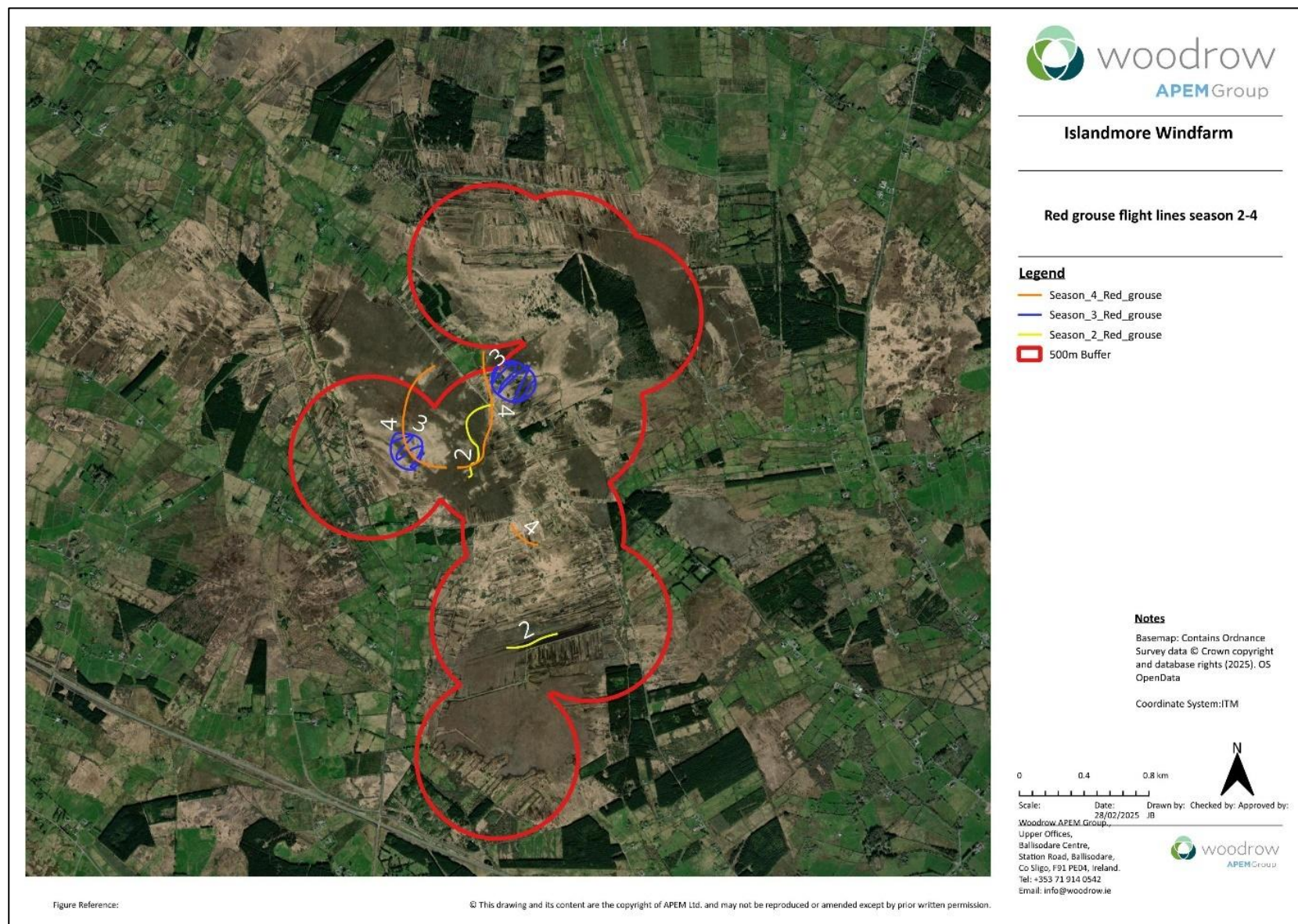


Figure 44: Red grouse flight lines season 1-4 breeding season 2020, non-breeding season 2020/21, breeding season 2021

