



APPENDIX 5

BASELINE ORNITHOLOGICAL SURVEY REPORTS



APPENDIX 7-1

BIRD SURVEY RESULTS – WINTER 2019-2019

APPENDIX 7-1

Bird Survey Report Winter 2018-19

BIRD SURVEY REPORT

WINTER 2018/19

Seven Hills Wind Farm Phase I and II

Prepared for: Seven Hills Wind Farm Ltd

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1.0 Introduction

SLR Consulting Ireland (SLR) was commissioned by Seven Hills Wind Farm Ltd. on 9 October 2018 to carry out a winter bird survey programme for the proposed Seven Hills Wind Farm, Co. Roscommon during the winter period 2018/19. There are two phases within the current iteration of the wind farm design, hereafter referred to as Wind Farm I and Wind Farm II.

1.1 Background to the Commission

Planning permission was originally granted by An Bord Pleanála (ABP) for both of these developments (Phase 1 ABP Planning Ref: PL 20.244346 / 20.239759; and Phase 2 ABP Planning Ref: PL 20.244347 / 20.241069) but was subsequently refused following the appeal process. The main reasons for refusal of planning for each of the developments cited by An Bord Pleanála were issues relating to the lack of certainty in relation to the impact of the proposed development on European Sites in the vicinity of the proposed developments and the qualifying interests for which those European Sites are designated.

1.2 Site Description

The dominant habitat within the boundaries of the proposed Seven Hills Wind Farm I development site is improved agricultural grassland and the proposed site is not designated for nature conservation.

The proposed Seven Hills Wind Farm II development site is a slightly more diverse area in terms of habitat composition with dominant habitats present being improved agricultural grassland, dry calcareous grassland and scrub. The proposed site also does not hold any designations for nature conservation.

There are several Natura 2000 designated sites relating to birds of conservation concern located within 15km of both wind farms. Please see Table 3-1 for further details of these.

1.3 Purpose of the Report

The aim of this report is to provide robust baseline ornithological survey data for the winter period 2018/19 at both phases of the wind farm. These data will be used to inform a separate ecological impact assessment and appropriate assessment for the proposed wind farm. The assessment of potential impacts is beyond the scope of this report.

2.0 Methodology

2.1 Desk-based Review

The desk-based review collated available information collected to date on the wintering bird movements in and around the proposed wind farm development sites. This included a review of the following documents submitted as part of the previous planning applications in 2010 and 2012:

- FERS (2010) Proposed Seven Hills Wind Farm Site (Phase I): Ornithological Assessment Report June 2010. Appendix 8.1 of IWCM (2010) Proposed Seven Hills Wind Farm Phase I EIS Chapter 8 – Ornithology;
- FERS (2011) Proposed Seven Hills Wind Farm (Phase II): Ornithological Assessment Report July 2011. Appendix 8.1 of IWCM (2011) Proposed Seven Hills Wind Farm Phase II EIS Chapter 8 – Ornithology;
- Moore Group, FERS and IWCM (2010) Natura Impact Statement and Appropriate Assessment as required under Article 6(3) of the Habitats Directive (Council Directive 92/43/EEC) of Seven Hills Wind Farm Co. Roscommon (Phase I);
- FERS (2010) Response to issues arising from item (5) of a Request for Further Information (RFI) from Roscommon Co. Council (Planning Reference no. 10/541);
- Moore Group, FERS and IWCM (2011) Natura Impact Statement and Appropriate Assessment as required under Article 6(3) of the Habitats Directive (Council Directive 92/43/EEC) of Seven Hills Wind Farm Co. Roscommon (Phase II);
- EcoFact Environmental Consultants Ltd (2012) Seven Hills Wind Farm (Phase I) Co. Roscommon Report to inform the Appropriate Assessment Process; and
- EcoFact Environmental Consultants Ltd (2012) Seven Hills Wind Farm (Phase II) Co. Roscommon Report to inform the Appropriate Assessment Process.

In addition, a review of the following more recent documents which were produced subsequent to the submission of the planning applications was also undertaken:

- EcoFact Environmental Consultants Ltd (2015) Seven Hills Wind Farm, Co. Roscommon Wintering Bird Survey 2014/2015;
- EcoFact Environmental Consultants Ltd (2018) Seven Hills Wind Farms Winter Bird Surveys 2016/17; and
- Inis Environmental Consultants Ltd (2018) Summary Report on Winter 2017/18 Findings at the Proposed Seven Hills I and II Windfarms, Co. Roscommon.

The websites of the National Parks and Wildlife Service (NPWS) www.npws.ie and the National Biodiversity Data Centre (NBDC) <http://maps.biodiversityireland.ie/#/Map> were also accessed for information on sites designated for nature conservation in the vicinity of the site.

2.2 Field Surveys

The scope of winter bird surveys for the proposed wind farm is based on recommendations given in Scottish Natural Heritage (SNH) 2017¹ guidance. This survey methods guidance is recognised as standard best practice guidance through the UK and Ireland for surveying birds to inform impact assessment of onshore wind farms.

2.2.1 Field Survey Team - Evidence of Technical Competence and Experience

The use of expert observers is a requirement for ornithological surveys and the SLR survey team outlined below are all highly experienced.

¹ SNH (2017) *Recommended bird survey methods to inform impact assessment of onshore wind farms*. Version 2.

Dr Rhys Bullman (RB) – Project Manager and Lead Ornithologist

Rhys is a highly experienced ornithologist and is a Principal Ecologist with SLR while also holding the position of Regional Manager for Scotland and Northern Ireland. Rhys specialises in the impacts of wind farms and transmission infrastructure on birds and has been involved in the provision of ornithological guidance and project management for a wide range of onshore and offshore renewables planning applications throughout the UK. He also provides training to Scottish Natural Heritage (SNH) staff on wind farm ornithology.

Daniel Hulmes (DH) – Lead Bird Surveyor

Daniel is an ornithologist and terrestrial ecologist, supporting the ecology team based in SLR's Stirling office. He has worked on a wide range of projects involving the survey and monitoring of birds both in the UK and internationally. He is also very experienced with protected species surveys and currently holds a Natural England Class 1 Bat Licence. Furthermore, as part of his previous work as an Ecologist, he gained experience in managing projects which included a large amount of report writing, survey planning and client interaction.

Andrew Hill (AH) – Assistant Bird Surveyor

Since joining SLR, Andrew has gained six field seasons worth of experience in national and European Protected Species survey, including birds, bats, great crested newts, reptiles, water vole and badger. He is particularly proficient in bird surveys, and regularly undertakes surveys around the UK and Ireland. During this time, he has worked on a diverse range of projects, including quarries, proposed wind farms, proposed solar farms and proposed residential and commercial developments.

2.2.2 Flight Activity Surveys

Vantage point (VP) locations were initially chosen based on locations used during previous surveys (see Section 3.1). These VPs were ground-truthed in the field and the total number of VP locations was reduced from seven to six with one of the VPs moved slightly to a location with better view. The adequacy of these VPs was subsequently checked by carrying out a desk-based viewshed analysis using a bespoke GIS tool for calculating the visible area from each vantage point (VP). The Zones of Theoretical Visibility (ZTV) from each VP were calculated using ArcMAP 10.5.1 Spatial Analyst. The ZTVs were calculated with a surface offset of 30m and from a viewing height of 1.8m above ground level. The terrain model was derived from EU-DEM data with a vertical accuracy of $\pm 7m$. VP locations and viewing arcs are shown in Figure 1 and VP viewsheds are shown in Figure 2. The proposed site layout is also shown in Figures 1 and 2.

A total of 36 hours of watches were undertaken at each of the six vantage point locations during the winter season (monthly visits October – March inclusive). This equates to a total of six hours per VP per month. Table 2-1 provides a summary of the survey effort at each VP during the winter of 2018/2019.

Table 2-1: VP survey effort undertaken during flight activity surveys from each VP at the two proposed Seven Hills Wind Farm sites October 2018 to March 2019 (hrs:mins).

| Month | WFI VP1 | WFI VP2 | WFII VP1 | WFII VP2 | WFII VP3 | WFII VP4 |
|----------|---------|---------|----------|----------|----------|----------|
| October | 6:00 | 6:00 | 6:00 | 6:00 | 6:00 | 6:00 |
| November | 6:00 | 6:00 | 6:00 | 6:00 | 6:00 | 6:00 |
| December | 6:00 | 6:00 | 6:00 | 6:00 | 6:00 | 6:00 |
| January | 6:00 | 6:00 | 6:00 | 6:00 | 6:00 | 6:00 |
| February | 6:00 | 6:00 | 6:00 | 6:00 | 6:00 | 6:00 |

| Month | WFI VP1 | WFI VP2 | WFII VP1 | WFII VP2 | WFII VP3 | WFII VP4 |
|---------------------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| March | 6:00 | 6:00 | 6:00 | 6:00 | 6:00 | 6:00 |
| Total hrs | 36:00 | 36:00 | 36:00 | 36:00 | 36:00 | 36:00 |
| VP grid locations (Figure 1) | 587337 E 748665 N | 585834 E 746017 N | 588967 E 745061 N | 587372 E 743512 N | 590643 E 743279 N | 592160 E 743701 N |

It is good practice to ensure that where possible each monthly six-hour survey period should be split over more than a single day and spread across different times of the day. As such, the six-hour survey periods were divided into three-hour blocks which were alternated across consecutive days e.g. on day 1, VP1 would be completed in the morning and VP2 would be completed in the afternoon and on day 2, VP2 would be completed in the morning and VP1 in the afternoon. Breaks of at least 30 minutes were taken between watches to minimise observer fatigue. Details of survey dates, times and observers are provided in Appendix I and a record of weather conditions during surveys is provided in Appendix II.

VP watches aimed to quantify the flight activity of primary and secondary target species (as defined in Section 2.2.2.1) within the study area.

The main purpose of VP watches is to collect data on primary target species that will enable estimates to be made of:

- The time spent flying over the site;
- The relative use by birds of different parts of the site;
- The proportion of flying time spent within the provisional upper and lower risk height limits as determined by the potential rotor diameter and rotor hub height; and
- Ultimately, the analysis of the potential risk of collision of birds with rotating turbines.

For each primary target species observation, the following details were recorded:

- Time of observation;
- Species, age and sex (where determinable);
- Number of birds observed per bout;
- Duration of flying bout;
- Time spent within each height band and;
- Notes on observation.

In the absence of detailed information regarding turbine specifications at the time of undertaking the surveys, the recording height bands were determined based on the turbine specifications included in the previous application (tip height 135m, lowest rotor swept height 35m) plus a bit extra to allow some flexibility. Flight heights were therefore attributed to three distinct height bands as follows:

- 1 = < 30m (below the likely rotor swept area);
- 2 = 30m to 150m (the likely rotor swept area);
- 3 = > 150m (above the likely rotor swept area).

In addition, a summary of observations of secondary target species (see Section 2.2.2.1) was recorded at the end of each five-minute period during each VP watch to provide an index of flight activity for secondary target species within the site, in accordance with current SNH guidance. Data collected on secondary species included:

- The five-minute period start and end time;
- Species;
- Number of birds observed;
- If flying, the height band in which birds were observed flying;
- Whether birds were observed onsite, in the 500m buffer or beyond;
- Flight behaviour; and
- Notes on observation.

2.2.2.1 Target Species

Target species for the surveys were defined by legal and/or conservation status and vulnerability to impacts caused by wind turbines, as defined in SNH Guidance (2017).

Primary Target Species

The target species for these VP surveys included all raptors, all waders and all waterfowl (duck, geese, swans), excluding feral species such as Canada goose *Branta canadensis*.

Secondary Target Species

Secondary target species included:

- Raven *Corvus corax*;
- Grey heron *Ardea cinerea*;
- Cormorant *Phalacrocorax carbo*;
- Gulls *Larus* sp., and;
- Any other non-passerine species of conservation concern.

2.2.3 Swans and Goose Feeding Distribution Surveys

SNH (2017) recommends that for whooper swan *Cygnus cygnus*, Greenland white-fronted goose *Anser albrifrons flavirostris* and other goose species, feeding distribution surveys should be undertaken in areas of suitable habitat when the survey area lies within the core foraging distance of SPAs for these species or other major roosts unless it can be established from existing data that the area is not utilised for feeding.

Feeding distribution surveys were carried out on a monthly basis to establish if swans and geese were using the fields within 1 km of the wind farm boundary. Whooper swan and Greenland white-fronted goose are features of interest of several Special Protection Areas (SPAs) within 15 km of the site boundary (see Table 3-1). A buffer of 1 km around both wind farm sites was used for these surveys which were undertaken by driven transect, stopping on a regular basis to check all fields for goose and swan feeding activity. An initial survey was undertaken in October 2018 and repeated on a monthly basis until March 2019.

The survey area is shown in Figure 3. Details of survey dates, times and observers are provided in Appendix I and a record of weather conditions during surveys is provided in Appendix II.

2.3 Survey Limitations

The majority of vantage point surveys were undertaken in optimal weather conditions. However, during such an extensive series of surveys carried out over the winter period it was inevitable that some surveys were completed in suboptimal conditions. There were 15 hours out of the total of 216 during which the visibility was recorded as “moderate” i.e. 1-3km and 2 non-consecutive hours during which the visibility was “poor” i.e. less than 1km. This comprises 7.9% of the total survey season and in most cases all of the relevant 2km viewing arc was visible. As such, this does not significantly affect the validity of the data collected. Please see details in Appendix II.

As shown in Figure 2, due to local topographical conditions a small area at the western end of Wind Farm I and a very small area within the 500m buffer zone for Wind Farm II were not within the 2km viewsheds from any of the VPs. All proposed turbine locations and the vast majority of the 500m buffer were visible from at least one VP however and the gaps in coverage are therefore not considered to represent a significant limitation.

In accordance with the standard methodology, the swan and goose feeding distribution surveys were carried out from public roads without any access to land and as such, not all fields were visible within the 1km survey area. This was a limitation in that there is a possibility that some feeding flocks may have been out of sight. However, any additional swans or geese which were potentially not recorded during the feeding distribution surveys would have most likely been observed moving between foraging grounds during the remainder of the survey or during the vantage point surveys and it is therefore considered unlikely that significant feeding flocks were overlooked.

3.0 Results

3.1 Desk-based Review

3.1.1 Natura 2000 Sites

There are no Special Protection Areas (SPA) within the proposed wind farm sites. However, there are a total of five SPAs within a 15 km² radius of the survey area. The five SPAs within 15km are shown in Table 3-1, which also shows the qualifying interests for each site. For the purposes of this report, which deals specifically with wintering birds, qualifying interests which are only present during the breeding season have been excluded from Table 3-1.

Table 3-1: SPAs within 15km of Seven Hills Wind Farms 1 and 2 and their qualifying interests (species present during the winter period only)

| Site Name | Site Code | Distance/ Direction from Site Boundary | Wintering Species of Special Conservation Interest |
|--------------------------|-----------|---|---|
| Lough Croan Turlough SPA | 004139 | 1.5km north | <ul style="list-style-type: none"> Shoveler <i>Anas clypeata</i> Golden Plover <i>Pluvialis apricaria</i> Greenland White-fronted Goose <i>Anser albifrons flavirostris</i> Wetland and Waterbirds |
| River Suck Callows SPA | 004097 | 1.7km west | <ul style="list-style-type: none"> Whooper Swan <i>Cygnus cygnus</i> Wigeon <i>Anas penelope</i> Golden Plover <i>Pluvialis apricaria</i> Lapwing <i>Vanellus vanellus</i> Greenland White-fronted Goose <i>Anser albifrons flavirostris</i> Wetland and Waterbirds |
| Four Roads Turlough SPA | 004140 | 1.9km north | <ul style="list-style-type: none"> Golden Plover <i>Pluvialis apricaria</i> Greenland White-fronted Goose <i>Anser albifrons flavirostris</i> Wetland and Waterbirds |
| Lough Ree SPA | 004064 | 8km east | <ul style="list-style-type: none"> Little Grebe <i>Tachybaptus ruficollis</i> Whooper Swan <i>Cygnus cygnus</i> Wigeon <i>Anas penelope</i> Teal <i>Anas crecca</i> Mallard <i>Anas platyrhynchos</i> Shoveler <i>Anas clypeata</i> Goldeneye <i>Bucephala clangula</i> Coot <i>Fulica atra</i> Golden Plover <i>Pluvialis apricaria</i> Lapwing <i>Vanellus vanellus</i> Wetland and Waterbirds |

² 15 km is the maximum distance typically applied when considering wildfowl ranging from roost sites to foraging sites (SNH, 2017).

| Site Name | Site Code | Distance/ Direction from Site Boundary | Wintering Species of Special Conservation Interest |
|----------------------------|-----------|---|---|
| Middle Shannon Callows SPA | 004096 | 11.4km southeast | <ul style="list-style-type: none"> • Whooper Swan <i>Cygnus cygnus</i> • Wigeon <i>Anas penelope</i> • Golden Plover <i>Pluvialis apricaria</i> • Lapwing <i>Vanellus vanellus</i> • Black-tailed Godwit <i>Limosa limosa</i> • Black-headed Gull <i>Chroicocephalus ridibundus</i> • Wetland and Waterbirds |

3.1.2 Previous Survey Data

Winter bird surveys were undertaken at Wind Farms I and II during the winter seasons of 2008/09, 2009/10, 2011/12, 2014/15, 2016/17 and 2017/18. A review of the previous winter bird survey reports listed in Section 2.1 revealed that a variety of bird survey methods were used across the six survey seasons. Surveys carried out each year at each wind farm site are described below together with a short summary of the survey results. The relevant reports should be referred to for further details.

During the survey period November 2008 – February 2009, the site was visited four times per month (FERS 2010; FERS 2011). On each of these occasions, five vantage points were visited for a period of 20 minutes throughout the day (three at Wind Farm I and two at Wind Farm II). During the surveys at Wind Farm I, a total of four species of red-listed status (Lynas *et al.*, 2009) were observed using the proposed development site, namely black-headed gull, curlew *Numenius arquata*, golden plover and lapwing. Six species of amber status were observed using the proposed development site, namely whooper swan, starling *Sturnus vulgaris*, house sparrow *Passer domesticus*, swallow *Hirundo rustica*, snipe *Gallinago gallinago* and linnet *Carduelis cannabina*. During surveys at Wind Farm II, a total of six red-listed species were recorded within the proposed development site namely pintail *Anas acuta*, shoveler, black-headed gull, curlew, golden plover and lapwing. A total of 17 amber-listed species were observed at Wind Farm II. In addition to the same six amber-listed species as observed at Wind Farm I, Bewick's swan *Cygnus columbianus*, mute swan *Cygnus olor*, wigeon, pochard *Aythya ferina*, tufted duck *Aythya fuligula*, teal, shelduck *Tadorna tadorna*, dunlin *Caladris alpina*, coot, lesser black-backed gull *Larus fuscus* and kestrel were also recorded within the site. Of these species, only two were evaluated as "potentially threatened" by the proposed wind farms, namely curlew and whooper swan.

Targeted whooper swan surveys were carried out twice monthly during the winter periods October 2009 – April 2010 (at both Wind Farms I and II) and November 2010 – February 2011 (Wind Farm II only) (FERS 2010; FERS 2011). These surveys were undertaken to determine if whooper swans flew through the area in which the turbines were proposed to be sited. Methods were based on Larsen and Clausen (2002). Observations were carried out from one vantage point within the Wind Farm I site in 2009/10 and three vantage points within Wind Farm II during the 2009/10 and 2010/11 seasons. Surveys at Wind Farm I in 2009/10 yielded observations of three flocks of whooper swan (n=5, n=3 and n=4) flying through the Wind Farm I site within a single survey period in February 2010. The three flocks were observed flying at heights of 15-20m. These were the only sightings of whooper swan at Wind Farm I throughout the winter season 2009/10. Surveys at Wind Farm II during the same season, yielded two observations of whooper swan flocks flying through the wind farm site, with one flock of seven recorded in December 2009 and a second flock of 17 recorded in February 2010. Both flocks were observed flying at heights of 10-20m above ground level.

During the 2010/11 whooper swan surveys undertaken at Wind Farm II, there were two records of whooper swan flying through the wind farm site. The first was of a flock of four observed in December 2010 flying towards Feacle Lough at a height of 30-40m, while the second, observed in February 2011, was of a flock of six whooper swan flying through the site at 5-10m height. There were also two observations of peregrine falcon recorded flying through the site during these surveys in December and February.

The methodology used in 2009/10 and 2010/11 was repeated twice monthly at both wind farm sites between December 2011 and February 2012 by FERS (data presented in Appendix 7 of the NIS (Ecofact, 2012)). During the 2011/12 survey season, a single whooper swan was recorded flying through the proposed location of the turbines at Wind Farm I at a height of 5m. This was the only sighting of whooper swan during those three months of surveying. An unspecified number of golden plovers were also recorded feeding in fields north of the proposed turbine locations in rough grassland during February 2012. At Wind Farm II, there were five flocks of whooper swan recorded flying through the site during December (n=4) and February (n=2; n=3; n=2 and n=4). All five flocks were recorded flying at heights of 5-15m.

Further winter surveys were undertaken at Wind Farms I and II from October 2014 to March 2015 (Ecofact, 2015). These surveys involved assessing an extensive area surrounding the proposed wind farm sites, which covered a large proportion of South Roscommon and encompassed waterbodies including Lough Croan Turlough SPA, Lough Feacle Turlough, Coolagarry Lough, Thomas Street Turlough and Four Roads Turlough SPA as well as the Ballyglass River Callows and other minor season waterbodies. The aim of the survey was to record the distribution of waterbirds in the region, primarily Greenland white-fronted geese, whooper swans and golden plover. Vantage point surveys targeting the proposed development sites were also undertaken from two vantage points, one at each proposed wind farm site. Although there were peak numbers of 42-48 whooper swans observed grazing on the grasslands surrounding Thomas Street Turlough, approximately 1.5km south of Wind Farm I, on two occasions (February and March 2015), there was only one observation of whooper swan recorded flying through Wind Farm I throughout the winter season. This observation was in November when a flock of nine whooper swan was recorded leaving Thomas Street turlough and flying in the direction of Lough Croan Turlough at dusk. There were two records of whooper swans flying through the Wind Farm II site between Feacle Lough and Ballyglass River Callows in February (n=52) and March (n=63). Throughout the season, flocks of whooper swan ranging in size from 4-78 were observed at various waterbodies within a 15km radius of both wind farm sites. Flocks of 21-79 Greenland white-fronted geese were observed in November (n=21), December (n=29) and March (n=79) at the Muckanagh Callows along the River Suck, which is approximately 5km to the northwest of the Wind Farm I site. There were no Greenland white-fronted geese observed flying through the wind farm sites throughout the winter season of 2014/15.

The winter 2016/17 surveys were undertaken at both wind farm sites from November 2016 to March 2017 (EcoFact, 2018). The approach followed that of the 2014/15 surveys i.e., to establish whether birds used or crossed the sites, and attempted to explain their movements when they were not interacting with the sites. As with previous surveys, the study focused primarily on species such as whooper swan and Greenland white-fronted geese, while also providing full counts and assessments for all other water birds. The wintering bird survey used two main vantage points, one at each proposed wind farm site and followed SNH guidance in place at that time (SNH, 2014) with a minimum of 6 hours per vantage point per month. Up to 10 other sites within the surrounding area were also visited at least twice per month and full counts undertaken on each visit. The survey was adaptive, as before, and was extended up to 10km+ away from the proposed wind farm site as necessary. Results showed that there was no significant bird activity recorded within either proposed development site during the November survey. This was attributed to the low water levels across the study area with all the turloughs very low or dry. In December 2016, the only notable observations were a sighting of a small flock of Greenland white-fronted geese on the River Suck, along with the large numbers of starlings which were resident on Lough Croan. No whooper swans were recorded during the December visit. During January 2017, a flock of c.60 golden plover were recorded passing near the Wind Farm I site and a flock of 32 curlew was recorded flying near Wind Farm II and landing on Lough Feacle (flight heights not reported). It was reported that water levels at Lough Croan remained low and there were no whooper swans present. However, there were increased numbers of ducks present with significant numbers of wigeon, teal, and shoveler recorded at Lough Croan. During the January vantage point watch on Wind Farm I, a merlin was recorded crossing the site. A total of 40 golden plover and 100 lapwing were recorded passing near the Wind Farm I site (location and direction not reported), with one snipe recorded within the site in January 2017. There were no records of whooper swans or Greenland white-fronted geese using or passing through the Wind Farm I site during February 2017 surveys.

Again, there were no movements of whooper swan or Greenland white-fronted geese recorded passing through or near the proposed either wind farm site during the March 2017 surveys. Whooper swan flocks were recorded at several waterbodies surrounding both wind farm sites in March 2017, namely Lough Croan, River Suck at Muckinagh North, Coolagarry turlough, Brideswell and Ballyglass River Callows. A total of 80 Greenland white-fronted geese were also recorded at the River Suck at Muckinagh north.

The 2017/18 surveys again followed SNH (2014) guidance with flight activity surveys undertaken from October 2017 to March 2018. Seven vantage points across the two wind farm sites (two at Wind Farm I and five at Wind Farm II) were used at which monthly flight activity surveys were undertaken at dawn and dusk only. Monthly wildfowl distribution surveys were also undertaken, although the area over which these were undertaken was unspecified within the report. Results showed that kestrel and sparrowhawk were the only two target species recorded using the Wind Farm II site during vantage point surveys on one occasion each. There were no other records of target species recorded at either wind farm throughout the entire survey season. A range of wildfowl was recorded during the monthly distribution surveys at locations surrounding both wind farm sites, namely whooper swan, mute swan, lapwing, curlew, golden plover, wigeon and teal. There were no flights of swan species observed flying through the proposed rotor swept areas.

3.2 Flight Activity Surveys

Flight lines of primary target species recorded at both wind farm sites throughout the winter season are presented in Figures 4-9. Flight data for primary target species and summary data for secondary target species are provided in Appendix III.

3.2.1 Primary Target Species

3.2.1.1 Wind Farm I: Vantage Points 1 and 2

At least six primary target species were recorded flying within the study area on and around Wind Farm I during the survey period. The primary target species recorded are presented in Table 3-2, alongside the total number of birds recorded from both VPs and the total number of flights recorded.

Table 3-2: Primary target species flights recorded from WFI VPs 1 and 2 - October 2018 to March 2019

| Target Species | Total number of birds recorded | Total number of flights recorded |
|------------------------------------|--------------------------------|----------------------------------|
| Whooper swan | 21 | 2 |
| Greenland white-fronted goose | 19 | 2 |
| Unidentified goose sp. | 100 | 1 |
| Golden plover | 92 | 2 |
| Snipe <i>Gallinago gallinago</i> | 2 | 2 |
| Buzzard <i>Buteo buteo</i> | 1 | 1 |
| Sparrowhawk <i>Accipiter nisus</i> | 4 | 3 |
| Total | 239 | 13 |

All primary target species recorded at Wind Farm I, with the exception of a distant, high up flock of unidentified geese, spent at least 15 seconds of at least one of their flights in Height Band 2 (the likely rotor swept area).

Greenland white-fronted goose and whooper swan spent up to 90 and 120 seconds, respectively, in Height Band 2 on two flights.

A flock of 40 golden plover was recorded during the October survey, spending most of the recorded flight in Height Band 3. A flock of 52 golden plover were also recorded at Wind Farm I in January in Height Band 2.

Only two species of raptor were recorded at the site (buzzard and sparrowhawk) with only one observation of buzzard recorded in February, spending a total of 30 seconds within Height Band 2.

3.2.1.2 Wind Farm II: Vantage Points 1 – 4

In total, 13 primary target species were recorded flying through the Wind Farm II site during the survey period. The primary target species recorded are shown in Table 3-3 alongside the total number of birds seen from all VPs combined and the total number of flights recorded.

Table 3-3: Primary target species flights recorded from WFII VP1 – VP4 – October 2018 to March 2019

| Target Species | Total number of birds recorded | Total number of flights recorded |
|------------------|--------------------------------|----------------------------------|
| Whooper swan | 32 | 6 |
| Golden plover | 11 | 2 |
| Curlew | 212 | 14 |
| Lapwing | 149 | 11 |
| Snipe | 7 | 4 |
| Wigeon | 15 | 1 |
| Mallard | 7 | 2 |
| Teal | 36 | 3 |
| Hen harrier | 1 | 1 |
| Peregrine falcon | 5 | 5 |
| Kestrel | 2 | 2 |
| Sparrowhawk | 1 | 1 |
| Buzzard | 2 | 2 |
| Total | 480 | 54 |

There was slightly more diversity in raptor and wader species recorded at Wind Farm II than at Wind Farm I, with five species of raptor and four species of wader observed throughout the winter period.

Whooper swan flight behaviour was similar to that recorded at Wind Farm I, with small flocks ranging from 1-4 individuals occasionally passing through the site within and above Height Band 2. There was one larger flock of 21 whooper swan recorded at this site during the season, which was observed within Height Band 1. There were no Greenland white-fronted geese recorded at Wind Farm II throughout the winter period.

The records of peregrine were all recorded within the 500 m buffer and not within the site boundary. There was one brief record (45 seconds) of a transient hen harrier on passage through the site in November.

In terms of waders, Wind Farm II was utilized as a foraging ground by wintering curlew (mean flock size $n = 15$; range: 1-38). Given that their primary behaviour was feeding in the fields around the site, the majority of flights were recorded in Height Band 1. Similarly, flocks of wintering lapwing ranging from 2-26 individuals (mean $n = 10$) were recorded foraging within the wind farm site. There were only two brief observations of golden plover recorded from VP3 during October and November, both of which were in Height Band 1. Occasional records of snipe were recorded in October and February only.

3.2.2 Secondary Target Species

There were seven secondary target species recorded at both proposed wind farm sites combined. Please see Table 3-4 for a list of these species alongside the total number of birds recorded and the total number of flights of each species observed.

Raven was the most commonly recorded secondary target species observed at both sites combined with 104 observations and a total of 186 birds, whilst black-headed gull was the most abundant across both sites with a total of 625-670 individuals recorded during 43 observations. Flock sizes of black-headed gull ranged from 1-150 individuals with the majority of flocks flying within Height Band 1.

There were four further species of gull recorded through the season namely, common gull, great black-backed gull, lesser black-backed gull and herring gull, all of which were recorded infrequently in low numbers.

A single flock of six Canada geese were observed from VP3 in February flying within Height Band 1.

Table 3-4: Secondary target species and flights recorded from WFI VPs 1 and 2 and WFII VPs 1-4 - October 2018 to March 2019

| Target Species | Total number of birds recorded | Total number of flights recorded |
|--------------------------|--------------------------------|----------------------------------|
| Canada Goose | 6 | 1 |
| Black-headed gull | 625-670 | 43 |
| Great black-backed gull | 6 | 4 |
| Common Gull | 2 | 1 |
| Lesser-black backed gull | 9 | 5 |
| Herring Gull | 38 | 2 |
| Raven | 186 | 104 |
| Total | 872-917 | 160 |

3.3 Swan and Goose Feeding and Distribution Surveys

There were no whooper swans recorded within 1 km of the wind farm sites during the October, November, December and February feeding and distribution surveys.

A peak count of 154 whooper swans was recorded on the feeding and distribution survey, located on a field near Cuilleenirwan Lough, east of Wind Farm I and outside the 1km survey buffer, in January 2019. Whooper swans were observed feeding in fields at two other locations during the January feeding distribution surveys, including 105 swans observed within the 1km buffer northwest of Wind Farm II and 21 swans were observed feeding within the Wind Farm II survey buffer to the southeast.

During the March survey, a flock of 12 whooper swans was recorded feeding in an improved agricultural grassland field north of the R363 road, south of Wind Farm I. 14 whoopers swans were also recorded at the south-eastern corner of Lough Croan Turlough north of Wind Farm I.

Please see Figure 3 for the distribution of all whooper swans recorded.

There were no Greenland white-fronted geese recorded within 1 km of either of the proposed wind farm sites throughout the entire season of feeding and distribution surveys.

4.0 Summary and Conclusions

The aim of this report is to provide baseline ornithological survey data for the 2018/2019 winter season at the two proposed wind farm sites at Seven Hills, Dysart, Co. Roscommon. These data will be used to inform the ecological impact assessment and appropriate assessment for the proposed wind farms. The assessment of potential effects of the proposed wind farms is beyond the scope of this report.

The winter bird survey methods employed during the 2018/2019 survey season were based on recommendations given in SNH (2017) guidance. This survey methods guidance is recognised as standard best practice guidance through the UK and Ireland for surveying birds to inform impact assessment of onshore wind farms. Winter season surveys were undertaken from October 2018 to March 2019. The following ornithological survey types were undertaken at the proposed Seven Hills Wind Farm development sites:

- Flight activity (VP) surveys;
- Swan and goose feeding and distribution surveys.

Flight activity surveys were undertaken from two vantage points overlooking Wind Farm I and four vantage points overlooking Wind Farm II. These vantage points were visited for six hours per month. This resulted in a total survey effort of 36 hours per vantage point throughout the season.

Swan and goose feeding and distribution surveys were repeated monthly across the season. A buffer of minimum 1 km around each wind farm site was used for these surveys, which were undertaken by driven transect, stopping on a regular basis to check fields for goose and swan feeding activity.

The following primary target species were recorded during flight activity surveys at both proposed wind farm sites combined:

- Whooper swan;
- Greenland white-fronted goose;
- Wigeon;
- Mallard;
- Teal;
- Golden plover;
- Lapwing;
- Curlew;
- Snipe;
- Hen harrier;
- Buzzard;
- Sparrowhawk;
- Kestrel; and
- Peregrine falcon.

The most frequent flight activity at Wind Farm I was by sparrowhawk (three flights) and at Wind Farm II was by curlew (14 flights), with other primary target species activity less frequent. The next most frequently recorded species was lapwing (11 flights recorded at WFII). All other primary target species were recorded six times or less.

In relation to SPA species, there were no records of Greenland white-fronted geese from any of the VP watches at Wind Farm II or the feeding and distribution surveys throughout the entire season. There were two records of Greenland white-fronted geese on passage through Wind Farm I, one in October and one in November.

Whooper swans were recorded during VP surveys at both sites through the season, however, not in any significant numbers or frequencies (two records totalling 21 birds at Wind Farm I and six records totalling 32 birds at Wind Farm II).

A flock of 40 golden plover was recorded during the October survey at Wind Farm I, spending most of the recorded flight above the likely rotor swept area and a flock of 52 was recorded there in January, this time within the likely rotor swept area. There were also two brief observations of golden plover recorded at Wind Farm II during October and November totalling 11 birds, both of which were below the likely rotor swept area. There were 11 records of lapwing at Wind Farm II, totalling 149 birds and lapwing were also recorded foraging within the Wind Farm II site in small flocks. There was also one record of wigeon (15 birds), two records of mallard (seven birds) and three records of teal (36 birds) at Wind Farm II.

There were five records of peregrine at Wind Farm II. However, all of these flights were recorded within the 500 m buffer and not within the site boundary. There was a single brief record of a transient hen harrier on passage through Wind Farm II in November. There were no Annex I raptor species recorded at Wind Farm I.

Wind Farm II was utilized as a foraging ground by wintering curlew, however, curlew was not recorded flying within the likely rotor swept area. Occasional records of snipe were recorded in October and February only.

Results from the current survey are broadly comparable with surveys undertaken at the site during the previous winters, despite differences in methods and survey effort, in that relatively low numbers and frequencies of sightings of species of special conservation concern were reported within the wind farm sites.

5.0 References

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- Scottish Natural Heritage (2016) Assessing Connectivity with Special Protection Areas (SPAs). Version 3 – June 2016. SNH Guidance. SNH, Battleby.
- Scottish Natural Heritage (2017) Recommended bird survey methods to inform impact assessment of onshore wind farms. Version 2. SNH Guidance. SNH, Battleby.

6.0 Figures

Figure 1: Vantage Points

Figure 2: Viewsheds from Vantage Points Overlooking Wind Farms I and II - 30m Offset

Figure 3: Swan and Goose Feeding Distribution Survey Winter 2018/19 Peak Counts

Figure 4: Flight Paths - October 2018

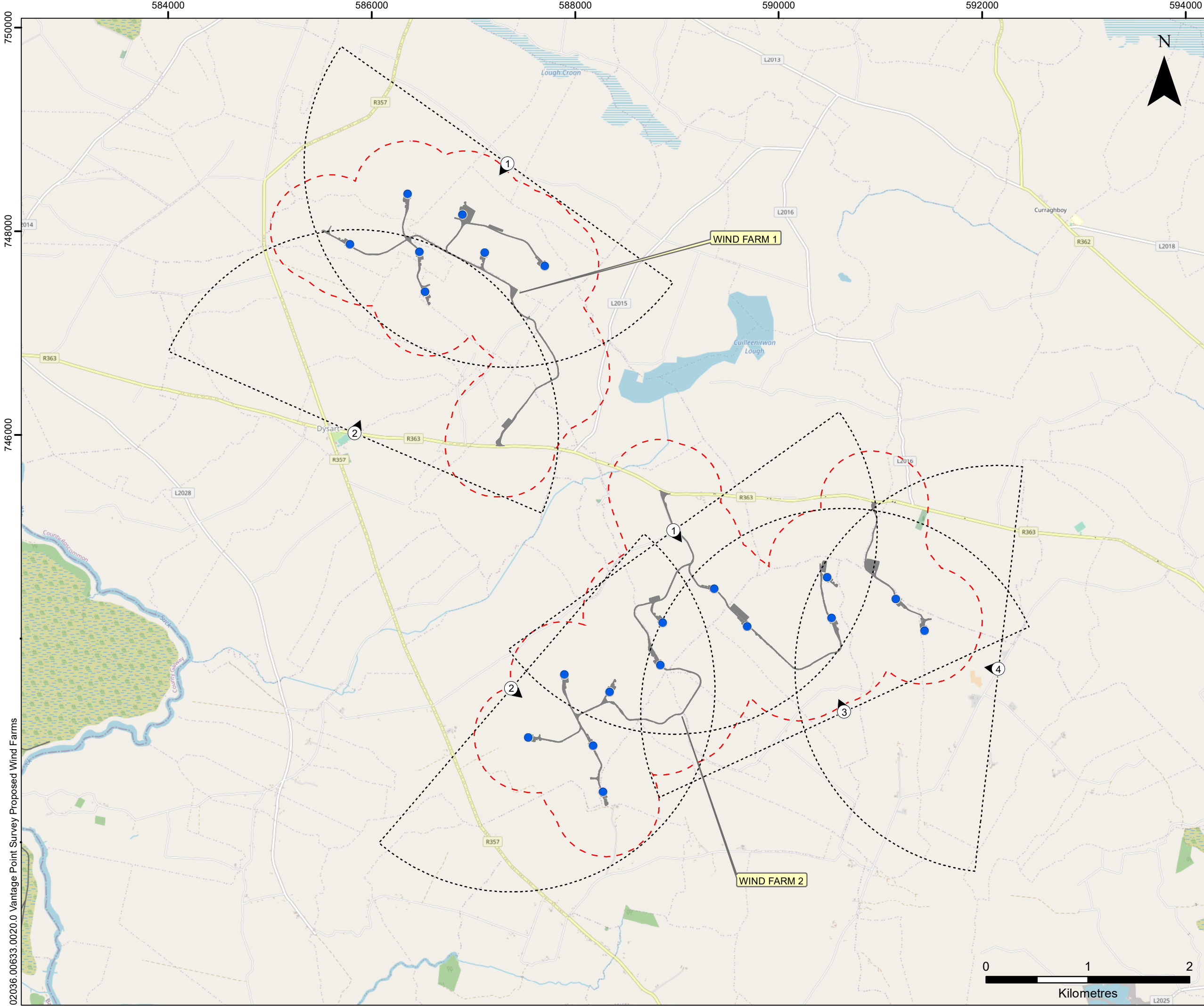
Figure 5: Flight Paths - November 2018

Figure 6: Flight Paths - December 2018

Figure 7: Flight Paths - January 2019

Figure 8: Flight Paths - February 2019

Figure 9: Flight Paths - March 2019



LEGEND

- Turbine Location
- Site Infrastructure
- Site Infrastructure 500 m Buffer
- Vantage Point
- Vantage Points 2km View Arc

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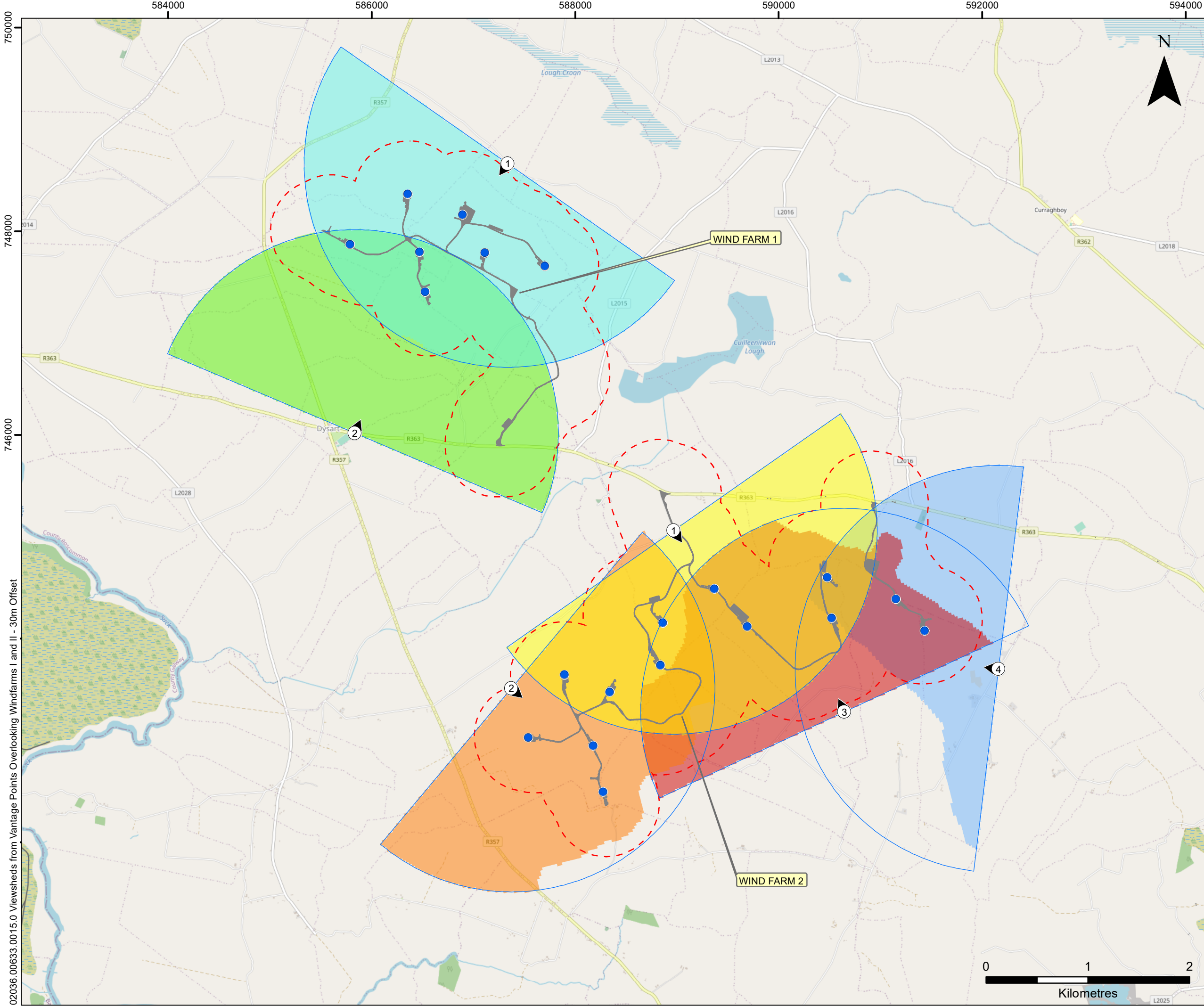
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BIRD SURVEY REPORT 2018/2019**

**FIGURE 1 - VANTAGE POINT
LOCATIONS**

Scale 1:35,000 @ A3

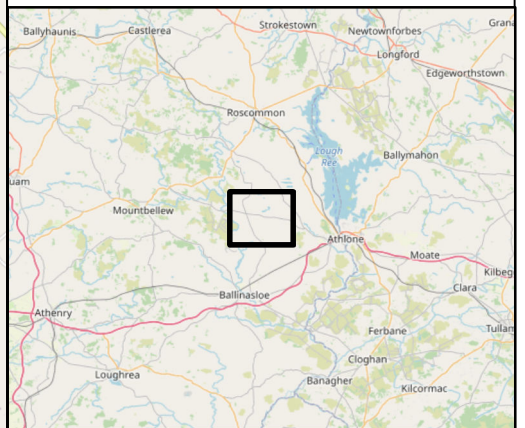
Date MAY 2022




NOTE

1. The Zones of Theoretical Visibility (ZTV) was calculated using ArcMAP 10.5.1 Spatial Analyst. The ZTV is calculated with a surface offset 30m & from a viewing height of 1.8m above ground level. The terrain model is derived from EU-DEM data with a vertical accuracy of $\pm 7m$.

- LEGEND**
- Turbine Location
 - Site Infrastructure
 - Site Infrastructure 500 m Buffer
 - Vantage Point
 - Distance of Viewing Arc
 - Theoretical Visibility from Wind Farm 1 VP1
 - Theoretical Visibility from Wind Farm 1 VP2
 - Theoretical Visibility from Wind Farm 2 VP1
 - Theoretical Visibility from Wind Farm 2 VP2
 - Theoretical Visibility from Wind Farm 2 VP3
 - Theoretical Visibility from Wind Farm 2 VP4



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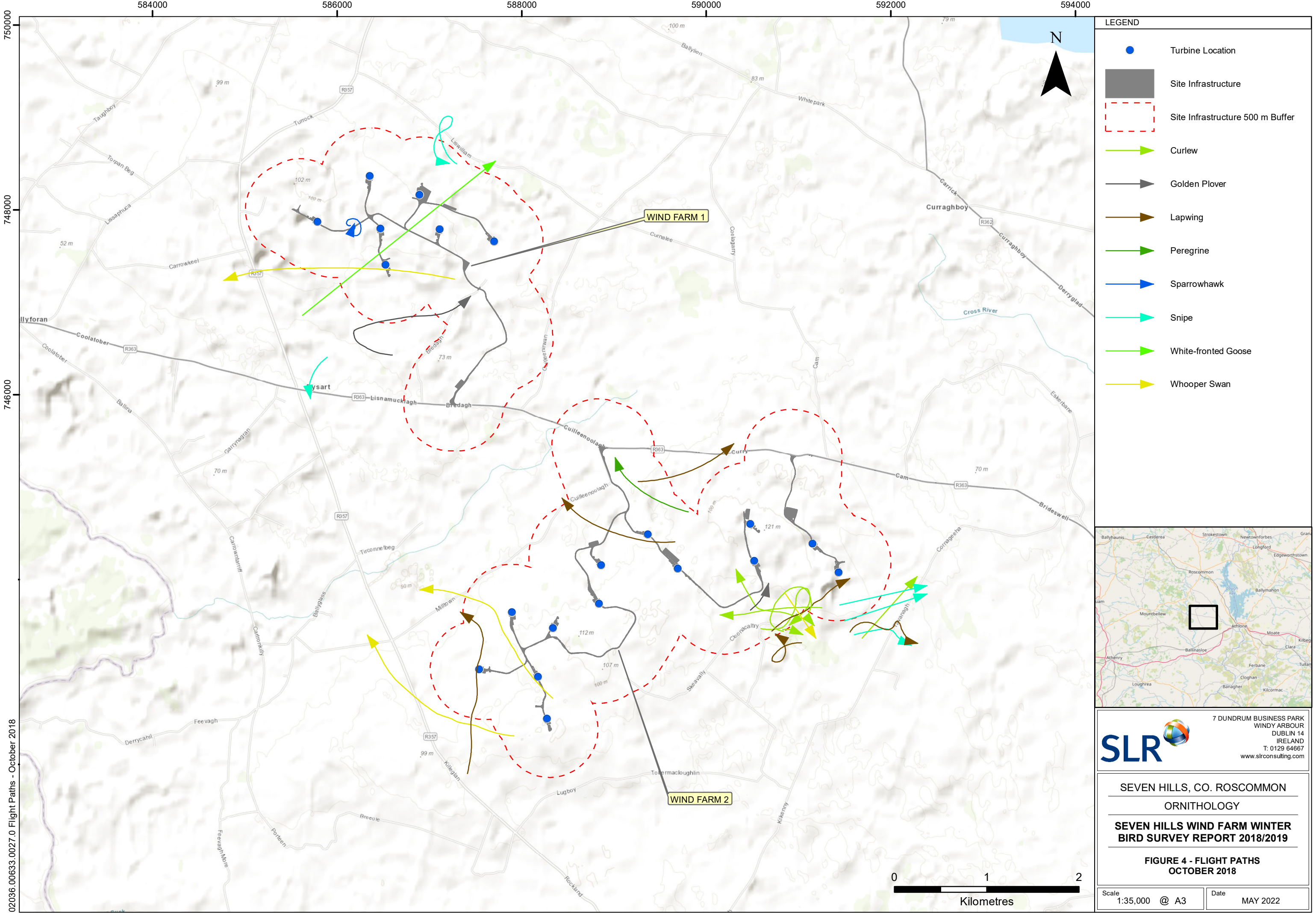
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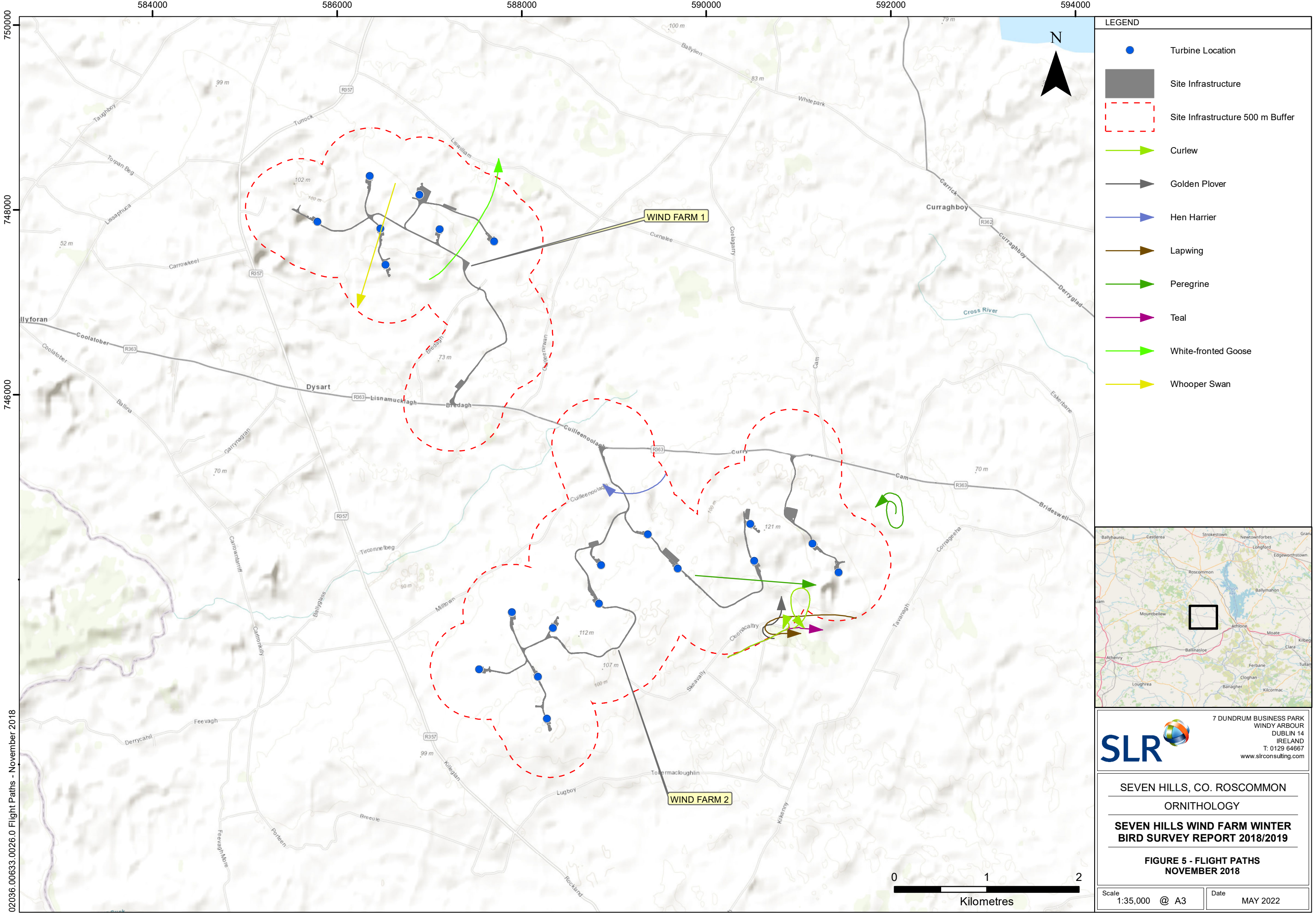
SEVEN HILLS WIND FARM WINTER BIRD SURVEY REPORT 2018/2019

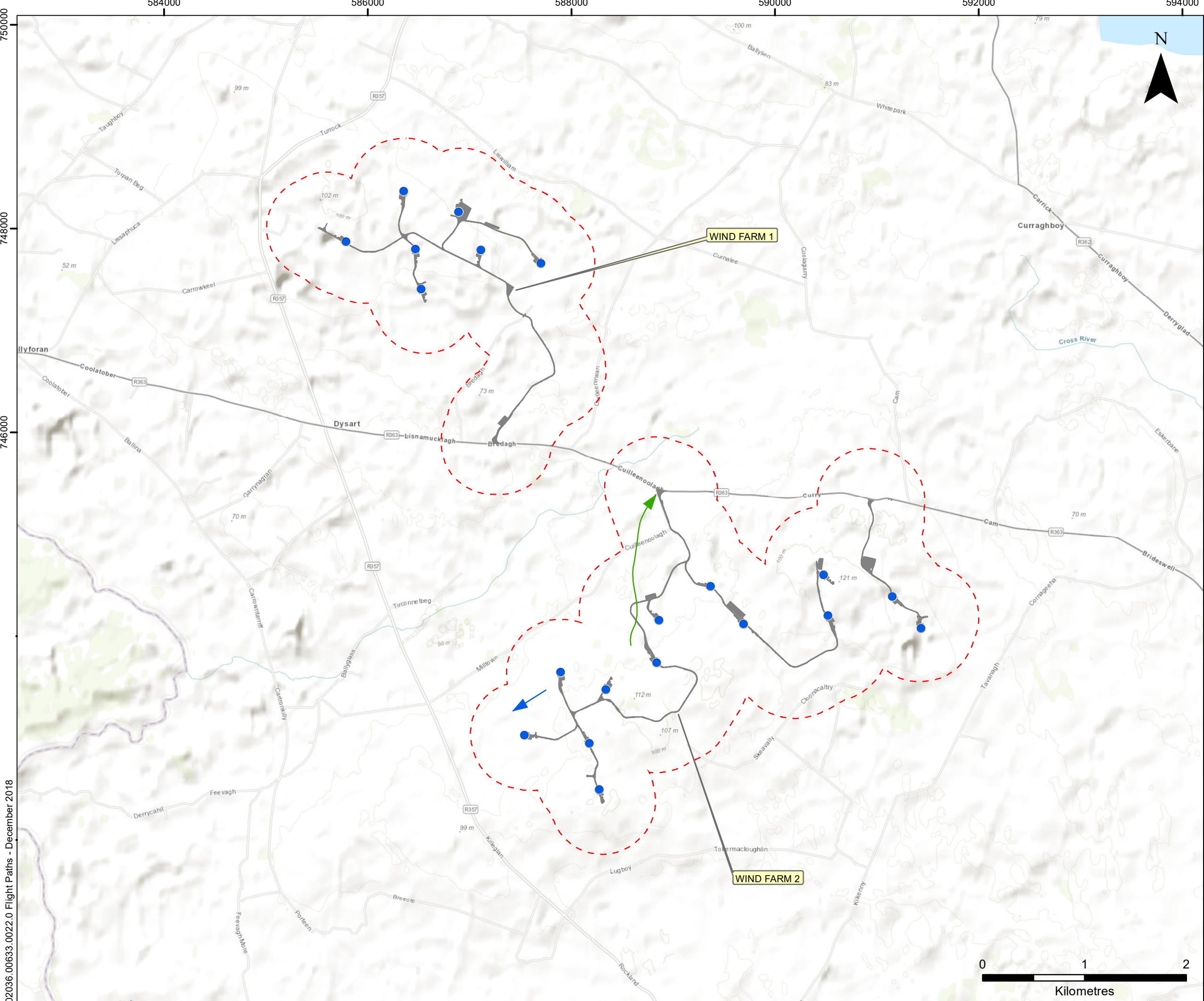
FIGURE 2 - VANTAGE POINTS OVERLOOKING WINDFARMS I AND II

Scale 1:35,000 @ A3 Date MAY 2022

02036.00633.0015.0 Viewsheds from Vantage Points Overlooking Windfarms I and II - 30m Offset

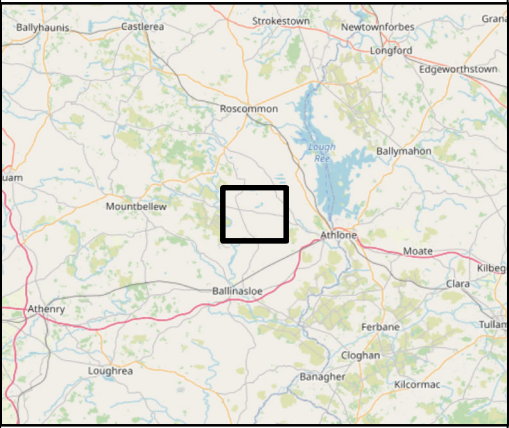






LEGEND

- Turbine Location
- Site Infrastructure
- Site Infrastructure 500 m Buffer
- Peregrine
- Sparrow Hawk



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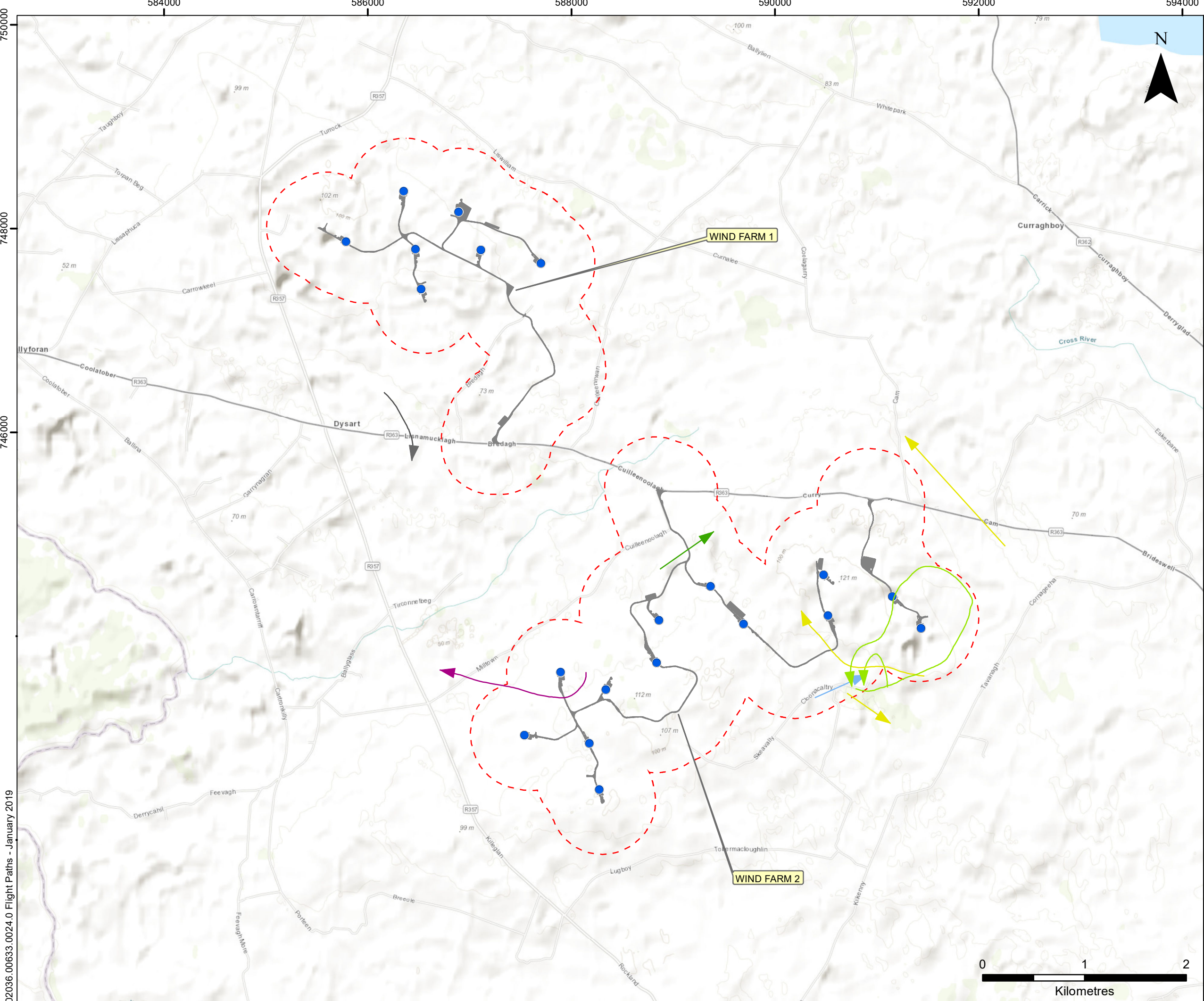
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BIRD SURVEY REPORT 2018/2019**

**FIGURE 6 - FLIGHT PATHS
DECEMBER 2018**

| | |
|------------------------|------------------|
| Scale 1:35,000 @ A3 | Date MAY 2022 |
|------------------------|------------------|

02036.00633.0022.0 Flight Paths - December 2018



LEGEND

Turbine Location

Site Infrastructure

Site Infrastructure 500 m Buffer

Curlew

Golden Plover

Mallard

Peregrine

Teal

Whooper Swan

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FIGURE 7 - FLIGHT PATHS
JANUARY 2019

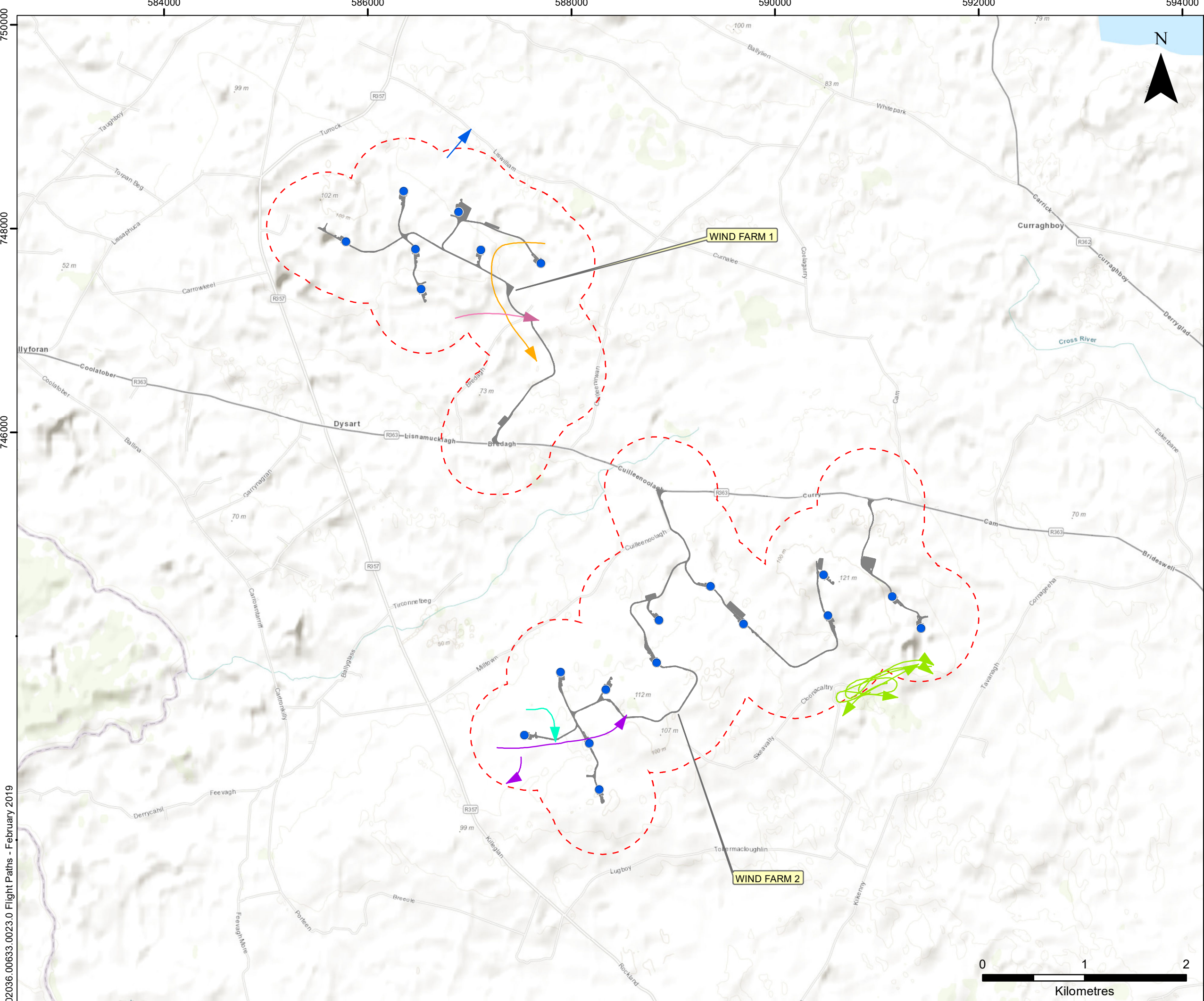
Scale
1:35,000 @ A3

Date
MAY 2022

02036.00633.0024.0 Flight Paths - January 2019

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Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri

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LEGEND

Turbine Location

Site Infrastructure

Site Infrastructure 500 m Buffer

Buzzard

Curlew

Kestrel

Sparrowhawk

Snipe

Unidentified Goose Sp.

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FIGURE 8 - FLIGHT PATHS
FEBRUARY 2019

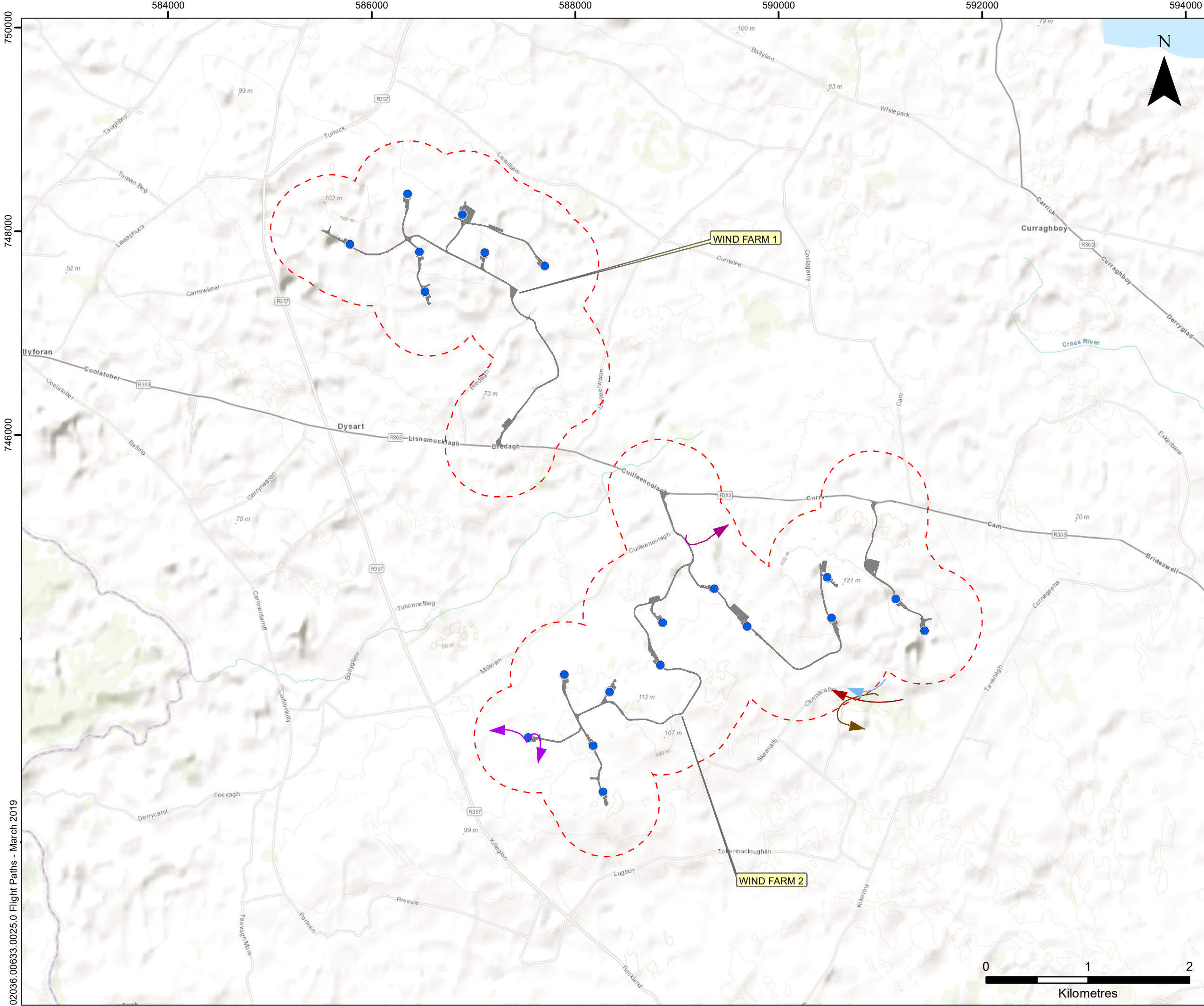
Scale
1:35,000 @ A3

Date
MAY 2022

02036.00633.0023.0 Flight Paths - February 2019

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Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri

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LEGEND

- Turbine Location
- Site Infrastructure
- Site Infrastructure 500 m Buffer
- Kestrel
- Lapwing
- Mallard
- Teal
- Wigeon

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**FIGURE 9 - FLIGHT PATHS
MARCH 2019**

Scale 1:35,000 @ A3

Date MAY 2022

APPENDIX I

Survey dates, times and observers

Table AI-1: Details of VP surveys undertaken from Wind Farm I Vantage Point 1

| Date | Surveyor | Start | End | Survey Duration |
|--------------------|----------|-------|-------|-----------------|
| 25/10/2018 | DH | 09:45 | 12:45 | 3 |
| 29/10/2018 | DH | 13:00 | 16:00 | 3 |
| 20/11/2018 | AH | 09:30 | 12:30 | 3 |
| 22/11/2018 | DH | 13:00 | 16:00 | 3 |
| 06/12/2018 | DH | 12:50 | 15:50 | 3 |
| 09/12/2018 | DH | 09:15 | 12:15 | 3 |
| 18/01/2019 | DH | 09:30 | 12:30 | 3 |
| 21/01/2019 | AH | 13:05 | 16:05 | 3 |
| 15/02/2019 | DH | 09:30 | 12:30 | 3 |
| 17/02/2019 | DH | 14:05 | 17:05 | 3 |
| 12/03/2019 | RB | 13:50 | 16:50 | 3 |
| 15/03/2019 | DH | 14:00 | 17:00 | 3 |
| Total Hours | | | | 36 |

Table AI-2: Details of VP surveys undertaken from Wind Farm I Vantage Point 2

| Date | Surveyor | Start | End | Survey Duration |
|--------------------|----------|-------|-------|-----------------|
| 25/10/2018 | AH | 09:20 | 12:20 | 3 |
| 26/10/2018 | DH | 13:30 | 16:30 | 3 |
| 20/11/2018 | DH | 09:30 | 12:30 | 3 |
| 22/11/2018 | DH | 09:30 | 12:30 | 3 |
| 06/12/2018 | DH | 09:15 | 12:15 | 3 |
| 09/12/2018 | DH | 13:00 | 16:00 | 3 |
| 15/01/2019 | RB | 13:30 | 16:55 | 3 |
| 21/01/2019 | RB | 10:00 | 13:00 | 3 |
| 15/02/2019 | RB | 09:45 | 12:45 | 3 |
| 17/02/2019 | RB | 11:15 | 14:15 | 3 |
| 12/03/2019 | AH | 14:00 | 17:00 | 3 |
| 16/03/2019 | DH | 08:50 | 11:50 | 3 |
| Total Hours | | | | 36 |

Table AI-3: Details of VP surveys undertaken from Wind Farm II Vantage Point 1

| Date | Surveyor | Start | End | Survey Duration |
|--------------------|----------|-------|-------|-----------------|
| 25/10/2018 | AH | 09:40 | 12:40 | 3 |
| 29/10/2018 | AH | 08:50 | 11:50 | 3 |
| 20/11/2018 | AH | 09:20 | 12:20 | 3 |
| 22/11/2018 | AH | 12:40 | 15:40 | 3 |
| 06/12/2018 | AH | 13:00 | 16:00 | 3 |
| 09/12/2018 | DH | 09:10 | 12:10 | 3 |
| 18/01/2019 | AH | 13:55 | 16:55 | 3 |
| 21/01/2019 | DH | 12:50 | 15:50 | 3 |
| 15/02/2019 | RB | 14:00 | 17:15 | 3 |
| 17/02/2019 | RB | 13:40 | 16:40 | 3 |
| 12/03/2019 | RB | 07:45 | 11:00 | 3 |
| 13/03/2019 | RB | 12:00 | 15:00 | 3 |
| Total Hours | | | | 36 |

Table AI-4: Details of VP surveys undertaken from Wind Farm II Vantage Point 2

| Date | Surveyor | Start | End | Survey Duration |
|--------------------|----------|-------|-------|-----------------|
| 25/10/2018 | DH | 13:30 | 16:30 | 3 |
| 28/10/2018 | DH | 09:00 | 12:00 | 3 |
| 22/11/2018 | DH | 09:30 | 12:30 | 3 |
| 23/11/2018 | DH | 13:10 | 16:10 | 3 |
| 07/12/2018 | DH | 09:15 | 12:15 | 3 |
| 10/12/2018 | DH | 12:30 | 15:30 | 3 |
| 16/01/2019 | DH | 13:55 | 16:55 | 3 |
| 19/01/2019 | DH | 12:50 | 15:50 | 3 |
| 13/02/2019 | DH | 09:15 | 12:15 | 3 |
| 18/02/2019 | RB | 09:45 | 12:45 | 3 |
| 11/03/2019 | DH | 09:00 | 12:00 | 3 |
| 14/03/2019 | RB | 12:00 | 15:00 | 3 |
| Total Hours | | | | 36 |

Table AI-5: Details of VP surveys undertaken from Wind Farm II Vantage Point 3

| Date | Surveyor | Start | End | Survey Duration |
|--------------------|----------|-------|-------|-----------------|
| 26/10/2018 | DH | 13:30 | 16:30 | 3 |
| 29/10/2018 | DH | 09:00 | 12:00 | 3 |
| 20/11/2018 | DH | 09:30 | 12:30 | 3 |
| 23/11/2018 | DH | 13:10 | 16:10 | 3 |
| 07/12/2018 | DH | 13:15 | 16:15 | 3 |
| 10/12/2018 | DH | 09:00 | 12:00 | 3 |
| 16/01/2019 | DH | 09:15 | 12:15 | 3 |
| 17/01/2019 | DH | 13:15 | 16:15 | 3 |
| 15/02/2019 | DH | 12:30 | 15:30 | 3 |
| 18/02/2019 | DH/RB | 12:30 | 15:30 | 3 |
| 12/03/2019 | DH | 13:55 | 16:55 | 3 |
| 16/03/2019 | DH | 12:50 | 15:50 | 3 |
| Total Hours | | | | 36 |

Table AI-6: Details of VP surveys undertaken from Wind Farm II Vantage Point 4

| Date | Surveyor | Start | End | Survey Duration |
|--------------------|----------|-------|-------|-----------------|
| 26/10/2018 | AH | 09:10 | 12:10 | 3 |
| 29/10/2018 | AH | 12:40 | 15:40 | 3 |
| 20/11/2018 | AH | 13:01 | 16:01 | 3 |
| 23/11/2018 | AH | 09:25 | 12:25 | 3 |
| 07/12/2018 | AH | 09:25 | 12:25 | 3 |
| 08/12/2019 | AH | 13:10 | 16:10 | 3 |
| 18/01/2019 | AH | 12:55 | 15:55 | 3 |
| 19/01/2019 | AH | 09:12 | 12:12 | 3 |
| 17/02/2019 | DH | 10:07 | 13:07 | 3 |
| 18/02/2019 | DH | 09:40 | 12:40 | 3 |
| 16/03/2019 | DH | 07:50 | 10:50 | 3 |
| 17/03/2019 | DH | 12:50 | 15:50 | 3 |
| Total Hours | | | | 36 |

APPENDIX II

Weather Data

Table AII-1: Weather data collected during flight activity surveys undertaken at WFI VP1

| Date | Surveyor | Start | End | Survey Hour | Wind Speed | Wind Direction | Rain | Cloud Cover | Cloud Height | Visibility | Snow | Frost | Temp (°c) |
|------------|----------|-------|-------|-------------|------------|----------------|------|-------------|--------------|------------|------|-------|-----------|
| 25/10/2018 | DH | 09:45 | 12:45 | 1 | 3 | NE | 2 | 8 | 2 | 2 | 0 | 0 | 10 |
| 25/10/2018 | DH | 09:45 | 12:45 | 2 | 3 | NE | 0 | 7 | 2 | 2 | 0 | 0 | 10 |
| 25/10/2018 | DH | 09:45 | 12:45 | 3 | 4 | NE | 0 | 7 | 2 | 2 | 0 | 0 | 10 |
| 29/10/2018 | DH | 13:00 | 16:00 | 1 | 3 | E | 0 | 8 | 2 | 2 | 0 | 0 | 7 |
| 29/10/2018 | DH | 13:00 | 16:00 | 2 | 3 | E | 0 | 8 | 2 | 2 | 0 | 0 | 8 |
| 29/10/2018 | DH | 13:00 | 16:00 | 3 | 3 | E | 0 | 8 | 2 | 2 | 0 | 0 | 8 |
| 20/11/2018 | AH | 09:30 | 12:30 | 1 | 3 | N | 0 | 4 | 2 | 2 | 0 | 0 | 5 |
| 20/11/2018 | AH | 09:30 | 12:30 | 2 | 2 | N | 0 | 4 | 2 | 2 | 0 | 0 | 6 |
| 20/11/2018 | AH | 09:30 | 12:30 | 3 | 2 | N | 0 | 4 | 2 | 2 | 0 | 0 | 6 |
| 22/11/2018 | DH | 13:00 | 16:00 | 1 | 2 | SE | 0 | 5 | 2 | 2 | 0 | 0 | 5 |
| 22/11/2018 | DH | 13:00 | 16:00 | 2 | 2 | SE | 0 | 0 | 2 | 2 | 0 | 0 | 5 |
| 22/11/2018 | DH | 13:00 | 16:00 | 3 | 2 | SE | 0 | 1 | 2 | 2 | 0 | 0 | 4 |
| 06/12/2018 | DH | 12:50 | 15:50 | 1 | 3 | NE | 0 | 8 | 2 | 2 | 0 | 0 | 10 |
| 06/12/2018 | DH | 12:50 | 15:50 | 2 | 4 | NE | 1 | 8 | 2 | 2 | 0 | 0 | 10 |
| 06/12/2018 | DH | 12:50 | 15:50 | 3 | 4 | NE | 0 | 6 | 2 | 2 | 0 | 0 | 9 |
| 09/12/2018 | DH | 09:15 | 12:15 | 1 | 4 | NW | 0 | 0 | 2 | 2 | 0 | 0 | 8 |
| 09/12/2018 | DH | 09:15 | 12:15 | 2 | 4 | NW | 0 | 0 | 2 | 2 | 0 | 0 | 7 |
| 09/12/2018 | DH | 09:15 | 12:15 | 3 | 4 | NW | 0 | 0 | 2 | 2 | 0 | 0 | 7 |
| 18/01/2019 | DH | 09:30 | 12:30 | 1 | 2 | NW | 0 | 5 | 2 | 2 | 0 | 0 | 4 |
| 18/01/2019 | DH | 09:30 | 12:30 | 2 | 2 | W | 0 | 2 | 2 | 2 | 0 | 0 | 4 |
| 18/01/2019 | DH | 09:30 | 12:30 | 3 | 2 | S | 0 | 2 | 2 | 2 | 0 | 0 | 5 |
| 21/01/2019 | AH | 13:05 | 16:05 | 1 | 4 | SW | 0 | 8 | 2 | 2 | 0 | 0 | 3 |
| 21/01/2019 | AH | 13:05 | 16:05 | 2 | 4 | SW | 2 | 8 | 2 | 2 | 0 | 0 | 4 |
| 21/01/2019 | AH | 13:05 | 16:05 | 3 | 4 | SW | 2 | 8 | 2 | 2 | 0 | 0 | 4 |
| 15/02/2019 | DH | 09:30 | 12:30 | 1 | 3 | S | 0 | 8 | 2 | 2 | 0 | 0 | 10 |
| 15/02/2019 | DH | 09:30 | 12:30 | 2 | 2 | S | 0 | 8 | 2 | 2 | 0 | 0 | 11 |

| Date | Surveyor | Start | End | Survey Hour | Wind Speed | Wind Direction | Rain | Cloud Cover | Cloud Height | Visibility | Snow | Frost | Temp (°C) |
|------------|----------|-------|-------|-------------|------------|----------------|------|-------------|--------------|------------|------|-------|-----------|
| 15/02/2019 | DH | 09:30 | 12:30 | 3 | 5 | S | 0 | 6 | 2 | 2 | 0 | 0 | 11 |
| 17/02/2019 | DH | 14:05 | 17:05 | 1 | 5 | S | 0 | 7 | 2 | 2 | 0 | 0 | 11 |
| 17/02/2019 | DH | 14:05 | 17:05 | 2 | 6 | S | 0 | 6 | 2 | 2 | 0 | 0 | 9 |
| 17/02/2019 | DH | 14:05 | 17:05 | 3 | 5 | S | 0 | 2 | 2 | 2 | 0 | 0 | 9 |
| 12/03/2019 | RB | 13:50 | 16:50 | 1 | 5 | W | 0 | 6 | 2 | 2 | 0 | 0 | 6 |
| 12/03/2019 | RB | 13:50 | 16:50 | 2 | 6 | W | 0 | 5 | 2 | 2 | 0 | 0 | 6 |
| 12/03/2019 | RB | 13:50 | 16:50 | 3 | 5 | W | 2 | 8 | 2 | 2 | 0 | 0 | 6 |
| 15/03/2019 | DH | 14:00 | 17:00 | 1 | 4 | NW | 0 | 6 | 2 | 2 | 0 | 0 | 9 |
| 15/03/2019 | DH | 14:00 | 17:00 | 2 | 4 | N | 2 | 8 | 2 | 2 | 0 | 0 | 9 |
| 15/03/2019 | DH | 14:00 | 17:00 | 3 | 4 | N | 0 | 8 | 2 | 2 | 0 | 0 | 8 |

Table All-2: Weather data collected during flight activity surveys undertaken at WFI VP2

| Date | Surveyor | Start | End | Survey Hour | Wind Speed | Wind Direction | Rain | Cloud Cover | Cloud Height | Visibility | Snow | Frost | Temp (°c) |
|------------|----------|-------|-------|-------------|------------|----------------|------|-------------|--------------|------------|------|-------|-----------|
| 25/10/2018 | AH | 09:20 | 12:20 | 1 | 1 | SW | 1 | 8 | 1 | 1 | 0 | 0 | 12 |
| 25/10/2018 | AH | 09:20 | 12:20 | 2 | 2 | SW | 1 | 8 | 2 | 2 | 0 | 0 | 12 |
| 25/10/2018 | AH | 09:20 | 12:20 | 3 | 2 | SW | 1 | 8 | 1 | 1 | 0 | 0 | 12 |
| 26/10/2018 | DH | 13:30 | 16:30 | 1 | 3 | E | 0 | 6 | 2 | 2 | 0 | 0 | 8 |
| 26/10/2018 | DH | 13:30 | 16:30 | 2 | 3 | SE | 1 | 5 | 2 | 2 | 0 | 0 | 8 |
| 26/10/2018 | DH | 13:30 | 16:30 | 3 | 3 | SE | 0 | 2 | 2 | 2 | 0 | 0 | 7 |
| 29/10/2018 | DH | 12:40 | 15:40 | 1 | 2 | S | 0 | 8 | 2 | 2 | 0 | 0 | 5 |
| 29/10/2018 | DH | 12:40 | 15:40 | 2 | 2 | S | 0 | 8 | 2 | 2 | 0 | 0 | 6 |
| 29/10/2018 | DH | 12:40 | 15:40 | 3 | 2 | S | 0 | 8 | 2 | 2 | 0 | 0 | 6 |
| 20/11/2018 | DH | 09:30 | 12:30 | 1 | 2 | NW | 0 | 4 | 2 | 2 | 0 | 0 | 6 |
| 20/11/2018 | DH | 09:30 | 12:30 | 2 | 2 | NW | 1 | 5 | 2 | 2 | 0 | 0 | 6 |
| 20/11/2018 | DH | 09:30 | 12:30 | 3 | 2 | NW | 0 | 8 | 2 | 2 | 0 | 0 | 7 |
| 06/12/2018 | DH | 09:30 | 12:30 | 1 | 2 | E | 1 | 8 | 1 | 0 | 0 | 0 | 10 |
| 06/12/2018 | DH | 09:30 | 12:30 | 2 | 2 | E | 0 | 8 | 2 | 1 | 0 | 0 | 11 |
| 06/12/2018 | DH | 09:30 | 12:30 | 3 | 2 | E | 0 | 8 | 2 | 1 | 0 | 0 | 11 |
| 09/12/2018 | DH | 12:35 | 15:35 | 1 | 5 | NW | 0 | 6 | 2 | 2 | 0 | 0 | 7 |
| 09/12/2018 | DH | 12:35 | 15:35 | 2 | 4 | NW | 0 | 3 | 2 | 2 | 0 | 0 | 7 |
| 09/12/2018 | DH | 12:35 | 15:35 | 3 | 4 | NW | 0 | 3 | 2 | 2 | 0 | 0 | 6 |
| 15/01/2019 | RB | 13:00 | 16:00 | 1 | 1 | N | 0 | 8 | 2 | 2 | 0 | 0 | 10 |
| 15/01/2019 | RB | 13:00 | 16:00 | 2 | 1 | N | 1 | 8 | 1 | 1 | 0 | 0 | 9 |
| 15/01/2019 | RB | 13:00 | 16:00 | 3 | 1 | N | 1 | 8 | 1 | 1 | 0 | 0 | 9 |
| 15/02/2019 | RB | 13:30 | 16:55 | 1 | 4 | S | 1 | 8 | 2 | 2 | 0 | 0 | 12 |
| 15/02/2019 | RB | 13:30 | 16:55 | 2 | 5 | S | 1 | 8 | 1 | 2 | 0 | 0 | 12 |
| 15/02/2019 | RB | 13:30 | 16:55 | 3 | 6 | S | 1 | 8 | 1 | 2 | 0 | 0 | 12 |
| 17/02/2019 | RB | 10:00 | 13:00 | 1 | 4 | SW | 0 | 1 | 2 | 2 | 0 | 0 | 9 |
| 17/02/2019 | RB | 10:00 | 13:00 | 2 | 4 | SW | 0 | 4 | 1 | 2 | 0 | 0 | 8 |

| Date | Surveyor | Start | End | Survey Hour | Wind Speed | Wind Direction | Rain | Cloud Cover | Cloud Height | Visibility | Snow | Frost | Temp (°C) |
|------------|----------|-------|-------|-------------|------------|----------------|------|-------------|--------------|------------|------|-------|-----------|
| 17/02/2019 | RB | 10:00 | 13:00 | 3 | 4 | SW | 0 | 5 | 1 | 2 | 0 | 0 | 8 |
| 12/03/2019 | AH | 09:45 | 12:45 | 1 | 2 | S | 1 | 7 | 1 | 2 | 0 | 0 | 5 |
| 12/03/2019 | AH | 09:45 | 12:45 | 2 | 2 | S | 0 | 4 | 1 | 2 | 0 | 0 | 5 |
| 12/03/2019 | AH | 09:45 | 12:45 | 3 | 4 | S | 1 | 8 | 1 | 2 | 0 | 0 | 6 |
| 16/03/2019 | DH | 11:15 | 14:15 | 1 | 4 | S | 0 | 8 | 1 | 1 | 0 | 0 | 8 |
| 16/03/2019 | DH | 11:15 | 14:15 | 2 | 4 | S | 0 | 8 | 1 | 1 | 0 | 0 | 8 |
| 16/03/2019 | DH | 11:15 | 14:15 | 3 | 4 | S | 0 | 8 | 1 | 1 | 0 | 0 | 8 |

Table All-3: Weather data collected during flight activity surveys undertaken at WFII VP1

| Date | Surveyor | Start | End | Survey Hour | Wind Speed | Wind Direction | Rain | Cloud Cover | Cloud Height | Visibility | Snow | Frost | Temp (°c) |
|------------|----------|-------|-------|-------------|------------|----------------|------|-------------|--------------|------------|------|-------|-----------|
| 25/10/2018 | AH | 13:20 | 16:20 | 1 | 3 | SW | 1 | 8 | 2 | 2 | 0 | 0 | 13 |
| 25/10/2018 | AH | 13:20 | 16:20 | 2 | 2 | SW | 1 | 8 | 2 | 2 | 0 | 0 | 13 |
| 25/10/2018 | AH | 13:20 | 16:20 | 3 | 2 | SW | 0 | 8 | 2 | 2 | 0 | 0 | 13 |
| 28/10/2018 | AH | 08:50 | 11:50 | 1 | 0 | N/A | 0 | 0 | N/A | 2 | 0 | 1 | 4 |
| 28/10/2018 | AH | 08:50 | 11:50 | 2 | 1 | NW | 0 | 0 | N/A | 2 | 0 | 0 | 6 |
| 28/10/2018 | AH | 08:50 | 11:50 | 3 | 2 | NW | 0 | 0 | N/A | 2 | 0 | 0 | 7 |
| 22/11/2018 | AH | 09:30 | 12:30 | 1 | 3 | E | 0 | 1 | 2 | 2 | 0 | 0 | 6 |
| 22/11/2018 | AH | 09:30 | 12:30 | 2 | 3 | E | 0 | 2 | 2 | 2 | 0 | 0 | 6 |
| 22/11/2018 | AH | 09:30 | 12:30 | 3 | 3 | E | 0 | 3 | 2 | 2 | 0 | 0 | 6 |
| 22/11/2018 | AH | 12:40 | 15:40 | 1 | 3 | E | 0 | 4 | 2 | 2 | 0 | 0 | 6 |
| 22/11/2018 | AH | 12:40 | 15:40 | 2 | 2 | E | 0 | 3 | 2 | 2 | 0 | 0 | 5 |
| 22/11/2018 | AH | 12:40 | 15:40 | 3 | 2 | E | 0 | 3 | 2 | 2 | 0 | 0 | 5 |
| 23/11/2018 | AH | 13:00 | 16:00 | 1 | 3 | NE | 0 | 8 | 2 | 2 | 0 | 0 | 5 |
| 23/11/2018 | AH | 13:00 | 16:00 | 2 | 3 | NE | 0 | 8 | 2 | 2 | 0 | 0 | 5 |
| 23/11/2018 | AH | 13:00 | 16:00 | 3 | 3 | NE | 0 | 8 | 2 | 2 | 0 | 0 | 5 |
| 10/12/2018 | DH | 09:10 | 12:10 | 1 | 3 | NW | 0 | 7 | 2 | 2 | 0 | 0 | 10 |
| 10/12/2018 | DH | 09:10 | 12:10 | 2 | 3 | NW | 2 | 8 | 2 | 2 | 0 | 0 | 11 |
| 10/12/2018 | DH | 09:10 | 12:10 | 3 | 3 | NW | 2 | 8 | 2 | 2 | 0 | 0 | 11 |
| 16/01/2019 | AH | 13:55 | 16:55 | 1 | 1 | W | 1 | 8 | 2 | 2 | 0 | 0 | 7 |
| 16/01/2019 | AH | 13:55 | 16:55 | 2 | 1 | W | 0 | 8 | 2 | 2 | 0 | 0 | 7 |
| 16/01/2019 | AH | 13:55 | 16:55 | 3 | 1 | W | 1 | 7 | 2 | 2 | 0 | 0 | 7 |
| 13/02/2019 | DH | 12:50 | 15:50 | 1 | 5 | SE | 0 | 8 | 2 | 2 | 0 | 0 | 12 |
| 13/02/2019 | DH | 12:50 | 15:50 | 2 | 5 | S | 0 | 8 | 2 | 2 | 0 | 0 | 12 |
| 13/02/2019 | DH | 12:50 | 15:50 | 3 | 4 | S | 0 | 8 | 2 | 2 | 0 | 0 | 12 |
| 17/02/2019 | RB | 14:00 | 17:15 | 1 | 6 | SW | 0 | 7 | 1 | 2 | 0 | 0 | 9 |
| 17/02/2019 | RB | 14:00 | 17:15 | 2 | 6 | SW | 1 | 6 | 1 | 2 | 0 | 0 | 9 |

| Date | Surveyor | Start | End | Survey Hour | Wind Speed | Wind Direction | Rain | Cloud Cover | Cloud Height | Visibility | Snow | Frost | Temp (°C) |
|------------|----------|-------|-------|-------------|------------|----------------|------|-------------|--------------|------------|------|-------|-----------|
| 17/02/2019 | RB | 14:00 | 17:15 | 3 | 6 | SW | 0 | 6 | 1 | 2 | 0 | 0 | 8 |
| 12/03/2019 | RB | 13:40 | 16:40 | 1 | 5 | S | 0 | 3 | 2 | 2 | 0 | 0 | 8 |
| 12/03/2019 | RB | 13:40 | 16:40 | 2 | 6 | S | 0 | 8 | 1 | 1 | 0 | 0 | 5 |
| 12/03/2019 | RB | 13:40 | 16:40 | 3 | 7 | S | 1 | 8 | 1 | 1 | 0 | 0 | 5 |
| 16/03/2019 | RB | 07:45 | 11:00 | 1 | 4 | S | 3 | 8 | 0 | 1 | 0 | 0 | 10 |
| 16/03/2019 | RB | 07:45 | 11:00 | 2 | 4 | S | 2 | 8 | 0 | 1 | 0 | 0 | 11 |
| 16/03/2019 | RB | 07:45 | 11:00 | 3 | 4 | S | 1 | 8 | 0 | 1 | 0 | 0 | 11 |

Table All-4: Weather data collected during flight activity surveys undertaken at WFII VP2

| Date | Surveyor | Start | End | Survey Hour | Wind Speed | Wind Direction | Rain | Cloud Cover | Cloud Height | Visibility | Snow | Frost | Temp (°C) |
|------------|----------|-------|-------|-------------|------------|----------------|------|-------------|--------------|------------|------|-------|-----------|
| 25/10/2018 | DH | 13:30 | 16:30 | 1 | 2 | E | 0 | 8 | 2 | 2 | 0 | 0 | 11 |
| 25/10/2018 | DH | 13:30 | 16:30 | 2 | 3 | E | 0 | 8 | 2 | 2 | 0 | 0 | 10 |
| 25/10/2018 | DH | 13:30 | 16:30 | 3 | 2 | E | 1 | 8 | 2 | 2 | 0 | 0 | 10 |
| 28/10/2018 | DH | 09:00 | 12:00 | 1 | 1 | SE | 0 | 0 | N/A | 2 | 0 | 1 | 2 |
| 28/10/2018 | DH | 09:00 | 12:00 | 2 | 1 | SE | 0 | 0 | N/A | 2 | 0 | 0 | 4 |
| 28/10/2018 | DH | 09:00 | 12:00 | 3 | 2 | SE | 0 | 0 | N/A | 2 | 0 | 0 | 7 |
| 22/11/2018 | DH | 09:30 | 12:30 | 1 | 3 | SE | 0 | 0 | 2 | 2 | 0 | 0 | 3 |
| 22/11/2018 | DH | 09:30 | 12:30 | 2 | 3 | SE | 0 | 0 | 2 | 2 | 0 | 0 | 3 |
| 22/11/2018 | DH | 09:30 | 12:30 | 3 | 2 | SE | 0 | 2 | 2 | 2 | 0 | 0 | 4 |
| 23/11/2018 | DH | 13:10 | 16:10 | 1 | 3 | NE | 0 | 8 | 2 | 2 | 0 | 0 | 4 |
| 23/11/2018 | DH | 13:10 | 16:10 | 2 | 3 | NE | 0 | 8 | 2 | 2 | 0 | 0 | 5 |
| 23/11/2018 | DH | 13:10 | 16:10 | 3 | 3 | NE | 0 | 8 | 2 | 2 | 0 | 0 | 5 |
| 07/12/2018 | DH | 09:15 | 12:15 | 1 | 4 | NW | 3 | 8 | 2 | 2 | 0 | 0 | 7 |
| 07/12/2018 | DH | 09:15 | 12:15 | 2 | 4 | NW | 1 | 6 | 2 | 2 | 0 | 0 | 8 |
| 07/12/2018 | DH | 09:15 | 12:15 | 3 | 5 | NW | 3 | 6 | 2 | 2 | 0 | 0 | 9 |
| 07/12/2018 | DH | 12:30 | 15:30 | 1 | 5 | NW | 3 | 8 | 2 | 2 | 0 | 0 | 8 |
| 07/12/2018 | DH | 12:30 | 15:30 | 2 | 5 | NW | 0 | 6 | 2 | 2 | 0 | 0 | 8 |
| 07/12/2018 | DH | 12:30 | 15:30 | 3 | 5 | NW | 0 | 4 | 2 | 2 | 0 | 0 | 7 |
| 10/12/2018 | DH | 12:30 | 15:30 | 1 | 4 | NW | 1 | 8 | 2 | 2 | 0 | 0 | 9 |
| 10/12/2018 | DH | 12:30 | 15:30 | 2 | 3 | NW | 0 | 8 | 2 | 2 | 0 | 0 | 8 |
| 10/12/2018 | DH | 12:30 | 15:30 | 3 | 3 | NW | 1 | 8 | 2 | 2 | 0 | 0 | 8 |
| 16/01/2019 | DH | 13:55 | 16:55 | 1 | 2 | NW | 3 | 8 | 2 | 2 | 0 | 0 | 4 |
| 16/01/2019 | DH | 13:55 | 16:55 | 2 | 2 | NW | 0 | 8 | 2 | 2 | 0 | 0 | 4 |
| 16/01/2019 | DH | 13:55 | 16:55 | 3 | 2 | NW | 2 | 4 | 2 | 2 | 0 | 0 | 3 |

| Date | Surveyor | Start | End | Survey Hour | Wind Speed | Wind Direction | Rain | Cloud Cover | Cloud Height | Visibility | Snow | Frost | Temp (°C) |
|------------|----------|-------|-------|-------------|------------|----------------|------|-------------|--------------|------------|------|-------|-----------|
| 19/01/2019 | DH | 12:50 | 15:50 | 1 | 1 | S | 0 | 8 | 2 | 2 | 0 | 0 | 8 |
| 19/01/2019 | DH | 12:50 | 15:50 | 2 | 1 | S | 0 | 8 | 2 | 2 | 0 | 0 | 7 |
| 19/01/2019 | DH | 12:50 | 15:50 | 3 | 1 | S | 0 | 8 | 2 | 2 | 0 | 0 | 5 |
| 13/02/2019 | DH | 09:15 | 12:15 | 1 | 5 | S | 0 | 8 | 2 | 2 | 0 | 0 | 11 |
| 13/02/2019 | DH | 09:15 | 12:15 | 2 | 5 | S | 0 | 8 | 2 | 2 | 0 | 0 | 12 |
| 13/02/2019 | DH | 09:15 | 12:15 | 3 | 5 | S | 0 | 8 | 2 | 2 | 0 | 0 | 12 |
| 18/02/2019 | RB | 09:45 | 12:45 | 1 | 3 | SW | 2 | 7 | 1 | 2 | 0 | 0 | 6 |
| 18/02/2019 | RB | 09:45 | 12:45 | 2 | 4 | SW | 0 | 5 | 1 | 2 | 0 | 0 | |
| 18/02/2019 | RB | 09:45 | 12:45 | 3 | 3 | SW | 0 | 5 | 2 | 2 | 0 | 0 | |