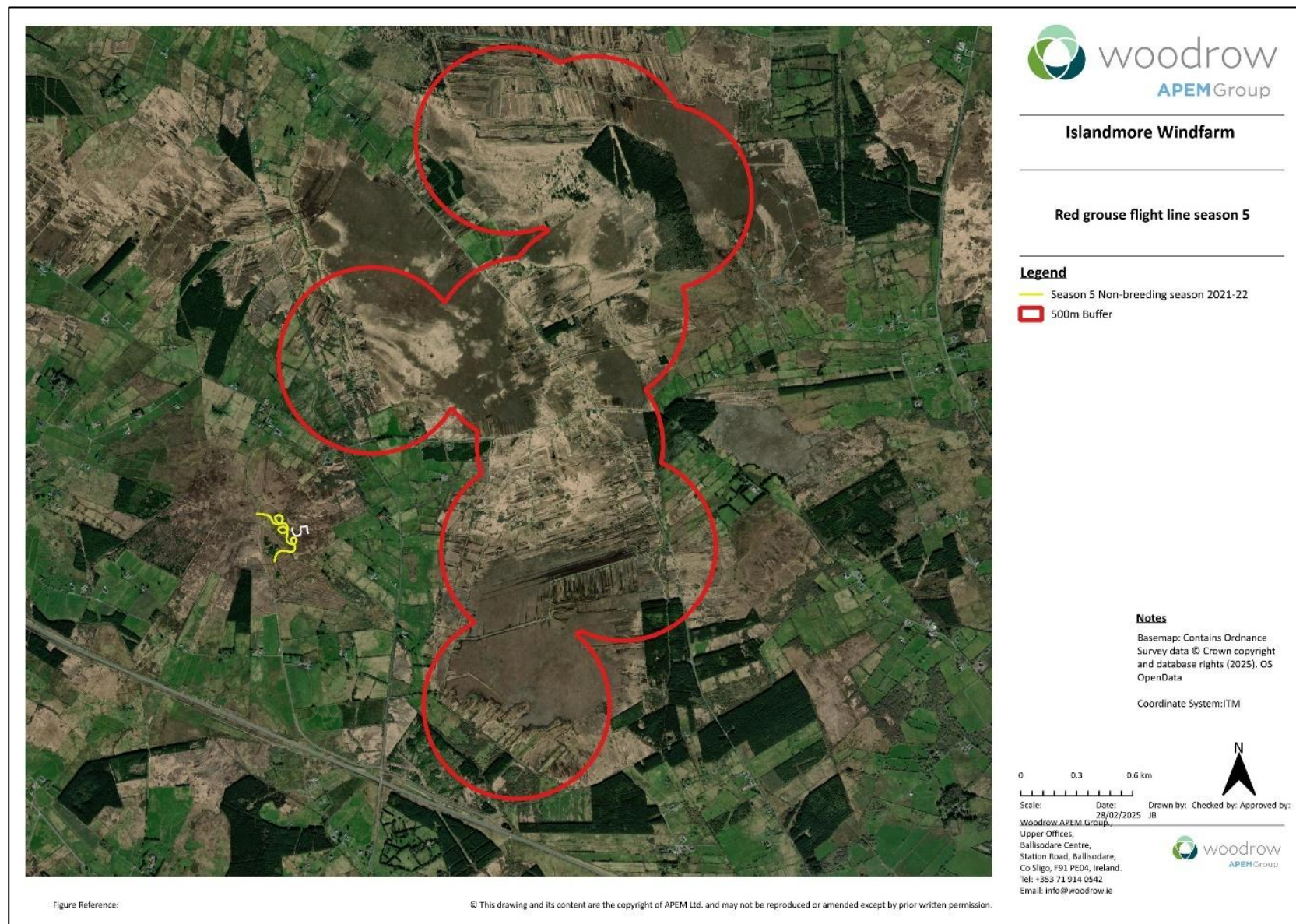


Figure 45: Red grouse flight lines season 5-8 non-breeding season 2021/22

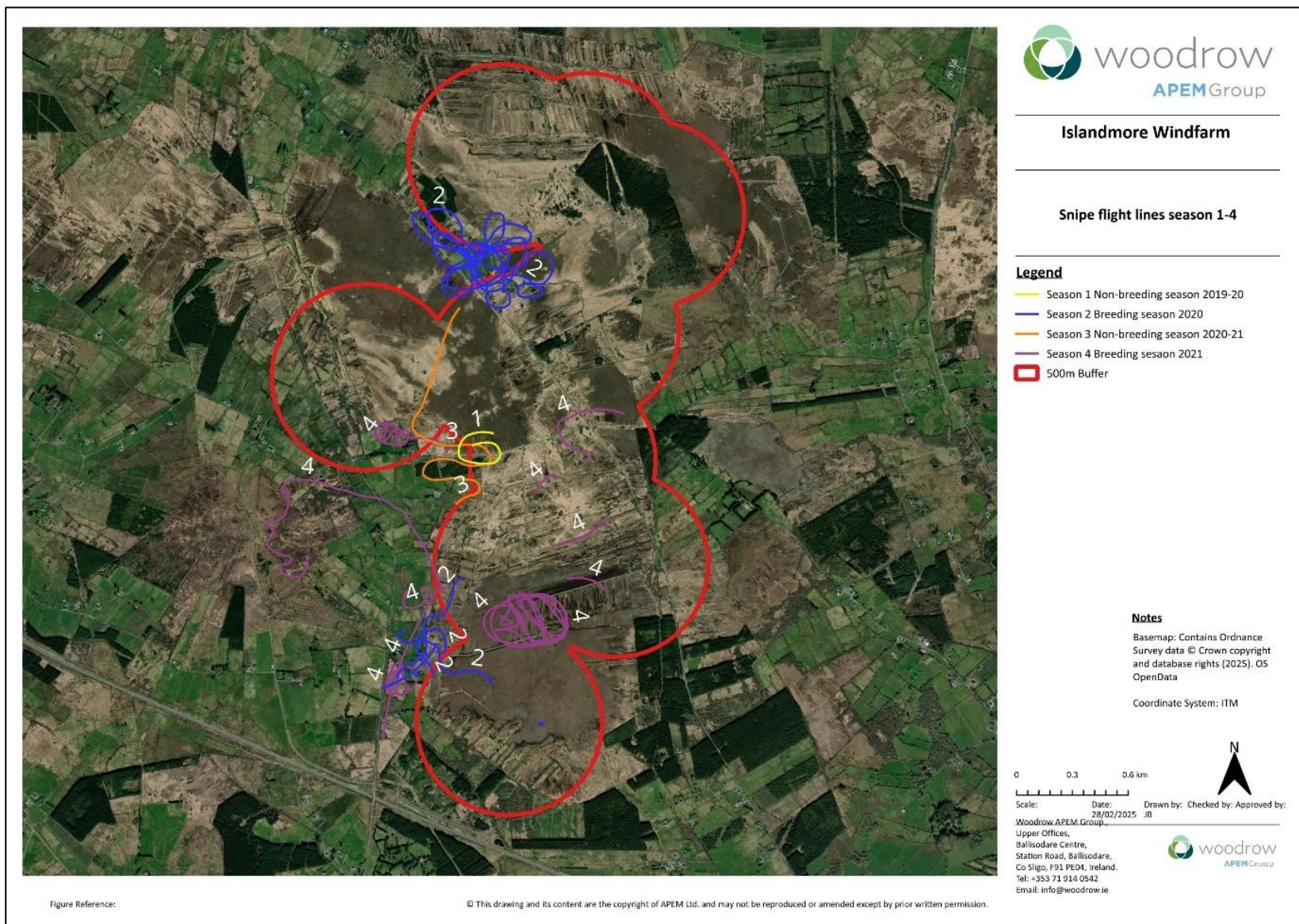


Figure 46: Snipe flight lines season 1-4 non-breeding season 2019/20, breeding season 2020, non-breeding season 2020/21 and breeding season 2021