Table All-5: Weather data collected during flight activity surveys undertaken at WFII VP3

| Date | Surveyor | Start | End | Survey Hour | Wind Speed | Wind Direction | Rain | Cloud Cover | Cloud Height | Visibility | Snow | Frost | Temp (°C) |
|------------|----------|-------|-------|-------------|------------|----------------|------|-------------|--------------|------------|------|-------|-----------|
| 26/10/2018 | DH | 09:40 | 12:40 | 1 | 4 | E | 0 | 5 | 2 | 2 | 0 | 0 | 4 |
| 26/10/2018 | DH | 09:40 | 12:40 | 2 | 4 | E | 0 | 3 | 2 | 2 | 0 | 0 | 5 |
| 26/10/2018 | DH | 09:40 | 12:40 | 3 | 4 | E | 0 | 2 | 2 | 2 | 0 | 0 | 5 |
| 29/10/2018 | DH | 09:20 | 12:20 | 1 | 1 | N/A | 0 | 8 | 2 | 2 | 0 | 0 | 4 |
| 29/10/2018 | DH | 09:20 | 12:20 | 2 | 1 | N/A | 0 | 8 | 2 | 2 | 0 | 0 | 5 |
| 29/10/2018 | DH | 09:20 | 12:20 | 3 | 1 | N/A | 0 | 8 | 2 | 2 | 0 | 0 | 6 |
| 20/11/2018 | DH | 13:00 | 16:00 | 1 | 4 | NW | 0 | 8 | 2 | 2 | 0 | 0 | 7 |
| 20/11/2018 | DH | 13:00 | 16:00 | 2 | 4 | NW | 0 | 8 | 2 | 2 | 0 | 0 | 7 |
| 20/11/2018 | DH | 13:00 | 16:00 | 3 | 4 | NW | 0 | 6 | 2 | 2 | 0 | 0 | 7 |
| 23/11/2018 | DH | 09:30 | 12:30 | 1 | 2 | SE | 0 | 0 | | 2 | 0 | 1 | 1 |
| 23/11/2018 | DH | 09:30 | 12:30 | 2 | 2 | SE | 0 | 3 | 2 | 2 | 0 | 0 | 2 |
| 23/11/2018 | DH | 09:30 | 12:30 | 3 | 2 | SE | 0 | 6 | 2 | 2 | 0 | 0 | 4 |
| 16/01/2019 | DH | 09:15 | 12:15 | 1 | 0 | SE | 0 | 2 | 2 | 2 | 0 | 0 | 3 |
| 16/01/2019 | DH | 09:15 | 12:15 | 2 | 1 | NS | 2 | 6 | 2 | 2 | 0 | 0 | 9 |
| 16/01/2019 | DH | 09:15 | 12:15 | 3 | 1 | NS | 0 | 3 | 2 | 2 | 0 | 0 | 5 |
| 15/02/2019 | DH | 13:40 | 16:40 | 1 | 3 | SW | 0 | 8 | 2 | 2 | 0 | 0 | 14 |
| 15/02/2019 | DH | 13:40 | 16:40 | 2 | 2 | SW | 0 | 8 | 2 | 2 | 0 | 0 | 14 |
| 15/02/2019 | DH | 13:40 | 16:40 | 3 | 2 | SW | 0 | 8 | 2 | 2 | 0 | 0 | 12 |
| 18/02/2019 | DH/RB | 13:57 | 16:57 | 1 | 4 | SW | 0 | 6 | 2 | 2 | 0 | 0 | 9 |
| 18/02/2019 | DH/RB | 13:57 | 16:57 | 2 | 4 | SW | 0 | 3 | 2 | 2 | 0 | 0 | 9 |
| 18/02/2019 | DH/RB | 13:57 | 16:57 | 3 | 5 | SW | 0 | 5 | 2 | 2 | 0 | 0 | 7 |
| 12/03/2019 | DH | 09:55 | 12:55 | 1 | 4 | SW | 0 | 4 | 2 | 2 | 0 | 0 | 6 |
| 12/03/2019 | DH | 09:55 | 12:55 | 2 | 6 | SW | 2 | 7 | 2 | 2 | 0 | 0 | 6 |
| 12/03/2019 | DH | 09:55 | 12:55 | 3 | 5 | SW | 0 | 6 | 2 | 2 | 0 | 0 | 7 |

| Date | Surveyor | Start | End | Survey Hour | Wind Speed | Wind Direction | Rain | Cloud Cover | Cloud Height | Visibility | Snow | Frost | Temp (°C) |
|------------|----------|-------|-------|-------------|------------|----------------|------|-------------|--------------|------------|------|-------|-----------|
| 16/03/2019 | DH | 11:25 | 14:25 | 1 | 4 | SW | 0 | 8 | 2 | 2 | 0 | 0 | 10 |
| 16/03/2019 | DH | 11:25 | 14:25 | 2 | 4 | SW | 0 | 8 | 2 | 2 | 0 | 0 | 10 |
| 16/03/2019 | DH | 11:25 | 14:25 | 3 | 4 | SW | 1 | 8 | 2 | 2 | 0 | 0 | 11 |

Table AII-6: Weather data collected during flight activity surveys undertaken at WFII VP4

| Date | Surveyor | Start | End | Survey Hour | Wind Speed | Wind Direction | Rain | Cloud Cover | Cloud Height | Visibility | Snow | Frost | Temp (°C) |
|------------|----------|-------|-------|-------------|------------|----------------|------|-------------|--------------|------------|------|-------|-----------|
| 26/10/2018 | AH | 09:10 | 12:10 | 1 | 3 | NW | 0 | 1 | 2 | 2 | 0 | 0 | 5 |
| 26/10/2018 | AH | 09:10 | 12:10 | 2 | 3 | NW | 0 | 3 | 2 | 2 | 0 | 0 | 6 |
| 26/10/2018 | AH | 09:10 | 12:10 | 3 | 3 | NW | 0 | 4 | 2 | 2 | 0 | 0 | 6 |
| 29/10/2018 | AH | 13:00 | 16:00 | 1 | 2 | SE | 0 | 8 | 2 | 2 | 0 | 0 | 4 |
| 29/10/2018 | AH | 13:00 | 16:00 | 2 | 2 | SE | 0 | 8 | 2 | 2 | 0 | 0 | 4 |
| 29/10/2018 | AH | 13:00 | 16:00 | 3 | 2 | SE | 0 | 8 | 2 | 2 | 0 | 0 | 4 |
| 20/11/2018 | AH | 13:01 | 16:01 | 1 | 3 | N | 0 | 3 | 2 | 2 | 0 | 0 | 7 |
| 20/11/2018 | AH | 13:01 | 16:01 | 2 | 4 | N | 2 | 7 | 2 | 2 | 0 | 0 | 7 |
| 20/11/2018 | AH | 13:01 | 16:01 | 3 | 4 | N | 0 | 6 | 2 | 2 | 0 | 0 | 6 |
| 23/11/2018 | AH | 09:25 | 12:25 | 1 | 2 | NE | 0 | 2 | 2 | 2 | 0 | 1 | 1 |
| 23/11/2018 | AH | 09:25 | 12:25 | 2 | 2 | NE | 0 | 3 | 2 | 2 | 0 | 0 | 2 |
| 23/11/2018 | AH | 09:25 | 12:25 | 3 | 2 | NE | 0 | 6 | 2 | 2 | 0 | 0 | 4 |
| 16/01/2019 | AH | 09:10 | 12:10 | 1 | 2 | W | 0 | 3 | 2 | 2 | 0 | 0 | 6 |
| 16/01/2019 | AH | 09:10 | 12:10 | 2 | 1 | W | 0 | 3 | 2 | 2 | 0 | 0 | 7 |
| 16/01/2019 | AH | 09:10 | 12:10 | 3 | 1 | W | 0 | 4 | 2 | 2 | 0 | 0 | 7 |
| 18/01/2019 | AH | 12:55 | 15:55 | 1 | 2 | W | 0 | 7 | 2 | 2 | 0 | 0 | 8 |
| 18/01/2019 | AH | 12:55 | 15:55 | 2 | 2 | W | 0 | 7 | 2 | 2 | 0 | 0 | 8 |
| 18/01/2019 | AH | 12:55 | 15:55 | 3 | 2 | W | 0 | 7 | 2 | 2 | 0 | 0 | 8 |
| 19/01/2019 | AH | 09:12 | 12:12 | 1 | 0 | W | 0 | 8 | 1 | 0 | 0 | 0 | 6 |
| 19/01/2019 | AH | 09:12 | 12:12 | 2 | 0 | S | 0 | 8 | 1 | 1 | 0 | 0 | 7 |
| 19/01/2019 | AH | 09:12 | 12:12 | 3 | 0 | S | 0 | 8 | 1 | 2 | 0 | 0 | 8 |
| 17/02/2019 | DH | 10:07 | 13:07 | 1 | 3 | SE | 0 | 1 | 2 | 2 | 0 | 0 | 10 |
| 17/02/2019 | DH | 10:07 | 13:07 | 2 | 4 | SE | 0 | 5 | 2 | 2 | 0 | 0 | 11 |
| 17/02/2019 | DH | 10:07 | 13:07 | 3 | 4 | SE | 0 | 4 | 2 | 2 | 0 | 0 | 11 |

| Date | Surveyor | Start | End | Survey Hour | Wind Speed | Wind Direction | Rain | Cloud Cover | Cloud Height | Visibility | Snow | Frost | Temp (°C) |
|------------|----------|-------|-------|-------------|------------|----------------|------|-------------|--------------|------------|------|-------|-----------|
| 18/02/2019 | DH | 09:40 | 12:40 | 1 | 4 | SE | 3 | 8 | 2 | 2 | 0 | 0 | |
| 18/02/2019 | DH | 09:40 | 12:40 | 2 | 4 | SE | 0 | 5 | 2 | 2 | 0 | 0 | |
| 18/02/2019 | DH | 09:40 | 12:40 | 3 | 4 | SE | 0 | 6 | 2 | 2 | 0 | 0 | |
| 16/03/2019 | DH | 07:50 | 10:50 | 1 | 5 | SW | 3 | 8 | 2 | 2 | 0 | 0 | 6 |
| 16/03/2019 | DH | 07:50 | 10:50 | 2 | 5 | SW | 1 | 8 | 2 | 2 | 0 | 0 | 8 |
| 16/03/2019 | DH | 07:50 | 10:50 | 3 | 5 | SW | 0 | 8 | 2 | 2 | 0 | 0 | 8 |

Table AII-7: Key to weather data

| Rain/ Precipitation | | Cloud Cover | | Visibility | | Lying Snow | | Frost | |
|---------------------|---|----------------------------|---|------------------|---|------------------|---|---------|---|
| None | 0 | Expressed in oktas (n/8) | | Poor (<1km) | 0 | None | 0 | None | 0 |
| Drizzle | 1 | Cloud Height | | Moderate (1-3km) | 1 | On site | 1 | Ground | 1 |
| Light showers/snow | 2 | Height of cloud above | | Good (>3km) | 2 | On higher ground | 2 | All day | 2 |
| Heavy showers/snow | 3 | average height of viewshed | | | | | | | |
| Heavy rain/snow | 4 | <150m | 0 | | | | | | |
| | | 150-500m | 1 | | | | | | |
| | | >500m | 2 | | | | | | |

APPENDIX III

Flight activity survey data

Primary Target Species

Table AIII-1a: Primary target species flight activity data from WFI VP1

| Date | Surveyor | Flight ID | Species | Num. Birds | M/F | Age | Obs. Time | Flight time (s) | Height Band 2 (Y/N) |
|------------|----------|-----------|---------|------------|-----|-----|-----------|-----------------|---------------------|
| 25/10/2018 | DH | 1 | WG | 5 | U | U | 10:40 | 15 | Y |
| 29/10/2018 | DH | 25 | SN | 1 | U | U | 13:28 | 30 | N |
| 20/11/2018 | AH | 31 | WS | 3 | A | U | 09:48 | 60 | Y |
| 20/11/2018 | AH | 32 | WG | 14 | A | U | 11:33 | 75 | Y |
| 09/12/2018 | DH | 44 | SH | 2 | U | U | 10:43 | 60 | Y |
| 17/02/2019 | DH | 52 | BZ | 1 | U | U | 16:23 | 30 | Y |
| 17/02/2019 | DH | 53 | SH | 1 | M | U | 16:48 | 15 | N |

Table AIII-2a: Primary target species flight activity data from WFI VP2

| Date | Surveyor | Flight ID | Species | Num. Birds | M/F | Age | Obs. Time | Flight time (s) | Height Band 2 (Y/N) |
|------------|----------|-----------|------------------------|------------|-----|-----|-----------|-----------------|---------------------|
| 25/10/2018 | AH | 2 | GP | 40 | U | U | 10:05 | 90 | Y |
| 25/10/2018 | AH | 3 | SN | 1 | U | U | 10:40 | 45 | Y |
| 25/10/2018 | AH | 4 | SH | 1 | U | U | 11:48 | 60 | N |
| 26/10/2018 | DH | 10 | WS | 18 | U | U | 15:52 | 45 | Y |
| 18/01/2019 | AH | 49 | GP | 52 | U | AD | 09:30 | 45 | Y |
| 15/02/2019 | RB | 50 | Unidentified goose sp. | 100 | U | U | 14:17 | 60 | N |

Table AIII-3a: Primary target species flight activity data from WFII VP1

| Date | Surveyor | Flight ID | Species | Num. Birds | M/F | Age | Obs. Time | Flight time (s) | Height Band 2 (Y/N) |
|------------|----------|-----------|---------|------------|-----|-----|-----------|-----------------|---------------------|
| 25/10/2018 | AH | 5 | PE | 1 | A | F | 14:16 | 60 | N |
| 28/10/2018 | AH | 14 | L. | 26 | U | U | 09:26 | 75 | N |
| 28/10/2018 | AH | 15 | L. | 1 | U | U | 10:11 | 60 | N |
| 22/11/2018 | AH | 36 | HH | 1 | U | A | 12:01 | 45 | N |
| 16/01/2019 | AH | 46 | PE | 1 | M | AD | 15:55 | 30 | N |
| 12/03/2019 | RB | 59 | T. | 6 | U | U | 13:45 | 15 | N |

Table AIII-4a: Primary target species flight activity data from WFII VP2

| Date | Surveyor | Flight ID | Species | Num. Birds | M/F | Age | Obs. Time | Flight time (s) | Height Band 2 (Y/N) |
|------------|----------|-----------|---------|------------|-----|-----|-----------|-----------------|---------------------|
| 28/10/2018 | DH | 11 | WS | 1 | U | U | 10:05 | 30 | N |
| 28/10/2018 | DH | 12 | L. | 8 | U | U | 10:28 | 75 | N |
| 28/10/2018 | DH | 13 | WS | 3 | U | U | 10:38 | 45 | N |
| 07/12/2018 | DH | 42 | SH | 1 | M | AD | 10:14 | 15 | N |

| Date | Surveyor | Flight ID | Species | Num. Birds | M/F | Age | Obs. Time | Flight time (s) | Height Band 2 (Y/N) |
|------------|----------|-----------|---------|------------|-----|-----|-----------|-----------------|---------------------|
| 07/12/2018 | DH | 43 | PE | 1 | F | AD | 13:19 | 45 | N |
| 19/01/2019 | DH | 48 | T. | 14 | U | U | 14:38 | 60 | N |
| 18/02/2019 | RB | 54 | SN | 1 | U | U | 10:27 | 15 | N |
| 15/03/2019 | RB | 60 | K. | 1 | M | AD | 15:15 | 30 | N |
| 15/03/2019 | RB | 61 | K. | 1 | M | AD | 15:17 | 105 | N |

Table AIII-5a: Primary target species flight activity data from WFII VP3

| Date | Surveyor | Flight ID | Species | Num. Birds | M/F | Age | Obs. Time | Flight time (s) | Height Band 2 (Y/N) |
|------------|----------|-----------|---------|------------|-----|-----------|-----------|-----------------|---------------------|
| 26/10/2018 | DH | 6 | CU | 6 | U | U | 09:51 | 15 | N |
| 26/10/2018 | DH | 7 | L. | 4 | U | U | 10:00 | 45 | N |
| 26/10/2018 | DH | 8 | CU | 13 | U | U | 10:00 | 30 | N |
| 26/10/2018 | DH | 9 | CU | 5 | U | U | 10:51 | 30 | N |
| 29/10/2018 | DH | 16 | L. | 23 | U | U | 09:40 | 45 | N |
| 29/10/2018 | DH | 17 | L. | 23 | U | U | 09:46 | 60 | N |
| 29/10/2018 | DH | 18 | CU | 13 | U | U | 09:47 | 30 | N |
| 29/10/2018 | DH | 19 | WS | 1 | U | U | 10:43 | 30 | N |
| 29/10/2018 | DH | 20 | GP | 4 | U | U | 10:58 | 15 | N |
| 20/11/2018 | DH | 34 | GP | 7 | U | U | 14:38 | 30 | N |
| 20/11/2018 | DH | 35 | L. | 17 | U | U | 15:05 | 45 | N |
| 23/11/2018 | DH | 38 | T | 16 | U | U | 10:03 | 30 | N |
| 23/11/2018 | DH | 39 | PE | 1 | F | U | 10:08 | 15 | N |
| 23/11/2018 | DH | 40 | CU | 11 | U | U | 10:08 | 30 | N |
| 23/11/2018 | DH | 41 | CU | 1 | U | U | 10:22 | 45 | N |
| 16/01/2019 | DH | 47 | MA | 3 | M | U | 09:15 | 45 | N |
| 16/01/2019 | DH | 47 | L | 22 | U | U | 09:21 | 60 | N |
| 16/01/2019 | DH | 47 | CU | 15 | U | U | 09:47 | 30 | N |
| 16/01/2019 | DH | 47 | WS | 21 | U | 16 AD/5 J | 09:52 | 15 | N |
| 16/01/2019 | DH | 47 | WS | 4 | U | 3 AD/1 J | 09:52 | 75 | Y |
| 16/01/2019 | DH | 47 | CU | 16 | U | U | 09:53 | 90 | Y |
| 15/02/2019 | DH | 51 | CU | 34 | U | U | 14:38 | 30 | N |
| 18/02/2019 | DH/RB | 55 | CU | 38 | U | U | 13:58 | 90 | N |
| 18/02/2019 | DH/RB | 56 | CU | 36 | U | U | 14:00 | 30 | N |
| 18/02/2019 | DH/RB | 57 | CU | 1 | U | U | 14:49 | 15 | N |
| 18/02/2019 | DH/RB | 58 | CU | 14 | U | U | 15:03 | 45 | Y |
| 16/03/2019 | DH | 62 | L. | 1 | U | U | 11:35 | 30 | N |

| Date | Surveyor | Flight ID | Species | Num. Birds | M/F | Age | Obs. Time | Flight time (s) | Height Band 2 (Y/N) |
|------------|----------|-----------|---------|------------|----------|-----|-----------|-----------------|---------------------|
| 16/03/2019 | DH | 63 | MA | 4 | 1M 3F | AD | 12:38 | 45 | N |
| 16/03/2019 | DH | 64 | WN | 15 | U | AD | 13:13 | 30 | N |

Table AIII-6a: Primary target species flight activity data from WFII VP4

| Date | Surveyor | Flight ID | Species | Num. Birds | M/F | Age | Obs. Time | Flight time (s) | Height Band 2 (Y/N) |
|------------|----------|-----------|---------|------------|-----|-----|-----------|-----------------|---------------------|
| 29/10/2018 | AH | 26 | CU | 9 | A | U | 14:20 | 45 | N |
| 29/10/2018 | AH | 27 | SN | 3 | A | U | 14:34 | 45 | Y |
| 29/10/2018 | AH | 28 | SN | 2 | A | U | 14:36 | 60 | Y |
| 29/10/2018 | AH | 29 | SN | 1 | A | U | 14:49 | 45 | N |
| 29/10/2018 | AH | 30 | L. | 1 | A | U | 14:49 | 45 | N |
| 20/11/2018 | AH | 33 | PE | 1 | A | F | 13:57 | 180 | N |
| 23/11/2018 | AH | 37 | L. | 23 | U | U | 11:19 | 90 | N |
| 16/01/2019 | AH | 45 | WS | 2 | U | AD | 11:10 | 75 | N |

Secondary Target Species

Table AIII-1b: Secondary target species flight activity data from WFI VP1

| Date | Survey start | Survey end | Species | Count | 5 min period | Height (Y/N) | Band 2 |
|------------|--------------|------------|---------|-------|--------------|--------------|--------|
| 25/10/2018 | 09:45 | 12:45 | RN | 1 | 10:20 | N | |
| 29/10/2018 | 13:00 | 16:00 | RN | 1 | 13:05 | Y | |
| 22/11/2018 | 13:00:00 | 16:00 | BH | 1 | 13:05 | N | |
| 22/11/2018 | 13:00 | 16:00 | BH | 7 | 13:10 | N | |
| 22/11/2018 | 13:00:00 | 16:00 | RN | 1 | 14:30 | N | |
| 22/11/2018 | 13:00 | 16:00 | RN | 2 | 15:30 | N | |
| 06/12/2018 | 12:50 | 15:50 | RN | 2 | 13:40 | Y | |
| 06/12/2018 | 12:50 | 15:50 | RN | 2 | 14:10 | N | |
| 06/12/2018 | 12:50 | 15:50 | RN | 6 | 14:55 | N | |
| 09/12/2018 | 09:15 | 12:15 | RN | 2 | 09:50 | Y | |
| 09/12/2018 | 09:15 | 12:15 | RN | 3 | 10:35 | Y | |
| 09/12/2018 | 09:15 | 12:15 | RN | 1 | 10:40 | N | |
| 18/01/2019 | 09:30 | 12:30 | RN | 1 | | Y | |
| 18/01/2019 | 09:30 | 12:30 | RN | 1 | | Y | |
| 18/01/2019 | 09:30 | 12:30 | RN | 1 | | N | |
| 18/01/2019 | 09:30 | 12:30 | RN | 1 | | Y | |
| 15/02/2019 | 09:30 | 12:30 | RN | 2 | 11:10 | N | |
| 17/02/2019 | 14:05 | 17:05 | RN | 2 | 14:45 | Y | |
| 17/02/2019 | 14:05 | 17:05 | RN | 1 | 16:10 | N | |
| 12/03/2019 | 13:50 | 16:50 | HG | 3 | 14:30 | N | |
| 12/03/2019 | 13:50 | 16:50 | RN | 2 | 14:55 | N | |
| 12/03/2019 | 13:50 | 16:50 | RN | 2 | 15:10 | N | |
| 15/03/2019 | 14:00 | 17:00 | LB | 2 | 15:40 | Y | |

Table AIII-2b: Secondary target species flight activity data from WFI VP2

| Date | Survey start | Survey end | Species | Count | 5 min period | Height (Y/N) | Band 2 |
|------------|--------------|------------|---------|-------|--------------|--------------|--------|
| 20/11/2018 | 09:30 | 12:30 | RN | 2 | 10:40 | N | |
| 06/12/2018 | 09:30 | 12:30 | BH | 8 | 09:55 | Y | |
| 06/12/2018 | 09:30 | 12:30 | BH | 3 | 10:00 | N | |
| 06/12/2018 | 09:30 | 12:30 | RN | 2 | 10:40 | Y | |
| 06/12/2018 | 09:30 | 12:30 | RN | 1 | 10:50 | Y | |
| 06/12/2018 | 09:30 | 12:30 | RN | 2 | 11:25 | N | |
| 09/12/2018 | 12:35 | 15:35 | RN | 1 | 13:50 | N | |
| 09/12/2018 | 12:35 | 15:35 | BH | 4 | 14:45 | N | |
| 15/01/2019 | 13:00 | 16:00 | BH | 1 | 13:55 | Y | |
| 15/01/2019 | 13:00 | 16:00 | RN | 1 | 14:40 | N | |
| 15/01/2019 | 13:00 | 16:00 | RN | 3 | 13:20 | N | |
| 15/01/2019 | 13:00 | 16:00 | RN | 1 | 15:20 | Y | |
| 15/02/2019 | 13:30 | 16:55 | GB | 1 | 15:14 | N | |
| 12/03/2019 | 09:45 | 12:45 | GB | 3 | 10:53 | Y | |
| 12/03/2019 | 09:45 | 12:45 | GB | 1 | 11:00 | Y | |
| 12/03/2019 | 09:45 | 12:45 | RN | 6 | 11:15 | Y | |

Table AIII-3b: Secondary target species flight activity data from WFII VP1

| Date | Survey start | Survey end | Species | Count | 5 min period | Height (Y/N) | Band 2 |
|------------|--------------|------------|---------|-------|--------------|--------------|--------|
| 28/10/2018 | 08:50 | 11:50 | RN | 2 | 10:30 | N | |
| 22/11/2018 | 09:30 | 12:30 | RN | 3 | 10:45 | Y | |
| 22/11/2018 | 09:30 | 12:30 | BH | 10 | 11:40 | N | |
| 22/11/2018 | 09:30 | 12:30 | CM | 2 | 11:40 | N | |
| 10/12/2018 | 09:10 | 12:10 | RN | 1 | 09:40 | N | |
| 10/12/2018 | 09:10 | 12:10 | RN | 2 | 10:15 | Y | |
| 10/12/2018 | 09:10 | 12:10 | BH | 4 | 10:35 | N | |
| 10/12/2018 | 09:10 | 12:10 | RN | 1 | 10:55 | N | |
| 10/12/2018 | 09:10 | 12:10 | RN | 1 | 11:50 | N | |

| Date | Survey start | Survey end | Species | Count | 5 min period | Height (Y/N) | Band 2 |
|------------|--------------|------------|---------|-------|--------------|--------------|--------|
| 13/02/2019 | 12:50 | 15:50 | RN | 2 | 13:40 | N | |
| 13/02/2019 | 12:50 | 15:50 | RN | 1 | 14:15 | Y | |
| 12/03/2019 | 13:40 | 16:40 | GB | 1 | 16:14 | Y | |

Table AIII-4b: Secondary target species flight activity data from WFII VP2

| Date | Survey start | Survey end | Species | Count | 5 min period | Height (Y/N) | Band 2 |
|------------|--------------|------------|---------|-------|--------------|--------------|--------|
| 25/10/2018 | 13:30 | 16:30 | RN | 2 | 14:35 | Y | |
| 25/10/2018 | 13:30 | 16:30 | RN | 1 | 14:40 | N | |
| 25/10/2018 | 13:30 | 16:30 | RN | 1 | 15:05 | N | |
| 28/10/2018 | 09:00 | 12:00 | RN | 1 | 09:35 | N | |
| 28/10/2018 | N09:00 | 12:00 | RN | 3 | 10:10 | N | |
| 28/10/2018 | 09:00 | 12:00 | RN | 1 | 10:40 | N | |
| 28/10/2018 | 09:00 | 12:00 | RN | 2 | 10:55 | N | |
| 22/11/2018 | 09:30 | 12:30 | RN | 1 | 09:30 | N | |
| 22/11/2018 | 09:30 | 12:30 | RN | 2 | 09:35 | N | |
| 22/11/2018 | 09:30 | 12:30 | RN | 2 | 09:50 | Y | |
| 22/11/2018 | 09:30 | 12:30 | RN | 4 | 09:50 | N | |
| 22/11/2018 | 09:30 | 12:30 | RN | 2 | 10:20 | Y | |
| 22/11/2018 | 09:30 | 12:30 | RN | 3 | 10:20 | N | |
| 22/11/2018 | 09:30 | 12:30 | RN | 3 | 10:20 | N | |
| 22/11/2018 | 09:30 | 12:30 | RN | 1 | 11:25 | N | |
| 23/11/2018 | 13:10 | 16:10 | RN | 1 | 13:20 | N | |
| 23/11/2018 | 13:10 | 16:10 | RN | 1 | 13:30 | N | |
| 23/11/2018 | 13:10 | 16:10 | RN | 2 | 13:35 | N | |
| 23/11/2018 | 13:10 | 16:10 | RN | 1 | 13:50 | Y | |
| 23/11/2018 | 13:10 | 16:10 | RN | 4 | 14:00 | N | |
| 23/11/2018 | 13:10 | 16:10 | RN | 1 | 14:10 | N | |
| 23/11/2018 | 13:10 | 16:10 | RN | 1 | 14:25 | Y | |

| Date | Survey start | Survey end | Species | Count | 5 min period | Height (Y/N) | Band 2 |
|------------|--------------|------------|---------|-------|--------------|--------------|--------|
| 23/11/2018 | 13:10 | 16:10 | RN | 1 | 14:40 | Y | |
| 23/11/2018 | 13:10 | 16:10 | RN | 2 | 15:10 | N | |
| 23/11/2018 | 13:10 | 16:10 | RN | 2 | 15:15 | N | |
| 23/11/2018 | 13:10 | 16:10 | RN | 2 | 15:35 | Y | |
| 07/12/2018 | 09:15 | 12:15 | RN | 2 | 09:35 | Y | |
| 07/12/2018 | 09:15 | 12:15 | RN | 1 | 09:55 | Y | |
| 07/12/2018 | 09:15 | 12:15 | BH | 6 | 10:00 | N | |
| 07/12/2018 | 09:15 | 12:15 | BH | 3 | 10:10 | Y | |
| 07/12/2018 | 09:15 | 12:15 | RN | 3 | 10:30 | Y | |
| 07/12/2018 | 09:15 | 12:15 | RN | 1 | 10:50 | Y | |
| 07/12/2018 | 12:30 | 15:30 | RN | 2 | 13:15 | N | |
| 07/12/2018 | 12:30 | 15:30 | RN | 1 | 13:35 | Y | |
| 07/12/2018 | 12:30 | 15:30 | BH | 14 | 14:50 | N | |
| 07/12/2018 | 12:30 | 15:30 | RN | 2 | 15:20 | N | |
| 10/12/2018 | 12:30 | 15:30 | RN | 2 | 13:25 | Y | |
| 10/12/2018 | 12:30 | 15:30 | RN | 1 | 14:15 | N | |
| 19/01/2019 | 12:50 | 15:50 | RN | 1 | 12:55 | Y | |
| 19/01/2019 | 12:50 | 15:50 | RN | 1 | 13:20 | Y | |
| 19/01/2019 | 12:50 | 15:50 | RN | 2 | 13:35 | Y | |
| 19/01/2019 | 12:50 | 15:50 | RN | 1 | 14:00 | N | |
| 19/01/2019 | 12:50 | 15:50 | RN | 1 | 14:05 | Y | |
| 19/01/2019 | 12:50 | 15:50 | RN | 2 | 14:20 | Y | |
| 19/01/2019 | 12:50 | 15:50 | RN | 3 | 14:40 | N | |
| 19/01/2019 | 12:50 | 15:50 | RN | 1 | 14:55 | N | |
| 19/01/2019 | 12:50 | 15:50 | RN | 1 | 15:05 | N | |
| 19/01/2019 | 12:50 | 15:50 | RN | 2 | 15:30 | N | |
| 13/02/2019 | 09:15 | 12:15 | RN | 1 | 09:20 | Y | |
| 13/02/2019 | 09:15 | 12:15 | RN | 2 | 09:45 | N | |
| 13/02/2019 | 09:15 | 12:15 | RN | 1 | 09:55 | N | |

| Date | Survey start | Survey end | Species | Count | 5 min period | Height (Y/N) | Band 2 |
|------------|--------------|------------|---------|-------|--------------|--------------|--------|
| 13/02/2019 | 09:15 | 12:15 | BH | 2 | 10:30 | Y | |
| 13/02/2019 | 09:15 | 12:15 | BH | 4 | 11:40 | Y | |
| 18/02/2019 | 09:45 | 12:45 | BH | 12 | 11:14 | N | |
| 18/02/2019 | 09:45 | 12:45 | BH | 25 | 12:03 | N | |

Table AIII-5b: Secondary target species flight activity data from WFII VP3

| Date | Survey start | Survey end | Species | Count | 5 min period | Height (Y/N) | Band 2 |
|------------|--------------|------------|---------|---------|--------------|--------------|--------|
| 26/10/2018 | 09:40 | 12:40 | RN | 1 | 10:30 | N | |
| 29/10/2018 | 09:20 | 12:20 | BH | 6 | 09:40 | N | |
| 29/10/2018 | 09:20 | 12:20 | RN | 4 | 10:10 | N | |
| 20/11/2018 | 13:00 | 16:00 | RN | 1 | 14:20 | N | |
| 23/11/2018 | 09:30 | 12:30 | BH | 13 | 09:45 | N | |
| 23/11/2018 | 09:30 | 12:30 | BH | 2 | 10:15 | N | |
| 23/11/2018 | 09:30 | 12:30 | RN | 2 | 10:45 | Y | |
| 23/11/2018 | 09:30 | 12:30 | BH | 6 | 10:55 | N | |
| 23/11/2018 | 09:30 | 12:30 | BH | 2 | 11:10 | N | |
| 23/11/2018 | 09:30 | 12:30 | RN | 1 | 11:30 | N | |
| 16/01/2019 | 09:15 | 12:15 | BH | 70-80 | 09:25 | Y | |
| 16/01/2019 | 09:15 | 12:15 | BH | 1 | 09:40 | Y | |
| 16/01/2019 | 09:15 | 12:15 | BH | 120-150 | 09:50 | N | |
| 16/01/2019 | 09:15 | 12:15 | BH | 4 | 10:15 | Y | |
| 16/01/2019 | 09:15 | 12:15 | BH | 2 | 11:00 | Y | |
| 16/01/2019 | 09:15 | 12:15 | BH | 80 | 11:10 | N | |
| 16/01/2019 | 09:15 | 12:15 | BH | 7 | 12:05 | N | |
| 15/02/2019 | 13:40 | 16:40 | BH | 2 | 14:00 | Y | |
| 15/02/2019 | 13:40 | 16:40 | RN | 2 | 14:05 | Y | |
| 15/02/2019 | 13:40 | 16:40 | RN | 1 | 14:50 | Y | |
| 15/02/2019 | 13:40 | 16:40 | RN | 1 | 16:10 | Y | |
| 18/02/2019 | 13:57 | 16:57 | BH | 1 | 14:10 | Y | |

| Date | Survey start | Survey end | Species | Count | 5 min period | Height (Y/N) | Band 2 |
|------------|--------------|------------|---------|-------|--------------|--------------|--------|
| 18/02/2019 | 13:57 | 16:57 | BH | 20-25 | 14:45 | Y | |
| 18/02/2019 | 13:57 | 16:57 | RN | 1 | 14:50 | N | |
| 18/02/2019 | 13:57 | 16:57 | BH | 44 | 15:05 | Y | |
| 18/02/2019 | 13:57 | 16:57 | BH | 4 | 15:40 | N | |
| 18/02/2019 | 13:57 | 16:57 | RN | 1 | 15:40 | Y | |
| 18/02/2019 | 13:57 | 16:57 | HG | 35 | 15:40 | Y | |
| 18/02/2019 | 13:57 | 16:57 | CG | 6 | 15:35 | N | |
| 12/03/2019 | 09:55 | 12:55 | BH | 2 | 10:40 | N | |
| 12/03/2019 | 09:55 | 12:55 | BH | 14 | 10:55 | N | |
| 12/03/2019 | 09:55 | 12:55 | BH | 1 | 11:15 | N | |
| 12/03/2019 | 09:55 | 12:55 | BH | 4 | 11:25 | N | |
| 12/03/2019 | 09:55 | 12:55 | LB | 1 | 11:40 | N | |
| 12/03/2019 | 09:55 | 12:55 | BH | 2 | 12:10 | N | |
| 16/03/2019 | 11:15 | 14:15 | BH | 5 | 11:20 | N | |
| 16/03/2019 | 11:15 | 14:15 | LB | 2 | 12:35 | N | |
| 16/03/2019 | 11:15 | 14:15 | RN | 8 | 12:40 | N | |
| 16/03/2019 | 11:15 | 14:15 | BH | 11 | 13:15 | N | |
| 16/03/2019 | 11:15 | 14:15 | LB | 3 | 13:45 | N | |
| 16/03/2019 | 11:15 | 14:15 | LB | 1 | 14:05 | N | |

Table AIII-6b: Secondary target species flight activity data from WFII VP4

| Date | Survey start | Survey end | Species | Count | 5 min period | Height (Y/N) | Band 2 |
|------------|--------------|------------|---------|-------|--------------|--------------|--------|
| 20/11/2018 | 13:01 | 16:01 | RN | 3 | 13:00 | Y | |
| 20/11/2018 | 13:01 | 16:01 | RN | 2 | 13:10 | Y | |
| 20/11/2018 | 13:01 | 16:01 | RN | 5 | 13:10 | Y | |
| 18/01/2019 | 12:55 | 15:55 | RN | 1 | 14:36 | Y | |
| 18/01/2019 | 12:55 | 15:55 | RN | 2 | 14:51 | Y | |
| 19/01/2019 | 09:12 | 12:12 | RN | 1 | 11:27 | Y | |
| 17/02/2019 | 10:07 | 13:07 | BH | 70 | 11:15 | Y | |

| Date | Survey start | Survey end | Species | Count | 5 min period | Height (Y/N) | Band 2 |
|------------|--------------|------------|---------|-------|--------------|--------------|--------|
| 17/02/2019 | 10:07 | 13:07 | BH | 15 | 11:20 | Y | |
| 17/02/2019 | 10:07 | 13:07 | RN | 2 | 12:30 | Y | |
| 18/02/2019 | 09:40 | 12:40 | RN | 1 | 09:55 | N | |
| 18/02/2019 | 09:40 | 12:40 | BH | 12 | 10:40 | Y | |
| 18/02/2019 | 09:40 | 12:40 | RN | 1 | 10:50 | N | |
| 18/02/2019 | 09:40 | 12:40 | BH | 1 | 11:30 | N | |

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APPENDIX 7-2

BIRD SURVEY RESULTS – BREEDING SEASON 2019

APPENDIX 7-2

Bird Survey Report Breeding Season 2019

BIRD SURVEY REPORT

BREEDING SEASON 2019

Seven Hills Wind Farm Phase I and II

Prepared for: Seven Hills Wind Farm Ltd

SLR Ref: 501.00501.00004
Version No: REV2
May 2022



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1.0 Introduction

SLR Consulting Ireland (SLR) was commissioned by Seven Hills Wind Farm Ltd. in April 2019 to carry out a breeding bird survey programme for the proposed Seven Hills Wind Farm Phases I and II during the breeding season in 2019. There are two phases within the current iteration of the wind farm design, hereafter referred to as Wind Farm I and Wind Farm II.

1.1 Background to the Commission

Planning permission was originally granted by An Bord Pleanála (ABP) for both of these developments (Phase 1 ABP Planning Ref: PL 20.244346 / 20.239759; Phase 2 ABP Planning Ref: PL 20.244347 / 241069), it was subsequently refused following the appeal process. The main reasons for refusal of planning for each of the developments cited by An Bord Pleanála are the issues relating to the lack of certainty in relation to the impact of the proposed development on European Sites in the vicinity of the proposed developments and the qualifying interests for which those European Sites are designated.

1.2 Site Description

The dominant habitat within the boundaries of the proposed Seven Hills Wind Farm I development site is improved agricultural grassland and the site is not designated for nature conservation.

The proposed Seven Hills Wind Farm II development site is a slightly more diverse area in terms of habitat composition with dominant habitats present being improved agricultural grassland, dry calcareous grassland and scrub. The site also does not hold any designations for nature conservation.

There are several Natura 2000 designated sites relating to birds of conservation concern located in 15km of each site. Please see Table 3-1 for further details of these.

1.3 Purpose of the Report

The aim of this report is to provide robust baseline ornithological survey data for the breeding period 2019 at both phases of the proposed wind farm. These data will be used to inform the ecological impact assessment and appropriate assessment for the proposed wind farm. The assessment of potential impacts is beyond the scope of this report.

2.0 Methodology

2.1 Desk-based Review

The majority of available data on both proposed wind farm sites relates to wintering birds with limited previous data available on breeding birds. The desk-based review collated all the available information to date on the breeding birds in and around the proposed wind farm development sites. This included a review of the following EIS documents submitted as part of the planning application:

- Proposed Seven Hills Windfarm Site: Ornithological Assessment Report June 2010. Forest, Environmental Research and Services Ltd. Included as Appendix 8.1 of the EIS (FERS, 2010); and
- Proposed Seven Hills Wind Farm (Phase II): Ornithological Assessment Report July 2011. Forest, Environmental Research and Services Ltd. Included as Appendix 8.1 of the EIS (FERS, 2011).

The websites of the National Parks and Wildlife Service (NPWS) www.npws.ie and the National Biodiversity Data Centre (NBDC) <http://maps.biodiversityireland.ie/#/Map> were accessed for information on sites designated for nature conservation.

2.2 Field Surveys

The scope of breeding bird surveys for the proposed wind farm is based on recommendations given in Scottish Natural Heritage (SNH) 2017¹. This survey methods guidance is recognised as standard best practice guidance through the UK and Ireland for surveying birds to inform impact assessment of onshore wind farms.

2.2.1 Field Survey Team: Evidence of Technical Competence and Experience

Sarah Ingham (SI) – Project Manager and Lead Ornithologist

Sarah is a Senior Ecologist with SLR and holds a BSc in Zoology from Anglia Ruskin University, Cambridge, UK and an MSc in Biodiversity and Conservation from Trinity College Dublin. She is an Associate member of the Chartered Institute of Ecology and Environmental Management (CIEEM). Sarah is a highly skilled and experienced bird surveyor with 11 years' post graduate experience as a professional consultant ecologist/ornithologist. Sarah managed this project through liaison with the client, coordination of the survey team, supervision of the health and safety of the team, carrying out various bird surveys onsite throughout the survey season, collating, quality controlling and assessing the survey data and writing this report.

Daniel Hulmes (DH) – Bird Surveyor

Daniel is a Senior Field Ornithologist and Terrestrial Ecologist. He has worked on a wide range of projects involving the survey and monitoring of birds in the UK, Ireland and internationally. Furthermore, as part of his previous work as an Ecologist, he gained experience in managing projects which included a large amount of report writing, survey planning and client interaction.

Supervised by Sarah Ingham, Daniel assisted with bird surveys at Seven Hills Wind Farm during the breeding 2019 survey season.

Daniel Alexander (DA) – Bird Surveyor

Daniel has been working as a field surveyor on numerous projects for the last ten years. During this time, he has gained a breadth of experience conducting, planning, and supporting ecological surveys. Daniel has expertise in undertaking bird surveys, both breeding and wintering, and in recent years has been responsible for monitoring the breeding bird assemblage of a large ecological restoration project as part of the Mersey Gateway Project in

¹ SNH (2017) *Recommended bird survey methods to inform impact assessment of onshore wind farms*. Version 2.

the UK. During this work, Daniel gained experience in drafting ecological reports and digitising data for map creation.

Daniel now works for SLR as a Project Ecologist. Supervised by Sarah Ingham, Daniel assisted with bird surveys at Seven Hills Wind Farm during the breeding 2019 survey season.

Ciaran Cronin PDip. (CC) – Bird Surveyor

Ciaran Cronin is a professional ecologist with over 30 years' experience in identifying animals and plants in Ireland and the UK. Since 2008 he has operated as a freelance ecological consultant, undertaking fieldwork to inform Ecological Impact Assessments. Ciaran possesses a wide ranging and very significant expertise in applying scientific methods, conducting surveys and reporting using best practice and an evidence-based approach.

Ciaran worked as an independent sub-consultant bird surveyor on this project.

2.2.2 Flight Activity Surveys

Vantage point (VP) locations were the same as those used in winter 2018-19, which were initially chosen based on locations used during previous surveys (see Section 3.1). The adequacy of these VPs was checked by carrying out a desk-based viewshed analysis using a bespoke GIS tool for calculating the visible area from each vantage point (VP). The Zones of Theoretical Visibility (ZTV) from each VP were calculated using ArcMAP 10.5.1 Spatial Analyst. The ZTVs were calculated with a surface offset of 30m and from a viewing height of 1.8m above ground level. The terrain model was derived from EU-DEM data with a vertical accuracy of ± 7 m. VP locations and viewing arcs are shown in Figure 1 and VP viewsheds are shown in Figure 2. The proposed site layout is also shown in Figures 1 and 2.

A total of 36 hours of watches were undertaken at each of the six VP locations during the breeding season (monthly visits April - September inclusive) in 2019. This equates to a total of six hours per VP per month. The VP survey effort undertaken during the breeding season of 2019 is given below in Table 2-1.

Table 2-1: VP survey effort undertaken for VP at the Seven Hills Wind Farm I and II sites April 2019 to September 2019 (hrs : mins)

| Month | WFI VP1 | WFI VP2 | WFII VP1 | WFII VP2 | WFII VP3 | WFII VP4 |
|------------------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| April | 6:00 | 6:00 | 6:00 | 6:00 | 6:00 | 6:00 |
| May | 6:00 | 6:00 | 6:00 | 6:00 | 6:00 | 6:00 |
| June | 6:00 | 6:00 | 6:00 | 6:00 | 6:00 | 6:00 |
| July | 6:00 | 6:00 | 6:00 | 6:00 | 6:00 | 6:00 |
| August | 6:00 | 6:00 | 6:00 | 6:00 | 6:00 | 6:00 |
| September | 6:00 | 6:00 | 6:00 | 6:00 | 6:00 | 6:00 |
| Total hrs | 36:00 | 36:00 | 36:00 | 36:00 | 36:00 | 36:00 |
| VP grid locations (Figure 1) | 587337 E 748665 N | 585834 E 746017 N | 588967 E 745061 N | 587372 E 743512 N | 590643 E 743279 N | 592160 E 743701 N |

It is good practice to ensure that where possible each monthly six-hour survey period should be split over more than a single day and spread across the day. As such, the six-hour survey periods were divided into three-hour blocks which were alternated across consecutive days e.g. on day 1, VP1 would be completed in the morning and VP2 would be completed in the afternoon and on day 2, VP2 would be completed in the morning and VP1 in the afternoon. In this way, it was possible to glean a clear picture of bird movements from each VP across the diurnal

period. Details of survey dates, times and observers are provided in Appendix I and a record of weather conditions during surveys is provided in Appendix II.

VP watches aimed to quantify the flight activity of primary and secondary target species (as defined in Section 2.2.2.1) within the study area.

The main purpose of VP watches is to collect data on primary target species that will enable estimates to be made of:

- The time spent flying over the site;
- The relative use by birds of different parts of the site;
- The proportion of flying time spent within the provisional upper and lower risk height limits as determined by the potential rotor diameter and rotor hub height; and
- Ultimately, the analysis of the potential risk of collision of birds with rotating turbines.

For each primary target species observation, the following details were recorded:

- Time of observation;
- Duration of flying bout;
- Species, age and sex (where determinable);
- Time spent within each height band and;
- Notes on observation.

In the absence of detailed information regarding turbine specifications at the time of undertaking the surveys, the recording height bands were determined based on the turbine specifications included in the previous application (tip height 135m, lowest rotor swept height 35m) plus a bit extra to allow some flexibility. Flight heights were therefore attributed to three distinct height bands as follows:

- 1 = < 30m (below the likely rotor swept area);
- 2 = 30m to 150m (the likely rotor swept area);
- 3 = > 150m (above the likely rotor swept area).

In addition, a summary of observations of secondary target species (see Section 2.2.2.1) was recorded at the end of each five-minute period during each VP watch to provide an index of flight activity for secondary target species within the site, in accordance with current SNH guidance. Data collected on secondary species included:

- The five-minute period start and end time;
- Species;
- Number of birds observed;
- If flying, the height band in which birds were observed flying;
- Whether birds were observed onsite, in the 500m buffer or beyond;
- Flight behaviour; and
- Notes on observation.

2.2.2.1 Target Species

Target species for the surveys were defined by legal and/or conservation status and vulnerability to impacts caused by wind turbines, as defined in SNH Guidance (2017).

Primary Target Species

The list of primary target species was limited to species upon which effects are most likely to be potentially significant in EIA terms, thereby enabling recording to focus on the species of greatest importance.

SNH guidelines state that “in most circumstances the target species will be limited to those species which are afforded a higher level of legislative protection.” Kestrel, buzzard and sparrowhawk are not subject to a higher level of legislative protection than any other bird species and were therefore not recorded as primary target species during the 2019 breeding season surveys.

Furthermore, primary target species were specifically limited to species upon which effects are most likely to be potentially significant in EIA terms, e.g. breeding species forming qualifying features for nearby SPAs or species listed on Annex I of the Birds Directive.. This enabled recording to focus on the species of greatest importance without the distraction of having to record detailed flight data for a larger number of more common species. A precautionary approach was taken to the inclusion of Annex 1 species as primary target species with all Annex 1 raptor/owl species with any realistic potential to be present included as primary target species, although it was recognised that the likelihood of some of these species breeding in the vicinity of the sites was very low. As such, the primary target species for these VP surveys included the following bird species:

- peregrine falcon *Falco peregrinus*;
- hen harrier *Circus cyaneus*;
- merlin *Falco columbarius*;
- short-eared owl *Asio flammeus*;
- golden plover *Pluvialis apricaria*; and
- curlew *Numenius arquata*.

Although curlew is not listed under Annex I of the Birds Directive, they are Red-listed in Ireland under the Birds of Conservation Concern 2014-2019 (Colhoun and Cummins, 2013) as numbers of breeding pairs within the Irish landscape have suffered a serious decline in recent years. As such, any observations of curlew were also recorded as a target species during the summer months.

Secondary Target Species

Secondary target species included:

- Any other wildfowl and wader species;
- Buzzard *Buteo buteo*;
- Sparrowhawk *Accipiter nisus*;
- Kestrel *Falco tinnunculus*;
- Raven *Corvus corax*;
- Grey heron *Ardea cinerea*;
- Cormorant *Phalacrocorax carbo*; and
- Gulls *Larus sp.*

2.2.3 Breeding Wader Surveys

Breeding wader surveys followed methodology described in O’Brien and Smith (1992). The survey involved a walked transect to which covered all habitat potentially suitable for breeding waders within the wind farm site.

Following a desktop assessment, it was determined that given that Wind Farm I is dominated by improved agricultural grassland habitat, Wind Farm I is not suitable for breeding waders and breeding wader surveys were therefore not undertaken there. Conversely, parts of Wind Farm II comprises a mosaic of wet grassland and rough, semi-improved agricultural grassland which is more suited to breeding waders. As such, a walked transect was undertaken covering potentially suitable habitat within the Wind Farm II site and a 500m buffer zone. The same transect was repeated three times across the 2019 breeding season on 19 April, 16 May and 26 June.

The location, movement and behaviour of all wader species were recorded onto the field maps using standard BTO species codes. The following criteria was recorded for each species:

- Lapwing *Vanellus vanellus* – the total numbers of birds seen from the transect;

- Snipe *Gallinago gallinago* – the number of drumming plus chipping birds heard or seen from the transect; and
- Other species – the number of pairs (where 'pairs' = (paired individuals/2), displaying birds, nests or broods and other single birds not in flocks).

Please see Figure 4 for an outline of the walked transect and the results of the surveys. Metadata relating to these surveys are available in Appendices I and II.

2.2.4 Breeding Raptor Surveys

The survey methodology for breeding raptors used a driven transect with regular stops, to carry out watches of suitable habitat from appropriate viewpoints to identify potential nesting territories. A total of seven stops were made along the driven transect around both wind farm sites overlooking potentially suitable breeding habitat.

A driven survey was used due to limitations to access to third party land within the 2 km buffer zone and the availability of a good road network in the vicinity of the site. It is also noted that suitable breeding habitat for Annex 1 raptors within the sites and 2 km buffer is very limited and visibility from the survey route was sufficient to cover the vast majority of potentially suitable breeding habitat within the survey area.

Suitable breeding habitat differs for each raptor species (Hardey *et al.*, 2013) and was limited within the survey area. Table 2-2 presents the habitats within the 2km buffer zone of the sites and the locations of these, which were focused on during the breeding raptor survey for each species.

Table 2-2: Potentially suitable habitats for breeding raptors within the study area, the viewpoints the habitats can be seen from and the target raptor species which could be expected within these habitats.

| Raptor Viewpoint No. (RVP) | Habitat type | Target raptor species |
|----------------------------|--|--|
| RVP1 | Mixed deciduous woodland | Buzzard, sparrowhawk |
| RVP2; RVP3 | Lowland heather moor | Hen harrier, merlin |
| RVP3; RVP5 | Wet grassland with dense rush or bracken cover | Hen harrier |
| RVP6 | Mature forestry plantation | Buzzard, sparrowhawk |
| RVP4 | Quarries | Peregrine falcon, kestrel |
| RVP7 | Rocky outcrops | Peregrine falcon, merlin, kestrel, buzzard |

It is noted that the Cam Quarry lies adjacent to the Wind Farm II site to the north. Although the quarry faces could not be viewed from the driven transect, the quarry could be partially viewed from the R363 road to the north (RVP4). It is also noted that the airspace above the quarry lies within the viewshed of WFII VP1. If breeding peregrine falcons were present in the quarry, it is therefore expected that evidence would have been recorded during the breeding raptor survey and/or the VP surveys.

Survey timings followed those in Hardey *et al.* (2013), as per SNH guidelines. This survey was repeated along the same route monthly from April to July inclusive. The location, movement and behaviour of all raptor species were recorded onto the field maps using standard BTO species codes.

The outline of the driven survey route together with the locations of the viewpoints and the results of the surveys are presented in Figure 5. Please see Appendices I and II for metadata relating to these surveys.

2.3 Survey Limitations

As shown in Figure 2, a small area at the western end of Wind Farm I and two small areas within the 500m buffer zone for Wind Farm II were not within the 2km viewsheds from any of the VPs. All proposed turbine locations, plus the vast majority of the 500m buffer were visible from at least one VP however, and the gaps in coverage are therefore not considered to represent a significant limitation.

The majority of vantage point surveys were undertaken in optimal weather conditions. However, there were 15 hours out of the total of 216 during which the visibility was recorded as moderate i.e. 1-3km and two hours in which the visibility, at least in part, was recorded as poor (<1km but greater than 500m when survey would have been suspended). This comprises just 7.9% of the total survey season and in most cases all of the relevant 2km viewing arc was visible. As such, this does not significantly affect the validity of the data collected.

3.0 Results

3.1 Desk-based Review

3.1.1 Natura 2000 Sites

There are no Special Protection Areas (SPA) within the proposed wind farm sites. However, there are a total of five SPAs within a 15 km² radius of the survey area.

The five SPAs within 15km are shown in Table 3-1, which also shows the species of special conservation interest (SSCI) for each site. The majority of SSCIs for which these sites are designated are wintering species. As such, for the purposes of this report which deals specifically with breeding birds, SSCI which are only present during the wintering season have been excluded from Table 3-1.

Corncrake *Crex crex* is a SSCI of the Middle Shannon Callows SPA. Upon their arrival to suitable breeding habitat in Ireland following migration from sub-Saharan Africa, corncrake then become sedentary and site faithful, rarely if ever, moving from the habitat they have chosen for breeding (Duffy, 2018). As such, given that the Middle Shannon Callows SPA is situated 11.4km from the proposed wind farm sites, dedicated corncrake surveys were not deemed necessary. There is also a lack of suitable habitat for corncrake (hay meadows) within the proposed wind farm sites.

Table 3-1: SPAs within 15km of Seven Hills Wind Farms I and II and their qualifying interests (species present during the breeding period only)

| Site Name | Site Code | Distance/ Direction from Site Boundary | Features of Interest |
|----------------------------|-----------|--|--|
| Lough Croan Turlough SPA | 004139 | 1.5km north | <ul style="list-style-type: none"> Shoveler <i>Anas clypeata</i> Wetland and Waterbirds |
| River Suck Callows SPA | 004097 | 1.7km west | <ul style="list-style-type: none"> Wetland and Waterbirds |
| Four Roads Turlough SPA | 004140 | 1.9km north | <ul style="list-style-type: none"> Wetland and Waterbirds |
| Lough Ree SPA | 004064 | 8km east | <ul style="list-style-type: none"> Tufted Duck <i>Aythya fuligula</i> Common Scoter <i>Melanitta nigra</i> Common Tern <i>Sterna hirundo</i> Black-headed Gull <i>Chroicocephalus ridibundus</i> Wetland and Waterbirds |
| Middle Shannon Callows SPA | 004096 | 11.4km southeast | <ul style="list-style-type: none"> Corncrake <i>Crex crex</i> Lapwing Black-tailed Godwit <i>Limosa limosa</i> Wetland and Waterbirds |

3.1.2 Existing Site Data

To our knowledge, the only existing breeding season bird survey data available relating to the two proposed wind farm sites were collected on six site visits during the period April to June 2009 (FERS, 2010; FERS, 2011). Surveys

² 15 km is the distance typically applied when considering wildfowl ranging from roost sites to foraging sites.

involved a walkover survey on each date, although precise survey area boundaries are unclear. The ornithological assessment for Phase I reports that 28 species were recorded within the (Phase I) wind farm site and buffer zone (the size of the buffer zone is not stated), of which 21 showed evidence of breeding. These included four species defined as 'important' species³, namely black-headed gull (red-listed), swallow *Hirundo rustica*, house sparrow *Passer domesticus* and starling *Sturnus vulgaris* (each amber-listed). Black-headed gull was not recorded as breeding within the site or buffer zone.

The ornithological assessment for Phase II reports that 57 species were recorded within the 'greater survey area', of which 53 showed evidence of breeding. The greater survey area is not defined but is thought to include both wind farm sites plus some of the surrounding area. 18 'important' species were recorded within the greater survey area including the red-listed species curlew, redshank *Tringa totanus* and black-headed gull and the amber listed mute swan *Cygnus olor*, teal *Anas crecca*, tufted duck, coot *Fulica atra*, snipe and kestrel. Of these, mute swan, teal, coot, curlew, snipe and redshank (a pair at Lough Feacle) showed evidence of breeding. A further nine amber listed passerine species were also recorded within the greater survey area.

3.2 Flight Activity Surveys

Flight lines of target species recorded at both wind farm sites throughout the breeding season are mapped in Figure 3.

3.2.1 Primary Target Species

3.2.1.1 Wind Farm I: Vantage Points 1 and 2

In total, one primary target species was recorded flying through the site during the six-month survey period. The target species is shown in Table 3-2 together with the total number of birds seen from both VPs and the total number of flights recorded.

Table 3-2: Target species and flights recorded from WFI VPs 1 and 2 - April to September 2019

| Target Species | Total number of birds recorded | Total number of flights recorded |
|------------------|--------------------------------|----------------------------------|
| Peregrine falcon | 1 | 1 |
| Total | 1 | 1 |

A single sighting of peregrine falcon was the only one target species recorded at Wind Farm 1 throughout the 2019 breeding season. This male bird spent a total of 45 seconds of its flight in the likely rotor swept area of 30m to 150m.

3.2.1.2 Wind Farm II: Vantage Points 1 – 4

In total, two primary target species were recorded flying through the site during the six-month survey period. The primary target species are shown in Table 3-3 together with the total number of birds seen from both VPs and the total number of flights recorded.

³ i.e. species listed on the red or amber lists of birds of conservation concern (Birdwatch Ireland) in place at that time.

Table 3-3: Primary target species and flights recorded from WFII VP1 – VP4 – April to September 2019

| Target Species | Total number of birds recorded | Total number of flights recorded |
|------------------|--------------------------------|----------------------------------|
| Peregrine falcon | 2 | 2 |
| Curlew | 5 | 2 |
| Total | 7 | 4 |

The two sightings of peregrine were recorded in July and August, which is late in the peregrine breeding season and there were no sightings prior to this. No evidence indicative of breeding peregrine was recorded during the flight activity surveys and the levels of activity recorded during the flight activity surveys would be expected to be much greater if peregrine had bred within the quarry adjacent to VP1 in 2019. Both birds were recorded flying below the CRZ.

There was a single sighting of four curlew on passage through Wind Farm II in April and a further sighting of one curlew passing through the site in September. There were no further sightings of this species during the breeding season, suggesting that these birds were non-breeders (or birds which bred elsewhere) moving between waterbodies in the vicinity of the site.

3.2.2 Secondary Target Species

Summary details of the nine secondary target species recorded throughout the season at Wind Farm I are presented in Table 3-4.

Raven was the most abundantly recorded secondary target species at Wind Farm I with 30 observations and a total of 54 birds. The majority (76%) of these sightings were recorded from VP1 to the east of which this species was observed nesting in a stand of Scots pine.

In addition to peregrine, two secondary raptor species were recorded at Wind Farm I during the breeding season, namely buzzard and sparrowhawk. Five of the seven (71%) sightings of secondary raptor species recorded at Wind Farm I were observed at heights of less than 30m or greater than 150m, thus outside the likely rotor swept area.

Four species of gull were recorded through the season (black-headed gull *Chroicocephalus ridibundus*, lesser black-backed gull *Larus fuscus*, herring gull *Larus argentatus* and common gull *Larus canus*), with lesser black-backed gull being the most recorded (nine observations of 15 birds). There was a single observation of 15 lapwing (*Vanellus vanellus*) on passage through the site in September below the likely rotor swept area.

Table 3-4: Secondary target species and flights recorded from WFI VPs 1 and 2 - April to September 2019

| Target Species | Total number of birds recorded | Total number of flights recorded |
|--------------------------|--------------------------------|----------------------------------|
| Black-headed gull | 2 | 1 |
| Lesser black-backed gull | 15 | 9 |
| Herring gull | 5 | 4 |
| Common gull | 4 | 1 |
| Lapwing | 15 | 1 |
| Grey heron | 1 | 1 |

| Target Species | Total number of birds recorded | Total number of flights recorded |
|----------------|--------------------------------|----------------------------------|
| Buzzard | 5 | 5 |
| Sparrowhawk | 2 | 2 |
| Raven | 54 | 30 |
| Total | 89 | 53 |

Similar to Wind Farm I, raven was the most abundantly recorded secondary species at Wind Farm II with 95 observations of 309 individuals. Flocks of between two and 18 birds were recorded as on passage between breeding sites, with several juveniles recorded within these flocks. This suggests that raven bred in the vicinity of the site.

There was a total of 12 observations of buzzard (n=13), 10 of kestrel and three of sparrowhawk recorded at Wind Farm II. These birds were either on passage through the site or hunting onsite with 98% of observation recorded as being below the likely rotor swept area.

There were three species of gull recorded through the season (black-headed gull, lesser black-backed gull and herring gull), with lesser black-backed being the most abundant gull (52 observations of 79 birds). Other secondary species recorded during the breeding season vantage point surveys at Wind Farm II were snipe *Gallinago gallinago* (n = 1), mallard *Anas platyrhynchos* (n = 18), common scoter *Melanitta nigra* (n = 1) and grey heron *Ardea cinerea* (n = 6).

Summary details of the 11 secondary target species recorded throughout the season at Wind Farm II are presented in Table 3-5.

Table 3-5: Secondary target species and flights recorded from WFII VPs 1 - 4 - April to September 2019

| Target Species | Total number of birds recorded | Total number of flights recorded |
|--------------------------|--------------------------------|----------------------------------|
| Black-headed gull | 47 | 24 |
| Lesser black-backed gull | 79 | 52 |
| Herring gull | 9 | 8 |
| Common scoter | 1 | 1 |
| Mallard | 18 | 2 |
| Grey heron | 6 | 6 |
| Snipe | 1 | 1 |
| Buzzard | 13 | 12 |
| Kestrel | 10 | 10 |
| Sparrowhawk | 3 | 3 |
| Raven | 309 | 95 |
| Total | 496 | 214 |

3.2.3 Breeding Wader Surveys

The wader walkover surveys at WF2 yielded very few records of possible breeding waders onsite with snipe being the only species observed, a total of four times within the 500m buffer of the site. Each of these sightings of snipe were recorded as the surveyors flushed the birds from their roosts within suitable breeding habitat. Given that these birds were flushed from suitable breeding habitat, it is possible that snipe were breeding within the vicinity, although no definitive behaviours indicative of breeding such as drumming or display flights, were recorded during the observations of snipe.

A single lapwing was observed from the transect, however, it was to the south of the 500m buffer and thus, outside the survey area.

Please see Figure 4 for locations of recorded sightings.

3.2.4 Breeding Raptor Surveys

A total of three species of raptor was recorded during the surveys. There was no raptor activity recorded during the April survey.

The majority of activity for the season was recorded during the May survey with two sightings of two pairs of buzzard recorded within the 2 km buffer to the north and northwest of WF1. The individuals in each pair were observed interacting with each other and engaging in courtship displays suggesting possible breeding within this area. The remaining sightings recorded during May were of single individual buzzard (n = 1), kestrel (n = 4) and sparrowhawk (n = 2) engaging in foraging and hunting behaviour.

Raptor activity in June was low with two sightings of kestrel, one of sparrowhawk and another sighting of a pair of buzzard engaged in display behaviour. There were no sightings of raptors during the survey in July.

There were no sightings of peregrine during these breeding raptor surveys throughout the entire 2019 breeding season.

Please see Figure 5 for locations of recorded sightings.

4.0 Conclusions

Records of primary target species at both wind farm sites during the 2019 breeding season were low, with peregrine falcon being the Annex I bird species recorded (three flights recorded at Wind Farms I and II combined). Curlew was the only other primary target species observed with two flights, of four birds and one bird, recorded at Wind Farm II.

The targeted breeding raptor surveys throughout the season yielded similarly low results. There were two probable buzzard breeding territories were identified to the north of Wind Farm I where two pairs of buzzard were observed in courtship display during May surveys. The absence of peregrine records during these surveys and the relatively low number of peregrine flights recorded during VP surveys suggest that breeding did not occur at the adjacent active quarry (or elsewhere within the 2km survey area) during the 2019 breeding season.

The four records of snipe during the walked breeding wader surveys showed no definitive behaviours indicative of breeding such as drumming or display flights. Although these birds were recorded within suitable breeding habitat, breeding territories could not be confirmed.

Direct comparison of survey results from 2019 with previous breeding season survey results from 2009 is difficult due to potential differences in the areas surveyed and the survey methods used. It is notable however that curlew, snipe and redshank were all recorded breeding within the 'greater survey area' in 2009 whereas there were only records for curlew (non-breeding) and snipe (in suitable habitat but no evidence of breeding recorded) in 2019 and no records of redshank in 2019. This could either indicate a decline in breeding wader populations since 2009 or it could simply reflect differences in the survey areas between years. No Annex I raptors were recorded breeding during either the surveys in 2009 or the surveys in 2019.

5.0 References

Colhoun and Cummins (2013) Birds of Conservation Concern in Ireland 2014–2019. *Irish Birds* 9: 523-544

Duffy, M. (2018) The Corncrake Conservation Project Annual Report 2018. NPWS.

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O'Brien, M. and Smith, K. W. (1992) Changes in the status of waders breeding on wet lowland grasslands in England and Wales between 1982 and 1989, *Bird Study*, 39:3, 165-176

Scottish Natural Heritage (2017) Recommended bird survey methods to inform impact assessment of onshore wind farms. Version 2. SNH Guidance. SNH, Battleby

6.0 Figures

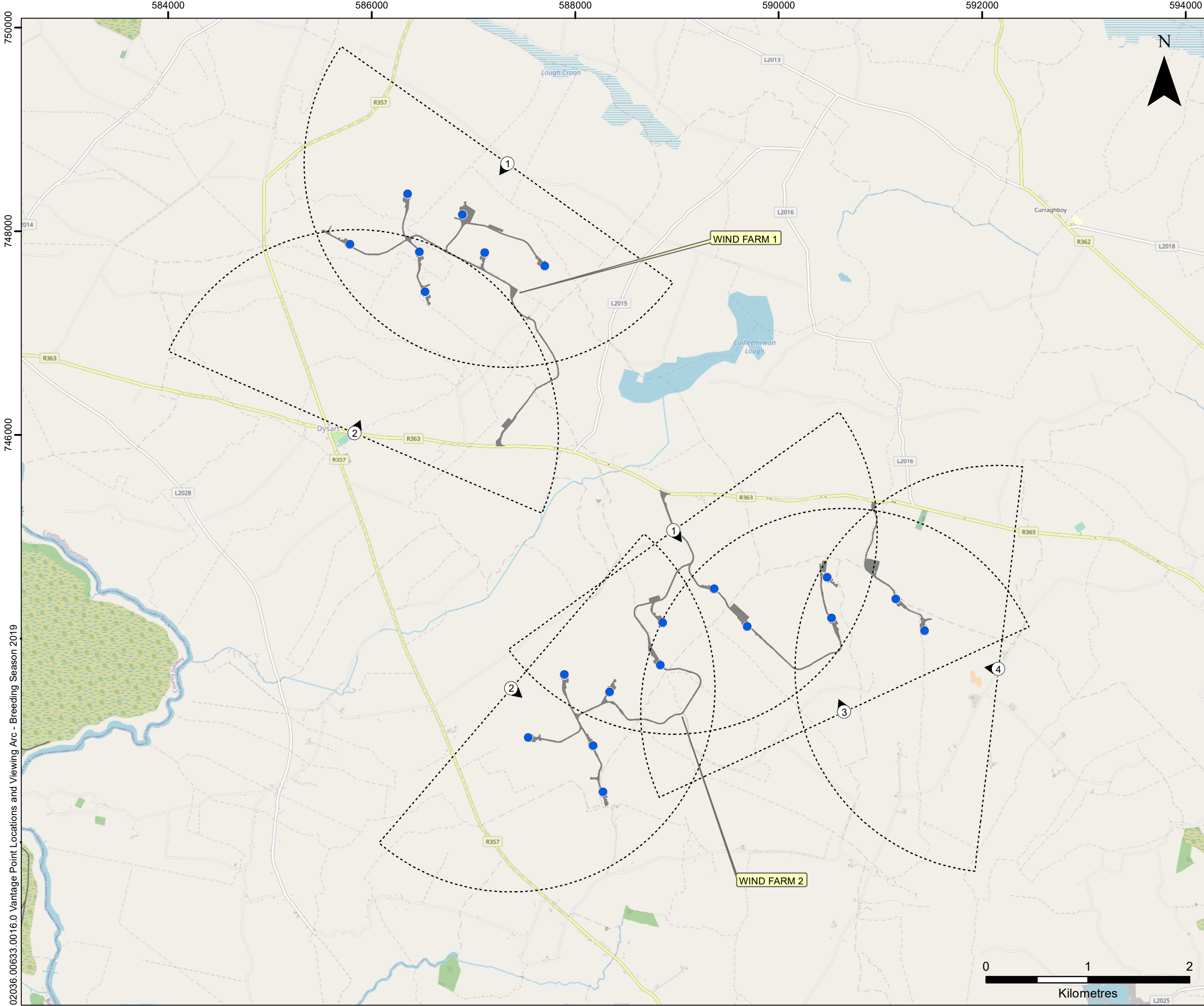
Figure 1: Vantage Points and Viewing Arcs

Figure 2: Viewsheds from Vantage Points Overlooking Wind Farms I and II – 30m Offset

Figure 3: Vantage Point Survey Results – Breeding Season 2019

Figure 4: Breeding Wader Walked Transect Survey Results – Breeding Season 2019

Figure 5: Breeding Raptor Driven Transect Survey Results – Breeding Season 2019



LEGEND

- Turbine Location
- Site Infrastructure
- Vantage Point
- Vantage Points 2km View Arc

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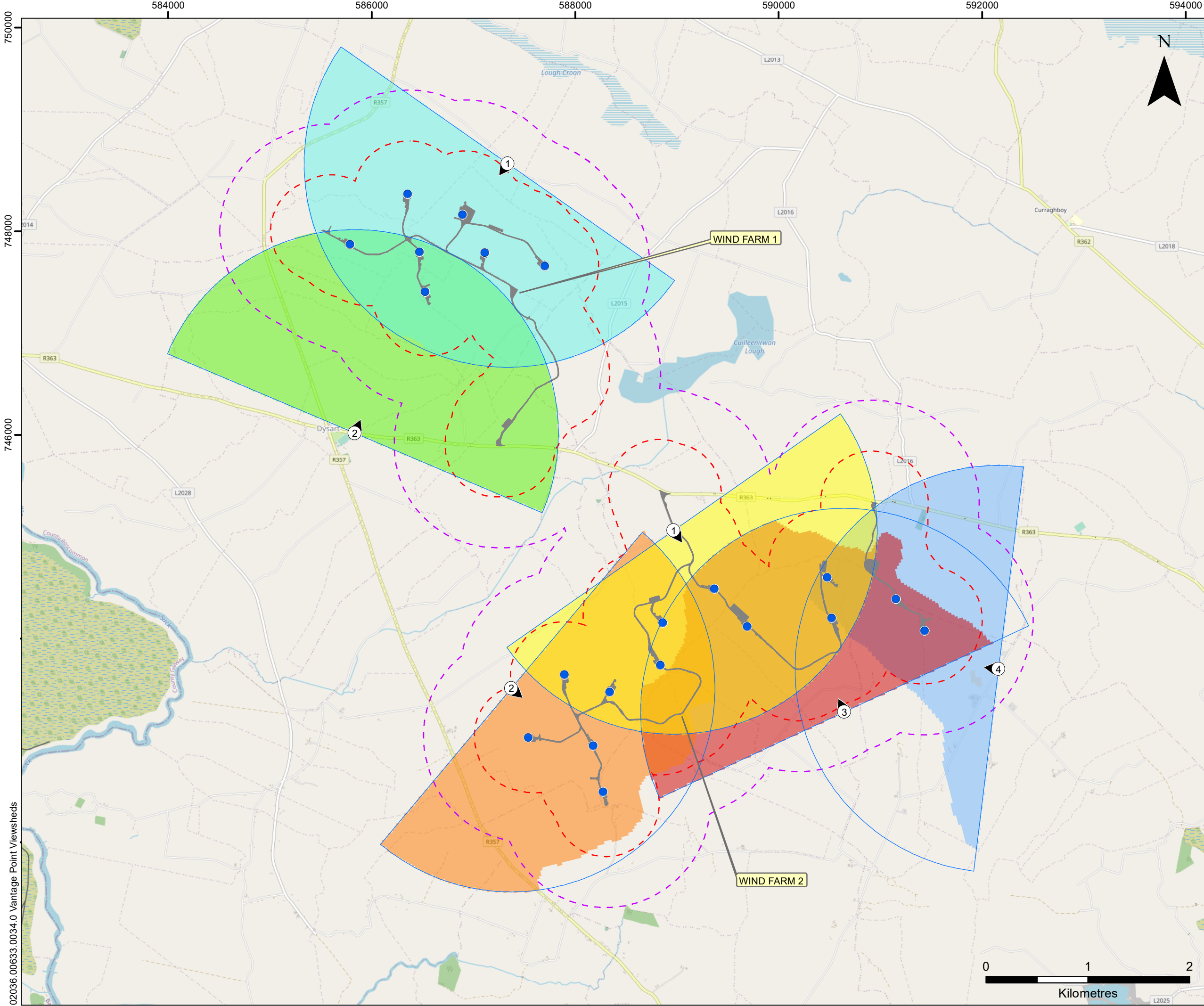
SEVEN HILLS WIND FARM SUMMER BREEDING SEASON REPORT 2019

FIGURE 1 - VANTAGE POINT LOCATIONS AND VIEWING ARCS

Scale
1:35,000 @ A3

Date
MAY 2022

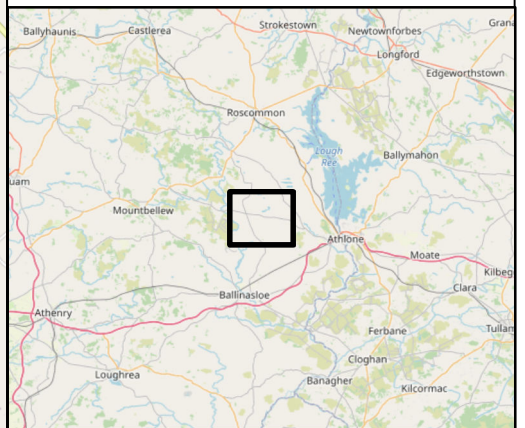
02036.00633.0016.0 Vantage Point Locations and Viewing Arc - Breeding Season 2019




NOTE

1. The Zones of Theoretical Visibility (ZTV) was calculated using ArcMAP 10.5.1 Spatial Analyst. The ZTV is calculated with a surface offset 30m & from a viewing height of 1.8m above ground level. The terrain model is derived from EU-DEM data with a vertical accuracy of $\pm 7m$.

- LEGEND**
- Turbine Location
 - Site Infrastructure
 - Site Infrastructure 500 m Buffer
 - Site Infrastructure 1 km Buffer
 - Vantage Point
 - Distance of Viewing Arc
 - Theoretical Visibility from Wind Farm 1 VP1
 - Theoretical Visibility from Wind Farm 1 VP2
 - Theoretical Visibility from Wind Farm 2 VP1
 - Theoretical Visibility from Wind Farm 2 VP2
 - Theoretical Visibility from Wind Farm 2 VP3
 - Theoretical Visibility from Wind Farm 2 VP4



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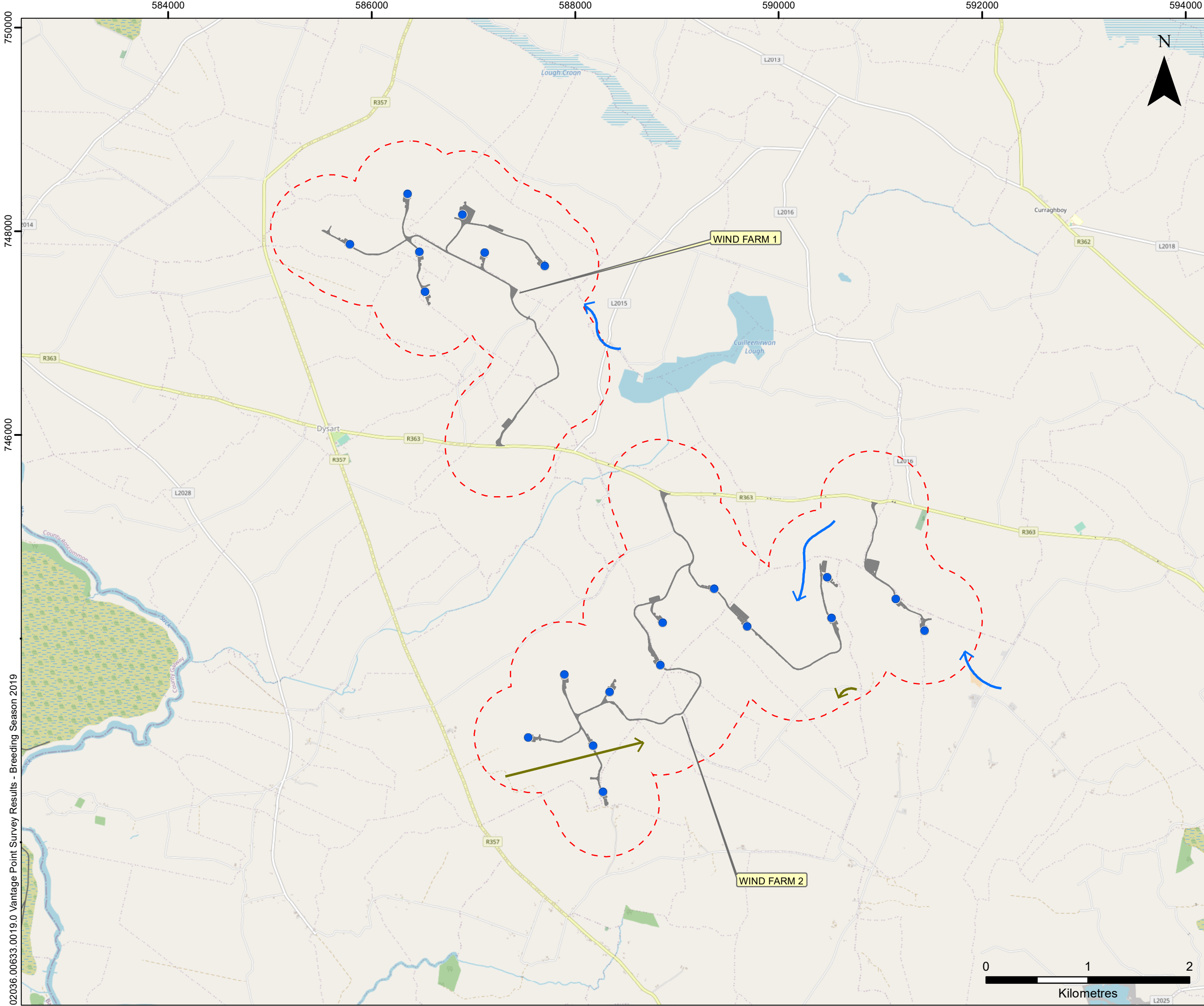
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FIGURE 2 - VANTAGE POINT VIEWSHEDS

Scale 1:35,000 @ A3 Date MAY 2022

02036.00633.0034.0 Vantage Point Viewsheds



LEGEND

- Turbine Location
- Site Infrastructure
- Site Infrastructure 500 m Buffer

Species Recorded - 2019

- Curlew
- Peregrine

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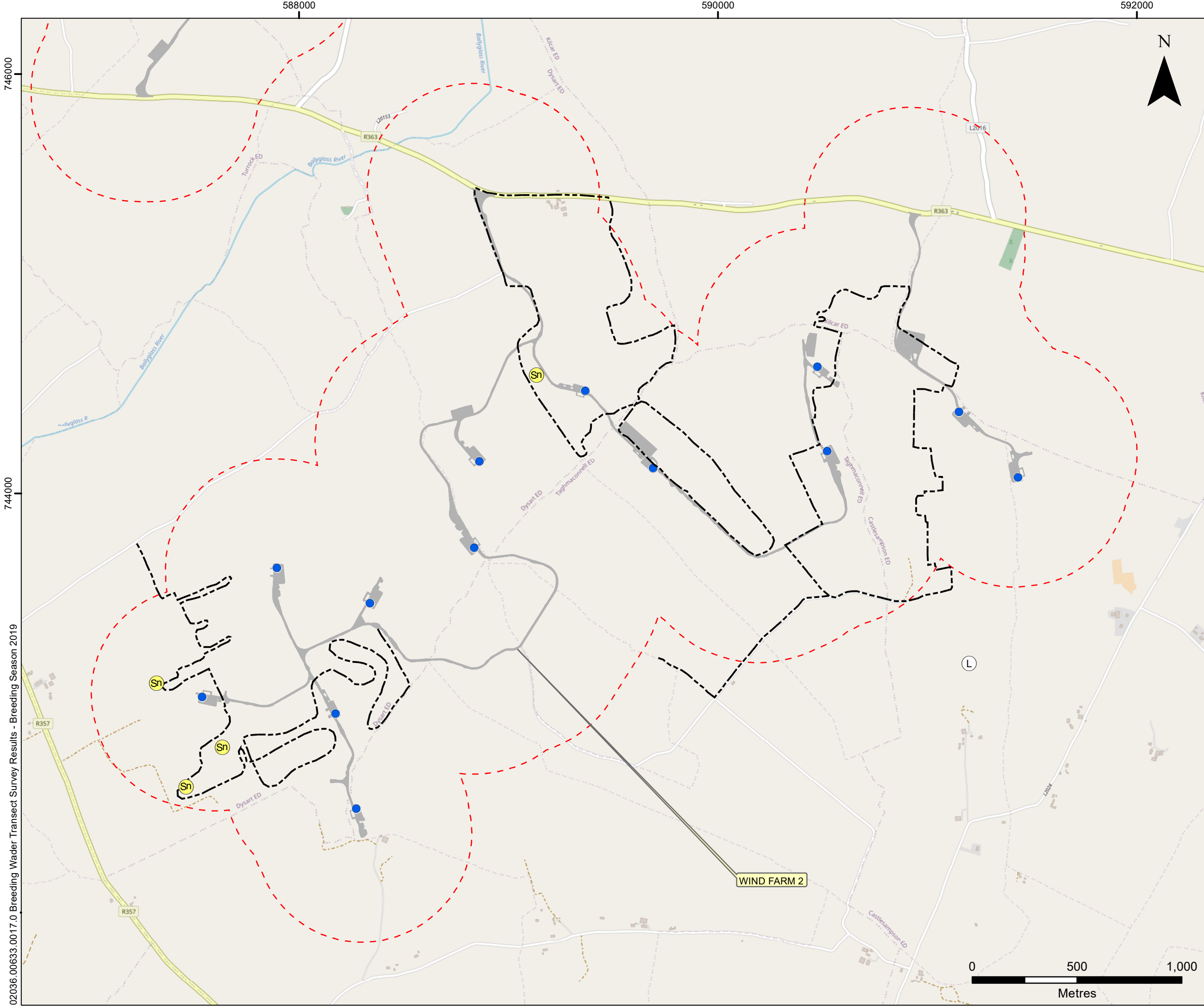
SEVEN HILLS WIND FARM SUMMER BREEDING SEASON REPORT 2019

FIGURE 3 - VANTAGE POINT SURVEY RESULTS

Scale
1:35,000 @ A3

Date
MAY 2022

02036.00633.0019.0 Vantage Point Survey Results - Breeding Season 2019



LEGEND

- Turbine Location
- Site Infrastructure
- Site Infrastructure 500 m Buffer
- Walked Transect

Breeding Wader Species

- Lapwing
- Snipe

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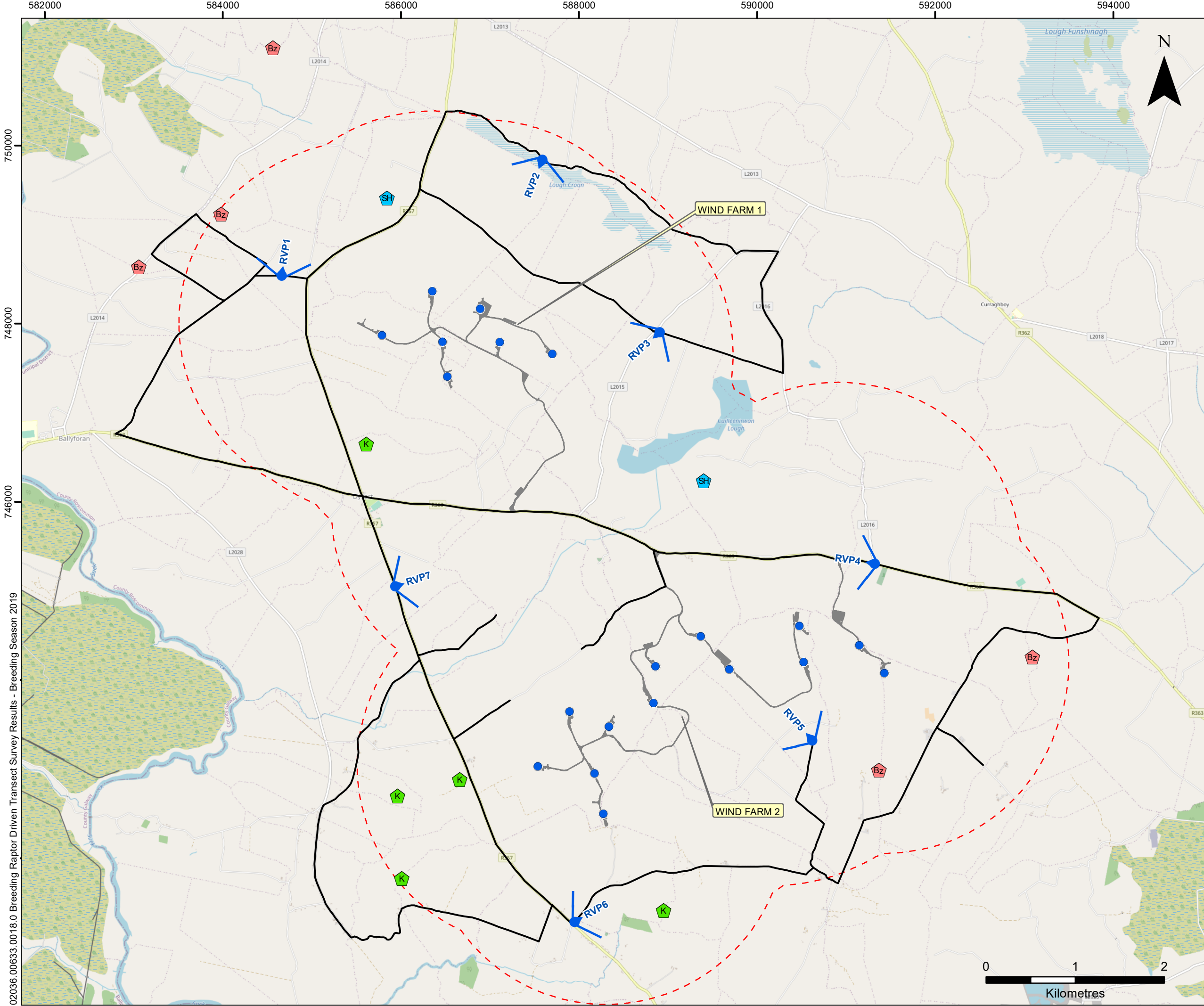
SEVEN HILLS WIND FARM SUMMER BREEDING SEASON REPORT 2019

FIGURE 4 - BREEDING WADER WALKED TRANSECT RESULTS

Scale 1:17,000 @ A3

Date MAY 2022

02036.00633.0017.0 Breeding Wader Transect Survey Results - Breeding Season 2019



LEGEND

- Turbine Location
- Site Infrastructure
- Site Infrastructure 2 km Buffer
- Driven transect
- Raptor Viewpoint Locations (Stopping Point)

Breeding Raptor species

- Buzzard
- Kestrel
- Sparrow hawk

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FIGURE 5 - BREEDING RAPTOR DRIVEN TRANSECT SURVEY RESULTS

Scale 1:40,000 @ A3

Date MAY 2022

0 1 2
Kilometres

02036.00633.0018.0 Breeding Raptor Driven Transect Survey Results - Breeding Season 2019

APPENDIX I

Survey dates, times and observers

Table AI-1: Details of VP surveys undertaken from Wind Farm I Vantage Point 1

| Date | Surveyor | Start | End | Survey Duration |
|--------------------|----------|-------|-------|-----------------|
| 16/04/2019 | DA | 12:59 | 15:59 | 03:00 |
| 19/04/2019 | DH | 09:55 | 12:55 | 03:00 |
| 15/05/2019 | CC | 16:25 | 19:25 | 03:00 |
| 17/05/2019 | CC | 13:00 | 16:00 | 03:00 |
| 18/06/2019 | SI | 13:00 | 16:00 | 03:00 |
| 19/06/2019 | SI | 09:10 | 12:10 | 03:00 |
| 15/07/2019 | SI | 09:10 | 12:10 | 03:00 |
| 16/07/2019 | SI | 12:30 | 15:30 | 03:00 |
| 07/08/2019 | SI | 10:00 | 13:00 | 03:00 |
| 08/08/2019 | SI | 13:00 | 16:00 | 03:00 |
| 24/09/2019 | LG | 13:10 | 16:10 | 03:00 |
| 25/09/2019 | LG | 09:10 | 12:10 | 03:00 |
| Total Hours | | | | 36 |

Table AI-2: Details of VP surveys undertaken from Wind Farm I Vantage Point 2

| Date | Surveyor | Start | End | Survey Duration |
|--------------------|----------|-------|-------|-----------------|
| 10/04/2019 | DH | 09:30 | 12:30 | 03:00 |
| 17/04/2019 | DA | 13:03 | 16:03 | 03:00 |
| 15/05/2019 | CC | 12:55 | 15:55 | 03:00 |
| 17/05/2019 | CC | 09:30 | 12:30 | 03:00 |
| 19/06/2019 | SI | 13:00 | 16:00 | 03:00 |
| 19/06/2019 | SI | 16:30 | 19:30 | 03:00 |
| 15/07/2019 | SI | 13:00 | 16:00 | 03:00 |
| 16/07/2019 | SI | 08:50 | 11:50 | 03:00 |
| 07/08/2019 | SI | 13:30 | 16:30 | 03:00 |
| 08/08/2019 | SI | 09:00 | 12:00 | 03:00 |
| 24/09/2019 | LG | 10:00 | 13:00 | 03:00 |
| 25/09/2019 | LG | 12:30 | 15:30 | 03:00 |
| Total Hours | | | | 36 |

Table AI-3: Details of VP surveys undertaken from Wind Farm II Vantage Point 1

| Date | Surveyor | Start | End | Survey Duration |
|--------------------|----------|-------|-------|-----------------|
| 16/04/2019 | DA | 09:31 | 12:31 | 03:00 |
| 17/04/2019 | DH | 13:05 | 16:05 | 03:00 |
| 14/05/2019 | CC | 10:55 | 13:55 | 03:00 |
| 16/05/2019 | CC | 07:20 | 10:20 | 03:00 |
| 20/06/2019 | SI | 09:30 | 12:30 | 03:00 |
| 24/06/2019 | SI | 09:30 | 12:30 | 03:00 |
| 17/07/2019 | SI | 09:00 | 12:00 | 03:00 |
| 18/07/2019 | SI | 13:00 | 16:00 | 03:00 |
| 09/08/2019 | SI | 09:00 | 12:00 | 03:00 |
| 13/08/2019 | SI | 13:45 | 16:45 | 03:00 |
| 24/09/2019 | SI | 10:30 | 13:30 | 03:00 |
| 25/09/2019 | SI | 12:30 | 15:30 | 03:00 |
| Total Hours | | | | 36 |

Table AI-4: Details of VP surveys undertaken from Wind Farm II Vantage Point 2

| Date | Surveyor | Start | End | Survey Duration |
|--------------------|----------|-------|-------|-----------------|
| 17/04/2019 | DA | 09:30 | 12:30 | 03:00 |
| 19/04/2019 | DH | 13:45 | 16:45 | 03:00 |
| 14/05/2019 | CC | 14:25 | 17:25 | 03:00 |
| 16/05/2019 | CC | 16:45 | 19:45 | 03:00 |
| 20/06/2019 | SI | 13:00 | 16:00 | 03:00 |
| 24/06/2019 | SI | 13:00 | 16:00 | 03:00 |
| 17/07/2019 | SI | 13:00 | 16:00 | 03:00 |
| 18/07/2019 | SI | 08:55 | 11:55 | 03:00 |
| 09/08/2019 | SI | 12:30 | 15:30 | 03:00 |
| 13/08/2019 | SI | 10:00 | 13:00 | 03:00 |
| 29/09/2019 | SI | 13:45 | 16:45 | 03:00 |
| 30/09/2019 | SI | 09:45 | 12:45 | 03:00 |
| Total Hours | | | | 36 |

Table AI-5: Details of VP surveys undertaken from Wind Farm II Vantage Point 3

| Date | Surveyor | Start | End | Survey Duration |
|--------------------|----------|-------|-------|-----------------|
| 16/04/2019 | DH | 13:05 | 16:05 | 03:00 |
| 19/04/2019 | DA | 09:30 | 12:30 | 03:00 |
| 15/05/2019 | CC | 09:25 | 12:25 | 03:00 |
| 27/05/2019 | CC | 11:36 | 14:36 | 03:00 |
| 17/06/2019 | CC | 11:44 | 14:44 | 03:00 |
| 18/06/2019 | CC | 10:50 | 13:50 | 03:00 |
| 19/07/2020 | SI | 09:00 | 12:00 | 03:00 |
| 24/07/2019 | SI | 14:00 | 17:00 | 03:00 |
| 14/08/2019 | SI | 09:00 | 12:00 | 03:00 |
| 15/08/2019 | SI | 12:30 | 15:30 | 03:00 |
| 24/09/2019 | SI | 14:00 | 17:00 | 03:00 |
| 25/09/2019 | SI | 09:00 | 12:00 | 03:00 |
| Total Hours | | | | 36 |

Table AI-6: Details of VP surveys undertaken from Wind Farm II Vantage Point 4

| Date | Surveyor | Start | End | Survey Duration |
|--------------------|----------|-------|-------|-----------------|
| 10/04/2019 | DH | 13:30 | 16:30 | 03:00 |
| 17/04/2019 | DH | 09:25 | 12:25 | 03:00 |
| 14/05/2019 | CC | 07:25 | 10:25 | 03:00 |
| 27/05/2019 | CC | 15:06 | 18:06 | 03:00 |
| 17/06/2019 | CC | 08:14 | 11:14 | 03:00 |
| 18/06/2019 | CC | 07:15 | 10:15 | 03:00 |
| 19/07/2019 | SI | 13:00 | 16:00 | 03:00 |
| 24/07/2019 | SI | 10:00 | 13:00 | 03:00 |
| 14/08/2019 | SI | 13:00 | 16:00 | 03:00 |
| 15/08/2019 | SI | 08:45 | 11:45 | 03:00 |
| 29/09/2019 | SI | 09:15 | 12:15 | 03:00 |
| 30/09/2019 | SI | 13:15 | 16:15 | 03:00 |
| Total Hours | | | | 36 |

Table AI-7: Details of breeding wader surveys undertaken at Wind Farm II during the 2019 bird breeding season

| Date | Surveyor | Start | End | Survey Duration |
|--------------------|----------|-------|-------|-----------------|
| 19/04/2019 | DH | 08:00 | 12:00 | 4 |
| 16/05/2019 | CC | 10:25 | 14:25 | 4 |
| 26/06/2019 | SI | 08:00 | 12:00 | 4 |
| Total Hours | | | | 12 |

Table AI-8: Details of breeding raptor surveys undertaken at Wind Farms I and II during the 2019 bird breeding season

| Date | Surveyor | Start | End | Survey Duration |
|--------------------|----------|-------|-------|-----------------|
| 23/04/2019 | DH | 13:00 | 16:00 | 3 |
| 28/05/2019 | CC | 07:15 | 10:15 | 3 |
| 17/06/2019 | CC | 15:00 | 18:00 | 3 |
| 12/07/2019 | SI | 10:00 | 13:00 | 3 |
| Total Hours | | | | 12 |

APPENDIX II

Weather Data

Table AII-1: Weather data collected during flight activity surveys undertaken at WFI VP1

| Date | Surveyor | Start | End | Survey Hour | Wind Speed | Wind Direction | Rain | Cloud Cover | Cloud Height | Visibility | Snow | Frost | Temp (°C) |
|------------|----------|-------|-------|-------------|------------|----------------|------|-------------|--------------|------------|------|-------|-----------|
| 16/04/2019 | DA | 12:59 | 15:59 | 1 | 2 | SE | 0 | 7 | 1 | 2 | 0 | 0 | 20 |
| 16/04/2019 | DA | 12:59 | 15:59 | 2 | 1 | SE | 0 | 7 | 1 | 2 | 0 | 0 | 20 |
| 16/04/2019 | DA | 12:59 | 15:59 | 3 | 2 | SE | 0 | 4 | 2 | 2 | 0 | 0 | 20 |
| 19/04/2019 | DH | 09:55 | 12:55 | 1 | 3 | | 0 | 6 | 2 | 2 | 0 | 0 | 17 |
| 19/04/2019 | DH | 09:55 | 12:55 | 2 | 3 | | 0 | 5 | 2 | 2 | 0 | 0 | 19 |
| 19/04/2019 | DH | 09:55 | 12:55 | 3 | 3 | | 0 | 5 | 2 | 2 | 0 | 0 | 20 |
| 15/05/2019 | CC | 16:25 | 19:25 | 1 | 2 | SE | 0 | 4 | 2 | 2 | 0 | 0 | 21 |
| 15/05/2019 | CC | 16:25 | 19:25 | 2 | 2 | SE | 0 | 5 | 2 | 2 | 0 | 0 | 21 |
| 15/05/2019 | CC | 16:25 | 19:25 | 3 | 2 | SE | 0 | 7 | 2 | 2 | 0 | 0 | 19 |
| 17/05/2019 | CC | 13:00 | 16:00 | 1 | 2 | E | 0 | 7 | 2 | 2 | 0 | 0 | 16 |
| 17/05/2019 | CC | 13:00 | 16:00 | 2 | 2 | E | 0 | 7 | 2 | 2 | 0 | 0 | 19 |
| 17/05/2019 | CC | 13:00 | 16:00 | 3 | 2 | E | 0 | 7 | 2 | 2 | 0 | 0 | 19 |
| 18/06/2019 | SI | 13:00 | 16:00 | 1 | 1 | SW | 0 | 4 | 2 | 2 | 0 | 0 | 18 |
| 18/06/2019 | SI | 13:00 | 16:00 | 2 | 2 | SW | 0 | 3 | 2 | 2 | 0 | 0 | 16 |

| Date | Surveyor | Start | End | Survey Hour | Wind Speed | Wind Direction | Rain | Cloud Cover | Cloud Height | Visibility | Snow | Frost | Temp (°c) |
|------------|----------|-------|-------|-------------|------------|----------------|------|-------------|--------------|------------|------|-------|-----------|
| 18/06/2019 | SI | 13:00 | 16:00 | 3 | 1 | SW | 0 | 3 | 2 | 2 | 0 | 0 | 16 |
| 19/06/2019 | SI | 09:10 | 12:10 | 1 | 0 | SW | 1 | 8 | 1 | 1 | 0 | 0 | 13 |
| 19/06/2019 | SI | 09:10 | 12:10 | 2 | 0 | SW | 0 | 7 | 2 | 2 | 0 | 0 | 14 |
| 19/06/2019 | SI | 09:10 | 12:10 | 3 | 1 | SW | 3 | 8 | 1 | 1 | 0 | 0 | 13 |
| 15/07/2019 | SI | 09:10 | 12:10 | 1 | 0 | E | 0 | 2 | 2 | 2 | 0 | 0 | 16 |
| 15/07/2019 | SI | 09:10 | 12:10 | 2 | 0 | E | 0 | 2 | 2 | 2 | 0 | 0 | 16 |
| 15/07/2019 | SI | 09:10 | 12:10 | 3 | 0 | E | 0 | 2 | 2 | 2 | 0 | 0 | 16 |
| 16/07/2019 | SI | 12:30 | 15:30 | 1 | 1 | W | 0 | 1 | 2 | 2 | 0 | 0 | 19 |
| 16/07/2019 | SI | 12:30 | 15:30 | 2 | 1 | W | 0 | 0 | NA | 2 | 0 | 0 | 20 |
| 16/07/2019 | SI | 12:30 | 15:30 | 3 | 1 | W | 0 | 0 | NA | 2 | 0 | 0 | 21 |
| 07/08/2019 | SI | 10:00 | 13:00 | 1 | 1 | W | 0 | 6 | 2 | 2 | 0 | 0 | 17 |
| 07/08/2019 | SI | 10:00 | 13:00 | 2 | 1 | W | 0 | 5 | 2 | 2 | 0 | 0 | 18 |
| 07/08/2019 | SI | 10:00 | 13:00 | 3 | 1 | W | 0 | 3 | 2 | 2 | 0 | 0 | 18 |
| 08/08/2019 | SI | 13:00 | 16:00 | 1 | 2 | E | 0 | 2 | 2 | 2 | 0 | 0 | 20 |
| 08/08/2019 | SI | 13:00 | 16:00 | 2 | 3 | E | 0 | 3 | 2 | 2 | 0 | 0 | 20 |

| Date | Surveyor | Start | End | Survey Hour | Wind Speed | Wind Direction | Rain | Cloud Cover | Cloud Height | Visibility | Snow | Frost | Temp (°c) |
|---------------------|----------|----------------------------|-------------|-------------|------------------|----------------|------------------|-------------|--------------|------------|------|-------|-----------|
| 08/08/2019 | SI | 13:00 | 16:00 | 3 | 3 | E | 0 | 3 | 2 | 2 | 0 | 0 | 20 |
| 24/09/2019 | LG | 13:10 | 16:10 | 1 | 3 | SSE | 1 | 8 | 1 | 2 | 0 | 0 | 17 |
| 24/09/2019 | LG | 13:10 | 16:10 | 2 | 3 | SSE | 0 | 8 | 1 | 2 | 0 | 0 | 17 |
| 24/09/2019 | LG | 13:10 | 16:10 | 3 | 2 | SSE | 1 | 7 | 1 | 2 | 0 | 0 | 17 |
| 25/09/2019 | LG | 09:10 | 12:10 | 1 | 1 | SW | 0 | 8 | 2 | 1 | 0 | 0 | 14 |
| 25/09/2019 | LG | 09:10 | 12:10 | 2 | 1 | S | 0 | 8 | 2 | 1 | 0 | 0 | 14 |
| 25/09/2019 | LG | 09:10 | 12:10 | 3 | 1 | SW | 1 | 8 | 1 | 1 | 0 | 0 | 16 |
| Rain/ Precipitation | | | Cloud Cover | | | Visibility | | | Lying Snow | | | Frost | |
| None | 0 | Expressed in oktas (n/8) | | | Poor (<1km) | 0 | None | 0 | None | 0 | | | |
| Drizzle | 1 | Cloud Height | | | Moderate (1-3km) | 1 | On site | 1 | Ground | 1 | | | |
| Light showers/snow | 2 | Height of cloud above | | | Good (>3km) | 2 | On higher ground | 2 | All day | 2 | | | |
| Heavy showers/snow | 3 | average height of viewshed | | | | | | | | | | | |
| Heavy rain/snow | 4 | <150m | | | 0 | | | | | | | | |
| | | 150-500m | | | 1 | | | | | | | | |
| | | >500m | | | 2 | | | | | | | | |

Table AII-2: Weather data collected during flight activity surveys undertaken at WFI VP2

| Date | Surveyor | Start | End | Survey Hour | Wind Speed | Wind Direction | Rain | Cloud Cover | Cloud Height | Visibility | Snow | Frost | Temp (°c) |
|------------|----------|-------|-------|-------------|------------|----------------|------|-------------|--------------|------------|------|-------|-----------|
| 10/04/2019 | DH | 09:30 | 12:30 | 1 | 2 | SW | 0 | 8 | 2 | 2 | 0 | 0 | 9 |
| 10/04/2019 | DH | 09:30 | 12:30 | 2 | 2 | SW | 0 | 8 | 2 | 2 | 0 | 0 | 10 |
| 10/04/2019 | DH | 09:30 | 12:30 | 3 | 2 | SW | 0 | 5 | 2 | 2 | 0 | 0 | 12 |
| 17/04/2019 | DA | 13:03 | 16:03 | 1 | 3 | NW | 0 | 8 | 2 | 2 | 0 | 0 | |
| 17/04/2019 | DA | 13:03 | 16:03 | 2 | 3 | NW | 0 | 7 | 2 | 2 | 0 | 0 | |
| 17/04/2019 | DA | 13:03 | 16:03 | 3 | 3 | NW | 0 | 6 | 2 | 2 | 0 | 0 | |
| 15/05/2019 | CC | 12:55 | 15:55 | 1 | 3 | SE | 0 | 4 | 2 | 2 | 0 | 0 | 20 |
| 15/05/2019 | CC | 12:55 | 15:55 | 2 | 3 | SE | 0 | 4 | 2 | 2 | 0 | 0 | 21 |
| 15/05/2019 | CC | 12:55 | 15:55 | 3 | 3 | SE | 0 | 3 | 2 | 2 | 0 | 0 | 24 |
| 17/05/2019 | CC | 09:30 | 12:30 | 1 | 2 | E | 0 | 5 | 2 | 2 | 0 | 0 | 14 |
| 17/05/2019 | CC | 09:30 | 12:30 | 2 | 2 | E | 0 | 5 | 2 | 2 | 0 | 0 | 15 |
| 17/05/2019 | CC | 09:30 | 12:30 | 3 | 2 | E | 0 | 4 | 2 | 2 | 0 | 0 | 16 |
| 19/06/2019 | SI | 13:00 | 16:00 | 1 | 2 | SW | 0 | 7 | 2 | 2 | 0 | 0 | 15 |
| 19/06/2019 | SI | 13:00 | 16:00 | 2 | 1 | SW | 0 | 6 | 2 | 2 | 0 | 0 | 15 |

| Date | Surveyor | Start | End | Survey Hour | Wind Speed | Wind Direction | Rain | Cloud Cover | Cloud Height | Visibility | Snow | Frost | Temp (°C) |
|------------|----------|-------|-------|-------------|------------|----------------|------|-------------|--------------|------------|------|-------|-----------|
| 19/06/2019 | SI | 13:00 | 16:00 | 3 | 1 | SW | 0 | 5 | 2 | 2 | 0 | 0 | 15 |
| 19/06/2019 | SI | 16:30 | 19:30 | 1 | 0 | SW | 0 | 7 | 2 | 2 | 0 | 0 | 16 |
| 19/06/2019 | SI | 16:30 | 19:30 | 2 | 0 | SW | 0 | 8 | 2 | 2 | 0 | 0 | 15 |
| 19/06/2019 | SI | 16:30 | 19:30 | 3 | 0 | SW | 0 | 8 | 2 | 2 | 0 | 0 | 15 |
| 15/07/2019 | SI | 13:00 | 16:00 | 1 | 0 | NE | 0 | 2 | 2 | 2 | 0 | 0 | 20 |
| 15/07/2019 | SI | 13:00 | 16:00 | 2 | 0 | NE | 0 | 2 | 2 | 2 | 0 | 0 | 20 |
| 15/07/2019 | SI | 13:00 | 16:00 | 3 | 0 | NE | 0 | 2 | 2 | 2 | 0 | 0 | 18 |
| 16/07/2019 | SI | 08:50 | 11:50 | 1 | 0 | W | 0 | 1 | 2 | 2 | 0 | 0 | 16 |
| 16/07/2019 | SI | 08:50 | 11:50 | 2 | 1 | W | 0 | 1 | 2 | 2 | 0 | 0 | 16 |
| 16/07/2019 | SI | 08:50 | 11:50 | 3 | 1 | W | 0 | 1 | 2 | 2 | 0 | 0 | 17 |
| 07/08/2019 | SI | 13:30 | 16:30 | 1 | 1 | W | 2 | 4 | 2 | 2 | 0 | 0 | 18 |
| 07/08/2019 | SI | 13:30 | 16:30 | 2 | 1 | W | 2 | 4 | 2 | 2 | 0 | 0 | 19 |
| 07/08/2019 | SI | 13:30 | 16:30 | 3 | 1 | W | 2 | 5 | 2 | 2 | 0 | 0 | 19 |
| 08/08/2019 | SI | 09:00 | 12:00 | 1 | 2 | NE | 0 | 2 | 2 | 2 | 0 | 0 | 15 |
| 08/08/2019 | SI | 09:00 | 12:00 | 2 | 2 | NE | 0 | 2 | 2 | 2 | 0 | 0 | 15 |

| Date | Surveyor | Start | End | Survey Hour | Wind Speed | Wind Direction | Rain | Cloud Cover | Cloud Height | Visibility | Snow | Frost | Temp (°c) |
|---------------------|----------|----------------------------|-------------|-------------|------------------|----------------|------------------|-------------|--------------|------------|------|-------|-----------|
| 08/08/2019 | SI | 09:00 | 12:00 | 3 | 2 | NE | 0 | 2 | 2 | 2 | 0 | 0 | 15 |
| 24/10/2019 | LG | 10:00 | 13:00 | 1 | 2 | S | 0 | 4 | 1 | 2 | 0 | 0 | 15 |
| 24/10/2019 | LG | 10:00 | 13:00 | 2 | 2 | S | 0 | 6 | 1 | 2 | 0 | 0 | 16 |
| 24/10/2019 | LG | 10:00 | 13:00 | 3 | 2 | S | 0 | 8 | 1 | 2 | 0 | 0 | 16 |
| 25/10/2019 | LG | 12:30 | 15:30 | 1 | 2 | SSW | 0 | 8 | 1 | 1 | 0 | 0 | 16 |
| 25/10/2019 | LG | 12:30 | 15:30 | 2 | 2 | SSW | 0 | 8 | 1 | 1 | 0 | 0 | 17 |
| 25/10/2019 | LG | 12:30 | 15:30 | 3 | 2 | SSW | 1 | 8 | 0 | 0 | 0 | 0 | 16 |
| Rain/ Precipitation | | | Cloud Cover | | | Visibility | | | Lying Snow | | | Frost | |
| None | 0 | Expressed in oktas (n/8) | | | Poor (<1km) | 0 | None | 0 | None | 0 | | | |
| Drizzle | 1 | Cloud Height | | | Moderate (1-3km) | 1 | On site | 1 | Ground | 1 | | | |
| Light showers/snow | 2 | Height of cloud above | | | Good (>3km) | 2 | On higher ground | 2 | All day | 2 | | | |
| Heavy showers/snow | 3 | average height of viewshed | | | | | | | | | | | |
| Heavy rain/snow | 4 | <150m 0 | | | | | | | | | | | |
| | | 150-500m 1 | | | | | | | | | | | |
| | | >500m 2 | | | | | | | | | | | |

Table AII-3: Weather data collected during flight activity surveys undertaken at WFII VP1

| Date | Surveyor | Start | End | Survey Hour | Wind Speed | Wind Direction | Rain | Cloud Cover | Cloud Height | Visibility | Snow | Frost | Temp (°C) |
|------------|----------|-------|-------|-------------|------------|----------------|------|-------------|--------------|------------|------|-------|-----------|
| 16/04/2019 | DA | 09:31 | 12:31 | 1 | 2 | E | 0 | 8 | 1 | 2 | 0 | 0 | 12 |
| 16/04/2019 | DA | 09:31 | 12:31 | 2 | 2 | E | 0 | 8 | 1 | 2 | 0 | 0 | 13 |
| 16/04/2019 | DA | 09:31 | 12:31 | 3 | 2 | E | 0 | 7 | 1 | 2 | 0 | 0 | 14 |
| 17/04/2019 | DH | 13:05 | 16:05 | 1 | 4 | NE | 0 | 6 | 2 | 2 | 0 | 0 | 12 |
| 17/04/2019 | DH | 13:05 | 16:05 | 2 | 2 | NE | 0 | 5 | 2 | 2 | 0 | 0 | 15 |
| 17/04/2019 | DH | 13:05 | 16:05 | 3 | 2 | NE | 0 | 4 | 2 | 2 | 0 | 0 | 14 |
| 14/05/2019 | CC | 10:55 | 13:55 | 1 | 2 | SW | 0 | 4 | 2 | 2 | 0 | 0 | 19 |
| 14/05/2019 | CC | 10:55 | 13:55 | 2 | 2 | SW | 0 | 5 | 2 | 2 | 0 | 0 | 20 |
| 14/05/2019 | CC | 10:55 | 13:55 | 3 | 3 | S | 0 | 3 | 2 | 2 | 0 | 0 | 20 |
| 16/05/2019 | CC | 07:20 | 10:20 | 1 | 2 | E | 0 | 8 | 2 | 2 | 0 | 0 | 13 |
| 16/05/2019 | CC | 07:20 | 10:20 | 2 | 2 | E | 0 | 8 | 1 | 2 | 0 | 0 | 13 |
| 16/05/2019 | CC | 07:20 | 10:20 | 3 | 2 | E | 0 | 8 | 1 | 2 | 0 | 0 | 14 |
| 20/06/2019 | SI | 09:30 | 12:30 | 1 | 0 | S | 0 | 3 | 0 | 2 | 0 | 0 | 13 |
| 20/06/2019 | SI | 09:30 | 12:30 | 2 | 0 | S | 0 | 3 | 0 | 2 | 0 | 0 | 14 |

| Date | Surveyor | Start | End | Survey Hour | Wind Speed | Wind Direction | Rain | Cloud Cover | Cloud Height | Visibility | Snow | Frost | Temp (°c) |
|------------|----------|-------|-------|-------------|------------|----------------|------|-------------|--------------|------------|------|-------|-----------|
| 20/06/2019 | SI | 09:30 | 12:30 | 3 | 0 | S | 0 | 3 | 0 | 2 | 0 | 0 | 14 |
| 24/06/2019 | SI | 09:30 | 12:30 | 1 | 0 | E | 0 | 3 | 0 | 2 | 0 | 0 | 12 |
| 24/06/2019 | SI | 09:30 | 12:30 | 2 | 0 | E | 0 | 4 | 0 | 2 | 0 | 0 | 13 |
| 24/06/2019 | SI | 09:30 | 12:30 | 3 | 0 | E | 0 | 4 | 0 | 2 | 0 | 0 | 15 |
| 17/07/2019 | SI | 09:00 | 12:00 | 1 | 2 | NW | 0 | 8 | 1 | 1 | 0 | 0 | 15 |
| 17/07/2019 | SI | 09:00 | 12:00 | 2 | 1 | NW | 0 | 8 | 1 | 2 | 0 | 0 | 15 |
| 17/07/2019 | SI | 09:00 | 12:00 | 3 | 1 | NW | 0 | 8 | 1 | 1 | 0 | 0 | 15 |
| 18/07/2019 | SI | 13:00 | 16:00 | 1 | 0 | W | 0 | 3 | 2 | 2 | 0 | 0 | 17 |
| 18/07/2019 | SI | 13:00 | 16:00 | 2 | 1 | W | 0 | 3 | 2 | 2 | 0 | 0 | 18 |
| 18/07/2019 | SI | 13:00 | 16:00 | 3 | 0 | W | 0 | 2 | 2 | 2 | 0 | 0 | 18 |
| 09/08/2019 | SI | 09:00 | 12:00 | 1 | 3 | SE | 2 | 8 | 2 | 2 | 0 | 0 | 15 |
| 09/08/2019 | SI | 09:00 | 12:00 | 2 | 3 | SE | 0 | 8 | 2 | 2 | 0 | 0 | 16 |
| 09/08/2019 | SI | 09:00 | 12:00 | 3 | 3 | SE | 0 | 8 | 2 | 2 | 0 | 0 | 17 |
| 13/08/2019 | SI | 13:45 | 16:45 | 1 | 2 | N | 0 | 7 | 2 | 2 | 0 | 0 | 16 |
| 13/08/2019 | SI | 13:45 | 16:45 | 2 | 3 | S | 2 | 8 | 2 | 2 | 0 | 0 | 16 |

| Date | Surveyor | Start | End | Survey Hour | Wind Speed | Wind Direction | Rain | Cloud Cover | Cloud Height | Visibility | Snow | Frost | Temp (°c) |
|---------------------|----------|----------------------------|-------------|-------------|------------------|----------------|------------------|-------------|--------------|------------|------|-------|-----------|
| 13/08/2019 | SI | 13:45 | 16:45 | 3 | 2 | S | 0 | 7 | 2 | 2 | 0 | 0 | 16 |
| 24/09/2019 | SI | 10:30 | 13:30 | 1 | 3 | SW | 0 | 3 | 1 | 2 | 0 | 0 | 15 |
| 24/09/2019 | SI | 10:30 | 13:30 | 2 | 4 | SW | 0 | 6 | 1 | 2 | 0 | 0 | 15 |
| 24/09/2019 | SI | 10:30 | 13:30 | 3 | 2 | SW | 1 | 8 | 1 | 2 | 0 | 0 | 15 |
| 25/09/2019 | SI | 12:30 | 15:30 | 1 | 1 | SW | 0 | 7 | 1 | 2 | 0 | 0 | 14 |
| 25/09/2019 | SI | 12:30 | 15:30 | 2 | 1 | SW | 2 | 8 | 1 | 2 | 0 | 0 | 13 |
| 25/09/2019 | SI | 12:30 | 15:30 | 3 | 1 | SW | 0 | 8 | 1 | 2 | 0 | 0 | 13 |
| Rain/ Precipitation | | | Cloud Cover | | | Visibility | | | Lying Snow | | | Frost | |
| None | 0 | Expressed in oktas (n/8) | | | Poor (<1km) | 0 | None | 0 | None | 0 | | | |
| Drizzle | 1 | Cloud Height | | | Moderate (1-3km) | 1 | On site | 1 | Ground | 1 | | | |
| Light showers/snow | 2 | Height of cloud above | | | Good (>3km) | 2 | On higher ground | 2 | All day | 2 | | | |
| Heavy showers/snow | 3 | average height of viewshed | | | | | | | | | | | |
| Heavy rain/snow | 4 | <150m 0 | | | | | | | | | | | |
| | | 150-500m 1 | | | | | | | | | | | |
| | | >500m 2 | | | | | | | | | | | |

Table AII-4: Weather data collected during flight activity surveys undertaken at WFII VP2

| Date | Surveyor | Start | End | Survey Hour | Wind Speed | Wind Direction | Rain | Cloud Cover | Cloud Height | Visibility | Snow | Frost | Temp (°C) |
|------------|----------|-------|-------|-------------|------------|----------------|------|-------------|--------------|------------|------|-------|-----------|
| 17/04/2019 | DA | 09:30 | 12:20 | 1 | 0 | S | 0 | 2 | 0 | 2 | 0 | 0 | 18 |
| 17/04/2019 | DA | 09:30 | 12:20 | 2 | 0 | S | 0 | 2 | 0 | 2 | 0 | 0 | 17 |
| 17/04/2019 | DA | 09:30 | 12:20 | 3 | 0 | E | 0 | 4 | 0 | 2 | 0 | 0 | 18 |
| 19/04/2019 | DA | 13:22 | 14:55 | 1 | 2 | E | 0 | 7 | 1 | 2 | 0 | 0 | 15 |
| 19/04/2019 | DA | 13:22 | 14:55 | 2 | 0 | S | 0 | 3 | 0 | 2 | 0 | 0 | 18 |
| 19/04/2019 | DA | 13:22 | 14:55 | 3 | 0 | S | 0 | 3 | 0 | 2 | 0 | 0 | 18 |
| 14/05/2019 | CC | 14:25 | 17:25 | 1 | 0 | E | 0 | 3 | 0 | 2 | 0 | 0 | 18 |
| 14/05/2019 | CC | 14:25 | 17:25 | 2 | 0 | E | 0 | 4 | 0 | 2 | 0 | 0 | 17 |
| 14/05/2019 | CC | 14:25 | 17:25 | 3 | 2 | S | 2 | 8 | 1 | 2 | 0 | 0 | 16 |
| 16/05/2019 | CC | 16:45 | 19:45 | 1 | 2 | S | 1 | 8 | 1 | 2 | 0 | 0 | 17 |
| 16/05/2019 | CC | 16:45 | 19:45 | 2 | 2 | S | 0 | 7 | 1 | 2 | 0 | 0 | 17 |
| 16/05/2019 | CC | 16:45 | 19:45 | 3 | 1 | W | 0 | 4 | 2 | 2 | 0 | 0 | 15 |
| 20/06/2019 | SI | 13:00 | 16:00 | 1 | 1 | W | 0 | 4 | 2 | 2 | 0 | 0 | 15 |
| 20/06/2019 | SI | 13:00 | 16:00 | 2 | 1 | W | 0 | 3 | 2 | 2 | 0 | 0 | 16 |

| Date | Surveyor | Start | End | Survey Hour | Wind Speed | Wind Direction | Rain | Cloud Cover | Cloud Height | Visibility | Snow | Frost | Temp (°c) |
|------------|----------|-------|-------|-------------|------------|----------------|------|-------------|--------------|------------|------|-------|-----------|
| 20/06/2019 | SI | 13:00 | 16:00 | 3 | 4 | SE | 0 | 7 | 2 | 2 | 0 | 0 | 17 |
| 24/06/2019 | SI | 13:00 | 16:00 | 1 | 4 | SE | 2 | 7 | 2 | 2 | 0 | 0 | 18 |
| 24/06/2019 | SI | 13:00 | 16:00 | 2 | 4 | SE | 0 | 7 | 2 | 2 | 0 | 0 | 19 |
| 24/06/2019 | SI | 13:00 | 16:00 | 3 | 2 | S | 0 | 7 | 2 | 2 | 0 | 0 | 14 |
| 17/07/2019 | SI | 13:00 | 16:00 | 1 | 2 | N | 2 | 8 | 2 | 2 | 0 | 0 | 14 |
| 17/07/2019 | SI | 13:00 | 16:00 | 2 | 2 | N | 0 | 7 | 2 | 2 | 0 | 0 | 15 |
| 17/07/2019 | SI | 13:00 | 16:00 | 3 | 1 | S | 0 | 8 | 1 | 1 | 0 | 0 | 10 |
| 18/07/2019 | SI | 08:55 | 11:55 | 1 | 1 | S | 2 | 8 | 1 | 1 | 0 | 0 | 10 |
| 18/07/2019 | SI | 08:55 | 11:55 | 2 | 1 | S | 4 | 8 | 1 | 1 | 0 | 0 | 10 |
| 18/07/2019 | SI | 08:55 | 11:55 | 3 | 2 | E | 0 | 7 | 1 | 2 | 0 | 0 | 15 |
| 09/08/2019 | SI | 12:30 | 15:30 | 1 | 0 | S | 0 | 3 | 0 | 2 | 0 | 0 | 18 |
| 09/08/2019 | SI | 12:30 | 15:30 | 2 | 0 | S | 0 | 2 | 0 | 2 | 0 | 0 | 18 |
| 09/08/2019 | SI | 12:30 | 15:30 | 3 | 0 | S | 0 | 2 | 0 | 2 | 0 | 0 | 17 |
| 13/08/2019 | SI | 10:00 | 13:00 | 1 | 0 | E | 0 | 4 | 0 | 2 | 0 | 0 | 18 |
| 13/08/2019 | SI | 10:00 | 13:00 | 2 | 0 | E | 0 | 3 | 0 | 2 | 0 | 0 | 18 |

| Date | Surveyor | Start | End | Survey Hour | Wind Speed | Wind Direction | Rain | Cloud Cover | Cloud Height | Visibility | Snow | Frost | Temp (°c) |
|----------------------------|----------|-------|----------------------------|-------------|------------|-------------------|------|-------------|-------------------|------------|------|--------------|-----------|
| 13/08/2019 | SI | 10:00 | 13:00 | 3 | 0 | E | 0 | 4 | 0 | 2 | 0 | 0 | 17 |
| 30/09/2019 | SI | 09:45 | 12:45 | 1 | 2 | S | 2 | 8 | 1 | 2 | 0 | 0 | 16 |
| 30/09/2019 | SI | 09:45 | 12:45 | 2 | 2 | S | 1 | 8 | 1 | 2 | 0 | 0 | 17 |
| 30/09/2019 | SI | 09:45 | 12:45 | 3 | 2 | S | 0 | 7 | 1 | 2 | 0 | 0 | 17 |
| Rain/ Precipitation | | | Cloud Cover | | | Visibility | | | Lying Snow | | | Frost | |
| None | 0 | | Expressed in oktas (n/8) | | | Poor (<1km) | 0 | | None | 0 | | None | 0 |
| Drizzle | 1 | | Cloud Height | | | Moderate (1-3km) | 1 | | On site | 1 | | Ground | 1 |
| Light showers/snow | 2 | | Height of cloud above | | | Good (>3km) | 2 | | On higher ground | 2 | | All day | 2 |
| Heavy showers/snow | 3 | | average height of viewshed | | | | | | | | | | |
| Heavy rain/snow | 4 | | <150m | | | | 0 | | | | | | |
| | | | 150-500m | | | | 1 | | | | | | |
| | | | >500m | | | | 2 | | | | | | |

Table AII-5: Weather data collected during flight activity surveys undertaken at WFII VP3

| Date | Surveyor | Start | End | Survey Hour | Wind Speed | Wind Direction | Rain | Cloud Cover | Cloud Height | Visibility | Snow | Frost | Temp (°c) |
|------------|----------|-------|-------|-------------|------------|----------------|------|-------------|--------------|------------|------|-------|-----------|
| 16/04/2019 | DH | 13:05 | 16:05 | 1 | 1 | NE | 0 | 4 | 2 | 2 | 0 | 0 | 13 |
| 16/04/2019 | DH | 13:05 | 16:05 | 2 | 1 | NE | 0 | 6 | 2 | 2 | 0 | 0 | 13 |
| 16/04/2019 | DH | 13:05 | 16:05 | 3 | 2 | NE | 0 | 6 | 2 | 2 | 0 | 0 | 12 |
| 19/04/2019 | DA | 09:30 | 12:20 | 1 | 0 | SW | 0 | 0 | | 1 | 0 | 0 | 12 |
| 19/04/2019 | DA | 09:30 | 12:20 | 2 | 0 | SW | 0 | 1 | 2 | 2 | 0 | 0 | 12 |
| 19/04/2019 | DA | 09:30 | 12:20 | 3 | 1 | SW | 0 | 2 | 2 | 2 | 0 | 0 | 12 |
| 15/05/2019 | CC | 09:25 | 12:25 | 1 | 3 | SE | 0 | 7 | 2 | 2 | 0 | 0 | 15 |
| 15/05/2019 | CC | 09:25 | 12:25 | 2 | 3 | SE | 0 | 7 | 2 | 2 | 0 | 0 | 16 |
| 15/05/2019 | CC | 09:25 | 12:25 | 3 | 3 | SE | 0 | 7 | 2 | 2 | 0 | 0 | 16 |
| 27/05/2019 | CC | 11:36 | 14:36 | 1 | 2 | W | 0 | 7 | 2 | 2 | 0 | 0 | 15 |
| 27/05/2019 | CC | 11:36 | 14:36 | 2 | 2 | SW | 0 | 7 | 2 | 2 | 0 | 0 | 15 |
| 27/05/2019 | CC | 11:36 | 14:36 | 3 | 3 | SW | 0 | 3 | 2 | 2 | 0 | 0 | 16 |
| 17/06/2019 | CC | 11:44 | 14:44 | 1 | 4 | SW | 0 | 5 | 2 | 2 | 0 | 0 | 14 |
| 17/06/2019 | CC | 11:44 | 14:44 | 2 | 4 | SW | 2 | 6 | 2 | 2 | 0 | 0 | 16 |
| 17/06/2019 | CC | 11:44 | 14:44 | 3 | 4 | SW | 0 | 6 | 2 | 2 | 0 | 0 | 17 |

| Date | Surveyor | Start | End | Survey Hour | Wind Speed | Wind Direction | Rain | Cloud Cover | Cloud Height | Visibility | Snow | Frost | Temp (°c) |
|------------|----------|-------|-------|-------------|------------|----------------|------|-------------|--------------|------------|------|-------|-----------|
| 18/06/2019 | CC | 10:50 | 13:50 | 1 | 3 | W | 0 | 4 | 2 | 2 | 0 | 0 | 16 |
| 18/06/2019 | CC | 10:50 | 13:50 | 2 | 3 | W | 0 | 5 | 2 | 2 | 0 | 0 | 17 |
| 18/06/2019 | CC | 10:50 | 13:50 | 3 | 3 | W | 0 | 4 | 2 | 2 | 0 | 0 | 17 |
| 19/07/2019 | SI | 09:00 | 12:00 | 1 | 1 | S | 0 | 3 | 2 | 2 | 0 | 0 | 13 |
| 19/07/2019 | SI | 09:00 | 12:00 | 2 | 1 | S | 0 | 3 | 2 | 2 | 0 | 0 | 14 |
| 19/07/2019 | SI | 09:00 | 12:00 | 3 | 1 | S | 0 | 4 | 2 | 2 | 0 | 0 | 14 |
| 24/07/2019 | SI | 14:00 | 17:00 | 1 | 0 | SE | 0 | 6 | 2 | 2 | 0 | 0 | 19 |
| 24/07/2019 | SI | 14:00 | 17:00 | 2 | 0 | SE | 0 | 6 | 2 | 2 | 0 | 0 | 20 |
| 24/07/2019 | SI | 14:00 | 17:00 | 3 | 0 | SE | 0 | 6 | 2 | 2 | 0 | 0 | 20 |
| 14/08/2019 | SI | 09:00 | 12:00 | 1 | 2 | W | 0 | 7 | 2 | 2 | 0 | 0 | 16 |
| 14/08/2019 | SI | 09:00 | 12:00 | 2 | 2 | W | 0 | 7 | 2 | 2 | 0 | 0 | 16 |
| 14/08/2019 | SI | 09:00 | 12:00 | 3 | 2 | W | 2 | 7 | 2 | 2 | 0 | 0 | 17 |
| 15/08/2019 | SI | 12:30 | 15:30 | 1 | 3 | W | 0 | 2 | 2 | 2 | 0 | 0 | 17 |
| 15/08/2019 | SI | 12:30 | 15:30 | 2 | 3 | W | 0 | 2 | 2 | 2 | 0 | 0 | 18 |
| 15/08/2019 | SI | 12:30 | 15:30 | 3 | 3 | W | 0 | 2 | 2 | 2 | 0 | 0 | 18 |

| Date | Surveyor | Start | End | Survey Hour | Wind Speed | Wind Direction | Rain | Cloud Cover | Cloud Height | Visibility | Snow | Frost | Temp (°c) |
|---------------------|----------|----------------------------|-------------|-------------|------------------|----------------|------------------|-------------|--------------|------------|------|-------|-----------|
| 24/09/2019 | SI | 14:00 | 17:00 | 1 | 1 | SE | 0 | 7 | 1 | 2 | 0 | 0 | 15 |
| 24/09/2019 | SI | 14:00 | 17:00 | 2 | 1 | SE | 0 | 6 | 1 | 2 | 0 | 0 | 15 |
| 24/09/2019 | SI | 14:00 | 17:00 | 3 | 1 | SE | 0 | 6 | 1 | 2 | 0 | 0 | 15 |
| 25/09/2019 | SI | 09:00 | 12:00 | 1 | 1 | SW | 0 | 8 | 1 | 2 | 0 | 0 | 14 |
| 25/09/2019 | SI | 09:00 | 12:00 | 2 | 1 | SW | 0 | 8 | 1 | 2 | 0 | 0 | 14 |
| 25/09/2019 | SI | 09:00 | 12:00 | 3 | 2 | SW | 2 | 7 | 1 | 2 | 0 | 0 | 14 |
| Rain/ Precipitation | | | Cloud Cover | | | Visibility | | | Lying Snow | | | Frost | |
| None | 0 | Expressed in oktas (n/8) | | | Poor (<1km) | 0 | None | 0 | None | 0 | | | |
| Drizzle | 1 | Cloud Height | | | Moderate (1-3km) | 1 | On site | 1 | Ground | 1 | | | |
| Light showers/snow | 2 | Height of cloud above | | | Good (>3km) | 2 | On higher ground | 2 | All day | 2 | | | |
| Heavy showers/snow | 3 | average height of viewshed | | | | | | | | | | | |
| Heavy rain/snow | 4 | <150m | | | 0 | | | | | | | | |
| | | 150-500m | | | 1 | | | | | | | | |
| | | >500m | | | 2 | | | | | | | | |

Table AII-6: Weather data collected during flight activity surveys undertaken at WFII VP4

| Date | Surveyor | Start | End | Survey Hour | Wind Speed | Wind Direction | Rain | Cloud Cover | Cloud Height | Visibility | Snow | Frost | Temp (°C) |
|------------|----------|-------|-------|-------------|------------|----------------|------|-------------|--------------|------------|------|-------|-----------|
| 17/04/2019 | DH | 09:25 | 12:25 | 1 | 3 | NE | 0 | 7 | 2 | 2 | 0 | 0 | 10 |
| 17/04/2019 | DH | 09:25 | 12:25 | 2 | 3 | NE | 0 | 8 | 2 | 2 | 0 | 0 | 11 |
| 17/04/2019 | DH | 09:25 | 12:25 | 3 | 3 | NE | 0 | 8 | 2 | 2 | 0 | 0 | 12 |
| 14/05/2019 | CC | 07:25 | 10:25 | 1 | 2 | SW | 0 | 6 | 2 | 2 | 0 | 0 | 11 |
| 14/05/2019 | CC | 07:25 | 10:25 | 2 | 2 | S | 0 | 5 | 2 | 2 | 0 | 0 | 14 |
| 14/05/2019 | CC | 07:25 | 10:25 | 3 | 2 | S | 0 | 4 | 2 | 2 | 0 | 0 | 18 |
| 27/05/2019 | CC | 15:06 | 18:06 | 1 | 2 | SW | 0 | 5 | 2 | 2 | 0 | 0 | 16 |
| 27/05/2019 | CC | 15:06 | 18:06 | 2 | 2 | SW | 0 | 6 | 2 | 2 | 0 | 0 | 16 |
| 27/05/2019 | CC | 15:06 | 18:06 | 3 | 2 | SW | 0 | 5 | 2 | 2 | 0 | 0 | 16 |
| 17/06/2019 | CC | 08:14 | 11:14 | 1 | 3 | S | 2 | 6 | 2 | 2 | 0 | 0 | 10 |
| 17/06/2019 | CC | 08:14 | 11:14 | 2 | 4 | S | 0 | 7 | 2 | 2 | 0 | 0 | 11 |
| 17/06/2019 | CC | 08:14 | 11:14 | 3 | 4 | S | 2 | 6 | 2 | 2 | 0 | 0 | 13 |
| 18/06/2019 | CC | 07:15 | 10:15 | 1 | 3 | SW | 0 | 4 | 2 | 2 | 0 | 0 | 13 |
| 18/06/2019 | CC | 07:15 | 10:15 | 2 | 3 | SW | 0 | 5 | 2 | 2 | 0 | 0 | 14 |

| Date | Surveyor | Start | End | Survey Hour | Wind Speed | Wind Direction | Rain | Cloud Cover | Cloud Height | Visibility | Snow | Frost | Temp (°c) |
|------------|----------|-------|-------|-------------|------------|----------------|------|-------------|--------------|------------|------|-------|-----------|
| 18/06/2019 | CC | 07:15 | 10:15 | 3 | 3 | W | 0 | 5 | 2 | 2 | 0 | 0 | 14 |
| 19/07/2019 | SI | 13:00 | 16:00 | 1 | 1 | NW | 0 | 4 | 2 | 2 | 0 | 0 | 18 |
| 19/07/2019 | SI | 13:00 | 16:00 | 2 | 1 | NW | 2 | 4 | 2 | 2 | 0 | 0 | 19 |
| 19/07/2019 | SI | 13:00 | 16:00 | 3 | 1 | NW | 0 | 4 | 2 | 2 | 0 | 0 | 19 |
| 24/07/2019 | SI | 10:00 | 13:00 | 1 | 0 | S | 0 | 7 | 2 | 2 | 0 | 0 | 17 |
| 24/07/2019 | SI | 10:00 | 13:00 | 2 | 0 | S | 0 | 7 | 2 | 2 | 0 | 0 | 17 |
| 24/07/2019 | SI | 10:00 | 13:00 | 3 | 0 | S | 0 | 6 | 2 | 2 | 0 | 0 | 18 |
| 14/08/2019 | SI | 13:00 | 16:00 | 1 | 1 | W | 0 | 6 | 2 | 2 | 0 | 0 | 17 |
| 14/08/2019 | SI | 13:00 | 16:00 | 2 | 1 | W | 0 | 6 | 2 | 2 | 0 | 0 | 17 |
| 14/08/2019 | SI | 13:00 | 16:00 | 3 | 2 | W | 0 | 6 | 2 | 2 | 0 | 0 | 17 |
| 15/08/2019 | SI | 08:45 | 11:45 | 1 | 3 | W | 0 | 3 | 2 | 2 | 0 | 0 | 16 |
| 15/08/2019 | SI | 08:45 | 11:45 | 2 | 3 | W | 0 | 3 | 2 | 2 | 0 | 0 | 16 |
| 15/08/2019 | SI | 08:45 | 11:45 | 3 | 3 | W | 0 | 2 | 2 | 2 | 0 | 0 | 17 |
| 30/09/2019 | SI | 13:15 | 16:15 | 1 | 1 | S | 4 | 8 | 0 | 0-1 | 0 | 0 | 10 |
| 30/09/2019 | SI | 13:15 | 16:15 | 2 | 2 | S | 3 | 8 | 0 | 1 | 0 | 0 | 10 |

| Date | Surveyor | Start | End | Survey Hour | Wind Speed | Wind Direction | Rain | Cloud Cover | Cloud Height | Visibility | Snow | Frost | Temp (°c) |
|----------------------------|----------|-------|----------------------------|-------------|------------|-------------------|------|-------------|-------------------|------------|------|--------------|-----------|
| 30/09/2019 | SI | 13:15 | 16:15 | 3 | 2 | S | 2 | 8 | 0 | 1 | 0 | 0 | 10 |
| Rain/ Precipitation | | | Cloud Cover | | | Visibility | | | Lying Snow | | | Frost | |
| None | 0 | | Expressed in oktas (n/8) | | | Poor (<1km) | 0 | | None | 0 | | None | 0 |
| Drizzle | 1 | | Cloud Height | | | Moderate (1-3km) | 1 | | On site | 1 | | Ground | 1 |
| Light showers/snow | 2 | | Height of cloud above | | | Good (>3km) | 2 | | On higher ground | 2 | | All day | 2 |
| Heavy showers/snow | 3 | | average height of viewshed | | | | | | | | | | |
| Heavy rain/snow | 4 | | <150m | | | | 0 | | | | | | |
| | | | 150-500m | | | | 1 | | | | | | |
| | | | >500m | | | | 2 | | | | | | |

Table All-7: Weather data collected during the breeding wader surveys undertaken at WFII during the 2019 breeding season

| Date | Surveyor | Start | End | Survey Hour | Wind Speed | Wind Direction | Rain | Cloud Cover | Cloud Height | Visibility | Snow | Frost | Temp (°C) |
|----------------------------|----------|--------------------------|-------|-------------------|------------|-------------------|------|--------------|--------------|------------|------|-------|-----------|
| 19/04/2019 | DH | 08:00 | 12:00 | 1 | 1 | SE | 0 | 7 | 2 | 2 | 0 | 0 | 10 |
| 19/04/2019 | DH | 08:00 | 12:00 | 2 | 1 | SE | 0 | 7 | 2 | 2 | 0 | 0 | 10 |
| 19/04/2019 | DH | 08:00 | 12:00 | 3 | 1 | SE | 0 | 7 | 2 | 2 | 0 | 0 | 11 |
| 19/04/2019 | DH | 08:00 | 12:00 | 4 | 1 | SE | 0 | 6 | 2 | 2 | 0 | 0 | 13 |
| 16/05/2019 | CC | 10:25 | 14:25 | 1 | 2 | E | 0 | 8 | 2 | 2 | 0 | 0 | 13 |
| 16/05/2019 | CC | 10:25 | 14:25 | 1 | 2 | E | 0 | 8 | 2 | 2 | 0 | 0 | 13 |
| 16/05/2019 | CC | 10:25 | 14:25 | 1 | 2 | E | 0 | 8 | 2 | 2 | 0 | 0 | 15 |
| 16/05/2019 | CC | 10:25 | 14:25 | 1 | 2 | E | 0 | 8 | 2 | 2 | 0 | 0 | 17 |
| 26/06/2019 | SI | 08:00 | 12:00 | 1 | 2 | W | 1 | 8 | 2 | 2 | 0 | 0 | 12 |
| 26/06/2019 | SI | 08:00 | 12:00 | 2 | 2 | W | 1 | 8 | 2 | 2 | 0 | 0 | 14 |
| 26/06/2019 | SI | 08:00 | 12:00 | 3 | 2 | W | 1 | 8 | 2 | 2 | 0 | 0 | 15 |
| 26/06/2019 | SI | 08:00 | 12:00 | 4 | 2 | W | 1 | 8 | 2 | 2 | 0 | 0 | 16 |
| Rain/ Precipitation | | Cloud Cover | | Visibility | | Lying Snow | | Frost | | | | | |
| None | 0 | Expressed in oktas (n/8) | | Poor (<1km) | 0 | None | 0 | None | 0 | | | | |
| Drizzle | 1 | Cloud Height | | Moderate (1-3km) | 1 | On site | 1 | Ground | 1 | | | | |
| Light showers/snow | 2 | Height of cloud above | | Good (>3km) | 2 | On higher ground | 2 | All day | 2 | | | | |

| Date | Surveyor | Start | End | Survey Hour | Wind Speed | Wind Direction | Rain | Cloud Cover | Cloud Height | Visibility | Snow | Frost | Temp (°c) |
|--------------------|----------|-------|----------------------------|-------------|------------|----------------|------|-------------|--------------|------------|------|-------|-----------|
| Heavy showers/snow | 3 | | average height of viewshed | | | | | | | | | | |
| Heavy rain/snow | 4 | | <150m | 0 | | | | | | | | | |
| | | | 150-500m | 1 | | | | | | | | | |
| | | | >500m | 2 | | | | | | | | | |

Table AII-8: Weather data collected during the breeding raptor surveys undertaken at WFI and II during the 2019 breeding season

| Date | Surveyor | Start | End | Survey Hour | Wind Speed | Wind Direction | Rain | Cloud Cover | Cloud Height | Visibility | Snow | Frost | Temp (°C) |
|----------------------------|----------|-------|--------------------------|-------------|------------|-------------------|------|-------------|-------------------|------------|------|--------------|-----------|
| 23/04/2019 | DH | 13:00 | 16:00 | 1 | 1 | N | 2 | 7 | 2 | 2 | 0 | 0 | 11 |
| 23/04/2019 | DH | 13:00 | 16:00 | 2 | 1 | N | 2 | 7 | 2 | 2 | 0 | 0 | 11 |
| 23/04/2019 | DH | 13:00 | 16:00 | 3 | 1 | N | 0 | 7 | 2 | 2 | 0 | 0 | 12 |
| 28/05/2019 | CC | 07:15 | 10:15 | 1 | 3 | S | 0 | 7 | 2 | 2 | 0 | 0 | 15 |
| 28/05/2019 | CC | 07:15 | 10:15 | 2 | 3 | S | 0 | 7 | 2 | 2 | 0 | 0 | 15 |
| 28/05/2019 | CC | 07:15 | 10:15 | 3 | 3 | S | 0 | 7 | 2 | 2 | 0 | 0 | 16 |
| 17/06/2019 | CC | 15:00 | 18:00 | 1 | 2 | W | 0 | 3 | 2 | 2 | 0 | 0 | 15 |
| 17/06/2019 | CC | 15:00 | 18:00 | 2 | 2 | W | 0 | 3 | 2 | 2 | 0 | 0 | 15 |
| 17/06/2019 | CC | 15:00 | 18:00 | 3 | 2 | W | 0 | 3 | 2 | 2 | 0 | 0 | 16 |
| 12/07/2019 | SI | 10:00 | 13:00 | 1 | 3 | W | 0 | 2 | 2 | 2 | 0 | 0 | 15 |
| 12/07/2019 | SI | 10:00 | 13:00 | 2 | 3 | W | 0 | 2 | 2 | 2 | 0 | 0 | 16 |
| 12/07/2019 | SI | 10:00 | 13:00 | 3 | 3 | W | 0 | 2 | 2 | 2 | 0 | 0 | 16 |
| Rain/ Precipitation | | | Cloud Cover | | | Visibility | | | Lying Snow | | | Frost | |
| None | 0 | | Expressed in oktas (n/8) | | | Poor (<1km) | 0 | | None | 0 | | None | 0 |
| Drizzle | 1 | | Cloud Height | | | Moderate (1-3km) | 1 | | On site | 1 | | Ground | 1 |
| Light showers/snow | 2 | | Height of cloud above | | | Good (>3km) | 2 | | On higher ground | 2 | | All day | 2 |

| Date | Surveyor | Start | End | Survey Hour | Wind Speed | Wind Direction | Rain | Cloud Cover | Cloud Height | Visibility | Snow | Frost | Temp (°c) |
|--------------------|----------|-------|----------------------------|-------------|------------|----------------|------|-------------|--------------|------------|------|-------|-----------|
| Heavy showers/snow | 3 | | average height of viewshed | | | | | | | | | | |
| Heavy rain/snow | 4 | | <150m | 0 | | | | | | | | | |
| | | | 150-500m | 1 | | | | | | | | | |
| | | | >500m | 2 | | | | | | | | | |

APPENDIX III

Flight activity survey data

Primary Target Species

Table AIII-1: Primary target species flight activity data from WFI VP1

| Date | Surveyor | Flight ID | Species | Num. Birds | M/F | Age | Obs. Time | Flight time (s) | Likely Rotor Swept Area (Y/N) |
|------------|----------|-----------|---------|------------|-----|-----|-----------|-----------------|-------------------------------|
| 15/07/2019 | SI | | PE | 1 | M | Ad | 10:05 | 45 | Y |

NB: There were no primary target species recorded from WFI VP 2 throughout the 2019 breeding season.

Table AIII-2: Primary target species flight activity data from WFII VP1

| Date | Surveyor | Flight ID | Species | Num. Birds | M/F | Age | Obs. Time | Flight time (s) | Likely Rotor Swept Area (Y/N) |
|------------|----------|-----------|---------|------------|-----|-----|-----------|-----------------|-------------------------------|
| 13/08/2019 | SI | 29 | PE | 1 | F | Ad | 14:07 | 60 | N |

Table AIII-3: Primary target species flight activity data from WFII VP2

| Date | Surveyor | Flight ID | Species | Num. Birds | M/F | Age | Obs. Time | Flight time (s) | Likely Rotor Swept Area (Y/N) |
|------------|----------|-----------|---------|------------|-----|-----|-----------|-----------------|-------------------------------|
| 17/04/2019 | DA | 9 | CU | 4 | U | Ad | 10:59 | 75 | N |

Table AIII-4: Primary target species flight activity data from WFII VP3

| Date | Surveyor | Flight ID | Species | Num. Birds | M/F | Age | Obs. Time | Flight time (s) | Likely Rotor Swept Area (Y/N) |
|------------|----------|-----------|---------|------------|-----|-----|-----------|-----------------|-------------------------------|
| 24/09/2019 | SI | 31 | CU | 1 | U | Ad | 14:17 | 60 | N |

Table AIII-5: Primary target species flight activity data from WFII VP4

| Date | Surveyor | Flight ID | Species | Num. Birds | M/F | Age | Obs. Time | Flight time (s) | Likely Rotor Swept Area (Y/N) |
|------------|----------|-----------|---------|------------|-----|-----|-----------|-----------------|-------------------------------|
| 24/07/2019 | SI | 28 | PE | 1 | F | Ad | 10:20 | 45 | N |

Secondary Target Species

Table AIII-1b: Secondary target species flight activity data from WFI VP1

| Date | Survey start | Survey end | Species | Count | 5 min period | Likely Rotor Swept Area (Y/N) |
|------------|--------------|------------|---------|-------|--------------|-------------------------------|
| 16/04/2019 | 12:59 | 15:59 | RN | 3 | 13:00 | Y |
| 16/04/2019 | 12:59 | 15:59 | RN | 2 | 13:07 | Y |
| 16/04/2019 | 12:59 | 15:59 | RN | 5 | 13:29 | Y |
| 16/04/2019 | 12:59 | 15:59 | RN | 1 | 13:38 | N |
| 16/04/2019 | 12:59 | 15:59 | RN | 2 | 15:14 | N |
| 16/04/2019 | 12:59 | 15:59 | RN | 2 | 15:21 | N |
| 16/04/2019 | 12:59 | 15:59 | CM | 4 | 15:32 | Y |
| 15/05/2019 | 16:25 | 19:25 | BZ | 1 | 17:05 | N |
| 15/05/2019 | 16:25 | 19:25 | LB | 2 | 18:20 | N |
| 17/05/2019 | 13:00 | 16:00 | LB | 2 | 13:54 | N |
| 17/05/2019 | 13:00 | 16:00 | LB | 1 | 14:00 | Y |
| 17/05/2019 | 13:00 | 16:00 | RN | 4 | 14:10 | N |
| 17/05/2019 | 13:00 | 16:00 | SH | 1 | 15:00 | N |
| 17/05/2019 | 13:00 | 16:00 | RN | 2 | 15:00 | N |
| 17/05/2019 | 13:00 | 16:00 | RN | 3 | 15:55 | N |
| 18/06/2019 | 13:00 | 16:00 | RN | 1 | 15:05 | N |
| 18/06/2019 | 13:00 | 16:00 | HG | 1 | 15:25 | N |
| 18/06/2019 | 13:00 | 16:00 | HG | 2 | 15:30 | N |
| 19/06/2019 | 09:10 | 12:10 | LB | 1 | 09:55 | N |
| 15/07/2019 | 09:10 | 12:10 | BZ | 1 | 10:25 | N |
| 16/07/2019 | 12:30 | 15:30 | RN | 2 | 13:00 | N |
| 16/07/2019 | 12:30 | 15:30 | HG | 1 | 14:10 | N |
| 16/07/2019 | 12:30 | 15:30 | RN | 1 | 14:55 | N |
| 07/08/2019 | 10:00 | 13:00 | RN | 3 | 10:00 | N |
| 07/08/2019 | 10:00 | 13:00 | H. | 1 | 11:10 | Y |
| 07/08/2019 | 10:00 | 13:00 | RN | 1 | 11:50 | N |
| 08/08/2019 | 13:00 | 16:00 | RN | 3 | 14:05 | N |
| 24/09/2019 | 13:10 | 16:10 | BZ | 1 | 15:40 | Y |
| 25/09/2019 | 09:10 | 12:10 | RN | 1 | 09:10 | Y |
| 25/09/2019 | 09:10 | 12:20 | L | 15 | 09:20 | N |

Table AIII-2b: Secondary target species flight activity data from WFI VP2

| Date | Survey start | Survey end | Species | Count | 5 min period | Likely Rotor Swept Area (Y/N) |
|------------|--------------|------------|---------|-------|--------------|-------------------------------|
| 10/04/2019 | 09:30 | 12:30 | RN | 1 | 12:05 | Y |
| 17/04/2019 | 13:03 | 16:03 | RN | 1 | 13:15 | Y |
| 17/04/2019 | 13:03 | 16:03 | LB | 2 | 13:54 | Y |
| 17/04/2019 | 13:03 | 16:03 | RN | 1 | 14:25 | Y |
| 17/04/2019 | 13:03 | 16:03 | RN | 1 | 14:28 | N |
| 17/04/2019 | 13:03 | 16:03 | RN | 1 | 14:37 | N |
| 17/04/2019 | 13:03 | 16:03 | LB | 3 | 14:48 | N |
| 17/04/2019 | 13:03 | 16:03 | RN | 1 | 14:53 | Y |
| 17/04/2019 | 13:03 | 16:03 | RN | 2 | 15:14 | Y |
| 17/04/2019 | 13:03 | 16:03 | RN | 1 | 15:35 | N |
| 17/04/2019 | 13:03 | 16:03 | RN | 2 | 15:52 | Y |
| 15/05/2019 | 12:55 | 15:55 | SH | 1 | 12:55 | N |
| 15/05/2019 | 12:55 | 15:55 | LB | 2 | 13:20 | N |
| 15/05/2019 | 12:55 | 15:55 | LB | 1 | 13:40 | N |
| 15/05/2019 | 12:55 | 15:55 | BZ | 1 | 14:55 | Y |
| 15/05/2019 | 12:55 | 15:55 | BZ | 1 | 15:00 | N |
| 15/05/2019 | 12:55 | 15:55 | RN | 1 | 15:00 | N |
| 17/05/2019 | 09:30 | 12:30 | RN | 3 | 09:45 | N |
| 17/05/2019 | 09:30 | 12:30 | RN | 2 | 09:55 | N |
| 17/05/2019 | 09:30 | 12:30 | RN | 1 | 10:40 | N |
| 17/05/2019 | 09:30 | 12:30 | BH | 2 | 10:40 | N |
| 17/05/2019 | 09:30 | 12:30 | RN | 4 | 12:00 | N |
| 19/06/2019 | 16:30 | 19:30 | HG | 1 | 17:00 | N |
| 15/07/2019 | 13:00 | 16:00 | LB | 1 | 13:35 | N |

Table AIII-3b: Secondary target species flight activity data from WFI VP1

| Date | Survey start | Survey end | Species | Count | 5 min period | Likely Rotor Swept Area (Y/N) |
|------------|--------------|------------|---------|-------|--------------|-------------------------------|
| 17/04/2019 | 13:05 | 16:05 | RN | 1 | 13:20 | N |
| 17/04/2019 | 13:05 | 16:05 | RN | 1 | 13:40 | N |
| 17/04/2019 | 13:05 | 16:05 | RN | 1 | 13:50 | N |
| 17/04/2019 | 13:05 | 16:05 | RN | 1 | 14:15 | N |

| Date | Survey start | Survey end | Species | Count | 5 min period | Likely Rotor Swept Area (Y/N) |
|------------|--------------|------------|---------|----------|--------------|-------------------------------|
| 17/04/2019 | 13:05 | 16:05 | RN | 1 | 14:30 | N |
| 17/04/2019 | 13:05 | 16:05 | RN | 1 | 14:50 | N |
| 17/04/2019 | 13:05 | 16:05 | RN | 1 | 15:00 | N |
| 17/04/2019 | 13:05 | 16:05 | RN | 1 | 15:10 | N |
| 17/04/2019 | 13:05 | 16:05 | RN | 1 | 15:25 | N |
| 17/04/2019 | 13:05 | 16:05 | RN | 1 | 15:35 | N |
| 17/04/2019 | 13:05 | 16:05 | RN | 2 | 15:55 | N |
| 16/04/2019 | 09:31 | 12:31 | RN | 1 | 09:51 | Y |
| 16/04/2019 | 09:31 | 12:31 | RN | 1 | 10:36 | Y |
| 16/04/2019 | 09:31 | 12:31 | LB | 1 | 10:38 | Y |
| 16/04/2019 | 09:31 | 12:31 | RN | 1 | 10:46 | Y |
| 16/04/2019 | 09:31 | 12:31 | LB | 1 | 10:57 | N |
| 16/04/2019 | 09:31 | 12:31 | RN | 1 | 11:46 | N |
| 16/04/2019 | 09:31 | 12:31 | RN | 1 | 12:25 | Y |
| 14/05/2019 | 10:55 | 13:55 | LB | 1 | 12:05 | Y |
| 14/05/2019 | 10:55 | 13:55 | RN | 1 | 12:10 | N |
| 14/05/2019 | 10:55 | 13:55 | LB | 1 | 12:20 | N |
| 14/05/2019 | 10:55 | 13:55 | RN | 2 | 12:20 | N |
| 14/05/2019 | 10:55 | 13:55 | LB | 5 | 12:25 | N |
| 14/05/2019 | 10:55 | 13:55 | LB | 2 | 12:25 | Y |
| 14/05/2019 | 10:55 | 13:55 | LB | 2 | 12:25 | N |
| 14/05/2019 | 10:55 | 13:55 | RN | 1 | 12:25 | N |
| 14/05/2019 | 10:55 | 13:55 | RN | 1 | 13:10 | Y |
| 14/05/2019 | 10:55 | 13:55 | LB | 1 | 13:20 | Y |
| 14/05/2019 | 10:55 | 13:55 | LB | 1 | 12:30 | N |
| 14/05/2019 | 10:55 | 13:55 | LB | 1 | 12:50 | N |
| 14/05/2019 | 10:55 | 13:55 | RN | 4 | 12:50 | N |
| 14/05/2019 | 10:55 | 13:55 | LB | 2 | 12:50 | N |
| 16/05/2019 | 07:20 | 10:20 | RN | 2 | 07:40 | N |
| 16/05/2019 | 07:20 | 10:20 | RN | 12 OR 14 | 07:55 | N |
| 16/05/2019 | 07:20 | 10:20 | RN | 6 | 08:35 | N |
| 16/05/2019 | 07:20 | 10:20 | RN | 2 | 09:00 | N |
| 16/05/2019 | 07:20 | 10:20 | LB | 2 | | N |
| 16/05/2019 | 07:20 | 10:20 | LB | 1 | | Y |

| Date | Survey start | Survey end | Species | Count | 5 min period | Likely Rotor Swept Area (Y/N) |
|------------|--------------|------------|---------|-------|--------------|-------------------------------|
| 16/05/2019 | 07:20 | 10:20 | RN | 3 | 10:00 | N |
| 16/05/2019 | 07:20 | 10:20 | RN | 2 | 10:20 | N |
| 20/06/2019 | 09:30 | 12:30 | RN | 1 | 11:00 | N |
| 20/06/2019 | 09:30 | 12:30 | RN | 2 | 11:35 | N |
| 24/06/2019 | 09:30 | 12:30 | LB | 1 | 09:50 | N |
| 24/06/2019 | 09:30 | 12:30 | BZ | 1 | 11:15 | N |
| 17/07/2019 | 09:00 | 12:00 | K. | 1 | 09:30 | N |
| 17/07/2019 | 09:00 | 12:00 | RN | 2 | 09:45 | N |
| 17/07/2019 | 09:00 | 12:00 | HG | 1 | 10:20 | N |
| 17/07/2019 | 09:00 | 12:00 | RN | 1 | 11:05 | N |
| 18/07/2019 | 13:00 | 16:00 | SN | 1 | 14:00 | N |
| 13/08/2019 | 13:45 | 16:45 | RN | 2 | 14:20 | N |
| 13/08/2019 | 13:45 | 16:45 | LB | 1 | 15:10 | N |
| 13/08/2019 | 13:45 | 16:45 | K. | 1 | 16:20 | N |
| 24/09/2019 | 13:30 | 13:30 | LB | 1 | 12:25 | N |
| 25/09/2019 | 12:30 | 15:30 | MA | 10 | 12:40 | N |

Table AIII-4b: Secondary target species flight activity data from WFII VP2

| Date | Survey start | Survey end | Species | Count | 5 min period | Likely Rotor Swept Area (Y/N) |
|------------|--------------|------------|---------|-------|--------------|-------------------------------|
| 19/04/2019 | 13:45 | 16:45 | RN | 1 | 14:40 | N |
| 19/04/2019 | 13:45 | 16:45 | RN | 2 | 15:10 | N |
| 19/04/2019 | 13:45 | 16:45 | RN | 3 | 15:35 | Y |
| 19/04/2019 | 13:22 | 14:55 | LB | 1 | 13:27 | Y |
| 19/04/2019 | 13:22 | 14:55 | LB | 1 | 14:13 | Y |
| 19/04/2019 | 13:22 | 14:55 | RN | 1 | 14:47 | Y |
| 17/04/2019 | 09:30 | 12:30 | LB | 1 | 10:06 | Y |
| 17/04/2019 | 09:30 | 12:30 | LB | 3 | 10:19 | Y |
| 17/04/2019 | 09:30 | 12:30 | LB | 2 | 11:02 | N |
| 17/04/2019 | 09:30 | 12:30 | RN | 2 | 11:57 | N |
| 14/05/2019 | 14:25 | 17:25 | RN | 5 | 15:05 | N |
| 14/05/2019 | 14:25 | 17:25 | RN | 3 | 15:15 | Y |
| 14/05/2019 | 14:25 | 17:25 | LB | 1 | 15:15 | Y |

| Date | Survey start | Survey end | Species | Count | 5 min period | Likely Rotor Swept Area (Y/N) |
|------------|--------------|------------|---------|-------|--------------|-------------------------------|
| 14/05/2019 | 14:25 | 17:25 | LB | 2 | 16:10 | Y |
| 16/05/2019 | 16:45 | 19:45 | RN | 3 | 16:50 | N |
| 16/05/2019 | 16:45 | 19:45 | RN | 1 | 16:55 | N |
| 16/05/2019 | 16:45 | 19:45 | SH | 1 | 16:55 | N |
| 16/05/2019 | 16:45 | 19:45 | RN | 3 | 17:20 | N |
| 16/05/2019 | 16:45 | 19:45 | LB | 2 | 17:45 | N |
| 16/05/2019 | 16:45 | 19:45 | RN | 2 | 18:15 | N |
| 16/05/2019 | 16:45 | 19:45 | RN | 5 | 19:00 | N |
| 20/06/2019 | 13:00 | 16:00 | K. | 1 | 13:25 | N |
| 24/06/2019 | 13:00 | 16:00 | HG | 1 | 13:20 | N |
| 24/06/2019 | 13:00 | 16:00 | RN | 2 | 13:55 | N |
| 24/06/2019 | 13:00 | 16:00 | RN | 3 | 14:20 | N |
| 24/06/2019 | 13:00 | 16:00 | RN | 1 | 14:40 | N |
| 24/06/2019 | 13:00 | 16:00 | HG | 1 | 15:30 | N |
| 18/07/2019 | 08:55 | 11:55 | BZ | 1 | 09:10 | N |
| 18/07/2019 | 08:55 | 11:55 | H. | 1 | 09:35 | N |
| 18/07/2019 | 08:55 | 11:55 | K. | 1 | 10:30 | N |
| 09/08/2019 | 12:30 | 15:30 | H. | 1 | 13:15 | N |

Table AIII-5b: Secondary target species flight activity data from WFII VP3

| Date | Survey start | Survey end | Species | Count | 5 min period | Likely Rotor Swept Area (Y/N) |
|------------|--------------|------------|---------|-------|--------------|-------------------------------|
| 16/04/2019 | 13:05 | 16:05 | BH | 1 | 13:15 | N |
| 16/04/2019 | 13:05 | 16:05 | BH | 3 | 13:25 | N |
| 16/04/2019 | 13:05 | 16:05 | BH | 3 | 13:50 | N |
| 16/04/2019 | 13:05 | 16:05 | BH | 4 | 14:00 | N |
| 16/04/2019 | 13:05 | 16:05 | RN | 1 | 14:20 | Y |
| 16/04/2019 | 13:05 | 16:05 | RN | 2 | 14:40 | N |
| 16/04/2019 | 13:05 | 16:05 | BH | 8 | 14:55 | N |
| 16/04/2019 | 13:05 | 16:05 | RN | 2 | 15:10 | Y |
| 16/04/2019 | 13:05 | 16:05 | BH | 3 | 15:15 | N |
| 16/04/2019 | 13:05 | 16:05 | LB | 1 | 15:30 | Y |
| 16/04/2019 | 13:05 | 16:05 | BH | 2 | 15:40 | N |

| Date | Survey start | Survey end | Species | Count | 5 min period | Likely Rotor Swept Area (Y/N) |
|------------|--------------|------------|---------|-------|--------------|-------------------------------|
| 19/04/2019 | 09:30 | 12:30 | BH | 1 | 09:46 | N |
| 19/04/2019 | 09:30 | 12:30 | BH | 1 | 09:59 | N |
| 19/04/2019 | 09:30 | 12:30 | LB | 2 | 10:09 | N |
| 19/04/2019 | 09:30 | 12:30 | BH | 1 | 10:09 | N |
| 19/04/2019 | 09:30 | 12:30 | BH | 2 | 10:28 | N |
| 19/04/2019 | 09:30 | 12:30 | BH | 2 | 10:51 | N |
| 19/04/2019 | 09:30 | 12:30 | MA | 8 | 11:00 | N |
| 19/04/2019 | 09:30 | 12:30 | BH | 1 | 11:29 | N |
| 19/04/2019 | 09:30 | 12:30 | BH | 2 | 11:40 | N |
| 19/04/2019 | 09:30 | 12:30 | RN | 1 | 11:55 | Y |
| 19/04/2019 | 09:30 | 12:30 | BH | 2 | 11:56 | N |
| 19/04/2019 | 09:30 | 12:30 | RN | 1 | 12:14 | N |
| 19/04/2019 | 09:30 | 12:30 | BH | 2 | 12:20 | Y |
| 19/04/2019 | 09:30 | 12:30 | RN | 1 | 12:22 | Y |
| 19/04/2019 | 09:30 | 12:30 | LB | 1 | 12:27 | Y |
| 15/05/2019 | 09:25 | 12:25 | LB | 1 | 09:35 | N |
| 15/05/2019 | 09:25 | 12:25 | RN | 2 | 10:05 | N |
| 15/05/2019 | 09:25 | 12:25 | LB | 1 | 10:15 | N |
| 15/05/2019 | 09:25 | 12:25 | RN | 1 | 10:20 | N |
| 15/05/2019 | 09:25 | 12:25 | H. | 1 | | N |
| 15/05/2019 | 09:25 | 12:25 | LB | 1 | 10:55 | N |
| 15/05/2019 | 09:25 | 12:25 | RN | 2 | 11:45 | N |
| 27/05/2019 | 11:36 | 14:36 | LB | 3 | 11:56 | N |
| 27/05/2019 | 11:36 | 14:36 | LB | 3 | 12:16 | N |
| 27/05/2019 | 11:36 | 14:36 | RN | 2 | 12:31 | N |
| 27/05/2019 | 11:36 | 14:36 | RN | 3 | 13:21 | Y |
| 27/05/2019 | 11:36 | 14:36 | RN | 8 | 13:26 | Y |
| 27/05/2019 | 11:36 | 14:36 | RN | 3 | 14:01 | N |
| 17/06/2019 | 11:44 | 14:44 | SH | 1 | 12:14 | N |
| 17/06/2019 | 11:44 | 14:44 | RN | 1 | 12:39 | N |
| 17/06/2019 | 11:44 | 14:44 | RN | 2 | 12:49 | N |
| 17/06/2019 | 11:44 | 14:44 | BH | 1 | 13:24 | N |
| 17/06/2019 | 11:44 | 14:44 | BH | 1 | 13:44 | N |
| 17/06/2019 | 11:44 | 14:44 | RN | 1 | 14:04 | N |

| Date | Survey start | Survey end | Species | Count | 5 min period | Likely Rotor Swept Area (Y/N) |
|------------|--------------|------------|---------|-------|--------------|-------------------------------|
| 17/06/2019 | 11:44 | 14:44 | BH | 1 | 14:29 | N |
| 18/06/2019 | 10:50 | 13:50 | BH | 1 | 10:50 | N |
| 18/06/2019 | 10:50 | 13:50 | BH | 1 | 11:05 | N |
| 18/06/2019 | 10:50 | 13:50 | RN | 18 | 12:40 | Y |
| 18/06/2019 | 10:50 | 13:50 | BZ | 1 | 12:40 | Y |
| 18/06/2019 | 10:50 | 13:50 | RN | 18 | 12:45 | Y |
| 18/06/2019 | 10:50 | 13:50 | BZ | 1 | 12:45 | Y |
| 18/06/2019 | 10:50 | 13:50 | BZ | 1 | 13:15 | N |
| 19/07/2019 | 09:00 | 12:00 | BZ | 1 | 09:25 | N |
| 19/07/2019 | 09:00 | 12:00 | LB | 1 | 09:50 | N |
| 19/07/2019 | 09:00 | 12:00 | LB | 1 | 10:15 | N |
| 19/07/2019 | 09:00 | 12:00 | H. | 1 | 11:05 | N |
| 19/07/2019 | 09:00 | 12:00 | SH | 1 | 11:40 | N |
| 24/07/2019 | 14:00 | 17:00 | H. | 1 | 14:20 | N |
| 24/07/2019 | 14:00 | 17:00 | HG | 2 | 15:05 | N |
| 24/07/2019 | 14:00 | 17:00 | RN | 5 | 15:40 | N |
| 24/07/2019 | 14:00 | 17:00 | K. | 1 | 16:45 | N |
| 14/08/2019 | 09:00 | 12:00 | K. | 1 | 11:05 | N |
| 14/08/2019 | 09:00 | 12:00 | RN | 2 | 11:30 | N |
| 15/08/2019 | 12:30 | 15:30 | K. | 1 | 13:15 | N |
| 15/08/2019 | 12:30 | 15:30 | BZ | 1 | 14:35 | Y |
| 15/08/2019 | 12:30 | 15:30 | RN | 5 | 15:00 | N |
| 24/09/2019 | 14:00 | 17:00 | HG | 1 | 14:15 | N |
| 24/09/2019 | 14:00 | 17:00 | HG | 1 | 14:20 | N |
| 24/09/2019 | 14:00 | 17:00 | RN | 1 | | N |
| 24/09/2019 | 14:00 | 17:00 | CX | 1 | 14:45 | N |
| 24/09/2019 | 14:00 | 17:00 | LB | 1 | 15:05 | N |
| 25/09/2019 | 09:00 | 12:00 | RN | 2 | 09:15 | N |
| 25/09/2019 | 09:00 | 12:00 | LB | 2 | 10:05 | N |

Table AIII-6b: Secondary target species flight activity data from WF2 VP4

| Date | Survey start | Survey end | Species | Count | 5 min period | Likely Rotor Swept Area (Y/N) |
|------------|--------------|------------|---------|-------|--------------|-------------------------------|
| 17/04/2019 | 09:25 | 12:25 | LB | 1 | 10:10 | N |
| 17/04/2019 | 09:25 | 12:25 | LB | 1 | 10:45 | N |
| 17/04/2019 | 09:25 | 12:25 | LB | 1 | 11:35 | N |
| 14/05/2019 | 07:25 | 10:25 | RN | 2 | 07:25 | N |
| 14/05/2019 | 07:25 | 10:25 | RN | 6 | 07:30 | N |
| 14/05/2019 | 07:25 | 10:25 | RN | 6 | 07:35 | N |
| 14/05/2019 | 07:25 | 10:25 | RN | 6 | 07:50 | N |
| 14/05/2019 | 07:25 | 10:25 | BH | 1 | 08:10 | N |
| 14/05/2019 | 07:25 | 10:25 | LB | 1 | 08:15 | N |
| 14/05/2019 | 07:25 | 10:25 | RN | 6 | 08:15 | N |
| 14/05/2019 | 07:25 | 10:25 | RN | 6 | 08:20 | N |
| 14/05/2019 | 07:25 | 10:25 | RN | 6 | 08:25 | N |
| 14/05/2019 | 07:25 | 10:25 | LB | 1 | 08:25 | Y |
| 14/05/2019 | 07:25 | 10:25 | RN | 6 | 08:30 | N |
| 14/05/2019 | 07:25 | 10:25 | RN | 6 | 08:35 | N |
| 14/05/2019 | 07:25 | 10:25 | RN | 6 | 08:40 | N |
| 14/05/2019 | 07:25 | 10:25 | RN | 6 | 08:45 | N |
| 14/05/2019 | 07:25 | 10:25 | LB | 1 | 08:45 | N |
| 14/05/2019 | 07:25 | 10:25 | RN | 6 | 09:00 | N |
| 14/05/2019 | 07:25 | 10:25 | RN | 6 | 09:15 | N |
| 14/05/2019 | 07:25 | 10:25 | RN | 6 | 09:20 | N |
| 14/05/2019 | 07:25 | 10:25 | LB | 2 | 09:20 | N |
| 14/05/2019 | 07:25 | 10:25 | BH | 1 | 09:20 | N |
| 14/05/2019 | 07:25 | 10:25 | RN | 6 | 09:25 | N |
| 14/05/2019 | 07:25 | 10:25 | LB | 1 | 09:45 | Y |
| 14/05/2019 | 07:25 | 10:25 | RN | 2 | 10:10 | N |
| 14/05/2019 | 07:25 | 10:25 | LB | 2 | 10:20 | N |
| 27/05/2019 | 15:06 | 18:06 | RN | 5 | 15:06 | N |
| 17/06/2019 | 08:14 | 11:14 | LB | 1 | 08:34 | Y |
| 17/06/2019 | 08:14 | 11:14 | RN | 6 | 08:49 | N |
| 17/06/2019 | 08:14 | 11:14 | RN | 6 | 08:54 | N |
| 17/06/2019 | 08:14 | 11:14 | BH | 2 | 08:54 | N |
| 17/06/2019 | 08:14 | 11:14 | BZ | 1 | 10:04 | Y |
| 17/06/2019 | 08:14 | 11:14 | BZ | 2 | 11:04 | N |

| Date | Survey start | Survey end | Species | Count | 5 min period | Likely Rotor Swept Area (Y/N) |
|------------|--------------|------------|---------|-------|--------------|-------------------------------|
| 18/06/2019 | 07:15 | 10:15 | RN | 3 | 07:20 | Y |
| 18/06/2019 | 07:15 | 10:15 | LB | 2 | 07:20 | Y |
| 18/06/2019 | 07:15 | 10:15 | RN | 3 | 07:40 | Y |
| 18/06/2019 | 07:15 | 10:15 | RN | 2 | 08:05 | N |
| 18/06/2019 | 07:15 | 10:15 | LB | 5 | 09:05 | N |
| 18/06/2019 | 07:15 | 10:15 | RN | 8 | 09:45 | N |
| 18/06/2019 | 07:15 | 10:15 | K. | 1 | 09:50 | N |
| 18/06/2019 | 07:15 | 10:15 | LB | 2 | 10:10 | N |
| 19/07/2019 | 13:00 | 16:00 | BZ | 1 | 14:00 | N |
| 19/07/2019 | 13:00 | 16:00 | K. | 1 | 14:25 | N |
| 19/07/2019 | 13:00 | 16:00 | H. | 1 | 15:40 | N |
| 19/07/2019 | 13:00 | 16:00 | LB | 1 | 15:50 | N |
| 19/07/2019 | 13:00 | 16:00 | LB | 1 | 15:50 | N |
| 24/07/2019 | 10:00 | 13:00 | BZ | 1 | 10:50 | N |
| 24/07/2019 | 10:00 | 13:00 | LB | 1 | 12:00 | N |
| 14/08/2019 | 13:00 | 16:00 | HG | 1 | 13:35 | N |
| 14/08/2019 | 13:00 | 16:00 | RN | 3 | 13:55 | N |
| 14/08/2019 | 13:00 | 16:00 | K. | 1 | 14:15 | N |
| 15/08/2019 | 08:45 | 11:45 | BZ | 1 | 09:30 | Y |
| 15/08/2019 | 08:45 | 11:45 | RN | 1 | 09:55 | N |
| 15/08/2019 | 08:45 | 11:45 | HG | 1 | 13:35 | N |

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APPENDIX 7-3

**BIRD SURVEY RESULTS –
WINTER 2019-2020**

APPENDIX 7-3

Bird Survey Report Winter 2019-20

BIRD SURVEY REPORT

WINTER 2019/20

Seven Hills Wind Farm I and II

Prepared for: Seven Hills Wind Farm Ltd

SLR Ref: 501.00501.00004
Version No: REV2
May 2022



BASIS OF REPORT

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1.0 Introduction

SLR Consulting Ireland (SLR) was commissioned by Seven Hills Wind Farm Ltd. in October 2019 to carry out a winter bird survey programme for the proposed Seven Hills Wind Farm, Co. Roscommon during the winter period 2019-20. There are two phases within the current iteration of the wind farm design, hereafter referred to as Wind Farm I and Wind Farm II.

1.1 Background to the Commission

Planning permission was originally granted by An Bord Pleanála (ABP) for both of these developments (Phase 1 ABP Planning Ref: PL 20.244346 / 20.239759; and Phase 2 ABP Planning Ref: PL 20.244347 / 20.241069) but was subsequently refused following the appeal process. The main reasons for refusal of planning for each of the developments cited by An Bord Pleanála were issues relating to the lack of certainty in relation to the impact of the proposed development on European Sites in the vicinity of the proposed developments and the qualifying interests for which those European Sites are designated.

1.2 Site Description

The dominant habitat within the boundaries of the proposed Seven Hills Wind Farm I development site is improved agricultural grassland and the proposed site is not designated for nature conservation.

The proposed Seven Hills Wind Farm II development site is a slightly more diverse area in terms of habitat composition with dominant habitats present being improved agricultural grassland, dry calcareous grassland and scrub. The proposed site also does not hold any designations for nature conservation.

There are several Natura 2000 designated sites relating to birds of conservation concern located within 15km of both wind farms. Please see Table 3-1 for further details of these.

1.3 Purpose of the Report

The aim of this report is to provide robust baseline ornithological survey data for the winter period 2019/20 at both phases of the wind farm. These data will be used to inform a separate ecological impact assessment and appropriate assessment for the proposed wind farm. The assessment of potential impacts is beyond the scope of this report.

This report follows on from the bird survey report for winter 2018/2019 (SLR Consulting, 2021). As such, in order to glean a comprehensive representation of winter bird activity at both proposed wind farm sites across the two winter seasons, the 2018/2019 report should be read alongside this report.

2.0 Methodology

2.1 Desk-based Review

The desk-based review collated available information collected to date on the wintering bird movements in and around the proposed wind farm development sites. This included a review of the following documents submitted as part of the previous planning applications in 2010 and 2012:

- FERS (2010) Proposed Seven Hills Wind Farm Site (Phase I): Ornithological Assessment Report June 2010. Appendix 8.1 of IWCM (2010) Proposed Seven Hills Wind Farm Phase I EIS Chapter 8 – Ornithology;
- FERS (2011) Proposed Seven Hills Wind Farm (Phase II): Ornithological Assessment Report July 2011. Appendix 8.1 of IWCM (2011) Proposed Seven Hills Wind Farm Phase II EIS Chapter 8 – Ornithology;
- Moore Group, FERS and IWCM (2010) Natura Impact Statement and Appropriate Assessment as required under Article 6(3) of the Habitats Directive (Council Directive 92/43/EEC) of Seven Hills Wind Farm Co. Roscommon (Phase I);
- FERS (2010) Response to issues arising from item (5) of a Request for Further Information (RFI) from Roscommon Co. Council (Planning Reference no. 10/541);
- Moore Group, FERS and IWCM (2011) Natura Impact Statement and Appropriate Assessment as required under Article 6(3) of the Habitats Directive (Council Directive 92/43/EEC) of Seven Hills Wind Farm Co. Roscommon (Phase II);
- EcoFact Environmental Consultants Ltd (2012) Seven Hills Wind Farm (Phase I) Co. Roscommon Report to inform the Appropriate Assessment Process; and
- EcoFact Environmental Consultants Ltd (2012) Seven Hills Wind Farm (Phase II) Co. Roscommon Report to inform the Appropriate Assessment Process.

In addition, a review of the following more recent documents which were produced subsequent to the submission of the planning applications was also undertaken:

- EcoFact Environmental Consultants Ltd (2015) Seven Hills Wind Farm, Co. Roscommon Wintering Bird Survey 2014/2015;
- EcoFact Environmental Consultants Ltd (2018) Seven Hills Wind Farms Winter Bird Surveys 2016/17; and
- Inis Environmental Consultants Ltd (2018) Summary Report on Winter 2017/18 Findings at the Proposed Seven Hills I and II Windfarms, Co. Roscommon.

The websites of the National Parks and Wildlife Service (NPWS) www.npws.ie and the National Biodiversity Data Centre (NBDC) <http://maps.biodiversityireland.ie/#/Map> were also accessed for information on sites designated for nature conservation in the vicinity of the site.

2.2 Field Surveys

The scope of winter bird surveys for the proposed wind farm is based on recommendations given in Scottish Natural Heritage (SNH) 2017 guidance. This survey methods guidance is recognised as standard best practice guidance through the UK and Ireland for surveying birds to inform impact assessment of onshore wind farms.

The scope of survey work was the same as that conducted in 2018-19, with the addition of Greenland white-fronted goose roosting surveys at Lough Croan and nocturnal foraging surveys for golden plover. Further details are provided in Sections 2.2.2 to 2.2.5.

2.2.1 Field Survey Team: Evidence of Technical Competence and Experience

Sarah Ingham (SI) – Project Manager and Lead Ornithologist

Sarah is a Senior Ecologist and holds a BSc in Zoology from Anglia Ruskin University, Cambridge, UK and an MSc in Biodiversity and Conservation from Trinity College Dublin. She is an Associate member of the Chartered Institute of Ecology and Environmental Management (CIEEM). Sarah is a highly skilled and experienced bird surveyor with 11 years' post graduate experience as a professional consultant ecologist/ornithologist. Sarah managed this project through liaison with the client, coordination of the survey team, supervision of the health and safety of the team, carrying out various bird surveys onsite throughout the survey season, collating, quality controlling and assessing the survey data and writing this report.

Daniel Alexander (DA) – Lead Bird Surveyor

Daniel has been working as a field surveyor on numerous projects for the last ten years. During this time, he has gained a breadth of experience conducting, planning, and supporting ecological surveys. Daniel has expertise in undertaking bird surveys, both breeding and wintering, and in recent years has been responsible for monitoring the breeding bird assemblage of a large ecological restoration project as part of the Mersey Gateway Project in the UK. Daniel now works for SLR as a Senior Field Ecologist. Supervised by Sarah Ingham, Daniel was lead bird surveyor at Seven Hills Wind Farm during the winter 2019/20 survey season.

Daniel Hulmes (DH) – Assistant Bird Surveyor

Daniel is a Senior Field Ornithologist and Terrestrial Ecologist. He has worked on a wide range of projects involving the survey and monitoring of birds in the UK, Ireland and internationally. Furthermore, as part of his previous work as an Ecologist, he gained experience in managing projects which included a large amount of report writing, survey planning and client interaction. Supervised by Sarah Ingham, Daniel assisted with bird surveys at Seven Hills Wind Farm during the winter 2019/20 survey season when required.

Jason Cahill (JC) – Assistant Bird Surveyor

Jason joined SLR in February 2020, and this is his first long-term role in ecological consultancy. Jason holds a BSc (Hons) in Field Biology with Wildlife Tourism from Institute of Technology Tralee. Jason has experience with bird surveys, involving vantage point and transect surveys, data collection and input. Supervised by Sarah Ingham, Jason also assisted with bird surveys at Seven Hills Wind Farm during the winter 2019/2020 survey season when required.

2.2.2 Flight Activity Surveys

Vantage point (VP) locations were the same as those used in winter 2018-19, which were initially chosen based on locations used during previous surveys (see Section 3.1). The adequacy of these VPs was checked by carrying out a desk-based viewshed analysis using a bespoke GIS tool for calculating the visible area from each vantage point (VP). The Zones of Theoretical Visibility (ZTV) from each VP were calculated using ArcMAP 10.5.1 Spatial Analyst. The ZTVs were calculated with a surface offset of 30m and from a viewing height of 1.8m above ground level. The terrain model was derived from EU-DEM data with a vertical accuracy of $\pm 7\text{m}$. VP locations and viewing arcs are shown in Figure 1 and VP viewsheds are shown in Figure 2. The proposed site layout is also shown in Figures 1 and 2.

Initially, a total of 36 hours of watches were undertaken at each of six vantage point (VP) locations during the winter season (monthly visits October – March inclusive). This equates to a total of six hours per VP per month. In addition, there was a further 6 hours of watches carried out at each of the 6 VPs in March 2020 with the aim of observing and recording any movements of target bird species, such as geese and swans, across the proposed wind farm development sites during the spring migration period. As such, a total of 42 hours of survey effort was carried out at each VP during the 2019/20 winter season. The VP survey effort undertaken during the winter of 2019/20 is given below in Table 2-1.

Table 2-1: VP survey effort undertaken at the Seven Hills Wind Farms I and II sites October 2019 to March 2020

| Month | WFI VP1 (hours) | WFI VP2 (hours) | WFII VP1 (hours) | WFII VP2 (hours) | WFII VP3 (hours) | WFII VP4 (hours) |
|-------------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| October | 6:00 | 6:00 | 6:00 | 6:00 | 6:00 | 6:00 |
| November | 6:00 | 6:00 | 6:00 | 6:00 | 6:00 | 6:00 |
| December | 6:00 | 6:00 | 6:00 | 6:00 | 6:00 | 6:00 |
| January | 6:00 | 6:00 | 6:00 | 6:00 | 6:00 | 6:00 |
| February | 6:00 | 6:00 | 6:00 | 6:00 | 6:00 | 6:00 |
| March | 12:00 | 12:00 | 12:00 | 12:00 | 12:00 | 12:00 |
| Total hrs | 42:00 | 42:00 | 42:00 | 42:00 | 42:00 | 42:00 |
| VP locations (Figure 1) | 587337 E 748665 N | 585834 E 746017 N | 588967 E 745061 N | 587372 E 743512 N | 590643 E 743279 N | 592160 E 743701 N |

It is good practice to ensure that where possible each monthly six-hour survey period is split over more than a single day and spread across different times of the day. As such, the six-hour survey periods were divided into three-hour blocks which were alternated across consecutive days e.g. on day 1, VP1 would be completed in the morning and VP2 would be completed in the afternoon and on day 2, VP2 would be completed in the morning and VP1 in the afternoon. Breaks of at least 30 minutes were taken between watches to minimise observer fatigue. Details of survey dates, times and observers are provided in Appendix I and a record of weather conditions during surveys is provided in Appendix II.

VP watches aimed to quantify the flight activity of primary and secondary target species (as defined in Section 2.2.2.1) within the study area.

The main purpose of VP watches is to collect data on primary target species that will enable estimates to be made of:

- The time spent flying over the site;
- The relative use by birds of different parts of the site;
- The proportion of flying time spent within the provisional upper and lower risk height limits as determined by the potential rotor diameter and rotor hub height; and
- Ultimately, the analysis of the potential risk of collision of birds with rotating turbines.

For each primary target species observation, the following details were recorded:

- Time of observation;
- Species, age and sex (where determinable);
- Number of birds observed per bout;
- Duration of flying bout;
- Time spent within each height band; and
- Notes on observation.

In the absence of detailed information regarding turbine specifications at the time of undertaking the surveys, the recording height bands were determined based on the turbine specifications included in the previous

application (tip height 135m, lowest rotor swept height 35m) plus a little bit extra to allow some flexibility. Flight heights were therefore attributed to four distinct height bands as follows:

- 1 = < 25m (below the likely rotor swept area);
- 2 = 25m to 50m (the likely rotor swept area);
- 3 = 50m to 150m (the likely rotor swept area); and
- 4 = > 150m (above the likely rotor swept area).

In addition, a summary of observations of secondary target species was recorded at the end of each five-minute period during each VP watch to provide an index of flight activity for secondary target species within the site, in accordance with current SNH guidance. Data collected on secondary species included:

- The five-minute period start and end time;
- Species;
- Number of birds observed;
- If flying, the height band in which birds were observed flying;
- Whether birds were observed onsite, in the 500m buffer or beyond;
- Flight behaviour and;
- Notes on observation.

2.2.2.1 Target Species

Primary Target Species

Target species for the surveys were defined by legal and/or conservation status and vulnerability to impacts caused by wind turbines, as defined in SNH Guidance (2017). Following the 2018-19 winter surveys, the list of primary target species was limited to species upon which effects are most likely to be potentially significant in EIA terms, thereby enabling recording to focus on the species of greatest importance.

SNH guidelines state that “*in most circumstances the target species will be limited to those species which are afforded a higher level of legislative protection.*” Kestrel, buzzard and sparrowhawk are not subject to a higher level of legislative protection than any other bird species and were therefore not recorded as primary target species during the winter 2019-20 surveys.

Furthermore, primary target species were specifically limited to species upon which effects are most likely to be potentially significant in EIA terms, e.g. whooper swan, Greenland white-fronted goose, Annex 1 raptor species and waders forming qualifying features for nearby SPAs. This enabled recording to focus on the species of greatest importance without the distraction of having to record detailed flight data for a larger number of more common species.

As such, the primary target species for these VP surveys included the following bird species:

- Greenland white-fronted goose *Anser albifrons flavirostris*;
- Whooper swan *Cygnus cygnus*;
- Golden plover *Pluvialis apricaria*;
- Lapwing *Vanellus vanellus*;
- Peregrine falcon *Falco peregrinus*;
- Hen harrier *Circus cyaneus*;
- Merlin *Falco columbarius*; and
- Short-eared owl *Asio flammeus*.

Secondary Target Species

Secondary target species included:

- Any other wildfowl and wader species;
- Buzzard *Buteo buteo*;
- Sparrowhawk *Accipiter nisus*;
- Kestrel *Falco tinnunculus*;
- Raven *Corvus corax*;
- Grey heron *Ardea cinerea*;
- Cormorant *Phalacrocorax carbo*; and
- Gulls *Larus sp.*

2.2.3 Swan and Goose Feeding Distribution Surveys

SNH (2017) recommends that for whooper swan, Greenland white-fronted goose and other goose species, feeding distribution surveys should be undertaken in areas of suitable habitat when the survey area lies within the core foraging distance of SPAs for these species or other major roosts, unless it can be established from existing data that the area is not utilised for feeding.

Feeding distribution surveys were therefore carried out on a monthly basis to establish if swans and geese were using the fields within 1 km of the wind farm boundary. Whooper swan and Greenland white-fronted goose are features of interest of several Special Protection Areas (SPAs) within 15 km of the site boundary (see Table 3-1). A buffer of 1 km around both wind farm sites was used for these surveys which were undertaken by driven transect, stopping on a regular basis to check all fields for goose and swan feeding activity. An initial survey was undertaken in October 2019 and repeated on a monthly basis until March 2020. The transect route, survey dates and survey results are shown in Figure 9. .

2.2.4 Greenland White-fronted Goose Roost Surveys

Data indicating recent usage of Lough Croan as a roost site by Greenland white-fronted geese came to light during discussions between SLR and personal contacts at Birdwatch Ireland in the latter part of 2019, following which we obtained an unpublished study on the species (Burke *et al.*, 2014). The unpublished document accessed in 2019 revealed evidence of recent use of Lough Croan, and other turloughs such as Four Roads, by roosting Greenland white-fronted geese. Surveys for roosting Greenland white-fronted geese were therefore added to the scope from December 2019 and were repeated on a monthly basis until March 2020.

There are a number of lakes and turloughs within a 2km radius of the wind farm sites, namely Lough Croan to the north of Wind Farm I, Coolagarry Lough to the east of Wind Farm I, Feacle Lough to the southeast of Wind Farm II and Corkip Lough to the east of Wind Farm II.

Coolagarry Lough has been consistently watched during the swan and goose feeding distribution surveys, which yielded no records of Greenland white-fronted geese using this lough. Furthermore, the data provided by Birdwatch Ireland revealed that there are no previous records of geese roosting at this lough. Thus, Coolagarry Lough was ruled out as a site for targeted goose roost surveys. Feacle Lough is overlooked entirely by VP3. As such, it has been closely monitored during VP surveys and did not require further targeted goose roost surveys. Corkip Lough is approximately 400m east of VP4. It was visited early in the winter season of 2019/20 and observed to have evolved into a reed bed. As such, this habitat has become unsuitable for roosting Greenland white-fronted geese and was also ruled out of targeted roost surveys.

The data provided by Birdwatch Ireland revealed that there are two turloughs within 6.5km of the proposed Wind Farm I which hold previous records roosting Greenland white-fronted geese (Burke *et al.*, 2014). These are Lough Funshinagh and Lough Croan.

Lough Funshinagh is the larger and most distant of the two, located 6.5km to the north east of Wind Farm I. Records show that geese previously foraged on the islands and wet-grassland fringes at the north-east end of the turlough. Funshinagh contains an extensive area of water throughout the year, which rises with increased rainfall in winter. Water levels fluctuate significantly between years however, and the turlough dries out entirely 2-3 times per decade on average, meaning its value to waterfowl varies from year to year. Islands and peripheral patches of fields formerly used for feeding have become overgrown with scrub since the early 1990s and White-fronts have not been recorded on Lough Funshinagh since the mid-1990s. As such, given the distance from the proposed wind farm site and the fact that Greenland white-fronts have not been recorded there for almost three decades, this turlough was excluded from targeted goose roost surveys.

Lough Croan is approximately 1.5km north of the proposed Wind Farm I. Lough Croan contains a variety of habitats such as turlough on the eastern side, with a reed-bed in the centre and a partly floating fen in the west, which also floods most winters. Burke *et al* (2014) reviews all available data on the Greenland White-fronted Goose population that overwinters in Ireland, which was collected over the three-decade period, 1982/83 – 2011/12, providing a description on each of the extant flocks present during that time. This review suggests that Lough Croan is suspected as having been used as a roosting site for Greenland White-fronted Goose to some extent in the past when water levels were suitably high. As such, given its proximity to Wind Farm I, it was deemed necessary to investigate the current status of and potential for the presence of roosting geese at Lough Croan by carrying out monthly dawn and dusk vantage point surveys at the lough.