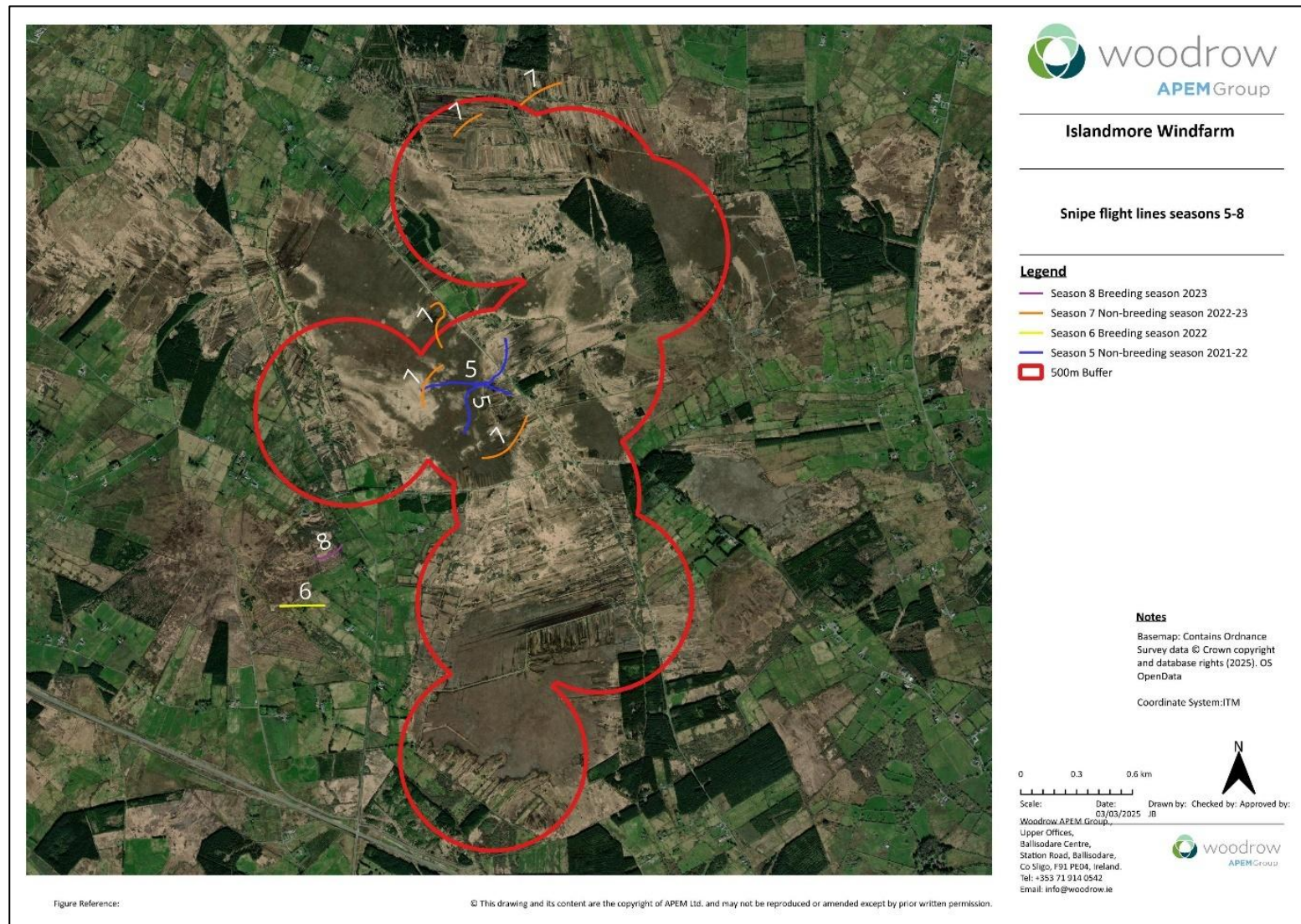


Figure 47: Snipe flight lines season 5-8 breeding season 2021/22, breeding season 2022, non-breeding season 2022/23 and breeding season 2023