Watches of Lough Croan were carried out simultaneously from two vantage points on the local road north of Lough Croan monthly between December 2019 and March 2020. The watches were carried out at dusk and the following dawn each month for a duration of up to 2 hours. The dawn watches began at civil twilight i.e. 30 minutes before the time of sunrise and continued for up to 1.5 hours after sunrise. The dusk watches ended at civil twilight i.e. starting 1.5hrs before the time of sunset and continuing for up to 30 minutes after sunset. Any flight-lines of geese to and from the roost along with the direction of flight and the number of birds were recorded during watches.

The vantage point locations and survey results are shown in Figure 10. .

2.2.5 Golden Plover Nocturnal Foraging Surveys

Following small numbers of records of golden plover during daytime surveys in winter 2018-19, additional surveys were carried out in winter 2019-20 to determine whether golden plover activity at the site was significantly different at night.

Pre-defined transects were walked at night on three occasions between January and March 2020. The purpose of the survey was to identify if golden plover uses the site for foraging at night. The relatively rough topography and terrain present on Wind Farm II was considered a health and safety risk to surveyors working in such terrain at night. Therefore, the transects were focused on the site of the proposed Wind Farm I and as such, all proposed turbine locations and associated access tracks under consideration at that time were walked after dark by 2 surveyors.

A high-powered torch was used by one surveyor to slowly sweep across the landscape, while a second surveyor used binoculars to spot any birds visible in the torchlight. Any foraging golden plover flushed while the surveyors were walking the transect route were also recorded.

The transect route and survey results are shown in Figure 11.

2.3 Survey Limitations

The majority of vantage point surveys were undertaken in optimal weather conditions. However, during such an extensive series of surveys carried out over the winter period it was inevitable that some surveys were completed in suboptimal conditions. There were 48 hours out of the total of 216 during which the visibility was recorded

as “moderate” i.e. 1-3km and 2 non-consecutive hours during which the visibility was “poor” i.e. less than 1km. This comprises 23% of the total survey season and in most cases all of the relevant 2km viewing arc was visible. As such, this does not significantly affect the validity of the data collected. Please see details in Appendix II.

As shown in Figure 2, due to local topographical conditions a small area at the western end of Wind Farm I and a very small area within the 500m buffer zone for Wind Farm II were not within the 2km viewsheds from any of the VPs. All proposed turbine locations and the vast majority of the 500m buffer were visible from at least one VP however and the gaps in coverage are therefore not considered to represent a significant limitation.

In accordance with the standard methodology, the swan and goose feeding distribution surveys were carried out from public roads without any access to land and as such, not all fields within the 1km survey area were visible from roads. This was a limitation in that there is a possibility that some feeding flocks may have been out of sight. However, any additional swans or geese which were potentially not recorded during the feeding distribution surveys would have most likely been observed moving between foraging grounds during the remainder of the survey or during the vantage point surveys and it is therefore considered unlikely that significant feeding flocks were overlooked.

As mentioned above in Section 2.2.5, the golden plover nocturnal survey was limited to Wind Farm I due to health and safety concerns relating to working at night in rough terrain at Wind Farm II. Unfortunately, this limitation was unavoidable.

3.0 Results

3.1 Desk-based Review

3.1.1 Natura 2000 Sites

There are no Special Protection Areas (SPA) within the proposed wind farm sites. However, there are a total of five SPAs within a 15 km¹ radius of the survey area.

The five SPAs within 15km are shown in Table 3-1, which also shows the qualifying interests for each site. For the purposes of this report, which deals specifically with wintering birds, qualifying interests which are only present during the breeding season have been excluded from Table 3-1.

Table 3-1: SPAs within 15km of Seven Hills Wind Farms I and II and their qualifying interests (species present during the winter period only)

| Site Name | Site Code | Distance/ Direction from Site Boundary | Wintering Species of Special Conservation Interest |
|--------------------------|-----------|---|---|
| Lough Croan Turlough SPA | 004139 | 1.5km north | <ul style="list-style-type: none"> Shoveler <i>Anas clypeata</i> Golden Plover <i>Pluvialis apricaria</i> Greenland White-fronted Goose <i>Anser albifrons flavirostris</i> Wetland and Waterbirds |
| River Suck Callows SPA | 004097 | 1.7km west | <ul style="list-style-type: none"> Whooper Swan <i>Cygnus cygnus</i> Wigeon <i>Anas penelope</i> Golden Plover <i>Pluvialis apricaria</i> Lapwing <i>Vanellus vanellus</i> Greenland White-fronted Goose <i>Anser albifrons flavirostris</i> Wetland and Waterbirds |
| Four Roads Turlough SPA | 004140 | 1.9km north | <ul style="list-style-type: none"> Golden Plover <i>Pluvialis apricaria</i> Greenland White-fronted Goose <i>Anser albifrons flavirostris</i> Wetland and Waterbirds |
| Lough Ree SPA | 004064 | 8km east | <ul style="list-style-type: none"> Little Grebe <i>Tachybaptus ruficollis</i> Whooper Swan <i>Cygnus cygnus</i> Wigeon <i>Anas penelope</i> Teal <i>Anas crecca</i> Mallard <i>Anas platyrhynchos</i> Shoveler <i>Anas clypeata</i> Goldeneye <i>Bucephala clangula</i> Coot <i>Fulica atra</i> Golden Plover <i>Pluvialis apricaria</i> Lapwing <i>Vanellus vanellus</i> Wetland and Waterbirds |

¹ 15 km is the distance typically applied when considering wildfowl ranging from roost sites to foraging sites.

| Site Name | Site Code | Distance/ Direction from Site Boundary | Wintering Species of Special Conservation Interest |
|----------------------------|-----------|---|---|
| Middle Shannon Callows SPA | 004096 | 11.4km southeast | <ul style="list-style-type: none"> Whooper Swan <i>Cygnus cygnus</i> Wigeon <i>Anas penelope</i> Golden Plover <i>Pluvialis apricaria</i> Lapwing <i>Vanellus vanellus</i> Black-tailed Godwit <i>Limosa limosa</i> Black-headed Gull <i>Chroicocephalus ridibundus</i> Wetland and Waterbirds |

3.1.2 Previous Survey Data

Winter bird surveys were undertaken at Wind Farms I and II during the winter seasons of 2008/09, 2009/10, 2011/12, 2014/15, 2016/17 and 2017/18. A review of the previous winter bird survey reports listed in Section 2.1 revealed that a variety of bird survey methods were used across the six survey seasons. Surveys carried out each year at each wind farm site are described below together with a short summary of the survey results. The relevant reports should be referred to for further details.

During the survey period November 2008 – February 2009, the site was visited four times per month (FERS 2010; FERS 2011). On each of these occasions, five vantage points were visited for a period of 20 minutes throughout the day (three at Wind Farm I and two at Wind Farm II). During the surveys at Wind Farm I, a total of four species of red-listed status (Lynas *et al.*, 2009) were observed using the proposed development site, namely black-headed gull, curlew *Numenius arquata*, golden plover and lapwing. Six species of amber status were observed using the proposed development site, namely whooper swan, starling *Sturnus vulgaris*, house sparrow *Passer domesticus*, swallow *Hirundo rustica*, snipe *Gallinago gallinago* and linnet *Carduelis cannabina*. During surveys at Wind Farm II, a total of six red-listed species were recorded within the proposed development site namely pintail *Anas acuta*, shoveler, black-headed gull, curlew, golden plover and lapwing. A total of 17 amber-listed species were observed at Wind Farm II. In addition to the same six amber-listed species as observed at Wind Farm I, Bewick's swan *Cygnus columbianus*, mute swan *Cygnus olor*, wigeon, pochard *Aythya ferina*, tufted duck *Aythya fuligula*, teal, shelduck *Tadorna tadorna*, dunlin *Caladris alpina*, coot, lesser black-backed gull *Larus fuscus* and kestrel were also recorded within the site. Of these species, only two were evaluated as "potentially threatened" by the proposed wind farms, namely curlew and whooper swan.

Targeted whooper swan surveys were carried out twice monthly during the winter periods October 2009 – April 2010 (at both Wind Farms I and II) and November 2010 – February 2011 (Wind Farm II only) (FERS 2010; FERS 2011). These surveys were undertaken to determine if whooper swans flew through the area in which the turbines were proposed to be sited. Methods were based on Larsen and Clausen (2002). Observations were carried out from one vantage point within the Wind Farm I site in 2009/10 and three vantage points within Wind Farm II during the 2009/10 and 2010/11 seasons. Surveys at Wind Farm I in 2009/10 yielded observations of three flocks of whooper swan (n=5, n=3 and n=4) flying through the Wind Farm I site within a single survey period in February 2010. The three flocks were observed flying at heights of 15-20m. These were the only sightings of whooper swan at Wind Farm I throughout the winter season 2009/10. Surveys at Wind Farm II during the same season, yielded two observations of whooper swan flocks flying through the wind farm site, with one flock of seven recorded in December 2009 and a second flock of 17 recorded in February 2010. Both flocks were observed flying at heights of 10-20m above ground level.

During the 2010/11 whooper swan surveys undertaken at Wind Farm II, there were two records of whooper swan flying through the wind farm site. The first was of a flock of four observed in December 2010 flying towards Feacle Lough at a height of 30-40m, while the second, observed in February 2011, was of a flock of six whooper

swan flying through the site at 5-10m height. There were also two observations of peregrine falcon recorded flying through the site during these surveys in December and February.

The methodology used in 2009/10 and 2010/11 was repeated twice monthly at both wind farm sites between December 2011 and February 2012 by FERS (data presented in Appendix 7 of the NIS (Ecofact, 2012)). During the 2011/12 survey season, a single whooper swan was recorded flying through the proposed location of the turbines at Wind Farm I at a height of 5m. This was the only sighting of whooper swan during those three months of surveying. An unspecified number of golden plovers were also recorded feeding in fields north of the proposed turbine locations in rough grassland during February 2012. At Wind Farm II, there were five flocks of whooper swan recorded flying through the site during December (n=4) and February (n=2; n=3; n=2 and n=4). All five flocks were recorded flying at heights of 5-15m.

Further winter surveys were undertaken at Wind Farms I and II from October 2014 to March 2015 (Ecofact, 2015). These surveys involved assessing an extensive area surrounding the proposed wind farm sites, which covered a large proportion of South Roscommon and encompassed waterbodies including Lough Croan Turlough SPA, Lough Feacle Turlough, Coolagarry Lough, Thomas Street Turlough and Four Roads Turlough SPA as well as the Ballyglass River Callows and other minor season waterbodies. The aim of the survey was to record the distribution of waterbirds and waders in the region, primarily Greenland white-fronted geese, whooper swans and golden plover. Vantage point surveys targeting the proposed development sites were also undertaken from two vantage points, one at each proposed wind farm site. Although there were peak numbers of 42-48 whooper swans observed grazing on the grasslands surrounding Thomas Street Turlough, approximately 1.5km south of Wind Farm 1, on two occasions (February and March 2015), there was only one observation of whooper swan recorded flying through Wind Farm I throughout the winter season. This observation was in November when a flock of nine whooper swan was recorded leaving Thomas Street turlough and flying in the direction of Lough Croan Turlough at dusk. There were two records of whooper swans flying through the Wind Farm II site between Feacle Lough and Ballyglass River Callows in February (n=52) and March (n=63). Throughout the season, flocks of whooper swan ranging in size from 4-78 were observed at various waterbodies within a 15km radius of both wind farm sites. Flocks of 21-79 Greenland white-fronted geese were observed in November (n=21), December (n=29) and March (n=79) at the Muckanagh Callows along the River Suck, which is approximately 5km to the northwest of the Wind Farm I site. There were no Greenland white-fronted geese observed flying through the wind farm sites throughout the winter season of 2014/15.

The winter 2016/17 surveys were undertaken at both wind farm sites from November 2016 to March 2017 (EcoFact, 2018). The approach followed that of the 2014/15 surveys i.e., to establish whether birds used or crossed the sites, and attempted to explain their movements when they were not interacting with the sites. As with previous surveys, the study focused primarily on species such as whooper swan and Greenland white-fronted geese, while also providing full counts and assessments for all other water birds. The wintering bird survey used two main vantage points, one at each proposed wind farm site and followed SNH guidance in place at that time (SNH, 2014) with a minimum of 6 hours per vantage point per month. Up to 10 other sites within the surrounding area were also visited at least twice per month and full counts undertaken on each visit. The survey was adaptive, as before, and was extended up to 10km+ away from the proposed wind farm site as necessary. Results showed that there was no significant bird activity recorded within either proposed development site during the November survey. This was attributed to the low water levels across the study area with all the turloughs very low or dry. In December 2016, the only notable observations were a sighting of a small flock of Greenland white-fronted geese on the River Suck, along with the large numbers of starlings which were resident on Lough Croan. No whooper swans were recorded during the December visit. During January 2017, a flock of c.60 golden plover were recorded passing near the Wind Farm I site and a flock of 32 curlew was recorded flying near Wind Farm II and landing on Lough Feacle (flight heights not reported). It was reported that water levels at Lough Croan remained low and there were no whooper swans present. However, there were increased numbers of ducks present with significant numbers of wigeon, teal, and shoveler recorded at Lough Croan. During the January vantage point watch on Wind Farm I, a merlin was recorded crossing the site. A total of 40 golden plover and 100 lapwing were recorded passing near the Wind Farm I site (location and direction not

reported), with one snipe recorded within the site in January 2017. There were no records of whooper swans or Greenland white-fronted geese using or passing through the Wind Farm I site during February 2017 surveys. Again, there were no movements of whooper swan or Greenland white-fronted geese recorded passing through or near the proposed either wind farm site during the March 2017 surveys. Whooper swan flocks were recorded at several waterbodies surrounding both wind farm sites in March 2017, namely Lough Croan, River Suck at Muckinagh North, Coolagarry turlough, Brideswell and Ballyglass River Callows. A total of 80 Greenland white-fronted geese were also recorded at the River Suck at Muckinagh north.

The 2017/18 surveys again followed SNH (2014) guidance with flight activity surveys undertaken from October 2017 to March 2018. Seven vantage points across the two wind farm sites (two at Wind Farm I and five at Wind Farm II) were used at which monthly flight activity surveys were undertaken at dawn and dusk only. Monthly wildfowl distribution surveys were also undertaken in area unspecified within the report. Results showed that kestrel and sparrowhawk were the only two target species recorded using the Wind Farm II site during vantage point surveys on one occasion each. There were no other records of target species recorded at either wind farm throughout the entire survey season. A range of wildfowl was recorded during the monthly distribution surveys at locations surrounding both wind farm sites, namely whooper swan, mute swan, lapwing, curlew, golden plover, wigeon and teal. There were no flights of swan species observed flying through the proposed rotor swept areas.

3.2 Flight Activity Surveys

Flight lines of primary target species recorded at both wind farm sites throughout the winter season are presented in Figures 3-8. Flight data for both primary and secondary target species are provided in Appendix III.

3.2.1 Primary Target Species

3.2.1.1 Wind Farm I: Vantage Points 1 and 2

In total, four primary target species were recorded flying through the site during the survey period. The primary target species are shown in Table 3-2 alongside the total number of birds observed from both VPs and the total number of flights recorded.

Table 3-2: Primary target species and flights recorded from WFI VPs 1 and 2 - October 2019 to March 2020

| Target Species | Total number of birds recorded | Total number of flights recorded |
|-------------------------------|--------------------------------|----------------------------------|
| Whooper swan | 16 | 5 |
| Greenland white-fronted goose | 72 | 1 |
| Lapwing | 10 | 1 |
| Golden plover | 140 | 5 |
| Total | 238 | 12 |

Results from surveys at Wind Farm I showed that whooper swan spent up to 15 seconds in Height Band 2 on three flights, dropping out of Height Band 2 (the likely rotor swept area) on two of those flights. The other two observations of whooper swan were recorded in Height Band 1. As shown in Figures 3, 5 and 6, all observations of whooper swan were recorded outside the 500m buffer zone around Wind Farm I.

A flock of 72 Greenland white-fronted geese were observed in March flying offsite to the north-west of the survey buffer around dusk. Given the direction of flight, it is likely that these birds were leaving Lough Croan to roost at the River Suck Callows (Figure 8). This flock was observed in Height Band 3.

As shown in Figures 6 and 7, four of the five observations of golden plover were recorded either on the edge or outside of the 500m buffer zone, with one flight-line entering the site in a north-easterly direction (Figure 6).

During the single observation of lapwing at Wind Farm I, the flock of 10 birds spent 45 seconds within Height Band 2. This observation was recorded from VP2 in October (Figure 3), within the eastern section of Wind Farm I.

3.2.1.2 Wind Farm II: Vantage Points 1 – 4

In total, three primary target species were recorded flying through the site during the six-month survey period. The primary target species are shown in Table 3-3 together with the total number of birds observed from both VPs and the total number of flights recorded.

Table 3-3: Target species and flights recorded from WFII VP1 – VP4 – October 2019 to March 2020

| Target Species | Total number of birds recorded | Total number of flights recorded |
|----------------|--------------------------------|----------------------------------|
| Whooper swan | 31 | 5 |
| Golden plover | 36 | 3 |
| Lapwing | 69 | 6 |
| Total | 136 | 14 |

There was a variety in whooper swan flock size, ranging from two to a flock of 11, with a total count of 31 throughout the 6-month period. As shown in Figures 4, 5 and 6, three of the five sightings of whooper swan were recorded within the boundaries of Wind Farm II, whilst the other two sightings were recorded within the 500m buffer. Three of the flocks recorded onsite spent between 60 and 90 seconds within Height Bands 2 or 3. The other three flocks were recorded in Height Band 1.

Golden plover was recorded on three occasions, once onsite and twice within the 500m buffer, during October surveys only (Figure 3) and only one of the flocks were observed flying within Height Bands 2 or 3.

Four of the six observations of lapwing were of flocks ranging from a single individual to three birds, while there were two observations of larger flocks (n=27 and n=35). There was a single observation of one individual lapwing recorded within Height Band 2 on site. The other five observations of lapwing were recorded within the 500m buffer (Figures 3 and 4), one of which was in Height Band 3 (the other observations were all in Height Band 1).

3.2.2 Secondary Target Species

Wind Farm I

Summary details of the eight secondary target species recorded through the season at Wind Farm I are presented in Table 3-4.

There were two species of gull recorded through the season (black-headed gull and lesser black-backed gull), with black-headed gull being the most abundant (36 observations of 1,956 birds). The vast majority of sightings of both species of gull were recorded offsite at Thomas Street Turlough, which is approximately 1.5km to the south of Wind Farm I.

Wigeon was recorded on one occasion throughout the entire survey season in a flock of 40-50 foraging at the turlough viewed from VP2 in February. There was no flight recorded within the flock.

Buzzard was the only species of raptor recorded at Wind Farm I, with three observations of five birds recorded throughout the six months of survey. All five birds were observed within Height Band 2.

A combined total of 65 raven were recorded in 35 observations. The majority of these were either on passage through the survey area or circling above.

Table 3-4: Secondary target species and flights recorded from WFI VPs 1 and 2 - October 2019 to March 2020

| Target Species | Total number of birds recorded | Total number of flights recorded |
|--------------------------|--------------------------------|----------------------------------|
| Black-headed gull | 1956 | 36 |
| Lesser black-backed gull | 12 | 7 |
| Buzzard | 5 | 3 |
| Curlew | 1 | 1 |
| Mallard | 6 | 2 |
| Wigeon | 50 | 1 |
| Mute swan | 1 | 1 |
| Raven | 65 | 35 |
| Total | 2094 | 85 |

Wind Farm II

Summary details of the eight secondary target species recorded through the season at Wind Farm I are presented in Table 3-5.

Black-headed gull was the most abundant secondary target species recorded at Wind Farm II with 37 records and a cumulative total of c. 339 individuals. Approximately 80% of records of black-headed gull flock-sizes ranged from 1-9 individuals, while the remaining 20% ranged from 12-42 individuals. The larger flocks were recorded from VP3 foraging and loafing over Feacle Lough, which is located within the 500m survey buffer. Of the 37 flights, 21 were in Height Band 1.

The second most abundant secondary target species recorded was curlew. There was a cumulative total of 290 birds recorded within 18 observations which utilise WFII as a winter foraging ground (mean flock size $n = 16$; range: 1-56). Given that their primary behaviour was feeding in the fields around the site, the majority of flights were recorded below Height Band 2 (<25m).

There were 2 flocks of wigeon recorded at WFII throughout the entire winter season in February and March ($n=57$ and $n=4$ respectively). Both flights were observed within Height Bands 2 and 3 within the survey buffer.

There were three flights of teal observed at Feacle Lough during the same survey period in March. All three flights were within Height Bands 2 and 3.

There was slightly more diversity of raptor species recorded at Wind Farm II than at Wind Farm I, with three species of raptor observed throughout the winter period. Buzzard was recorded on three occasions ($n=4$), kestrel on four occasions ($n=4$) and sparrowhawk on four occasions ($n=4$). All of these records were observed flying in Height Band 1.

Table 3-5: Secondary target species and flights recorded from WFII VPs 1-4 - October 2019 to March 2020

| Target Species | Total number of birds recorded | Total number of flights recorded |
|--------------------------|--------------------------------|----------------------------------|
| Black-headed gull | 339 | 37 |
| Lesser black-backed gull | 2 | 1 |
| Herring gull | 6 | 4 |
| Buzzard | 4 | 3 |
| Kestrel | 4 | 4 |
| Sparrowhawk | 4 | 4 |
| Curlew | 290 | 18 |
| Snipe | 1 | 1 |
| Mallard | 37 | 2 |
| Wigeon | 61 | 2 |
| Teal | 7 | 3 |
| Cormorant | 1 | 1 |
| Grey heron | 1 | 1 |
| Raven | 79 | 42 |
| Total | 836 | 123 |

3.3 Swan and Goose Feeding and Distribution Surveys

There were no Greenland white-fronted geese recorded within 1 km of the wind farm sites during the October 2019 to March 2020 feeding distribution surveys.

Whooper swans were recorded during the feeding distribution surveys in each month except for October. Figure 9 illustrates that there appear to be two main foraging areas for whooper swan approximately 1km from each of the proposed wind farm sites, namely at Lough Croan to the north of Wind Farm I and the Ballyglass River to the north of Wind Farm II. A small flock of four whooper swan was also recorded foraging in an agricultural grassland field just to the north of Wind Farm I during the December survey.

As mentioned above, Lough Croan is located approximately 1.5km north of Wind Farm I. There were three small flocks of whooper swan ranging in size from 2-5 birds observed foraging on the grasslands at Lough Croan in December 2019, January and February 2020. A larger flock of 32 was observed foraging in the same area in March 2020.

The Ballyglass River is located just over 1km to the north of Wind Farm II and is a relatively short 6.5km river which flows in a south western direction from Coolagarry Lough to the River Suck Callows SPA. Small to mid-sized flocks of whoopers swans ranging from 8-20 birds were observed foraging on the grassland callows adjacent to the Ballyglass River during the feeding distribution surveys in November 2019 – March 2020 (Figure 9).

3.4 Greenland White-fronted Goose Roost Surveys

Dawn and dusk Greenland white-fronted goose roost surveys were carried out at Lough Croan on a monthly basis between December 2019 and March 2020.

Greenland white-fronted geese were recorded at Lough Croan in December 2019 and February 2020 only, with no sightings of geese during January or the two March surveys. Please see Figure 10 for flight-line results and flock sizes observed during these surveys.

A total of five flocks were observed at the lough in December, with four of these flocks ranging in size from 9 - 17. There was one larger flock of 120 observed arriving from the west during the dusk survey. There were two flocks recorded during February surveys. One of these was a flock of 40 birds flying west at dusk, however, due to fading light, it was not possible to confirm whether the flock left the site or if it moved to another part of the lough. Similarly, a small flock of 14 was observed moving west at dawn during the February survey, however, again as the flock went out of sight, it was not possible to confirm if the flock moved or left the area entirely.

3.5 Golden Plover Nocturnal Foraging Surveys

Golden plover nocturnal foraging surveys were undertaken at Wind Farm I monthly between January and March 2020. There was a total of four records of golden plover noted during these surveys (Figure 11), one record in January and three in March. There were no records in February.

In January, a single golden plover was heard calling in the eastern section of the site. During the March survey, there were two records of calling plovers, one in the west of the site and the second in the east. The third record in March was of a flock of three plovers which were flushed by surveyors north of where the second record was heard, and these were observed in torchlight flying north.

4.0 Summary and Conclusions

The aim of this report is to provide baseline ornithological survey data for the 2019/2020 winter season at the two proposed wind farm sites at Seven Hills, Dysart, Co. Roscommon. These data will be used to inform the ecological impact assessment and appropriate assessment for the proposed wind farms. The assessment of potential effects of the proposed wind farms is beyond the scope of this report.

The winter bird survey methods employed during the 2019/2020 survey season are based on recommendations given in SNH (2017) guidance. This survey methods guidance is recognised as standard best practice guidance through the UK and Ireland for surveying birds to inform impact assessment of onshore wind farms. Winter season surveys were undertaken from October 2019 to March 2020. The following ornithological survey types were undertaken at the proposed Seven Hills Wind Farm development sites:

- Flight activity (VP) surveys;
- Swan and goose feeding and distribution surveys;
- Goose roost surveys at Lough Croan; and
- Golden plover nocturnal foraging surveys.

Flight activity surveys were undertaken from two vantage points overlooking Wind Farm I and four vantage points overlooking Wind Farm II. These vantage points were visited for six hours per month from October to February and 12 hours per month during the spring passage season in March. This resulted in a total survey effort of 42 hours per vantage point throughout the season.

Swan and goose feeding and distribution surveys were repeated monthly across the season. A buffer of minimum 1 km around each wind farm site was used for these surveys, which were undertaken by driven transect, stopping on a regular basis to check fields for goose and swan feeding activity.

Following receipt of an unpublished study on Greenland white-fronted geese (Burke *et al.*, 2014) goose roost watches of Lough Croan were carried out at Lough Croan between December 2019 and March 2020. The watches were carried out at dusk and the following dawn each month for a duration of up to 2 hours depending on the levels of light. The dawn watches began at civil twilight i.e., 30 minutes before the time of sunrise and continued for up to 1.5 hours after sunrise. The dusk watches ended at civil twilight i.e., starting 1.5hrs before the time of sunset and continuing for up to 30 minutes after sunset. All flight-lines of Greenland white-fronted geese to and from the turlough, in addition to the direction of flight and the number of birds, were recorded during watches.

Nocturnal surveys for golden plover were undertaken at Wind Farm I on three occasions between January and March 2020 to determine whether golden plover activity at the site was significantly different at night. Nocturnal survey was not possible at Wind Farm II due to the rough topography and terrain, which was considered a health and safety risk to surveyors.

The following primary target species were recorded during flight activity surveys at both proposed wind farm sites combined:

- Whooper swan;
- Greenland white-fronted goose;
- Golden plover; and
- Lapwing.

There was only one record of Greenland white-fronted geese from any of the VP watches, a flock of 72 offsite to the north-west of the 500m buffer at Wind Farm I in March. They were also observed using Lough Croan during the dawn dusk goose roost surveys. This species was recorded using the lough during two of the four months of surveys, which suggests that although Lough Croan is potentially an established roost site, it does not appear to be used on a consistent basis throughout the winter season. Burke *et al* (2014) suggested that Lough Croan is

suspected as having been used as a roosting site to some extent in the past when water levels were suitably high but is used less so in more recent years. This may align with the sporadic use of the lough recorded during this survey.

In addition, all but one of the movements and flight-paths of the flocks of Greenland white-fronted geese which were observed at Lough Croan during roost watches were on a lateral east/west-west/east plane. The one flock which was not on an east/west plane was observed flying in from the north west. These flight patterns suggest that these birds may be associated with the River Suck Callows SPA located approximately 5km to the west of Lough Croan. This theory can be supported by the fact that there were no sightings of Greenland white-fronted geese recorded flying through either of the proposed wind farm sites during the entire season of vantage point surveys or using either of the sites during the feeding distribution driven transects. Thus, it appears that these flocks move to the north of the proposed wind farms and do not transect the wind farm sites when moving between their feeding and roosting sites.

In relation to whooper swan, vantage point surveys showed low movements of this species across the two wind farm sites. This species was not observed traversing Wind Farm I as all observations were recorded offsite and outside of the 500m buffer of that proposed wind farm site. Of the five sightings of swans at Wind Farm II, three were recorded onsite. It is possible that these birds may be associated with the flocks which graze the agricultural grassland fields on the banks of the Ballyglass River to the north of Wind Farm II which may also be associated with the River Suck Callows SPA population.

Golden plover was recorded on five occasions at Wind Farm I and on three occasions at Wind Farm II during vantage point surveys throughout the entire survey season. Three of the eight sightings were recorded within the 500m buffer with only one flock recorded entering the site at Wind Farm I and none observed flying within Height Band 2. Furthermore, the targeted nocturnal surveys for golden plover at Wind Farm I yielded a total of just four records of six birds. These results suggest a small sporadic population of golden plover exists in the area surrounding the two wind farm sites. Records of lapwing were infrequent with a total of seven sightings throughout the survey season, one record at Wind Farm I and six at Wind Farm II. The largest of these flocks was 35 which occurred on one occasion at Wind Farm II in November. Similar to golden plover, the lapwing population in this area appears to be small and sporadic.

Regarding secondary target species, there were eight secondary target species recorded throughout the season at Wind Farm I. Of these, black-headed gull was the most frequently recorded and the most numerous species recorded, predominantly associated with Thomas Street Turlough. There were 14 secondary species recorded throughout the season at Wind Farm II. Raven was the most frequently recorded secondary species (42 records) and black-headed gull was the most numerous, with a combined total of 339 birds recorded, with the larger flocks recorded around Feacle Lough. Curlew was the next most frequently recorded species with 18 records of a combined total of 290 birds, which were mostly recorded feeding in the fields around the survey area.

5.0 References

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6.0 Figures

Figure 1: Seven Hills Wind Farm Phase 1 and 2 Site Layout and Vantage Point Locations

Figure 2: Viewsheds from Vantage Points Overlooking Wind Farms I and II - 30m Offset

Figure 3: Target Species Flight-lines – October 2019

Figure 4: Target Species Flight-lines – November 2019

Figure 5: Target Species Flight-lines – December 2019

Figure 6: Target Species Flight-lines – January 2020

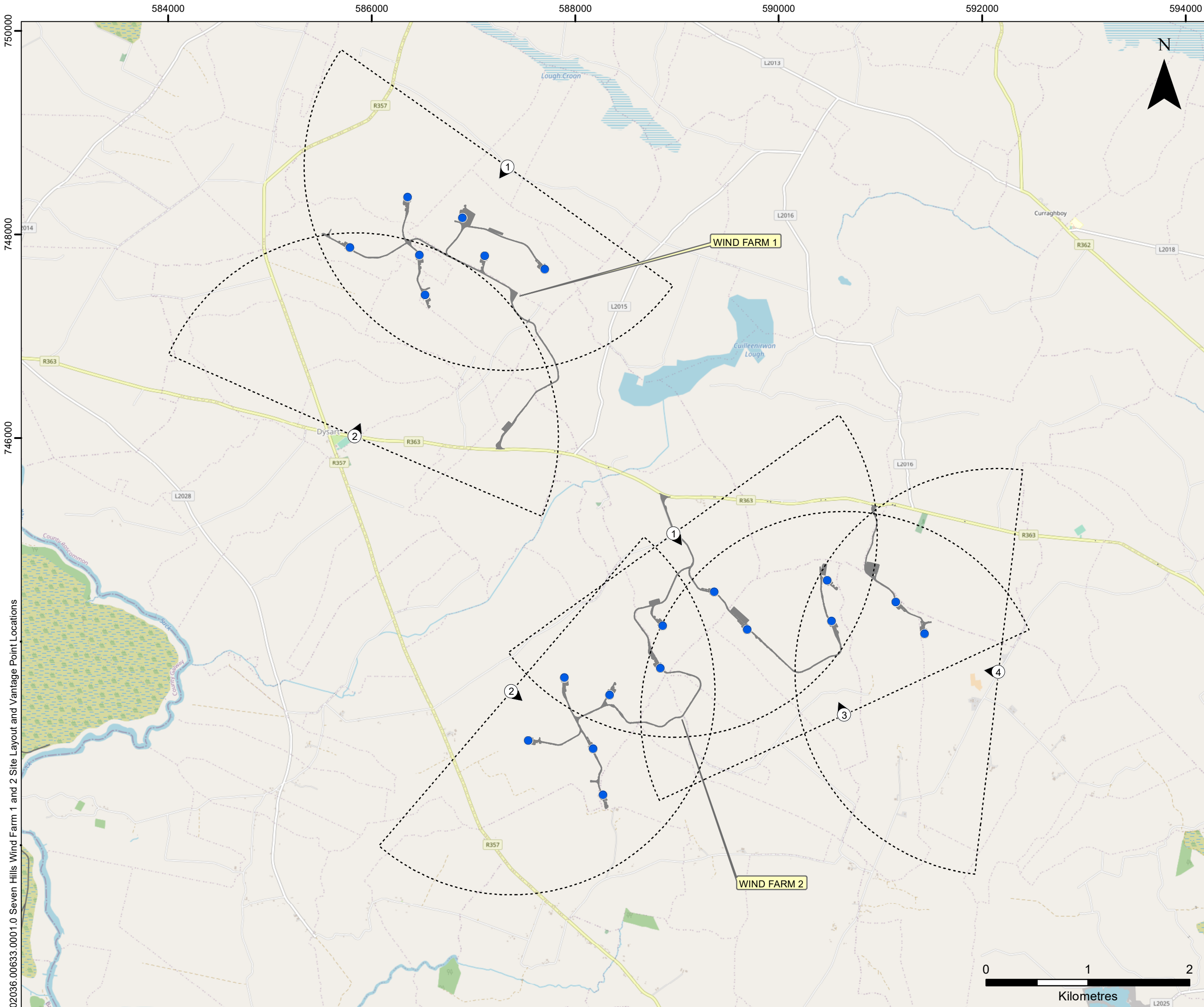
Figure 7: Target Species Flight-lines – February 2020

Figure 8: Target Species Flight-lines – March 2020

Figure 9: Swan and Goose Feeding Distribution Survey Winter 2019/2020 – Transect Route and Peak Counts

Figure 10: Greenland White-fronted Goose Roost Dawn/Dusk Survey Winter 2019/2020 – Vantage Point Locations and Flight-lines

Figure 11: Golden Plover Nocturnal Survey Winter 2019/2020 – Transect Route and Observation Locations



LEGEND

- Turbine Location
- Site Infrastructure
- Vantage Point
- Vantage Points 2km View Arc

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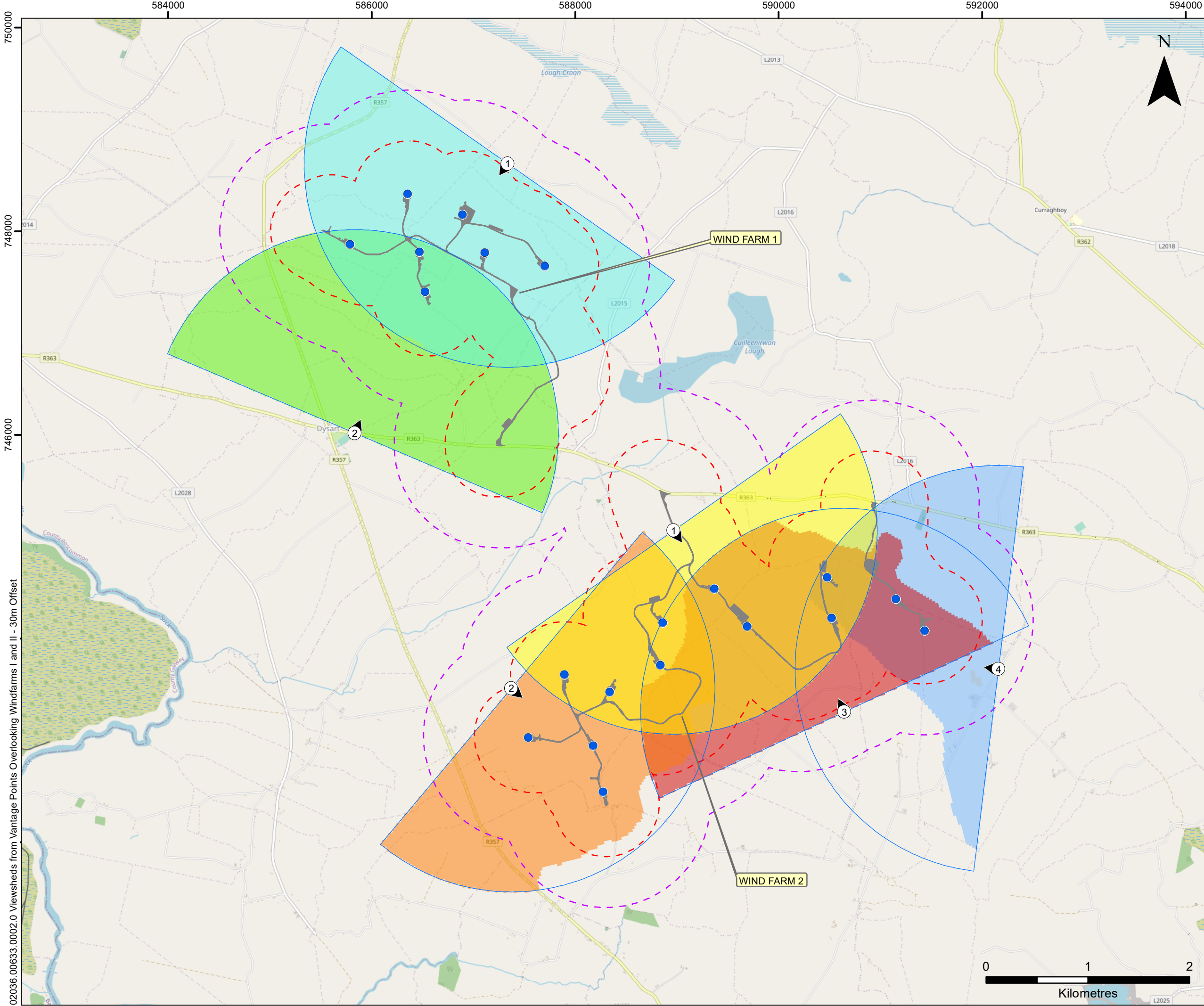
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BIRD SURVEY REPORT 2019/2020

FIGURE 1 - SITE LAYOUT AND
VANTAGE POINT LOCATIONS

Scale
1:35,000 @ A3

Date
MAY 2022

02036.00633.0001.0 Seven Hills Wind Farm 1 and 2 Site Layout and Vantage Point Locations



02036.00633.0002.0 Viewsheds from Vantage Points Overlooking Windfarms I and II - 30m Offset

NOTE

1. The Zones of Theoretical Visibility (ZTV) was calculated using ArcMAP 10.5.1 Spatial Analyst. The ZTV is calculated with a surface offset 30m & from a viewing height of 1.8m above ground level. The terrain model is derived from EU-DEM data with a vertical accuracy of $\pm 7m$.

LEGEND

- Turbine Location
- Site Infrastructure
- Site Infrastructure 500 m Buffer
- Site Infrastructure 1 km Buffer
- Vantage Point
- Distance of Viewing Arc
- Theoretical Visibility from Wind Farm 1 VP1
- Theoretical Visibility from Wind Farm 1 VP2
- Theoretical Visibility from Wind Farm 2 VP1
- Theoretical Visibility from Wind Farm 2 VP2
- Theoretical Visibility from Wind Farm 2 VP3
- Theoretical Visibility from Wind Farm 2 VP4

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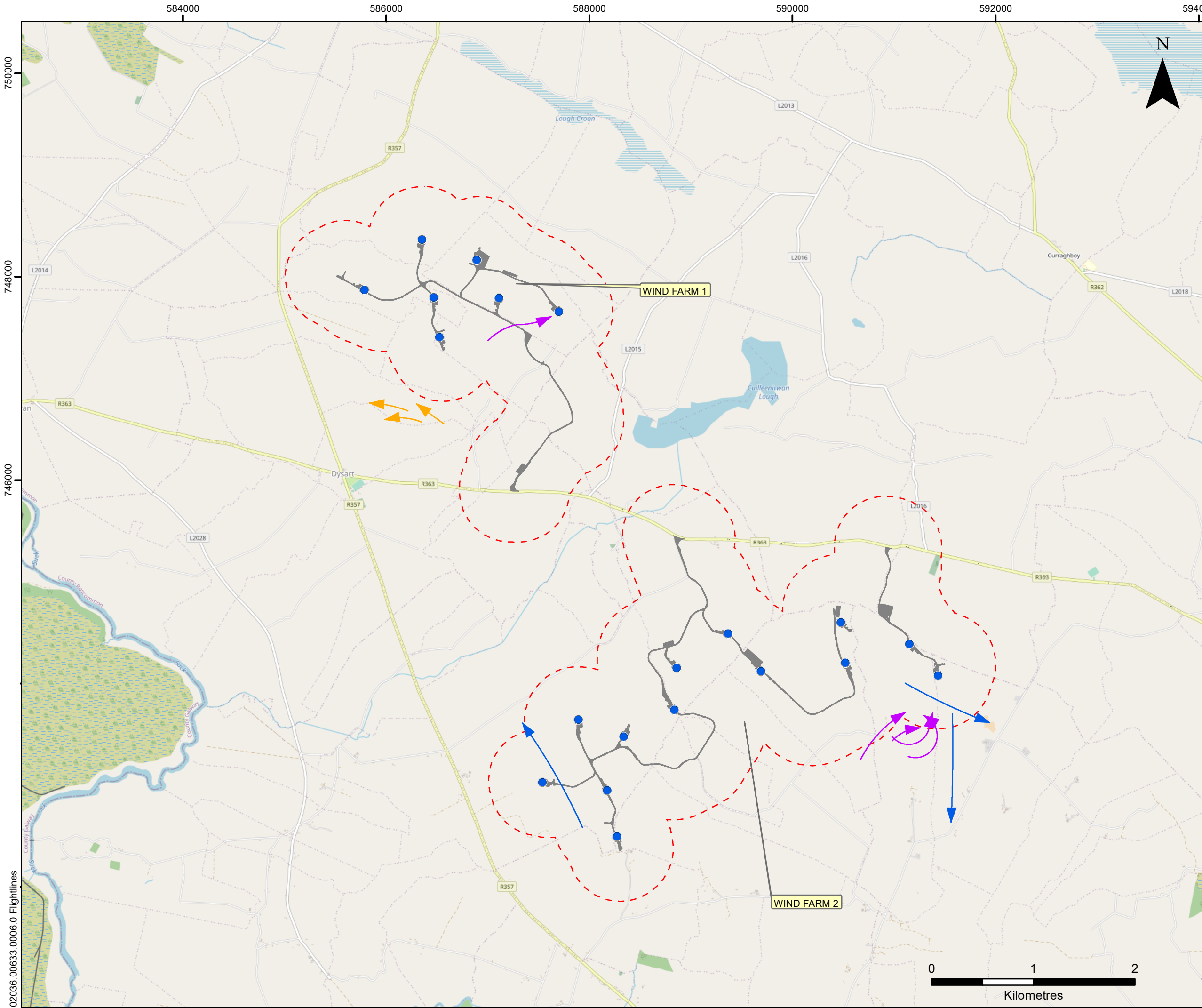
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FIGURE 2 - VANTAGE POINT VIEWSHEDS OVERLOOKING WINDFARMS I AND II

Scale
1:35,000 @ A3

Date
MAY 2022



LEGEND

- Turbine Location
- Site Infrastructure
- Site Infrastructure 500 m Buffer
- Species**
- Golden Plover
- Lapwing
- Whooper Swan

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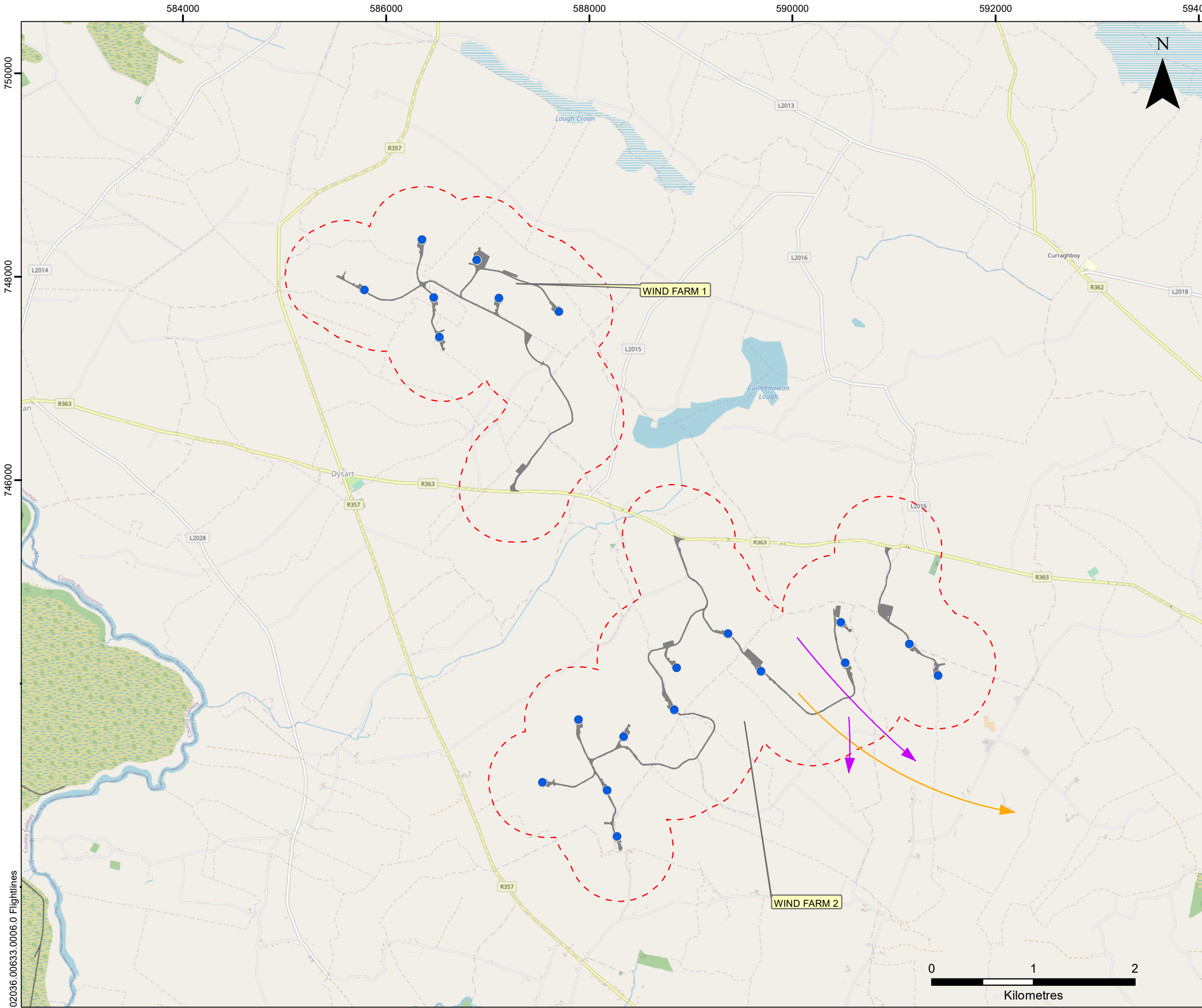
**SEVEN HILLS WIND FARM WINTER
BIRD SURVEY REPORT 2019/2020**

**FIGURE 3 - FLIGHT-LINES
OCTOBER 2019**

Scale 1:35,000 @ A3

Date MAY 2022

0 1 2
Kilometres



LEGEND

- Turbine Location
- Site Infrastructure
- Site Infrastructure 500 m Buffer

Species

- Lapwing
- Whooper Swan

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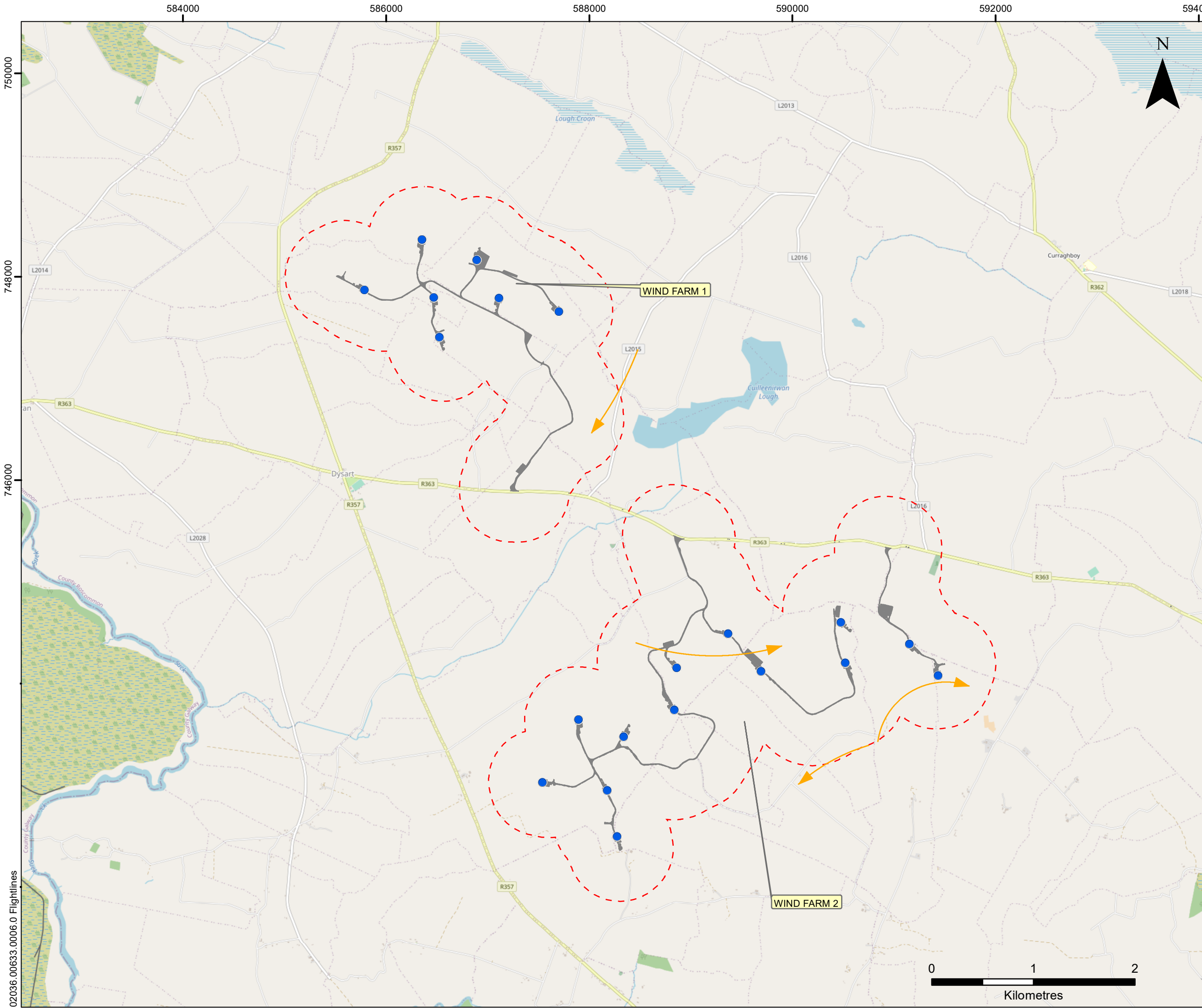
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**FIGURE 4 - FLIGHT-LINES
NOVEMBER 2019**

Scale
1:35,000 @ A3

Date
MAY 2022



LEGEND

- Turbine Location
- Site Infrastructure
- Site Infrastructure 500 m Buffer
- Species**
- Whooper Swan

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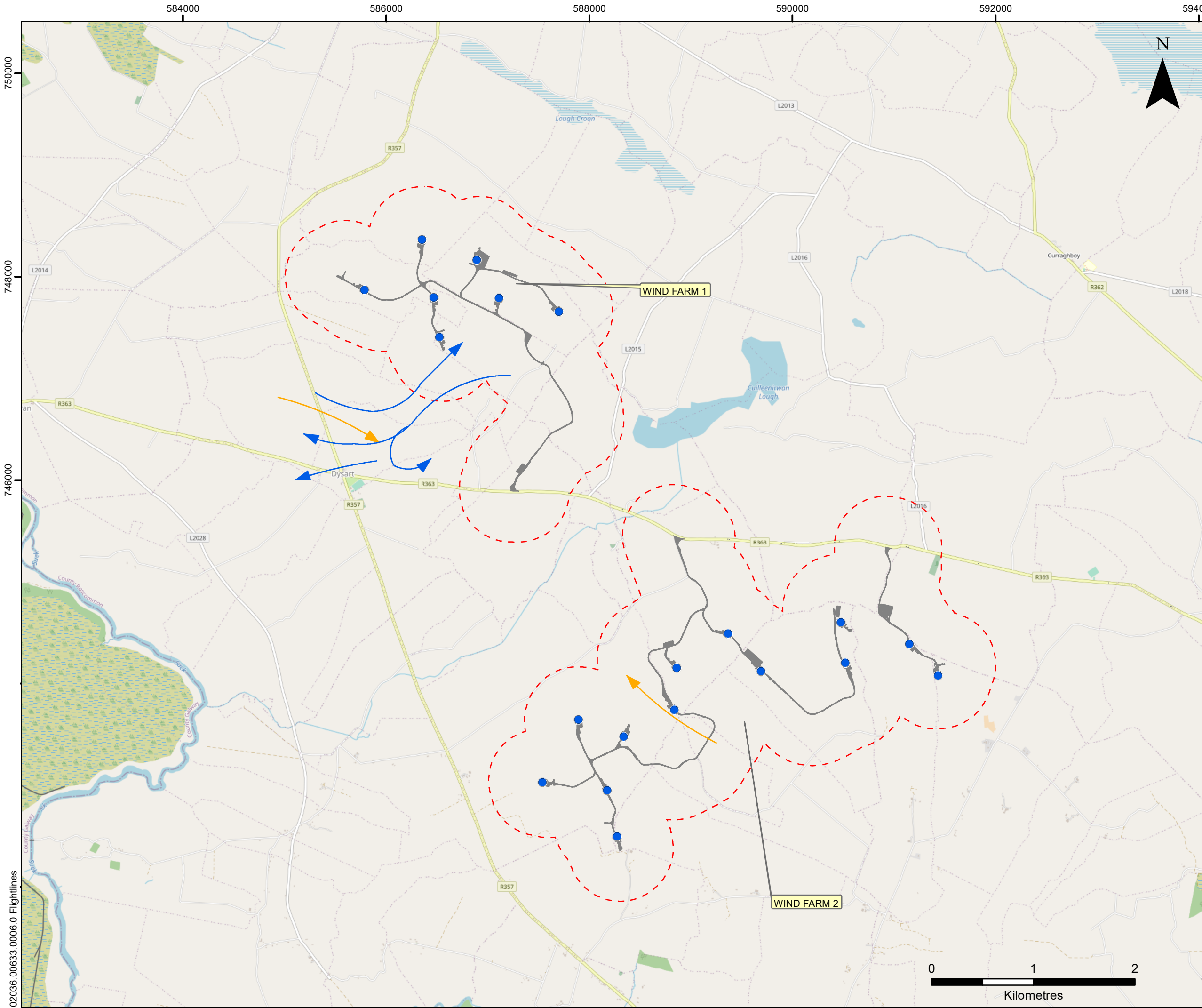
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FIGURE 5 - FLIGHT-LINES
DECEMBER 2019

Scale
1:35,000 @ A3

Date
MAY 2022



LEGEND

- Turbine Location
- Site Infrastructure
- Site Infrastructure 500 m Buffer
- Species**
- Golden Plover
- Whooper Swan

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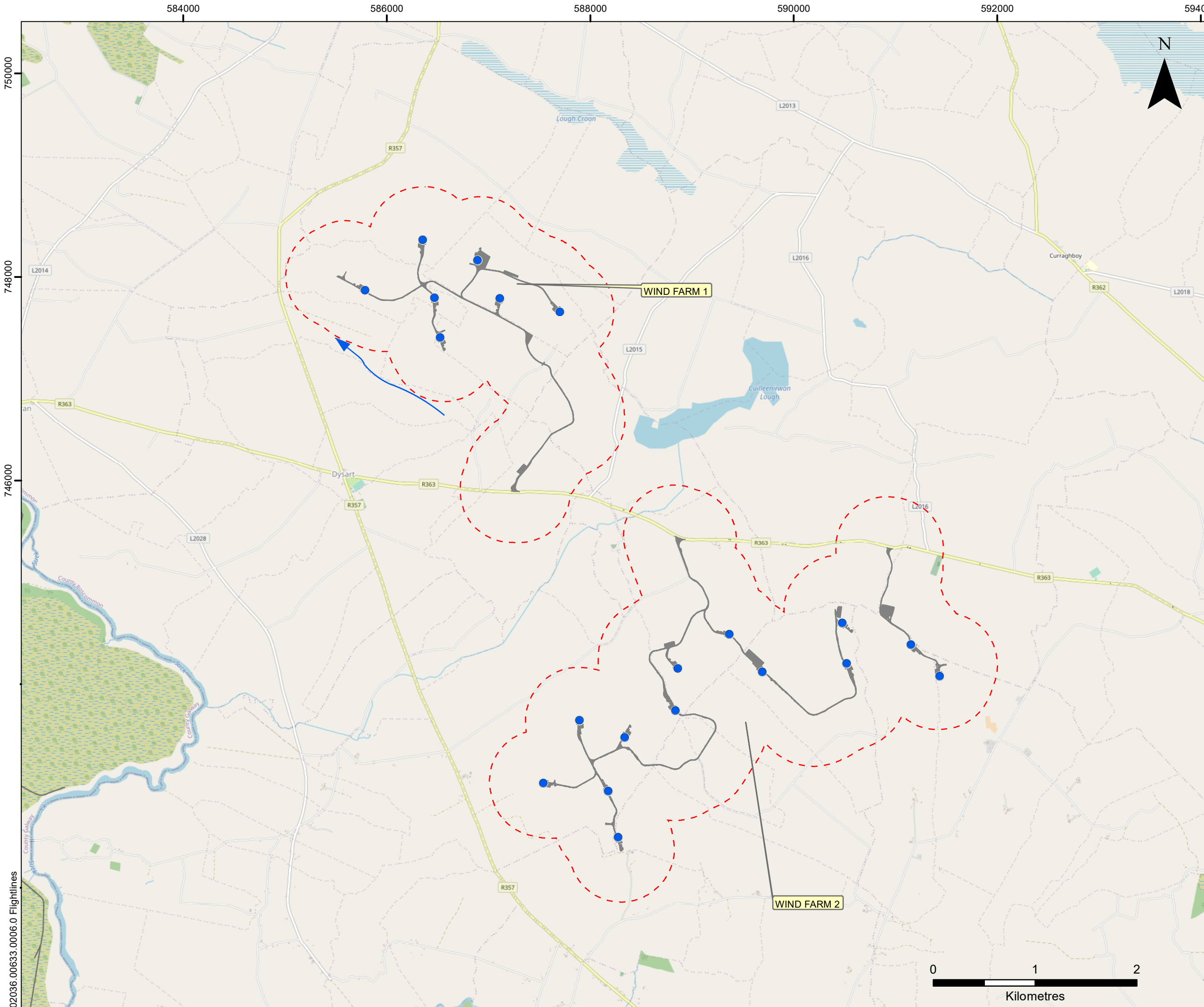
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FIGURE 6 - FLIGHT-LINES
JANUARY 2020

Scale
1:35,000 @ A3

Date
MAY 2022



LEGEND

- Turbine Location
- Site Infrastructure
- Site Infrastructure 500 m Buffer
- Species
 - Golden Plover

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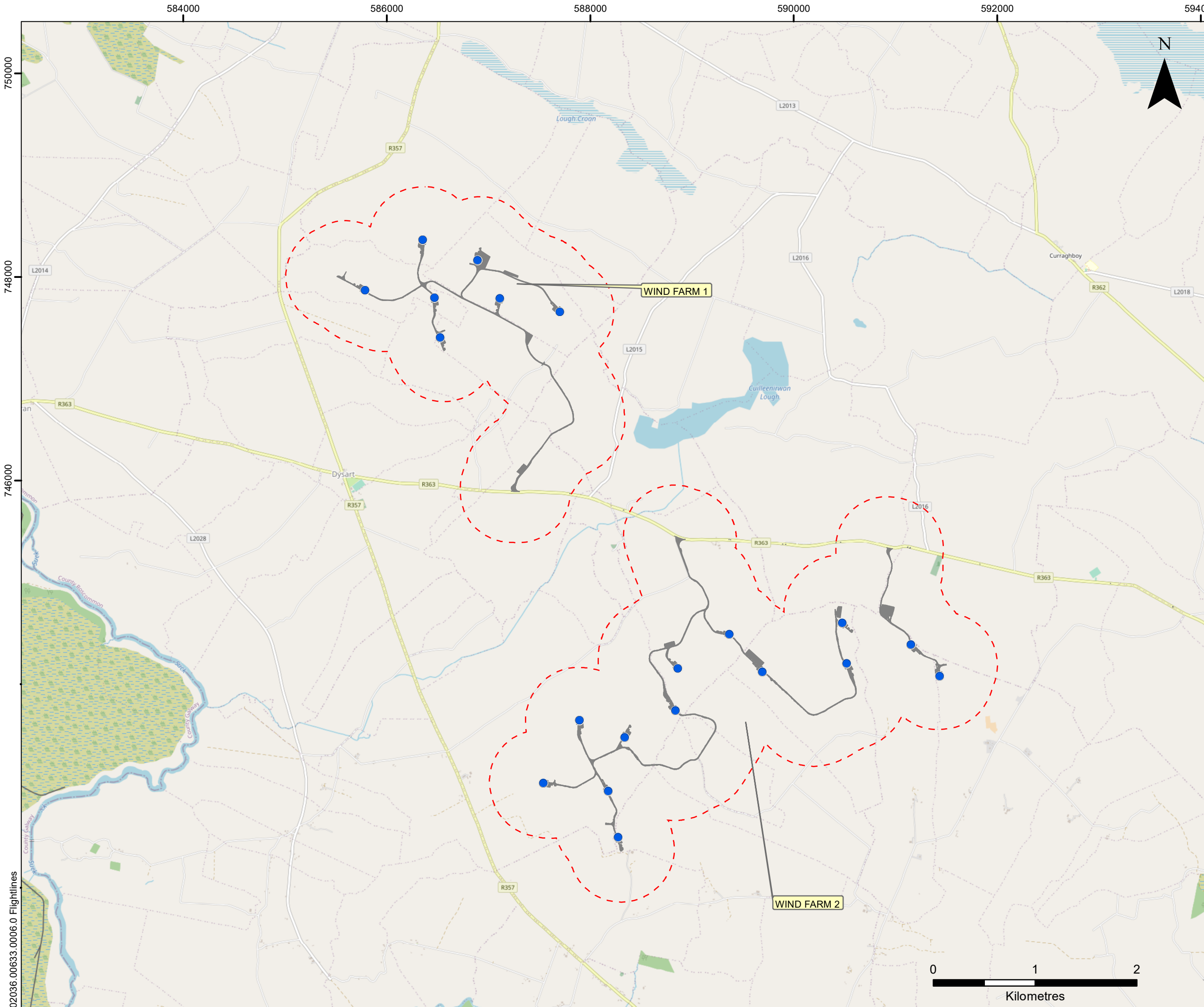
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FIGURE 7 - FLIGHT-LINES
FEBRUARY 2020

Scale
1:35,000 @ A3

Date
MAY 2022



LEGEND

- Turbine Location
- Site Infrastructure
- Site Infrastructure 500 m Buffer
- Species**
- No Target Species Recorded

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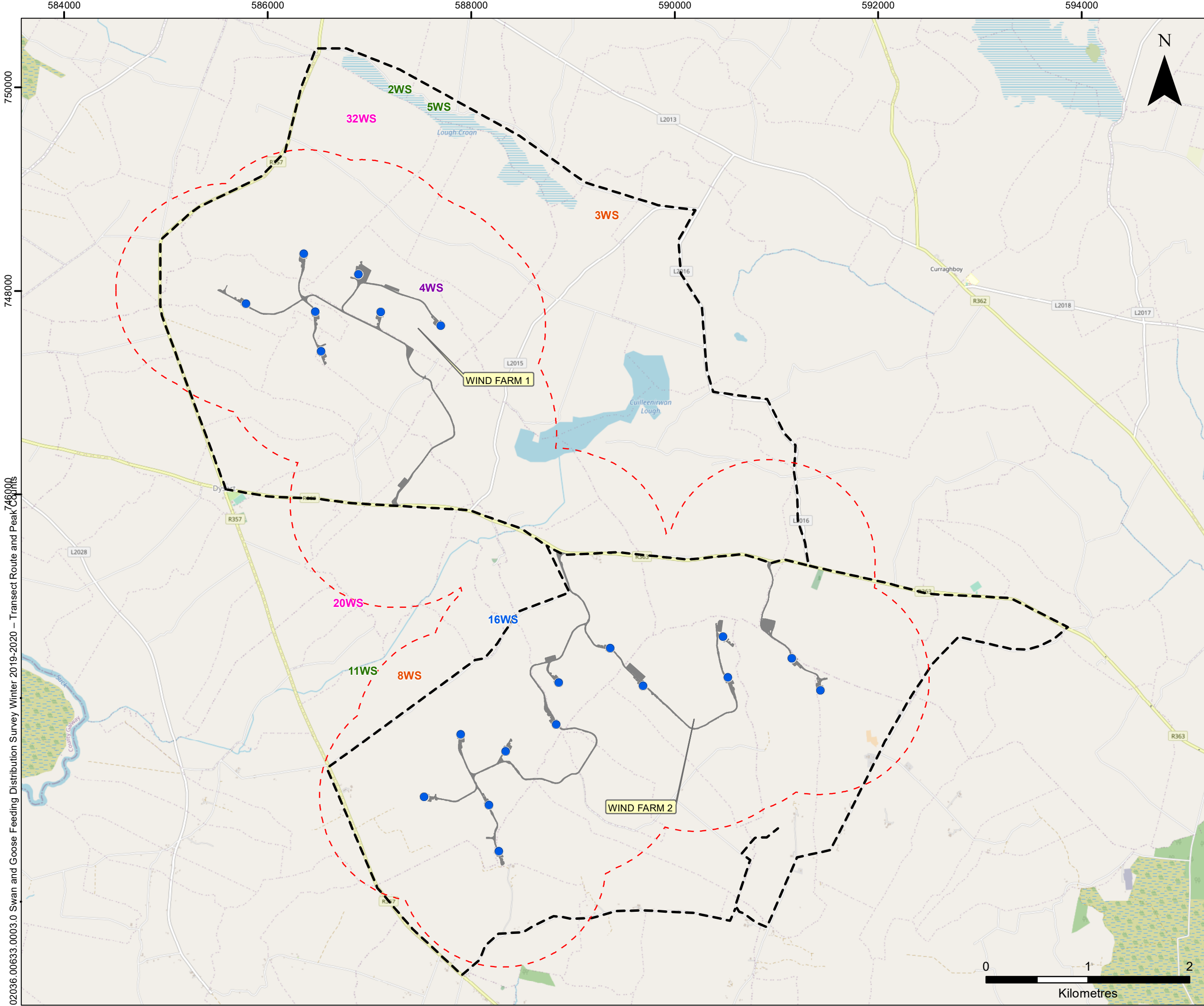
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BIRD SURVEY REPORT 2019/2020

FIGURE 8 - FLIGHT-LINES
MARCH 2020

Scale
1:35,000 @ A3

Date
MAY 2022



LEGEND

- Turbine Location
- Site Infrastructure
- Site Infrastructure 1 km Buffer
- Transect Route

Swan and Goose Registrations (Label Colour Denotes Survey Date)

- 12/11/2019
- 11/12/2019
- 29/01/2020
- 25/02/2020
- 12/03/2020

Label Indicates Count and Species
WS - Whooper Swan

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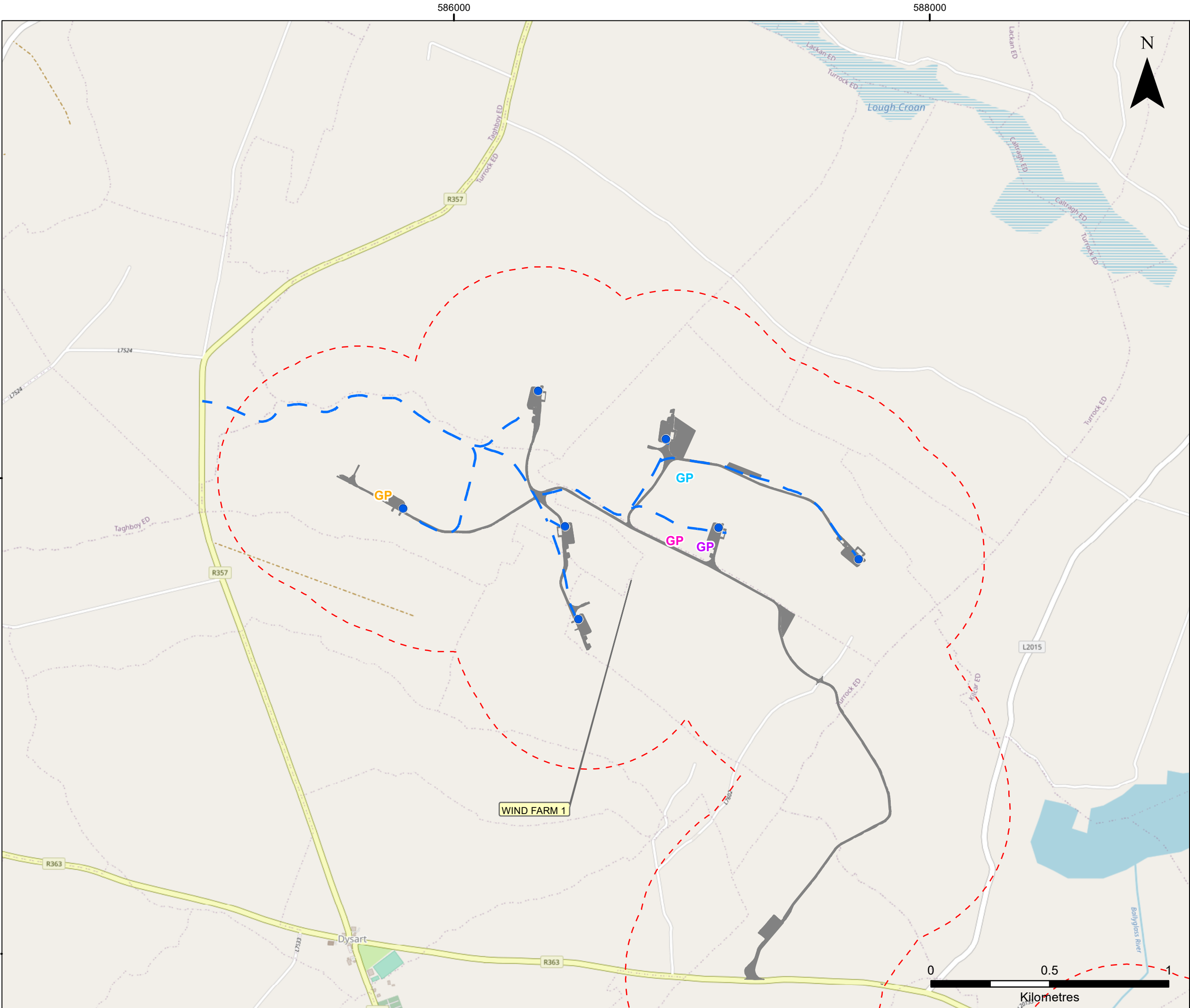
FIGURE 9 - SWAN AND GOOSE FEEDING DISTRIBUTION SURVEY – TRANSECT ROUTE AND PEAK COUNTS

Scale 1:35,000 @ A3

Date MAY 2022

02036.00633.0003.0 Swan and Goose Feeding Distribution Survey Winter 2019-2020 – Transect Route and Peak Counts

02036.00633.0005.0 Golden Plover Nocturnal Survey Winter 2019-2020 – Transect Route and Observation Locations



LEGEND

- Turbine Location
- Site Infrastructure
- Site Infrastructure 500 m Buffer
- Transect Route

Species Observation Point

| | |
|---|---|
| GP | Golden Plover |
| GP | 27/01/02 @ 18:34 – GP x1 Heard Calling |
| GP | 23/03/20 @ 20:22 – GP x1 Heard Calling |
| GP | 23/03/20 @ 21:29 – GP x1 Heard Calling |
| GP | 23/03/20 @ 21:40 – GP x3 Flushed and Flew North |

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**FIGURE 11 - GOLDEN PLOVER
NOCTURNAL SURVEY TRANSECT ROUTE
AND OBSERVATION LOCATIONS**

Scale

1:15,000 @ A3

Date

MAY 2022

APPENDIX I

Survey dates, times and observers

Table AI-1: Details of VP surveys undertaken from Wind Farm 1 Vantage Point 1

| Date | Surveyor | Start | End | Survey Duration |
|--------------------|----------|-------|-------|-----------------|
| 29/10/2019 | SI | 10:00 | 13:00 | 3 |
| 29/10/2019 | SI | 13:30 | 16:30 | 3 |
| 12/11/2019 | DA | 09:11 | 12:11 | 3 |
| 13/11/2019 | DA | 09:10 | 12:10 | 3 |
| 10/12/2019 | DA | 08:50 | 11:50 | 3 |
| 12/12/2019 | DA | 11:31 | 14:31 | 3 |
| 28/01/2020 | DA | 08:45 | 11:45 | 3 |
| 30/01/2020 | DA | 11:01 | 14:01 | 3 |
| 26/02/2020 | DA | 15:30 | 18:30 | 3 |
| 27/02/2020 | DA | 06:30 | 09:30 | 3 |
| 10/03/2020 | DH | 15:50 | 18:50 | 3 |
| 13/03/2020 | DH | 06:25 | 09:25 | 3 |
| 23/03/2020 | SI | 06:30 | 09:30 | 3 |
| 24/03/2020 | SI | 16:00 | 19:00 | 3 |
| Total Hours | | | | 42 |

Table AI-2: Details of VP surveys undertaken from Wind Farm 1 Vantage Point 2

| Date | Surveyor | Start | End | Survey Duration |
|--------------------|----------|-------|-------|-----------------|
| 30/10/2019 | SI | 09:00 | 12:00 | 3 |
| 30/10/2019 | SI | 13:30 | 16:30 | 3 |
| 12/11/2019 | SI | 13:30 | 16:30 | 3 |
| 13/11/2019 | SI | 09:30 | 12:30 | 3 |
| 09/12/2019 | SI | 09:00 | 12:00 | 3 |
| 10/12/2019 | SI | 12:30 | 15:30 | 3 |
| 27/01/2020 | SI | 09:00 | 12:00 | 3 |
| 28/01/2020 | SI | 13:00 | 16:00 | 3 |
| 24/02/2020 | SI | 15:30 | 18:30 | 3 |
| 25/02/2020 | SI | 07:00 | 10:00 | 3 |
| 11/03/2020 | SI | 16:00 | 19:00 | 3 |
| 12/03/2020 | SI | 06:20 | 09:20 | 3 |
| 23/03/2020 | SI | 16:00 | 19:00 | 3 |
| 24/03/2020 | SI | 06:30 | 09:30 | 3 |
| Total Hours | | | | 42 |

Table AI-3: Details of VP surveys undertaken from Wind Farm 2 Vantage Point 1

| Date | Surveyor | Start | End | Survey Duration |
|--------------------|----------|-------|-------|-----------------|
| 28/10/2019 | DA | 09:41 | 12:41 | 3 |
| 29/10/2019 | DA | 12:32 | 15:32 | 3 |
| 14/11/2019 | DA | 09:20 | 12:20 | 3 |
| 15/11/2019 | DA | 10:57 | 13:57 | 3 |
| 09/12/2019 | DA | 09:29 | 12:29 | 3 |
| 11/12/2019 | DA | 12:14 | 15:14 | 3 |
| 27/01/2020 | DA | 13:21 | 16:21 | 3 |
| 28/01/2020 | DA | 08:30 | 11:30 | 3 |
| 24/02/2020 | DA | 09:51 | 12:51 | 3 |
| 25/02/2020 | DA | 13:31 | 16:31 | 3 |
| 11/03/2020 | DH | 09:30 | 12:30 | 3 |
| 13/03/2020 | DH | 09:50 | 12:50 | 3 |
| 25/03/2020 | SI | 09:30 | 12:30 | 3 |
| 26/03/2020 | SI | 13:00 | 16:00 | 3 |
| Total Hours | | | | 42 |

Table AI-4: Details of VP surveys undertaken from Wind Farm 2 Vantage Point 2

| Date | Surveyor | Start | End | Survey Duration |
|--------------------|----------|-------|-------|-----------------|
| 28/10/2019 | DA | 13:01 | 16:01 | 3 |
| 29/10/2019 | DA | 09:21 | 12:21 | 3 |
| 14/11/2019 | DA | 12:31 | 15:31 | 3 |
| 15/11/2019 | DA | 07:46 | 10:46 | 3 |
| 9/12/2019 | DA | 12:39 | 15:39 | 3 |
| 11/12/2019 | DA | 09:05 | 12:05 | 3 |
| 29/01/2020 | DA | 13:20 | 16:20 | 3 |
| 30/01/2020 | DA | 07:42 | 10:42 | 3 |
| 24/02/2020 | DA | 13:12 | 16:12 | 3 |
| 26/02/2020 | DA | 08:21 | 11:21 | 3 |
| 11/03/2020 | DH | 13:00 | 16:00 | 3 |
| 12/03/2020 | DH | 13:05 | 16:05 | 3 |
| 25/03/2020 | SI | 13:00 | 16:00 | 3 |
| 26/03/2020 | SI | 09:30 | 12:30 | 3 |
| Total Hours | | | | 42 |

Table AI-5: Details of VP surveys undertaken from Wind Farm 2 Vantage Point 3

| Date | Surveyor | Start | End | Survey Duration |
|--------------------|----------|-------|-------|-----------------|
| 30/10/2019 | DA | 12:42 | 15:42 | 3 |
| 31/10/2019 | DA | 08:31 | 11:31 | 3 |
| 12/11/2019 | DA | 12:25 | 15:25 | 3 |
| 13/11/2019 | DA | 12:26 | 15:26 | 3 |
| 10/12/2020 | DA | 12:04 | 15:04 | 3 |
| 12/12/2020 | DA | 08:10 | 11:10 | 3 |
| 28/01/2020 | DA | 12:01 | 15:01 | 3 |
| 29/01/2020 | DA | 09:21 | 12:21 | 3 |
| 25/02/2020 | DA | 10:12 | 13:12 | 3 |
| 26/02/2020 | DA | 12:00 | 15:00 | 3 |
| 10/03/2020 | DA | 11:50 | 14:50 | 3 |
| 12/03/2020 | DH | 09:25 | 12:25 | 3 |
| 27/03/2020 | SI | 09:30 | 12:30 | 3 |
| 30/03/2020 | SI | 13:00 | 16:00 | 3 |
| Total Hours | | | | 42 |

Table AI-6: Details of VP surveys undertaken from Wind Farm 2 Vantage Point 4

| Date | Surveyor | Start | End | Survey Duration |
|--------------------|----------|-------|-------|-----------------|
| 30/10/2019 | DA | 09:36 | 12:36 | 3 |
| 31/10/2019 | DA | 11:50 | 14:02 | 3 |
| 12/11/2019 | SI | 10:00 | 13:00 | 3 |
| 13/11/2019 | SI | 13:00 | 16:00 | 3 |
| 09/12/2019 | SI | 12:30 | 15:30 | 3 |
| 10/12/2019 | SI | 09:00 | 12:00 | 3 |
| 27/01/2020 | SI | 13:00 | 16:00 | 3 |
| 28/01/2020 | SI | 09:10 | 12:10 | 3 |
| 24/02/2020 | SI | 12:00 | 15:00 | 3 |
| 25/02/2020 | SI | 10:30 | 13:10 | 3 |
| 11/03/2020 | SI | 12:15 | 15:15 | 3 |
| 12/03/2020 | SI | 13:00 | 16:00 | 3 |
| 27/03/2020 | SI | 13:00 | 16:00 | 3 |
| 30/03/2020 | SI | 09:30 | 12:30 | 3 |
| Total Hours | | | | 42 |

APPENDIX II

Weather Data

Table AII-1: Weather data collected during flight activity surveys undertaken at WF1 VP1

| Date | Surveyor | Start | End | Survey Hour | Wind Speed | Wind Direction | Rain | Cloud Cover | Cloud Height | Visibility | Snow | Frost | Temp (°C) |
|------------|----------|-------|-------|-------------|------------|----------------|------|-------------|--------------|------------|------|-------|-----------|
| 29/10/2019 | SI | 10:00 | 13:00 | 1 | 2 | N | 0 | 3 | 2 | 2 | 0 | 0 | 8 |
| 29/10/2019 | SI | 10:00 | 13:00 | 2 | 1 | N | 0 | 3 | 2 | 2 | 0 | 0 | 9 |
| 29/10/2019 | SI | 10:00 | 13:00 | 3 | 2 | N | 0 | 4 | 2 | 2 | 0 | 0 | 9 |
| 29/10/2019 | SI | 13:30 | 16:30 | 1 | 2 | E | 0 | 4 | 2 | 2 | 0 | 0 | 9 |
| 29/10/2019 | SI | 13:30 | 16:30 | 2 | 3 | E | 0 | 5 | 2 | 2 | 0 | 0 | 9 |
| 29/10/2019 | SI | 13:30 | 16:30 | 3 | 2 | E | 0 | 6 | 2 | 2 | 0 | 0 | 9 |
| 12/11/2019 | DA | 09:11 | 12:11 | 1 | 2 | NE | 0 | 2 | 2 | 2 | 0 | 0 | 5 |
| 12/11/2019 | DA | 09:11 | 12:11 | 2 | 2 | NE | 0 | 3 | 2 | 2 | 0 | 0 | 6 |
| 12/11/2019 | DA | 09:11 | 12:11 | 3 | 2 | NE | 0 | 5 | 2 | 2 | 0 | 0 | 7 |
| 13/11/2019 | DA | 09:10 | 12:20 | 1 | 2 | E | 1 | 8 | 1 | 1 | 0 | 0 | 5 |
| 13/11/2019 | DA | 09:10 | 12:10 | 2 | 2 | E | 2 | 8 | 1 | 1 | 0 | 0 | 6 |
| 13/11/2019 | DA | 09:10 | 12:10 | 3 | 2 | E | 3 | 8 | 1 | 1 | 0 | 0 | 7 |
| 10/12/2019 | DA | 08:50 | 11:50 | 1 | 6 | SW | 4 | 8 | 1 | 1 | 0 | 0 | 13 |
| 10/12/2019 | DA | 08:50 | 11:50 | 2 | 6 | SW | 4 | 8 | 1 | 1 | 0 | 0 | 13 |
| 10/12/2019 | DA | 08:50 | 11:50 | 3 | 4 | SW | 3 | 8 | 1 | 1 | 0 | 0 | 13 |

| Date | Surveyor | Start | End | Survey Hour | Wind Speed | Wind Direction | Rain | Cloud Cover | Cloud Height | Visibility | Snow | Frost | Temp (°c) |
|------------|----------|-------|-------|-------------|------------|----------------|------|-------------|--------------|------------|------|-------|-----------|
| 12/12/2019 | DA | 11:31 | 14:31 | 1 | 3 | E | 0 | 6 | 1 | 2 | 0 | 0 | 7 |
| 12/12/2019 | DA | 11:31 | 14:31 | 2 | 3 | E | 1 | 7 | 1 | 2 | 0 | 0 | 7 |
| 12/12/2019 | DA | 11:31 | 14:31 | 3 | 3 | E | 0 | 7 | 1 | 2 | 0 | 0 | 7 |
| 28/01/2020 | DA | 08:45 | 11:45 | 1 | 3 | SE | 0 | 7 | 1 | 2 | 0 | 0 | 3 |
| 28/01/2020 | DA | 08:45 | 11:45 | 2 | 3 | SE | 0 | 4 | 1 | 2 | 0 | 0 | 5 |
| 28/01/2020 | DA | 08:45 | 11:45 | 3 | 4 | SE | 2 | 6 | 1 | 2 | 0 | 0 | 5 |
| 30/01/2020 | DA | 11:01 | 14:01 | 1 | 3 | SW | 0 | 7 | 1 | 1 | 0 | 0 | 3 |
| 30/01/2020 | DA | 11:01 | 14:01 | 2 | 3 | SW | 1 | 8 | 1 | 1 | 0 | 0 | 4 |
| 30/01/2020 | DA | 11:01 | 14:01 | 3 | 3 | SW | 0 | 8 | 1 | 1 | 0 | 0 | 5 |
| 26/02/2020 | DA | 15:30 | 18:30 | 1 | 2 | SW | 1 | 8 | 1 | 1 | 0 | 0 | 5 |
| 26/02/2020 | DA | 15:30 | 18:30 | 2 | 2 | SW | 0 | 8 | 1 | 1 | 0 | 0 | 4 |
| 26/02/2020 | DA | 15:30 | 18:30 | 3 | 2 | SW | 0 | 8 | 1 | 1 | 0 | 0 | 4 |
| 27/02/2020 | DA | 06:30 | 09:30 | 1 | 1 | SW | 0 | 0 | | 1 | 0 | 2 | 1 |
| 27/02/2020 | DA | 06:30 | 09:30 | 2 | 2 | SW | 0 | 2 | 2 | 2 | 0 | 2 | 2 |
| 27/02/2020 | DA | 06:30 | 09:30 | 3 | 2 | SW | 0 | 2 | 2 | 2 | 0 | 2 | 2 |
| 10/03/2020 | DH | 15:50 | 18:50 | 1 | 5 | NW | 0 | 7 | 2 | 2 | 0 | 0 | 4 |

| Date | Surveyor | Start | End | Survey Hour | Wind Speed | Wind Direction | Rain | Cloud Cover | Cloud Height | Visibility | Snow | Frost | Temp (°c) |
|----------------------------|----------|-------|-------|----------------------------|------------|----------------|--------------------|-------------|--------------|--------------------|------|--------------|-----------|
| 10/03/2020 | DH | 15:50 | 18:50 | 2 | 5 | NW | 0 | 5 | 2 | 2 | 0 | 0 | 2 |
| 10/03/2020 | DH | 15:50 | 18:50 | 3 | 5 | NW | 0 | 4 | 2 | 2 | 0 | 0 | 1 |
| 13/03/2020 | DH | 06:25 | 09:25 | 1 | 5 | SW | 2 | 8 | 2 | 2 | 0 | 0 | 2 |
| 13/03/2020 | DH | 06:25 | 09:25 | 2 | 5 | SW | 0 | 5 | 2 | 2 | 0 | 0 | 2 |
| Rain/ Precipitation | | | | Cloud Cover | | | Visibility | | | Lying Snow | | Frost | |
| None 0 | | | | Expressed in oktas (n/8) | | | Poor (<1km) 0 | | | None 0 | | None 0 | |
| Drizzle 1 | | | | Cloud Height | | | Moderate (1-3km) 1 | | | On site 1 | | Ground 1 | |
| Light showers/snow 2 | | | | Height of cloud above | | | Good (>3km) 2 | | | On higher ground 2 | | All day 2 | |
| Heavy showers/snow 3 | | | | average height of viewshed | | | | | | | | | |
| Heavy rain/snow 4 | | | | <150m 0 | | | | | | | | | |
| | | | | 150-500m 1 | | | | | | | | | |
| | | | | >500m 2 | | | | | | | | | |

Table AII-2: Weather data collected during flight activity surveys undertaken at WF1 VP2

| Date | Surveyor | Start | End | Survey Hour | Wind Speed | Wind Direction | Rain | Cloud Cover | Cloud Height | Visibility | Snow | Frost | Temp (°C) |
|------------|----------|-------|-------|-------------|------------|----------------|--------|-------------|--------------|------------|------|-------|-----------|
| 30/10/2019 | SI | 09:00 | 12:00 | 1 | 3 | E | 0 | 5 | 2 | 2 | 0 | 0 | 8 |
| 30/10/2019 | SI | 09:00 | 12:00 | 2 | 3 | E | 0 | 6 | 2 | 2 | 0 | 0 | 9 |
| 30/10/2019 | SI | 09:00 | 12:00 | 3 | 4 | E | 0 | 6 | 2 | 2 | 0 | 0 | 9 |
| 30/10/2019 | SI | 13:30 | 16:30 | 1 | 2 | E | 0 | 8 | 2 | 2 | 0 | 0 | 11 |
| 30/10/2019 | SI | 13:30 | 16:30 | 2 | 2 | E | 0 | 8 | 2 | 2 | 0 | 0 | 11 |
| 30/10/2019 | SI | 13:30 | 16:30 | 3 | 1 | E | 0 | 8 | 2 | 2 | 0 | 0 | 10 |
| 12/11/2019 | SI | 10:00 | 13:00 | 1 | 1 | NW | 2 | 4 | 2 | 2 | 0 | 0 | 6 |
| 12/11/2019 | SI | 10:00 | 13:00 | 2 | 2 | NW | 2 | 4 | 2 | 2 | 0 | 0 | 7 |
| 12/11/2019 | SI | 10:00 | 13:00 | 3 | 2 | NW | 0 | 5 | 2 | 2 | 0 | 0 | 8 |
| 13/11/2019 | SI | 09:30 | 12:30 | 1 | 0 | S | 2 | 8 | 2 | 2 | 0 | 0 | 5 |
| 13/11/2019 | SI | 09:30 | 12:30 | 2 | 0 | S | 4 or 3 | 8 | 2 | 1 | 0 | 0 | 5 |
| 13/11/2019 | SI | 09:30 | 12:30 | 3 | 0 | S | 0 | 8 | 2 | 1 | 0 | 0 | 5 |
| 09/12/2019 | SI | 09:00 | 12:00 | 1 | 1 | NW | 0 | 1 | 2 | 2 | 0 | 0 | 5 |
| 09/12/2019 | SI | 09:00 | 12:00 | 2 | 1 | NW | 0 | 1 | 2 | 2 | 0 | 0 | 5 |
| 09/12/2019 | SI | 09:00 | 12:00 | 3 | 1 | NW | 0 | 1 | 2 | 2 | 0 | 0 | 5 |

| Date | Surveyor | Start | End | Survey Hour | Wind Speed | Wind Direction | Rain | Cloud Cover | Cloud Height | Visibility | Snow | Frost | Temp (°c) |
|------------|----------|-------|-------|-------------|------------|----------------|-------|-------------|--------------|------------|------|-------|-----------|
| 10/12/2019 | SI | 12:30 | 15:30 | 1 | 2 | W | 3 | 8 | 1 | 2 | 0 | 0 | 8 |
| 10/12/2019 | SI | 12:30 | 15:30 | 2 | 2 | W | 3 | 8 | 1 | 2 | 0 | 0 | 8 |
| 10/12/2019 | SI | 12:30 | 15:30 | 3 | 2 | W | 3 | 8 | 1 | 2 | 0 | 0 | 6 |
| 27/01/2020 | SI | 09:00 | 12:00 | 1 | 1 | SW | 2 | 7 | 1 | 2 | 0 | 0 | 2.5 |
| 27/01/2020 | SI | 09:00 | 12:00 | 2 | 1 | SW | 0 | 5 | 2 | 2 | 0 | 0 | 3 |
| 27/01/2020 | SI | 09:00 | 12:00 | 3 | 1 | SW | 0 | 4 | 2 | 2 | 0 | 0 | 4 |
| 28/01/2020 | SI | 13:00 | 16:00 | 1 | 1 | W | 0 | 4 | 2 | 2 | 0 | 0 | 4 |
| 28/01/2020 | SI | 13:00 | 16:00 | 2 | 1 | W | 0 | 3 | 2 | 2 | 0 | 0 | 4 |
| 28/01/2020 | SI | 13:00 | 16:00 | 3 | 2 | W | 0 | 3 | 2 | 2 | 0 | 0 | 4 |
| 24/02/2020 | SI | 15:30 | 18:30 | 1 | 1 | WNW | 0 | 2 | 2 | 2 | 0 | 0 | 5 |
| 24/02/2020 | SI | 15:30 | 18:30 | 2 | 1 | NW | 0 - 2 | 2 | 2 | 2 | 0 | 0 | 5 |
| 24/02/2020 | SI | 15:30 | 18:30 | 3 | 1 | NW | 0 | 8 | 2 | 2 | 0 | 0 | 3 |
| 25/02/2020 | SI | 07:00 | 10:00 | 1 | 0 | W | 0 | 6 | 2 | 2 | 0 | 0 | 2.5 |
| 25/02/2020 | SI | 07:00 | 10:00 | 2 | 2 | W | 0 | 5 | 2 | 2 | 0 | 0 | 2 |
| 25/02/2020 | SI | 07:00 | 10:00 | 3 | 1 | W | 2 | 7 | 2 | 2 | 0 | 0 | 3 |
| 11/03/2020 | SI | 16:00 | 19:00 | 1 | 0 | W | 0 | 8 | 2 | 2 | 0 | 0 | 4 |

| Date | Surveyor | Start | End | Survey Hour | Wind Speed | Wind Direction | Rain | Cloud Cover | Cloud Height | Visibility | Snow | Frost | Temp (°c) |
|----------------------------|----------|-------|-------|----------------------------|------------|----------------|--------------------|-------------|--------------|--------------------|------|--------------|-----------|
| 11/03/2020 | SI | 16:00 | 19:00 | 2 | 0 | W | 2 | 8 | 2 | 2 | 0 | 0 | 5 |
| 11/03/2020 | SI | 16:00 | 19:00 | 3 | 1 | W | 3 | 8 | 1 | 1 | 0 | 0 | 5 |
| 12/03/2020 | SI | 06:20 | 09:20 | 1 | 0 | W | 2 | 5 | 2 | 2 | 0 | 0 | 4 |
| 12/03/2020 | SI | 06:20 | 09:20 | 2 | 0 | W | 0 | 1 | 2 | 2 | 0 | 0 | 4 |
| 12/03/2020 | SI | 06:20 | 09:20 | 3 | 1 | W | 5 | 3 | 2 | 2 | 0 | 0 | 4 |
| 30/10/2019 | SI | 09:00 | 12:00 | 1 | 3 | E | 0 | 5 | 2 | 2 | 0 | 0 | 8 |
| 30/10/2019 | SI | 09:00 | 12:00 | 2 | 3 | E | 0 | 6 | 2 | 2 | 0 | 0 | 9 |
| 30/10/2019 | SI | 09:00 | 12:00 | 3 | 4 | E | 0 | 6 | 2 | 2 | 0 | 0 | 9 |
| Rain/ Precipitation | | | | Cloud Cover | | | Visibility | | | Lying Snow | | Frost | |
| None 0 | | | | Expressed in oktas (n/8) | | | Poor (<1km) 0 | | | None 0 | | None 0 | |
| Drizzle 1 | | | | Cloud Height | | | Moderate (1-3km) 1 | | | On site 1 | | Ground 1 | |
| Light showers/snow 2 | | | | Height of cloud above | | | Good (>3km) 2 | | | On higher ground 2 | | All day 2 | |
| Heavy showers/snow 3 | | | | average height of viewshed | | | | | | | | | |
| Heavy rain/snow 4 | | | | <150m 0 | | | | | | | | | |
| | | | | 150-500m 1 | | | | | | | | | |
| | | | | >500m 2 | | | | | | | | | |