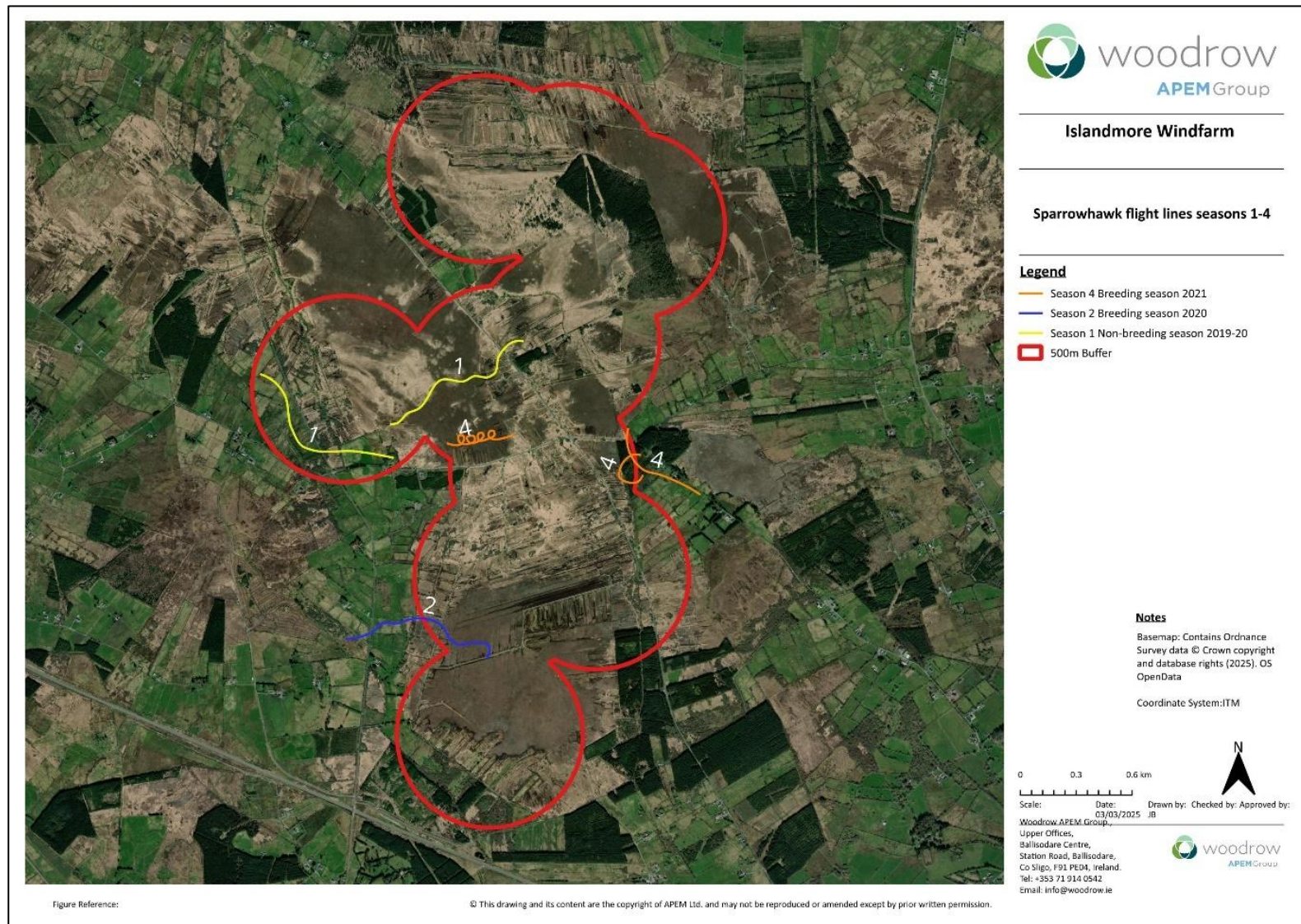


Figure 48: Sparrowhawk flight lines season 1-4 non-breeding season 2019/20, breeding season 2020, breeding season 2021

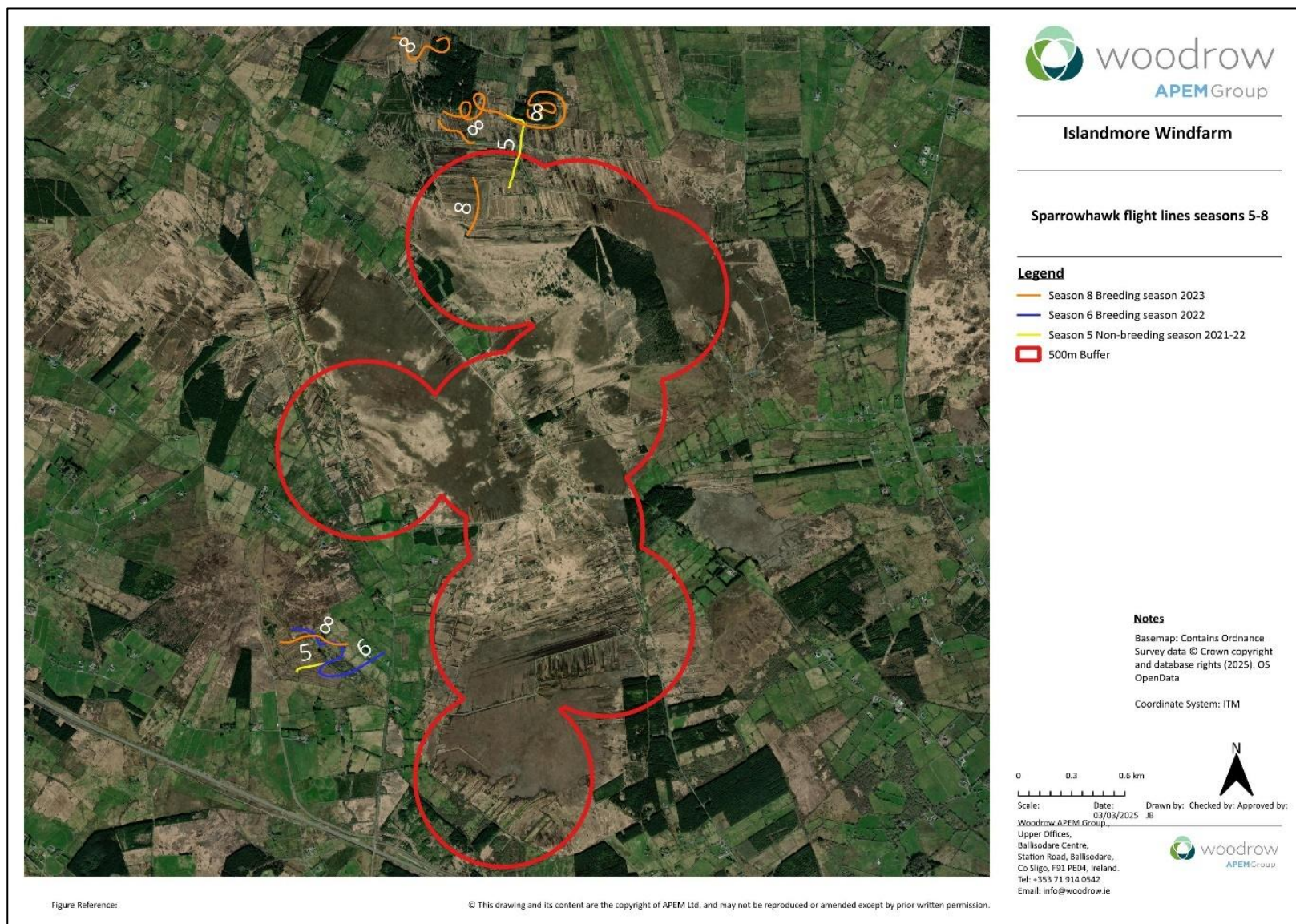


Figure 49: Sparrowhawk flight lines season 5-8 breeding season 2021/22, breeding season 2022 and breeding season 2023