Table AII-3: Weather data collected during flight activity surveys undertaken at WF2 VP1

| Date | Surveyor | Start | End | Survey Hour | Wind Speed | Wind Direction | Rain | Cloud Cover | Cloud Height | Visibility | Snow | Frost | Temp (°C) |
|------------|----------|-------|-------|-------------|------------|----------------|------|-------------|--------------|------------|------|-------|-----------|
| 28/10/2019 | DA | 09:41 | 12:41 | 1 | 1 | 2 | E | 0 | 4 | 2 | 2 | 0 | 0 |
| 28/10/2019 | DA | 09:41 | 12:41 | 2 | 2 | 2 | E | 0 | 3 | 2 | 2 | 0 | 0 |
| 28/10/2019 | DA | 09:41 | 12:41 | 3 | 3 | 2 | E | 0 | 3 | 2 | 2 | 0 | 0 |
| 29/10/2019 | DA | 12:32 | 15:32 | 1 | 1 | 3 | E | 0 | 4 | 1 | 2 | 0 | 0 |
| 29/10/2019 | DA | 12:32 | 15:32 | 2 | 2 | 4 | E | 0 | 5 | 1 | 2 | 0 | 0 |
| 29/10/2019 | DA | 12:32 | 15:32 | 3 | 3 | 4 | E | 0 | 6 | 1 | 2 | 0 | 0 |
| 14/11/2019 | DA | 09:20 | 12:20 | 1 | 1 | 1 | E | 0 | 0 | 2 | 2 | 0 | 0 |
| 14/11/2019 | DA | 09:20 | 12:20 | 2 | 2 | 1 | E | 0 | 0 | 2 | 2 | 0 | 0 |
| 14/11/2019 | DA | 09:20 | 12:20 | 3 | 3 | 1 | E | 0 | 0 | 2 | 2 | 0 | 0 |
| 15/11/2019 | DA | 10:57 | 13:57 | 1 | 1 | 1 | E | 0 | 0 | 2 | 2 | 0 | 0 |
| 15/11/2019 | DA | 10:57 | 13:57 | 2 | 2 | 1 | E | 0 | 0 | 2 | 2 | 0 | 0 |
| 15/11/2019 | DA | 10:57 | 13:57 | 3 | 3 | 2 | E | 0 | 1 | 2 | 2 | 0 | 0 |
| 09/12/2019 | DA | 09:29 | 12:29 | 1 | 1 | 0 | SE | 0 | 1 | 2 | 2 | 0 | 0 |
| 09/12/2019 | DA | 09:29 | 12:29 | 2 | 2 | 0 | SE | 0 | 2 | 2 | 2 | 0 | 0 |
| 09/12/2019 | DA | 09:29 | 12:29 | 3 | 3 | 0 | SE | 0 | 2 | 2 | 2 | 0 | 0 |

| Date | Surveyor | Start | End | Survey Hour | Wind Speed | Wind Direction | Rain | Cloud Cover | Cloud Height | Visibility | Snow | Frost | Temp (°c) |
|------------|----------|-------|-------|-------------|------------|----------------|------|-------------|--------------|------------|------|-------|-----------|
| 11/12/2019 | DA | 12:14 | 15:14 | 1 | 1 | 2 | SW | 0 | 3 | 1 | 2 | 0 | 0 |
| 11/12/2019 | DA | 12:14 | 15:14 | 2 | 2 | 2 | SW | 0 | 3 | 1 | 2 | 0 | 0 |
| 11/12/2019 | DA | 12:14 | 15:14 | 3 | 3 | 3 | SW | 3 | 7 | 1 | 1 | 0 | 0 |
| 27/01/2020 | DA | 13:21 | 16:21 | 1 | 1 | 2 | SW | 0 | 5 | 1 | 1 | 0 | 0 |
| 27/01/2020 | DA | 13:21 | 16:21 | 2 | 2 | 2 | SW | 0 | 5 | 1 | 1 | 0 | 0 |
| 27/01/2020 | DA | 13:21 | 16:21 | 3 | 3 | 3 | SW | 0 | 5 | 1 | 1 | 0 | 0 |
| 24/02/2020 | DA | 09:51 | 12:51 | 1 | 1 | 5 | SW | 0 | 6 | 1 | 2 | 0 | 0 |
| 24/02/2020 | DA | 09:51 | 12:51 | 2 | 2 | 4 | SW | 0 | 4 | 1 | 2 | 0 | 0 |
| 24/02/2020 | DA | 09:51 | 12:51 | 3 | 3 | 4 | SW | 0 | 4 | 1 | 2 | 0 | 0 |
| 25/02/2020 | DA | 13:31 | 16:31 | 1 | 1 | 3 | SW | 0 | 6 | 1 | 2 | 0 | 0 |
| 25/02/2020 | DA | 13:31 | 16:31 | 2 | 2 | 3 | SW | 3 | 8 | 0 | 0 | 0 | 0 |
| 25/02/2020 | DA | 13:31 | 16:31 | 3 | 3 | 3 | SW | 2 | 8 | 1 | 1 | 0 | 0 |
| 11/03/2020 | DH | 09:30 | 12:30 | 1 | 1 | 5 | NW | 0 | 8 | 2 | 2 | 0 | 0 |
| 11/03/2020 | DH | 09:30 | 12:30 | 2 | 2 | 5 | NW | 0 | 7 | 2 | 2 | 0 | 0 |
| 11/03/2020 | DH | 09:30 | 12:30 | 3 | 3 | 4 | NW | 3 | 8 | 2 | 2 | 0 | 0 |
| 13/03/2020 | DH | 09:50 | 12:50 | 1 | 1 | 4 | W | 0 | 8 | 2 | 2 | 0 | 0 |

| Date | Surveyor | Start | End | Survey Hour | Wind Speed | Wind Direction | Rain | Cloud Cover | Cloud Height | Visibility | Snow | Frost | Temp (°c) |
|----------------------------|----------|-------|----------------------------|-------------|------------|-------------------|------|-------------|-------------------|------------|--------------|-------|-----------|
| 13/03/2020 | DH | 09:50 | 12:50 | 2 | 2 | 4 | W | 0 | 8 | 2 | 2 | 0 | 0 |
| 13/03/2020 | DH | 09:50 | 12:50 | 3 | 3 | 4 | W | 2 | 6 | 2 | 2 | 0 | 0 |
| Rain/ Precipitation | | | Cloud Cover | | | Visibility | | | Lying Snow | | Frost | | |
| None | 0 | | Expressed in oktas (n/8) | | | Poor (<1km) | 0 | | None | 0 | None | 0 | |
| Drizzle | 1 | | Cloud Height | | | Moderate (1-3km) | 1 | | On site | 1 | Ground | 1 | |
| Light showers/snow | 2 | | Height of cloud above | | | Good (>3km) | 2 | | On higher ground | 2 | All day | 2 | |
| Heavy showers/snow | 3 | | average height of viewshed | | | | | | | | | | |
| Heavy rain/snow | 4 | | <150m | | | | | | | | | | |
| | | | 150-500m | | | | | | | | | | |
| | | | >500m | | | | | | | | | | |

Table AII-4: Weather data collected during flight activity surveys undertaken at WF2 VP2

| Date | Surveyor | Start | End | Survey Hour | Wind Speed | Wind Direction | Rain | Cloud Cover | Cloud Height | Visibility | Snow | Frost | Temp (°C) |
|------------|----------|-------|-------|-------------|------------|----------------|------|-------------|--------------|------------|------|-------|-----------|
| 28/10/2019 | DA | 13:01 | 16:01 | 1 | 3 | E | 0 | 2 | 2 | 2 | 0 | 0 | 9 |
| 28/10/2019 | DA | 13:01 | 16:01 | 2 | 4 | E | 0 | 1 | 2 | 2 | 0 | 0 | 9 |
| 28/10/2019 | DA | 13:01 | 16:01 | 3 | 4 | E | 0 | 1 | 2 | 2 | 0 | 0 | 9 |
| 29/10/2019 | DA | 09:21 | 12:21 | 1 | 1 | E | 0 | 1 | 2 | 2 | 0 | 0 | 6 |
| 29/10/2019 | DA | 09:21 | 12:21 | 2 | 3 | E | 0 | 1 | 2 | 2 | 0 | 0 | 8 |
| 29/10/2019 | DA | 09:21 | 12:21 | 3 | 3 | E | 0 | 1 | 2 | 2 | 0 | 0 | 9 |
| 14/11/2019 | DA | 12:31 | 15:31 | 1 | 2 | E | 0 | 1 | 2 | 2 | 0 | 0 | 7 |
| 14/11/2019 | DA | 12:31 | 15:31 | 2 | 3 | E | 0 | 1 | 2 | 2 | 0 | 0 | 7 |
| 14/11/2019 | DA | 12:31 | 15:31 | 3 | 3 | E | 0 | 1 | 2 | 2 | 0 | 0 | 7 |
| 15/11/2019 | DA | 07:46 | 10:46 | 1 | 1 | E | 0 | 0 | 2 | 2 | 0 | 1 | 0 |
| 15/11/2019 | DA | 07:46 | 10:46 | 2 | 1 | E | 0 | 0 | 2 | 2 | 0 | 0 | 3 |
| 15/11/2019 | DA | 07:46 | 10:46 | 3 | 1 | E | 0 | 0 | 2 | 2 | 0 | 0 | 5 |
| 09/12/2019 | DA | 12:39 | 15:39 | 1 | 1 | SE | 0 | 1 | 2 | 2 | 0 | 0 | 8 |
| 09/12/2019 | DA | 12:39 | 15:39 | 2 | 1 | SE | 0 | 3 | 2 | 2 | 0 | 0 | 8 |
| 09/12/2019 | DA | 12:39 | 15:39 | 3 | 2 | SE | 0 | 2 | 2 | 2 | 0 | 0 | 7 |

| Date | Surveyor | Start | End | Survey Hour | Wind Speed | Wind Direction | Rain | Cloud Cover | Cloud Height | Visibility | Snow | Frost | Temp (°c) |
|------------|----------|-------|-------|-------------|------------|----------------|------|-------------|--------------|------------|------|-------|-----------|
| 11/12/2019 | DA | 09:05 | 12:05 | 1 | 2 | SW | 0 | 5 | 1 | 2 | 0 | 0 | 6 |
| 11/12/2019 | DA | 09:05 | 12:05 | 2 | 2 | SW | 0 | 4 | 1 | 2 | 0 | 0 | 7 |
| 11/12/2019 | DA | 09:05 | 12:05 | 3 | 2 | SW | 0 | 6 | 1 | 2 | 0 | 0 | 7 |
| 29/01/2020 | DA | 13:20 | 16:20 | 1 | 3 | SW | 1 | 8 | 1 | 1 | 0 | 0 | 7 |
| 29/01/2020 | DA | 13:20 | 16:20 | 2 | 3 | SW | 0 | 7 | 1 | 1 | 0 | 0 | 7 |
| 29/01/2020 | DA | 13:20 | 16:20 | 3 | 3 | SW | 0 | 8 | 1 | 1 | 0 | 0 | 7 |
| 30/01/2020 | DA | 07:42 | 10:42 | 1 | 2 | SW | 0 | 5 | 1 | 2 | 0 | 0 | 3 |
| 30/01/2020 | DA | 07:42 | 10:42 | 2 | 3 | SW | 0 | 4 | 1 | 2 | 0 | 0 | 3 |
| 30/01/2020 | DA | 07:42 | 10:42 | 3 | 3 | SW | 0 | 6 | 1 | 2 | 0 | 0 | 4 |
| 24/02/2020 | DA | 13:12 | 16:12 | 1 | 4 | SW | 0 | 4 | 1 | 2 | 0 | 0 | 9 |
| 24/02/2020 | DA | 13:12 | 16:12 | 2 | 4 | SW | 0 | 3 | 1 | 2 | 0 | 0 | 9 |
| 24/02/2020 | DA | 13:12 | 16:12 | 3 | 4 | SW | 0 | 5 | 1 | 2 | 0 | 0 | 8 |
| 26/02/2020 | DA | 08:21 | 11:21 | 1 | 2 | SW | 0 | 3 | 2 | 2 | 0 | 2 | 2 |
| 26/02/2020 | DA | 08:21 | 11:21 | 2 | 2 | SW | 0 | 3 | 2 | 2 | 0 | 0 | 3 |
| 26/02/2020 | DA | 08:21 | 11:21 | 3 | 2 | SW | 0 | 2 | 2 | 2 | 0 | 0 | 4 |
| 11/03/2020 | DH | 13:00 | 16:00 | 1 | 4 | W | 0 | 2 | 2 | 2 | 0 | 0 | 5 |

| Date | Surveyor | Start | End | Survey Hour | Wind Speed | Wind Direction | Rain | Cloud Cover | Cloud Height | Visibility | Snow | Frost | Temp (°c) |
|----------------------------|----------|-------|----------------------------|-------------|------------|-------------------|------|-------------|-------------------|------------|------|--------------|-----------|
| 11/03/2020 | DH | 13:00 | 16:00 | 2 | 4 | W | 2 | 2 | 2 | 2 | 0 | 0 | 6 |
| 11/03/2020 | DH | 13:00 | 16:00 | 3 | 4 | NW | 0 | 2 | 2 | 2 | 0 | 0 | 6 |
| 12/03/2020 | DH | 13:05 | 16:05 | 1 | 5 | W | 0 | 8 | 2 | 2 | 0 | 0 | 5 |
| 12/03/2020 | DH | 13:05 | 16:05 | 2 | 5 | W | 3 | 7 | 2 | 2 | 0 | 0 | 6 |
| 12/03/2020 | DH | 13:05 | 16:05 | 3 | 5 | W | 2 | 7 | 2 | 2 | 0 | 0 | 6 |
| Rain/ Precipitation | | | Cloud Cover | | | Visibility | | | Lying Snow | | | Frost | |
| None | 0 | | Expressed in oktas (n/8) | | | Poor (<1km) | 0 | | None | 0 | | None | 0 |
| Drizzle | 1 | | Cloud Height | | | Moderate (1-3km) | 1 | | On site | 1 | | Ground | 1 |
| Light showers/snow | 2 | | Height of cloud above | | | Good (>3km) | 2 | | On higher ground | 2 | | All day | 2 |
| Heavy showers/snow | 3 | | average height of viewshed | | | | | | | | | | |
| Heavy rain/snow | 4 | | <150m | | | | | | | | | | |
| | | | 150-500m | | | | | | | | | | |
| | | | >500m | | | | | | | | | | |

Table AII-5: Weather data collected during flight activity surveys undertaken at WF2 VP3

| Date | Surveyor | Start | End | Survey Hour | Wind Speed | Wind Direction | Rain | Cloud Cover | Cloud Height | Visibility | Snow | Frost | Temp (°C) |
|------------|----------|-------|-------|-------------|------------|----------------|------|-------------|--------------|------------|------|-------|-----------|
| 30/10/2019 | DA | 12:42 | 15:42 | 1 | 5 | E | 0 | 5 | 1 | 2 | 0 | 0 | 10 |
| 30/10/2019 | DA | 12:42 | 15:42 | 2 | 5 | E | 0 | 5 | 1 | 2 | 0 | 0 | 10 |
| 30/10/2019 | DA | 12:42 | 15:42 | 3 | 5 | E | 0 | 5 | 1 | 2 | 0 | 0 | 10 |
| 31/10/2019 | DA | 08:31 | 11:31 | 1 | 2 | E | 1 | 8 | 1 | 1 | 0 | 0 | 8 |
| 31/10/2019 | DA | 08:31 | 11:31 | 2 | 2 | E | 1 | 8 | 1 | 1 | 0 | 0 | 8 |
| 31/10/2019 | DA | 08:31 | 11:31 | 3 | 2 | E | 0 | 8 | 1 | 1 | 0 | 0 | 8 |
| 12/11/2019 | DA | 12:25 | 15:25 | 1 | 2 | NE | 0 | 6 | 1 | 2 | 0 | 0 | 9 |
| 12/11/2019 | DA | 12:25 | 15:25 | 2 | 2 | NE | 0 | 4 | 1 | 2 | 0 | 0 | 9 |
| 12/11/2019 | DA | 12:25 | 15:25 | 3 | 2 | NE | 0 | 3 | 1 | 2 | 0 | 0 | 9 |
| 10/12/2019 | DA | 12:04 | 15:04 | 1 | 5 | SW | 3 | 8 | 1 | 1 | 0 | 0 | 12 |
| 10/12/2019 | DA | 12:04 | 15:04 | 2 | 4 | SW | 2 | 8 | 1 | 1 | 0 | 0 | 10 |
| 10/12/2019 | DA | 12:04 | 15:04 | 3 | 4 | SW | 3 | 8 | 1 | 1 | 0 | 0 | 8 |
| 12/12/2019 | DA | 08:10 | 11:10 | 1 | 1 | E | 0 | 7 | 1 | 2 | 0 | 0 | 6 |
| 12/12/2019 | DA | 08:10 | 11:10 | 2 | 2 | E | 0 | 8 | 1 | 2 | 0 | 0 | 7 |
| 12/12/2019 | DA | 08:10 | 11:10 | 3 | 3 | E | 0 | 8 | 1 | 2 | 0 | 0 | 7 |

| Date | Surveyor | Start | End | Survey Hour | Wind Speed | Wind Direction | Rain | Cloud Cover | Cloud Height | Visibility | Snow | Frost | Temp (°c) |
|------------|----------|-------|-------|-------------|------------|----------------|------|-------------|--------------|------------|------|-------|-----------|
| 28/01/2020 | DA | 12:01 | 15:01 | 1 | 3 | SE | 0 | 3 | 1 | 2 | 0 | 0 | 5 |
| 28/01/2020 | DA | 12:01 | 15:01 | 2 | 3 | SE | 0 | 4 | 1 | 2 | 0 | 0 | 5 |
| 28/01/2020 | DA | 12:01 | 15:01 | 3 | 3 | SE | 0 | 6 | 1 | 2 | 0 | 0 | 5 |
| 29/01/2020 | DA | 09:21 | 12:21 | 1 | 2 | SE | 0 | 8 | 2 | 2 | 0 | 0 | 8 |
| 29/01/2020 | DA | 09:21 | 12:21 | 2 | 3 | SE | 0 | 8 | 2 | 2 | 0 | 0 | 8 |
| 29/01/2020 | DA | 09:21 | 12:21 | 3 | 3 | SE | 0 | 8 | 2 | 2 | 0 | 0 | 8 |
| 25/02/2020 | DA | 10:12 | 13:12 | 1 | 3 | SW | 1 | 8 | 1 | 2 | 0 | 0 | 3 |
| 25/02/2020 | DA | 10:12 | 13:12 | 2 | 3 | SW | 1 | 8 | 1 | 2 | 0 | 0 | 3 |
| 25/02/2020 | DA | 10:12 | 13:12 | 3 | 3 | SW | 2 | 8 | 1 | 2 | 0 | 0 | 4 |
| 26/02/2020 | DA | 12:00 | 15:00 | 1 | 2 | SW | 0 | 3 | 2 | 2 | 0 | 0 | 6 |
| 26/02/2020 | DA | 12:00 | 15:00 | 2 | 2 | SW | 0 | 5 | 2 | 2 | 0 | 0 | 6 |
| 26/02/2020 | DA | 12:00 | 15:00 | 3 | 2 | SW | 2 | 7 | 1 | 1 | 0 | 0 | 6 |
| 10/03/2020 | DH | 11:50 | 14:40 | 1 | 5 | W | 0 | 8 | 2 | 2 | 0 | 0 | 5 |
| 10/03/2020 | DH | 11:50 | 14:50 | 2 | 5 | W | 2 | 8 | 2 | 2 | 0 | 0 | 6 |
| 10/03/2020 | DH | 11:50 | 14:50 | 3 | 5 | NW | 2 | 8 | 2 | 2 | 0 | 0 | 6 |
| 12/03/2020 | DH | 09:25 | 12:25 | 1 | 5 | NW | 3 | 8 | 2 | 2 | 0 | 0 | 5 |

| Date | Surveyor | Start | End | Survey Hour | Wind Speed | Wind Direction | Rain | Cloud Cover | Cloud Height | Visibility | Snow | Frost | Temp (°c) |
|----------------------------|----------|-------|----------------------------|-------------|------------|-------------------|------|-------------|-------------------|------------|------|--------------|-----------|
| 12/03/2020 | DH | 09:25 | 12:25 | 2 | 5 | NW | 0 | 3 | 2 | 2 | 0 | 0 | 5 |
| 12/03/2020 | DH | 09:25 | 12:25 | 3 | 5 | NW | 0 | 6 | 2 | 2 | 0 | 0 | 6 |
| Rain/ Precipitation | | | Cloud Cover | | | Visibility | | | Lying Snow | | | Frost | |
| None | 0 | | Expressed in oktas (n/8) | | | Poor (<1km) | 0 | | None | 0 | | None | 0 |
| Drizzle | 1 | | Cloud Height | | | Moderate (1-3km) | 1 | | On site | 1 | | Ground | 1 |
| Light showers/snow | 2 | | Height of cloud above | | | Good (>3km) | 2 | | On higher ground | 2 | | All day | 2 |
| Heavy showers/snow | 3 | | average height of viewshed | | | | | | | | | | |
| Heavy rain/snow | 4 | | <150m | | | | | | | | | | |
| | | | 150-500m | | | | | | | | | | |
| | | | >500m | | | | | | | | | | |

Table AII-6: Weather data collected during flight activity surveys undertaken at WF2 VP4

| Date | Surveyor | Start | End | Survey Hour | Wind Speed | Wind Direction | Rain | Cloud Cover | Cloud Height | Visibility | Snow | Frost | Temp (°C) |
|------------|----------|-------|-------|-------------|------------|----------------|------|-------------|--------------|------------|------|-------|-----------|
| 30/10/2019 | DA | 09:36 | 12:36 | 1 | 3 | E | 0 | 6 | 1 | 2 | 0 | 0 | 8 |
| 30/10/2019 | DA | 09:36 | 12:36 | 2 | 3 | E | 0 | 7 | 1 | 2 | 0 | 0 | 9 |
| 30/10/2019 | DA | 09:36 | 12:36 | 3 | 3 | E | 0 | 7 | 1 | 2 | 0 | 0 | 9 |
| 31/10/2019 | DA | 11:50 | 14:02 | 1 | 2 | E | 0 | 8 | 1 | 1 | 0 | 0 | 8 |
| 31/10/2019 | DA | 11:50 | 14:02 | 2 | 2 | E | 0 | 8 | 1 | 1 | 0 | 0 | 8 |
| 31/10/2019 | DA | 11:50 | 14:02 | 3 | 2 | E | 0 | 8 | 1 | 1 | 0 | 0 | 9 |
| 13/11/2019 | SI | 13:00 | 16:00 | 1 | 0 | S | 0 | 8 | 2 | 2 | 0 | 0 | 5 |
| 13/11/2019 | SI | 13:00 | 16:00 | 2 | 0 | S | 1 | 8 | 1 | 0 | 0 | 0 | 5 |
| 13/11/2019 | SI | 13:00 | 16:00 | 3 | 0 | S | 0 | 8 | 1 | 1 | 0 | 0 | 5 |
| 09/12/2019 | SI | 12:30 | 15:30 | 1 | 1 | NW | 0 | 1 | 2 | 2 | 0 | 0 | 6 |
| 09/12/2019 | SI | 12:30 | 15:30 | 2 | 1 | NW | 0 | 1 | 2 | 2 | 0 | 0 | 6 |
| 09/12/2020 | SI | 12:30 | 15:30 | 3 | 1 | NW | 0 | 1 | 2 | 2 | 0 | 0 | 5 |
| 10/12/2019 | SI | 09:00 | 12:00 | 1 | 4 | SW | 3-4 | 1 | 1 | 1 | 0 | 0 | 11 |
| 10/12/2019 | SI | 09:00 | 12:00 | 2 | 4 | SW | 3 | 1 | 1 | 1 | 0 | 0 | 12 |
| 10/12/2019 | SI | 09:00 | 12:00 | 3 | 4 | SW | 3 | 1 | 1 | 1 | 0 | 0 | 13 |

| Date | Surveyor | Start | End | Survey Hour | Wind Speed | Wind Direction | Rain | Cloud Cover | Cloud Height | Visibility | Snow | Frost | Temp (°c) |
|------------|----------|-------|-------|-------------|------------|----------------|------|-------------|--------------|------------|------|-------|-----------|
| 27/01/2020 | SI | 13:00 | 16:00 | 1 | 3-4 | W | 0 | 8 | 2 | 2 | 0 | 0 | 1 |
| 27/01/2020 | SI | 13:00 | 16:00 | 2 | 2 | W | 0 | 7 | 2 | 2 | 0 | 0 | 2 |
| 27/01/2020 | SI | 13:00 | 16:00 | 3 | 1 | W | 2 | 8 | 2 | 2 | 0 | 0 | 2 |
| 28/01/2020 | SI | 09:10 | 12:10 | 1 | 0 | W | 0 | 4 | 2 | 2 | 0 | 0 | 2.5 |
| 28/01/2020 | SI | 09:10 | 12:10 | 2 | 1 | W | 0 | 3 | 2 | 2 | 0 | 0 | 3 |
| 28/01/2020 | SI | 09:10 | 12:10 | 3 | 1 | W | 0 | 2 | 2 | 2 | 0 | 0 | 2 |
| 24/02/2020 | SI | 12:00 | 15:00 | 1 | 2 | NW | 0 | 7 | 2 | 2 | 0 | 0 | 5 |
| 24/02/2020 | SI | 12:00 | 15:00 | 2 | 2 | NW | 0 | 6 | 2 | 2 | 0 | 0 | 7 |
| 24/02/2020 | SI | 12:00 | 15:00 | 3 | 2 | NW | 0 | 5 | 2 | 2 | 0 | 0 | 7 |
| 25/02/2020 | SI | 10:30 | 13:30 | 1 | 1 | W | 2 | 8 | 2 | 2 | 0 | 0 | 3 |
| 25/02/2020 | SI | 10:30 | 13:30 | 2 | 1 | W | 2 | 7 | 2 | 2 | 0 | 0 | 3 |
| 25/02/2020 | SI | 10:30 | 13:30 | 3 | 1 | W | 2 | 8 | 2 | 2 | 0 | 0 | 2 |
| 11/03/2020 | SI | 12:15 | 15:15 | 1 | 1 | W | 3 | 8 | 2 | 2 | 0 | 0 | 7 |
| 11/03/2020 | SI | 12:15 | 15:15 | 2 | 2 | W | 2 | 5 | 2 | 2 | 0 | 0 | 5 |
| 11/03/2020 | SI | 12:15 | 15:15 | 3 | 1 | W | 3 | 8 | 2 | 1 | 0 | 0 | 4 |
| 12/03/2020 | SI | 13:00 | 16:00 | 1 | 1 | W | 0 | 8 | 2 | 2 | 0 | 0 | 7 |

| Date | Surveyor | Start | End | Survey Hour | Wind Speed | Wind Direction | Rain | Cloud Cover | Cloud Height | Visibility | Snow | Frost | Temp (°c) |
|----------------------------|----------|-------|----------------------------|-------------|------------|-------------------|------|-------------|-------------------|------------|------|--------------|-----------|
| 12/03/2020 | SI | 13:00 | 16:00 | 2 | 1 | W | 3 | 8 | 2 | 2 | 0 | 0 | 7 |
| 12/03/2020 | SI | 13:00 | 16:00 | 3 | 1 | W | 0 | 8 | 2 | 2 | 0 | 0 | 7 |
| Rain/ Precipitation | | | Cloud Cover | | | Visibility | | | Lying Snow | | | Frost | |
| None | 0 | | Expressed in oktas (n/8) | | | Poor (<1km) | 0 | | None | 0 | | None | 0 |
| Drizzle | 1 | | Cloud Height | | | Moderate (1-3km) | 1 | | On site | 1 | | Ground | 1 |
| Light showers/snow | 2 | | Height of cloud above | | | Good (>3km) | 2 | | On higher ground | 2 | | All day | 2 |
| Heavy showers/snow | 3 | | average height of viewshed | | | | | | | | | | |
| Heavy rain/snow | 4 | | <150m | | | | | | | | | | |
| | | | 150-500m | | | | | | | | | | |
| | | | >500m | | | | | | | | | | |

APPENDIX III

Flight activity survey data

Table AIII-1a: Primary target species flight activity data from WF1 VP1

| Date | Surveyor | Flight ID | Species | Num. Birds | M/F | Age | Obs. Time | Flight time (s) | Collision Risk Zone (CRZ) (Y/N) |
|------------|----------|-----------|---------|------------|-----|-----|-----------|-----------------|---------------------------------|
| 12/12/2019 | DA | 1 | WS | 4 | U | U | 13:03 | 30 | N |
| 10/03/2020 | DH | 1 | NW | 72 | U | U | 17:44 | 60 | Y |

Table AIII-2a: Primary target species flight activity data from WF1 VP2

| Date | Surveyor | Flight ID | Species | Num. Birds | M/F | Age | Obs. Time | Flight time (s) | Collision Risk Zone (CRZ) (Y/N) |
|------------|----------|-----------|---------|------------|-----|-----|-----------|-----------------|---------------------------------|
| 29/10/2019 | SI | 1 | WS | 4 | U | AD | 15:01 | 30 | N |
| 29/10/2019 | SI | 2 | WS | 2 | U | AD | 16:01 | 30 | N |
| 29/10/2019 | SI | 3 | WS | 2 | U | AD | 16:22 | 60 | N |
| 30/10/2019 | SI | 1 | L. | 10 | U | U | 11:45 | 45 | N |
| 27/01/2020 | SI | 1 | WS | 4 | U | Ad | 10:28 | 30 | N |
| 27/01/2020 | SI | 2 | GP | 30 | U | U | 11:38 | 45 | N |
| 27/01/2020 | SI | 3 | GP | 50 | U | U | 11:48 | 75 | N |
| 27/01/2020 | SI | 4 | GP | 40 | U | U | 11:51 | 60 | N |
| 28/01/2020 | SI | 1 | GP | 8 | U | U | 13:47 | 45 | N |
| 24/02/2020 | SI | 1 | GP | 12 | U | U | 17:54 | 45 | N |

Table AIII-3a: Primary target species flight activity data from WF2 VP1

| Date | Surveyor | Flight ID | Species | Num. Birds | M/F | Age | Obs. Time | Flight time (s) | Collision Risk Zone (CRZ) (Y/N) |
|------------|----------|-----------|---------|------------|-----|-----|-----------|-----------------|---------------------------------|
| 09/12/2019 | DA | 1 | WS | 4 | U | U | 10:21 | 60 | N |

Table AIII-4a: Primary target species flight activity data from WF2 VP2

| Date | Surveyor | Flight ID | Species | Num. Birds | M/F | Age | Obs. Time | Flight time (s) | Collision Risk Zone (CRZ) (Y/N) |
|------------|----------|-----------|---------|------------|-----|-----|-----------|-----------------|---------------------------------|
| 29/10/2019 | DA | 1 | GP | 15 | U | U | 10:50 | 105 | N |
| 30/01/2020 | DA | 1 | WS | 11 | AD | U | 09:31 | 90 | N |

Table AIII-5a: Primary target species flight activity data from WF2 VP3

| Date | Surveyor | Flight ID | Species | Num. Birds | M/F | Age | Obs. Time | Flight time (s) | Collision Risk Zone (CRZ) (Y/N) |
|------------|----------|-----------|---------|------------|-----|-----|-----------|-----------------|---------------------------------|
| 30/10/2019 | DH | 1 | L | 1 | U | U | 12:52 | 75 | N |
| 30/10/2019 | DH | 2 | GP | 4 | U | U | 13:51 | 45 | N |
| 31/10/2019 | DH | 1 | L | 2 | U | U | 09:34 | 60 | N |
| 31/10/2019 | DH | 2 | GP | 17 | U | U | 09:35 | 105 | Y |
| 31/10/2019 | DH | 6 | L | 3 | U | U | 10:49 | 90 | N |

| Date | Surveyor | Flight ID | Species | Num. Birds | M/F | Age | Obs. Time | Flight time (s) | Collision Risk Zone (CRZ) (Y/N) |
|------------|----------|-----------|---------|------------|-----|-----|-----------|-----------------|---------------------------------|
| 31/10/2019 | DH | 7 | L | 27 | U | U | 11:02 | 0 | N |
| 12/11/2019 | DH | 3 | L | 35 | U | AD | 13:42 | 105 | Y |
| 12/11/2019 | DH | 5 | L | 1 | U | AD | 14:09 | 45 | N |
| 12/12/2019 | DH | 1 | WS | 9 | U | U | 09:39 | 75 | N |
| 12/12/2019 | DH | 2 | WS | 2 | U | U | 09:46 | 60 | N |

Table AIII-6: Primary target species flight activity data from WF2 VP4

| Date | Surveyor | Flight ID | Species | Num. Birds | M/F | Age | Obs. Time | Flight time (s) | Collision Risk Zone (CRZ) (Y/N) |
|------------|----------|-----------|---------|------------|-----|-----|-----------|-----------------|---------------------------------|
| 12/11/2019 | SI | 2 | WS | 5 | U | AD | 12:31 | 90 | Y |

Table AIII-1b: Secondary target species flight activity data from WF1 VP1

| Date | Survey start | Survey end | Species | Count | 5 min period | Likely Rotor Swept Height (Y/N) |
|------------|--------------|------------|---------|-------|---------------|---------------------------------|
| 29/10/2019 | 10:00 | 13:00 | RN | 3 | 11:10-11:15 | N |
| 29/10/2019 | 10:00 | 13:00 | RN | 1 | 12:40-12:45 | Y |
| 12/11/2019 | 09:11 | 12:11 | RN | 1 | 09:42 - 09:47 | N |
| 12/11/2019 | 09:11 | 12:11 | RN | 1 | 10:05 - 10:10 | N |
| 10/12/2019 | 08:50 | 11:50 | BH | 1 | 09:55-10:00 | N |
| 12/12/2019 | 11:31 | 14:31 | RN | 1 | 11:40-11:45 | Y |
| 12/12/2019 | 11:31 | 14:31 | RN | 2 | 11:49-11:54 | Y |
| 28/01/2020 | 08:45 | 11:45 | RN | 4 | 8:59-9:04 | Y |
| 28/01/2020 | 08:45 | 11:45 | BZ | 1 | 10:08-10:13 | Y |
| 28/01/2020 | 08:45 | 11:45 | BZ | 1 | 10:37-10:42 | Y |
| 30/01/2020 | 11:01 | 13:01 | RN | 3 | 09:32-09:37 | Y |
| 26/02/2020 | 15:30 | 18:30 | RN | 1 | 15:41 - 15:51 | N |
| 26/02/2020 | 15:30 | 18:30 | RN | 2 | 15:57-16:02 | N |
| 26/02/2020 | 15:30 | 18:30 | RN | 1 | 16:31-16:36 | N |
| 26/02/2020 | 15:30 | 18:30 | RN | 1 | 17:14-17:19 | N |
| 26/02/2020 | 15:30 | 18:30 | RN | 1 | 17:21-17:26 | N |
| 27/02/2020 | 06:30 | 09:30 | RN | 3 | 06:30-06:35 | Y |
| 27/02/2020 | 06:30 | 09:30 | RN | 1 | 06:42-06:47 | N |
| 27/02/2020 | 06:30 | 09:30 | BZ | 3 | 07:10-07:15 | Y |
| 27/02/2020 | 06:30 | 09:30 | RN | 2 | 07:19-07:24 | Y |
| 27/02/2020 | 06:30 | 09:30 | LB | 2 | 08:06-08:11 | Y |

| Date | Survey start | Survey end | Species | Count | 5 min period | Likely Rotor Swept Height (Y/N) |
|------------|--------------|------------|---------|-------|--------------|------------------------------------|
| 27/02/2020 | 06:30 | 09:30 | RN | 3 | 08:07-08:12 | Y |

Table AIII-2b: Secondary target species flight activity data from WF1 VP2

| Date | Survey start | Survey end | Species | Count | 5 min period | Likely Rotor Swept Height (Y/N) |
|------------|--------------|------------|---------|-------|---------------|------------------------------------|
| 30/10/2019 | 09:00 | 12:00 | RN | 2 | 10:05-10:10 | N |
| 30/10/2019 | 09:00 | 12:00 | RN | 2 | 10:45-10:50 | N |
| 30/10/2019 | 09:00 | 12:00 | RN | 3 | 11:50-11:55 | N |
| 30/10/2019 | 13:30 | 16:30 | RN | 1 | 13:35-13:40 | N |
| 30/10/2019 | 13:30 | 16:30 | RN | 1 | 14:10-14:15 | N |
| 30/10/2019 | 13:30 | 16:30 | RN | 1 | 14:15-14:20 | N |
| 30/10/2019 | 13:30 | 16:30 | RN | 3 | 14:25-14:30 | N |
| 13/11/2019 | 09:30 | 12:30 | MA | 2 | 10:30-10:35 | N |
| 13/11/2019 | 09:30 | 12:30 | RN | 1 | 11:35-11:40 | N |
| 09/12/2019 | 09:00 | 12:00 | MA | 4 | 11:12 -11:17 | Y |
| 09/12/2019 | 09:00 | 12:00 | BH | 5 | 10:15 - 10:20 | Y |
| 09/12/2019 | 09:00 | 12:00 | RN | 2 | 10:15 - 10:20 | Y |
| 09/12/2019 | 09:00 | 12:00 | RN | 1 | 11:00 - 11:05 | Y |
| 09/12/2019 | 09:00 | 12:00 | RN | 1 | 11:05 - 11:10 | Y |
| 09/12/2019 | 09:00 | 12:00 | RN | 1 | 11:20 - 11:25 | Y |
| 09/12/2019 | 09:00 | 12:00 | BH | 7 | 11:45 - 11:50 | Y |
| 09/12/2019 | 09:00 | 12:00 | BH | 2 | 11:50 - 11:55 | Y |
| 10/12/2019 | 12:30 | 15:30 | BH | 1 | 13:50 - 13:55 | Y |
| 10/12/2019 | 12:30 | 15:30 | RN | 1 | 14:15 - 14:20 | N |
| 27/01/2020 | 09:00 | 12:00 | BH | 15 | 09:00 - 09:05 | N |
| 27/01/2020 | 09:00 | 12:00 | RN | 1 | 09:40 - 09:45 | Y |
| 27/01/2020 | 09:00 | 12:00 | LB | 1 | 10:10 - 10:15 | N |
| 27/01/2020 | 09:00 | 12:00 | RN | 4 | 10:25 - 10:30 | N |
| 27/01/2020 | 09:00 | 12:00 | BH | 4 | 11:00 - 11:05 | N |
| 27/01/2020 | 09:00 | 12:00 | BH | 11 | 11:05 - 11:10 | N |
| 27/01/2020 | 09:00 | 12:00 | BH | 25 | 11:05 - 11:10 | Y |
| 27/01/2020 | 09:00 | 12:00 | BH | 2 | 11:25 - 11:30 | N |
| 27/01/2020 | 09:00 | 12:00 | BH | 23 | 11:55 - 12:00 | N |
| 28/01/2020 | 13:00 | 16:00 | BH | 50 | 13:00 - 13:05 | N |
| 28/01/2020 | 13:00 | 16:00 | BH | 60 | 13:35 - 13:40 | N |

| Date | Survey start | Survey end | Species | Count | 5 min period | Likely Rotor Swept Height (Y/N) |
|------------|--------------|------------|---------|-----------|---------------|------------------------------------|
| 28/01/2020 | 13:00 | 16:00 | BH | 17 | 13:45 - 13:50 | N |
| 28/01/2020 | 13:00 | 16:00 | BH | 30 | 14:00 - 14:05 | Y |
| 28/01/2020 | 13:00 | 16:00 | BH | 150 | 14:10 - 14:15 | N |
| 28/01/2020 | 13:00 | 16:00 | BH | 1 | 14:20 - 14:25 | Y |
| 28/01/2020 | 13:00 | 16:00 | BH | 4 | 15:10 - 15:15 | N |
| 28/01/2020 | 13:00 | 16:00 | BH | 5 | 15:40 - 15:45 | N |
| 28/01/2020 | 13:00 | 16:00 | BH | 1 | 15:50 - 15:55 | N |
| 24/02/2020 | 15:30 | 18:30 | BH | 300 - 500 | 15:30 - 15:35 | N |
| 24/02/2020 | 15:30 | 18:30 | WN | 40 - 50 | 15:30 - 15:35 | N |
| 24/02/2020 | 15:30 | 18:30 | RN | 2 | 16:25 - 16:30 | N |
| 24/02/2020 | 15:30 | 18:30 | RN | 6 | 16:45 - 16:50 | N |
| 25/02/2020 | 07:00 | 10:00 | BH | 50-70 | 07:15 - 07:20 | N |
| 25/02/2020 | 07:00 | 10:00 | MS | 1 | 07:30 - 07:35 | N |
| 25/02/2020 | 07:00 | 10:00 | LB | 1 | 07:55 - 08:00 | N |
| 25/02/2020 | 07:00 | 10:00 | BH | 120-150 | 08:00 - 08:05 | N |
| 25/02/2020 | 07:00 | 10:00 | RN | 1 | 08:05 - 08:10 | N |
| 25/02/2020 | 07:00 | 10:00 | BH | 1 | 08:10 - 08:15 | N |
| 25/02/2020 | 07:00 | 10:00 | LB | 2 | 08:50 - 08:55 | N |
| 25/02/2020 | 07:00 | 10:00 | BH | 10 | 09:00 - 09:05 | N |
| 25/02/2020 | 07:00 | 10:00 | LB | 1 | 09:00 - 09:05 | N |
| 11/03/2020 | 16:00 | 19:00 | BH | 4 | 16:00 - 16:05 | N |
| 11/03/2020 | 16:00 | 19:00 | BH | 3 | 16:05 - 16:10 | N |
| 11/03/2020 | 16:00 | 19:00 | BH | 10 | 16:10 - 16:15 | N |
| 11/03/2020 | 16:00 | 19:00 | LB | 4 | 16:15 - 16:20 | N |
| 11/03/2020 | 16:00 | 19:00 | BH | 20 | 16:30 - 16:35 | N |
| 11/03/2020 | 16:00 | 19:00 | BH | 4 | 16:55 - 17:00 | N |
| 11/03/2020 | 16:00 | 19:00 | BH | 105 | 17:10 - 17:15 | Y |
| 11/03/2020 | 16:00 | 19:00 | BH | 10 | 18:05 - 18:10 | N |
| 12/03/2020 | 06:20 | 09:20 | BH | 30 | 6:30 - 6:35 | N |
| 12/03/2020 | 06:20 | 09:20 | BH | 200-250 | 6:45 - 6:50 | N |
| 12/03/2020 | 06:20 | 09:20 | CU | 1 | 7:10 - 7:15 | N |
| 12/03/2020 | 06:20 | 09:20 | BH | 200-250 | 7:40 - 7:45 | Y |
| 12/03/2020 | 06:20 | 09:20 | LB | 1 | 7:50 - 7:55 | N |
| 12/03/2020 | 06:20 | 09:20 | BH | 100-125 | 8:20 - 8:25 | N |

Table AIII-3b: Secondary target species flight activity data from WF2 VP1

| Date | Survey start | Survey end | Species | Count | 5 min period | Likely Rotor Swept Height (Y/N) |
|------------|--------------|------------|---------|-------|---------------|---------------------------------|
| 28/10/2019 | 09:41 | 12:41 | RN | 2 | 11:02 - 11:07 | Y |
| 28/10/2019 | 09:41 | 12:41 | RN | 1 | 11:58 - 12:03 | Y |
| 29/10/2019 | 12:32 | 15:32 | SH | 1 | 13:05 - 13:10 | N |
| 29/10/2019 | 12:32 | 15:32 | RN | 2 | 13:33 - 13:38 | N |
| 29/10/2019 | 12:32 | 15:32 | K | 1 | 13:33 - 13:38 | Y |
| 14/11/2019 | 09:20 | 12:20 | BH | 7 | 10:47 - 10:53 | N |
| 14/11/2019 | 09:20 | 12:20 | SH | 1 | 10:49 - 10:54 | N |
| 15/11/2019 | 10:57 | 13:57 | RN | 1 | 11:25 - 11:30 | Y |
| 15/11/2019 | 10:57 | 13:57 | BZ | 1 | 12:03 - 12:08 | Y |
| 09/12/2019 | 09:29 | 12:29 | RN | 2 | 10:11-10:16 | N |
| 09/12/2019 | 09:29 | 12:29 | SH | 1 | 11:31-11:36 | Y |
| 11/12/2019 | 12:14 | 15:14 | RN | 1 | 12:20-12:25 | Y |
| 11/12/2019 | 12:14 | 15:14 | BH | 9 | 13:23-13:27 | Y |
| 11/12/2019 | 12:14 | 15:14 | RN | 2 | 14:01-14:02 | N |
| 27/01/2020 | 13:21 | 16:21 | RN | 2 | 14:40-14:45 | Y |
| 27/01/2020 | 13:21 | 16:21 | RN | 1 | 16:10-16:15 | N |
| 24/02/2020 | 09:51 | 12:51 | BH | 4 | 10:21-10:26 | N |
| 24/02/2020 | 09:51 | 12:51 | RN | 1 | 11:47-11:52 | N |
| 25/02/2020 | 13:31 | 16:31 | WN | 57 | 12:51 - 12:56 | Y |

Table AIII-4b: Secondary target species flight activity data from WF2 VP2

| Date | Survey start | Survey end | Species | Count | 5 min period | Likely Rotor Swept Height (Y/N) |
|------------|--------------|------------|---------|-------|---------------|---------------------------------|
| 28/10/2019 | 13:01 | 16:01 | RN | 1 | 14:45 - 14:50 | Y |
| 28/10/2019 | 13:01 | 16:01 | RN | 1 | 15:08 - 14:50 | Y |
| 28/10/2019 | 13:01 | 16:01 | K | 1 | 14:44 - 14:49 | Y |
| 29/10/2019 | 09:21 | 12:21 | RN | 5 | 10:11 - 10:16 | N |
| 29/10/2019 | 09:21 | 12:21 | RN | 4 | 10:28 - 10:33 | Y |
| 29/10/2019 | 09:21 | 12:21 | RN | 2 | 12:07 - 12:13 | N |
| 14/11/2019 | 12:31 | 15:31 | RN | 2 | 13:08 - 13:13 | Y |
| 15/11/2019 | 07:46 | 10:46 | RN | 1 | 10:19 - 10:24 | N |
| 15/11/2019 | 07:46 | 10:46 | K | 1 | 10:25 - 10:30 | Y |
| 09/12/2019 | 12:39 | 15:39 | RN | 1 | 13:51-13:56 | N |

| Date | Survey start | Survey end | Species | Count | 5 min period | Likely Rotor Swept Height (Y/N) |
|------------|--------------|------------|---------|-------|---------------|---------------------------------|
| 11/12/2019 | 09:05 | 12:05 | BH | 12 | 10:07-10:12 | N |
| 11/12/2019 | 09:05 | 12:05 | RN | 1 | 10:23-10:27 | N |
| 11/12/2019 | 09:05 | 12:05 | RN | 2 | 10:47-10:53 | N |
| 29/01/2020 | 13:20 | 16:20 | SH | 1 | 14:37-14:42 | N |
| 30/01/2020 | 07:42 | 10:42 | RN | 4 | 08:12-08:17 | Y |
| 24/02/2020 | 13:12 | 16:12 | RN | 2 | 14:30-14:35 | N |
| 24/02/2020 | 13:12 | 16:12 | RN | 3 | 16:01-16:05 | N |
| 26/02/2020 | 08:21 | 11:21 | RN | 1 | 10:15 - 10:20 | N |
| 26/02/2020 | 08:21 | 11:21 | RN | 2 | 10:48 - 10:53 | N |
| 26/02/2020 | 08:21 | 11:21 | RN | 1 | 11:07 - 11:12 | N |
| 11/03/2020 | 13:00 | 16:00 | SN | 1 | 15:52 - 15:57 | Y |

Table AIII-5b: Secondary target species flight activity data from WF2 VP3

| Date | Survey start | Survey end | Species | Count | 5 min period | Likely Rotor Swept Height (Y/N) |
|------------|--------------|------------|---------|-------|---------------|---------------------------------|
| 30/10/2019 | 12:42 | 15:42 | BZ | 1 | 12:51 - 12:56 | N |
| 30/10/2019 | 12:42 | 15:42 | LB | 2 | 13:36 - 13:41 | N |
| 30/10/2019 | 12:42 | 15:04 | CU | 11 | 14:17 - 14:22 | N |
| 31/10/2019 | 08:31 | 11:31 | CU | 1 | 9:31 - 9:36 | N |
| 31/10/2019 | 08:31 | 11:31 | CU | 1 | 09:33 - 9:38 | N |
| 31/10/2019 | 08:31 | 11:31 | CU | 25 | 10:08 - 10:13 | N |
| 12/11/2019 | 12:25 | 15:25 | BH | 25 | 12:40 - 12:45 | N |
| 12/11/2019 | 12:25 | 15:25 | CU | 2 | 12:58 - 13:03 | N |
| 12/11/2019 | 12:25 | 15:25 | CU | 15 | 13:29 - 13:34 | N |
| 12/11/2019 | 12:25 | 15:25 | CU | 45 | 13:59 - 14:04 | N |
| 13/11/2019 | 12:26 | 12:31 | RN | 4 | 13:12 - 13:17 | Y |
| 13/11/2019 | 12:26 | 12:31 | RN | 2 | 13:45 - 13:56 | Y |
| 10/12/2019 | 12:05 | 15:05 | BH | 2 | 12:32 - 12:37 | N |
| 10/12/2019 | 12:05 | 15:05 | BH | 1 | 12:55 - 13:00 | N |
| 10/12/2019 | 12:05 | 15:05 | BH | 28 | 14:26 - 14:31 | N |
| 12/12/2019 | 08:10 | 11:10 | BH | 12 | 09:40 - 09:45 | N |
| 12/12/2019 | 08:10 | 11:10 | BH | 24 | 09:53 - 09:58 | N |
| 12/12/2019 | 08:10 | 11:10 | BH | 31 | 10:11 - 10:16 | N |
| 12/12/2019 | 08:10 | 11:10 | RN | 1 | 10:29 - 10:34 | N |
| 12/12/2019 | 08:10 | 11:10 | RN | 1 | 10:57-11:02 | N |

| Date | Survey start | Survey end | Species | Count | 5 min period | Likely Rotor Swept Height (Y/N) |
|------------|--------------|------------|---------|-------|---------------|---------------------------------|
| 12/12/2019 | 08:10 | 11:10 | CA | 1 | 10:06 - 10:11 | N |
| 28/01/2020 | 12:01 | 15:01 | BH | 6 | 12:21 - 12:26 | N |
| 28/01/2020 | 12:01 | 15:01 | BH | 12 | 13:25 - 13:30 | N |
| 28/01/2020 | 12:01 | 15:01 | H | 1 | 14:12 - 14:17 | N |
| 29/01/2020 | 09:21 | 12:21 | RN | 1 | 10:45 - 10:50 | N |
| 29/01/2020 | 09:21 | 12:21 | CU | 9 | 10:51 - 10:56 | Y |
| 29/01/2020 | 09:21 | 12:21 | CU | 23 | 10:59 - 11:04 | Y |
| 25/02/2020 | 10:12 | 13:12 | BH | 2 | 10:30 - 10:35 | N |
| 25/02/2020 | 10:12 | 13:12 | RN | 1 | 11:00 - 11:05 | N |
| 25/02/2020 | 10:12 | 13:12 | MA | 23 | 10:57 - 11:02 | Y |
| 25/02/2020 | 10:12 | 13:12 | MA | 14 | 12:09 - 12:14 | Y |
| 25/02/2020 | 10:12 | 13:12 | CU | 42 | 12:46 - 12:51 | Y |
| 26/02/2020 | 12:00 | 15:00 | RN | 2 | 12:20 - 12:25 | N |
| 26/02/2020 | 12:00 | 15:00 | RN | 1 | 12:28 - 12:32 | N |
| 26/02/2020 | 12:00 | 15:00 | CU | 56 | 12:50 - 12:55 | Y |
| 10/03/2020 | 11:50 | 14:50 | CU | 1 | 13:22 - 13:27 | N |
| 12/03/2020 | 09:25 | 12:25 | T | 2 | 9:43 - 9:48 | Y |
| 12/03/2020 | 09:25 | 12:25 | T | 3 | 9:51 - 9:56 | Y |
| 12/03/2020 | 09:25 | 12:25 | WN | 4 | 10:07 - 10:12 | Y |
| 12/03/2020 | 09:25 | 12:25 | T | 2 | 10:42 - 10:47 | Y |

Table AIII-6: Secondary target species flight activity data from WF2 VP4

| Date | Survey start | Survey end | Species | Count | 5 min period | Likely Rotor Swept Height (Y/N) |
|------------|--------------|------------|---------|-------|---------------|---------------------------------|
| 31/10/2019 | 11:50 | 14:02 | RN | 1 | 12:21 - 12:26 | N |
| 12/11/2019 | 10:00 | 13:00 | RN | 1 | 13:30-10:35 | N |
| 12/11/2019 | 10:00 | 13:00 | CU | 1 | 11:07 - 11:12 | N |
| 09/12/2019 | 12:30 | 15:30 | RN | 6 | 13:25 - 13:30 | Y |
| 09/12/2019 | 12:30 | 15:30 | RN | 2 | 13:45 - 13:50 | N |
| 10/12/2019 | 09:00 | 12:00 | BH | 2 | 10:50 - 10:55 | N |
| 27/01/2020 | 13:00 | 16:00 | BH | 1 | 13:45 - 13:50 | N |
| 27/01/2020 | 13:00 | 16:00 | BH | 1 | 13:55 - 14:00 | N |
| 27/01/2020 | 13:00 | 16:00 | BH | 1 | 14:10 - 14:15 | N |
| 28/01/2020 | 09:10 | 12:10 | BH | 4 | 9:35 - 9:40 | N |
| 28/01/2020 | 09:10 | 12:10 | BH | 4 | 9:35 - 9:40 | N |

| Date | Survey start | Survey end | Species | Count | 5 min period | Likely Rotor Swept Height (Y/N) |
|------------|--------------|------------|---------|-------|---------------|---------------------------------|
| 28/01/2020 | 09:10 | 12:10 | BH | 1 | 10:05 - 10:10 | N |
| 28/01/2020 | 09:10 | 12:10 | BH | 42 | 10:10 - 10:15 | N |
| 28/01/2020 | 09:10 | 12:10 | BH | 1 | 10:20 - 10:25 | N |
| 28/01/2020 | 09:10 | 12:10 | BH | 35 | 10:30 - 10:35 | N |
| 28/01/2020 | 09:10 | 12:10 | BH | 8 | 10:35 - 10:40 | N |
| 28/01/2020 | 09:10 | 12:10 | BH | 2 | 10:40 - 10:45 | N |
| 28/01/2020 | 09:10 | 12:10 | BH | 2 | 11:00 - 11:05 | N |
| 28/01/2020 | 09:10 | 12:10 | BH | 2 | 11:30 - 11:35 | N |
| 28/01/2020 | 09:10 | 12:10 | BH | 5 | 11:30 - 11:35 | N |
| 28/01/2020 | 09:10 | 12:10 | BH | 5 | 11:30 - 11:35 | N |
| 24/02/2020 | 12:00 | 15:00 | BH | 3 | unrecorded | N |
| 24/02/2020 | 12:00 | 15:00 | BH | 5 | unrecorded | N |
| 24/02/2020 | 12:00 | 15:00 | BH | 5 | unrecorded | N |
| 24/02/2020 | 12:00 | 15:00 | BH | 3 | unrecorded | N |
| 24/02/2020 | 12:00 | 15:00 | RN | 1 | unrecorded | N |
| 24/02/2020 | 12:00 | 15:00 | RN | 2 | unrecorded | N |
| 11/03/2020 | 12:15 | 15:15 | HG | 2 | 12:30 - 12:35 | N |
| 11/03/2020 | 12:15 | 15:15 | HG | 1 | 13:15 - 13:20 | N |
| 11/03/2020 | 12:15 | 15:15 | HG | 1 | 14:45 - 14:50 | N |
| 11/03/2020 | 12:15 | 15:15 | HG | 2 | 14:55 - 15:00 | N |

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APPENDIX 7-4

BIRD SURVEY RESULTS – BREEDING SEASON 2020

APPENDIX 7-4

Bird Survey Report Breeding Season 2020

BIRD SURVEY REPORT

BREEDING SEASON 2020

Seven Hills Wind Farm Phase I and II

Prepared for: Seven Hills Wind Farm Ltd

SLR Ref: 501.00501.00004
Version No: Rev2
May 2022



BASIS OF REPORT

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1.0 Introduction

SLR Consulting Ireland (SLR) was commissioned by Seven Hills Wind Farm Ltd. in April 2020 to carry out a breeding bird survey programme for the proposed Seven Hills Wind Farm Phases I and II during the breeding season in 2020. There are two phases within the current iteration of the wind farm design, hereafter referred to as Wind Farm I and Wind Farm II.

1.1 Background to the Commission

Planning permission was originally granted by An Bord Pleanála (ABP) for both of these developments (Phase 1 ABP Planning Ref: PL 20.244346 / 20.239759; Phase 2 ABP Planning Ref: PL 20.244347 / 241069), it was subsequently refused following the appeal process. The main reasons for refusal of planning for each of the developments cited by An Bord Pleanála are the issues relating to the lack of certainty in relation to the impact of the proposed development on European Sites in the vicinity of the proposed developments and the qualifying interests for which those European Sites are designated.

1.2 Site Description

The dominant habitat within the boundaries of the proposed Seven Hills Wind Farm I site is improved agricultural grassland and the site is not designated for nature conservation.

The proposed Seven Hills Wind Farm II site is a slightly more diverse area in terms of habitat composition with dominant habitats present being improved agricultural grassland, dry calcareous grassland and scrub. The site also does not hold any designations for nature conservation.

There are several Natura 2000 designated sites relating to birds located within 15km of each site. Please see Table 3-1 for further details of these.

1.3 Purpose of the Report

The aim of this report is to provide robust baseline ornithological survey data for the breeding period in 2020 at both phases of the wind farm at Seven Hills, Co. Roscommon. These data will be used to inform the ecological impact assessment and appropriate assessment for the proposed wind farm. The assessment of potential impacts is beyond the scope of this report.

This report follows on from the bird survey report for the breeding season in 2019 (SLR Consulting, 2020). As such, in order to glean a comprehensive representation of breeding bird activity at both proposed wind farm sites across the two breeding seasons, the 2019 report should be read alongside this report.

2.0 Methodology

2.1 Desk-based Review

The majority of available data on both proposed wind farm sites relates to wintering birds with limited previous data available on breeding birds. The desk-based review collated all the available information to date on breeding birds in and around the wind farm development. This included a review of the following documents submitted as part of the original planning application:

- Proposed Seven Hills Windfarm Site: Ornithological Assessment Report June 2010. Forest, Environmental Research and Services Ltd. Included as Appendix 8.1 of the EIS (FERS, 2010); and
- Proposed Seven Hills Wind-farm (Phase II): Ornithological Assessment July 2011. Forest, Environmental Research and Services Ltd. Included as Appendix 8.1 of the EIS (FERS, 2010).

The websites of the National Parks and Wildlife Service (NPWS) www.npws.ie and the National Biodiversity Data Centre (NBDC) <http://maps.biodiversityireland.ie/#/Map> were also accessed for information on sites designated for nature conservation in the vicinity of the sites.

2.2 Field Surveys

The scope of breeding bird surveys for the proposed wind farm is based on recommendations given in Scottish Natural Heritage (SNH) 2017¹. This survey methods guidance is recognised as standard best practice guidance throughout the UK and Ireland for surveying birds to inform impact assessment of onshore wind farms.

2.2.1 Field Survey Team: Evidence of Technical Competence and Experience

Sarah Ingham (SI) – Project Manager and Lead Ornithologist

Sarah is a Senior Ecologist with SLR and holds a BSc in Zoology from Anglia Ruskin University, Cambridge, UK and an MSc in Biodiversity and Conservation from Trinity College Dublin. She is an Associate member of the Chartered Institute of Ecology and Environmental Management (CIEEM). Sarah is a highly skilled and experienced bird surveyor with 11 years' post graduate experience as a professional consultant ecologist/ornithologist.

Sarah managed this project through liaison with the client, coordination of the survey team, supervision of the health and safety of the team, carrying out various bird surveys onsite throughout the survey season, collating, quality controlling and assessing the survey data and writing this report.

Daniel Hulmes (DH) – Bird Surveyor

Daniel is a Senior Field Ornithologist and Terrestrial Ecologist. He has worked on a wide range of projects involving the survey and monitoring of birds in the UK, Ireland and internationally. Furthermore, as part of his previous work as an Ecologist, he gained experience in managing projects which included a large amount of report writing, survey planning and client interaction.

Supervised by Sarah Ingham, Daniel assisted with breeding bird surveys at Seven Hills Wind Farm in June 2020.

Jason Cahill (JC) – Assistant Bird Surveyor

Jason joined SLR in February 2020, and this is his first long-term role in ecological consultancy. Jason holds a BSc (Hon) in Field Biology with Wildlife Tourism from Institute of Technology Tralee. Jason has experience with bird surveys, involving vantage point and transect surveys, data collection and input. Supervised by Sarah Ingham, Jason also assisted with bird surveys at Seven Hills Wind Farm in May 2020.

¹ SNH (2017) *Recommended bird survey methods to inform impact assessment of onshore wind farms*. Version 2.

2.2.2 Flight Activity Surveys

Vantage point (VP) locations were the same as those used in each season since winter 2018-19, which were initially chosen based on locations used during previous surveys (see Section 3.1). The adequacy of these VPs was checked by carrying out a desk-based viewshed analysis using a bespoke GIS tool for calculating the visible area from each vantage point (VP). The Zones of Theoretical Visibility (ZTV) from each VP were calculated using ArcMAP 10.5.1 Spatial Analyst. The ZTVs were calculated with a surface offset of 30m and from a viewing height of 1.8m above ground level. The terrain model was derived from EU-DEM data with a vertical accuracy of $\pm 7\text{m}$. VP locations and viewing arcs are shown in Figure 1 and VP viewsheds are shown in Figure 2.

A total of 36 hours of watches were undertaken at each of the six VP locations during the breeding season (monthly visits April - September inclusive). This equates to a total of six hours per VP per month. The VP survey effort undertaken during the breeding season of 2020 is given below in Table 2-1.

Table 2-1: VP survey effort undertaken at the Seven Hills Wind Farm (WF) I and II sites April to September 2020 (hrs : mins)

| Month | WFI VP1 | WFI VP2 | WFII VP1 | WFII VP2 | WFII VP3 | WFII VP4 |
|------------------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| April | 6:00 | 6:00 | 6:00 | 6:00 | 6:00 | 6:00 |
| May | 6:00 | 6:00 | 6:00 | 6:00 | 6:00 | 6:00 |
| June | 6:00 | 6:00 | 6:00 | 6:00 | 6:00 | 6:00 |
| July | 6:00 | 6:00 | 6:00 | 6:00 | 6:00 | 6:00 |
| August | 6:00 | 6:00 | 6:00 | 6:00 | 6:00 | 6:00 |
| September | 6:00 | 6:00 | 6:00 | 6:00 | 6:00 | 6:00 |
| Total hrs | 36:00 | 36:00 | 36:00 | 36:00 | 36:00 | 36:00 |
| VP grid locations (Figure 1) | 587337 E 748665 N | 585834 E 746017 N | 588967 E 745061 N | 587372 E 743512 N | 590643 E 743279 N | 592160 E 743701 N |

It is good practice to ensure that where possible each monthly six-hour survey period should be split over more than a single day and spread across the day. As such, the six-hour survey periods were divided into three-hour blocks, the times of which were alternated across consecutive days e.g. on day 1, VP1 would be completed in the morning and VP2 would be completed in the afternoon and on day 2, VP2 would be completed in the morning and VP1 in the afternoon. In this way, it was possible to glean a clear picture of bird movements from each VP across the diurnal period. Details of survey dates, times and observers are provided in Appendix I and a record of weather conditions during surveys is provided in Appendix II.

VP watches aimed to quantify the flight activity of primary and secondary target species (as defined in Section 2.2.2.1) within the study area.

The main purpose of VP watches is to collect data on primary target species that will enable estimates to be made of:

- The time spent flying over the site;
- The relative use by birds of different parts of the site;
- The proportion of flying time spent within the provisional upper and lower risk height limits as determined by the potential rotor diameter and rotor hub height; and
- Ultimately, the analysis of the potential risk of collision of birds with rotating turbines.

For each primary target species observation, the following details were recorded:

- Time of observation;
- Duration of flying bout;
- Species, age and sex (where determinable);
- Time spent within each height band; and
- Notes on observation.

In the absence of detailed information regarding turbine specifications at the time of commencing surveys, the recording height bands were determined based on the turbine specifications included in the previous application (tip height 135m, lowest rotor swept height 35m) plus a bit extra to allow some flexibility. Flight heights were therefore attributed to three distinct height bands as follows:

- 1 = < 30m (below the likely rotor swept area);
- 2 = 30m to 150m (the likely rotor swept area);
- 3 = > 150m (above the likely rotor swept area).

In addition, a summary of observations of secondary target species (see Section 2.2.2.1) was recorded at the end of each five-minute period during each VP watch to provide an index of flight activity for secondary target species within the site, in accordance with current SNH guidance. Data collected on secondary species included:

- The five-minute period start and end time;
- Species;
- Number of birds observed;
- If flying, the height band in which birds were observed flying;
- Whether birds were observed onsite, in the 500m buffer or beyond;
- Flight behaviour; and
- Notes on observation.

2.2.2.1 Target Species

Target species for the surveys were defined by legal and/or conservation status and vulnerability to impacts caused by wind turbines, as defined in SNH Guidance (2017).

Primary Target Species

The list of primary target species was limited to species upon which effects are most likely to be potentially significant in EIA terms, thereby enabling recording to focus on the species of greatest importance. This approach was also taken for the 2019 breeding bird surveys.

SNH guidelines state that “*in most circumstances the target species will be limited to those species which are afforded a higher level of legislative protection.*” Kestrel, buzzard and sparrowhawk are not subject to a higher level of legislative protection than any other bird species and were therefore not recorded as primary target species during the 2019 or 2020 breeding bird surveys.

Furthermore, primary target species were specifically limited to species upon which effects are most likely to be potentially significant in EIA terms, e.g. breeding species forming qualifying features for nearby SPAs or species listed on Annex I of the Birds Directive. This enabled recording to focus on the species of greatest importance without the distraction of having to record detailed flight data for a larger number of more common species. A precautionary approach was taken to the inclusion of Annex 1 species as primary target species with all Annex 1 raptor/owl species with any realistic potential to be present included as primary target species, although it was recognised that the likelihood of some of these species breeding in the vicinity of the sites was very low.

As such, the primary target species for these VP surveys included the following bird species:

- peregrine falcon *Falco peregrinus*;
- hen harrier *Circus cyaneus*;

- merlin *Falco columbarius*;
- short-eared owl *Asio flammeus*;
- lapwing *Vanellus vanellus*;
- golden plover *Pluvialis apricaria*;
- curlew *Numenius arquata*;
- black-headed gull *Chroicocephalus ridibundus*
- herring gull *Larus argentatus*.

Although lapwing, curlew, black-headed gull and herring gull are not listed under Annex I of the Birds Directive, the breeding populations of these species are Red-listed in Ireland under the Birds of Conservation Concern 2014-2019 (Colhoun and Cummins, 2013) as numbers of breeding pairs within the Irish landscape have suffered a serious decline in recent years. As such, any observations of these four species were also recorded as primary target species during the summer months.

Secondary Target Species

Secondary target species included:

- Any other wildfowl, wader and gull species;
- Buzzard *Buteo buteo*;
- Sparrowhawk *Accipiter nisus*;
- Kestrel *Falco tinnunculus*;
- Raven *Corvus corax*;
- Grey heron *Ardea cinerea*; and
- Cormorant *Phalacrocorax carbo*.

2.2.3 Breeding Wader Surveys

Breeding wader surveys followed the methodology described in O'Brien and Smith (1992). The survey involved a walked transect which covered all habitat potentially suitable for breeding waders within the wind farm site.

Following a desktop assessment, it was determined that given that Wind Farm I is dominated by improved agricultural grassland habitat, Wind Farm I is not suitable for breeding waders and breeding wader surveys were therefore not undertaken there. Conversely, parts of Wind Farm II comprise a mosaic of wet grassland and rough, semi-improved agricultural grassland which is more suited to breeding waders. As such, a walked transect was undertaken covering potentially suitable habitat within the Wind Farm II site and a 500m buffer zone. The same transect route was repeated three times across the 2020 breeding season on 24 April, 18 May and 26 June.

The location, movement and behaviour of all wader species were recorded onto field maps using standard BTO species codes. The following criteria was recorded for each species:

- Lapwing – the total numbers of birds seen from the transect;
- Snipe *Gallinago gallinago* – the number of drumming plus chipping birds heard or seen from the transect; and
- Other species – the number of pairs (where 'pairs' = (paired individuals/2), displaying birds, nests or broods and other single birds not in flocks).

Please see Figure 7 for an outline of the walked transect and Appendices I and II for metadata relating to these surveys.

2.2.4 Breeding Raptor Surveys

The survey methodology for breeding raptors used a driven transect with regular stops, to carry out watches of suitable habitat from appropriate viewpoints to identify potential nesting territories. A total of seven stops were made along the driven transect around both wind farm sites overlooking potentially suitable breeding habitat.

The locations of these viewpoints are presented in Figure 8 together with the outline of the driven survey route and the results of the surveys.

A driven survey was used due to limitations to access to third party land within the 2 km buffer zone and the availability of a good road network in the vicinity of the site. It is also noted that suitable breeding habitat for Annex 1 raptors within the sites and 2 km buffer is very limited and visibility from the survey route was sufficient to cover the vast majority of potentially suitable breeding habitat within the survey area.

Suitable breeding habitat differs for each raptor species (Hardey *et al.*, 2013) and was limited within the survey area. Table 2-2 provides a summary of the potentially suitable raptor habitats within the 2km buffer zone of the sites and the approximate locations of these in relation to the viewpoints used during the survey.

Table 2-2: Potentially suitable habitats for breeding raptors within the study area, the viewpoints the habitats can be seen from and the target raptor species which could be expected within these habitats

| Raptor Viewpoint No. (RVP) | Habitat type | Target raptor species |
|----------------------------|--|--|
| RVP1 | Mixed deciduous woodland | Buzzard, sparrowhawk |
| RVP2; RVP3 | Lowland heather moor | Hen harrier, merlin |
| RVP3; RVP5 | Wet grassland with dense rush or bracken cover | Hen harrier |
| RVP6 | Mature forestry plantation | Buzzard, sparrowhawk |
| RVP4 | Quarries | Peregrine falcon, kestrel |
| RVP7 | Rocky outcrops | Peregrine falcon, merlin, kestrel, buzzard |

It is noted that the Cam Quarry lies adjacent to the Wind Farm II site to the north. Although the quarry faces could not be viewed from the driven transect, the quarry could be partially viewed from the R363 road to the north (RVP4). It is also noted that the airspace above the quarry lies within the viewshed of WFII VP1. If breeding peregrine falcons were present in the quarry, it is therefore expected that evidence would have been recorded during the breeding raptor survey and/or the VP surveys.

Survey timings followed those in Hardey *et al.* (2013), as per SNH guidelines. This survey was repeated along the same route monthly from April to July inclusive. Please see Appendices I and II for metadata relating to these surveys.

The location, movement and behaviour of all raptor species observed were recorded onto the field maps using standard BTO species codes.

2.3 Survey Limitations

As shown in Figure 2, a small area at the western end of Wind Farm I and two small areas within the 500m buffer zone for Wind Farm II were not within the 2km viewsheds from any of the VPs. All turbine locations and the vast majority of the 500m buffer were visible from at least one VP however and the gaps in coverage are therefore not considered to represent a significant limitation.

The majority of vantage point surveys were undertaken in optimal weather conditions. However, there were 15 hours out of the total of 216 during which the visibility was recorded as moderate i.e. 1-3km. This comprises 7%

of the total survey season and in most cases all of the relevant 2km viewing arc was visible. As such, this does not significantly affect the validity of the data collected.

3.0 Results

3.1 Desk-based Review

3.1.1 Natura 2000 Sites

There are no Special Protection Areas (SPA) within the proposed wind farm sites. However, there are a total of five SPAs within a 15 km² radius of the survey area.

The five SPAs within 15km are shown in Table 3-1, which also shows the species of special conservation interest (SSCI) for each site. The majority of SSCIs for which these sites are designated are wintering species. As such, for the purposes of this report which deals specifically with breeding birds, SSCI which are only present during the wintering season have been excluded from Table 3-1.

Corncrake *Crex crex* is a SSCI of the Middle Shannon Callows SPA. Upon their arrival to suitable breeding habitat in Ireland following migration from sub-Saharan Africa, corncrake, a site faithful species, then become sedentary, rarely if ever, moving from the habitat they have chosen for breeding once they find a mate (Duffy, 2018). As such, given that the Middle Shannon Callows SPA is at a distance of 11.4km from the proposed wind farm sites, dedicated corncrake surveys were not deemed necessary. There is also a lack of suitable habitat for corncrake (hay meadows) within the proposed wind farm sites.

Table 3-1: SPAs within 15km of Seven Hills Wind Farms I and II and their qualifying interests (species present during the breeding season only)

| Site Name | Site Code | Distance/ Direction from Site Boundary | Features of Interest |
|----------------------------|-----------|--|--|
| Lough Croan Turlough SPA | 004139 | 1.5km north | <ul style="list-style-type: none"> Shoveler <i>Anas clypeata</i> Wetland and Waterbirds |
| River Suck Callows SPA | 004097 | 1.7km west | <ul style="list-style-type: none"> Wetland and Waterbirds |
| Four Roads Turlough SPA | 004140 | 1.9km north | <ul style="list-style-type: none"> Wetland and Waterbirds |
| Lough Ree SPA | 004064 | 8km east | <ul style="list-style-type: none"> Tufted Duck <i>Aythya fuligula</i> Common Scoter <i>Melanitta nigra</i> Common Tern <i>Sterna hirundo</i> Black-headed Gull <i>Chroicocephalus ridibundus</i> Wetland and Waterbirds |
| Middle Shannon Callows SPA | 004096 | 11.4km southeast | <ul style="list-style-type: none"> Corncrake <i>Crex crex</i> Lapwing <i>Vanellus vanellus</i> Black-tailed Godwit <i>Limosa limosa</i> Wetland and Waterbirds |

3.1.2 Existing Site Data

To our knowledge, the only breeding season bird survey data available relating to the two proposed wind farm sites were collected on six site visits during the period April to June 2009 (FERS, 2010; FERS, 2011). Surveys

² 15 km is the maximum distance typically applied when considering wildfowl ranging from roost sites to foraging sites.

involved a walkover survey on each date, although precise survey area boundaries are unclear. The ornithological assessment for Phase I reports that 28 species were recorded within the (Phase I) wind farm site and buffer zone (the size of the buffer zone is not stated), of which 21 showed evidence of breeding. These included four species defined as 'important' species³, namely black-headed gull (red-listed), swallow *Hirundo rustica*, house sparrow *Passer domesticus* and starling *Sturnus vulgaris* (each amber-listed). Black-headed gull was not recorded as breeding within the site or buffer zone.

The ornithological assessment for Phase II reports that 57 species were recorded within the 'greater survey area', of which 53 showed evidence of breeding. The greater survey area is not defined but is thought to include both wind farm sites plus some of the surrounding area. 18 'important' species were recorded within the greater survey area including the red-listed species curlew, redshank *Tringa totanus* and black-headed gull and the amber listed mute swan *Cygnus olor*, teal *Anas crecca*, tufted duck, coot *Fulica atra*, snipe and kestrel. Of these, mute swan, teal, coot, curlew, snipe and redshank (a pair at Lough Feacle) showed evidence of breeding. A further nine amber listed passerine species were also recorded within the greater survey area.

3.2 Flight Activity Surveys

Flight lines of primary target species recorded at during the 2020 breeding season are mapped in Figures 3-6.

3.2.1 Primary Target Species

3.2.1.1 Wind Farm I: Vantage Points 1 and 2

In total, three primary target species were recorded flying through Wind Farm I during the six-month survey period. The target species are shown in Table 3-2 together with the total number of birds seen from both VPs and the total number of flights recorded.

Table 3-2: Target species and flights recorded from WFI VPs 1 and 2 – April to September 2020

| Target Species | Total number of birds recorded | Total number of flights recorded |
|-------------------|--------------------------------|----------------------------------|
| Hen harrier | 1 | 1 |
| Black-headed gull | 41 | 13 |
| Herring gull | 19 | 10 |
| Total | 61 | 24 |

All but two sightings of black-headed gull (Figure 3) and herring gull (Figure 4) were recorded on and around the Thomas Street Turlough, outside the 500m buffer zone to the south, which can be seen from VP2. The turlough was utilised by foraging and roosting gulls until it dried up in mid-May, after which the area became a mosaic of cattle and sheep grazing pastures with little bird activity for the rest of the season.

There were two records of black-headed gulls within the site and buffer zone, observed from VP1 in June. However, only one of these flew within the likely rotor swept area for a total of 15 seconds, while the other did not enter the likely rotor swept area during its flight.

A single female hen harrier was observed from Wind Farm I VP1 in April 2020. The bird was observed flying and soaring in height-bands 2 and 3 in a northerly direction away from the site and the 500m buffer. This was the

³ i.e. species listed on the red or amber lists of birds of conservation concern (Birdwatch Ireland) in place at that time.

only Annex I primary target species recorded at either proposed wind farm site during the 2020 breeding season (Figure 5).

3.2.1.2 Wind Farm II: Vantage Points 1 – 4

In total, three primary target species were recorded flying through Wind Farm II during the six-month survey period. The primary target species are shown in Table 3-3 together with the total number of birds seen from all VPs and the total number of flights recorded.

Table 3-3: Primary target species and flights recorded from WFII VP1 – VP4 – April to September 2020

| Target Species | Total number of birds recorded | Total number of flights recorded |
|-------------------|--------------------------------|----------------------------------|
| Black-headed gull | 44 | 19 |
| Herring gull | 5 | 5 |
| Lapwing | 23 | 1 |
| Total | 72 | 25 |

Black-headed gull was the most abundant and frequently recorded primary target species at Wind Farm II throughout the breeding season with 19 records of 44 birds. The majority of these birds were recorded from VP4 most likely on passage to and from the River Suck to the east of the site (Figure 3). All sightings of black-headed gull were recorded below the likely rotor swept area.

Herring gull was less abundant with only 5 sightings of lone birds throughout the entire season. These were recorded from VPs 1, 3 and 4 (Figure 4).

A single flock of 23 lapwing was recorded from VP4 in June on the edge of the 500m buffer (Figure 5).

3.2.2 Secondary Target Species

Summary details of the five secondary target species recorded throughout the season at Wind Farm I are presented in Table 3-4.

Raven was the most abundantly recorded secondary target species at Wind Farm I with 25 observations and a total of 39 birds. A total of 54% of these raven sightings (n=22) were recorded flying off site.

The second most abundant secondary target species recorded at Wind Farm I was lesser black-backed gull *Larus fuscus* with 17 observations of 32 individuals. A total of 25 of the 32 (78%) individuals of this species were also recorded flying off site, mainly over the Thomas Street Turlough.

A total of two secondary target raptor species were recorded at Wind Farm I during the breeding season, namely buzzard (n=2) and kestrel (n=1). These were recorded both onsite and within the 500m buffer of the wind farm site. All three sightings of secondary raptor species recorded at Wind Farm I were observed at heights of less than 30m, thus below the likely rotor swept area.

Table 3-4: Secondary target species and flights recorded from WFI VPs 1 and 2 – April to September 2020

| Target Species | Total number of birds recorded | Total number of flights recorded |
|--------------------------|--------------------------------|----------------------------------|
| Lesser black-backed gull | 32 | 17 |
| Grey heron | 2 | 2 |

| Target Species | Total number of birds recorded | Total number of flights recorded |
|----------------|--------------------------------|----------------------------------|
| Buzzard | 2 | 2 |
| Kestrel | 1 | 1 |
| Raven | 39 | 25 |
| Total | 76 | 47 |

As with Wind Farm I, raven was the most abundantly recorded secondary target species at Wind Farm II with 55 observations of 135 individuals. Flocks of between two and 25 birds were recorded as being on passage between breeding sites, with several juveniles recorded within these flocks. This suggests that raven are breeding in the vicinity of the site.

Lesser black-backed gull was the second most abundant secondary target species recorded at Wind Farm II with 26 observations of 50 birds. A total of 35 of the 50 lesser black-backed gulls (70%) observed were recorded below the likely rotor swept height.

There was a total of 13 observations of buzzard (n=14), nine lone kestrels and one sparrowhawk recorded at Wind Farm II. These were either on passage through the site or hunting onsite with 90% of observation recorded as being below the likely rotor swept area.

Other secondary target species recorded during the breeding season vantage point surveys at Wind Farm II were mallard *Anas platyrhynchos* (n=17), shelduck *Tadorna tadorna* (n= 5), grey heron (n=7), cormorant (n=3) and coot (n=1).

Summary details of the ten secondary target species recorded throughout the season at Wind Farm II are presented in Table 3-5.

Table 3-5: Secondary target species and flights recorded from WFII VPs 1 - 4 - April to September 2020

| Target Species | Total number of birds recorded | Total number of flights recorded |
|--------------------------|--------------------------------|----------------------------------|
| Lesser black-backed gull | 50 | 26 |
| Mallard | 17 | 8 |
| Shelduck | 5 | 3 |
| Grey heron | 7 | 7 |
| Cormorant | 3 | 1 |
| Coot | 1 | 1 |
| Buzzard | 14 | 13 |
| Kestrel | 9 | 9 |
| Sparrowhawk | 1 | 1 |
| Raven | 135 | 55 |
| Total | 242 | 124 |

3.2.3 Breeding Wader Surveys

The wader walkover surveys at WFII during April, May and June yielded no records of waders, breeding or otherwise.

Please see Figure 7 for transect route.

3.2.4 Breeding Raptor Surveys

A total of three species of raptor was recorded during the surveys. There was no raptor activity recorded during the June and July surveys.

Raptor activity in April was low with one sightings of kestrel and one of sparrowhawk. Both of these birds were engaged in hunting/foraging behaviour.

The majority of activity for the season was recorded during the May survey with a sighting of two pairs of buzzard recorded within the 2 km buffer to the north and northeast of Wind Farm I respectively. The individuals in both pairs were observed interacting with each other and engaging in a courtship display suggesting possible breeding within these two areas.

The remaining sighting recorded during May was of a kestrel within the 2km buffer to the south of Wind Farm II which was observed engaging in hunting behaviour.

There were no sightings of peregrine or hen harrier during the breeding raptor surveys throughout the entire 2020 breeding season.

Please see Figure 8 for the transect route and locations of recorded sightings.

4.0 Conclusions

Records of primary target species at both wind farm sites during the 2020 breeding season were low, with a single passing hen harrier at Wind Farm I in April being the only Annex I bird species recorded at either Wind Farms I or II.

Black-headed gull was the most abundant primary target species recorded at both wind farm sites throughout the season (WFI: n=41; WFII: n=44). From VPs overlooking Wind Farm I, black-headed gulls were observed primarily foraging and roosting the Thomas Street Turlough, outside the 500m buffer to the south, whilst water remained there until May only. Black-headed gulls recorded at Wind Farm II were observed mainly from VP4 on passage offsite within the 500m buffer to the south of the site. Although black-headed gull was recorded as secondary target species in 2019 and primary target species in 2020, the numbers recorded at WFII are similar across both years (WFII 2019: n=47; 2020: n=44). However, a large contrast in numbers of this species was observed between the two breeding seasons at WFI (WFI 2019: n=2; 2020: n=41). This is likely due to the fact that the Thomas Street Turlough dried up in April 2019, before the breeding season surveys began and as such, the area was not attractive to foraging and roosting black-headed gulls in 2019.

Herring gull was also recorded at both sites but was less abundant than black-headed gull at both sites (WFI: n=19; WFII: n=5). Similar to black-headed gull observations, herring gulls were primarily present at Thomas Street Turlough to the south of Wind Farm I and from VP4 to the south of Wind Farm II. Like black-headed gull, herring gull was also a secondary target species in 2019 and a primary target species in 2020. When compared with the 2019 records, the numbers of this species observed at each site in 2020 remain generally low, with approximately 60% fewer observations at WFI in 2019 than 2020 (WFI 2019: n=5; 2020: n=16), likely due to Thomas Street Turlough drying out earlier in 2019, as for black-headed gull. There were low numbers of herring gull recorded at WFII across both years, however, there were slightly more observations in 2019 than 2020 (WFII 2019: n=9; 2020: n=5).

Only one sighting of any wader species was recorded during the flight activity surveys throughout the 2020 breeding season with a single flock of 23 lapwing was recorded within the 500m buffer to the south of Wind Farm II in June. No waders were recorded during the breeding wader surveys. During the 2019 breeding season, in addition to lapwing (n=1), two further wader species were recorded, namely curlew (n=1) and snipe (n=1), but in very low numbers only.

The only raptor species recorded within 2km of either Wind Farm I or II during the breeding raptor surveys and VP surveys were buzzard, sparrowhawk and kestrel. Of these, two probable buzzard breeding territories were identified to the north of Wind Farm I. There were no records of peregrine falcon during either the breeding raptor surveys or VP surveys during the breeding season in 2020. There were three records of peregrine falcon in 2019, however, there were no confirmed breeding territories.

Direct comparison of survey results from 2019 and 2020 with previous breeding season survey results from 2009 is difficult due to differences in the survey methods used and potential differences in the areas surveyed. It is notable however that curlew, snipe and redshank were all recorded breeding within the 'greater survey area' in 2009 whereas there has only been one record each for curlew and snipe in 2019 (and no records in 2020) and no records of redshank in either 2019 or 2020. This could either indicate a decline in breeding wader populations since 2009 or it could simply reflect differences in the survey areas between years. No Annex I raptors were recorded breeding during either the surveys in 2009 or the surveys in 2019-20.

5.0 References

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Scottish Natural Heritage (2017) Recommended bird survey methods to inform impact assessment of onshore wind farms. Version 2. SNH Guidance. SNH, Battleby

6.0 Figures

Figure 1: Vantage Points and Viewing Arcs

Figure 2: Viewsheds from Vantage Points Overlooking Wind Farms I and II – 30m Offset

Figure 3: Vantage Point Survey Results – Breeding Season 2020 – Black-headed Gull

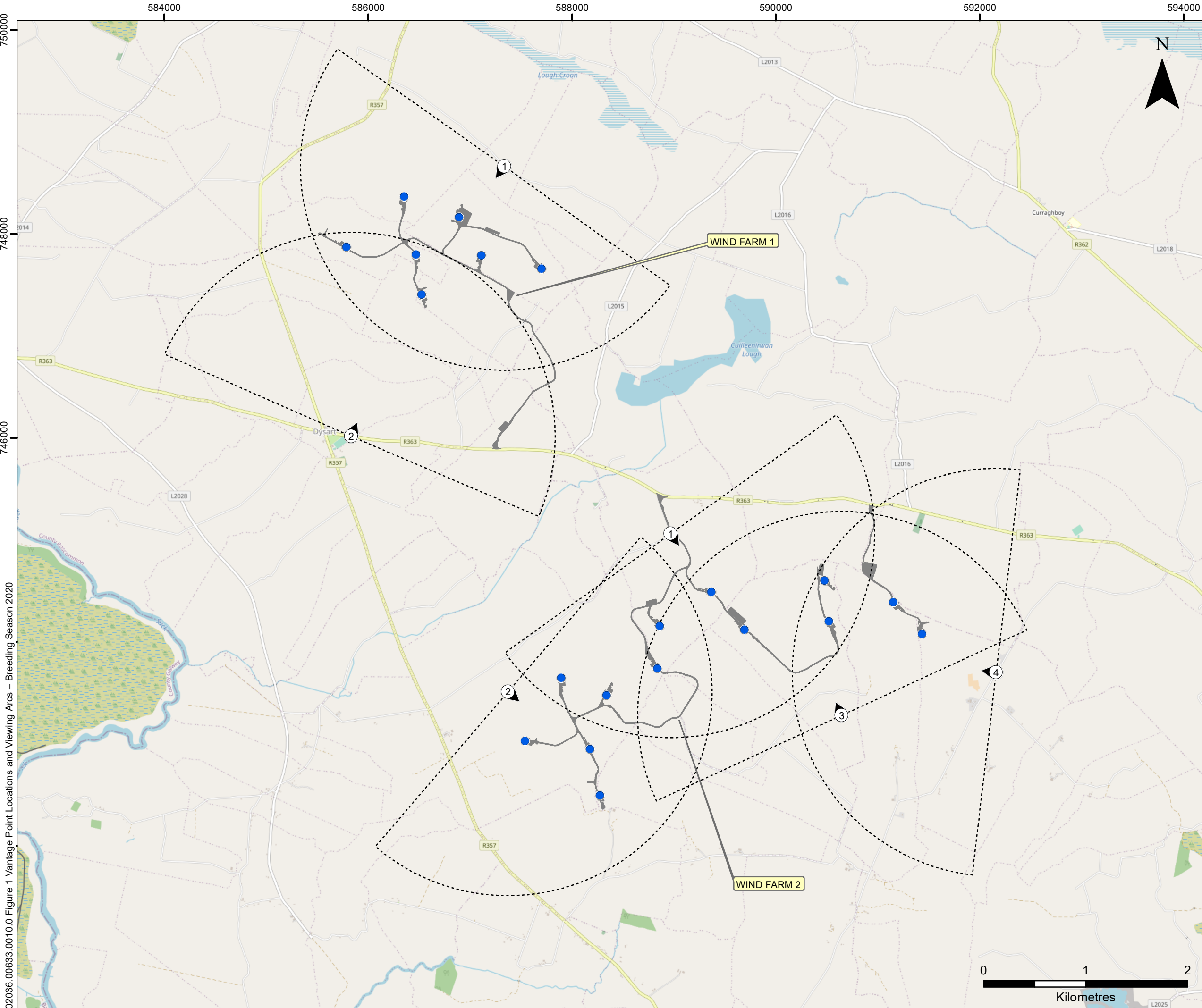
Figure 4: Vantage Point Survey Results – Breeding Season 2020 – Herring Gull

Figure 5: Vantage Point Survey Results – Breeding Season 2020 – Hen Harrier

Figure 6: Vantage Point Survey Results – Breeding Season 2020 – Lapwing

Figure 7: Breeding Wader Walked Transect Survey Results – Breeding Season 2020

Figure 8: Breeding Raptor Driven Transect Survey Results – Breeding Season 2020



LEGEND

- Turbine Location
- Site Infrastructure
- Vantage Point
- Vantage Points 2km View Arc

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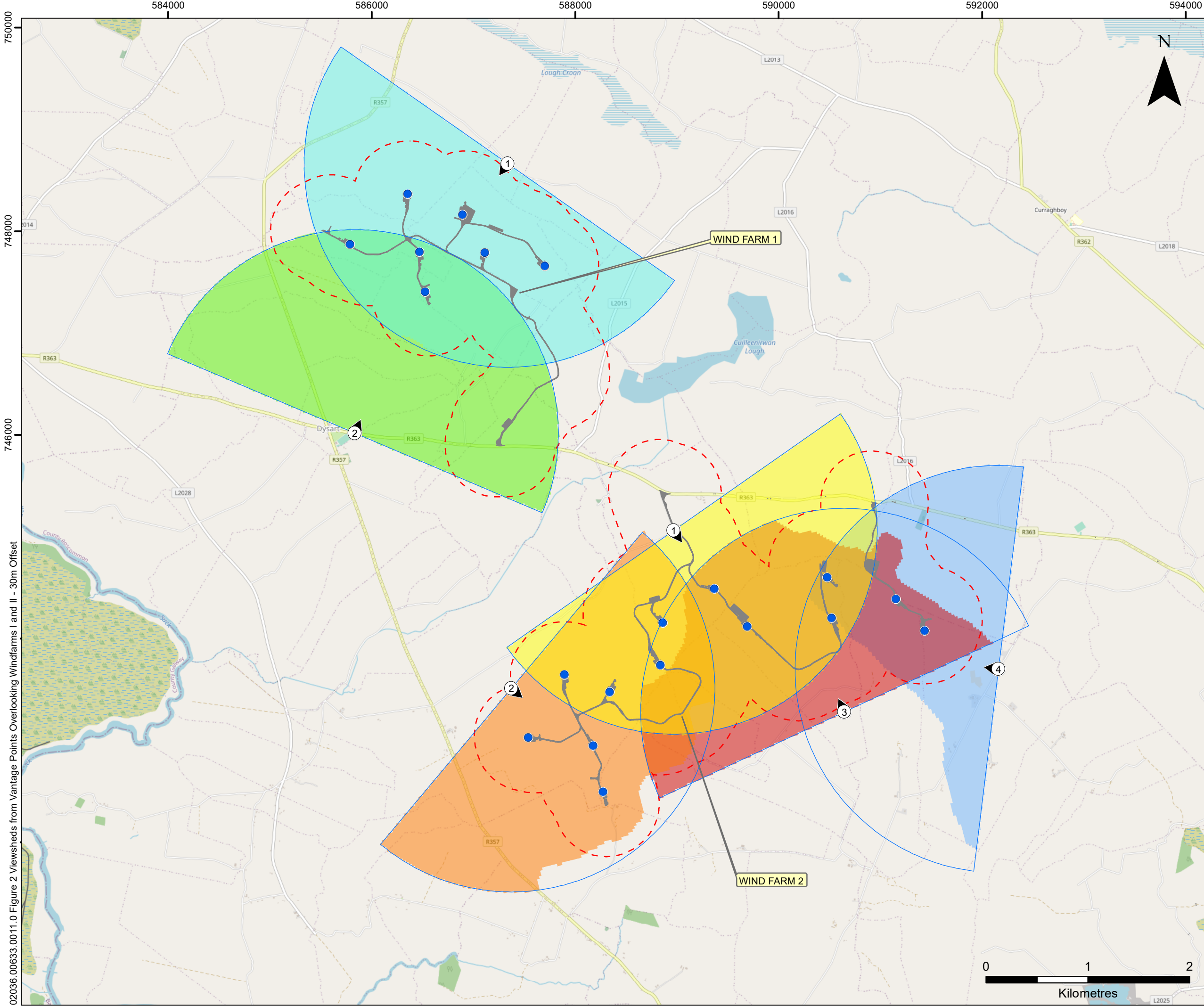
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FIGURE 1 - VANTAGE POINT LOCATIONS AND VIEWING ARCS

Scale
1:35,000 @ A3

Date
MAY 2022

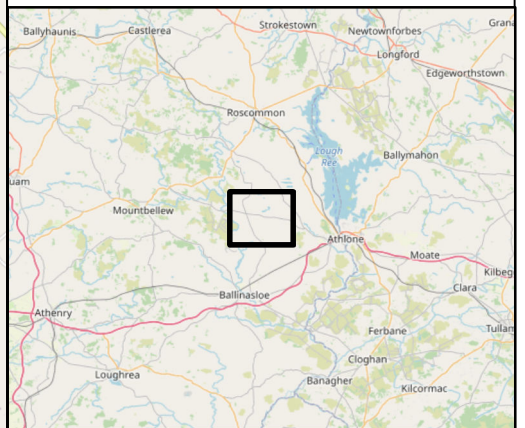
02036.00633.0010.0 Figure 1 Vantage Point Locations and Viewing Arcs – Breeding Season 2020




NOTE

1. The Zones of Theoretical Visibility (ZTV) was calculated using ArcMAP 10.5.1 Spatial Analyst. The ZTV is calculated with a surface offset 30m & from a viewing height of 1.8m above ground level. The terrain model is derived from EU-DEM data with a vertical accuracy of $\pm 7m$.