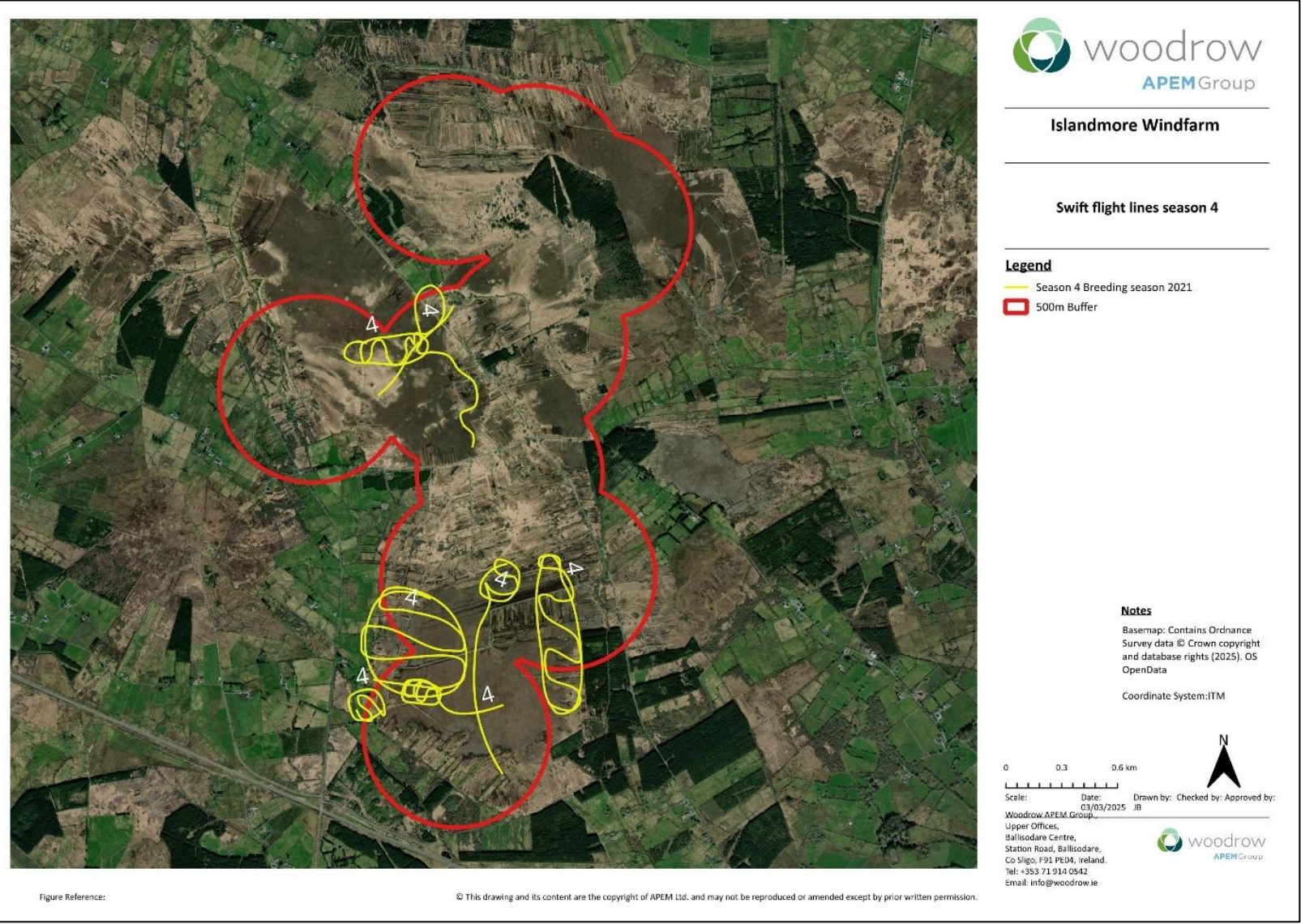


Figure 50: Swift flight lines season 1-4 breeding season 2021

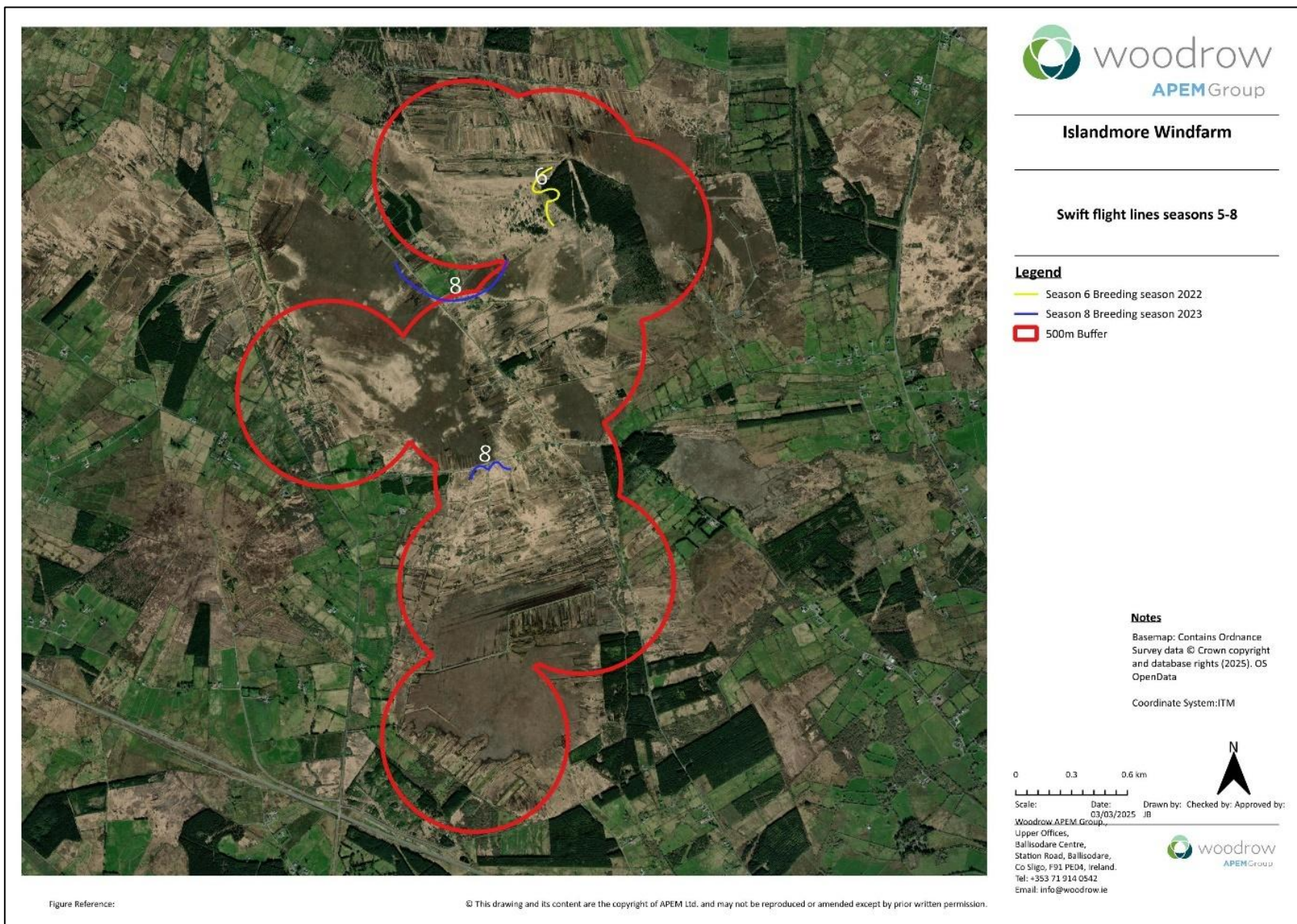


Figure 51: Swift flight lines season 5-8 breeding season 2022 and 2023

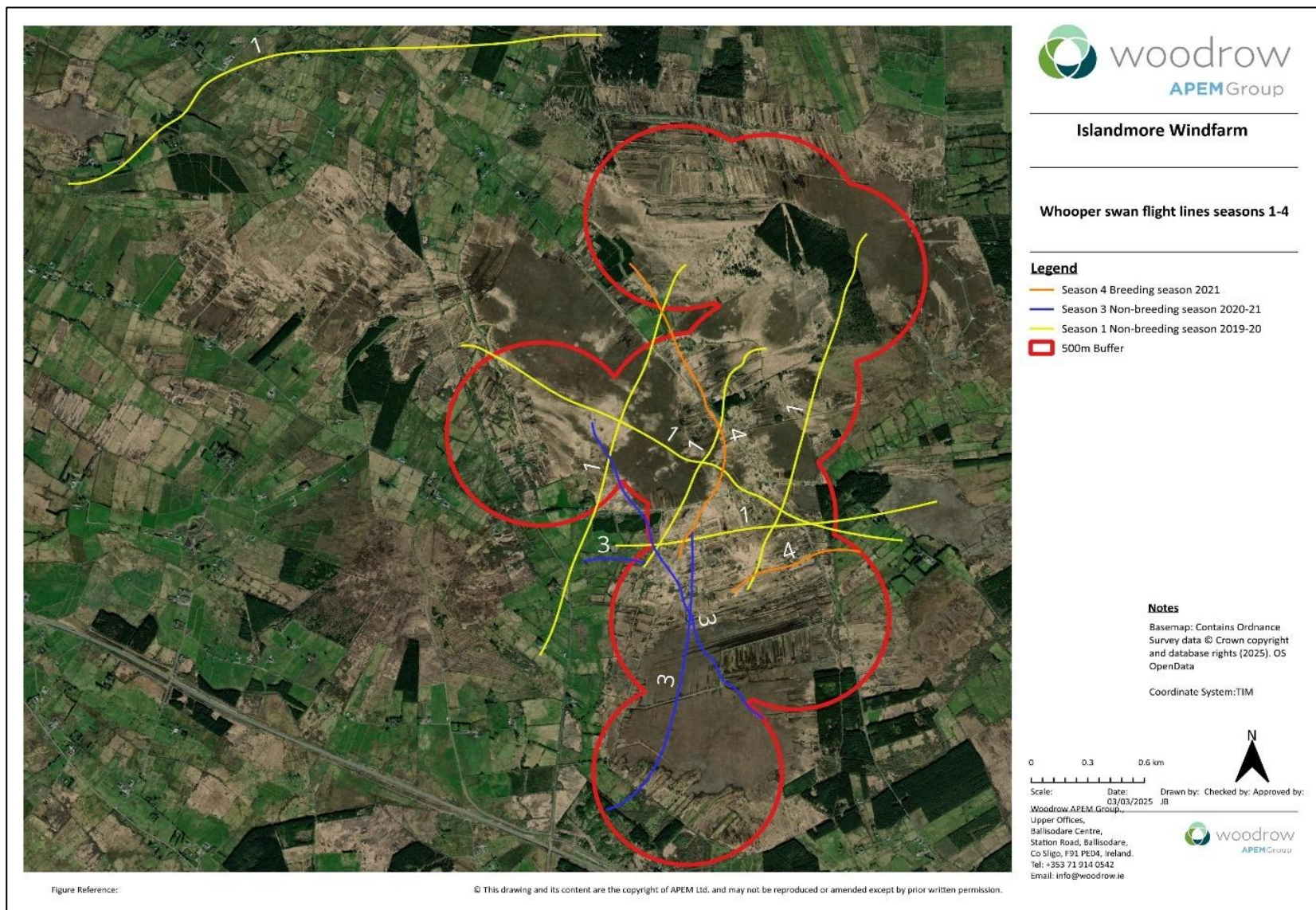


Figure 52: Whooper swan flight lines season 1-4 non-breeding season 2019/20, non-breeding season 2020/21, breeding season 2021