- LEGEND**
- Turbine Location
 - Site Infrastructure
 - Site Infrastructure 500 m Buffer
 - Vantage Point
 - Distance of Viewing Arc
 - Theoretical Visibility from Wind Farm 1 VP1
 - Theoretical Visibility from Wind Farm 1 VP2
 - Theoretical Visibility from Wind Farm 2 VP1
 - Theoretical Visibility from Wind Farm 2 VP2
 - Theoretical Visibility from Wind Farm 2 VP3
 - Theoretical Visibility from Wind Farm 2 VP4



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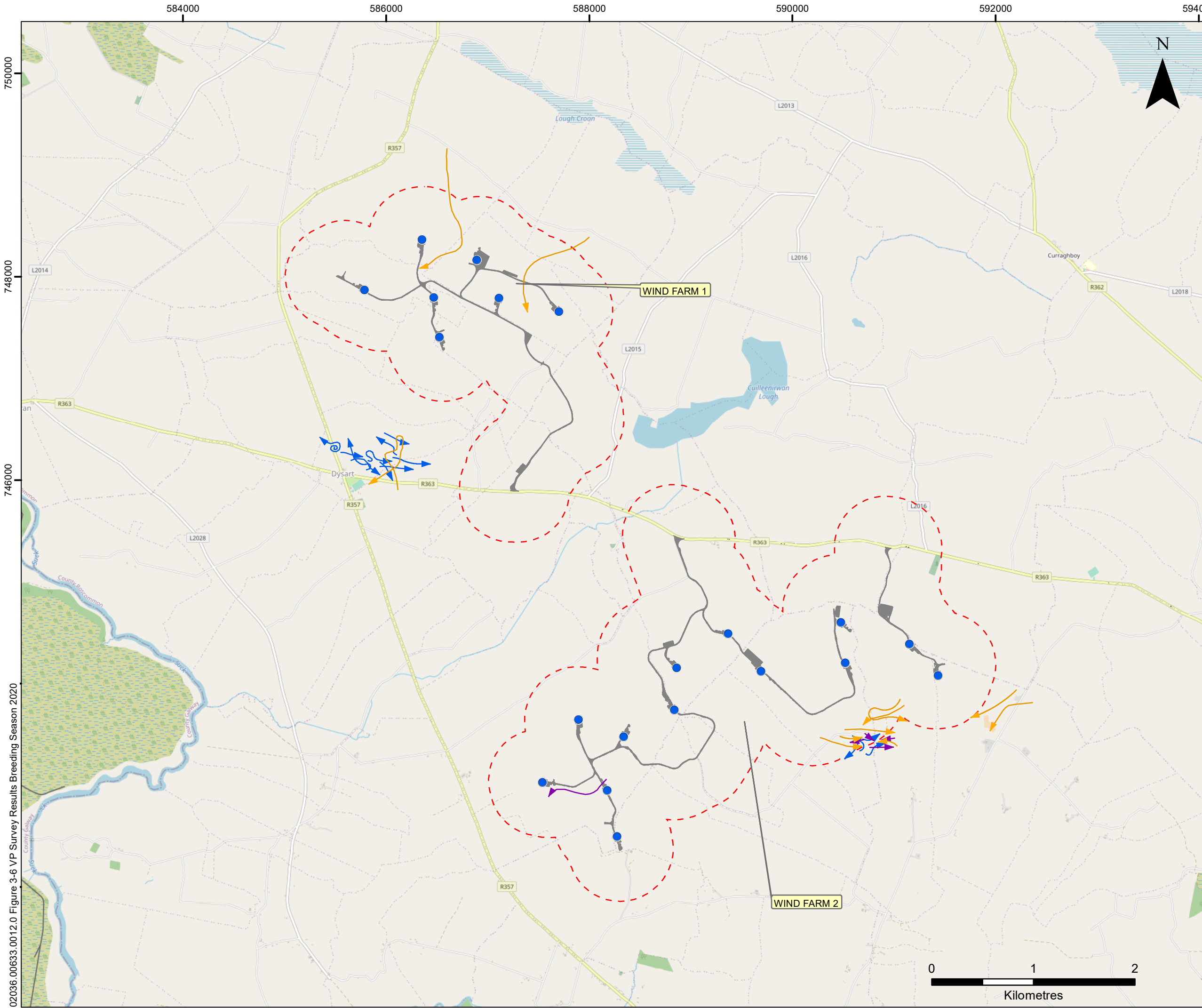
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FIGURE 2 - VANTAGE POINTS OVERLOOKING WINDFARMS I AND II

Scale 1:35,000 @ A3 Date MAY 2022



LEGEND

- Turbine Location
- Site Infrastructure
- Site Infrastructure 500 m Buffer
- Flightline (Month)
 - April
 - May
 - June

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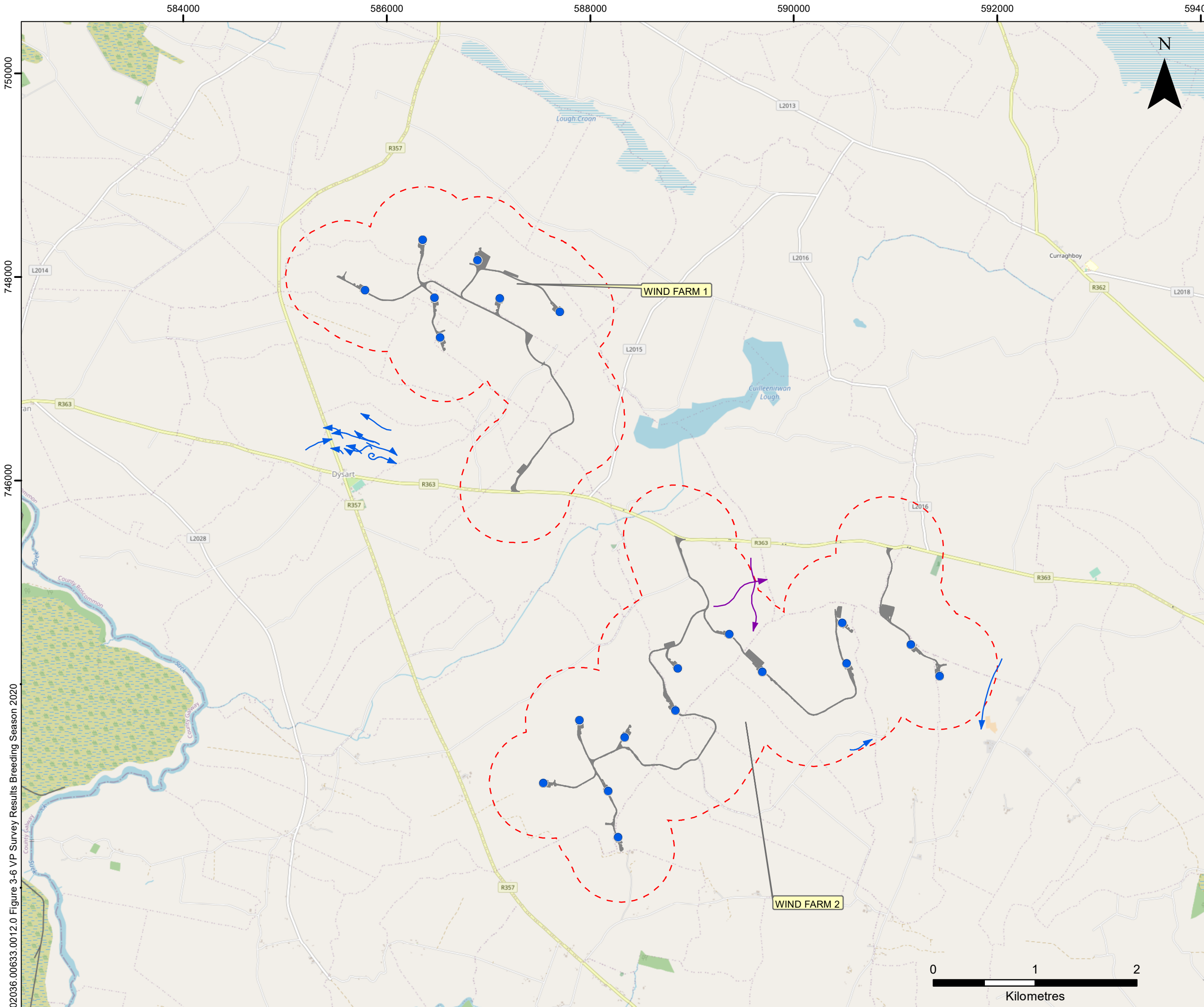
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**FIGURE 3 - FLIGHT-LINES
BLACK-HEADED GULL**

Scale 1:35,000 @ A3

Date MAY 2022

02036.00633.0012.0 Figure 3-6 VP Survey Results Breeding Season 2020



LEGEND

- Turbine Location
- Site Infrastructure
- Site Infrastructure 500 m Buffer
- Flightline (Month)
 - April
 - May

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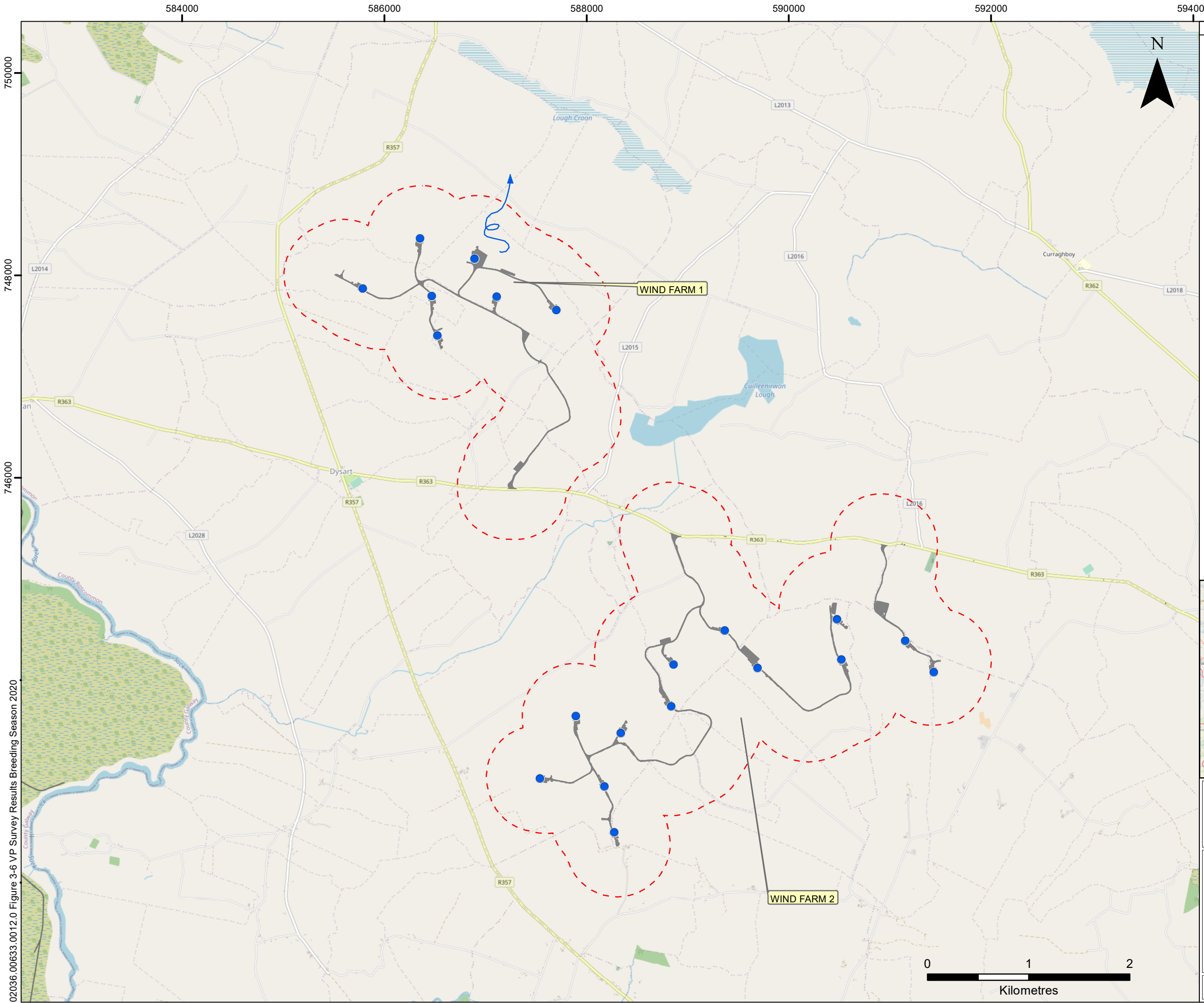
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FIGURE 4 - FLIGHT-LINES
HERRING GULL

Scale
1:35,000 @ A3

Date
MAY 2022

02036.00633.0012.0 Figure 3-6 VP Survey Results Breeding Season 2020



LEGEND

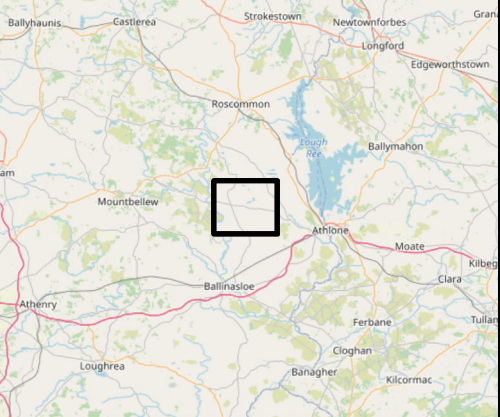
● Turbine Location

■ Site Infrastructure

□ Site Infrastructure 500 m Buffer

Flightline (Month)

→ April



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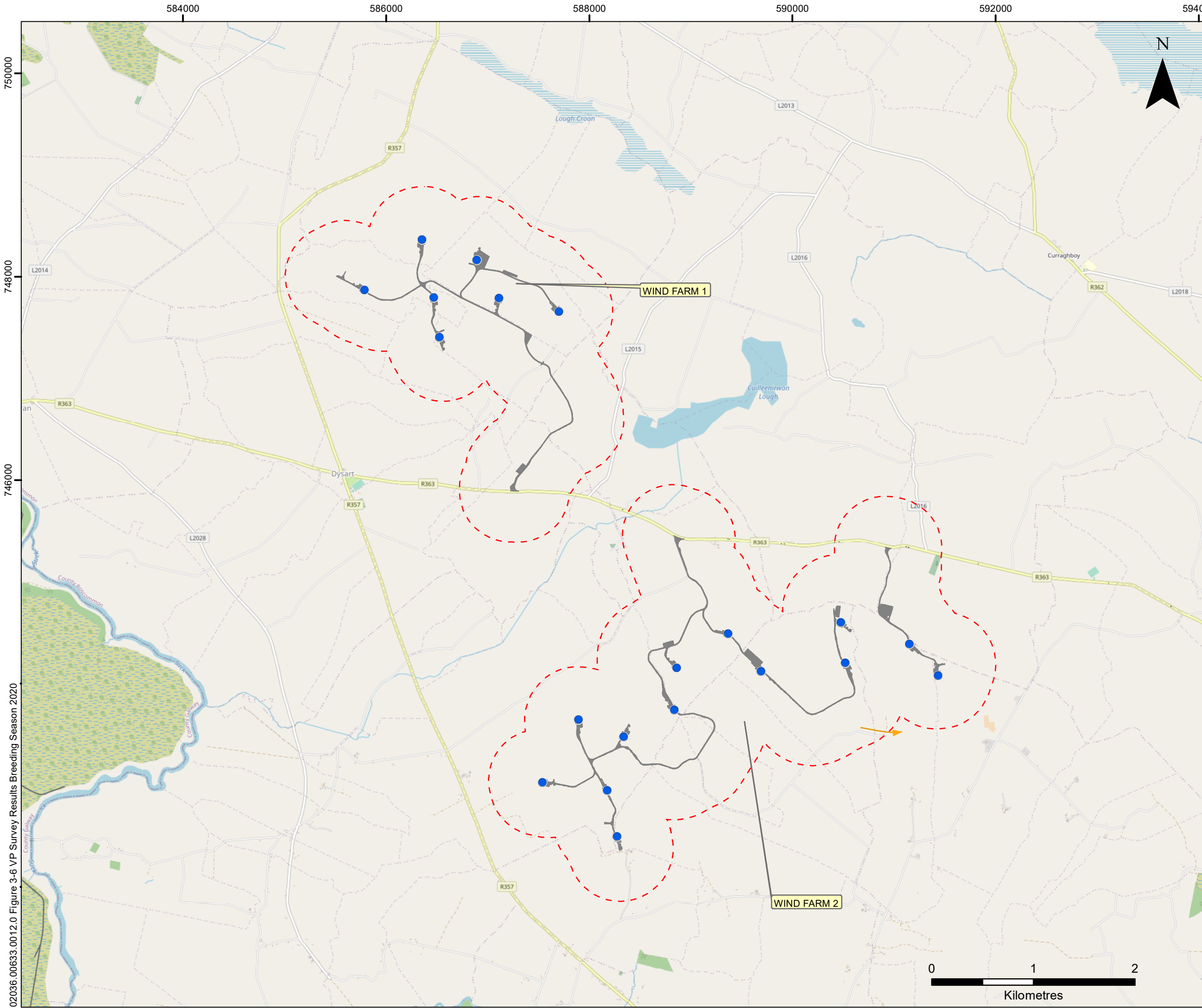
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FIGURE 5 - FLIGHT-LINES HEN HARRIER

| | |
|------------------------|------------------|
| Scale 1:35,000 @ A3 | Date MAY 2022 |
|------------------------|------------------|

02036.00633.0012.0 Figure 3-6 VP Survey Results Breeding Season 2020



LEGEND

- Turbine Location
- Site Infrastructure
- Site Infrastructure 500 m Buffer
- Flightline (Month)
 - June

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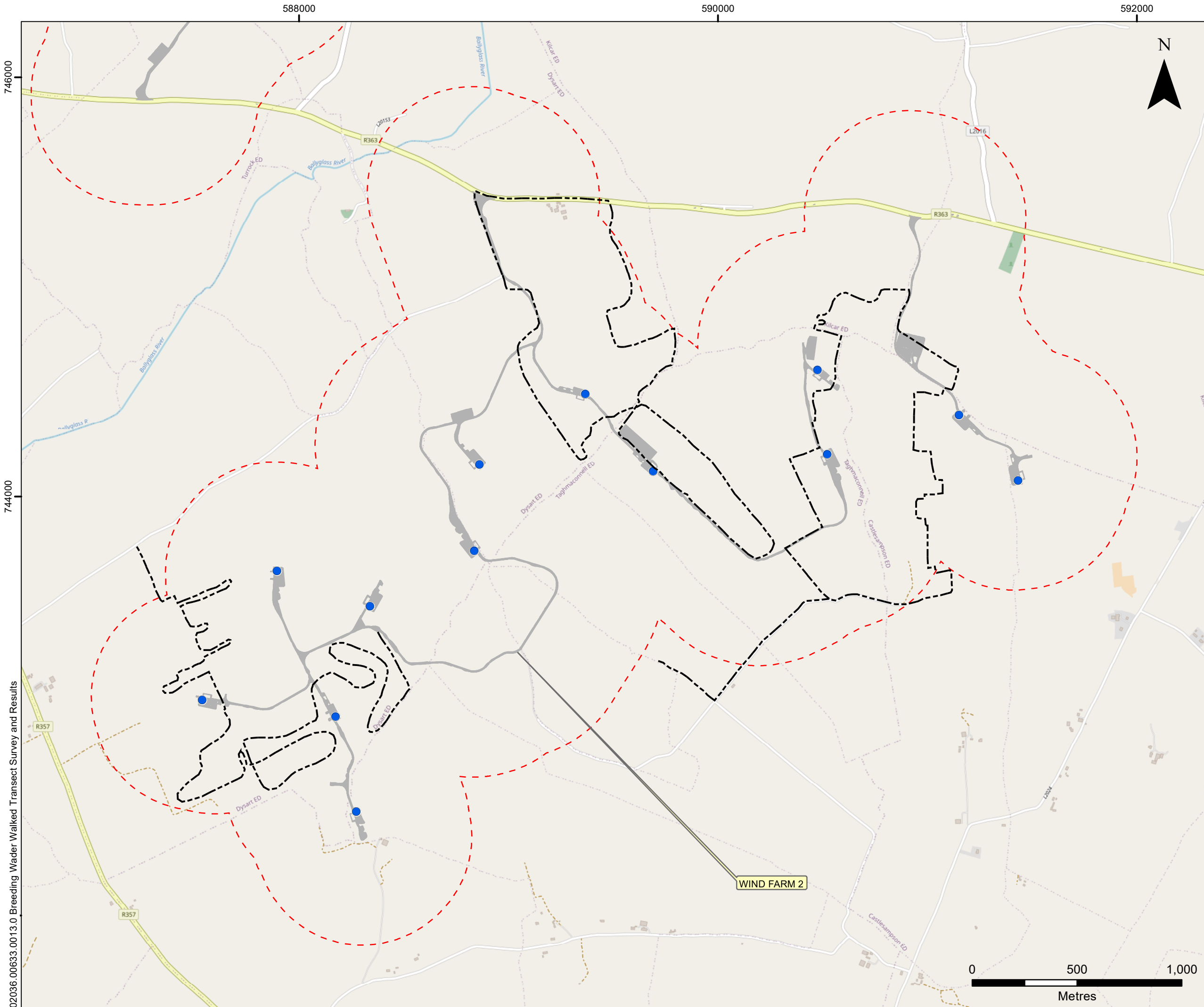
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FIGURE 6 - FLIGHT-LINES LAPWING

Scale
1:35,000 @ A3

Date
MAY 2022

02036.00633.0012.0 Figure 3-6 VP Survey Results Breeding Season 2020



LEGEND

- Turbine Location
- Site Infrastructure
- Site Infrastructure 500 m Buffer
- Walked Transect

Note:

No breeding wader bird species recorded throughout the season.

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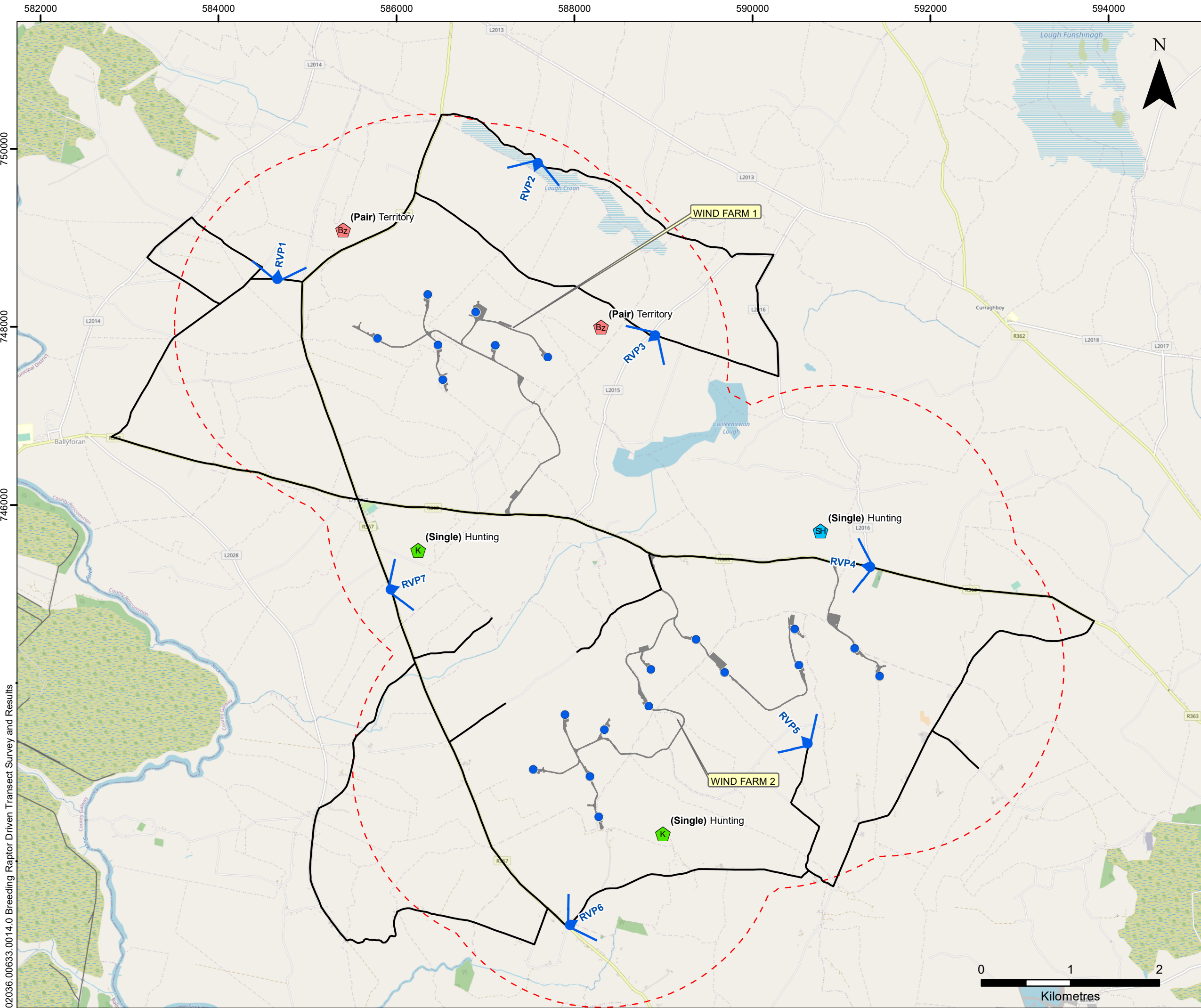
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FIGURE 7 - BREEDING WADER WALKED TRANSECT RESULTS

Scale
1:17,000 @ A3

Date
MAY 2022

02036.00633.0013.0 Breeding Wader Walked Transect Survey and Results



LEGEND

- Turbine Location
- Site Infrastructure
- Site Infrastructure 2 km Buffer
- Driven transect
- Raptor Viewpoint Locations (Stopping Point)

Breeding Raptor Species

- Bz Buzzard
- K Kestrel
- SH Sparrow hawk

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FIGURE 8 - BREEDING RAPTOR DRIVEN TRANSECT SURVEY RESULTS

Scale 1:40,000 @ A3 Date MAY 2022

APPENDIX I

Survey dates, times and observers

Table AI-1: Details of VP surveys undertaken from Wind Farm I Vantage Point 1

| Date | Surveyor | Start | End | Survey Duration |
|--------------------|----------|-------|-------|-----------------|
| 14/04/2020 | SI | 10:30 | 13:30 | 3 |
| 15/04/2020 | SI | 13:00 | 16:00 | 3 |
| 18/05/2020 | SI | 14:00 | 17:00 | 3 |
| 19/05/2020 | SI | 13:30 | 16:30 | 3 |
| 02/06/2020 | DH | 09:10 | 12:10 | 3 |
| 19/06/2020 | DH | 13:30 | 16:30 | 3 |
| 15/07/2020 | SI | 10:30 | 13:30 | 3 |
| 16/07/2020 | SI | 13:00 | 16:00 | 3 |
| 18/08/2020 | SI | 10:00 | 13:00 | 3 |
| 19/08/2020 | SI | 13:00 | 16:00 | 3 |
| 10/09/2020 | SI | 10:30 | 13:30 | 3 |
| 11/09/2020 | SI | 12:50 | 15:50 | 3 |
| Total Hours | | | | 36 |

Table AI-2: Details of VP surveys undertaken from Wind Farm I Vantage Point 2

| Date | Surveyor | Start | End | Survey Duration |
|--------------------|----------|-------|-------|-----------------|
| 14/04/2020 | SI | 14:00 | 17:00 | 3 |
| 15/04/2020 | SI | 09:20 | 12:20 | 3 |
| 18/05/2020 | SI | 10:30 | 13:30 | 3 |
| 19/05/2020 | SI | 10:00 | 13:00 | 3 |
| 02/06/2020 | DH | 12:45 | 15:45 | 3 |
| 19/06/2020 | DH | 09:30 | 12:30 | 3 |
| 15/07/2020 | SI | 14:00 | 17:00 | 3 |
| 16/07/2020 | SI | 09:30 | 12:30 | 3 |
| 18/08/2020 | SI | 13:45 | 16:45 | 3 |
| 19/08/2020 | SI | 09:30 | 12:30 | 3 |
| 10/09/2020 | SI | 14:00 | 17:00 | 3 |
| 11/09/2020 | SI | 09:20 | 12:20 | 3 |
| Total Hours | | | | 36 |

Table AI-3: Details of VP surveys undertaken from Wind Farm II Vantage Point 1

| Date | Surveyor | Start | End | Survey Duration |
|--------------------|----------|-------|-------|-----------------|
| 16/04/2020 | SI | 09:30 | 12:30 | 3 |
| 27/04/2020 | SI | 16:00 | 19:00 | 3 |
| 20/05/2020 | SI | 10:00 | 13:00 | 3 |
| 21/05/2020 | SI | 14:00 | 17:00 | 3 |
| 03/06/2020 | DH | 09:15 | 12:15 | 3 |
| 23/06/2020 | DH | 09:20 | 12:20 | 3 |
| 20/07/2020 | SI | 12:15 | 15:15 | 3 |
| 21/07/2020 | SI | 13:00 | 16:00 | 3 |
| 24/08/2020 | SI | 14:00 | 17:00 | 3 |
| 27/08/2020 | SI | 09:00 | 12:00 | 3 |
| 23/09/2020 | SI | 10:00 | 13:00 | 3 |
| 24/09/2020 | SI | 13:00 | 16:00 | 3 |
| Total Hours | | | | 36 |

Table AI-4: Details of VP surveys undertaken from Wind Farm II Vantage Point 2

| Date | Surveyor | Start | End | Survey Duration |
|--------------------|----------|-------|-------|-----------------|
| 16/04/2020 | SI | 13:00 | 16:00 | 3 |
| 27/04/2020 | SI | 12:30 | 15:30 | 3 |
| 20/05/2020 | SI | 13:30 | 16:30 | 3 |
| 21/05/2020 | SI | 10:00 | 13:00 | 3 |
| 03/06/2020 | DH | 13:05 | 16:05 | 3 |
| 22/06/2020 | DH | 13:30 | 16:30 | 3 |
| 20/07/2020 | SI | 15:45 | 18:45 | 3 |
| 21/07/2020 | SI | 09:30 | 12:30 | 3 |
| 24/08/2020 | SI | 10:30 | 13:30 | 3 |
| 27/08/2020 | SI | 12:30 | 15:30 | 3 |
| 23/09/2020 | SI | 14:00 | 17:00 | 3 |
| 24/09/2020 | SI | 09:30 | 12:30 | 3 |
| Total Hours | | | | 36 |

Table AI-5: Details of VP surveys undertaken from Wind Farm II Vantage Point 3

| Date | Surveyor | Start | End | Survey Duration |
|--------------------|----------|-------|-------|-----------------|
| 28/04/2020 | SI | 09:30 | 12:30 | 3 |
| 29/04/2020 | SI | 12:45 | 15:45 | 3 |
| 22/05/2020 | JC | 10:20 | 13:20 | 3 |
| 23/05/2020 | SI | 14:00 | 17:00 | 3 |
| 04/06/2020 | DH | 09:30 | 12:30 | 3 |
| 23/06/2020 | DH | 13:30 | 16:30 | 3 |
| 27/07/2020 | SI | 10:30 | 13:30 | 3 |
| 28/07/2020 | SI | 13:00 | 16:00 | 3 |
| 25/08/2020 | SI | 09:30 | 12:30 | 3 |
| 26/08/2020 | SI | 13:15 | 16:15 | 3 |
| 25/09/2020 | SI | 09:30 | 12:30 | 3 |
| 28/09/2020 | SI | 13:30 | 16:30 | 3 |
| Total Hours | | | | 36 |

Table AI-6: Details of VP surveys undertaken from Wind Farm II Vantage Point 4

| Date | Surveyor | Start | End | Survey Duration |
|--------------------|----------|-------|-------|-----------------|
| 28/04/2020 | SI | 13:00 | 16:00 | 3 |
| 29/04/2020 | SI | 09:30 | 12:30 | 3 |
| 22/05/2020 | JC | 14:05 | 17:05 | 3 |
| 23/05/2020 | SI | 10:00 | 13:00 | 3 |
| 04/06/2020 | DH | 12:55 | 15:55 | 3 |
| 22/06/2020 | DH | 09:56 | 12:56 | 3 |
| 27/07/2020 | SI | 14:00 | 17:00 | 3 |
| 28/07/2020 | SI | 09:30 | 12:30 | 3 |
| 25/08/2020 | SI | 13:30 | 16:30 | 3 |
| 26/08/2020 | SI | 09:30 | 12:30 | 3 |
| 28/09/2020 | SI | 09:30 | 12:30 | 3 |
| 29/09/2020 | SI | 13:30 | 16:30 | 3 |
| Total Hours | | | | 36 |

Table AI-7: Details of breeding wader surveys undertaken at Wind Farm II during the 2020 bird breeding season

| Date | Surveyor | Start | End | Survey Duration |
|--------------------|----------|-------|-------|-----------------|
| 24/04/2020 | SI | 08:00 | 12:00 | 4 |
| 18/05/2020 | SI | 06:00 | 10:00 | 4 |
| 26/06/2020 | DH | 08:00 | 12:00 | 4 |
| Total Hours | | | | 12 |

Table AI-8: Details of breeding raptor surveys undertaken at Wind Farms I and II during the 2020 bird breeding season

| Date | Surveyor | Start | End | Survey Duration |
|--------------------|----------|-------|-------|-----------------|
| 30/04/2020 | SI | 13:00 | 18:00 | 5 |
| 25/05/2020 | SI | 10:00 | 13:00 | 3 |
| 25/06/2020 | DH | 09:00 | 12:00 | 3 |
| 13/07/2020 | SI | 10:00 | 13:00 | 3 |
| Total Hours | | | | 14 |

APPENDIX II

Weather Data

Table AII-1: Weather data collected during flight activity surveys undertaken at WFI VP1

| Date | Surveyor | Start | End | Survey Hour | Wind Speed | Wind Direction | Rain | Cloud Cover | Cloud Height | Visibility | Snow | Frost | Temp (°C) |
|------------|----------|-------|-------|-------------|------------|----------------|------|-------------|--------------|------------|------|-------|-----------|
| 14/04/2020 | SI | 10:30 | 13:30 | 1 | 0 | E | 0 | 0 | N/A | 2 | 0 | 0 | 7 |
| 14/04/2020 | SI | 10:30 | 13:30 | 2 | 0 | E | 0 | 0 | N/A | 2 | 0 | 0 | 8 |
| 14/04/2020 | SI | 10:30 | 13:30 | 3 | 1 | E | 0 | 0 | N/A | 2 | 0 | 0 | 9 |
| 15/04/2020 | SI | 13:00 | 16:00 | 1 | 0 | N/A | 0 | 0 | N/A | 2 | 0 | 0 | 14 |
| 15/04/2020 | SI | 13:00 | 16:00 | 2 | 1 | SE | 0 | 0 | N/A | 2 | 0 | 0 | 16 |
| 15/04/2020 | SI | 13:00 | 16:00 | 3 | 1 | SE | 0 | 0 | N/A | 2 | 0 | 0 | 18 |
| 18/05/2020 | SI | 14:00 | 17:00 | 1 | 1 | W | 0 | 8 | 2 | 2 | 0 | 0 | 15 |
| 18/05/2020 | SI | 14:00 | 17:00 | 2 | 1 | W | 0 | 8 | 2 | 2 | 0 | 0 | 15 |
| 18/05/2020 | SI | 14:00 | 17:00 | 3 | 1 | W | 0 | 8 | 2 | 2 | 0 | 0 | 15 |
| 19/05/2020 | SI | 13:30 | 16:30 | 1 | 1 | SW | 0 | 8 | 2 | 2 | 0 | 0 | 14 |
| 19/05/2020 | SI | 13:30 | 16:30 | 2 | 1 | SW | 0 | 8 | 2 | 2 | 0 | 0 | 14 |
| 19/05/2020 | SI | 13:30 | 16:30 | 3 | 1 | SW | 0 | 5 | 2 | 2 | 0 | 0 | 15 |
| 02/06/2020 | DH | 09:10 | 12:10 | 1 | 2 | SE | 0 | 2 | 2 | 2 | 0 | 0 | 19 |
| 02/06/2020 | DH | 09:10 | 12:10 | 2 | 3 | SE | 0 | 3 | 2 | 2 | 0 | 0 | 21 |

| Date | Surveyor | Start | End | Survey Hour | Wind Speed | Wind Direction | Rain | Cloud Cover | Cloud Height | Visibility | Snow | Frost | Temp (°c) |
|------------|----------|-------|-------|-------------|------------|----------------|------|-------------|--------------|------------|------|-------|-----------|
| 02/06/2020 | DH | 09:10 | 12:10 | 3 | 3 | SE | 0 | 2 | 2 | 2 | 0 | 0 | 21 |
| 19/06/2020 | DH | 13:30 | 16:30 | 1 | 4 | W | 0 | 8 | 2 | 2 | 0 | 0 | 20 |
| 19/06/2020 | DH | 13:30 | 16:30 | 2 | 4 | W | 0 | 6 | 2 | 2 | 0 | 0 | 20 |
| 19/06/2020 | DH | 13:30 | 16:30 | 3 | 4 | W | 0 | 5 | 2 | 2 | 0 | 0 | 20 |
| 15/07/2020 | SI | 10:30 | 13:30 | 1 | 2 | S | 1 | 8 | 2 | 1 | 0 | 0 | 11 |
| 15/07/2020 | SI | 10:30 | 13:30 | 2 | 2 | S | 1 | 8 | 2 | 2 | 0 | 0 | 12 |
| 15/07/2020 | SI | 10:30 | 13:30 | 3 | 1 | S | 1 | 8 | 2 | 2 | 0 | 0 | 12 |
| 16/07/2020 | SI | 13:00 | 16:00 | 1 | 1 | E | 0 | 7 | 2 | 2 | 0 | 0 | 16 |
| 16/07/2020 | SI | 13:00 | 16:00 | 2 | 1 | E | 0 | 6 | 2 | 2 | 0 | 0 | 17 |
| 16/07/2020 | SI | 13:00 | 16:00 | 3 | 0 | E | 0 | 6 | 2 | 2 | 0 | 0 | 17 |
| 18/08/2020 | SI | 10:00 | 13:00 | 1 | 2 | W | 0 | 6 | 2 | 2 | 0 | 0 | 19 |
| 18/08/2020 | SI | 10:00 | 13:00 | 2 | 2 | W | 0 | 6 | 2 | 2 | 0 | 0 | 20 |
| 18/08/2020 | SI | 10:00 | 13:00 | 3 | 3 | W | 0 | 7 | 2 | 2 | 0 | 0 | 20 |
| 19/08/2020 | SI | 13:00 | 16:00 | 1 | 3 | SE | 2 | 8 | 2 | 2 | 0 | 0 | 16 |
| 19/08/2020 | SI | 13:00 | 16:00 | 2 | 3 | SE | 2 | 7 | 2 | 2 | 0 | 0 | 16 |

| Date | Surveyor | Start | End | Survey Hour | Wind Speed | Wind Direction | Rain | Cloud Cover | Cloud Height | Visibility | Snow | Frost | Temp (°c) |
|---------------------|----------|----------------------------|-------------|-------------|------------------|----------------|------------------|-------------|--------------|------------|------|-------|-----------|
| 19/08/2020 | SI | 13:00 | 16:00 | 3 | 3 | SE | 2 | 7 | 2 | 2 | 0 | 0 | 16 |
| 10/09/2020 | SI | 10:30 | 13:30 | 1 | 1 | W | 0 | 8 | 2 | 2 | 0 | 0 | 12 |
| 10/09/2020 | SI | 10:30 | 13:30 | 2 | 1 | W | 1 | 8 | 2 | 2 | 0 | 0 | 12 |
| 10/09/2020 | SI | 10:30 | 13:30 | 3 | 1 | W | 0 | 8 | 2 | 2 | 0 | 0 | 13 |
| 11/09/2020 | SI | 12:50 | 15:50 | 1 | 2 | SW | 0 | 7 | 2 | 2 | 0 | 0 | 14 |
| 11/09/2020 | SI | 12:50 | 15:50 | 2 | 2 | SW | 0 | 6 | 2 | 2 | 0 | 0 | 15 |
| 11/09/2020 | SI | 12:50 | 15:50 | 3 | 2 | SW | 0 | 6 | 2 | 2 | 0 | 0 | 14 |
| Rain/ Precipitation | | | Cloud Cover | | | Visibility | | | Lying Snow | | | Frost | |
| None | 0 | Expressed in oktas (n/8) | | | Poor (<1km) | 0 | None | 0 | None | 0 | | | |
| Drizzle | 1 | Cloud Height | | | Moderate (1-3km) | 1 | On site | 1 | Ground | 1 | | | |
| Light showers/snow | 2 | Height of cloud above | | | Good (>3km) | 2 | On higher ground | 2 | All day | 2 | | | |
| Heavy showers/snow | 3 | average height of viewshed | | | | | | | | | | | |
| Heavy rain/snow | 4 | <150m | | | 0 | | | | | | | | |
| | | 150-500m | | | 1 | | | | | | | | |
| | | >500m | | | 2 | | | | | | | | |

Table AII-2: Weather data collected during flight activity surveys undertaken at WFI VP2

| Date | Surveyor | Start | End | Survey Hour | Wind Speed | Wind Direction | Rain | Cloud Cover | Cloud Height | Visibility | Snow | Frost | Temp (°C) |
|------------|----------|-------|-------|-------------|------------|----------------|------|-------------|--------------|------------|------|-------|-----------|
| 14/04/2020 | SI | 14:00 | 17:00 | 1 | 1 | W | 0 | 1 | 2 | 2 | 0 | 0 | 15 |
| 14/04/2020 | SI | 14:00 | 17:00 | 2 | 1 | W | 0 | 1 | 2 | 2 | 0 | 0 | 16 |
| 14/04/2020 | SI | 14:00 | 17:00 | 3 | 1 | W | 0 | 1 | 2 | 2 | 0 | 0 | 16 |
| 15/04/2020 | SI | 09:20 | 12:20 | 1 | 1 | SE | 0 | 0 | N/A | 2 | 0 | 0 | 9 |
| 15/04/2020 | SI | 09:20 | 12:20 | 2 | 1 | SE | 0 | 0 | N/A | 2 | 0 | 0 | 11 |
| 15/04/2020 | SI | 09:20 | 12:20 | 3 | 1 | SE | 0 | 0 | N/A | 2 | 0 | 0 | 13 |
| 18/05/2020 | SI | 10:30 | 13:30 | 1 | 1 | W | 1 | 8 | 2 | 2 | 0 | 0 | 14 |
| 18/05/2020 | SI | 10:30 | 13:30 | 2 | 1 | W | 2 | 8 | 2 | 2 | 0 | 0 | 15 |
| 18/05/2020 | SI | 10:30 | 13:30 | 3 | 1 | W | 0 | 8 | 2 | 2 | 0 | 0 | 15 |
| 19/05/2020 | SI | 10:00 | 13:00 | 1 | 1 | SW | 1 | 8 | 2 | 2 | 0 | 0 | 13 |
| 19/05/2020 | SI | 10:00 | 13:00 | 2 | 1 | SW | 1 | 8 | 2 | 2 | 0 | 0 | 14 |
| 19/05/2020 | SI | 10:00 | 13:00 | 3 | 1 | SW | 0 | 8 | 2 | 2 | 0 | 0 | 15 |
| 02/06/2020 | DH | 12:45 | 15:15 | 1 | 3 | S | 0 | 4 | 2 | 2 | 0 | 0 | 21 |
| 02/06/2020 | DH | 12:45 | 15:15 | 2 | 3 | S | 0 | 4 | 2 | 2 | 0 | 0 | 21 |

| Date | Surveyor | Start | End | Survey Hour | Wind Speed | Wind Direction | Rain | Cloud Cover | Cloud Height | Visibility | Snow | Frost | Temp (°C) |
|------------|----------|-------|-------|-------------|------------|----------------|------|-------------|--------------|------------|------|-------|-----------|
| 02/06/2020 | DH | 12:45 | 15:15 | 3 | 3 | S | 0 | 4 | 2 | 2 | 0 | 0 | 21 |
| 19/06/2020 | DH | 09:30 | 12:30 | 1 | 4 | S | 1 | 8 | 2 | 2 | 0 | 0 | 18 |
| 19/06/2020 | DH | 09:30 | 12:30 | 2 | 4 | S | 0 | 8 | 2 | 2 | 0 | 0 | 20 |
| 19/06/2020 | DH | 09:30 | 12:30 | 3 | 4 | SE | 0 | 6 | 2 | 2 | 0 | 0 | 21 |
| 15/07/2020 | SI | 14:00 | 17:00 | 1 | 1 | S | 0 | 7 | 2 | 2 | 0 | 0 | 14 |
| 15/07/2020 | SI | 14:00 | 17:00 | 2 | 1 | S | 0 | 7 | 2 | 2 | 0 | 0 | 14 |
| 15/07/2020 | SI | 14:00 | 17:00 | 3 | 1 | S | 0 | 7 | 2 | 2 | 0 | 0 | 13 |
| 16/07/2020 | SI | 09:30 | 12:30 | 1 | 1 | E | 2 | 8 | 2 | 2 | 0 | 0 | 12 |
| 16/07/2020 | SI | 09:30 | 12:30 | 2 | 1 | E | 0 | 6 | 2 | 2 | 0 | 0 | 12 |
| 16/07/2020 | SI | 09:30 | 12:30 | 3 | 1 | E | 0 | 6 | 2 | 2 | 0 | 0 | 13 |
| 18/08/2020 | SI | 13:45 | 16:45 | 1 | 3 | W | 0 | 7 | 2 | 2 | 0 | 0 | 20 |
| 18/08/2020 | SI | 13:45 | 16:45 | 2 | 3 | W | 0 | 7 | 2 | 2 | 0 | 0 | 20 |
| 18/08/2020 | SI | 13:45 | 16:45 | 3 | 2 | W | 0 | 7 | 2 | 2 | 0 | 0 | 19 |
| 19/08/2020 | SI | 09:30 | 12:30 | 1 | 2 | S | 0 | 5 | 2 | 2 | 0 | 0 | 15 |
| 19/08/2020 | SI | 09:30 | 12:30 | 2 | 2 | S | 0 | 5 | 2 | 2 | 0 | 0 | 15 |

| Date | Surveyor | Start | End | Survey Hour | Wind Speed | Wind Direction | Rain | Cloud Cover | Cloud Height | Visibility | Snow | Frost | Temp (°c) |
|---------------------|----------|----------------------------|-------------|-------------|------------------|----------------|------------------|-------------|--------------|------------|------|-------|-----------|
| 19/08/2020 | SI | 09:30 | 12:30 | 3 | 3 | E | 0 | 6 | 2 | 2 | 0 | 0 | 16 |
| 10/09/2020 | SI | 14:00 | 17:00 | 1 | 1 | W | 0 | 8 | 2 | 2 | 0 | 0 | 14 |
| 10/09/2020 | SI | 14:00 | 17:00 | 2 | 1 | W | 0 | 8 | 2 | 2 | 0 | 0 | 14 |
| 10/09/2020 | SI | 14:00 | 17:00 | 3 | 1 | W | 0 | 8 | 2 | 2 | 0 | 0 | 14 |
| 11/09/2020 | SI | 09:20 | 12:20 | 1 | 1 | SW | 0 | 8 | 2 | 2 | 0 | 0 | 12 |
| 11/09/2020 | SI | 09:20 | 12:20 | 2 | 1 | SW | 1 | 8 | 2 | 1 | 0 | 0 | 12 |
| 11/09/2020 | SI | 09:20 | 12:20 | 3 | 1 | SW | 1 | 8 | 2 | 2 | 0 | 0 | 14 |
| Rain/ Precipitation | | | Cloud Cover | | | Visibility | | | Lying Snow | | | Frost | |
| None | 0 | Expressed in oktas (n/8) | | | Poor (<1km) | 0 | None | 0 | None | 0 | | | |
| Drizzle | 1 | Cloud Height | | | Moderate (1-3km) | 1 | On site | 1 | Ground | 1 | | | |
| Light showers/snow | 2 | Height of cloud above | | | Good (>3km) | 2 | On higher ground | 2 | All day | 2 | | | |
| Heavy showers/snow | 3 | average height of viewshed | | | | | | | | | | | |
| Heavy rain/snow | 4 | <150m | | | 0 | | | | | | | | |
| | | 150-500m | | | 1 | | | | | | | | |
| | | >500m | | | 2 | | | | | | | | |

Table AII-3: Weather data collected during flight activity surveys undertaken at WFII VP1

| Date | Surveyor | Start | End | Survey Hour | Wind Speed | Wind Direction | Rain | Cloud Cover | Cloud Height | Visibility | Snow | Frost | Temp (°C) |
|------------|----------|-------|-------|-------------|------------|----------------|------|-------------|--------------|------------|------|-------|-----------|
| 16/04/2020 | SI | 09:30 | 12:30 | 1 | 1 | E | 0 | 8 | 2 | 2 | 0 | 0 | 8 |
| 16/04/2020 | SI | 09:30 | 12:30 | 2 | 1 | E | 0 | 7 | 2 | 2 | 0 | 0 | 10 |
| 16/04/2020 | SI | 09:30 | 12:30 | 3 | 2 | E | 0 | 6 | 2 | 2 | 0 | 0 | 10 |
| 27/04/2020 | SI | 16:00 | 19:00 | 1 | 1 | N | 0 | 5 | 2 | 2 | 0 | 0 | 12 |
| 27/04/2020 | SI | 16:00 | 19:00 | 2 | 1 | N | 0 | 6 | 2 | 2 | 0 | 0 | 11 |
| 27/04/2020 | SI | 16:00 | 19:00 | 3 | 0 | N/A | 0 | 7 | 2 | 2 | 0 | 0 | 11 |
| 20/05/2020 | SI | 10:00 | 13:00 | 1 | 1 | S | 0 | 1 | 2 | 2 | 0 | 0 | 15 |
| 20/05/2020 | SI | 10:00 | 13:00 | 2 | 2 | S | 0 | 1 | 2 | 2 | 0 | 0 | 15 |
| 20/05/2020 | SI | 10:00 | 13:00 | 3 | 2 | S | 0 | 3 | 2 | 2 | 0 | 0 | 15 |
| 21/05/2020 | SI | 14:00 | 17:00 | 1 | 2 | S | 0 | 8 | 2 | 2 | 0 | 0 | 17 |
| 21/05/2020 | SI | 14:00 | 17:00 | 2 | 1 | S | 0 | 8 | 2 | 2 | 0 | 0 | 17 |
| 21/05/2020 | SI | 14:00 | 17:00 | 3 | 2 | S | 0 | 8 | 2 | 2 | 0 | 0 | 16 |
| 03/06/2020 | DH | 09:15 | 12:15 | 1 | 4 | W | 0 | 3 | 2 | 2 | 0 | 0 | 19 |
| 03/06/2020 | DH | 09:15 | 12:15 | 2 | 4 | W | 0 | 4 | 2 | 2 | 0 | 0 | 19 |

| Date | Surveyor | Start | End | Survey Hour | Wind Speed | Wind Direction | Rain | Cloud Cover | Cloud Height | Visibility | Snow | Frost | Temp (°c) |
|------------|----------|-------|-------|-------------|------------|----------------|------|-------------|--------------|------------|------|-------|-----------|
| 03/06/2020 | DH | 09:15 | 12:15 | 3 | 4 | W | 0 | 2 | 2 | 2 | 0 | 0 | 20 |
| 23/06/2020 | DH | 09:20 | 12:20 | 1 | 4 | NW | 1 | 8 | 2 | 2 | 0 | 0 | 15 |
| 23/06/2020 | DH | 09:20 | 12:20 | 2 | 4 | NW | 0 | 8 | 2 | 2 | 0 | 0 | 17 |
| 23/06/2020 | DH | 09:20 | 12:20 | 3 | 5 | N | 0 | 8 | 2 | 2 | 0 | 0 | 17 |
| 20/07/2020 | SI | 12:15 | 15:15 | 1 | 1 | NW | 0 | 4 | 2 | 2 | 0 | 0 | 15 |
| 20/07/2020 | SI | 12:15 | 15:15 | 2 | 1 | NW | 0 | 5 | 2 | 2 | 0 | 0 | 15 |
| 20/07/2020 | SI | 12:15 | 15:15 | 3 | 1 | NW | 0 | 4 | 2 | 2 | 0 | 0 | 15 |
| 21/07/2020 | SI | 13:00 | 16:00 | 1 | 1 | SW | 0 | 5 | 2 | 2 | 0 | 0 | 17 |
| 21/07/2020 | SI | 13:00 | 16:00 | 2 | 0 | N/A | 0 | 4 | 2 | 2 | 0 | 0 | 19 |
| 21/07/2020 | SI | 13:00 | 16:00 | 3 | 1 | SW | 0 | 7 | 2 | 2 | 0 | 0 | 18 |
| 24/08/2020 | SI | 14:00 | 17:00 | 1 | 2 | SE | 0 | 5 | 2 | 2 | 0 | 0 | 17 |
| 24/08/2020 | SI | 14:00 | 17:00 | 2 | 2 | SE | 0 | 5 | 2 | 2 | 0 | 0 | 17 |
| 24/08/2020 | SI | 14:00 | 17:00 | 3 | 2 | SE | 0 | 5 | 2 | 2 | 0 | 0 | 17 |
| 27/08/2020 | SI | 09:00 | 12:00 | 1 | 3 | NE | 2 | 8 | 2 | 2 | 0 | 0 | 13 |
| 27/08/2020 | SI | 09:00 | 12:00 | 2 | 4 | NE | 3 | 8 | 2 | 2 | 0 | 0 | 13 |

| Date | Surveyor | Start | End | Survey Hour | Wind Speed | Wind Direction | Rain | Cloud Cover | Cloud Height | Visibility | Snow | Frost | Temp (°c) |
|---------------------|----------|----------------------------|-------------|-------------|------------------|----------------|------------------|-------------|--------------|------------|------|-------|-----------|
| 27/08/2020 | SI | 09:00 | 12:00 | 3 | 4 | NE | 2 | 8 | 2 | 2 | 0 | 0 | 14 |
| 23/09/2020 | SI | 10:00 | 13:00 | 1 | 1 | N | 0 | 4 | 2 | 2 | 0 | 0 | 12 |
| 23/09/2020 | SI | 10:00 | 13:00 | 2 | 1 | W | 0 | 4 | 2 | 2 | 0 | 0 | 12 |
| 23/09/2020 | SI | 10:00 | 13:00 | 3 | 2 | W | 0 | 3 | 2 | 2 | 0 | 0 | 13 |
| 24/09/2020 | SI | 13:00 | 16:00 | 1 | 1 | E | 0 | 8 | 2 | 2 | 0 | 0 | 8 |
| 24/09/2020 | SI | 13:00 | 16:00 | 2 | 1 | E | 0 | 7 | 2 | 2 | 0 | 0 | 10 |
| 24/09/2020 | SI | 13:00 | 16:00 | 3 | 2 | E | 0 | 6 | 2 | 2 | 0 | 0 | 10 |
| Rain/ Precipitation | | | Cloud Cover | | | Visibility | | | Lying Snow | | | Frost | |
| None | 0 | Expressed in oktas (n/8) | | | Poor (<1km) | 0 | None | 0 | None | 0 | | | |
| Drizzle | 1 | Cloud Height | | | Moderate (1-3km) | 1 | On site | 1 | Ground | 1 | | | |
| Light showers/snow | 2 | Height of cloud above | | | Good (>3km) | 2 | On higher ground | 2 | All day | 2 | | | |
| Heavy showers/snow | 3 | average height of viewshed | | | | | | | | | | | |
| Heavy rain/snow | 4 | <150m 0 | | | | | | | | | | | |
| | | 150-500m 1 | | | | | | | | | | | |
| | | >500m 2 | | | | | | | | | | | |

Table AII-4: Weather data collected during flight activity surveys undertaken at WFII VP2

| Date | Surveyor | Start | End | Survey Hour | Wind Speed | Wind Direction | Rain | Cloud Cover | Cloud Height | Visibility | Snow | Frost | Temp (°C) |
|------------|----------|-------|-------|-------------|------------|----------------|------|-------------|--------------|------------|------|-------|-----------|
| 16/04/2020 | SI | 13:00 | 16:00 | 1 | 2 | E | 0 | 2 | 2 | 2 | 0 | 0 | 13 |
| 16/04/2020 | SI | 13:00 | 16:00 | 2 | 2 | E | 0 | 2 | 2 | 2 | 0 | 0 | 13 |
| 16/04/2020 | SI | 13:00 | 16:00 | 3 | 4 | E | 0 | 1 | 2 | 2 | 0 | 0 | 13 |
| 27/04/2020 | SI | 12:30 | 15:30 | 1 | 0 | N/A | 2 | 8 | 2 | 2 | 0 | 0 | 12 |
| 27/04/2020 | SI | 12:30 | 15:30 | 2 | 1 | N | 0 | 7 | 2 | 2 | 0 | 0 | 12 |
| 27/04/2020 | SI | 12:30 | 15:30 | 3 | 0 | N/A | 0 | 5 | 2 | 2 | 0 | 0 | 12 |
| 20/05/2020 | SI | 13:30 | 16:30 | 1 | 3 | S | 0 | 6 | 2 | 2 | 0 | 0 | 16 |
| 20/05/2020 | SI | 13:30 | 16:30 | 2 | 3 | S | 0 | 6 | 2 | 2 | 0 | 0 | 16 |
| 20/05/2020 | SI | 13:30 | 16:30 | 3 | 3 | S | 0 | 7 | 2 | 2 | 0 | 0 | 16 |
| 21/05/2020 | SI | 10:00 | 13:00 | 1 | 1 | SW | 0 | 7 | 2 | 2 | 0 | 0 | 15 |
| 21/05/2020 | SI | 10:00 | 13:00 | 2 | 1 | SW | 0 | 5 | 2 | 2 | 0 | 0 | 16 |
| 21/05/2020 | SI | 10:00 | 13:00 | 3 | 1 | SW | 0 | 8 | 2 | 2 | 0 | 0 | 16 |
| 03/06/2020 | DH | 13:05 | 16:05 | 1 | 5 | NW | 0 | 6 | 2 | 2 | 0 | 0 | 19 |
| 03/06/2020 | DH | 13:05 | 16:05 | 2 | 5 | NW | 0 | 5 | 2 | 2 | 0 | 0 | 18 |

| Date | Surveyor | Start | End | Survey Hour | Wind Speed | Wind Direction | Rain | Cloud Cover | Cloud Height | Visibility | Snow | Frost | Temp (°c) |
|------------|----------|-------|-------|-------------|------------|----------------|------|-------------|--------------|------------|------|-------|-----------|
| 03/06/2020 | DH | 13:05 | 16:05 | 3 | 5 | NW | 0 | 5 | 2 | 2 | 0 | 0 | 18 |
| 22/06/2020 | DH | 13:30 | 16:30 | 1 | 5 | W | 3 | 8 | 2 | 2 | 0 | 0 | 20 |
| 22/06/2020 | DH | 13:30 | 16:30 | 2 | 5 | W | 3 | 8 | 2 | 2 | 0 | 0 | 20 |
| 22/06/2020 | DH | 13:30 | 16:30 | 3 | 5 | W | 3 | 8 | 2 | 2 | 0 | 0 | 18 |
| 20/07/2020 | SI | 15:45 | 18:45 | 1 | 2 | NW | 0 | 5 | 2 | 2 | 0 | 0 | 15 |
| 20/07/2020 | SI | 15:45 | 18:45 | 2 | 1 | NW | 0 | 4 | 2 | 2 | 0 | 0 | 16 |
| 20/07/2020 | SI | 15:45 | 18:45 | 3 | 1 | NW | 0 | 3 | 2 | 2 | 0 | 0 | 15 |
| 21/07/2020 | SI | 09:30 | 12:30 | 1 | 1 | SW | 0 | 6 | 2 | 2 | 0 | 0 | 14 |
| 21/07/2020 | SI | 09:30 | 12:30 | 2 | 1 | SW | 0 | 5 | 2 | 2 | 0 | 0 | 15 |
| 21/07/2020 | SI | 09:30 | 12:30 | 3 | 1 | SW | 0 | 5 | 2 | 2 | 0 | 0 | 16 |
| 24/08/2020 | SI | 10:30 | 13:30 | 1 | 1 | S | 0 | 2 | 2 | 2 | 0 | 0 | 16 |
| 24/08/2020 | SI | 10:30 | 13:30 | 2 | 2 | S | 0 | 2 | 2 | 2 | 0 | 0 | 16 |
| 24/08/2020 | SI | 10:30 | 13:30 | 3 | 2 | S | 0 | 3 | 2 | 2 | 0 | 0 | 17 |
| 27/08/2020 | SI | 12:30 | 15:30 | 1 | 4 | NE | 0 | 8 | 2 | 2 | 0 | 0 | 14 |
| 27/08/2020 | SI | 12:30 | 15:30 | 2 | 3 | E | 0 | 8 | 2 | 2 | 0 | 0 | 14 |

| Date | Surveyor | Start | End | Survey Hour | Wind Speed | Wind Direction | Rain | Cloud Cover | Cloud Height | Visibility | Snow | Frost | Temp (°C) |
|----------------------------|----------|-------|----------------------------|-------------|------------|-------------------|------|-------------|-------------------|------------|------|--------------|-----------|
| 27/08/2020 | SI | 12:30 | 15:30 | 3 | 3 | E | 0 | 8 | 2 | 2 | 0 | 0 | 14 |
| 23/09/2020 | SI | 14:00 | 17:00 | 1 | 2 | SW | 0 | 2 | 2 | 2 | 0 | 0 | 14 |
| 23/09/2020 | SI | 14:00 | 17:00 | 2 | 3 | SW | 0 | 2 | 2 | 2 | 0 | 0 | 14 |
| 23/09/2020 | SI | 14:00 | 17:00 | 3 | 3 | W | 0 | 2 | 2 | 2 | 0 | 0 | 14 |
| 24/09/2020 | SI | 09:30 | 12:30 | 1 | 3 | N | 0 | 5 | 2 | 2 | 0 | 0 | 9 |
| 24/09/2020 | SI | 09:30 | 12:30 | 2 | 3 | N | 0 | 5 | 2 | 2 | 0 | 0 | 10 |
| 24/09/2020 | SI | 09:30 | 12:30 | 3 | 4 | N | 0 | 6 | 2 | 2 | 0 | 0 | 10 |
| Rain/ Precipitation | | | Cloud Cover | | | Visibility | | | Lying Snow | | | Frost | |
| None | 0 | | Expressed in oktas (n/8) | | | Poor (<1km) | 0 | | None | 0 | | None | 0 |
| Drizzle | 1 | | Cloud Height | | | Moderate (1-3km) | 1 | | On site | 1 | | Ground | 1 |
| Light showers/snow | 2 | | Height of cloud above | | | Good (>3km) | 2 | | On higher ground | 2 | | All day | 2 |
| Heavy showers/snow | 3 | | average height of viewshed | | | | | | | | | | |
| Heavy rain/snow | 4 | | <150m | | | | 0 | | | | | | |
| | | | 150-500m | | | | 1 | | | | | | |
| | | | >500m | | | | 2 | | | | | | |

Table AII-5: Weather data collected during flight activity surveys undertaken at WFII VP3

| Date | Surveyor | Start | End | Survey Hour | Wind Speed | Wind Direction | Rain | Cloud Cover | Cloud Height | Visibility | Snow | Frost | Temp (°C) |
|------------|----------|-------|-------|-------------|------------|----------------|------|-------------|--------------|------------|------|-------|-----------|
| 28/04/2020 | SI | 09:30 | 12:30 | 1 | 1 | SE | 0 | 0 | N/A | 2 | 0 | 0 | 11 |
| 28/04/2020 | SI | 09:30 | 12:30 | 2 | 1 | SE | 0 | 1 | 2 | 2 | 0 | 0 | 12 |
| 28/04/2020 | SI | 09:30 | 12:30 | 3 | 0 | N/A | 0 | 1 | 2 | 2 | 0 | 0 | 15 |
| 29/04/2020 | SI | 12:45 | 15:45 | 1 | 1 | SE | 0 | 0 | N/A | 2 | 0 | 0 | 11 |
| 29/04/2020 | SI | 12:45 | 15:45 | 2 | 1 | SE | 0 | 1 | 2 | 2 | 0 | 0 | 12 |
| 29/04/2020 | SI | 12:45 | 15:45 | 3 | 0 | N/A | 0 | 1 | 2 | 2 | 0 | 0 | 15 |
| 22/05/2020 | JC | 10:20 | 13:20 | 1 | 6 | S | 1 | 8 | 1 | 1 | 0 | 0 | 12 |
| 22/05/2020 | JC | 10:20 | 13:20 | 2 | 6 | S | 0 | 8 | 1 | 1 | 0 | 0 | 13 |
| 22/05/2020 | JC | 10:20 | 13:20 | 3 | 6 | S | 1 | 8 | 1 | 1 | 0 | 0 | 13 |
| 23/05/2020 | SI | 14:00 | 17:00 | 1 | 6 | S | 1 | 8 | 1 | 1 | 0 | 0 | 12 |
| 23/05/2020 | SI | 14:00 | 17:00 | 2 | 6 | S | 0 | 8 | 1 | 1 | 0 | 0 | 13 |
| 23/05/2020 | SI | 14:00 | 17:00 | 3 | 6 | S | 1 | 8 | 1 | 1 | 0 | 0 | 13 |
| 04/06/2020 | DH | 09:30 | 12:30 | 1 | 4 | NW | 1 | 8 | 2 | 2 | 0 | 0 | 16 |
| 04/06/2020 | DH | 09:30 | 12:30 | 2 | 4 | NW | 0 | 5 | 2 | 2 | 0 | 0 | 17 |
| 04/06/2020 | DH | 09:30 | 12:30 | 3 | 4 | NW | 0 | 5 | 2 | 2 | 0 | 0 | 17 |

| Date | Surveyor | Start | End | Survey Hour | Wind Speed | Wind Direction | Rain | Cloud Cover | Cloud Height | Visibility | Snow | Frost | Temp (°c) |
|------------|----------|-------|-------|-------------|------------|----------------|------|-------------|--------------|------------|------|-------|-----------|
| 23/06/2020 | DH | 13:30 | 16:30 | 1 | 5 | N | 0 | 8 | 2 | 2 | 0 | 0 | 19 |
| 23/06/2020 | DH | 13:30 | 16:30 | 2 | 5 | N | 2 | 8 | 2 | 2 | 0 | 0 | 20 |
| 23/06/2020 | DH | 13:30 | 16:30 | 3 | 5 | NW | 2 | 8 | 2 | 2 | 0 | 0 | 20 |
| 27/07/2020 | SI | 10:30 | 13:30 | 1 | 1 | N | 0 | 7 | 2 | 2 | 0 | 0 | 14 |
| 27/07/2020 | SI | 10:30 | 13:30 | 2 | 2 | N | 0 | 7 | 2 | 2 | 0 | 0 | 15 |
| 27/07/2020 | SI | 10:30 | 13:30 | 3 | 2 | N | 0 | 7 | 2 | 2 | 0 | 0 | 15 |
| 28/07/2020 | SI | 13:00 | 16:00 | 1 | 1 | NW | 0 | 4 | 2 | 2 | 0 | 0 | 17 |
| 28/07/2020 | SI | 13:00 | 16:00 | 2 | 1 | NW | 0 | 3 | 2 | 2 | 0 | 0 | 17 |
| 28/07/2020 | SI | 13:00 | 16:00 | 3 | 1 | NW | 0 | 3 | 2 | 2 | 0 | 0 | 17 |
| 25/08/2020 | SI | 09:30 | 12:30 | 1 | 1 | N | 0 | 7 | 2 | 2 | 0 | 0 | 12 |
| 25/08/2020 | SI | 09:30 | 12:30 | 2 | 1 | N | 2 | 8 | 2 | 2 | 0 | 0 | 12 |
| 25/08/2020 | SI | 09:30 | 12:30 | 3 | 2 | N | 2 | 8 | 2 | 2 | 0 | 0 | 13 |
| 26/08/2020 | SI | 13:15 | 16:15 | 1 | 4 | W | 0 | 4 | 2 | 2 | 0 | 0 | 18 |
| 26/08/2020 | SI | 13:15 | 16:15 | 2 | 4 | W | 0 | 4 | 2 | 2 | 0 | 0 | 18 |
| 26/08/2020 | SI | 13:15 | 16:15 | 3 | 3 | W | 0 | 4 | 2 | 2 | 0 | 0 | 18 |

| Date | Surveyor | Start | End | Survey Hour | Wind Speed | Wind Direction | Rain | Cloud Cover | Cloud Height | Visibility | Snow | Frost | Temp (°c) |
|---------------------|----------|----------------------------|-------------|-------------|------------------|----------------|------------------|-------------|--------------|------------|------|-------|-----------|
| 25/09/2020 | SI | 09:30 | 12:30 | 1 | 3 | N | 0 | 4 | 2 | 2 | 0 | 0 | 11 |
| 25/09/2020 | SI | 09:30 | 12:30 | 2 | 3 | NW | 0 | 4 | 2 | 2 | 0 | 0 | 12 |
| 25/09/2020 | SI | 09:30 | 12:30 | 3 | 3 | NW | 0 | 5 | 2 | 2 | 0 | 0 | 12 |
| 28/09/2020 | SI | 13:30 | 16:30 | 1 | 4 | NW | 1 | 8 | 2 | 2 | 0 | 0 | 16 |
| 28/09/2020 | SI | 13:30 | 16:30 | 2 | 4 | NW | 0 | 5 | 2 | 2 | 0 | 0 | 17 |
| 28/09/2020 | SI | 13:30 | 16:30 | 3 | 4 | NW | 0 | 5 | 2 | 2 | 0 | 0 | 17 |
| Rain/ Precipitation | | | Cloud Cover | | | Visibility | | | Lying Snow | | | Frost | |
| None | 0 | Expressed in oktas (n/8) | | | Poor (<1km) | 0 | None | 0 | None | 0 | | | |
| Drizzle | 1 | Cloud Height | | | Moderate (1-3km) | 1 | On site | 1 | Ground | 1 | | | |
| Light showers/snow | 2 | Height of cloud above | | | Good (>3km) | 2 | On higher ground | 2 | All day | 2 | | | |
| Heavy showers/snow | 3 | average height of viewshed | | | | | | | | | | | |
| Heavy rain/snow | 4 | <150m | | | 0 | | | | | | | | |
| | | 150-500m | | | 1 | | | | | | | | |
| | | >500m | | | 2 | | | | | | | | |

Table AII-6: Weather data collected during flight activity surveys undertaken at WFII VP4

| Date | Surveyor | Start | End | Survey Hour | Wind Speed | Wind Direction | Rain | Cloud Cover | Cloud Height | Visibility | Snow | Frost | Temp (°C) |
|------------|----------|-------|-------|-------------|------------|----------------|------|-------------|--------------|------------|------|-------|-----------|
| 28/04/2020 | SI | 13:00 | 16:00 | 1 | 1 | SE | 0 | 7 | 2 | 2 | 0 | 0 | 15 |
| 28/04/2020 | SI | 13:00 | 16:00 | 2 | 1 | SE | 2 | 7 | 2 | 2 | 0 | 0 | 16 |
| 28/04/2020 | SI | 13:00 | 16:00 | 3 | 1 | SE | 0 | 7 | 2 | 2 | 0 | 0 | 16 |
| 29/04/2020 | SI | 09:30 | 12:30 | 1 | 2 | SW | 3 | 8 | 2 | 1 | 0 | 0 | 10 |
| 29/04/2020 | SI | 09:30 | 12:30 | 2 | 2 | SW | 3 | 8 | 2 | 1 | 0 | 0 | 10 |
| 29/04/2020 | SI | 09:30 | 12:30 | 3 | 2 | SW | 2 | 8 | 2 | 1 | 0 | 0 | 10 |
| 22/05/2020 | JC | 14:05 | 17:05 | 1 | 6 | S | 0 | 7 | 2 | 2 | 0 | 0 | 13 |
| 22/05/2020 | JC | 14:05 | 17:05 | 2 | 6 | S | 0 | 7 | 2 | 2 | 0 | 0 | 16 |
| 22/05/2020 | JC | 14:05 | 17:05 | 3 | 6 | S | 0 | 7 | 2 | 2 | 0 | 0 | 16 |
| 23/05/2020 | SI | 10:00 | 13:00 | 1 | 6 | S | 1 | 8 | 1 | 1 | 0 | 0 | 11 |
| 23/05/2020 | SI | 10:00 | 13:00 | 2 | 6 | S | 0 | 8 | 1 | 1 | 0 | 0 | 12 |
| 23/05/2020 | SI | 10:00 | 13:00 | 3 | 6 | S | 1 | 8 | 1 | 1 | 0 | 0 | 13 |
| 04/06/2020 | DH | 12:55 | 15:55 | 1 | 4 | NW | 0 | 6 | 2 | 2 | 0 | 0 | 18 |
| 04/06/2020 | DH | 12:55 | 15:55 | 2 | 4 | NW | 0 | 5 | 2 | 2 | 0 | 0 | 18 |

| Date | Surveyor | Start | End | Survey Hour | Wind Speed | Wind Direction | Rain | Cloud Cover | Cloud Height | Visibility | Snow | Frost | Temp (°c) |
|------------|----------|-------|-------|-------------|------------|----------------|------|-------------|--------------|------------|------|-------|-----------|
| 04/06/2020 | DH | 12:55 | 15:55 | 3 | 4 | NW | 0 | 6 | 2 | 2 | 0 | 0 | 18 |
| 22/06/2020 | DH | 09:56 | 12:56 | 1 | 5 | W | 2 | 8 | 2 | 2 | 0 | 0 | 18 |
| 22/06/2020 | DH | 09:56 | 12:56 | 2 | 5 | NW | 3 | 8 | 2 | 2 | 0 | 0 | 19 |
| 22/06/2020 | DH | 09:56 | 12:56 | 3 | 5 | W | 3 | 8 | 2 | 2 | 0 | 0 | 19 |
| 27/07/2020 | SI | 14:00 | 17:00 | 1 | 1 | N | 0 | 6 | 2 | 2 | 0 | 0 | 16 |
| 27/07/2020 | SI | 14:00 | 17:00 | 2 | 1 | N | 0 | 7 | 2 | 2 | 0 | 0 | 17 |
| 27/07/2020 | SI | 14:00 | 17:00 | 3 | 1 | N | 0 | 7 | 2 | 2 | 0 | 0 | 17 |
| 28/07/2020 | SI | 09:30 | 12:30 | 1 | 1 | NW | 0 | 4 | 2 | 2 | 0 | 0 | 15 |
| 28/07/2020 | SI | 09:30 | 12:30 | 2 | 1 | NW | 0 | 4 | 2 | 2 | 0 | 0 | 16 |
| 28/07/2020 | SI | 09:30 | 12:30 | 3 | 1 | NW | 0 | 4 | 2 | 2 | 0 | 0 | 16 |
| 25/08/2020 | SI | 13:30 | 16:30 | 1 | 3 | N | 2 | 8 | 2 | 2 | 0 | 0 | 13 |
| 25/08/2020 | SI | 13:30 | 16:30 | 2 | 4 | N | 2 | 8 | 2 | 1 | 0 | 0 | 13 |
| 25/08/2020 | SI | 13:30 | 16:30 | 3 | 4 | N | 2 | 8 | 2 | 2 | 0 | 0 | 12 |
| 26/08/2020 | SI | 09:30 | 12:30 | 1 | 2 | W | 0 | 5 | 2 | 2 | 0 | 0 | 15 |
| 26/08/2020 | SI | 09:30 | 12:30 | 2 | 2 | W | 0 | 5 | 2 | 2 | 0 | 0 | 15 |

| Date | Surveyor | Start | End | Survey Hour | Wind Speed | Wind Direction | Rain | Cloud Cover | Cloud Height | Visibility | Snow | Frost | Temp (°c) |
|---------------------|----------|----------------------------|-------------|-------------|------------------|----------------|------------------|-------------|--------------|------------|------|-------|-----------|
| 26/08/2020 | SI | 09:30 | 12:30 | 3 | 2 | W | 0 | 4 | 2 | 2 | 0 | 0 | 15 |
| 28/09/2020 | SI | 09:30 | 12:30 | 1 | 1 | SE | 0 | 7 | 2 | 2 | 0 | 0 | 11 |
| 28/09/2020 | SI | 09:30 | 12:30 | 2 | 1 | SE | 2 | 4 | 2 | 2 | 0 | 0 | 11 |
| 28/09/2020 | SI | 09:30 | 12:30 | 3 | 1 | SE | 0 | 4 | 2 | 2 | 0 | 0 | 12 |
| 29/09/2020 | SI | 13:30 | 16:30 | 1 | 1 | S | 0 | 4 | 2 | 2 | 0 | 0 | 15 |
| 29/09/2020 | SI | 13:30 | 16:30 | 2 | 1 | S | 2 | 7 | 2 | 2 | 0 | 0 | 16 |
| 29/09/2020 | SI | 13:30 | 16:30 | 3 | 1 | S | 0 | 7 | 2 | 2 | 0 | 0 | 16 |
| Rain/ Precipitation | | | Cloud Cover | | | Visibility | | | Lying Snow | | | Frost | |
| None | 0 | Expressed in oktas (n/8) | | | Poor (<1km) | 0 | None | 0 | None | 0 | | | |
| Drizzle | 1 | Cloud Height | | | Moderate (1-3km) | 1 | On site | 1 | Ground | 1 | | | |
| Light showers/snow | 2 | Height of cloud above | | | Good (>3km) | 2 | On higher ground | 2 | All day | 2 | | | |
| Heavy showers/snow | 3 | average height of viewshed | | | | | | | | | | | |
| Heavy rain/snow | 4 | <150m | | | 0 | | | | | | | | |
| | | 150-500m | | | 1 | | | | | | | | |
| | | >500m | | | 2 | | | | | | | | |

Table AII-7: Weather data collected during the breeding wader surveys undertaken at WFII during the 2020 breeding season

| Date | Surveyor | Start | End | Survey Hour | Wind Speed | Wind Direction | Rain | Cloud Cover | Cloud Height | Visibility | Snow | Frost | Temp (°C) |
|----------------------------|----------|--------------------------|-------|-------------------|------------|-------------------|------|--------------|--------------|------------|------|-------|-----------|
| 24/04/2020 | SI | 08:00 | 12:00 | 1 | 1 | SE | 0 | 7 | 2 | 2 | 0 | 0 | 10 |
| 24/04/2020 | SI | 08:00 | 12:00 | 2 | 1 | SE | 0 | 7 | 2 | 2 | 0 | 0 | 10 |
| 24/04/2020 | SI | 08:00 | 12:00 | 3 | 1 | SE | 0 | 7 | 2 | 2 | 0 | 0 | 11 |
| 24/04/2020 | SI | 08:00 | 12:00 | 4 | 1 | SE | 0 | 6 | 2 | 2 | 0 | 0 | 13 |
| 18/05/2020 | SI | 06:00 | 10:00 | 1 | 1 | S | 0 | 8 | 2 | 2 | 0 | 0 | 11 |
| 18/05/2020 | SI | 06:00 | 10:00 | 2 | 1 | S | 1 | 8 | 2 | 2 | 0 | 0 | 11 |
| 18/05/2020 | SI | 06:00 | 10:00 | 3 | 1 | S | 1 | 8 | 2 | 2 | 0 | 0 | 11 |
| 18/05/2020 | SI | 06:00 | 10:00 | 4 | 1 | S | 1 | 8 | 2 | 2 | 0 | 0 | 12 |
| 26/06/2020 | DH | 08:00 | 12:00 | 1 | 2 | W | 1 | 8 | 2 | 2 | 0 | 0 | 12 |
| 26/06/2020 | DH | 08:00 | 12:00 | 2 | 2 | W | 1 | 8 | 2 | 2 | 0 | 0 | 14 |
| 26/06/2020 | DH | 08:00 | 12:00 | 3 | 2 | W | 1 | 8 | 2 | 2 | 0 | 0 | 15 |
| 26/06/2020 | DH | 08:00 | 12:00 | 4 | 2 | W | 1 | 8 | 2 | 2 | 0 | 0 | 16 |
| Rain/ Precipitation | | Cloud Cover | | Visibility | | Lying Snow | | Frost | | | | | |
| None | 0 | Expressed in oktas (n/8) | | Poor (<1km) | 0 | None | 0 | None | 0 | | | | |
| Drizzle | 1 | Cloud Height | | Moderate (1-3km) | 1 | On site | 1 | Ground | 1 | | | | |
| Light showers/snow | 2 | Height of cloud above | | Good (>3km) | 2 | On higher ground | 2 | All day | 2 | | | | |

| Date | Surveyor | Start | End | Survey Hour | Wind Speed | Wind Direction | Rain | Cloud Cover | Cloud Height | Visibility | Snow | Frost | Temp (°C) |
|--------------------|----------|-------|----------------------------|-------------|------------|----------------|------|-------------|--------------|------------|------|-------|-----------|
| Heavy showers/snow | 3 | | average height of viewshed | | | | | | | | | | |
| Heavy rain/snow | 4 | | <150m | 0 | | | | | | | | | |
| | | | 150-500m | 1 | | | | | | | | | |
| | | | >500m | 2 | | | | | | | | | |

Table AII-8: Weather data collected during the breeding raptor surveys undertaken at WFI and II during the 2020 breeding season

| Date | Surveyor | Start | End | Survey Hour | Wind Speed | Wind Direction | Rain | Cloud Cover | Cloud Height | Visibility | Snow | Frost | Temp (°C) |
|----------------------------|----------|-------|--------------------------|-------------|------------|-------------------|------|-------------|-------------------|------------|------|--------------|-----------|
| 30/04/2020 | SI | 13:00 | 18:00 | 1 | 1 | N | 2 | 7 | 2 | 2 | 0 | 0 | 11 |
| 30/04/2020 | SI | 13:00 | 18:00 | 2 | 1 | N | 2 | 7 | 2 | 2 | 0 | 0 | 11 |
| 30/04/2020 | SI | 13:00 | 18:00 | 3 | 1 | N | 0 | 7 | 2 | 2 | 0 | 0 | 12 |
| 25/05/2020 | SI | 10:00 | 13:00 | 1 | 3 | S | 0 | 7 | 2 | 2 | 0 | 0 | 15 |
| 25/05/2020 | SI | 10:00 | 13:00 | 2 | 3 | S | 0 | 7 | 2 | 2 | 0 | 0 | 15 |
| 25/05/2020 | SI | 10:00 | 13:00 | 3 | 3 | S | 0 | 7 | 2 | 2 | 0 | 0 | 16 |
| 25/06/2020 | DH | 09:00 | 12:00 | 1 | 2 | W | 0 | 3 | 2 | 2 | 0 | 0 | 15 |
| 25/06/2020 | DH | 09:00 | 12:00 | 2 | 2 | W | 0 | 3 | 2 | 2 | 0 | 0 | 15 |
| 25/06/2020 | DH | 09:00 | 12:00 | 3 | 2 | W | 0 | 3 | 2 | 2 | 0 | 0 | 16 |
| 13/07/2020 | SI | 10:00 | 13:00 | 1 | 3 | W | 0 | 2 | 2 | 2 | 0 | 0 | 15 |
| 13/07/2020 | SI | 10:00 | 13:00 | 2 | 3 | W | 0 | 2 | 2 | 2 | 0 | 0 | 16 |
| 13/07/2020 | SI | 10:00 | 13:00 | 3 | 3 | W | 0 | 2 | 2 | 2 | 0 | 0 | 16 |
| Rain/ Precipitation | | | Cloud Cover | | | Visibility | | | Lying Snow | | | Frost | |
| None | 0 | | Expressed in oktas (n/8) | | | Poor (<1km) | 0 | | None | 0 | | None | 0 |
| Drizzle | 1 | | Cloud Height | | | Moderate (1-3km) | 1 | | On site | 1 | | Ground | 1 |
| Light showers/snow | 2 | | Height of cloud above | | | Good (>3km) | 2 | | On higher ground | 2 | | All day | 2 |

| Date | Surveyor | Start | End | Survey Hour | Wind Speed | Wind Direction | Rain | Cloud Cover | Cloud Height | Visibility | Snow | Frost | Temp (°c) |
|--------------------|----------|-------|----------------------------|-------------|------------|----------------|------|-------------|--------------|------------|------|-------|-----------|
| Heavy showers/snow | 3 | | average height of viewshed | | | | | | | | | | |
| Heavy rain/snow | 4 | | <150m | 0 | | | | | | | | | |
| | | | 150-500m | 1 | | | | | | | | | |
| | | | >500m | 2 | | | | | | | | | |

APPENDIX III

Flight activity survey data

Primary Target Species

Table AIII-1: Primary target species flight activity data from WFI VP1

| Date | Surveyor | Flight ID | Species | Num. Birds | M/F | Age | Obs. Time | Flight time (s) | Likely Rotor Swept Height (Y/N) |
|------------|----------|-----------|---------|------------|-----|-----|-----------|-----------------|---------------------------------|
| 14/04/2020 | SI | 1 | HH | 1 | F | Ad | 13:04 | 120 | Y |
| 19/06/2020 | DH | 1 | BH | 3 | U | Ad | 14:15 | 45 | Y |
| 19/06/2020 | DH | 2 | BH | 4 | U | Ad | 14:32 | 60 | N |

Table AIII-2: Primary target species flight activity data from WFI VP2

| Date | Surveyor | Flight ID | Species | Num. Birds | M/F | Age | Obs. Time | Flight time (s) | Likely Rotor Swept Height (Y/N) |
|------------|----------|-----------|---------|------------|-----|-----|-----------|-----------------|---------------------------------|
| 14/04/2020 | SI | 1 | BH | 10 | U | Ad | 14:01 | 45 | N |
| 14/04/2020 | SI | 2 | HG | 2 | U | Ad | 14:02 | 45 | N |
| 14/04/2020 | SI | 3 | BH | 3 | U | Ad | 14:11 | 45 | N |
| 14/04/2020 | SI | 4 | HG | 1 | U | Ad | 15:08 | 30 | N |
| 14/04/2020 | SI | 5 | HG | 3 | U | Ad | 15:15 | 45 | N |
| 14/04/2020 | SI | 6 | BH | 3 | U | Ad | 15:22 | 30 | N |
| 14/04/2020 | SI | 7 | HG | 2 | U | Ad | 15:31 | 45 | N |
| 14/04/2020 | SI | 8 | HG | 2 | U | Ad | 15:54 | 45 | N |
| 14/04/2020 | SI | 9 | BH | 4 | U | Ad | 16:04 | 30 | N |
| 14/04/2020 | SI | 10 | HG | 1 | U | Ad | 16:15 | 45 | N |
| 15/04/2020 | SI | 1 | HG | 3 | U | Ad | 09:24 | 45 | N |
| 15/04/2020 | SI | 2 | HG | 2 | U | Ad | 09:32 | 45 | N |
| 15/04/2020 | SI | 3 | BH | 4 | U | Ad | 09:50 | 30 | N |
| 15/04/2020 | SI | 4 | HG | 2 | U | Ad | 10:16 | 30 | N |
| 15/04/2020 | SI | 5 | BH | 1 | U | Ad | 10:26 | 30 | N |
| 15/04/2020 | SI | 6 | BH | 3 | U | Ad | 10:40 | 45 | N |

| Date | Surveyor | Flight ID | Species | Num. Birds | M/F | Age | Obs. Time | Flight time (s) | Likely Rotor Swept Height (Y/N) |
|------------|----------|-----------|---------|------------|-----|-----|-----------|-----------------|---------------------------------|
| 15/04/2020 | SI | 7 | BH | 1 | U | Ad | 11:00 | 45 | N |
| 15/04/2020 | SI | 8 | BH | 1 | U | Ad | 11:24 | 30 | N |
| 15/04/2020 | SI | 9 | BH | 2 | U | Ad | 11:44 | 30 | N |
| 15/04/2020 | SI | 10 | HG | 1 | U | Ad | 12:01 | 30 | N |
| 02/06/2020 | DH | 1 | BH | 2 | U | Ad | 14:04 | 45 | N |

Table AIII-3: Primary target species flight activity data from WFII VP1

| Date | Surveyor | Flight ID | Species | Num. Birds | M/F | Age | Obs. Time | Flight time (s) | Likely Rotor Swept Height (Y/N) |
|------------|----------|-----------|---------|------------|-----|-----|-----------|-----------------|---------------------------------|
| 27/04/2020 | SI | 1 | HG | 1 | U | Ad | 17:47 | 45 | N |
| 20/05/2020 | SI | 1 | HG | 1 | U | Ad | 11:47 | 30 | N |
| 20/05/2020 | SI | 2 | HG | 1 | U | Ad | 12:38 | 45 | N |

Table AIII-4: Primary target species flight activity data from WFII VP2

| Date | Surveyor | Flight ID | Species | Num. Birds | M/F | Age | Obs. Time | Flight time (s) | Likely Rotor Swept Height (Y/N) |
|------------|----------|-----------|---------|------------|-----|-----|-----------|-----------------|---------------------------------|
| 20/05/2020 | SI | 1 | BH | 2 | U | Ad | 16:11 | 45 | N |

Table AIII-5: Primary target species flight activity data from WFII VP3

| Date | Surveyor | Flight ID | Species | Num. Birds | M/F | Age | Obs. Time | Flight time (s) | Likely Rotor Swept Height (Y/N) |
|------------|----------|-----------|---------|------------|-----|-----|-----------|-----------------|---------------------------------|
| 28/04/2020 | SI | 1 | HG | 1 | U | Ad | 09:45 | 30 | N |
| 28/04/2020 | SI | 2 | BH | 1 | U | Ad | 10:06 | 45 | N |
| 28/04/2020 | SI | 3 | BH | 2 | U | Ad | 10:10 | 30 | N |
| 28/04/2020 | SI | 4 | BH | 2 | U | Ad | 11:34 | 45 | N |

| Date | Surveyor | Flight ID | Species | Num. Birds | M/F | Age | Obs. Time | Flight time (s) | Likely Rotor Swept Height (Y/N) |
|------------|----------|-----------|---------|------------|-----|-----|------------|-----------------|---------------------------------|
| 28/04/2020 | SI | 5 | BH | 3 | U | Ad | 11:44 | 45 | N |
| 22/05/2020 | JC | 1 | BH | 5 | U | Ad | 10:41 | 30 | N |
| 22/05/2020 | JC | 2 | BH | 1 | U | Ad | 10:47 | 45 | N |
| 22/05/2020 | JC | 3 | BH | 1 | U | Ad | 11:04 | 30 | N |
| 22/05/2020 | JC | 4 | BH | 2 | U | Ad | 11:19 | 45 | N |
| 22/05/2020 | JC | 5 | BH | 1 | U | Ad | 11:31 | 30 | N |
| 22/05/2020 | JC | 6 | BH | 2 | U | Ad | 11:46 | 15 | N |
| 04/06/2020 | DH | 1 | BH | 2 | U | Ad | unrecorded | 45 | N |
| 04/06/2020 | DH | 2 | BH | 1 | U | Ad | unrecorded | 15 | N |
| 04/06/2020 | DH | 3 | BH | 1 | U | Ad | unrecorded | 45 | Y |
| 04/06/2020 | DH | 4 | BH | 3 | U | Ad | unrecorded | 15 | N |
| 04/06/2020 | DH | 5 | BH | 8 | U | Ad | unrecorded | 30 | Y |
| 04/06/2020 | DH | 6 | BH | 1 | U | Ad | unrecorded | 15 | N |
| 23/06/2020 | DH | 1 | L | 23 | U | Ad | 16:25 | 30 | N |

Table AIII-6: Primary target species flight activity data from WFII VP4

| Date | Surveyor | Flight ID | Species | Num. Birds | M/F | Age | Obs. Time | Flight time (s) | Likely Rotor Swept Height (Y/N) |
|------------|----------|-----------|---------|------------|-----|-----|-----------|-----------------|---------------------------------|
| 28/04/2020 | SI | 1 | HG | 1 | U | Ad | 13:34 | 45 | N |
| 04/06/2020 | DH | 1 | BH | 5 | U | Ad | 13:40 | 30 | N |
| 04/06/2020 | DH | 2 | BH | 1 | U | Ad | 15:03 | 30 | Y |

Secondary Target Species

Table AIII-1b: Secondary target species flight activity data from WFI VP1

| Date | Survey start | Survey end | Species | Count | 5 min period | Likely Rotor Swept Height (Y/N) |
|------------|--------------|------------|---------|-------|--------------|---------------------------------|
| 14/04/2020 | 10:30 | 13:30 | RN | 1 | 11:15-11:20 | N |
| 14/04/2020 | 10:30 | 13:30 | RN | 3 | 12:00-12:05 | N |
| 14/04/2020 | 10:30 | 13:30 | RN | 1 | 12:25-12:30 | N |
| 14/04/2020 | 10:30 | 13:30 | RN | 1 | 13:00-13:05 | Y |
| 15/04/2020 | 13:00 | 16:00 | RN | 1 | 13:40-13:45 | N |
| 15/04/2020 | 13:00 | 16:00 | RN | 1 | 14:10-14:15 | N |
| 15/04/2020 | 13:00 | 16:00 | RN | 3 | 14:20-14:25 | N |
| 19/05/2020 | 13:30 | 16:30 | RN | 1 | 14:25-14:30 | N |
| 02/06/2020 | 09:10 | 12:10 | RN | 1 | unrecorded | Y |
| 19/06/2020 | 09:56 | 12:56 | LB | 1 | 15:50-15:55 | Y |
| 19/06/2020 | 09:56 | 12:56 | H | 1 | 16:05-16:10 | N |
| 15/07/2020 | 10:30 | 13:30 | RN | 1 | 10:40-10:45 | N |
| 15/07/2020 | 10:30 | 13:30 | K | 1 | 11:55-12:00 | N |
| 16/07/2020 | 13:00 | 16:00 | RN | 2 | 13:30-13:35 | N |
| 16/07/2020 | 13:00 | 16:00 | RN | 1 | 14:10-14:15 | N |
| 16/07/2020 | 13:00 | 16:00 | LB | 1 | 15:40-15:45 | N |
| 18/08/2020 | 10:00 | 13:00 | RN | 1 | 10:15-10:20 | N |
| 18/08/2020 | 10:00 | 13:00 | RN | 2 | 11:05-11:10 | N |
| 18/08/2020 | 10:00 | 13:00 | BZ | 1 | 12:10-12:15 | N |
| 19/08/2020 | 13:00 | 16:00 | RN | 1 | 13:45-13:50 | N |
| 19/08/2020 | 13:00 | 16:00 | H | 1 | 14:10-14:15 | N |
| 19/08/2020 | 13:00 | 16:00 | RN | 2 | 15:25-15:30 | N |
| 11/09/2020 | 12:50 | 15:50 | RN | 2 | 13:30-13:35 | N |

Table AIII-2b: Secondary target species flight activity data from WFI VP2

| Date | Survey start | Survey end | Species | Count | 5 min period | Likely Rotor Swept Height (Y/N) |
|------------|--------------|------------|---------|-------|--------------|---------------------------------|
| 14/04/2020 | 14:00 | 17:00 | LB | 1 | 14:10-14:15 | N |
| 14/04/2020 | 14:00 | 17:00 | LB | 2 | 14:20-14:25 | N |

| Date | Survey start | Survey end | Species | Count | 5 min period | Likely Rotor Swept Height (Y/N) |
|------------|--------------|------------|---------|-------|--------------|---------------------------------|
| 14/04/2020 | 14:00 | 17:00 | LB | 2 | 15:50-15:55 | N |
| 14/04/2020 | 14:00 | 17:00 | LB | 2 | 16:00-16:05 | N |
| 14/04/2020 | 14:00 | 17:00 | LB | 1 | 16:05-16:10 | N |
| 15/04/2020 | 09:20 | 12:20 | LB | 1 | 9:30-9:35 | N |
| 15/04/2020 | 09:20 | 12:20 | LB | 1 | 10:25-10:30 | N |
| 15/04/2020 | 09:20 | 12:20 | LB | 3 | 10:30-10:35 | N |
| 15/04/2020 | 09:20 | 12:20 | LB | 3 | 10:30-10:35 | N |
| 15/04/2020 | 09:20 | 12:20 | LB | 2 | 10:40-10:45 | N |
| 15/04/2020 | 09:20 | 12:20 | LB | 3 | 10:40-10:45 | N |
| 15/04/2020 | 09:20 | 12:20 | LB | 1 | 10:50-10:55 | N |
| 15/04/2020 | 09:20 | 12:20 | LB | 3 | 10:50-10:55 | N |
| 15/04/2020 | 09:20 | 12:20 | RN | 5 | 11:05-11:10 | N |
| 15/04/2020 | 09:20 | 12:20 | LB | 3 | 12:05-12:10 | N |
| 18/05/2020 | 10:30 | 13:00 | RN | 1 | 10:55-11:00 | N |
| 02/06/2020 | 12:45 | 15:45 | RN | 1 | 15:20-15:25 | N |
| 19/06/2020 | 09:30 | 12:30 | RN | 1 | 10:05-10:10 | N |
| 19/06/2020 | 09:30 | 12:30 | RN | 1 | 10:45-10:50 | Y |
| 19/06/2020 | 09:30 | 12:30 | RN | 2 | 11:05-11:10 | N |
| 16/07/2020 | 09:30 | 12:30 | LB | 2 | 10:40-10:45 | N |
| 19/08/2020 | 09:30 | 12:30 | RN | 1 | 10:10-10:15 | N |
| 19/08/2020 | 09:30 | 12:30 | RN | 2 | 11:25-11:30 | N |
| 19/08/2020 | 09:30 | 12:30 | BZ | 1 | 12:05-12:10 | N |

Table AIII-3b: Secondary target species flight activity data from WFII VP1

| Date | Survey start | Survey end | Species | Count | 5 min period | Likely Rotor Swept Height (Y/N) |
|------------|--------------|------------|---------|-------|--------------|---------------------------------|
| 16/04/2020 | 09:30 | 12:30 | CA | 3 | 10:25-10:30 | N |
| 16/04/2020 | 09:30 | 12:30 | LB | 1 | 10:45-10:50 | Y |
| 16/04/2020 | 09:30 | 12:30 | LB | 3 | 11:40-11:45 | N |
| 16/04/2020 | 09:30 | 12:30 | RN | 2 | 12:00-12:05 | N |
| 16/04/2020 | 09:30 | 12:30 | RN | 2 | 12:15-12:20 | N |
| 27/04/2020 | 16:00 | 19:00 | CO | 1 | 17:15-17:20 | N |
| 27/04/2020 | 16:00 | 19:00 | LB | 1 | 16:45-16:50 | N |

| Date | Survey start | Survey end | Species | Count | 5 min period | Likely Rotor Swept Height (Y/N) |
|------------|--------------|------------|---------|-------|--------------|---------------------------------|
| 27/04/2020 | 16:00 | 19:00 | LB | 2 | 17:40-17:45 | Y |
| 27/04/2020 | 16:00 | 19:00 | BZ | 1 | 18:05-18:10 | Y |
| 27/04/2020 | 16:00 | 19:00 | K | 1 | 18:05-18:10 | N |
| 27/04/2020 | 16:00 | 19:00 | RN | 3 | 18:15-18:20 | N |
| 27/04/2020 | 16:00 | 19:00 | H | 1 | 18:35-18:40 | N |
| 20/05/2020 | 10:00 | 13:00 | BZ | 1 | 11:10-11:15 | N |
| 20/05/2020 | 10:00 | 13:00 | BZ | 1 | 12:40-12:45 | N |
| 21/05/2020 | 14:00 | 17:00 | BZ | 1 | 14:25-14:30 | N |
| 21/05/2020 | 14:00 | 17:00 | BZ | 2 | 14:30-14:35 | N |
| 21/05/2020 | 14:00 | 17:00 | LB | 3 | 15:40-15:45 | N |
| 21/05/2020 | 14:00 | 17:00 | LB | 4 | 15:40-15:45 | N |
| 21/05/2020 | 14:00 | 17:00 | LB | 4 | 15:40-15:45 | N |
| 03/06/2020 | 09:15 | 12:15 | RN | 1 | 9:40-9:45 | N |
| 03/06/2020 | 09:15 | 12:15 | BZ | 1 | 10:10-10:15 | N |
| 03/06/2020 | 09:15 | 12:15 | BZ | 1 | 10:20-10:25 | N |
| 03/06/2020 | 09:15 | 12:15 | LB | 2 | 11:05-11:10 | N |
| 03/06/2020 | 09:15 | 12:15 | RN | 1 | 11:50-11:55 | Y |
| 23/06/2020 | 13:30 | 16:30 | SU | 2 | 13:40-13:45 | N |
| 23/06/2020 | 13:30 | 16:30 | SU | 2 | 14:20-14:45 | N |
| 23/06/2020 | 13:30 | 16:30 | SU | 1 | 14:35-14:40 | N |
| 23/06/2020 | 13:30 | 16:30 | RN | 1 | 15:10-15:15 | N |
| 23/06/2020 | 13:30 | 16:30 | RN | 1 | 15:50-15:55 | N |
| 20/07/2020 | 12:15 | 15:15 | LB | 7 | 13:20-13:25 | Y |
| 20/07/2020 | 12:15 | 15:15 | RN | 1 | 13:45-13:50 | Y |
| 20/07/2020 | 12:15 | 15:15 | SH | 1 | 14:40-14:45 | N |
| 21/07/2020 | 13:00 | 16:00 | RN | 2 | 13:05-13:10 | N |
| 21/07/2020 | 13:00 | 16:00 | LB | 1 | 13:20-13:25 | N |

Table AIII-4b: Secondary target species flight activity data from WFII VP2

| Date | Survey start | Survey end | Species | Count | 5 min period | Likely Rotor Swept Height (Y/N) |
|------------|--------------|------------|---------|-------|--------------|---------------------------------|
| 27/04/2020 | 12:30 | 15:30 | RN | 1 | 13:05-13:10 | N |
| 27/04/2020 | 12:30 | 15:30 | K | 1 | 14:40-14:45 | N |
| 20/05/2020 | 13:30 | 16:30 | RN | 1 | 13:40-13:45 | N |

| Date | Survey start | Survey end | Species | Count | 5 min period | Likely Rotor Swept Height (Y/N) |
|------------|--------------|------------|---------|-------|--------------|---------------------------------|
| 20/05/2020 | 13:30 | 16:30 | K | 1 | 14:30-14:35 | N |
| 20/05/2020 | 13:30 | 16:30 | BZ | 1 | 15:20-15:25 | N |
| 21/05/2020 | 10:00 | 13:00 | RN | 1 | 10:05-10:10 | N |
| 21/05/2020 | 10:00 | 13:00 | RN | 2 | 10:20-10:25 | N |
| 21/05/2020 | 10:00 | 13:00 | RN | 2 | 10:45-10:50 | N |
| 21/05/2020 | 10:00 | 13:00 | RN | 2 | 11:10-11:15 | N |
| 21/05/2020 | 10:00 | 13:00 | RN | 4 | 11:30-11:35 | N |
| 21/05/2020 | 10:00 | 13:00 | RN | 1 | 12:30-12:35 | N |
| 03/06/2020 | 13:05 | 16:05 | RN | 2 | 14:15-14:20 | N |
| 03/06/2020 | 13:05 | 16:05 | RN | 1 | 14:50-14:55 | N |
| 23/06/2020 | 09:20 | 12:20 | RN | 1 | 9:45-9:50 | Y |
| 23/06/2020 | 09:20 | 12:20 | LB | 1 | 9:50-9:55 | Y |
| 23/06/2020 | 09:20 | 12:20 | RN | 1 | 9:55-10:00 | N |
| 23/06/2020 | 09:20 | 12:20 | RN | 1 | 10:35-10:40 | Y |
| 23/06/2020 | 09:20 | 12:20 | RN | 1 | 10:40-10:45 | N |
| 23/06/2020 | 09:20 | 12:20 | LB | 2 | 10:40-10:45 | N |
| 23/06/2020 | 09:20 | 12:20 | RN | 1 | 11:55-12:00 | Y |
| 20/07/2020 | 15:45 | 18:45 | RN | 3 | 15:50-15:55 | N |
| 20/07/2020 | 15:45 | 18:45 | RN | 2 | 16:05-16:10 | N |
| 20/07/2020 | 15:45 | 18:45 | RN | 1 | 16:25-16:30 | N |
| 20/07/2020 | 15:45 | 18:45 | RN | 3 | 16:35-16:40 | N |
| 20/07/2020 | 15:45 | 18:45 | LB | 1 | 16:50-16:55 | N |
| 20/07/2020 | 15:45 | 18:45 | RN | 1 | 16:55-17:00 | N |
| 20/07/2020 | 15:45 | 18:45 | RN | 25 | 16:55-17:00 | N |
| 20/07/2020 | 15:45 | 18:45 | H | 1 | 17:25-17:30 | N |
| 20/07/2020 | 15:45 | 18:45 | RN | 1 | 17:25-17:30 | N |
| 21/07/2020 | 09:30 | 12:30 | RN | 2 | 9:35-9:40 | N |
| 21/07/2020 | 09:30 | 12:30 | RN | 6 | 9:50-9:55 | N |
| 21/07/2020 | 09:30 | 12:30 | RN | 2 | 10:15-10:20 | N |
| 21/07/2020 | 09:30 | 12:30 | RN | 1 | 11:05-11:10 | N |
| 21/07/2020 | 09:30 | 12:30 | RN | 2 | 12:10-12:15 | N |
| 24/08/2020 | 10:30 | 13:30 | RN | 6 | 10:30-10:35 | N |
| 24/08/2020 | 10:30 | 13:30 | RN | 10 | 10:50-10:55 | N |
| 24/08/2020 | 10:30 | 13:30 | RN | 3 | 11:15-11:20 | N |

| Date | Survey start | Survey end | Species | Count | 5 min period | Likely Rotor Swept Height (Y/N) |
|------------|--------------|------------|---------|-------|--------------|---------------------------------|
| 24/08/2020 | 10:30 | 13:30 | RN | 5 | 12:00-12:05 | N |
| 24/08/2020 | 10:30 | 13:30 | RN | 2 | 13:05-13:10 | N |
| 27/08/2020 | 12:30 | 15:30 | RN | 3 | 13:05-13:10 | N |
| 24/09/2020 | 09:30 | 12:30 | RN | 1 | 10:30-10:35 | N |
| 24/09/2020 | 09:30 | 12:30 | H | 1 | 11:15-11:20 | N |

Table AIII-5b: Secondary target species flight activity data from WFII VP3

| Date | Survey start | Survey end | Species | Count | 5 min period | Likely Rotor Swept Height (Y/N) |
|------------|--------------|------------|---------|---------|--------------|---------------------------------|
| 28/04/2020 | 09:30 | 12:30 | MA | 2 | 9:35-9:40 | N |
| 28/04/2020 | 09:30 | 12:30 | H | 1 | 10:10-10:15 | N |
| 28/04/2020 | 09:30 | 12:30 | RN | 2 | 11:05-11:10 | N |
| 28/04/2020 | 09:30 | 12:30 | H | 1 | 11:30-11:35 | N |
| 28/04/2020 | 09:30 | 12:30 | H | 1 | 12:25-12:30 | N |
| 22/05/2020 | 10:20 | 13:20 | MA | 2 | 10:35-10:40 | N |
| 22/05/2020 | 10:20 | 13:20 | LB | 1 | 10:40-10:45 | N |
| 22/05/2020 | 10:20 | 13:20 | MA | 4 | 10:50-10:55 | N |
| 22/05/2020 | 10:20 | 13:20 | RN | 1 | 11:05-11:10 | N |
| 22/05/2020 | 10:20 | 13:20 | MA | 1 | 11:45-11:50 | N |
| 22/05/2020 | 10:20 | 13:20 | H | 1 | 12:00-12:05 | N |
| 22/05/2020 | 10:20 | 13:20 | RN | 1 | 12:15-12:20 | N |
| 22/05/2020 | 10:20 | 13:20 | MA | 2 | 12:25-12:30 | N |
| 22/05/2020 | 10:20 | 13:20 | MA | 12 - 14 | 12:35-12:40 | N |
| 22/05/2020 | 10:20 | 13:20 | LB | 1 | 12:50-12:55 | N |
| 22/05/2020 | 10:20 | 13:20 | MA | 3 | 12:50-12:55 | N |
| 22/05/2020 | 10:20 | 13:20 | MA | 3 | 13:00-13:05 | N |
| 04/06/2020 | 09:30 | 12:30 | RN | 1 | 10:35-10:40 | N |
| 04/06/2020 | 09:30 | 12:30 | LB | 1 | unrecorded | N |
| 04/06/2020 | 09:30 | 12:30 | LB | 2 | unrecorded | N |

| Date | Survey start | Survey end | Species | Count | 5 min period | Likely Rotor Swept Height (Y/N) |
|------------|--------------|------------|---------|-------|--------------|---------------------------------|
| 25/08/2020 | 09:30 | 12:30 | RN | 4 | 10:05-10:10 | N |
| 25/08/2020 | 09:30 | 12:30 | BZ | 1 | 10:05-10:10 | N |
| 26/08/2020 | 13:15 | 16:15 | BZ | 1 | 13:45-13:50 | N |
| 25/09/2020 | 09:30 | 12:30 | BZ | 1 | 10:20-13:20 | N |

Table AIII-6b: Secondary target species flight activity data from WFII VP4

| Date | Survey start | Survey end | Species | Count | 5 min period | Likely Rotor Swept Height (Y/N) |
|------------|--------------|------------|---------|-------|--------------|---------------------------------|
| 22/05/2020 | 14:05 | 17:05 | LB | 1 | 14:35-14:40 | N |
| 22/05/2020 | 14:05 | 17:05 | LB | 2 | 15:05-15:10 | N |
| 22/05/2020 | 14:05 | 17:05 | LB | 1 | 16:15-16:20 | N |
| 22/05/2020 | 14:05 | 17:05 | LB | 2 | 16:20-16:25 | N |
| 04/06/2020 | 12:55 | 15:55 | LB | 2 | 13:20-13:25 | N |
| 04/06/2020 | 12:55 | 15:55 | BZ | 1 | 14:40-14:45 | Y |
| 22/06/2020 | 13:30 | 16:30 | RN | 1 | 13:45-13:50 | Y |
| 22/06/2020 | 13:30 | 16:30 | LB | 1 | 15:40-15:45 | Y |
| 22/06/2020 | 13:30 | 16:30 | LB | 2 | 15:50-15:55 | Y |
| 27/07/2020 | 14:00 | 17:00 | RN | 3 | 14:25-14:30 | N |
| 28/07/2020 | 09:30 | 12:30 | LB | 1 | 10:35-10:45 | N |
| 26/08/2020 | 09:30 | 12:30 | K | 1 | 9:45-9:50 | N |

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APPENDIX 7-5

**BIRD SURVEY RESULTS –
WINTER 2020-2021**

APPENDIX 7-5

Bird Survey Report Winter 2020-21

BIRD SURVEY REPORT

WINTER 2020/21

Seven Hills Wind Farm I and II

Prepared for: Seven Hills Wind Farm Ltd

SLR Ref: 501.00501.00004
Version No: REV1
May 2022



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| Appendix III: Flight activity survey data | |

1.0 Introduction

SLR Consulting Ireland (SLR) was commissioned by Seven Hills Wind Farm Ltd in October 2020 to carry out a winter bird survey programme for the proposed Seven Hills Wind Farm, Co. Roscommon during the winter period 2020-21. There are two phases within the current iteration of the wind farm design, hereafter referred to as Wind Farm I and Wind Farm II.

1.1 Background to the Commission

Planning permission was originally granted by An Bord Pleanála (ABP) for both developments (Phase 1 ABP Planning Ref: PL 20.244346 / 20.239759 and Phase 2 ABP Planning Ref: PL 20.244347 / 20.241069) but was subsequently refused following the appeal process. The main reasons for refusal of planning cited by An Bord Pleanála were issues relating to the lack of certainty in relation to the impact of the proposed development on European Sites in the vicinity of the proposed developments and the qualifying interests for which those European Sites are designated.

1.2 Site Description

The dominant habitat within the boundaries of the proposed Seven Hills Wind Farm I development site is improved agricultural grassland and the proposed site is not designated for nature conservation.

The proposed Seven Hills Wind Farm II development site is a slightly more diverse area in terms of habitat composition with dominant habitats present being improved agricultural grassland, dry calcareous grassland and scrub. The proposed site also does not hold any designations for nature conservation.

There are several Natura 2000 designated sites relating to birds of conservation concern located within 15km of both wind farms. Please see Table 3-1 for further details of these.

1.3 Purpose of the Report

The aim of this report is to provide robust baseline ornithological survey data for the winter period 2020/21 at both phases of the wind farm. These data will be used to inform a separate ecological impact assessment and appropriate assessment for the proposed wind farm. The assessment of potential impacts is beyond the scope of this report.

This report follows on from the bird survey reports for winter 2018/2019 and 2019/20 (SLR Consulting, 2021a; SLR Consulting, 2021b). As such, in order to glean a comprehensive representation of winter bird activity at both proposed wind farm sites across the three winter seasons, the two previous reports should be read alongside this report.

2.0 Methodology

2.1 Desk-based Review

The desk-based review collated available information collected to date on the wintering bird movements in and around the proposed wind farm development sites. This included a review of the following documents submitted as part of the previous planning applications in 2010 and 2012:

- FERS (2010) Proposed Seven Hills Wind Farm Site (Phase I): Ornithological Assessment Report June 2010. Appendix 8.1 of IWCM (2010) Proposed Seven Hills Wind Farm Phase I EIS Chapter 8 – Ornithology;
- FERS (2011) Proposed Seven Hills Wind Farm (Phase II): Ornithological Assessment Report July 2011. Appendix 8.1 of IWCM (2011) Proposed Seven Hills Wind Farm Phase II EIS Chapter 8 – Ornithology;
- Moore Group, FERS and IWCM (2010) Natura Impact Statement and Appropriate Assessment as required under Article 6(3) of the Habitats Directive (Council Directive 92/43/EEC) of Seven Hills Wind Farm Co. Roscommon (Phase I);
- FERS (2010) Response to issues arising from item (5) of a Request for Further Information (RFI) from Roscommon Co. Council (Planning Reference no. 10/541);
- Moore Group, FERS and IWCM (2011) Natura Impact Statement and Appropriate Assessment as required under Article 6(3) of the Habitats Directive (Council Directive 92/43/EEC) of Seven Hills Wind Farm Co. Roscommon (Phase II);
- EcoFact Environmental Consultants Ltd (2012) Seven Hills Wind Farm (Phase I) Co. Roscommon Report to inform the Appropriate Assessment Process; and
- EcoFact Environmental Consultants Ltd (2012) Seven Hills Wind Farm (Phase II) Co. Roscommon Report to inform the Appropriate Assessment Process.

In addition, a review of the following more recent documents which were produced subsequent to the submission of the planning applications was also undertaken:

- EcoFact Environmental Consultants Ltd (2015) Seven Hills Wind Farm, Co. Roscommon Wintering Bird Survey 2014/2015;
- EcoFact Environmental Consultants Ltd (2018) Seven Hills Wind Farms Winter Bird Surveys 2016/17; and
- Inis Environmental Consultants Ltd (2018) Summary Report on Winter 2017/18 Findings at the Proposed Seven Hills I and II Windfarms, Co. Roscommon.

The websites of the National Parks and Wildlife Service (NPWS) www.npws.ie and the National Biodiversity Data Centre (NBDC) <http://maps.biodiversityireland.ie/#/Map> were also accessed for information on sites designated for nature conservation in the vicinity of the site.

2.2 Field Surveys

The scope of winter bird surveys for the proposed wind farm is based on recommendations given in Scottish Natural Heritage (SNH) (now NatureScot) 2017 guidance. This survey methods guidance is recognised as standard best practice guidance throughout the UK and Ireland for surveying birds to inform impact assessment for onshore wind farms.

The scope of survey work was the same as that conducted in 2019/20 with the exception of nocturnal foraging surveys for golden plover, which were not considered necessary given the very low levels of nocturnal golden plover activity recorded on site during the 2019/20 survey season. Further details are provided in Sections 2.2.2 to 2.2.5.

2.2.1 Field Survey Team: Evidence of Technical Competence and Experience

Sarah Ingham (SI) BSc (Hons) MSc ACIEEM – Project Manager and Lead Ornithologist

Sarah is a Senior Ecologist with SLR and holds a BSc in Zoology from Anglia Ruskin University, Cambridge, UK and an MSc in Biodiversity and Conservation from Trinity College Dublin. She is an Associate member of the Chartered Institute of Ecology and Environmental Management (CIEEM). Sarah is a highly skilled and experienced bird surveyor with 11 years' post graduate experience as a professional consultant ecologist/ornithologist. Sarah managed this project through liaison with the client, coordination of the survey team, supervision of the health and safety of the team, carrying out various bird surveys onsite throughout the survey season, collating, quality controlling and assessing the survey data and writing this report.

Jason Cahill (JC) BSc (Hons) – Assistant Bird Surveyor

Jason joined SLR in February 2020, and this is his first long-term role in ecological consultancy. Jason holds a BSc (Hon) in Field Biology with Wildlife Tourism from Institute of Technology Tralee. Jason has experience with bird surveys, involving vantage point and transect surveys, data collection and input. Supervised by Sarah Ingham, Jason assisted with the Greenland white-fronted goose roost surveys at Seven Hills Wind Farm during the winter 2020/2021 survey season.

Aisling Kinsella (AK) BSc MSc – Assistant Bird Surveyor

Aisling is a graduate ecologist who joined SLR in September 2020. Aisling holds a BSc in Biological, Earth and Environmental Sciences (Zoology) from University College Cork and an MSc in Wildlife Management and Conservation from University College Dublin. Aisling's main interest is in ornithology. Since joining SLR, Aisling's field experience includes acting as ECoW on a large national road scheme, habitat survey mapping and classification, mammal survey, bird surveys, data collection and data input. Aisling has also helped prepare EIAR Biodiversity chapters and AA screening reports and Natura Impact Statements for a range of different projects and plans. Supervised by Sarah Ingham, Aisling assisted with the Greenland white-fronted goose roost surveys at Seven Hills Wind Farm during the winter 2020/2021 survey season.

2.2.2 Flight Activity Surveys

Vantage point (VP) locations were the same as those used in winters 2018/19 and 2019/20, which were initially chosen based on locations used during previous surveys (see Section 3.1). The adequacy of these VPs was checked by carrying out a desk-based viewshed analysis using a bespoke GIS tool for calculating the visible area from each vantage point (VP). The Zones of Theoretical Visibility (ZTV) from each VP were calculated using ArcMAP 10.5.1 Spatial Analyst using a terrain model derived from EU-DEM data with a vertical accuracy of $\pm 7\text{m}$. In previous years, when proposed turbine dimensions were unknown, the ZTVs were calculated with a surface offset of 30m. However, now that the proposed turbine dimensions are known the ZTVs have been re-calculated using a surface offset of 18m, to match the lowest point swept by the rotors of the proposed turbines. As in previous years the ZTVs are based in a viewing height of 1.8m above ground level. VP locations and viewing arcs are shown in **Figure 1** and the updated VP viewsheds are shown in **Figure 2**.

A total of 36 hours of watches were undertaken at each of six vantage point (VP) locations during the winter season (monthly visits October – March inclusive). This equates to a total of six hours per VP per month. The VP survey effort undertaken during the winter of 2020/21 is summarised in Table 2-1 with full details of survey dates, times and observers provided in Appendix I and details of weather conditions during the surveys provided in Appendix II.

Table 2-1: VP survey effort undertaken at the Seven Hills Wind Farms I and II sites October 2020 to March 2021

| Month | WFI VP1 (hours) | WFI VP2 (hours) | WFII VP1 (hours) | WFII VP2 (hours) | WFII VP3 (hours) | WFII VP4 (hours) |
|-------------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| October | 6:00 | 6:00 | 6:00 | 6:00 | 6:00 | 6:00 |
| November | 6:00 | 6:00 | 6:00 | 6:00 | 6:00 | 6:00 |
| December | 6:00 | 6:00 | 6:00 | 6:00 | 6:00 | 6:00 |
| January | 6:00 | 6:00 | 6:00 | 6:00 | 6:00 | 6:00 |
| February | 6:00 | 6:00 | 6:00 | 6:00 | 6:00 | 6:00 |
| March | 6:00 | 6:00 | 6:00 | 6:00 | 6:00 | 6:00 |
| Total hrs | 6:00 | 6:00 | 6:00 | 6:00 | 6:00 | 6:00 |
| VP locations (Figure 1) | 587337 E 748665 N | 585834 E 746017 N | 588967 E 745061 N | 587372 E 743512 N | 590643 E 743279 N | 592160 E 743701 N |

It is good practice to ensure that where possible each monthly six-hour survey period is split over more than a single day. As such, the six-hour survey periods were divided into three-hour blocks which were alternated across consecutive days e.g., on day 1, VP1 would be completed in the morning and VP2 would be completed in the afternoon and on day 2, VP2 would be completed in the morning and VP1 in the afternoon. Breaks of at least 30 minutes were taken between watches to minimise observer fatigue.

VP watches aimed to quantify the flight activity of primary and secondary target species (as defined in Section 2.2.2.1) within the study area.

The main purpose of VP watches is to collect data on primary target species that will enable estimates to be made of:

- The time spent flying over the site;
- The relative use by birds of different parts of the site;
- The proportion of flying time spent within the provisional upper and lower risk height limits as determined by the potential rotor diameter and rotor hub height; and
- Ultimately, the analysis of the potential risk of collision of birds with rotating turbines.

For each primary target species observation, the following details were recorded:

- Time of observation;
- Duration of flying bout;
- Species, age and sex (where determinable);
- Time spent within each height band and;
- Notes on observation.

Recording height bands were determined based on the likely turbine specifications under consideration at the time of survey. It is noted that these were slightly different to the height bands used in previous surveys when information regarding likely turbines specifications was not available. Surveys in October 2020 used the following flight height bands which were the same as those used in winter 2019/20:

- 1 = <25m (below the likely rotor swept area);

- 2 = 25m to 50m (within the likely rotor swept area);
- 3 = 50m to 150m (within the likely rotor swept area); and
- 4 = >150m (above the likely rotor swept area).

Following discussions with the client in November 2020, the flight height bands were altered to reflect potential changes to turbine specifications under consideration at that time. As such, from November onwards flight heights were attributed to five distinct height bands as follows:

- 1 = < 15m (below the likely rotor swept area);
- 2 = 15m to 30m (potentially within the likely rotor swept area, at least in part);
- 3 = 30m to 150m (within the likely rotor swept area);
- 4 = 150m to 200m (potentially within the likely rotor swept area, at least in part); and
- 5 = >200m (above the likely rotor swept area).

In addition, a summary of observations of secondary target species was recorded at the end of each five-minute period during each VP watch to provide an index of flight activity for secondary target species within the site, in accordance with current SNH guidance. Data collected on secondary species included:

- The five-minute period start and end time;
- Species;
- Number of birds observed;
- If flying, the height band in which birds were observed flying;
- Whether birds were observed onsite, in the 500m buffer or beyond;
- Flight behaviour and;
- Notes on observation.

2.2.2.1 Target Species

Target species for the surveys were defined by legal and/or conservation status and vulnerability to impacts caused by wind turbines, as defined in SNH (2017) Guidance.

Primary Target Species

The list of primary target species was limited to species upon which effects are most likely to be potentially significant in EIA terms, thereby enabling recording to focus on the species of greatest importance without the distraction of having to record detailed flight data for a larger number of more common species.

SNH (2017) guidelines state that “*in most circumstances the target species will be limited to those species which are afforded a higher level of legislative protection.*” Kestrel, buzzard and sparrowhawk are not subject to a higher level of legislative protection than any other bird species and were therefore not recorded as primary target species during the winter 2020/21 surveys.

Primary target species were therefore specifically limited to species forming qualifying features for nearby SPAs and those other species upon which effects could be potentially significant in EIA terms, e.g. Annex I raptor and owl species.

As such, the primary target species for these VP surveys included the following bird species:

- Greenland white-fronted goose *Anser albifrons flavirostris*;
- Whooper swan *Cygnus cygnus*;
- Golden plover *Pluvialis apricaria*;
- Lapwing *Vanellus vanellus*;
- Wigeon *Mareca penelope*;
- Peregrine falcon *Falco peregrinus*;
- Hen harrier *Circus cyaneus*;
- Merlin *Falco columbarius*; and

- Short-eared owl *Asio flammeus*.

Secondary Species

Local circumstances may indicate that survey information should also be acquired on other species, especially those of regional conservation concern. Such species are termed secondary species (SNH, 2017). Recording of secondary species is subsidiary to recording of primary target species.

Secondary target species included:

- Any other wildfowl and wader species;
- Buzzard *Buteo buteo*;
- Sparrowhawk *Accipiter nisus*;
- Kestrel *Falco tinnunculus*;
- Raven *Corvus corax*;
- Grey heron *Ardea cinerea*;
- Cormorant *Phalacrocorax carbo*; and
- Gulls *Larus sp.*

2.2.3 Swan and Goose Feeding Distribution Surveys

SNH (2017) recommends that for whooper swan, Greenland white-fronted goose and other goose species, feeding distribution surveys should be undertaken in areas of suitable habitat where the survey area lies within the core foraging distance of SPAs for these species or other major roosts, unless it can be established from existing data that the area is not utilised for feeding. Feeding distribution surveys were therefore carried out on a fortnightly basis to establish if swans and geese were using the fields within a minimum of 1 km of the wind farm boundary.

Whooper swan and Greenland white-fronted goose are features of interest of several SPAs within 15 km of the site boundary (see Table 3-1). A minimum buffer of 1 km around both wind farm sites was used for these surveys which were undertaken by driven transect, stopping on a regular basis to check all fields for goose and swan feeding activity. The transect route and survey results are shown in **Figure 9**.

Details of survey dates, times and observers are provided in Appendix I and a record of weather conditions during surveys is provided in Appendix II

2.2.4 Greenland White-fronted Goose Roost Surveys

Data indicating recent usage of Lough Croan as a roost site by Greenland white-fronted geese came to light during discussions between SLR and personal contacts at Birdwatch Ireland in the latter part of 2019, following which an unpublished study on the species (Burke *et al.*, 2014) was obtained. This revealed evidence of recent use of Lough Croan, and other turloughs such as Four Roads, by roosting Greenland white-fronted geese. Surveys for roosting Greenland white-fronted geese were therefore added to the scope from December 2019 to March 2020. These surveys were repeated on a monthly basis from October 2020 to March 2021.

There are a number of lakes and turloughs within a 2km radius of the wind farm sites, namely Lough Croan to the north of Wind Farm I, Coolagarry Lough to the east of Wind Farm I, Feacle Lough to the southeast of Wind Farm II and Corkip Lough to the east of Wind Farm II.

Coolagarry Lough has been consistently watched during the swan and goose feeding distribution surveys, which yielded no records of Greenland white-fronted geese using this lough. Furthermore, the data provided by Birdwatch Ireland revealed that there are no previous records of geese roosting at this lough. Thus, Coolagarry Lough was ruled out as a site for targeted goose roost surveys. Feacle Lough is overlooked entirely by VP3. As such, it has been closely monitored during VP surveys and did not require further targeted goose roost surveys.

Corkip Lough is approximately 400m east of VP4. It was visited early in the winter season of 2019/20 and observed to have evolved into a reed bed. As such, the habitat has become unsuitable for roosting Greenland white-fronted geese and was also ruled out of targeted roost surveys.

The data provided by Birdwatch Ireland revealed that there are two turloughs within 6.5km of the proposed Wind Farm I which hold previous records roosting Greenland white-fronted geese (Burke *et al*, 2014). These are Lough Funshinagh and Lough Croan.

Lough Funshinagh is the larger and most distant of the two, located 6.5km to the north east of Wind Farm I. Records show that geese previously foraged on the islands and wet-grassland fringes at the north-east end of the turlough. Lough Funshinagh contains an extensive area of water throughout the year, which rises with increased rainfall in winter. Water levels fluctuate significantly between years however, and the turlough dries out entirely 2-3 times per decade on average, meaning its value to waterfowl varies from year to year. Islands and peripheral patches of fields formerly used for feeding have become overgrown with scrub since the early 1990s and White-fronts have not been recorded on Lough Funshinagh since the mid-1990s. As such, given the distance from the proposed wind farm site and the fact that Greenland white-fronts have not been recorded there for almost three decades, this turlough was excluded from targeted goose roost surveys.

Lough Croan is approximately 1.5km north of the proposed Wind Farm I. Lough Croan contains a variety of habitats such as turlough on the eastern side, with a reed-bed in the centre and a partly floating fen in the west, which also floods most winters. Burke *et al* (2014) reviewed all available data on the Greenland white-fronted goose population that overwinters in Ireland, which was collected over the three-decade period, 1982/83 – 2011/12, providing a description on each of the extant flocks present during that time. This review suggests that Lough Croan is suspected as having been used as a roosting site for Greenland White-fronted Goose to some extent in the past when water levels were suitably high. As such, given its proximity to Wind Farm I, it was deemed necessary to investigate the current status of and potential for the presence of roosting geese at Lough Croan by carrying out monthly dawn and dusk vantage point surveys at the lough.

As mentioned above, watches of Lough Croan were carried out simultaneously from two vantage points on the local road north of Lough Croan monthly between October 2020 and March 2021. The watches were carried out at dusk and the following dawn each month for a duration of up to 2 hours depending on the levels of light. The dawn watches began at civil twilight i.e., 30 minutes before the time of sunrise and continued for up to 1.5 hours after sunrise. The dusk watches ended at civil twilight i.e., starting up to 1.5hrs before the time of sunset and continuing for 30 minutes after sunset. All flight-lines of Greenland white-fronted geese to and from the turlough in addition to the direction of flight and the number of birds were recorded during watches. The vantage point locations and survey results are shown in **Figure 10**.

Details of survey dates, times and observers are provided in Appendix I and a record of weather conditions during surveys is provided in Appendix II.

2.3 Survey Limitations

The majority of vantage point surveys were undertaken in optimal weather conditions. However, during such an extensive series of surveys carried out over the winter period it was inevitable that some surveys were completed in suboptimal conditions. There were 46 hours out of the total of 216 during which the visibility was recorded as “moderate”, i.e. 1-3km. This comprises 21% of the total survey effort but in most cases all of the relevant 2km viewing arc was visible and this is not considered to significantly affect the validity of the data collected. There were also 13 non-consecutive hours (up to 6% of the total survey effort) in which the visibility was recorded as “poor”, i.e. less than 1km, at some point. However, in no cases did visibility fall below 500m (when survey would have been suspended) and in many cases visibility was better than this for part of the relevant hour. As such, given the low proportion of surveys affected this is not considered to significantly affect the validity of the data collected. Further details regarding weather conditions during surveys are provided in Appendix II.

As shown in **Figure 2**, due to local topographical conditions a small area at the western end of Wind Farm I and a very small area within the 500m buffer zone for Wind Farm II were not within the 2km viewsheds from any of the VPs. All turbine locations and the vast majority of the 500m buffer were visible from at least one VP however and the gaps in coverage are therefore not considered to represent a significant limitation.

In accordance with the standard methodology, the swan and goose feeding distribution surveys were carried out from the roads without any access to third party land and as such, a small number of fields within the 1km survey area were not visible from roads. This was a limitation in that there is a possibility that some feeding flocks may have been out of sight. However, any additional swans or geese which were potentially not recorded during the feeding distribution surveys would have most likely been observed moving between foraging grounds during the remainder of the survey or during vantage point surveys and it is therefore considered unlikely that significant feeding flocks were overlooked.

Due to inclement weather on the morning of the scheduled dawn goose roost survey at Lough Croan in February 2021, which made driving to site before dawn a health and safety risk, it was necessary to postpone that survey. The postponed dawn survey was rescheduled to be undertaken in March. However, due to a staffing issue, only one surveyor was available to undertake the survey. This surveyor was located at the eastern VP and had a clear view of the lough. The main role of the second surveyor at the western VP was to confirm the direction of flight of any geese leaving the turlough in a westerly direction. However, given that the initial direction of flight of geese leaving the turlough was also visible to the surveyor at the eastern VP, this limitation during one survey period is not deemed significant to the overall results of the survey season.

3.0 Results

3.1 Desk-based Review

3.1.1 Natura 2000 Sites

There are no Special Protection Areas (SPA) within the proposed wind farm sites. However, there are a total of five SPAs within a 15 km¹ radius of the survey area.

The five SPAs within 15km are shown in Table 3-1, which also shows the qualifying interests for each site. For the purposes of this report, which deals specifically with wintering birds, qualifying interests which are only present during the breeding season have been excluded from Table 3-1.

Table 3-1: SPAs within 15km of Seven Hills Wind Farms I and II and their qualifying interests (species present during the winter period only)

| Site Name | Site Code | Distance/ Direction from Site Boundary | Wintering Species of Special Conservation Interest |
|--------------------------|-----------|---|---|
| Lough Croan Turlough SPA | 004139 | 1.5km north | <ul style="list-style-type: none"> Shoveler <i>Anas clypeata</i> Golden Plover <i>Pluvialis apricaria</i> Greenland White-fronted Goose <i>Anser albifrons flavirostris</i> Wetland and Waterbirds |
| River Suck Callows SPA | 004097 | 1.7km west | <ul style="list-style-type: none"> Whooper Swan <i>Cygnus cygnus</i> Wigeon <i>Anas penelope</i> Golden Plover <i>Pluvialis apricaria</i> Lapwing <i>Vanellus vanellus</i> Greenland White-fronted Goose <i>Anser albifrons flavirostris</i> Wetland and Waterbirds |
| Four Roads Turlough SPA | 004140 | 1.9km north | <ul style="list-style-type: none"> Golden Plover <i>Pluvialis apricaria</i> Greenland White-fronted Goose <i>Anser albifrons flavirostris</i> Wetland and Waterbirds |
| Lough Ree SPA | 004064 | 8km east | <ul style="list-style-type: none"> Little Grebe <i>Tachybaptus ruficollis</i> Whooper Swan <i>Cygnus cygnus</i> Wigeon <i>Anas penelope</i> Teal <i>Anas crecca</i> Mallard <i>Anas platyrhynchos</i> Shoveler <i>Anas clypeata</i> Goldeneye <i>Bucephala clangula</i> Coot <i>Fulica atra</i> Golden Plover <i>Pluvialis apricaria</i> Lapwing <i>Vanellus vanellus</i> Wetland and Waterbirds |

¹ 15 km is the distance typically applied when considering wildfowl ranging from roost sites to foraging sites.

| Site Name | Site Code | Distance/ Direction from Site Boundary | Wintering Species of Special Conservation Interest |
|----------------------------|-----------|---|---|
| Middle Shannon Callows SPA | 004096 | 11.4km southeast | <ul style="list-style-type: none"> Whooper Swan <i>Cygnus cygnus</i> Wigeon <i>Anas penelope</i> Golden Plover <i>Pluvialis apricaria</i> Lapwing <i>Vanellus vanellus</i> Black-tailed Godwit <i>Limosa limosa</i> Black-headed Gull <i>Chroicocephalus ridibundus</i> Wetland and Waterbirds |

3.1.2 Previous Survey Data

Winter bird surveys were undertaken at Wind Farms I and II during the winter seasons of 2008/09, 2009/10, 2011/12, 2014/15, 2016/17 and 2017/18. A review of the previous winter bird survey reports listed in Section 2.1 revealed that a variety of bird survey methods were used across the six survey seasons. Surveys carried out each year at each wind farm site are described below together with a short summary of the survey results. The relevant reports should be referred to for further details.

During the survey period November 2008 – February 2009, the site was visited four times per month (FERS 2010; FERS 2011). On each of these occasions, five vantage points were visited for a period of 20 minutes throughout the day (three at Wind Farm I and two at Wind Farm II). During the surveys at Wind Farm I, a total of four species of red-listed status (Lynas *et al.*, 2009) were observed using the proposed development site, namely black-headed gull, curlew *Numenius arquata*, golden plover and lapwing. Six species of amber status were observed using the proposed development site, namely whooper swan, starling *Sturnus vulgaris*, house sparrow *Passer domesticus*, swallow *Hirundo rustica*, snipe *Gallinago gallinago* and linnet *Carduelis cannabina*. During surveys at Wind Farm II, a total of six red-listed species were recorded within the proposed development site namely pintail *Anas acuta*, shoveler, black-headed gull, curlew, golden plover and lapwing. A total of 17 amber-listed species were observed at Wind Farm II. In addition to the same six amber-listed species as observed at Wind Farm I, Bewick's swan *Cygnus columbianus*, mute swan *Cygnus olor*, wigeon, pochard *Aythya ferina*, tufted duck *Aythya fuligula*, teal, shelduck *Tadorna tadorna*, dunlin *Caladris alpina*, coot, lesser black-backed gull *Larus fuscus* and kestrel were also recorded within the site. Of these species, only two were evaluated as "potentially threatened" by the proposed wind farms, namely curlew and whooper swan.

Targeted whooper swan surveys were carried out twice monthly during the winter periods October 2009 – April 2010 (at both Wind Farms I and II) and November 2010 – February 2011 (Wind Farm II only) (FERS 2010; FERS 2011). These surveys were undertaken to determine if whooper swans flew through the area in which the turbines were proposed to be sited. Methods were based on Larsen and Clausen (2002). Observations were carried out from one vantage point within the Wind Farm I site in 2009/10 and three vantage points within Wind Farm II during the 2009/10 and 2010/11 seasons. Surveys at Wind Farm I in 2009/10 yielded observations of three flocks of whooper swan (n=5, n=3 and n=4) flying through the Wind Farm I site within a single survey period in February 2010. The three flocks were observed flying at heights of 15-20m. These were the only sightings of whooper swan at Wind Farm I throughout the winter season 2009/10. Surveys at Wind Farm II during the same season, yielded two observations of whooper swan flocks flying through the wind farm site, with one flock of seven recorded in December 2009 and a second flock of 17 recorded in February 2010. Both flocks were observed flying at heights of 10-20m above ground level.

During the 2010/11 whooper swan surveys undertaken at Wind Farm II, there were two records of whooper swan flying through the wind farm site. The first was of a flock of four observed in December 2010 flying towards Feacle Lough at a height of 30-40m, while the second, observed in February 2011, was of a flock of six whooper swan flying through the site at 5-10m height. There were also two observations of peregrine falcon recorded flying through the site during these surveys in December and February.

The methodology used in 2009/10 and 2010/11 was repeated twice monthly at both wind farm sites between December 2011 and February 2012 by FERS (data presented in Appendix 7 of the NIS (Ecofact, 2012)). During the 2011/12 survey season, a single whooper swan was recorded flying through the proposed location of the turbines at Wind Farm I at a height of 5m. This was the only sighting of whooper swan during those three months of surveying. An unspecified number of golden plovers were also recorded feeding in fields north of the proposed turbine locations in rough grassland during February 2012. At Wind Farm II, there were five flocks of whooper swan recorded flying through the site during December (n=4) and February (n=2; n=3; n=2 and n=4). All five flocks were recorded flying at heights of 5-15m.

Further winter surveys were undertaken at Wind Farms I and II from October 2014 to March 2015 (Ecofact, 2015). These surveys involved assessing an extensive area surrounding the proposed wind farm sites, which covered a large proportion of South Roscommon and encompassed waterbodies including Lough Croan Turlough SPA, Lough Feacle Turlough, Coolagarry Lough, Thomas Street Turlough and Four Roads Turlough SPA as well as the Ballyglass River Callows and other minor season waterbodies. The aim of the survey was to record the distribution of waterbirds in the region, primarily Greenland white-fronted geese, whooper swans and golden plover. Vantage point surveys targeting the proposed development sites were also undertaken from two vantage points, one at each proposed wind farm site. Although there were peak numbers of 42-48 whooper swans observed grazing on the grasslands surrounding Thomas Street Turlough, approximately 1.5km south of Wind Farm I, on two occasions (February and March 2015), there was only one observation of whooper swan recorded flying through Wind Farm I throughout the winter season. This observation was in November when a flock of nine whooper swan was recorded leaving Thomas Street turlough and flying in the direction of Lough Croan Turlough at dusk. There were two records of whooper swans flying through the Wind Farm II site between Feacle Lough and Ballyglass River Callows in February (n=52) and March (n=63). Throughout the season, flocks of whooper swan ranging in size from 4-78 were observed at various waterbodies within a 15km radius of both wind farm sites. Flocks of 21-79 Greenland white-fronted geese were observed in November (n=21), December (n=29) and March (n=79) at the Muckanagh Callows along the River Suck, which is approximately 5km to the northwest of the Wind Farm I site. There were no Greenland white-fronted geese observed flying through the wind farm sites throughout the winter season of 2014/15.

The winter 2016/17 surveys were undertaken at both wind farm sites from November 2016 to March 2017 (EcoFact, 2018). The approach followed that of the 2014/15 surveys i.e., to establish whether birds used or crossed the sites, and attempted to explain their movements when they were not interacting with the sites. As with previous surveys, the study focused primarily on species such as whooper swan and Greenland white-fronted geese, while also providing full counts and assessments for all other water birds. The wintering bird survey used two main vantage points, one at each proposed wind farm site and followed SNH guidance in place at that time (SNH, 2014) with a minimum of 6 hours per vantage point per month. Up to 10 other sites within the surrounding area were also visited at least twice per month and full counts undertaken on each visit. The survey was adaptive, as before, and was extended up to 10km+ away from the proposed wind farm site as necessary. Results showed that there was no significant bird activity recorded within either proposed development site during the November survey. This was attributed to the low water levels across the study area with all the turloughs very low or dry. In December 2016, the only notable observations were a sighting of a small flock of Greenland white-fronted geese on the River Suck, along with the large numbers of starlings which were resident on Lough Croan. No whooper swans were recorded during the December visit. During January 2017, a flock of c.60 golden plover were recorded passing near the Wind Farm I site and a flock of 32 curlew was recorded flying near Wind Farm II and landing on Lough Feacle (flight heights not reported). It was reported that water levels at Lough Croan remained low and there were no whooper swans present. However, there were increased numbers of ducks present with significant numbers of wigeon, teal, and shoveler recorded at Lough Croan. During the January vantage point watch on Wind Farm I, a merlin was recorded crossing the site. A total of 40 golden plover and 100 lapwing were recorded passing near the Wind Farm I site (location and direction not reported), with one snipe recorded within the site in January 2017. There were no records of whooper swans or Greenland white-fronted geese using or passing through the Wind Farm I site during February 2017 surveys.

Again, there were no movements of whooper swan or Greenland white-fronted geese recorded passing through or near the proposed either wind farm site during the March 2017 surveys. Whooper swan flocks were recorded at several waterbodies surrounding both wind farm sites in March 2017, namely Lough Croan, River Suck at Muckinagh North, Coolagarry turlough, Brideswell and Ballyglass River Callows. A total of 80 Greenland white-fronted geese were also recorded at the River Suck at Muckinagh north.

The 2017/18 surveys again followed SNH (2014) guidance with flight activity surveys undertaken from October 2017 to March 2018. Seven vantage points across the two wind farm sites (two at Wind Farm I and five at Wind Farm II) were used at which monthly flight activity surveys were undertaken at dawn and dusk only. Monthly wildfowl distribution surveys were also undertaken, although the area over which these were undertaken was unspecified within the report. Results showed that kestrel and sparrowhawk were the only two target species recorded using the Wind Farm II site during vantage point surveys on one occasion each. There were no other records of target species recorded at either wind farm throughout the entire survey season. A range of wildfowl was recorded during the monthly distribution surveys at locations surrounding both wind farm sites, namely whooper swan, mute swan, lapwing, curlew, golden plover, wigeon and teal. There were no flights of swan species observed flying through the proposed rotor swept areas.

3.2 Flight Activity Surveys

Flight lines of primary target species recorded at both wind farm sites throughout the winter season are presented in **Figures 3-8** and a summary of the survey findings are provided in Sections 3.2.1 and 3.2.2 for primary and secondary target species, respectively. Flight data for both primary and secondary target species are provided in Appendix III.

3.2.1 Primary Target Species

3.2.1.1 Wind Farm I

In total, five primary target species were recorded flying within the study area on and around Wind Farm I during the winter survey period. Flight activity recorded from Wind Farm I VP1 and VP2 by primary target species is summarised in Table 3-2. Primary target species flights from both VPs are shown on **Figures 3 to 8**. Detailed survey data are provided in Appendix III.

Table 3-2: Number of Primary Target Species Flights from Wind Farm I VP1 and VP2 Combined – October 2020 – March 2021

| Species | Number of flights and birds by month* | | | | | | Total number of flights | Total number of flights potentially at-risk height** | Total number of birds recorded in flight | Total number of birds potentially at-risk height** |
|------------------|---------------------------------------|-----|--------|-----|--------|--------|-------------------------|--|--|--|
| | Oct | Nov | Dec | Jan | Feb | Mar | | | | |
| Whooper swan | 2 (10) | 0 | 6 (24) | 0 | 1 (2) | 5 (22) | 14 | 10 | 58 | 39 |
| Golden plover | 2 (32) | 0 | 1 (60) | 0 | 1 (15) | 0 | 4 | 3 | 107 | 92 |
| Lapwing | 0 | 0 | 0 | 0 | 3 (60) | 0 | 3 | 2 | 60 | 10 |
| Wigeon | 0 | 0 | 0 | 0 | 0 | 1 (35) | 1 | 0 | 35 | 0 |
| Peregrine falcon | 0 | 0 | 0 | 0 | 1 (1) | 0 | 1 | 1 | 1 | 1 |

| Species | Number of flights and birds by month* | | | | | | Total number of flights | Total number of flights potentially at-risk height** | Total number of birds recorded in flight | Total number of birds potentially at-risk height** |
|--|---------------------------------------|----------|---------------|----------|---------------|---------------|-------------------------|--|--|--|
| | Oct | Nov | Dec | Jan | Feb | Mar | | | | |
| Total | 4 (42) | 0 | 7 (84) | 0 | 6 (78) | 6 (57) | 23 | 16 | 261 | 142 |
| <p>* numbers in parentheses represent the total number of birds observed that month</p> <p>** precautionary risk height assumed to be between 15m – 200m</p> | | | | | | | | | | |

3.2.1.1.1 Primary Target Species Accounts

A total of 23 flights by five primary target species were recorded during flight activity surveys at Wind Farm I between October 2020 and March 2021. A summary of flight activity by species is presented below.

Whooper Swan

There were 14 flights of whooper swan observed at Wind Farm I, with a total of 58 birds recorded. All observations of whooper swan were recorded from VP2 flying over the Thomas Street Turlough to the south of the wind farm site and buffer. There were no flights recorded from VP1. There were 10 flights (n=39) observed at potential collision risk height, however, only one of these, a flock of four, was observed flying through the wind farm site, in December.

Golden Plover

There were four flights of golden plover recorded at Wind Farm I (n=107), all of which were observed outside the wind farm site. Three of the four flights were recorded outside the 500m buffer flying over Thomas Street Turlough and the fourth was observed within the 500m buffer to the north of the site. Although none of the flocks were observed flying within the wind farm site, 92 of the 107 birds were recorded at potential collision risk height.

Lapwing

Three flights of lapwing were observed in February flying over Thomas Street Turlough. Two of these flights were of 10 birds which were observed in the same location within seven minutes of each other. It is therefore assumed that these were two observations of the same flock. Although this flock was observed off site, they were flying at potential collision risk height. The third observation was of a flock of 40 lapwing flying below the potential collision risk height.

Wigeon

There was one observation of a flock of wigeon (n=35) throughout the season. This observation occurred in March, off site at Thomas Street Turlough. The flight was below the potential collision risk height.

Peregrine Falcon

A single female peregrine falcon was observed from VP2 flying offsite over Thomas Street Turlough in February. Although the flight was off site, the bird was flying within the potential collision risk height.

Wind Farm II

In total, six primary target species were recorded flying within the study area on and around Wind Farm II during the winter survey period. Flight activity recorded from Wind Farm II VP1 to VP4 by primary target species is summarised in Table 3-3. Primary target species flights from all VPs are shown on **Figures 3 to 8**. Detailed survey data are provided in Appendix III.

Table 3-3: Number of Primary Target Species Flights from Wind Farm II VP1-VP4 Combined – October 2020 – March 2021

| Species | Number of flights by month* | | | | | | Total number of flights | Total number of flights potentially at-risk height** | Total number of birds recorded in flight | Total number of birds potentially at-risk height** |
|-------------------------------|-----------------------------|---------------|-----------------|---------------|---------------|----------------|-------------------------|--|--|--|
| | Oct | Nov | Dec | Jan | Feb | Mar | | | | |
| Whooper swan | 0 | 2 (11) | 2 (10) | 2 (5) | 1 (7) | 1 (2) | 8 | 8 | 35 | 35 |
| Greenland white-fronted goose | 1 (50) | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 50 | 50 |
| Golden plover | 0 | 0 | 4 (120) | 1 (2) | 0 | 0 | 5 | 5 | 122 | 122 |
| Lapwing | 0 | 0 | 8 (313) | 0 | 0 | 0 | 8 | 8 | 313 | 313 |
| Wigeon | 0 | 0 | 2 (137) | 1 (21) | 2 (33) | 2 (100) | 7 | 3 | 291 | 158 |
| Peregrine falcon | 1 (1) | 0 | 0 | 0 | 0 | 1 (1) | 2 | 2 | 2 | 2 |
| Total | 2 (51) | 2 (11) | 16 (580) | 4 (28) | 3 (40) | 4 (103) | 31 | 27 | 813 | 680 |

* numbers in parentheses represent the total number of birds observed that month

** precautionary risk height assumed to be between 15m – 200m

Primary Target Species Accounts

A total of 31 flights by six primary target species were recorded during flight activity surveys at Wind Farm II between October 2020 and March 2021. A summary of flight activity by species is presented below.

Whooper Swan

A total of eight flights recorded of whooper swan (n=35) were recorded at Wind Farm II, none of which were observed flying on site. Seven of the eight flights were observed from VP3, flying to and from Feacle Lough within the buffer to the southeast of the site and one was recorded from VP2 within the buffer to the west of the site. Although none of the flights were recorded flying through the site, all 35 whooper swans were observed flying at the potential collision risk height.

Greenland White-fronted Goose

A single flock of 50 white-fronted geese was recorded from VP4 in October. The flock was observed flying in a north-westerly direction to the east of the boundary of the 500m buffer at the potential collision risk height

Golden Plover

There were five golden plover flights recorded at Wind Farm II. Four of the five flights were observed from VP3 at Feacle Lough within two surveys periods on consecutive days in December. Thus, it is likely that these four flights were of the same single flock or two flocks. All five flights were observed at the potential collision risk height, however none were recorded flying through the site.

Lapwing

Lapwing were observed on eight occasions throughout the survey season. All eight flights were observed over two consecutive days in December, with all but one recorded from VP3 at Feacle Lough. Although all flights were observed at the potential collision risk height, there were no observations of lapwing flying through the site.

Wigeon

There were seven flocks of wigeon observed throughout the survey season. All flights were observed flying over Feacle Lough, with four flights below the potential collision risk height and three within. There were no flights observed within the wind farm site.

Peregrine Falcon

A total of two peregrine falcon flights were recorded throughout the winter season. The first was observed from VP4 to the southeast of the site in October. This individual was observed flying towards the site at the potential collision risk height. The second was observed from VP1 in March circling over the Roadstone Cam Quarry at collision risk height. The quarry is on the boundary of the 500m buffer.

3.2.2 Secondary Species

Wind Farm I

Secondary species activity at Wind Farm I is summarised in Table 3-4. There were four secondary species recorded throughout the season at Wind Farm I. Black-headed gull was the most frequently recorded secondary species (in 43 five-minute periods out of a possible 864), and the most numerous (maximum flock size 60).

Table 3-4: Secondary Species Activity Summary for Wind Farm I VP1 and VP2 Combined – October 2020 – March 2021

| Species | Number of 5 min periods recorded * | Maximum number of birds recorded | Combined maximum total of birds recorded | Comments |
|---|------------------------------------|----------------------------------|--|---|
| Common buzzard | 13 | 2 | 16 | Activity in October, January and March only, within the survey buffer and off site. Not recorded within the wind farm site. |
| Raven | 17 | 4 | 33 | Activity throughout all months, within the survey buffer and off site. Not recorded within the wind farm site. |
| Black-headed gull | 43 | 60 | 334 | Activity throughout all months. Recorded primarily off site outside the survey buffer using Thomas Street Turlough. |
| Snipe | 1 | 1 | 1 | Observed off site in October only. |
| * total of 864 five-minute periods during surveys | | | | |

Wind Farm II

Secondary species activity at Wind Farm II is summarised in Table 3-5. There were 12 secondary species recorded throughout the season at Wind Farm II. Black-headed gull and raven were the most frequently recorded secondary species (in 54 five-minute periods out of a possible 864), and curlew was the most numerous (maximum flock size 100).

Table 3-5: Secondary Species Activity Summary for Wind Farm II VP1 - VP4 Combined – October 2020 – March 2021

| Species | Number of 5 min periods recorded * | Maximum number of birds recorded | Combined maximum total of birds recorded | Comments |
|---|------------------------------------|----------------------------------|--|--|
| Common buzzard | 26 | 2 | 37 | Activity throughout all months, within the wind farm site and the survey buffer. |
| Kestrel | 15 | 1 | 15 | Activity throughout all months, within the survey buffer and off site. Not recorded within the wind farm site. |
| Raven | 54 | 14 | 96 | Activity throughout all months, within the survey buffer and off site. Not recorded within the wind farm site. |
| Curlew | 11 | 100 | 267 | Activity throughout all months except October. All records within the survey buffer associated with Feacle Lough and off site. Not recorded within the wind farm site. |
| Grey heron | 7 | 2 | 8 | Activity throughout all months, within the survey buffer and off site. Not recorded within the wind farm site. |
| Black-headed gull | 54 | 60 | 312 | Activity throughout all months, within the survey buffer and off site. Not recorded within the wind farm site. Majority of activity associated with Feale Lough. |
| Herring gull <i>Larus argentatus</i> | 2 | 1 | 2 | Low activity in January and February only, within the survey buffer and off site. |
| Lesser black-backed gull | 8 | 2 | 10 | Activity in November, December and March only, within the survey buffer and off site. |
| Cormorant | 4 | 6 | 10 | Activity in November and January only, predominantly within the survey buffer and off site. There was one observation flying through the site. |
| Coot | 1 | 2 | 2 | Two birds observed flying from a small pond adjacent VP1 within the buffer. |
| Mallard | 9 | 4 | 22 | Activity in December, February and March only, within the survey buffer and off site. |
| Mute swan | 1 | 2 | 2 | Low activity in December only, within the survey buffer at Feacle Lough. |

| Species | Number of 5 min periods recorded * | Maximum number of birds recorded | Combined maximum total of birds recorded | Comments |
|---|------------------------------------|----------------------------------|--|----------|
| * total of 864 five-minute periods during surveys | | | | |

3.3 Swan and Goose Feeding and Distribution Surveys

Whooper swan was by far the most abundant species recorded, with Greenland white-fronted goose observed in February only and greylag goose *Anser anser* observed in February and March. A summary of results of the twice-monthly swan and goose feeding and distribution surveys undertaken within a minimum 1km radius of each wind farm site throughout the winter season is presented Table 3-6. Table 3-6 presents the peak count obtained for each species on any single date in each month and the combined total for each species across the two surveys each month. Please see **Figure 9** for locations of all sightings, several of which were outside the 1km buffer.

Table 3-6: Peak counts and combined results of the twice-monthly swan and goose feeding and distribution surveys undertaken within a minimum 1km radius of both wind farm sites between October 2020 and March 2021

| Month | Peak Count and Combined Total of Each Species Recorded Per Month | | | | | |
|--------------|--|----------------|-------------------------------|----------------|---------------|----------------|
| | Whooper Swan | | Greenland White-fronted Goose | | Greylag Goose | |
| | Peak Count | Combined Total | Peak Count | Combined Total | Peak Count | Combined Total |
| October | 64 | 64 | 0 | 0 | 0 | 0 |
| November | 71 | 104 | 0 | 0 | 0 | 0 |
| December | 114 | 162 | 0 | 0 | 0 | 0 |
| January | 78 | 139 | 0 | 0 | 0 | 0 |
| February | 75 | 102 | 129 | 179 | 3 | 3 |
| March | 119 | 189 | 0 | 0 | 3 | 3 |
| Total | - | 760 | - | 179 | - | 6 |

3.3.1 Swan and Goose Species Accounts

3.3.1.1 Whooper Swan

Whooper swans were recorded within the survey area during all 12 feeding and distribution surveys undertaken throughout the winter season.

There were two predominant grazing locations within the survey area at Wind Farm I, namely Lough Croan to the north and Thomas Street Turlough to the south, whilst Coolagarry Lough to the east of Wind Farm I was used less frequently. There were no observations of whooper swan flocks feeding within the Wind Farm site, however, there was one flock of 30 whooper swan recorded grazing within 500m of the wind farm in October.

Within the survey area for Wind Farm II, Ballyglass River Callows to the northwest was the principal grazing site, with a single flock of 40 whooper swans recorded at Feacle Lough in March only. October was the quietest

month in terms of total numbers of swans, with a peak count of 64 recorded, whilst December and March were the most active with peak counts of 114 and 119 birds recorded respectively.

3.3.1.2 Greenland White-fronted Goose

Greenland white-fronted geese were recorded in February only, with three separate flocks observed grazing during the same survey period in the fields surrounding Lough Croan, just outside the 1km buffer. On the first February survey five geese were observed in a field to the west of Lough Croan grazing within a flock of 29 whooper swans while further east of that location on the same day, a further 124 white-fronted geese were recorded grazing. On the second February visit, 38 white-fronted geese were observed grazing with 22 whooper swans in a field to the south of Lough Croan, while slightly further west a flock of 12 geese was recorded. These were the only observations of Greenland white-fronted geese during the feeding and distribution surveys throughout the season.

3.3.1.3 Greylag Goose

A flock of three greylag geese was recorded both in February and March grazing in pastures around Lough Croan. Given that these two observations were recorded in close proximity to each other, albeit in consecutive months, it is likely that these were two observations of the same small flock of three. There were no other observations of greylag geese during these surveys throughout the season.

3.4 Greenland White-fronted Goose Roost Surveys

Dawn and dusk Greenland white-fronted goose roost surveys were carried out at Lough Croan on a monthly basis between October 2020 and March 2021. Please see **Figure 10** for flight-line results and flock sizes observed during these surveys.

Greenland white-fronted geese were recorded at Lough Croan in January, February and March 2021 only, with no sightings of geese during the October - December surveys.

During the January dusk survey, a flock of 55 geese flew from the west just after sunset and landed in the east of the lough. The dawn survey on the following morning in January yielded the greatest level of activity throughout the season of goose roost surveys at Lough Croan with nine movements of white-fronted geese recorded. A total of three of the nine flocks ($n=36$, $n=40$ and $n=80$) were observed flying in from the west just after sunrise and landing on a field to the south of the lough. A further three flocks ($n=11$, $n=50$ and $n=50$) moved a short distance from the eastern section of the turlough to the fields to the south of the central section of the turlough, joining the three flocks which had arrived from the west. This formed a large flock of approximately 267 Greenland white-fronted geese. A short time later, there were three departures from this flock with two flocks of four flying to the northeast and west respectively. A third, larger flock of 95 geese left the turlough towards the end of the survey period, flying to the northwest.

As previously mentioned in the limitations section of this report (Section 2.3), owing to inclement weather in February, the dawn survey could not be undertaken. As such, a dusk survey only could be carried out. During that survey, a flock of 70 geese was observed leaving the lough to the west just after sunset. The additional dawn survey undertaken in March, in place of the dawn survey which was unable to be undertaken in February, did not record any geese.

The planned March surveys yielded no sightings of geese during the dusk survey, however, a flock of 50 geese was observed leaving the lough at dawn the following morning, heading in a north-westerly direction.

4.0 Summary and Conclusions

The aim of this report is to provide baseline ornithological survey data for the 2020/2021 winter season at the two proposed wind farm sites at Seven Hills, Dysart, Co. Roscommon. These data will be used to inform the ecological impact assessment and appropriate assessment for the proposed wind farms. The assessment of potential effects of the proposed wind farms is beyond the scope of this report.

The winter bird survey methods employed during the 2020/2021 survey season are based on recommendations given in SNH (2017) guidance. This survey methods guidance is recognised as standard best practice guidance through the UK and Ireland for surveying birds to inform impact assessment of onshore wind farms. Winter season surveys were undertaken from October 2020 to March 2021. The following ornithological survey types were undertaken at the proposed Seven Hills Wind Farm development sites:

- Flight activity (VP) surveys;
- Swan and goose feeding and distribution surveys; and
- Goose roost surveys at Lough Croan.

Flight activity surveys were undertaken from two vantage points overlooking Wind Farm I and four vantage points overlooking Wind Farm II. These vantage points were visited for six hours per month. This resulted in a total survey effort of 36 hours per vantage point throughout the season.

Swan and goose feeding and distribution surveys were repeated twice monthly across the season. A buffer of minimum 1 km around each wind farm site was used for these surveys, which were undertaken by driven transect, stopping on a regular basis to check fields for goose and swan feeding activity.

Goose watches of Lough Croan were carried out simultaneously from two vantage points on the local road north of Lough Croan monthly between October 2020 and March 2021. The watches were carried out at dusk and the following dawn each month for a duration of up to 2 hours depending on the levels of light. The dawn watches began at civil twilight i.e., 30 minutes before the time of sunrise and continued for up to 1.5 hours after sunrise. The dusk watches ended at civil twilight i.e., starting 1.5hrs before the time of sunset and continuing for up to 30 minutes after sunset. All flight-lines of Greenland white-fronted geese to and from the turlough, in addition to the direction of flight and the number of birds, were recorded during watches.

The following primary target species were recorded during flight activity surveys at both proposed wind farm sites combined:

- Whooper swan;
- Greenland white-fronted goose;
- Golden plover;
- Lapwing;
- Wigeon; and
- Peregrine falcon.

The most frequent flight activity was by whooper swan (14 flights recorded at WFI and 8 at WFII), with other target species activity less frequent. The next most frequently recorded species was lapwing (8 flights recorded at WFII). All other target species were recorded seven times or less.

In relation to whooper swan, vantage point surveys at Wind Farm I showed that all flights of this species were associated with the fields around Thomas Street Turlough to the south, with only one movement of this species across the wind farm site itself. All eight sightings of swans at Wind Farm II were associated with the pastures surrounding Feacle Lough, which is off site and within the 500m survey buffer. During the feeding and distribution surveys around Wind Farm I whooper swans were most frequently recorded at Lough Croan to the north and Thomas Street Turlough, whilst Coolagarry Lough to the east of Wind Farm I was used less frequently. There were no observations of whooper swan flocks feeding within the proposed Wind Farm site, and just one

flock of 30 whooper swan recorded within 500m of the site. During the surveys at Wind Farm II Ballyglass River Callows to the northwest was the principal grazing site, with a single flock of 40 whooper swans recorded at Feacle Lough in March only.

Greenland white-fronted geese were not recorded during VP watches at WFI. They were, however, recorded on one occasion during VP watches at Wind Farm II, although off site. They were also observed using Lough Croan during the dawn/dusk goose roost surveys. This species was recorded using the lough during three of the six months of surveys, which suggests that although Lough Croan is potentially an established roost site, it is not used on a consistent basis throughout the winter season. Burke *et al.* (2014) suggested that Lough Croan is suspected as having been used as a roosting site to some extent in the past when water levels were suitably high but has been used less so in more recent years. This may align with the sporadic use of the lough recorded during this survey. This result is also comparable with results of the 2019/20 surveys, during which geese were observed using Lough Croan twice throughout the season.

In addition, also similar to 2019/2020, all movements and flight-paths of the flocks of Greenland white-fronted geese which were observed at Lough Croan during roost watches were on a lateral east/west or west/east plane. These flight patterns suggest that these birds may be associated with the River Suck Callows SPA located approximately 5km to the west of Lough Croan. This theory can be supported by the fact that there were no sightings of Greenland white-fronted geese recorded flying through either of the proposed wind farm sites during the entire season of vantage point surveys or using either of the sites during the feeding distribution driven transects (with the only records of feeding birds recorded close to Lough Croan).

Both proposed wind farm sites are used as sporadic foraging grounds for a number of wintering wader species, in particular golden plover and lapwing. Golden plover was recorded on four occasions at Wind Farm I and on five occasions at Wind Farm II during vantage point surveys throughout the entire survey season. All nine sightings were recorded within the 500m buffer and were associated with the two largest waterbodies, Thomas Street Turlough (Wind Farm I) and Feacle Lough (Wind Farm II). Records of lapwing were infrequent and concentrated within two months of the season, with three sightings at Wind Farm I in February and eight sightings at Wind Farm II in December. Similar to golden plover, the lapwing population in this area appears to be relatively small and sporadic.

Wigeon were observed during flight activity surveys on only one occasion at Wind Farm I and seven times throughout the season at Wind Farm II. None of the flights were recorded within either wind farm as all were associated with the waterbodies of Thomas Street Turlough and Feacle Lough.

There were three flights of peregrine falcon recorded throughout the season, one during surveys at Wind Farm I and two during surveys at Wind Farm II. All three were recorded offsite or within the 500m survey buffer.

Regarding secondary species, there were four secondary species recorded throughout the season at Wind Farm I. Of these, black-headed gull was the most frequently recorded and the most numerous species recorded, predominantly associated with Thomas Street Turlough. There were 12 secondary species recorded throughout the season at Wind Farm II. Black-headed gull was the most frequently recorded secondary species and curlew was the most numerous, with a maximum flock size of 100. These species were mostly associated with Feacle Lough.

5.0 References

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6.0 Figures

Figure 1: Site Layout and Vantage Point Locations

Figure 2: Vantage Point Viewsheds

Figure 3: Flight-lines – Whooper Swan

Figure 4: Flight-lines – Greenland White-fronted Goose

Figure 5: Flight-lines – Golden Plover

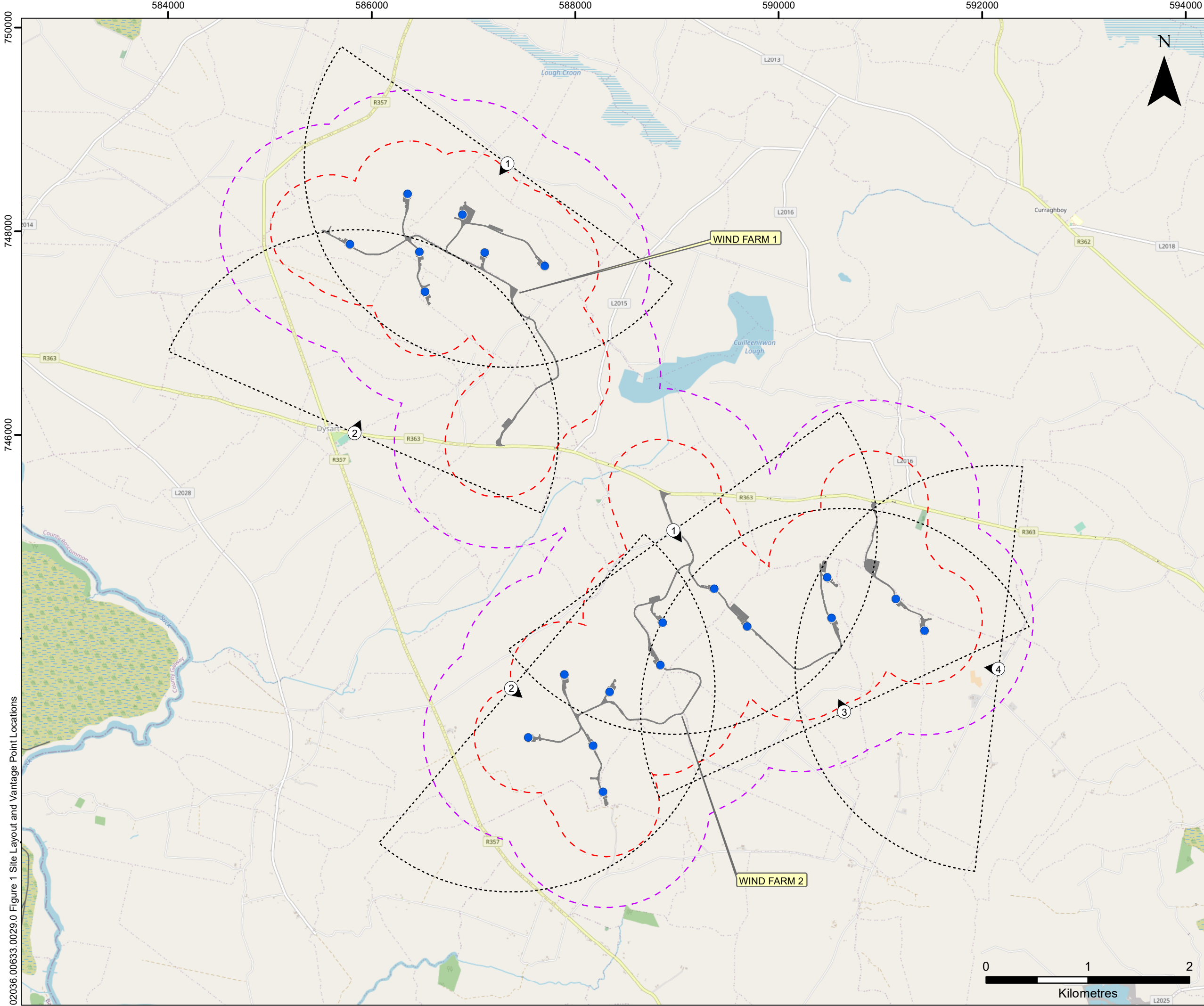
Figure 6: Flight-lines – Lapwing

Figure 7: Flight-lines – Wigeon

Figure 8: Flight-lines – Peregrine Falcon

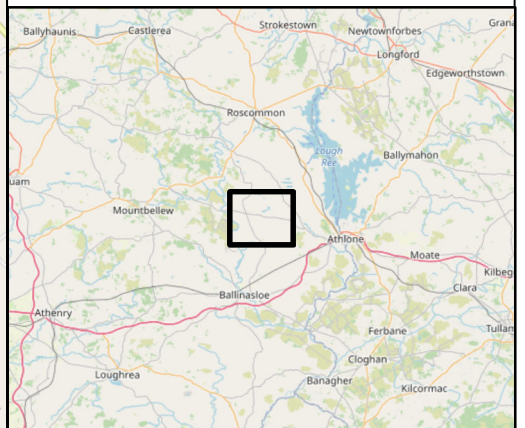
Figure 9: Swan and Goose Feeding Distribution Survey Winter 2019/2020 – Transect Route and Survey Results

Figure 10: Greenland White-fronted Goose Roost Dawn/Dusk Survey Winter 2019/2020 – Vantage Point Locations and Flight-lines



LEGEND

- Turbine Location
- Site Infrastructure
- Site Infrastructure 500 m Buffer
- Site Infrastructure 1 km Buffer
- Vantage Point
- Vantage Points 2km View Arc





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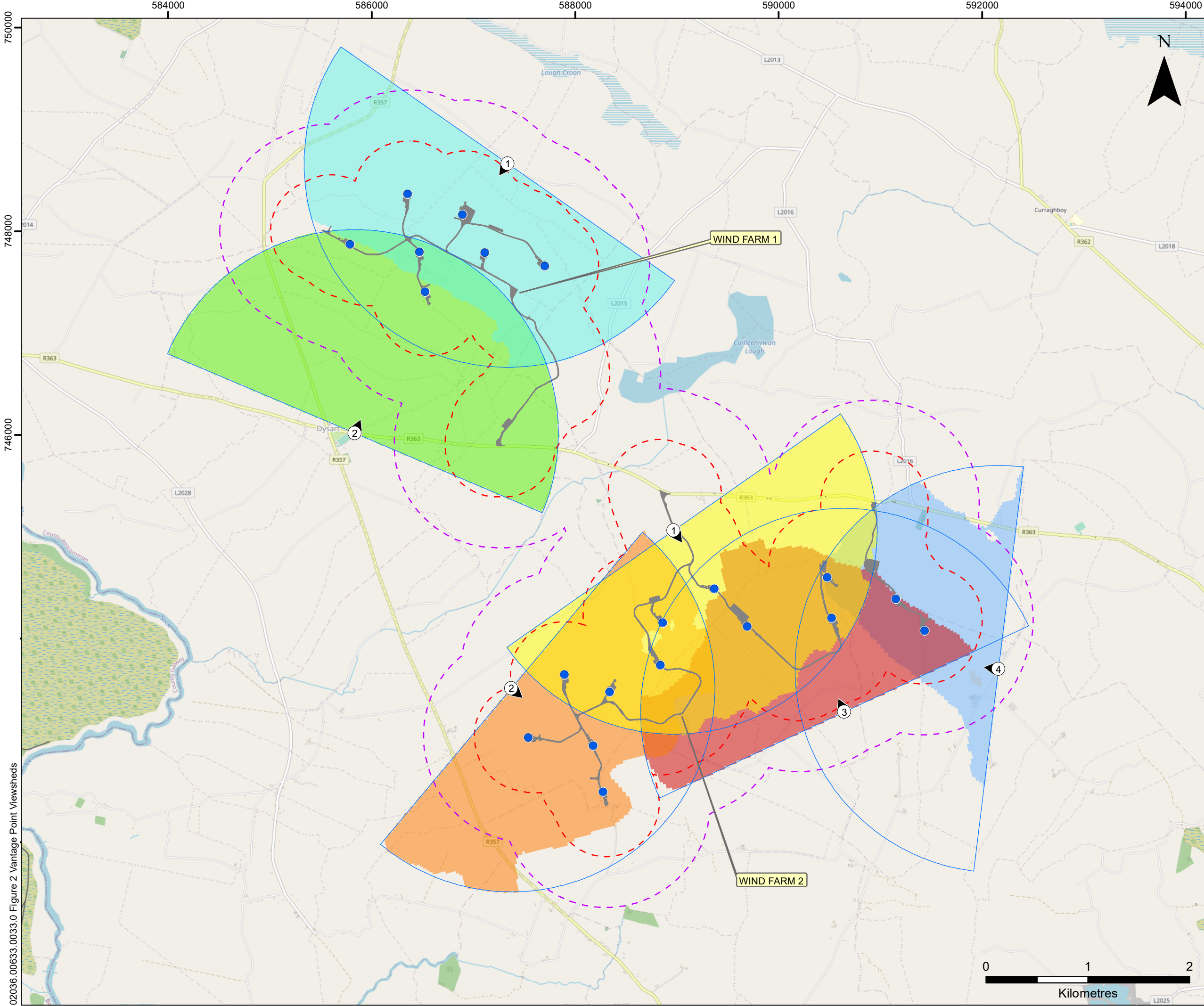
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**FIGURE 1 - SITE LAYOUT AND
VANTAGE POINT LOCATIONS**

Scale 1:35,000 @ A3

Date MAY 2022

02036.00633.0029.0 Figure 1 Site Layout and Vantage Point Locations



NOTE

1. The Zones of Theoretical Visibility (ZTV) was calculated using ArcMAP 10.5.1 Spatial Analyst. The ZTV is calculated with a surface offset 18m & from a viewing height of 1.8m above ground level. The terrain model is derived from EU-DEM data with a vertical accuracy of $\pm 7m$.

LEGEND

- Turbine Location
- Site Infrastructure
- Site Infrastructure 500 m Buffer
- Site Infrastructure 1 km Buffer
- Vantage Point
- Distance of Viewing Arc
- Theoretical Visibility from Wind Farm 1 VP1
- Theoretical Visibility from Wind Farm 1 VP2
- Theoretical Visibility from Wind Farm 2 VP1
- Theoretical Visibility from Wind Farm 2 VP2
- Theoretical Visibility from Wind Farm 2 VP3
- Theoretical Visibility from Wind Farm 2 VP4

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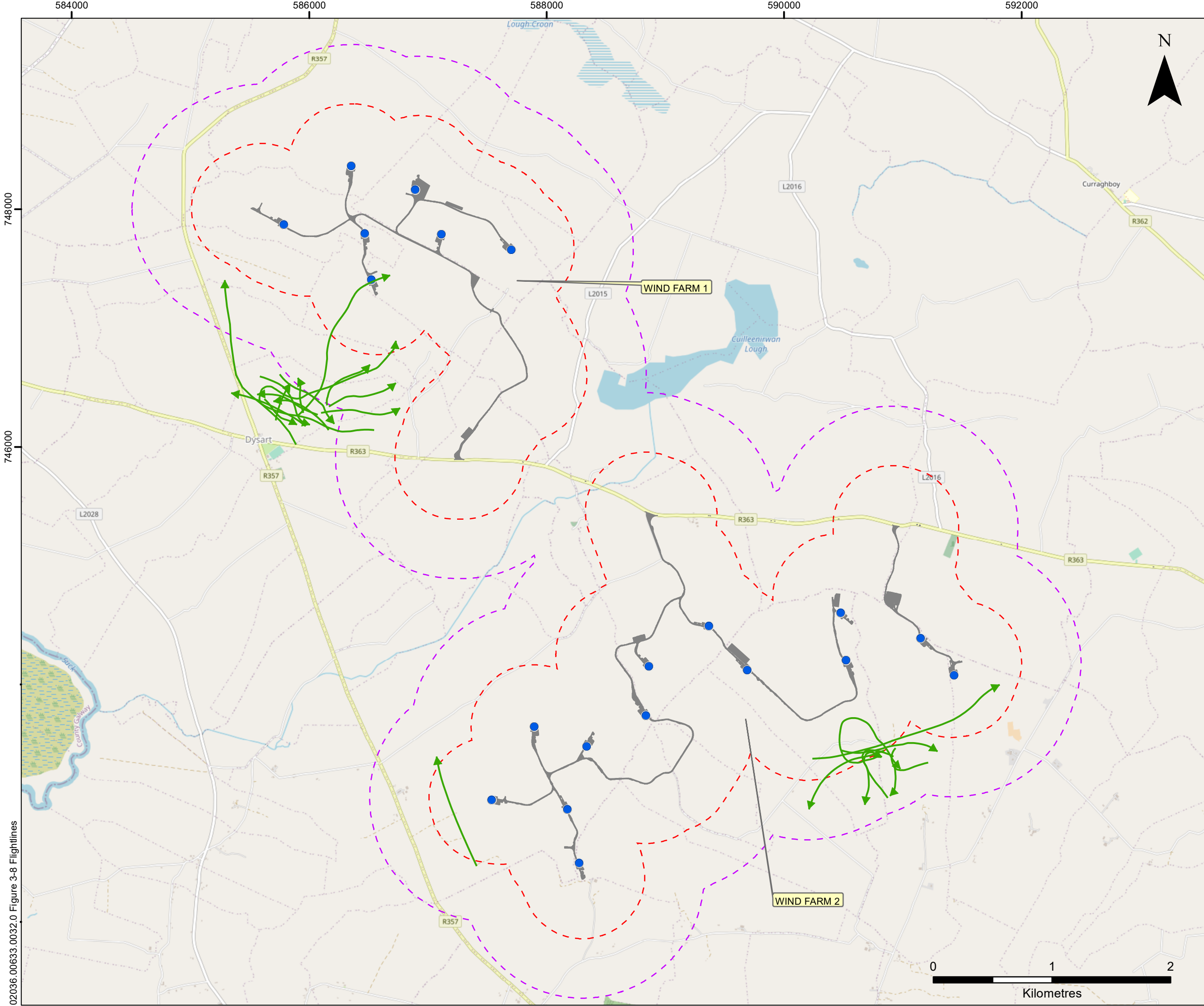
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**FIGURE 2 - VANTAGE POINT
VIEWSHEDS**

Scale
1:35,000 @ A3

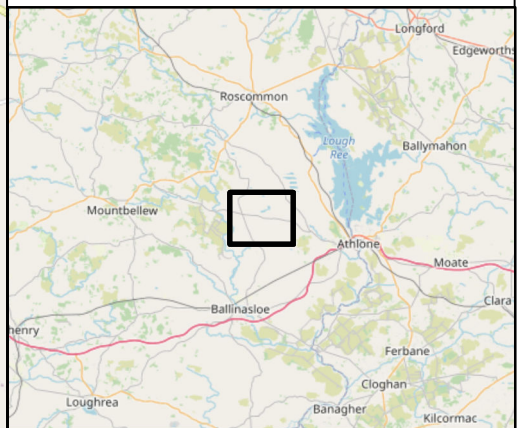
Date
MAY 2022


02036.00633.0033.0 Figure 2 Vantage Point Viewsheds



LEGEND

- Turbine Location
- Site Infrastructure
- Site Infrastructure 500 m Buffer
- Site Infrastructure 1 km Buffer
- Whooper Swan Flight-line





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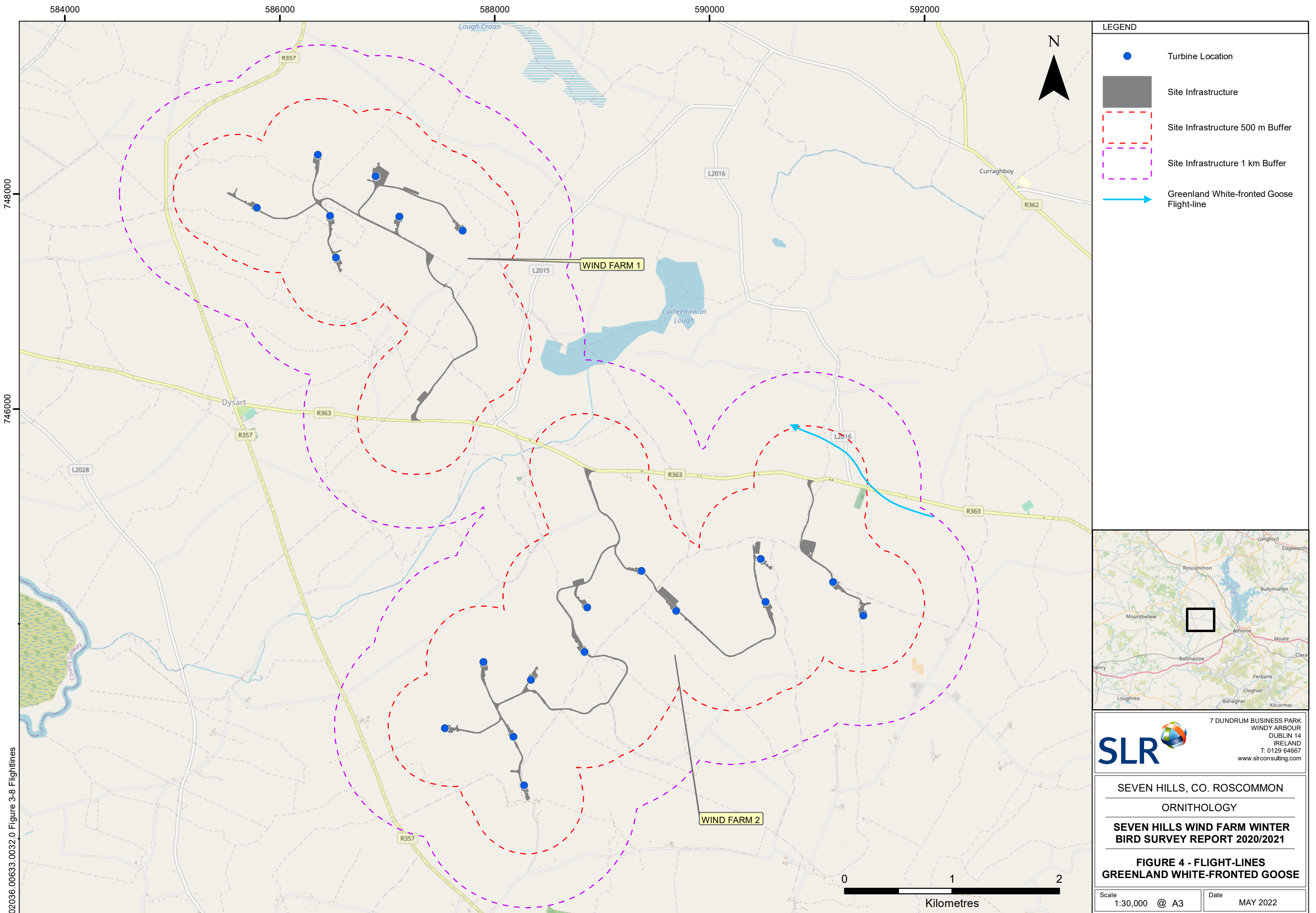
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BIRD SURVEY REPORT 2020/2021

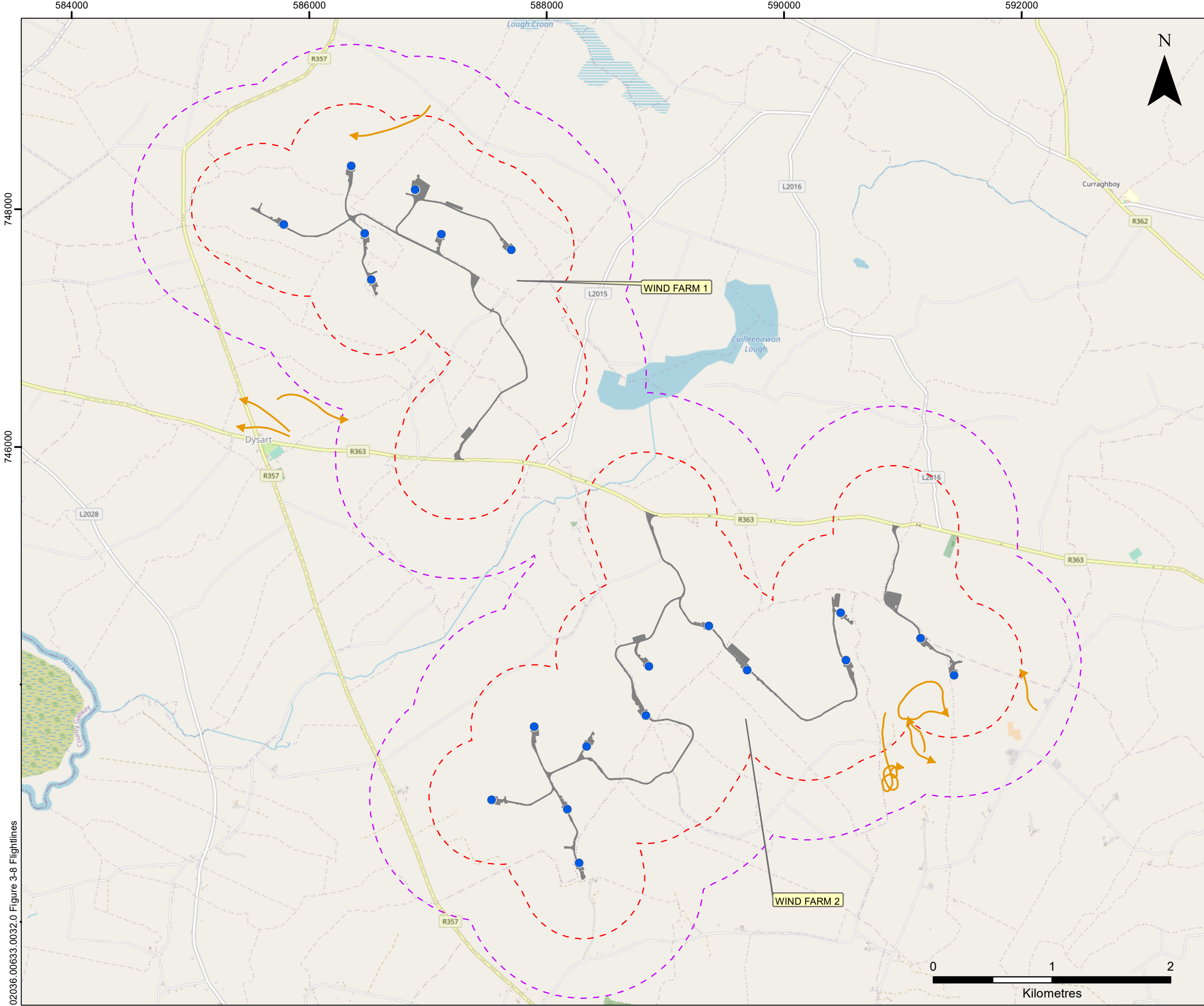
FIGURE 3 - FLIGHT-LINES
WHOOPER SWAN

Scale 1:30,000 @ A3

Date MAY 2022

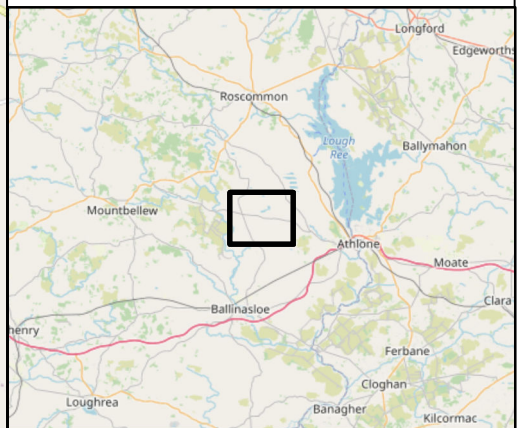
02036.00633.0032.0 Figure 3-8 Flightlines






LEGEND

- Turbine Location
- Site Infrastructure
- Site Infrastructure 500 m Buffer
- Site Infrastructure 1 km Buffer
- Golden Plover Flight-line





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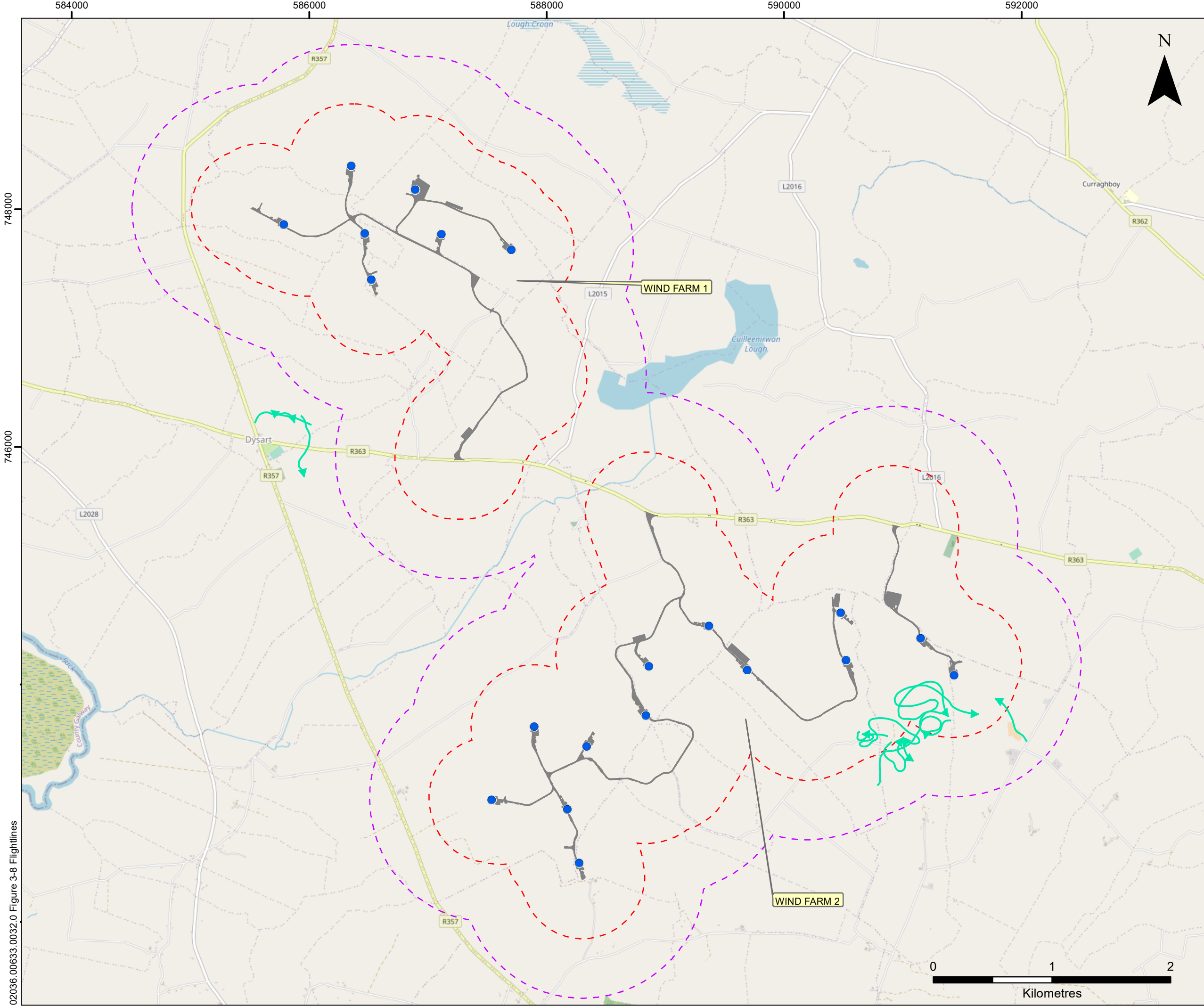
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**FIGURE 5 - FLIGHT-LINES
GOLDEN PLOVER**

Scale
1:30,000 @ A3

Date
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02036.00633.0032.0 Figure 3-8 Flightlines



LEGEND

Turbine Location

Site Infrastructure

Site Infrastructure 500 m Buffer

Site Infrastructure 1 km Buffer

Lapwing Flight-line

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FIGURE 6 - FLIGHT-LINES LAPWING

Scale

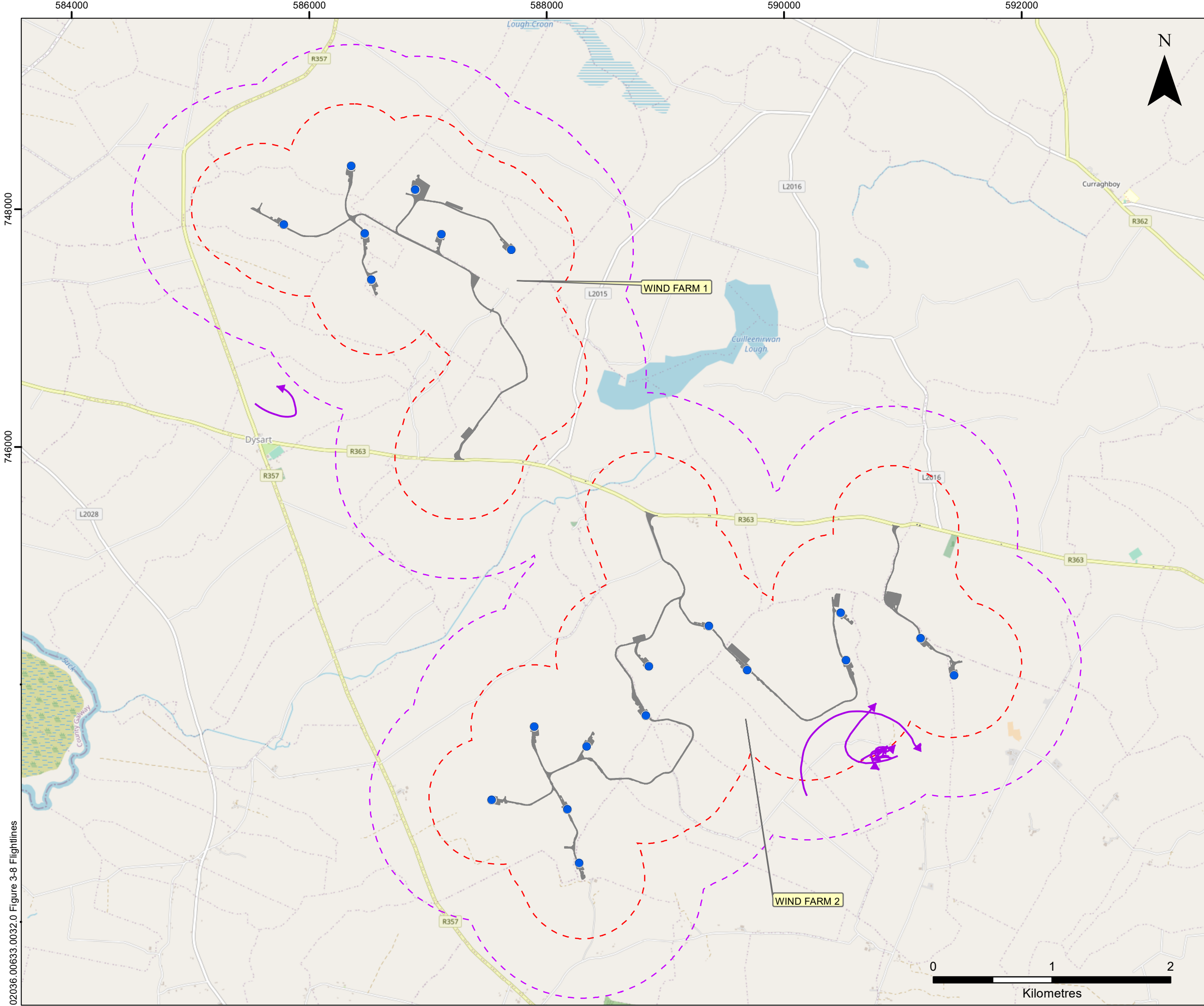
1:30,000 @ A3

Date

MAY 2022

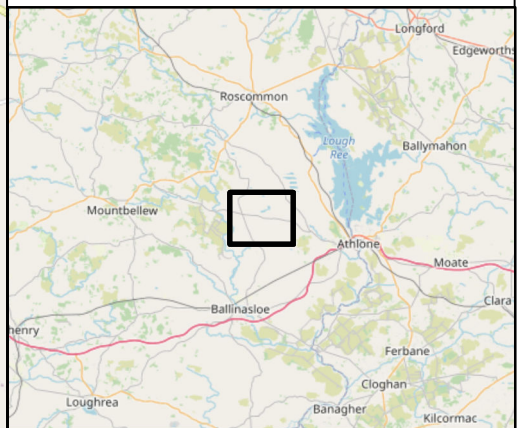
02036.00633.0032.0 Figure 3-8 Flightlines


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LEGEND

- Turbine Location
- Site Infrastructure
- Site Infrastructure 500 m Buffer
- Site Infrastructure 1 km Buffer
- Wigeon Flight-line





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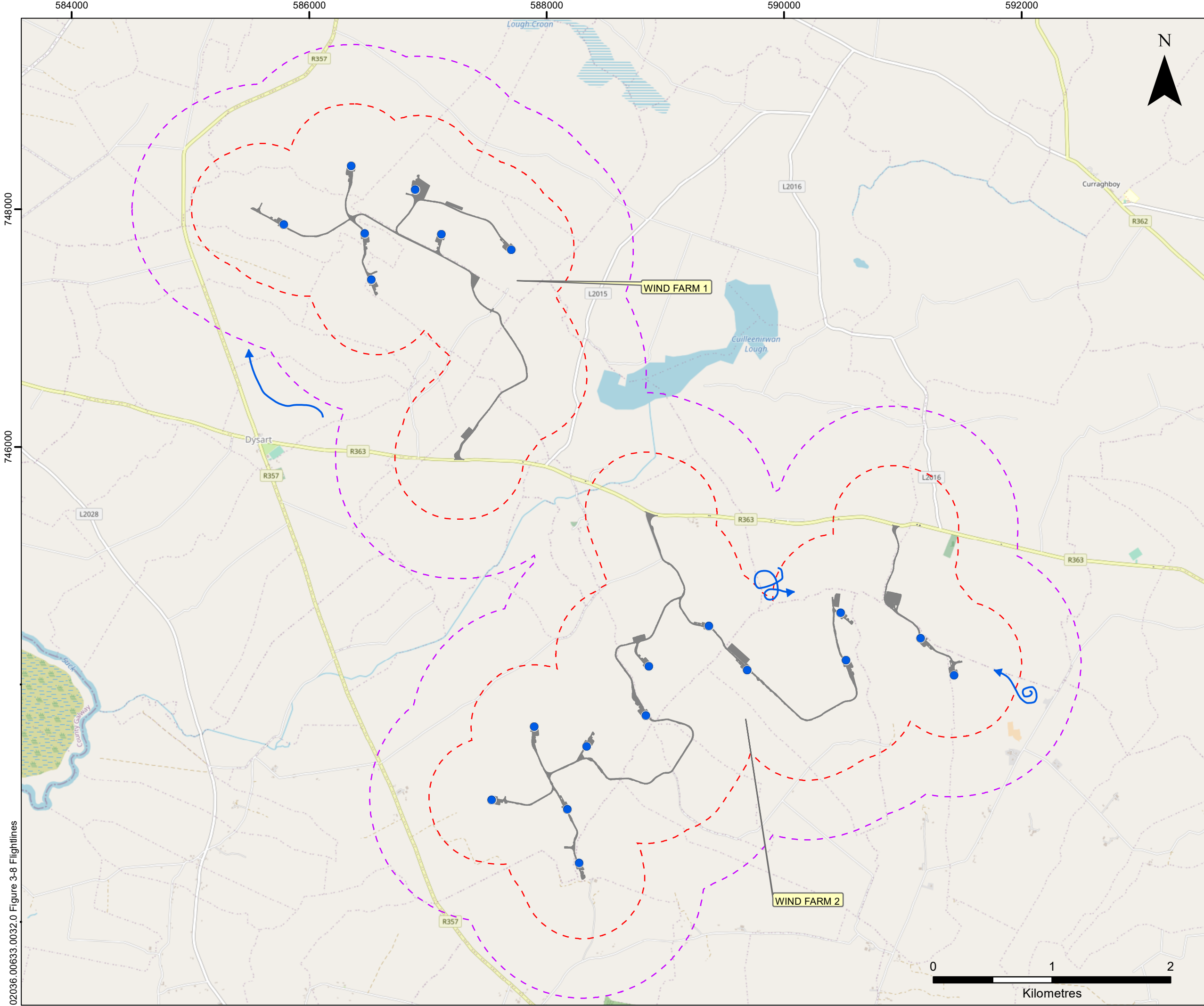
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**FIGURE 7 - FLIGHT-LINES
WIGEON**

Scale
1:30,000 @ A3

Date
MAY 2022

02036.00633.0032.0 Figure 3-8 Flightlines



LEGEND

- Turbine Location
- Site Infrastructure
- Site Infrastructure 500 m Buffer
- Site Infrastructure 1 km Buffer
- Peregrine Flight-line