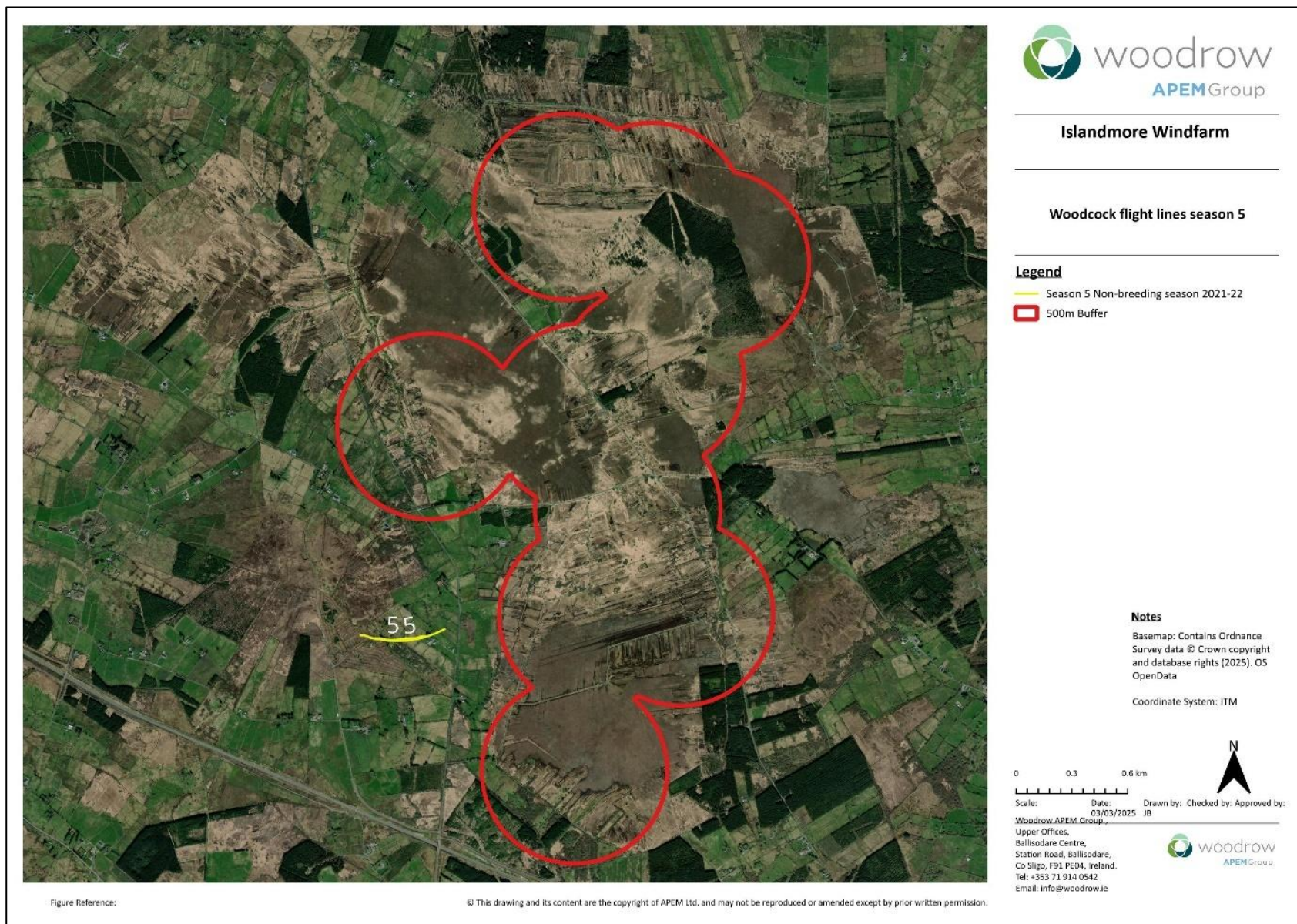


Figure 53: Woodcock flight lines season 5-8 non-breeding season 2021/22

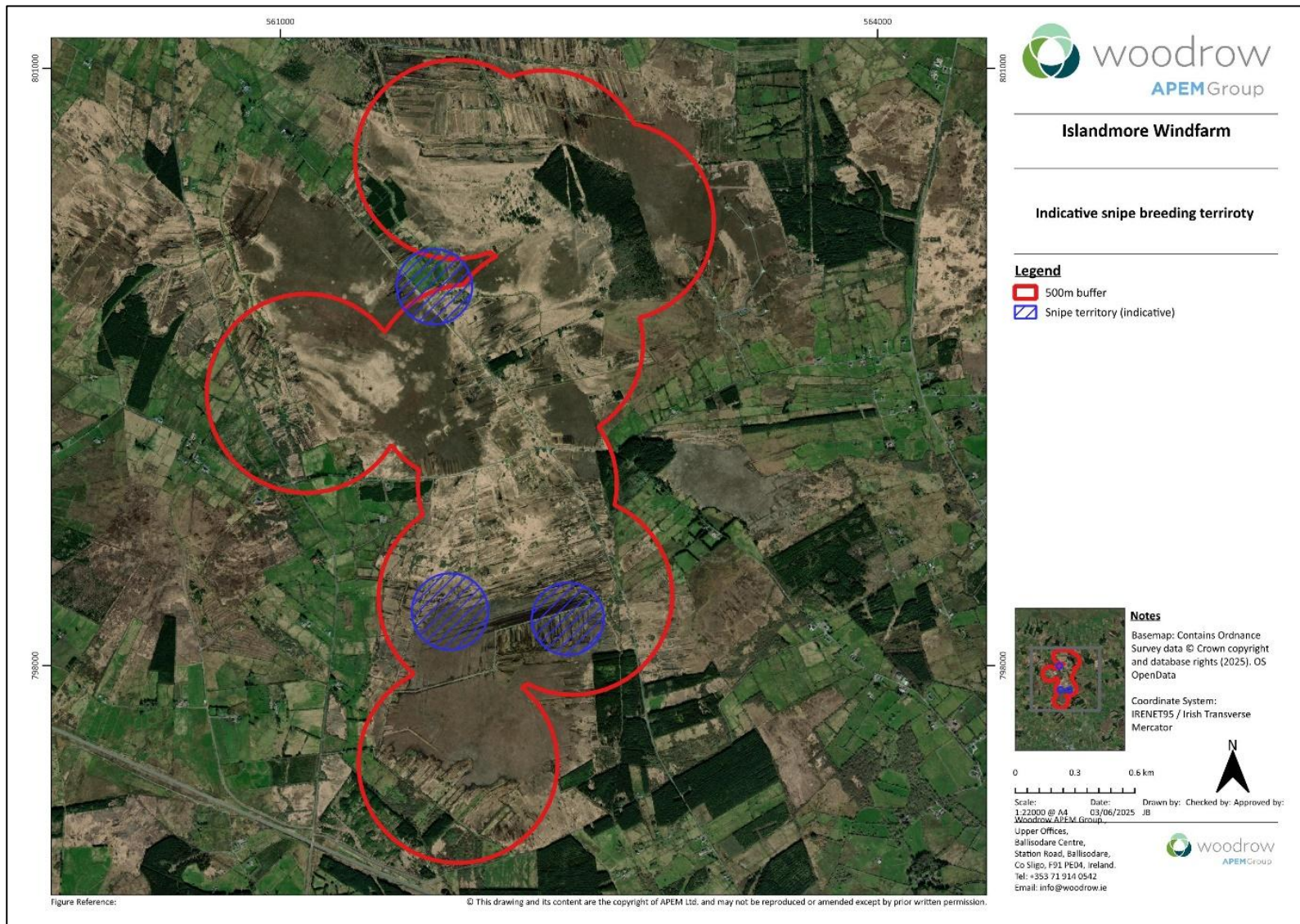


Figure 54: Indicative snipe breeding territory locations informed by dusk surveys

APPENDIX 3 – FULL BREEDING RAPTOR SURVEY RESULTS

Species	Number of individuals									BoCCI 2020- 2026
	Visit 1	Visit 2	Visit 3	Visit 4	Visit 6	Visit 7	Visit 8 ²⁸	Visit 9	Visit 10	
Kestrel	2	3	1		1	2		3	2	Red
Merlin	1									Amber
Buzzard	1	1								Green
Sparrowhawk	1			1					6	Green

Table 68: Raptor survey breeding season 2020

Species	Number of individuals							BoCCI 2020- 2026
	Visit 1	Visit 2	Visit 3	Visit 4 ²⁹	Visit 6	Visit 7	Visit 9	
Kestrel	2						1	Red
Merlin	1							Amber
Hen harrier						1		Amber
Sparrowhawk	2	2	2					Green

Table 69: Raptor survey breeding season 2021

Species	Number of individuals						BoCCI 2020- 2026
	Visit 2	Visit 3 ³⁰	Visit 5	Visit 7	Visit 8	Visit 9	
Kestrel				1	2	1	Red
Sparrowhawk	1						Green

Table 70: Raptor survey breeding season 2022

²⁸ Visit 8 no target species

²⁹ Visit 4/6 no target species

³⁰ Visit 3/5 no target species

Species	Number of individuals											BoCCI 2020- 2026
	Visit 1	Visit 2	Visit 4	Visit 5 ³¹	Visit 6	Visit 7	Visit 10	Visit 12	Visit 14	Visit 16	Visit 17	
Kestrel		1	1		1	1	1	1		2		Red
Buzzard	1	1										Green
Sparrow hawk									1		1	Green

Table 71: Raptor survey breeding season 2023

³¹ Visit 5 no target species



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