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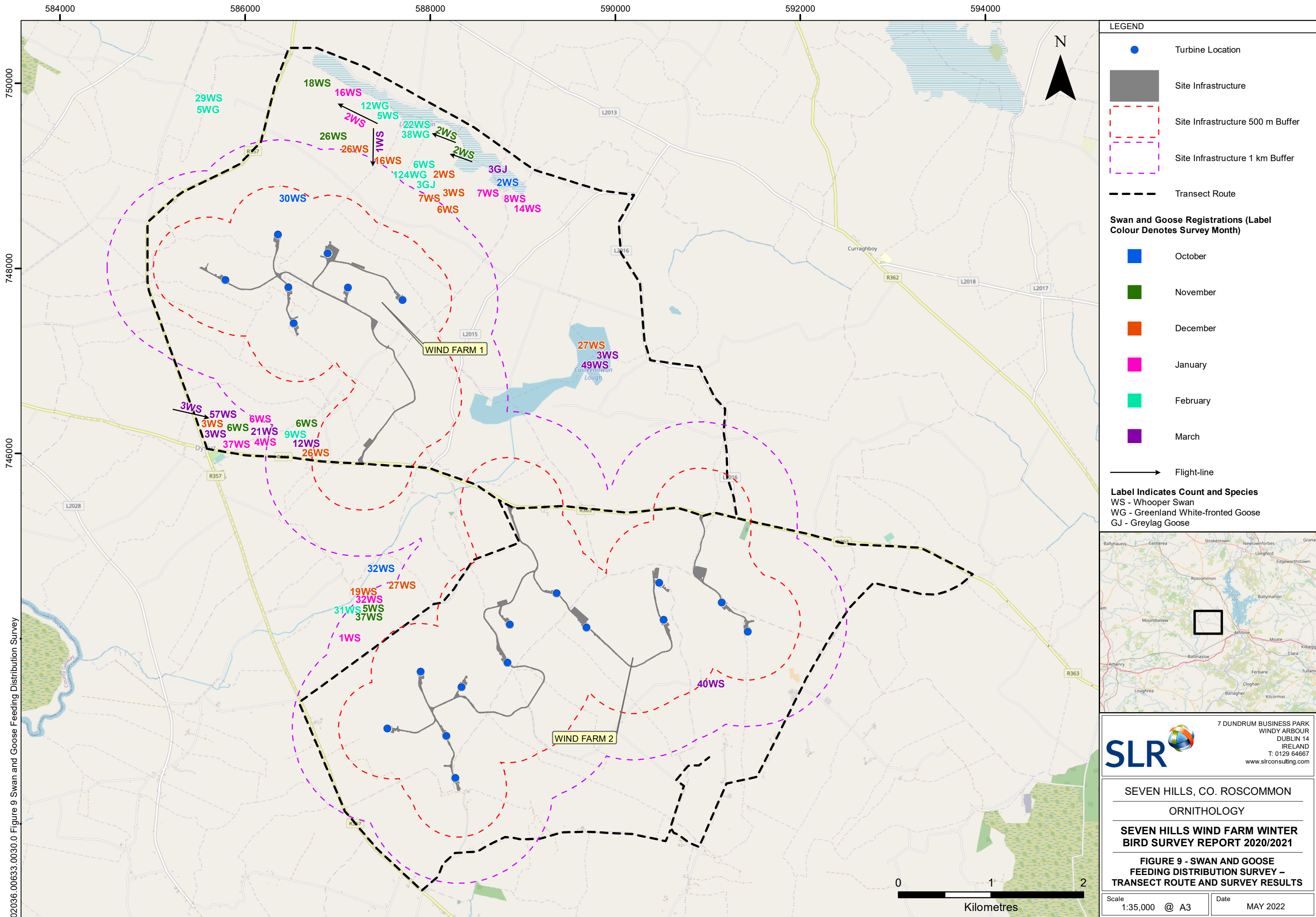
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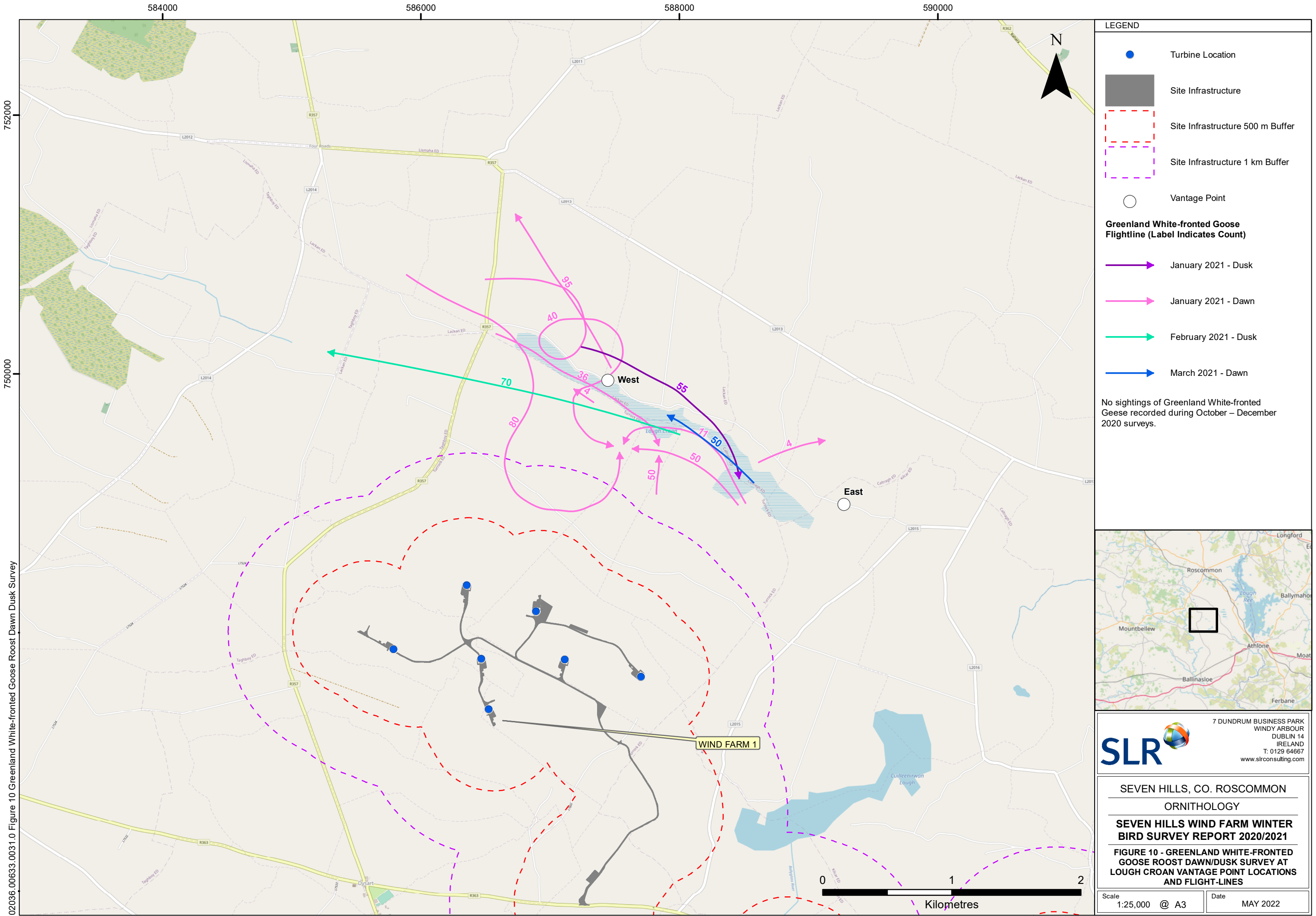
**FIGURE 8 - FLIGHT-LINES
PEREGRINE**

Scale 1:30,000 @ A3

Date MAY 2022

02036.00633.0032.0 Figure 3-8 Flightlines





APPENDIX I

Survey dates, times and observers

Table AI-1: Details of VP surveys undertaken from Wind Farm I Vantage Point 1

| Date | Surveyor | Start | End | Survey Duration |
|--------------------|----------|-------|-------|-----------------|
| 06/10/20 | SI | 09:10 | 12:10 | 03:00 |
| 19/10/20 | SI | 14:00 | 17:00 | 03:00 |
| 24/11/20 | SI | 07:15 | 10:15 | 03:00 |
| 25/11/20 | SI | 07:15 | 10:15 | 03:00 |
| 11/12/20 | SI | 09:00 | 12:00 | 03:00 |
| 17/12/20 | SI | 12:30 | 15:30 | 03:00 |
| 19/01/21 | SI | 09:30 | 12:30 | 03:00 |
| 21/01/21 | SI | 12:45 | 15:45 | 03:00 |
| 12/02/21 | SI | 09:00 | 12:00 | 03:00 |
| 17/02/21 | SI | 15:00 | 18:00 | 03:00 |
| 09/03/21 | SI | 10:00 | 13:00 | 03:00 |
| 16/03/21 | SI | 13:45 | 16:45 | 03:00 |
| Total Hours | | | | 36 |

Table AI-2: Details of VP surveys undertaken from Wind Farm I Vantage Point 2

| Date | Surveyor | Start | End | Survey Duration |
|--------------------|----------|-------|-------|-----------------|
| 05/10/20 | SI | 11:00 | 14:00 | 03:00 |
| 06/10/20 | SI | 12:40 | 15:40 | 03:00 |
| 21/11/20 | SI | 14:00 | 17:00 | 03:00 |
| 24/11/20 | SI | 13:30 | 16:30 | 03:00 |
| 11/12/20 | SI | 13:00 | 16:00 | 03:00 |
| 17/12/20 | SI | 09:00 | 12:00 | 03:00 |
| 20/01/21 | SI | 13:00 | 16:00 | 03:00 |
| 21/01/21 | SI | 09:00 | 12:00 | 03:00 |
| 12/02/21 | SI | 12:30 | 15:30 | 03:00 |
| 17/02/21 | SI | 10:00 | 13:00 | 03:00 |
| 10/03/21 | SI | 13:00 | 16:00 | 03:00 |
| 16/03/21 | SI | 10:15 | 13:15 | 03:00 |
| Total Hours | | | | 36 |

Table AI-3: Details of VP surveys undertaken from Wind Farm II Vantage Point 1

| Date | Surveyor | Start | End | Survey Duration |
|--------------------|----------|-------|-------|-----------------|
| 07/10/20 | SI | 13:00 | 16:00 | 03:00 |
| 14/10/20 | SI | 10:15 | 13:15 | 03:00 |
| 25/11/20 | SI | 11:00 | 14:00 | 03:00 |
| 26/11/20 | SI | 09:00 | 12:00 | 03:00 |
| 07/12/20 | SI | 09:10 | 12:10 | 03:00 |
| 16/12/20 | SI | 09:30 | 12:30 | 03:00 |
| 22/01/21 | SI | 09:15 | 12:15 | 03:00 |
| 29/01/21 | SI | 14:30 | 17:30 | 03:00 |
| 10/02/21 | SI | 10:00 | 13:00 | 03:00 |
| 11/02/21 | SI | 14:30 | 17:30 | 03:00 |
| 17/03/21 | SI | 11:20 | 14:20 | 03:00 |
| 18/03/21 | SI | 11:50 | 14:50 | 03:00 |
| Total Hours | | | | 36 |

Table AI-4: Details of VP surveys undertaken from Wind Farm II, Vantage Point 2

| Date | Surveyor | Start | End | Survey Duration |
|--------------------|----------|-------|-------|-----------------|
| 07/10/20 | SI | 09:30 | 12:30 | 03:00 |
| 14/10/20 | SI | 14:15 | 17:15 | 03:00 |
| 27/11/20 | SI | 09:00 | 12:00 | 03:00 |
| 26/11/20 | SI | 12:30 | 15:30 | 03:00 |
| 07/12/20 | SI | 13:00 | 16:00 | 03:00 |
| 10/12/20 | SI | 08:45 | 11:45 | 03:00 |
| 22/01/21 | SI | 12:45 | 15:45 | 03:00 |
| 29/01/21 | SI | 09:10 | 12:10 | 03:00 |
| 10/02/21 | SI | 13:30 | 16:30 | 03:00 |
| 11/02/21 | SI | 09:20 | 12:20 | 03:00 |
| 17/03/21 | SI | 14:50 | 17:50 | 03:00 |
| 18/03/21 | SI | 08:20 | 11:20 | 03:00 |
| Total Hours | | | | 36 |

Table AI-5: Details of VP surveys undertaken from Wind Farm II, Vantage Point 3

| Date | Surveyor | Start | End | Survey Duration |
|--------------------|----------|-------|-------|-----------------|
| 21/10/20 | SI | 10:30 | 13:30 | 03:00 |
| 22/10/20 | SI | 13:00 | 16:00 | 03:00 |
| 19/11/20 | SI | 09:45 | 12:45 | 03:00 |
| 20/11/20 | SI | 12:40 | 15:40 | 03:00 |
| 08/12/20 | SI | 13:15 | 16:15 | 03:00 |
| 09/12/20 | SI | 09:30 | 12:30 | 03:00 |
| 27/01/21 | SI | 14:30 | 17:30 | 03:00 |
| 28/01/21 | SI | 09:30 | 12:30 | 03:00 |
| 18/02/21 | SI | 12:50 | 15:50 | 03:00 |
| 19/02/21 | SI | 09:30 | 12:30 | 03:00 |
| 11/03/21 | SI | 12:15 | 15:15 | 03:00 |
| 12/03/21 | SI | 08:45 | 11:45 | 03:00 |
| Total Hours | | | | 36 |

Table AI-6: Details of VP surveys undertaken from Wind Farm II, Vantage Point 4

| Date | Surveyor | Start | End | Survey Duration |
|--------------------|----------|-------|-------|-----------------|
| 21/10/20 | SI | 14:00 | 17:00 | 03:00 |
| 22/10/20 | SI | 09:30 | 12:30 | 03:00 |
| 19/11/20 | SI | 13:20 | 16:20 | 03:00 |
| 20/11/20 | SI | 09:00 | 12:00 | 03:00 |
| 08/12/20 | SI | 09:40 | 12:40 | 03:00 |
| 09/12/20 | SI | 13:00 | 16:00 | 03:00 |
| 27/01/21 | SI | 11:00 | 14:00 | 03:00 |
| 28/01/21 | SI | 13:15 | 16:15 | 03:00 |
| 18/02/21 | SI | 09:10 | 12:10 | 03:00 |
| 19/02/21 | SI | 13:00 | 16:00 | 03:00 |
| 11/03/21 | SI | 08:45 | 11:45 | 03:00 |
| 12/03/21 | SI | 12:20 | 15:20 | 03:00 |
| Total Hours | | | | 36 |

Table AI-7: Details of swan and goose feeding and distribution surveys undertaken during winter 2020/2021

| Date | Surveyor | Start | End | Survey Duration |
|--------------------|----------|-------|-------|-----------------|
| 05/10/20 | SI | 14:30 | 17:30 | 03:00 |
| 30/10/20 | SI | 13:00 | 15:30 | 02:30 |
| 12/11/20 | SI | 11:00 | 14:00 | 03:00 |
| 18/11/20 | SI | 11:00 | 14:00 | 03:00 |
| 10/12/20 | SI | 12:00 | 15:00 | 03:00 |
| 16/12/20 | SI | 13:00 | 15:00 | 02:00 |
| 20/01/21 | SI | 09:30 | 12:30 | 03:00 |
| 29/01/21 | SI | 12:30 | 14:15 | 01:45 |
| 11/02/21 | SI | 12:25 | 14:30 | 02:05 |
| 17/02/21 | SI | 13:00 | 15:00 | 02:00 |
| 10/03/21 | SI | 10:10 | 12:10 | 02:00 |
| 17/03/21 | SI | 09:15 | 11:15 | 02:00 |
| Total Hours | | | | 29:20 |

Table AI-8: Details of Greenland white-fronted goose roost surveys undertaken during winter 2020/2021

| Date | Surveyor | Start | End | Survey Duration |
|--------------------|----------|-------|-------|-----------------|
| 30/10/20 | SI + JC | 07:00 | 08:30 | 01:30 |
| 30/10/20 | SI + JC | 16:30 | 18:00 | 01:30 |
| 26/11/20 | SI + JC | 16:00 | 17:30 | 01:30 |
| 27/11/20 | SI + JC | 07:15 | 08:30 | 01:15 |
| 16/12/20 | SI + JC | 15:45 | 17:30 | 01:45 |
| 17/12/20 | SI + JC | 07:30 | 09:15 | 01:45 |
| 21/01/21 | SI + JC | 16:45 | 18:00 | 01:15 |
| 22/01/21 | SI + JC | 07:30 | 09:00 | 01:30 |
| 10/02/21 | SI + JC | 17:00 | 18:30 | 01:30 |
| 10/03/21 | SI + AK | 17:15 | 19:15 | 02:00 |
| 11/03/21 | SI + AK | 06:15 | 08:15 | 02:00 |
| 12/03/21 | SI | 06:15 | 08:00 | 01:45 |
| Total Hours | | | | 19:15 |

APPENDIX II

Weather Data

Table AII-1: Weather data collected during flight activity surveys undertaken at WF1 VP1

| Date | Surveyor | Start | End | Survey Hour | Wind Speed | Wind Direction | Rain | Cloud Cover | Cloud Height | Visibility | Snow | Frost | Temp (°C) |
|------------|----------|-------|-------|-------------|------------|----------------|------|-------------|--------------|------------|------|-------|-----------|
| 06/10/2020 | SI | 09:10 | 12:10 | 1 | 3 | W | 0 | 7 | 2 | 2 | 0 | 0 | 12 |
| 06/10/2020 | SI | 09:10 | 12:10 | 2 | 3 | W | 1 | 8 | 2 | 2 | 0 | 0 | 12 |
| 06/10/2020 | SI | 09:10 | 12:10 | 3 | 3 | W | 0 | 7 | 2 | 2 | 0 | 0 | 12 |
| 19/10/2020 | SI | 14:00 | 17:00 | 1 | 2 | SW | 0 | 2 | 2 | 2 | 0 | 0 | 8 |
| 19/10/2020 | SI | 14:00 | 17:00 | 2 | 2 | SW | 0 | 3 | 2 | 2 | 0 | 0 | 8 |
| 19/10/2020 | SI | 14:00 | 17:00 | 3 | 4 | SW | 2 | 6 | 2 | 2 | 0 | 0 | 7 |
| 24/11/2020 | SI | 07:15 | 10:15 | 1 | 2 | W | 3 | 8 | 0 | 0 | 0 | 0 | 7 |
| 24/11/2020 | SI | 07:15 | 10:15 | 2 | 3 | W | 3 | 8 | 1 | 1 | 0 | 0 | 7 |
| 24/11/2020 | SI | 07:15 | 10:15 | 3 | 3 | W | 3 | 8 | 1 | 1 | 0 | 0 | 8 |
| 25/11/2020 | SI | 07:15 | 10:15 | 1 | 2 | W | 3 | 8 | 0 | 0 | 0 | 0 | 6 |
| 25/11/2020 | SI | 07:15 | 10:15 | 2 | 2 | W | 3 | 8 | 1 | 1 | 0 | 0 | 6 |
| 25/11/2020 | SI | 07:15 | 10:15 | 3 | 2 | W | 3 | 8 | 1 | 1 | 0 | 0 | 6 |
| 11/12/2020 | SI | 09:00 | 12:00 | 1 | 2 | E | 0 | 8 | 2 | 2 | 0 | 0 | 10 |
| 11/12/2020 | SI | 09:00 | 12:00 | 2 | 2 | E | 2 | 8 | 2 | 2 | 0 | 0 | 10 |
| 11/12/2020 | SI | 09:00 | 12:00 | 3 | 2 | E | 0 | 8 | 2 | 2 | 0 | 0 | 10 |
| 17/12/2020 | SI | 12:30 | 15:30 | 1 | 1 | S | 1 | 8 | 2 | 2 | 0 | 0 | 9 |
| 17/12/2020 | SI | 12:30 | 15:30 | 2 | 1 | S | 1 | 8 | 1 | 1 | 0 | 0 | 9 |
| 17/12/2020 | SI | 12:30 | 15:30 | 3 | 1 | S | 1 | 8 | 1 | 1 | 0 | 0 | 9 |
| 19/01/2021 | SI | 09:30 | 12:30 | 1 | 1 | W | 0 | 5 | 2 | 2 | 0 | 0 | 5 |

| Date | Surveyor | Start | End | Survey Hour | Wind Speed | Wind Direction | Rain | Cloud Cover | Cloud Height | Visibility | Snow | Frost | Temp (°c) |
|----------------------------|----------|-------|-------|----------------------------|------------|----------------|--------------------|-------------|--------------|--------------------|------|--------------|-----------|
| 19/01/2021 | SI | 09:30 | 12:30 | 2 | 1 | W | 0 | 7 | 2 | 2 | 0 | 0 | 5 |
| 19/01/2021 | SI | 09:30 | 12:30 | 3 | 2 | W | 0 | 7 | 2 | 2 | 0 | 0 | 6 |
| 21/01/2021 | SI | 12:45 | 15:45 | 1 | 2 | W | 0 | 3 | 2 | 2 | 0 | 0 | 5 |
| 21/01/2021 | SI | 12:45 | 15:45 | 2 | 2 | W | 0 | 4 | 2 | 2 | 0 | 0 | 5 |
| 21/01/2021 | SI | 12:45 | 15:45 | 3 | 1 | W | 0 | 2 | 2 | 2 | 0 | 0 | 5 |
| 12/02/2021 | SI | 09:00 | 12:00 | 1 | 2 | SE | 0 | 8 | 2 | 2 | 0 | 0 | 2 |
| 12/02/2021 | SI | 09:00 | 12:00 | 2 | 2 | SE | 0 | 8 | 2 | 2 | 0 | 0 | 2 |
| 12/02/2021 | SI | 09:00 | 12:00 | 3 | 2 | SE | 0 | 8 | 2 | 2 | 0 | 0 | 3 |
| 17/02/2021 | SI | 15:00 | 18:00 | 1 | 2 | S | 0 | 3 | 2 | 0 | 0 | 0 | 8.5 |
| 17/02/2021 | SI | 15:00 | 18:00 | 2 | 3 | S | 0 | 7 | 2 | 0 | 0 | 0 | 8.5 |
| 17/02/2021 | SI | 15:00 | 18:00 | 3 | 3 | S | 0 | 7 | 2 | 0 | 0 | 0 | 8.5 |
| 09/03/2021 | SI | 10:00 | 13:00 | 1 | 4 | W | 0 | 8 | 1 | 1 | 0 | 0 | 8 |
| 09/03/2021 | SI | 10:00 | 13:00 | 2 | 4 | W | 3 | 8 | 2 | 1 | 0 | 0 | 8 |
| 09/03/2021 | SI | 10:00 | 13:00 | 3 | 4 | W | 2 | 8 | 1 | 1 | 0 | 0 | 8 |
| 16/03/2021 | SI | 13:45 | 16:45 | 1 | 1 | NW | 0 | 1 | 2 | 0 | 0 | 0 | 14 |
| 16/03/2021 | SI | 13:45 | 16:45 | 2 | 1 | NW | 0 | 1 | 2 | 0 | 0 | 0 | 14 |
| 16/03/2021 | SI | 13:45 | 16:45 | 3 | 1 | NW | 0 | 0 | 0 | 0 | 0 | 0 | 14 |
| Rain/ Precipitation | | | | Cloud Cover | | | Visibility | | | Lying Snow | | Frost | |
| None 0 | | | | Expressed in oktas (n/8) | | | Poor (<1km) 0 | | | None 0 | | None 0 | |
| Drizzle 1 | | | | Cloud Height | | | Moderate (1-3km) 1 | | | On site 1 | | Ground 1 | |
| Light showers/snow 2 | | | | Height of cloud above | | | Good (>3km) 2 | | | On higher ground 2 | | All day 2 | |
| Heavy showers/snow 3 | | | | average height of viewshed | | | | | | | | | |
| Heavy rain/snow 4 | | | | <150m 0 | | | | | | | | | |

| Date | Surveyor | Start | End | Survey Hour | Wind Speed | Wind Direction | Rain | Cloud Cover | Cloud Height | Visibility | Snow | Frost | Temp (°C) |
|------|----------|-------|-------------------|-------------|------------|----------------|------|-------------|--------------|------------|------|-------|-----------|
| | | | 150-500m >500m | 1 2 | | | | | | | | | |

Table AII-1: Weather data collected during flight activity surveys undertaken at WF1 VP2

| Date | Surveyor | Start | End | Survey Hour | Wind Speed | Wind Direction | Rain | Cloud Cover | Cloud Height | Visibility | Snow | Frost | Temp (°C) |
|------------|----------|-------|-------|-------------|------------|----------------|------|-------------|--------------|------------|------|-------|-----------|
| 05/10/2020 | SI | 11:00 | 14:00 | 1 | 2 | W | 0 | 8 | 2 | 2 | 0 | 0 | 12 |
| 05/10/2020 | SI | 11:00 | 14:00 | 2 | 2 | SW | 0 | 8 | 2 | 2 | 0 | 0 | 11 |
| 05/10/2020 | SI | 11:00 | 14:00 | 3 | 2 | S | 0 | 7 | 2 | 2 | 0 | 0 | 12 |
| 06/10/2020 | SI | 12:40 | 15:40 | 1 | 1 | W | 0 | 7 | 2 | 2 | 0 | 0 | 12 |
| 06/10/2020 | SI | 12:40 | 15:40 | 2 | 2 | W | 0 | 7 | 2 | 2 | 0 | 0 | 13 |
| 06/10/2020 | SI | 12:40 | 15:40 | 3 | 1 | W | 0 | 7 | 2 | 2 | 0 | 0 | 15 |
| 21/11/2020 | SI | 14:00 | 17:00 | 1 | 1 | NW | 2 | 7 | 2 | 2 | 0 | 0 | 8 |
| 21/11/2020 | SI | 14:00 | 17:00 | 2 | 2 | NW | 2 | 7 | 2 | 2 | 0 | 0 | 8 |
| 21/11/2020 | SI | 14:00 | 17:00 | 3 | 1 | NW | 0 | 7 | 2 | 2 | 0 | 0 | 8 |
| 24/11/2020 | SI | 13:30 | 16:30 | 1 | 1 | W | 0 | 6 | 2 | 2 | 0 | 0 | 7 |
| 24/11/2020 | SI | 13:30 | 16:30 | 2 | 1 | W | 0 | 5 | 2 | 2 | 0 | 0 | 7 |
| 24/11/2020 | SI | 13:30 | 16:30 | 3 | 1 | W | 0 | 5 | 2 | 2 | 0 | 0 | 7 |
| 11/12/2020 | SI | 13:00 | 16:00 | 1 | 2 | E | 0 | 8 | 2 | 2 | 0 | 0 | 11 |
| 11/12/2020 | SI | 13:00 | 16:00 | 2 | 2 | E | 0 | 8 | 2 | 2 | 0 | 0 | 11 |

| Date | Surveyor | Start | End | Survey Hour | Wind Speed | Wind Direction | Rain | Cloud Cover | Cloud Height | Visibility | Snow | Frost | Temp (°C) |
|------------|----------|-------|-------|-------------|------------|----------------|------|-------------|--------------|------------|------|-------|-----------|
| 11/12/2020 | SI | 13:00 | 16:00 | 3 | 2 | E | 0 | 8 | 2 | 2 | 0 | 0 | 11 |
| 17/12/2020 | SI | 09:00 | 12:00 | 1 | 1 | S | 0 | 7 | 2 | 2 | 0 | 0 | 4 |
| 17/12/2020 | SI | 09:00 | 12:00 | 2 | 1 | S | 0 | 8 | 2 | 2 | 0 | 0 | 5 |
| 17/12/2020 | SI | 09:00 | 12:00 | 3 | 1 | S | 0 | 8 | 2 | 2 | 0 | 0 | 5 |
| 20/01/2021 | SI | 13:00 | 16:00 | 1 | 1 | W | 0 | 6 | 2 | 2 | 0 | 0 | 4 |
| 20/01/2021 | SI | 13:00 | 16:00 | 2 | 1 | W | 0 | 5 | 2 | 2 | 0 | 0 | 4 |
| 20/01/2021 | SI | 13:00 | 16:00 | 3 | 1 | W | 0 | 5 | 2 | 2 | 0 | 0 | 4 |
| 21/01/2021 | SI | 09:00 | 12:00 | 1 | 2 | W | 0 | 4 | 2 | 2 | 0 | 0 | 2 |
| 21/01/2021 | SI | 09:00 | 12:00 | 2 | 2 | W | 0 | 4 | 2 | 2 | 0 | 0 | 2 |
| 21/01/2021 | SI | 09:00 | 12:00 | 3 | 2 | W | 0 | 3 | 2 | 2 | 0 | 0 | 3 |
| 12/02/2021 | SI | 12:30 | 15:30 | 1 | 2 | SE | 0 | 8 | 2 | 2 | 0 | 0 | 3 |
| 12/02/2021 | SI | 12:30 | 15:30 | 2 | 1 | SE | 0 | 8 | 2 | 2 | 0 | 0 | 4 |
| 12/02/2021 | SI | 12:30 | 15:30 | 3 | 1 | SE | 0 | 8 | 2 | 2 | 0 | 0 | 4 |
| 17/02/2021 | SI | 10:00 | 13:00 | 1 | 1 | S | 0 | 2 | 2 | 2 | 0 | 0 | 8 |
| 17/02/2021 | SI | 10:00 | 13:00 | 2 | 1 | S | 0 | 2 | 2 | 2 | 0 | 0 | 8 |
| 17/02/2021 | SI | 10:00 | 13:00 | 3 | 2 | S | 0 | 2 | 2 | 2 | 0 | 0 | 10 |
| 10/03/2021 | SI | 13:00 | 16:00 | 1 | 2 | W | 0 | 8 | 2 | 2 | 0 | 0 | 10 |
| 10/03/2021 | SI | 13:00 | 16:00 | 2 | 3 | W | 1 | 8 | 1 | 1 | 0 | 0 | 10 |
| 10/03/2021 | SI | 13:00 | 16:00 | 3 | 4 | W | 3 | 8 | 1 | 1 | 0 | 0 | 10 |
| 16/03/2021 | SI | 10:15 | 13:15 | 1 | 1 | NW | 0 | 0 | 0 | 2 | 0 | 0 | 12 |
| 16/03/2021 | SI | 10:15 | 13:15 | 2 | 2 | NW | 0 | 0 | 0 | 2 | 0 | 0 | 12 |

| Date | Surveyor | Start | End | Survey Hour | Wind Speed | Wind Direction | Rain | Cloud Cover | Cloud Height | Visibility | Snow | Frost | Temp (°c) |
|----------------------------|----------|-------|-------|----------------------------|------------|----------------|--------------------|-------------|--------------|--------------------|------|--------------|-----------|
| 16/03/2021 | SI | 10:15 | 13:15 | 3 | 2 | NW | 0 | 0 | 0 | 2 | 0 | 0 | 13 |
| Rain/ Precipitation | | | | Cloud Cover | | | Visibility | | | Lying Snow | | Frost | |
| None 0 | | | | Expressed in oktas (n/8) | | | Poor (<1km) 0 | | | None 0 | | None 0 | |
| Drizzle 1 | | | | Cloud Height | | | Moderate (1-3km) 1 | | | On site 1 | | Ground 1 | |
| Light showers/snow 2 | | | | Height of cloud above | | | Good (>3km) 2 | | | On higher ground 2 | | All day 2 | |
| Heavy showers/snow 3 | | | | average height of viewshed | | | | | | | | | |
| Heavy rain/snow 4 | | | | <150m 0 | | | | | | | | | |
| | | | | 150-500m 1 | | | | | | | | | |
| | | | | >500m 2 | | | | | | | | | |

Table AII-1: Weather data collected during flight activity surveys undertaken at WF2 VP1

| Date | Surveyor | Start | End | Survey Hour | Wind Speed | Wind Direction | Rain | Cloud Cover | Cloud Height | Visibility | Snow | Frost | Temp (°c) |
|------------|----------|-------|-------|-------------|------------|----------------|------|-------------|--------------|------------|------|-------|-----------|
| 07/10/2020 | SI | 13:00 | 16:00 | 1 | 1 | W | 0 | 8 | 2 | 2 | 0 | 0 | 12 |
| 07/10/2020 | SI | 13:00 | 16:00 | 2 | 1 | W | 2 | 8 | 2 | 2 | 0 | 0 | 12 |
| 07/10/2020 | SI | 13:00 | 16:00 | 3 | 1 | W | 0 | 8 | 2 | 2 | 0 | 0 | 12 |
| 14/10/2020 | SI | 10:15 | 13:15 | 1 | 1 | W | 0 | 1 | 2 | 2 | 0 | 0 | 8 |
| 14/10/2020 | SI | 10:15 | 13:15 | 2 | 2 | W | 0 | 6 | 2 | 2 | 0 | 0 | 8 |
| 14/10/2020 | SI | 10:15 | 13:15 | 3 | 1 | W | 0 | 4 | 2 | 2 | 0 | 0 | 8 |
| 25/11/2020 | SI | 11:00 | 14:00 | 1 | 1 | W | 0 | 2 | 2 | 1 | 0 | 1 | 1 |
| 25/11/2020 | SI | 11:00 | 14:00 | 2 | 1 | W | 0 | 2 | 2 | 2 | 0 | 1 | 1 |
| 25/11/2020 | SI | 11:00 | 14:00 | 3 | 1 | W | 0 | 3 | 2 | 2 | 0 | 1 | 1 |

| Date | Surveyor | Start | End | Survey Hour | Wind Speed | Wind Direction | Rain | Cloud Cover | Cloud Height | Visibility | Snow | Frost | Temp (°C) |
|------------|----------|-------|-------|-------------|------------|----------------|------|-------------|--------------|------------|------|-------|-----------|
| 26/11/2020 | SI | 09:00 | 12:00 | 1 | 1 | W | 0 | 8 | 2 | 2 | 0 | 2 | 3 |
| 26/11/2020 | SI | 09:00 | 12:00 | 2 | 1 | W | 0 | 5 | 2 | 2 | 0 | 2 | 3 |
| 26/11/2020 | SI | 09:00 | 12:00 | 3 | 1 | W | 0 | 8 | 2 | 2 | 0 | 0 | 4 |
| 07/12/2020 | SI | 09:10 | 12:10 | 1 | 4 | NE | 0 | 3 | 2 | 2 | 0 | 1 | 1 |
| 07/12/2020 | SI | 09:10 | 12:10 | 2 | 4 | NE | 0 | 4 | 2 | 2 | 0 | 0 | 1 |
| 07/12/2020 | SI | 09:10 | 12:10 | 3 | 3 | NE | 0 | 3 | 2 | 2 | 0 | 0 | 2 |
| 16/12/2020 | SI | 09:30 | 12:30 | 1 | 3 | W | 0 | 7 | 2 | 2 | 0 | 0 | 4 |
| 16/12/2020 | SI | 09:30 | 12:30 | 2 | 3 | W | 0 | 6 | 2 | 2 | 0 | 0 | 5 |
| 16/12/2020 | SI | 09:30 | 12:30 | 3 | 3 | NW | 0 | 5 | 2 | 2 | 0 | 0 | 5 |
| 22/01/2021 | SI | 09:15 | 12:15 | 1 | 0 | N/A | 0 | 3 | 2 | 2 | 0 | 1 | -1 |
| 22/01/2021 | SI | 09:15 | 12:15 | 2 | 1 | W | 0 | 3 | 2 | 2 | 0 | 1 | 0 |
| 22/01/2021 | SI | 09:15 | 12:15 | 3 | 1 | W | 0 | 1 | 2 | 2 | 0 | 0 | 2 |
| 29/01/2021 | SI | 14:30 | 17:30 | 1 | 1 | W | 1 | 3 | 2 | 2 | 0 | 0 | 9 |
| 29/01/2021 | SI | 14:30 | 17:30 | 2 | 1 | W | 2 | 4 | 2 | 2 | 0 | 0 | 10 |
| 29/01/2021 | SI | 14:30 | 17:30 | 3 | 1 | W | 0 | 7 | 2 | 2 | 0 | 0 | 10 |
| 10/02/2021 | SI | 10:00 | 13:00 | 1 | 4 | NE | 0 | 3 | 2 | 2 | 0 | 1 | -1 |
| 10/02/2021 | SI | 10:00 | 13:00 | 2 | 4 | NE | 0 | 4 | 2 | 2 | 0 | 0 | 1 |
| 10/02/2021 | SI | 10:00 | 13:00 | 3 | 3 | NE | 0 | 3 | 2 | 2 | 0 | 0 | 1 |
| 11/02/2021 | SI | 14:30 | 17:30 | 1 | 4 | SE | 3 | 8 | 2 | 1 | 0 | 0 | 1 |
| 11/02/2021 | SI | 14:30 | 17:30 | 2 | 4 | SE | 0 | 8 | 2 | 2 | 0 | 0 | 1 |
| 11/02/2021 | SI | 14:30 | 17:30 | 3 | 4 | SE | 3 | 8 | 2 | 1 | 0 | 0 | 1 |

| Date | Surveyor | Start | End | Survey Hour | Wind Speed | Wind Direction | Rain | Cloud Cover | Cloud Height | Visibility | Snow | Frost | Temp (°C) |
|----------------------------|----------|-------|-------|----------------------------|------------|----------------|--------------------|-------------|--------------|--------------------|------|--------------|-----------|
| 17/03/2021 | SI | 11:20 | 14:20 | 1 | 3 | W | 0 | 7 | 2 | 2 | 0 | 0 | 9 |
| 17/03/2021 | SI | 11:20 | 14:20 | 2 | 3 | W | 0 | 6 | 2 | 2 | 0 | 0 | 10 |
| 17/03/2021 | SI | 11:20 | 14:20 | 3 | 3 | NW | 0 | 5 | 2 | 2 | 0 | 0 | 10 |
| 18/03/2021 | SI | 11:50 | 14:50 | 1 | 4 | N | 0 | 8 | 2 | 2 | 0 | 0 | 10 |
| 18/03/2021 | SI | 11:50 | 14:50 | 2 | 4 | N | 0 | 7 | 2 | 2 | 0 | 0 | 9 |
| 18/03/2021 | SI | 11:50 | 14:50 | 3 | 4 | N | 0 | 7 | 2 | 2 | 0 | 0 | 9 |
| Rain/ Precipitation | | | | Cloud Cover | | | Visibility | | | Lying Snow | | Frost | |
| None 0 | | | | Expressed in oktas (n/8) | | | Poor (<1km) 0 | | | None 0 | | None 0 | |
| Drizzle 1 | | | | Cloud Height | | | Moderate (1-3km) 1 | | | On site 1 | | Ground 1 | |
| Light showers/snow 2 | | | | Height of cloud above | | | Good (>3km) 2 | | | On higher ground 2 | | All day 2 | |
| Heavy showers/snow 3 | | | | average height of viewshed | | | | | | | | | |
| Heavy rain/snow 4 | | | | <150m 0 | | | | | | | | | |
| | | | | 150-500m 1 | | | | | | | | | |
| | | | | >500m 2 | | | | | | | | | |

Table AII-1: Weather data collected during flight activity surveys undertaken at WF2 VP2

| Date | Surveyor | Start | End | Survey Hour | Wind Speed | Wind Direction | Rain | Cloud Cover | Cloud Height | Visibility | Snow | Frost | Temp (°C) |
|------------|----------|-------|-------|-------------|------------|----------------|------|-------------|--------------|------------|------|-------|-----------|
| 07/10/2020 | SI | 09:30 | 12:30 | 1 | 2 | W | 0 | 7 | 2 | 2 | 0 | 0 | 11 |
| 07/10/2020 | SI | 09:30 | 12:30 | 2 | 2 | W | 0 | 6 | 2 | 2 | 0 | 0 | 11 |
| 07/10/2020 | SI | 09:30 | 12:30 | 3 | 2 | W | 0 | 7 | 2 | 2 | 0 | 0 | 12 |
| 14/10/2020 | SI | 14:15 | 17:15 | 1 | 1 | W | 0 | 2 | 2 | 2 | 0 | 0 | 3 |

| Date | Surveyor | Start | End | Survey Hour | Wind Speed | Wind Direction | Rain | Cloud Cover | Cloud Height | Visibility | Snow | Frost | Temp (°C) |
|------------|----------|-------|-------|-------------|------------|----------------|------|-------------|--------------|------------|------|-------|-----------|
| 14/10/2020 | SI | 14:15 | 17:15 | 2 | 1 | W | 0 | 6 | 2 | 2 | 0 | 0 | 4 |
| 14/10/2020 | SI | 14:15 | 17:15 | 3 | 1 | W | 0 | 7 | 2 | 2 | 0 | 0 | 5 |
| 27/11/2020 | SI | 09:00 | 12:00 | 1 | 1 | SE | 0 | 6 | 2 | 2 | 0 | 0 | 4 |
| 27/11/2020 | SI | 09:00 | 12:00 | 2 | 1 | SE | 0 | 7 | 2 | 2 | 0 | 0 | 4 |
| 27/11/2020 | SI | 09:00 | 12:00 | 3 | 2 | S | 0 | 7 | 2 | 2 | 0 | 0 | 3 |
| 26/11/2020 | SI | 12:20 | 15:30 | 1 | 1 | W | 0 | 6 | 2 | 2 | 0 | 0 | 8 |
| 26/11/2020 | SI | 12:20 | 15:30 | 2 | 1 | W | 0 | 7 | 2 | 2 | 0 | 0 | 9 |
| 26/11/2020 | SI | 12:20 | 15:30 | 3 | 1 | W | 0 | 5 | 2 | 2 | 0 | 0 | 9 |
| 07/12/2020 | SI | 13:00 | 16:00 | 1 | 1 | W | 0 | 2 | 2 | 2 | 0 | 0 | 4 |
| 07/12/2020 | SI | 13:00 | 16:00 | 2 | 1 | W | 0 | 6 | 2 | 2 | 0 | 0 | 4 |
| 07/12/2020 | SI | 13:00 | 16:00 | 3 | 1 | W | 0 | 7 | 2 | 2 | 0 | 0 | 5 |
| 10/12/2020 | SI | 08:45 | 11:45 | 1 | 1 | W | 0 | 6 | 2 | 2 | 0 | 0 | 7 |
| 10/12/2020 | SI | 08:45 | 11:45 | 2 | 1 | W | 1 | 8 | 1 | 1 | 0 | 0 | 7 |
| 10/12/2020 | SI | 08:45 | 11:45 | 3 | 1 | W | 0 | 5 | 2 | 2 | 0 | 0 | 9 |
| 22/01/2021 | SI | 12:45 | 15:45 | 1 | 1 | W | 0 | 2 | 2 | 2 | 0 | 0 | 3 |
| 22/01/2021 | SI | 12:45 | 15:45 | 2 | 1 | W | 0 | 6 | 2 | 2 | 0 | 0 | 4 |
| 22/01/2021 | SI | 12:45 | 15:45 | 3 | 1 | W | 0 | 7 | 2 | 2 | 0 | 0 | 5 |
| 29/01/2021 | SI | 09:10 | 12:10 | 1 | 1 | W | 0 | 6 | 2 | 2 | 0 | 0 | 8 |
| 29/01/2021 | SI | 09:10 | 12:10 | 2 | 1 | W | 1 | 8 | 1 | 1 | 0 | 0 | 9 |
| 29/01/2021 | SI | 09:10 | 12:10 | 3 | 1 | W | 0 | 5 | 2 | 2 | 0 | 0 | 9 |
| 10/02/2021 | SI | 13:30 | 16:30 | 1 | 3 | NE | 0 | 4 | 2 | 2 | 0 | 0 | 3 |

| Date | Surveyor | Start | End | Survey Hour | Wind Speed | Wind Direction | Rain | Cloud Cover | Cloud Height | Visibility | Snow | Frost | Temp (°C) |
|----------------------------|----------|-------|----------------------------|-------------|------------|--------------------|------|-------------|--------------------|------------|------|--------------|-----------|
| 10/02/2021 | SI | 13:30 | 16:30 | 2 | 4 | NE | 0 | 5 | 2 | 2 | 0 | 0 | 2 |
| 10/02/2021 | SI | 13:30 | 16:30 | 3 | 3 | NE | 0 | 4 | 2 | 2 | 0 | 0 | 1 |
| 11/02/2021 | SI | 09:20 | 12:20 | 1 | 5 | SE | 0 | 2 | 2 | 2 | 0 | 0 | -1 |
| 11/02/2021 | SI | 09:20 | 12:20 | 2 | 4 | SE | 0 | 2 | 2 | 2 | 0 | 0 | -1 |
| 11/02/2021 | SI | 09:20 | 12:20 | 3 | 4 | SE | 0 | 2 | 2 | 2 | 0 | 0 | -1 |
| 17/03/2021 | SI | 14:50 | 17:50 | 1 | 2 | NW | 0 | 3 | 2 | 2 | 0 | 0 | 12 |
| 17/03/2021 | SI | 14:50 | 17:50 | 2 | 1 | NW | 0 | 2 | 2 | 2 | 0 | 0 | 12 |
| 17/03/2021 | SI | 14:50 | 17:50 | 3 | 1 | NW | 0 | 3 | 2 | 2 | 0 | 0 | 11 |
| 18/03/2021 | SI | 08:20 | 11:20 | 1 | 1 | N | 1 | 8 | 1 | 1 | 0 | 0 | 8.5 |
| 18/03/2021 | SI | 08:20 | 11:20 | 2 | 1 | N | 0 | 8 | 1 | 1 | 0 | 0 | 8.5 |
| 18/03/2021 | SI | 08:20 | 11:20 | 3 | 2 | N | 0 | 8 | 1 | 1 | 0 | 0 | 9 |
| Rain/ Precipitation | | | Cloud Cover | | | Visibility | | | Lying Snow | | | Frost | |
| None 0 | | | Expressed in oktas (n/8) | | | Poor (<1km) 0 | | | None 0 | | | None 0 | |
| Drizzle 1 | | | Cloud Height | | | Moderate (1-3km) 1 | | | On site 1 | | | Ground 1 | |
| Light showers/snow 2 | | | Height of cloud above | | | Good (>3km) 2 | | | On higher ground 2 | | | All day 2 | |
| Heavy showers/snow 3 | | | average height of viewshed | | | | | | | | | | |
| Heavy rain/snow 4 | | | <150m 0 | | | | | | | | | | |
| | | | 150-500m 1 | | | | | | | | | | |
| | | | >500m 2 | | | | | | | | | | |

Table AII-1: Weather data collected during flight activity surveys undertaken at WF2, VP3

| Date | Surveyor | Start | End | Survey Hour | Wind Speed | Wind Direction | Rain | Cloud Cover | Cloud Height | Visibility | Snow | Frost | Temp (°C) |
|------------|----------|-------|-------|-------------|------------|----------------|------|-------------|--------------|------------|------|-------|-----------|
| 21/10/2020 | SI | 10:30 | 13:30 | 1 | 2 | NW | 1 | 8 | 2 | 1 | 0 | 0 | 7 |
| 21/10/2020 | SI | 10:30 | 13:30 | 2 | 2 | NW | 1 | 7 | 2 | 1 | 0 | 0 | 7 |
| 21/10/2020 | SI | 10:30 | 13:30 | 3 | 2 | NW | 2 | 7 | 2 | 2 | 0 | 0 | 8 |
| 07/10/2020 | SI | 13:00 | 14:15 | 1 | 2 | W | 0 | 4 | 2 | 2 | 0 | 0 | 10 |
| 07/10/2020 | SI | 13:00 | 14:15 | 2 | 2 | W | 0 | 6 | 2 | 2 | 0 | 0 | 9 |
| 19/11/2020 | SI | 09:45 | 12:45 | 1 | 2 | SW | 0 | 3 | 2 | 2 | 0 | 0 | 5 |
| 19/11/2020 | SI | 09:45 | 12:45 | 2 | 1 | SW | 0 | 7 | 2 | 2 | 0 | 0 | 5 |
| 19/11/2020 | SI | 09:45 | 12:45 | 3 | 1 | SW | 0 | 4 | 2 | 2 | 0 | 0 | 5 |
| 20/11/2020 | SI | 12:40 | 15:40 | 1 | 3 | SW | 0 | 8 | 1 | 2 | 0 | 0 | 12 |
| 20/11/2020 | SI | 12:40 | 15:40 | 2 | 4 | SW | 0 | 8 | 2 | 2 | 0 | 0 | 12 |
| 20/11/2020 | SI | 12:40 | 15:40 | 3 | 4 | SW | 0 | 8 | 2 | 2 | 0 | 0 | 12 |
| 08/12/2020 | SI | 13:15 | 16:15 | 1 | 2 | NW | 0 | 2 | 2 | 2 | 0 | 0 | 5 |
| 08/12/2020 | SI | 13:15 | 16:15 | 2 | 1 | NW | 2 | 7 | 2 | 2 | 0 | 0 | 6 |
| 08/12/2020 | SI | 13:15 | 16:15 | 3 | 2 | NW | 0 | 3 | 2 | 2 | 0 | 0 | 6 |
| 09/12/2020 | SI | 09:30 | 12:30 | 1 | 1 | W | 2 | 8 | 2 | 2 | 0 | 0 | 4 |
| 09/12/2020 | SI | 09:30 | 12:30 | 2 | 1 | W | 2 | 8 | 2 | 2 | 0 | 0 | 4 |
| 09/12/2020 | SI | 09:30 | 12:30 | 3 | 1 | W | 2 | 8 | 2 | 2 | 0 | 0 | 4 |
| 27/01/2021 | SI | 14:00 | 17:00 | 1 | 1 | W | 2 | 8 | 0 | 0 | 0 | 0 | 8 |
| 27/01/2021 | SI | 14:00 | 17:00 | 2 | 1 | W | 2 | 8 | 1 | 1 | 0 | 0 | 8 |
| 27/01/2021 | SI | 14:00 | 17:00 | 3 | 1 | W | 2 | 8 | 1 | 1 | 0 | 0 | 8 |

| Date | Surveyor | Start | End | Survey Hour | Wind Speed | Wind Direction | Rain | Cloud Cover | Cloud Height | Visibility | Snow | Frost | Temp (°C) |
|--|----------|-------|-------|---|------------|----------------|---|-------------|--------------|--|------|---|-----------|
| 28/01/2021 | SI | 09:30 | 12:30 | 1 | 1 | S | 0 | 8 | 2 | 2 | 0 | 0 | 10 |
| 28/01/2021 | SI | 09:30 | 12:30 | 2 | 1 | S | 0 | 8 | 2 | 2 | 0 | 0 | 10 |
| 28/01/2021 | SI | 09:30 | 12:30 | 3 | 1 | S | 0 | 8 | 2 | 2 | 0 | 0 | 11 |
| 18/01/2021 | SI | 12:50 | 15:50 | 1 | 3 | SW | 0 | 5 | 2 | 2 | 0 | 0 | 7 |
| 18/01/2021 | SI | 12:50 | 15:50 | 2 | 2 | SW | 2 | 4 | 2 | 2 | 0 | 0 | 8 |
| 18/01/2021 | SI | 12:50 | 15:50 | 3 | 2 | SW | 0 | 5 | 2 | 2 | 0 | 0 | 8 |
| 19/01/2021 | SI | 09:30 | 12:30 | 1 | 2 | S | 2 | 8 | 2 | 2 | 0 | 0 | 10 |
| 19/01/2021 | SI | 09:30 | 12:30 | 2 | 4 | S | 2 | 8 | 2 | 2 | 0 | 0 | 10 |
| 19/01/2021 | SI | 09:30 | 12:30 | 3 | 3 | S | 3 | 8 | 1 | 1 | 0 | 0 | 10 |
| 11/03/2021 | SI | 12:15 | 15:15 | 1 | 3 | W | 0 | 4 | 2 | 2 | 0 | 0 | 6.5 |
| 11/03/2021 | SI | 12:15 | 15:15 | 2 | 3 | W | 3 | 8 | 2 | 2 | 0 | 0 | 6 |
| 11/03/2021 | SI | 12:15 | 15:15 | 3 | 3 | W | 0 | 3 | 2 | 2 | 0 | 0 | 6 |
| 12/03/2021 | SI | 08:45 | 11:45 | 1 | 1 | W | 6 | 6 | 2 | 2 | 0 | 0 | 3.5 |
| 12/03/2021 | SI | 08:45 | 11:45 | 2 | 2 | W | 5 | 5 | 2 | 2 | 0 | 0 | 3.5 |
| 12/03/2021 | SI | 08:45 | 11:45 | 3 | 2 | W | 5 | 5 | 2 | 0 | 0 | 0 | 3.5 |
| Rain/ Precipitation None 0 Drizzle 1 Light showers/snow 2 Heavy showers/snow 3 Heavy rain/snow 4 | | | | Cloud Cover Expressed in oktas (n/8) Cloud Height Height of cloud above average height of viewshed <150m 0 150-500m 1 >500m 2 | | | Visibility Poor (<1km) 0 Moderate (1-3km) 1 Good (>3km) 2 | | | Lying Snow None 0 On site 1 On higher ground 2 | | Frost None 0 Ground 1 All day 2 | |

Table AII-1: Weather data collected during flight activity surveys undertaken at WF2, VP4

| Date | Surveyor | Start | End | Survey Hour | Wind Speed | Wind Direction | Rain | Cloud Cover | Cloud Height | Visibility | Snow | Frost | Temp (°C) |
|------------|----------|-------|-------|-------------|------------|----------------|------|-------------|--------------|------------|------|-------|-----------|
| 21/10/2020 | SI | 14:00 | 17:00 | 1 | 1 | NW | 2 | 7 | 2 | 2 | 0 | 0 | 8 |
| 21/10/2020 | SI | 14:00 | 17:00 | 2 | 2 | NW | 2 | 7 | 2 | 2 | 0 | 0 | 8 |
| 21/10/2020 | SI | 14:00 | 17:00 | 3 | 1 | NW | 0 | 7 | 2 | 2 | 0 | 0 | 8 |
| 22/10/2020 | SI | 09:30 | 12:30 | 1 | 1 | W | 0 | 2 | 2 | 2 | 0 | 0 | 10 |
| 22/10/2020 | SI | 09:30 | 12:30 | 2 | 1 | W | 0 | 2 | 2 | 2 | 0 | 0 | 10 |
| 22/10/2020 | SI | 09:30 | 12:30 | 3 | 1 | W | 0 | 1 | 2 | 2 | 0 | 0 | 11 |
| 20/11/2020 | SI | 09:00 | 12:00 | 1 | 2 | SW | 1 | 8 | 1 | 0 | 0 | 0 | 11 |
| 20/11/2020 | SI | 09:00 | 12:00 | 2 | 2 | SW | 1 | 8 | 1 | 1 | 0 | 0 | 11 |
| 20/11/2020 | SI | 09:00 | 12:00 | 3 | 2 | SW | 0 | 8 | 2 | 1 | 0 | 0 | 12 |
| 19/11/2020 | SI | 13:20 | 16:20 | 1 | 1 | W | 0 | 5 | 2 | 2 | 0 | 0 | 7 |
| 19/11/2020 | SI | 13:20 | 16:20 | 2 | 1 | W | 0 | 8 | 2 | 2 | 0 | 0 | 8 |
| 19/11/2020 | SI | 13:20 | 16:20 | 3 | 1 | W | 0 | 8 | 2 | 2 | 0 | 0 | 8 |
| 08/12/2020 | SI | 09:40 | 12:40 | 1 | 1 | NW | 0 | 4 | 1 | 2 | 0 | 0 | 6 |
| 08/12/2020 | SI | 09:40 | 12:40 | 2 | 2 | NW | 2 | 5 | 1 | 2 | 0 | 0 | 6 |
| 08/12/2020 | SI | 09:40 | 12:40 | 3 | 2 | NW | 0 | 4 | 1 | 2 | 0 | 0 | 6 |
| 09/12/2020 | SI | 13:00 | 16:00 | 1 | 1 | W | 1 | 8 | 1 | 1 | 0 | 0 | 5 |
| 09/12/2020 | SI | 13:00 | 16:00 | 2 | 1 | W | 1 | 8 | 1 | 1 | 0 | 0 | 5 |
| 09/12/2020 | SI | 13:00 | 16:00 | 3 | 1 | W | 1 | 8 | 1 | 1 | 0 | 0 | 5 |
| 27/01/2021 | SI | 11:00 | 14:00 | 1 | 1 | S | 1 | 8 | 0 | 0 | 0 | 0 | 8 |
| 27/01/2021 | SI | 11:00 | 14:00 | 2 | 1 | S | 1 | 8 | 0 | 0 | 0 | 0 | 8 |

| Date | Surveyor | Start | End | Survey Hour | Wind Speed | Wind Direction | Rain | Cloud Cover | Cloud Height | Visibility | Snow | Frost | Temp (°c) |
|---------------------|----------|----------------------------|-------------|-------------|--------------------|----------------|------|------------------|--------------|------------|------|-------|-----------|
| 27/01/2021 | SI | 11:00 | 14:00 | 3 | 1 | S | 1 | 8 | 0 | 1 | 0 | 0 | 9 |
| 28/01/2021 | SI | 13:15 | 16:15 | 1 | 1 | S | 0 | 8 | 2 | 2 | 0 | 0 | 10 |
| 28/01/2021 | SI | 13:15 | 16:15 | 2 | 1 | S | 3 | 8 | 2 | 2 | 0 | 0 | 10 |
| 28/01/2021 | SI | 13:15 | 16:15 | 3 | 1 | S | 3 | 8 | 1 | 1 | 0 | 0 | 10 |
| 18/01/2021 | SI | 09:10 | 12:10 | 1 | 2 | SE | 0 | 7 | 2 | 2 | 0 | 0 | 4.5 |
| 18/01/2021 | SI | 09:10 | 12:10 | 2 | 2 | SE | 0 | 8 | 2 | 2 | 0 | 0 | 5 |
| 18/01/2021 | SI | 09:10 | 12:10 | 3 | 2 | SE | 0 | 4 | 2 | 2 | 0 | 0 | 5 |
| 19/01/2021 | SI | 13:00 | 16:00 | 1 | 3 | S | 2 | 8 | 1 | 1 | 0 | 0 | 10 |
| 19/01/2021 | SI | 13:00 | 16:00 | 2 | 1 | S | 0 | 7 | 2 | 2 | 0 | 0 | 10 |
| 19/01/2021 | SI | 13:00 | 16:00 | 3 | 2 | S | 0 | 8 | 2 | 2 | 0 | 0 | 11 |
| 11/03/2021 | SI | 08:45 | 11:45 | 1 | 1 | W | 0 | 4 | 2 | 2 | 0 | 0 | 4.5 |
| 11/03/2021 | SI | 08:45 | 11:45 | 2 | 2 | W | 2 | 6 | 2 | 2 | 0 | 0 | 5 |
| 11/03/2021 | SI | 08:45 | 11:45 | 3 | 2 | W | 3 | 5 | 2 | 2 | 0 | 0 | 5 |
| 12/03/2021 | SI | 12:20 | 15:20 | 1 | 2 | W | 0 | 6 | 2 | 2 | 0 | 0 | 7.5 |
| 12/03/2021 | SI | 12:20 | 15:20 | 2 | 2 | W | 0 | 3 | 2 | 2 | 0 | 0 | 7.5 |
| 12/03/2021 | SI | 12:20 | 15:20 | 3 | 2 | W | 0 | 7 | 2 | 2 | 0 | 0 | 7.5 |
| | | | | | | | | | | | | | |
| Rain/ Precipitation | | | Cloud Cover | | | Visibility | | | Lying Snow | | | Frost | |
| None | 0 | Expressed in oktas (n/8) | | | Poor (<1km) 0 | | | None | | | 0 | | |
| Drizzle | 1 | Cloud Height | | | Moderate (1-3km) 1 | | | On site | | | 1 | | |
| Light showers/snow | 2 | Height of cloud above | | | Good (>3km) 2 | | | On higher ground | | | 2 | | |
| Heavy showers/snow | 3 | average height of viewshed | | | | | | | | | | | |
| Heavy rain/snow | 4 | <150m 0 | | | | | | | | | | | |

| Date | Surveyor | Start | End | Survey Hour | Wind Speed | Wind Direction | Rain | Cloud Cover | Cloud Height | Visibility | Snow | Frost | Temp (°C) |
|------|----------|-------|-------------------|-------------|------------|----------------|------|-------------|--------------|------------|------|-------|-----------|
| | | | 150-500m >500m | 1 2 | | | | | | | | | |

APPENDIX III

Flight activity survey data

Primary Target Species

Table All-1: Primary target species recorded during flight activity surveys undertaken at WF1 VP1

| Date | Surveyor | Flight ID | Species | Num. Birds | Age | Sex | Obs. Time | Flight time (s) |
|------------|----------|-----------|---------|------------|-----|-----|-----------|-----------------|
| 06/10/2020 | SI | 1 | GP | 17 | U | U | 09:33 | 60 |

Table All-2: Primary target species recorded during flight activity surveys undertaken at WF1 VP2

| Date | Surveyor | Flight ID | Species | Num. Birds | Age | Sex | Obs. Time | Flight time (s) |
|------------|----------|-----------|---------|------------|-----|-----|-----------|-----------------|
| 05/10/2020 | SI | 1 | WS | 9 | Ad | U | 11:55 | 90 |
| 05/10/2020 | SI | 2 | GP | 15 | U | U | 12:46 | 45 |
| 06/10/2020 | SI | 1 | WS | 1 | Ad | U | 14:05 | 90 |
| 17/12/2020 | SI | 1 | GP | 60 | U | U | 09:15 | 45 |
| 17/12/2020 | SI | 2 | WS | 4 | Ad | U | 09:32 | 105 |
| 17/12/2020 | SI | 3 | WS | 2 | Ad | U | 10:00 | 75 |
| 17/12/2020 | SI | 4 | WS | 3 | Ad | U | 10:04 | 60 |
| 17/12/2020 | SI | 5 | WS | 5 | Ad | U | 10:07 | 75 |
| 17/12/2020 | SI | 7 | WS | 5 | Ad | U | 11:08 | 60 |
| 17/12/2020 | SI | 8 | WS | 5 | Ad | U | 11:29 | 75 |
| 12/02/2021 | SI | 1 | L. | 10 | U | U | 14:17 | 45 |
| 12/02/2021 | SI | 2 | L. | 10 | U | U | 14:24 | 45 |
| 12/02/2021 | SI | 3 | GP | 15 | U | U | 15:06 | 60 |
| 12/02/2021 | SI | 4 | PE | 1 | Ad | F | 15:07 | 60 |
| 17/02/2021 | SI | 1 | WS | 2 | Ad | U | 11:24 | 75 |
| 17/02/2021 | SI | 2 | L. | 40 | Ad | U | 12:17 | 30 |
| 10/03/2021 | SI | 1 | WS | 6 | Ad | U | 13:£1 | 45 |
| 10/03/2021 | SI | 2 | WS | 2 | Ad | U | 13:46 | 30 |
| 10/03/2021 | SI | 3 | WS | 4 | Ad | U | 14:01 | 30 |
| 10/03/2021 | SI | 4 | WS | 6 | Ad | U | 15:12 | 30 |
| 10/03/2021 | SI | 5 | WN | 35 | Ad | U | 15:20 | 30 |
| 10/03/2021 | SI | 6 | WS | 4 | Ad | U | 15:30 | 30 |

Table All-2: Primary target species recorded during flight activity surveys undertaken at WF2 VP1

| Date | Surveyor | Flight ID | Species | Num. Birds | Sex | Age | Obs. Time | Flight time (s) |
|------------|----------|-----------|---------|------------|-----|-----|-----------|-----------------|
| 17/03/2021 | SI | 1 | PE | 1 | U | Ad | 13:04 | 165 |

Table All-3: Primary target species recorded during flight activity surveys undertaken at WF2 VP2

| Date | Surveyor | Flight ID | Species | Num. Birds | Age | Sex | Obs. Time | Flight time (s) |
|------------|----------|-----------|---------|------------|-------------|-----|-----------|-----------------|
| 27/11/2020 | SI | 1 | WS | 6 | 3 Ad; 3 Juv | U | 10:52 | 60 |

Table All-2: Primary target species recorded during flight activity surveys undertaken at WF2 VP3

| Date | Surveyor | Flight ID | Species | Num. Birds | Age | Sex | Obs. Time | Flight time (s) |
|------------|----------|-----------|---------|------------|-----|-----|-----------|-----------------|
| 19/11/2020 | SI | 1 | WS | 5 | Ad | U | 10:10 | 45 |
| 08/12/2020 | SI | 3 | L | 50 | Ad | U | 14:16 | 45 |
| 08/12/2020 | SI | 4 | L | 20 | Ad | U | 14:16 | 45 |
| 08/12/2020 | SI | 6 | GP | 40 | U | U | 14:20 | 135 |
| 08/12/2020 | SI | 7 | L | 50 | U | U | 15:27 | 75 |
| 08/12/2020 | SI | 8 | WS | 5 | Ad | U | 15:42 | 60 |
| 08/12/2020 | SI | 9 | L | 40 | Ad | U | 15:45 | 60 |
| 08/12/2020 | SI | 10 | GP | 10 | Ad | U | 15:48 | 75 |
| 09/12/2020 | SI | 1 | L | 50 | U | U | 09:54 | 150 |
| 09/12/2020 | SI | 2 | GP | 35 | U | U | 09:58 | 240 |
| 09/12/2020 | SI | 3 | L | 50 | U | U | 10:03 | 135 |
| 09/12/2020 | SI | 4 | WN | 120 | U | U | 10:45 | 120 |
| 09/12/2020 | SI | 5 | GP | 35 | U | U | 10:45 | 60 |
| 09/12/2020 | SI | 6 | L | 50 | U | U | 10:47 | 90 |
| 09/12/2020 | SI | 7 | WN | 17 | U | U | 11:34 | 60 |
| 09/12/2020 | SI | 8 | WS | 5 | Ad | U | 12:10 | 75 |
| 27/01/2021 | SI | 1 | WN | 21 | U | U | 14:54 | 45 |
| 28/01/2021 | SI | 1 | WS | 4 | Ad | U | 10:52 | 75 |
| 28/01/2021 | SI | 2 | WS | 1 | Ad | U | 11:45 | 60 |
| 18/02/2021 | SI | 1 | WS | 7 | Ad | U | 13:24 | 75 |
| 18/02/2021 | SI | 2 | WN | 30 | Ad | U | 14:28 | 45 |
| 19/02/2021 | SI | 1 | WN | 3 | Ad | M | 10:16 | 30 |
| 12/03/2021 | SI | 1 | WS | 2 | Ad | U | 09:15 | 45 |
| 12/03/2021 | SI | 2 | WN | 60 | U | U | 09:33 | 30 |
| 12/03/2021 | SI | 3 | WN | 40 | U | U | 10:29 | 30 |

Table All-2: Primary target species recorded during flight activity surveys undertaken at WF2 VP4

| Date | Surveyor | Flight ID | Species | Num. Birds | M/F | Age | Obs. Time | Flight time (s) |
|------------|----------|-----------|---------|------------|-----|-----|-----------|-----------------|
| 21/10/2020 | SI | 1 | WG | 50 | U | U | 15:50 | 45 |
| 22/10/2020 | SI | 1 | PE | 1 | U | Ad | 10:57 | 60 |
| 08/12/2020 | SI | 3 | L | 3 | U | Ad | 11:26 | 60 |
| 27/01/2021 | SI | 1 | GP | 2 | U | Ad | 13:33 | 45 |

Secondary Target Species

Table AIII-1b: Secondary target species recorded during flight activity surveys undertaken at WF1 VP1

| Date | Survey Start | Survey End | Species | Count | 5 min period |
|----------|--------------|------------|---------|-------|--------------|
| 06/10/20 | 09:30 | 12:30 | SN | 1 | 10:00 |
| 06/10/20 | 09:30 | 12:30 | RN | 2 | 10:35 |
| 06/10/20 | 12:45 | 15:45 | RN | 1 | 11:15 |
| 06/10/20 | 12:45 | 15:45 | BZ | 1 | 11:30 |
| 18/11/20 | 12:45 | 15:45 | RN | 1 | 15:40 |
| 18/11/20 | 12:45 | 15:45 | K | 1 | 15:40 |
| 24/11/20 | 12:45 | 15:45 | RN | 2 | 08:55 |
| 17/12/20 | 12:45 | 15:45 | RN | 2 | 13:20 |
| 19/01/21 | 09:00 | 12:00 | RN | 3 | 10:05 |
| 19/01/21 | 15:00 | 18:00 | BZ | 1 | 11:15 |
| 21/01/21 | 15:00 | 18:00 | RN | 1 | 12:50 |
| 21/01/21 | 15:00 | 18:00 | RN | 4 | 13:25 |
| 21/01/21 | 10:00 | 13:00 | BZ | 1 | 14:15 |
| 21/01/21 | 10:00 | 13:00 | RN | 1 | 14:45 |
| 21/01/21 | 13:45 | 14:05 | RN | 2 | 15:05 |
| 21/01/21 | 13:45 | 14:05 | BZ | 1 | 15:40 |
| 12/02/21 | 13:45 | 14:05 | RN | 3 | 11:45 |
| 17/02/21 | 13:45 | 14:05 | BH | 2 | 15:30 |
| 17/02/21 | 13:45 | 14:05 | RN | 3 | 16:45 |
| 17/02/21 | 09:30 | 12:30 | RN | 1 | 17:05 |
| 09/03/21 | 09:30 | 12:30 | RN | 1 | 10:15 |
| 09/03/21 | 12:45 | 15:45 | BZ | 1 | 11:45 |
| 16/03/21 | 12:45 | 15:45 | RN | 1 | 14:00 |
| 16/03/21 | 12:45 | 15:45 | BZ | 1 | 14:25 |
| 16/03/21 | 12:45 | 15:45 | BZ | 1 | 14:30 |
| 16/03/21 | 12:45 | 15:45 | BZ | 1 | 15:00 |
| 16/03/21 | 12:45 | 15:45 | BZ | 1 | 15:05 |

Table AIII-2b: Secondary target species recorded during flight activity surveys undertaken at WF1 VP2

| Date | Survey Start | Survey End | Species | Count | 5 min period |
|----------|--------------|------------|---------|-------|--------------|
| 05/10/20 | 11:00 | 14:00 | RN | 2 | 12:15 |
| 05/10/20 | 11:00 | 14:00 | BZ | 1 | 13:30 |

| Date | Survey Start | Survey End | Species | Count | 5 min period |
|----------|--------------|------------|---------|-------|--------------|
| 05/10/20 | 11:00 | 14:00 | BZ | 2 | 13:45 |
| 21/10/20 | 14:00 | 17:00 | K | 1 | 15:25 |
| 17/12/20 | 09:00 | 12:00 | RN | 1 | 09:20 |
| 20/01/21 | 13:00 | 16:00 | BH | 5 | 13:05 |
| 20/01/21 | 13:00 | 16:00 | BH | 4 | 13:10 |
| 20/01/21 | 13:00 | 16:00 | BH | 2 | 13:25 |
| 20/01/21 | 13:00 | 16:00 | BZ | 2 | 14:30 |
| 20/01/21 | 13:00 | 16:00 | BZ | 2 | 15:05 |
| 21/01/21 | 09:00 | 12:00 | BH | 10 | 09:05 |
| 21/01/21 | 09:00 | 12:00 | RN | 2 | 10:10 |
| 12/02/21 | 12:30 | 15:30 | BH | 3 | 13:00 |
| 12/02/21 | 12:30 | 15:30 | BH | 2 | 13:45 |
| 12/02/21 | 12:30 | 15:30 | BH | 7 | 13:50 |
| 12/02/21 | 12:30 | 15:30 | BH | 25 | 13:55 |
| 12/02/21 | 12:30 | 15:30 | BH | 15 | 14:50 |
| 12/02/21 | 12:30 | 15:30 | BH | 3 | 14:55 |
| 12/02/21 | 12:30 | 15:30 | BH | 20 | 15:05 |
| 17/02/21 | 10:00 | 13:00 | BH | 2 | 10:00 |
| 17/02/21 | 10:00 | 13:00 | BH | 3 | 10:15 |
| 17/02/21 | 10:00 | 13:00 | BH | 10 | 10:25 |
| 17/02/21 | 10:00 | 13:00 | BH | 3 | 10:50 |
| 17/02/21 | 10:00 | 13:00 | BH | 2 | 11:20 |
| 17/02/21 | 10:00 | 13:00 | BH | 8 | 11:40 |
| 17/02/21 | 10:00 | 13:00 | BH | 2 | 12:05 |
| 17/02/21 | 10:00 | 13:00 | BH | 8 | 12:15 |
| 17/02/21 | 10:00 | 13:00 | BH | 2 | 12:40 |
| 10/03/21 | 13:00 | 16:00 | BH | 1 | 13:00 |
| 10/03/21 | 13:00 | 16:00 | BH | 40 | 13:10 |
| 10/03/21 | 13:00 | 16:00 | BH | 22 | 13:15 |
| 10/03/21 | 13:00 | 16:00 | BH | 60 | 13:20 |
| 10/03/21 | 13:00 | 16:00 | BH | 10 | 15:30 |
| 16/03/21 | 10:15 | 13:15 | BH | 2 | 10:15 |
| 16/03/21 | 10:15 | 13:15 | BH | 4 | 10:30 |
| 16/03/21 | 10:15 | 13:15 | BH | 3 | 11:40 |
| 16/03/21 | 10:15 | 13:15 | BH | 8 | 11:55 |

| Date | Survey Start | Survey End | Species | Count | 5 min period |
|----------|--------------|------------|---------|-------|--------------|
| 16/03/21 | 10:15 | 13:15 | BH | 3 | 12:15 |
| 16/03/21 | 10:15 | 13:15 | BH | 4 | 12:45 |
| 16/03/21 | 10:15 | 13:15 | LB | 4 | 12:50 |
| 16/03/21 | 10:15 | 13:15 | BH | 3 | 13:05 |

Table AIII-3b: Secondary target species recorded during flight activity surveys undertaken at WF2 VP1

| Date | Survey Start | Survey End | Species | Count | 5 min period |
|----------|--------------|------------|---------|-------|--------------|
| 25/11/20 | 11:00 | 14:00 | K | 1 | 12:25 |
| 25/11/20 | 11:00 | 14:00 | K | 1 | 12:40 |
| 25/11/20 | 11:00 | 14:00 | RN | 2 | 12:45 |
| 25/11/20 | 11:00 | 14:00 | K | 1 | 12:45 |
| 25/11/20 | 11:00 | 14:00 | CO | 2 | 12:45 |
| 26/11/20 | 09:00 | 12:00 | RN | 2 | 10:05 |
| 26/11/20 | 09:00 | 12:00 | K | 1 | 10:45 |
| 26/11/20 | 09:00 | 12:00 | BZ | 2 | 11:10 |
| 26/11/20 | 09:00 | 12:00 | RN | 2 | 11:30 |
| 22/01/21 | 09:15 | 12:15 | RN | 1 | 10:10 |
| 22/01/21 | 09:15 | 12:15 | RN | 2 | 10:25 |
| 22/01/21 | 09:15 | 12:15 | RN | 2 | 11:00 |
| 22/01/21 | 09:15 | 12:15 | H | 1 | 11:00 |
| 10/02/21 | 10:00 | 13:00 | H | 2 | 10:30 |
| 10/02/21 | 10:00 | 13:00 | BH | 1 | 11:15 |
| 10/02/21 | 10:00 | 13:00 | RN | 1 | 11:35 |
| 10/02/21 | 10:00 | 13:00 | RN | 2 | 11:40 |
| 10/02/21 | 10:00 | 13:00 | BZ | 1 | 11:50 |
| 10/02/21 | 10:00 | 13:00 | H | 1 | 12:00 |
| 11/02/21 | 14:30 | 17:30 | BH | 4 | 15:45 |
| 17/03/21 | 11:20 | 14:20 | H | 1 | 11:40 |
| 17/03/21 | 11:20 | 14:20 | BZ | 2 | 12:10 |
| 17/03/21 | 11:20 | 14:20 | BZ | 2 | 12:15 |
| 17/03/21 | 11:20 | 14:20 | BZ | 2 | 12:20 |
| 17/03/21 | 11:20 | 14:20 | BZ | 2 | 12:25 |
| 17/03/21 | 11:20 | 14:20 | RZ | 2 | 12:30 |
| 17/03/21 | 11:20 | 14:20 | BZ | 1 | 12:50 |
| 17/03/21 | 11:20 | 14:20 | K | 1 | 13:15 |

| Date | Survey Start | Survey End | Species | Count | 5 min period |
|----------|--------------|------------|---------|-------|--------------|
| 17/03/21 | 11:20 | 14:20 | RN | 2 | 13:20 |
| 17/03/21 | 11:20 | 14:20 | BZ | 1 | 13:25 |
| 17/03/21 | 11:20 | 14:20 | BZ | 1 | 13:25 |
| 17/03/21 | 11:20 | 14:20 | BZ | 1 | 14:00 |
| 18/03/21 | 11:50 | 14:50 | BZ | 1 | 12:05 |
| 18/03/21 | 11:50 | 14:50 | K | 1 | 12:20 |
| 18/03/21 | 11:50 | 14:50 | RN | 2 | 12:30 |
| 18/03/21 | 11:50 | 14:50 | BZ | 2 | 12:35 |
| 18/03/21 | 11:50 | 14:50 | BZ | 1 | 13:10 |
| 18/03/21 | 11:50 | 14:50 | RN | 1 | 13:10 |
| 18/03/21 | 11:50 | 14:50 | BZ | 1 | 13:40 |
| 18/03/21 | 11:50 | 14:50 | K | 1 | 13:40 |
| 18/03/21 | 11:50 | 14:50 | BZ | 2 | 13:50 |
| 18/03/21 | 11:50 | 14:50 | LB | 2 | 13:50 |
| 18/03/21 | 11:50 | 14:50 | BZ | 1 | 13:55 |
| 18/03/21 | 11:50 | 14:50 | BZ | 1 | 14:10 |
| 18/03/21 | 11:50 | 14:50 | K | 1 | 14:15 |
| 18/03/21 | 11:50 | 14:50 | LB | 1 | 14:15 |
| 18/03/21 | 11:50 | 14:50 | BZ | 2 | 14:20 |
| 18/03/21 | 11:50 | 14:50 | K | 1 | 14:20 |
| 18/03/21 | 11:50 | 14:50 | LB | 2 | 14:40 |

Table AIII-4b: Secondary target species recorded during flight activity surveys undertaken at WF2 VP2

| Date | Survey Start | Survey End | Species | Count | 5 min period |
|----------|--------------|------------|---------|-------|--------------|
| 07/10/20 | 09:30 | 12:30 | RN | 3 | 09:30 |
| 07/10/20 | 09:30 | 12:30 | RN | 1 | 10:35 |
| 27/11/20 | 09:00 | 12:00 | RN | 1 | 09:55 |
| 27/11/20 | 09:00 | 12:00 | CA | 1 | 10:05 |
| 27/11/20 | 09:00 | 12:00 | RN | 1 | 10:20 |
| 27/11/20 | 09:00 | 12:00 | RN | 1 | 10:40 |
| 26/11/20 | 12:30 | 15:10 | RN | 1 | 12:24 |
| 26/11/20 | 12:30 | 15:10 | RN | 2 | 13:00 |
| 26/11/20 | 12:30 | 15:10 | RN | 1 | 13:15 |
| 26/11/20 | 12:30 | 15:10 | RN | 1 | 13:20 |
| 26/11/20 | 12:30 | 15:10 | RN | 1 | 13:25 |

| Date | Survey Start | Survey End | Species | Count | 5 min period |
|----------|--------------|------------|---------|-------|--------------|
| 26/11/20 | 12:30 | 15:10 | RN | 2 | 14:05 |
| 26/11/20 | 12:30 | 15:10 | RN | 1 | 15:20 |
| 22/01/21 | 12:45 | 15:45 | K | 1 | 13:10 |
| 29/01/21 | 09:10 | 12:10 | RN | 2 | 11:00 |
| 29/01/21 | 09:10 | 12:10 | K | 1 | 14:45 |
| 10/02/21 | 13:30 | 16:30 | RN | 1 | 14:20 |
| 10/02/21 | 13:30 | 16:30 | RN | 2 | 14:35 |
| 11/02/21 | 09:20 | 12:20 | RN | 5 | 09:45 |
| 11/02/21 | 09:20 | 12:20 | BZ | 1 | 10:25 |
| 11/02/21 | 09:20 | 12:20 | RN | 3 | 11:15 |
| 17/03/21 | 14:50 | 17:50 | K | 1 | 15:55 |
| 17/03/21 | 14:50 | 17:50 | BZ | 1 | 15:55 |
| 17/03/21 | 14:50 | 17:50 | LB | 1 | 16:05 |
| 17/03/21 | 14:50 | 17:50 | RN | 14 | 16:10 |
| 17/03/21 | 14:50 | 17:50 | RN | 2 | 17:20 |
| 18/03/21 | 08:20 | 11:20 | RN | 4 | 10:10 |
| 18/03/21 | 08:20 | 11:20 | RN | 1 | 10:40 |

Table AIII-5b: Secondary target species recorded during flight activity surveys undertaken at WF2 VP3

| Date | Survey Start | Survey End | Species | Count | 5 min period |
|----------|--------------|------------|---------|-------|--------------|
| 22/10/20 | 13:00 | 14:15 | H | 1 | 13:05 |
| 22/10/20 | 13:00 | 14:15 | BZ | 2 | 13:15 |
| 22/10/20 | 13:00 | 14:15 | BZ | 2 | 13:25 |
| 19/11/20 | 09:45 | 12:45 | RN | 2 | 11:15 |
| 19/11/20 | 09:45 | 12:45 | RN | 1 | 11:40 |
| 19/11/20 | 09:45 | 12:45 | RN | 1 | 11:45 |
| 19/11/20 | 09:45 | 12:45 | CU | 14 | 11:50 |
| 20/11/20 | 12:40 | 15:40 | K | 1 | 12:45 |
| 20/11/20 | 12:40 | 15:40 | H | 1 | 12:50 |
| 20/11/20 | 12:40 | 15:40 | RN | 1 | 12:50 |
| 20/11/20 | 12:40 | 15:40 | CU | 20 | 13:00 |
| 20/11/20 | 12:40 | 15:40 | CU | 1 | 13:55 |
| 20/11/20 | 12:40 | 15:40 | CU | 8 | 14:30 |
| 20/11/20 | 12:40 | 15:40 | RN | 1 | 15:15 |
| 08/12/20 | 13:15 | 16:15 | CU | 40 | 13:55 |

| Date | Survey Start | Survey End | Species | Count | 5 min period |
|----------|--------------|------------|---------|-------|--------------|
| 08/12/20 | 13:15 | 16:15 | RN | 2 | 16:05 |
| 09/12/20 | 09:30 | 12:30 | RN | 2 | 10:10 |
| 09/12/20 | 09:30 | 12:30 | MA | 2 | 11:10 |
| 09/12/20 | 09:30 | 12:30 | MS | 2 | 11:20 |
| 09/12/20 | 09:30 | 12:30 | CU | 50 | 11:35 |
| 27/01/21 | 14:00 | 17:00 | RN | 1 | 15:40 |
| 27/01/21 | 14:00 | 17:00 | BH | 2 | 15:45 |
| 27/01/21 | 14:00 | 17:00 | H | 1 | 15:55 |
| 27/01/21 | 14:00 | 17:00 | CA | 1 | 16:00 |
| 28/01/21 | 09:30 | 12:30 | BH | 1 | 10:30 |
| 28/01/21 | 09:30 | 12:30 | BZ | 1 | 11:55 |
| 28/01/21 | 09:30 | 12:30 | CU | 100 | 12:00 |
| 28/01/21 | 09:30 | 12:30 | BH | 1 | 12:10 |
| 18/02/21 | 12:50 | 15:50 | RN | 1 | 12:55 |
| 18/02/21 | 12:50 | 15:50 | BH | 2 | 13:10 |
| 18/02/21 | 12:50 | 15:50 | BH | 18 | 13:30 |
| 18/02/21 | 12:50 | 15:50 | CU | 10 | 14:00 |
| 18/02/21 | 12:50 | 15:50 | BH | 15 | 14:15 |
| 18/02/21 | 12:50 | 15:50 | BH | 2 | 15:25 |
| 18/02/21 | 12:50 | 15:50 | BH | 3 | 15:40 |
| 18/02/21 | 12:50 | 15:50 | MA | 4 | 15:40 |
| 18/02/21 | 12:50 | 15:50 | CU | 20 | 15:40 |
| 19/02/21 | 09:30 | 12:30 | BH | 11 | 09:40 |
| 19/02/21 | 09:30 | 12:30 | RN | 2 | 09:50 |
| 19/02/21 | 09:30 | 12:30 | HG | 1 | 10:10 |
| 19/02/21 | 09:30 | 12:30 | BH | 2 | 10:25 |
| 11/03/21 | 12:15 | 15:15 | BH | 4 | 12:20 |
| 11/03/21 | 12:15 | 15:15 | MA | 2 | 12:45 |
| 11/03/21 | 12:15 | 15:15 | MA | 3 | 13:10 |
| 11/03/21 | 12:15 | 15:15 | BH | 8 | 14:05 |
| 11/03/21 | 12:15 | 15:15 | BH | 2 | 14:40 |
| 11/03/21 | 12:15 | 15:15 | BH | 20 | 14:55 |
| 12/03/21 | 08:15 | 11:45 | BH | 2 | 08:50 |
| 12/03/21 | 08:15 | 11:45 | MA | 2 | 08:55 |
| 12/03/21 | 08:15 | 11:45 | BH | 50 | 09:20 |

| Date | Survey Start | Survey End | Species | Count | 5 min period |
|----------|--------------|------------|---------|-------|--------------|
| 12/03/21 | 08:15 | 11:45 | MA | 2 | 09:30 |
| 12/03/21 | 08:15 | 11:45 | CU | 2 | 09:50 |
| 12/03/21 | 08:15 | 11:45 | CU | 2 | 10:05 |
| 12/03/21 | 08:15 | 11:45 | BZ | 1 | 10:10 |
| 12/03/21 | 08:15 | 11:45 | MA | 3 | 10:15 |
| 12/03/21 | 08:15 | 11:45 | MA | 2 | 11:05 |

Table AIII-6b: Secondary target species recorded during flight activity surveys undertaken at WF2 VP4

| Date | Survey Start | Survey End | Species | Count | 5 min period |
|----------|--------------|------------|---------|-------|--------------|
| 21/10/20 | 14:00 | 17:00 | K | 1 | 15:25 |
| 22/10/20 | 09:30 | 12:30 | RN | 1 | 11:05 |
| 22/10/20 | 09:30 | 12:30 | BZ | 1 | 12:00 |
| 20/11/20 | 09:00 | 12:00 | LB | 1 | 11:50 |
| 08/12/20 | 09:40 | 12:40 | RN | 1 | 10:55 |
| 08/12/20 | 09:40 | 12:40 | RN | 1 | 11:05 |
| 08/12/20 | 09:40 | 12:40 | LB | 1 | 11:45 |
| 08/12/20 | 09:40 | 12:40 | RN | 1 | 11:55 |
| 08/12/20 | 09:40 | 12:40 | LB | 1 | 12:10 |
| 09/12/20 | 13:00 | 16:00 | RN | 1 | 13:50 |
| 09/12/20 | 13:00 | 16:00 | RN | 1 | 14:20 |
| 09/12/20 | 13:00 | 16:00 | K | 1 | 15:40 |
| 27/01/21 | 11:00 | 14:00 | RN | 1 | 11:05 |
| 27/01/21 | 11:00 | 14:00 | HG | 1 | 11:15 |
| 27/01/21 | 11:00 | 14:00 | BH | 6 | 12:30 |
| 27/01/21 | 11:00 | 14:00 | RN | 1 | 13:30 |
| 28/01/21 | 13:15 | 16:15 | BH | 3 | 14:50 |
| 28/01/21 | 13:15 | 16:15 | CA | 6 | 15:45 |
| 28/01/21 | 13:15 | 16:15 | CA | 2 | 15:55 |
| 18/02/21 | 09:10 | 12:10 | RN | 1 | 09:15 |
| 18/02/21 | 09:10 | 12:10 | BH | 1 | 09:20 |
| 18/02/21 | 09:10 | 12:10 | BH | 4 | 09:20 |
| 18/02/21 | 09:10 | 12:10 | RN | 2 | 09:45 |
| 18/02/21 | 09:10 | 12:10 | RN | 1 | 10:00 |
| 18/02/21 | 09:10 | 12:10 | BH | 1 | 10:40 |
| 18/02/21 | 09:10 | 12:10 | BH | 1 | 11:50 |

| Date | Survey Start | Survey End | Species | Count | 5 min period |
|----------|--------------|------------|---------|-------|--------------|
| 19/02/21 | 13:00 | 16:00 | BH | 1 | 13:50 |
| 19/02/21 | 13:00 | 16:00 | BH | 2 | 13:50 |
| 19/02/21 | 13:00 | 16:00 | BH | 2 | 13:55 |
| 19/02/21 | 13:00 | 16:00 | BH | 2 | 14:00 |
| 19/02/21 | 13:00 | 16:00 | BH | 3 | 15:15 |
| 19/02/21 | 13:00 | 16:00 | BH | 4 | 15:45 |
| 12/03/21 | 12:20 | 15:20 | LB | 1 | 13:30 |
| 12/03/21 | 12:20 | 15:20 | RN | 1 | 13:40 |
| 12/03/21 | 12:20 | 15:20 | BH | 10 | 14:10 |
| 12/03/21 | 12:20 | 15:20 | BH | 14 | 14:30 |

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APPENDIX 7-6

**BIRD SURVEY RESULTS –
BREEDING SEASON 2021**

APPENDIX 7-6

Bird Survey Report Breeding Season 2021

BIRD SURVEY REPORT BREEDING SEASON 2021

Seven Hills Wind Farm I and II
Prepared for: Seven Hills Wind Farm Ltd

SLR Ref: 501.00501.00004
Version No: REV1
May 2022



BASIS OF REPORT

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1.0 Introduction

SLR Consulting Ireland (SLR) was commissioned by Seven Hills Wind Farm Ltd in March 2021 to carry out a breeding bird survey programme for the proposed Seven Hills Wind Farm, Co. Roscommon during the breeding bird period in 2021. There are two phases within the current iteration of the wind farm design, hereafter referred to as Wind Farm I and Wind Farm II.

1.1 Background to the Commission

Planning permission was originally granted by An Bord Pleanála (ABP) for both developments (Phase 1 ABP Planning Ref: PL 20.244346 / 20.239759 and Phase 2 ABP Planning Ref: PL 20.244347 / 20.241069) but was subsequently refused following the appeal process in 2016 and 2017. The main reasons for refusal of planning cited by ABP were issues relating to the lack of certainty in relation to the impact of the proposed development on European Sites in the vicinity of the proposed developments and the qualifying interests for which those European Sites are designated.

1.2 Site Description

The dominant habitat within the boundaries of the proposed Seven Hills Wind Farm I development site is improved agricultural grassland and the proposed site is not designated for nature conservation.

The proposed Seven Hills Wind Farm II development site is a slightly more diverse area in terms of habitat composition with dominant habitats present being improved agricultural grassland, dry calcareous grassland and scrub. The proposed site also does not hold any designations for nature conservation.

There are several Natura 2000 designated sites relating to birds of conservation concern located within 15 km of both wind farms. Please see Table 3-1 for further details of these.

1.3 Purpose of the Report

The aim of this report is to provide robust baseline ornithological survey data for the breeding period 2021 at both phases of the wind farm. These data will be used to inform a separate ecological impact assessment and appropriate assessment for the proposed wind farm. The assessment of potential impacts is beyond the scope of this report.

This report follows on from the bird survey reports for the breeding period in 2019¹ and 2020². As such, in order to obtain a comprehensive representation of breeding bird activity at both proposed wind farm sites across the three breeding seasons, the two previous reports should be read alongside this report.

¹ SLR Consulting. 2021a. Seven Hills Wind Farm Bird Survey Report Breeding Season 2019.

² SLR Consulting. 2021b. Seven Hills Wind Farm Bird Survey Report Breeding Season 2020.

2.0 Methodology

2.1 Desk-based Review

The desk-based review collated available information collected to date on the breeding bird movements in and around the proposed wind farm development sites. This included a review of the following documents submitted as part of the previous planning applications in 2010 and 2012:

- FERS (2010) Proposed Seven Hills Wind Farm Site (Phase I): Ornithological Assessment Report June 2010. Appendix 8.1 of IWCM (2010) Proposed Seven Hills Wind Farm Phase I EIS Chapter 8 – Ornithology;
- FERS (2011) Proposed Seven Hills Wind Farm (Phase II): Ornithological Assessment Report July 2011. Appendix 8.1 of IWCM (2011) Proposed Seven Hills Wind Farm Phase II EIS Chapter 8 – Ornithology;
- Moore Group, FERS and IWCM (2010) Natura Impact Statement and Appropriate Assessment as required under Article 6(3) of the Habitats Directive (Council Directive 92/43/EEC) of Seven Hills Wind Farm Co. Roscommon (Phase I);
- FERS (2010) Response to issues arising from item (5) of a Request for Further Information (RFI) from Roscommon Co. Council (Planning Reference no. 10/541);
- Moore Group, FERS and IWCM (2011) Natura Impact Statement and Appropriate Assessment as required under Article 6(3) of the Habitats Directive (Council Directive 92/43/EEC) of Seven Hills Wind Farm Co. Roscommon (Phase II);
- EcoFact Environmental Consultants Ltd (2012) Seven Hills Wind Farm (Phase I) Co. Roscommon Report to inform the Appropriate Assessment Process; and
- EcoFact Environmental Consultants Ltd (2012) Seven Hills Wind Farm (Phase II) Co. Roscommon Report to inform the Appropriate Assessment Process.

The websites of the National Parks and Wildlife Service (NPWS) www.npws.ie and the National Biodiversity Data Centre (NBDC) <http://maps.biodiversityireland.ie/#/Map> were also accessed for information on sites designated for nature conservation in the vicinity of the site.

2.2 Field Surveys

The scope of breeding bird surveys for the proposed wind farm is based on recommendations given in Scottish Natural Heritage (SNH; now NatureScot) 2017 guidance³. This survey methods guidance is recognised as standard best practice guidance throughout the UK and Ireland for surveying birds to inform impact assessment for onshore wind farms.

The scope of survey work was the same as that conducted in 2020. Further details are provided in Sections 2.2.2 to 2.2.4.

2.2.1 Field Survey Team: Evidence of Technical Competence and Experience

Sarah Ingham (SI) – Project Manager and Bird Surveyor

Sarah was a Senior Ecologist with SLR and holds a BSc in Zoology from Anglia Ruskin University, Cambridge, UK and an MSc in Biodiversity and Conservation from Trinity College Dublin. She is an Associate member of the Chartered Institute of Ecology and Environmental Management (ACIEEM). Sarah is a highly skilled and

³ NatureScot (formerly SNH). (2017). Recommended bird survey methods to inform impact assessment of onshore wind farms. Version 2. SNH Guidance. SNH, Battleby.

experienced bird surveyor with 11 years' post graduate experience as a professional consultant ecologist/ornithologist.

Sarah managed this project and carried out various bird surveys onsite in April 2021.

Jason Cahill (JC) – Bird Surveyor

Jason was a Graduate Ecologist with SLR. Jason holds a BSc (Hon) in Field Biology with Wildlife Tourism from Institute of Technology Tralee. Jason has experience with bird surveys, involving vantage point and transect surveys, data collection and input. Supervised by Sarah Ingham, Jason also assisted with bird surveys at Seven Hills Wind Farm in May 2021.

Aisling Kinsella (AK) – Bird Surveyor

Aisling is a Senior Field Ecologist who joined SLR in September 2020. Aisling holds a BSc in Biological, Earth and Environmental Sciences (Zoology) from University College Cork and an MSc in Wildlife Management and Conservation from University College Dublin. Aisling's main interest is in ornithology. Since joining SLR, Aisling's field experience includes acting as ECoW on a large national road scheme, habitat survey mapping and classification, mammal survey, bird surveys, data collection and data input. Aisling has also helped prepare EIAR Biodiversity chapters and AA screening reports and Natura Impact Statements for a range of different projects and plans. Aisling carried out the breeding bird surveys at Seven Hills Wind Farm in June 2021.

Jonathon Dunn (JD) – Project Manager and Lead Ornithologist

Jonathon is a Senior Ecologist with SLR and holds a BA (Hons) in Natural Sciences from the University of Cambridge, an MSc in Ecology Evolution and Conservation from Imperial College London and a PhD in Avian Ecology from Newcastle University. He is a Full member of the Chartered Institute of Ecology and Environmental Management (MCIEEM). Jonathon is a highly skilled and experienced bird surveyor with six years' post graduate experience as a professional consultant ecologist. Jonathon managed this project through liaison with the client, coordination of the survey team, supervision of the health and safety of the team, carrying out various bird surveys onsite from July to September 2021, collating, quality controlling and assessing the survey data and writing this report.

2.2.2 Flight Activity Surveys

Vantage point (VP) locations were the same as those used in breeding seasons 2019 and 2020, which were initially chosen based on locations used during previous surveys (see Section 3.1). The adequacy of these VPs was checked by carrying out a desk-based viewshed analysis using a bespoke GIS tool for calculating the visible area from each vantage point (VP). The Zones of Theoretical Visibility (ZTV) from each VP were calculated using ArcMAP 10.5.1 Spatial Analyst using a terrain model derived from EU-DEM data with a vertical accuracy of ± 7 m. In previous years, when proposed turbine dimensions were unknown, the ZTVs were calculated with a surface offset of 30 m. However, now that the proposed turbine dimensions are known the ZTVs have been re-calculated using a surface offset of 18 m, to match the lowest point swept by the rotors of the proposed turbines. As in previous years the ZTVs are based in a viewing height of 1.8 m above ground level. VP locations and viewing arcs are shown in **Figure 1** and the updated VP viewsheds are shown in **Figure 2**.

A total of 36 hours of watches were undertaken at each of six vantage point (VP) locations during the breeding season (monthly visits April – September inclusive). This equates to a total of six hours per VP per month. The VP survey effort undertaken during the breeding season of 2021 is summarised in Table 2-1 with full details of survey dates, times and observers provided in Appendix 01 and details of weather conditions during the surveys provided in Appendix 02.

Table 2-1
VP survey effort undertaken at the Seven Hills Wind Farms I and II sites April 2021 to September 2021.

| Month | WFI (hours) | VP1 | WFI (hours) | VP2 | WFII (hours) | VP1 | WFII (hours) | VP2 | WFII (hours) | VP3 | WFII (hours) | VP4 |
|--------------------------------|----------------------|-----|----------------------|-----|----------------------|-----|----------------------|-----|----------------------|-----|----------------------|-----|
| April | 6:00 | | 6:00 | | 6:00 | | 6:00 | | 6:00 | | 6:00 | |
| May | 6:00 | | 6:00 | | 6:00 | | 6:00 | | 6:00 | | 6:00 | |
| June | 6:00 | | 6:00 | | 6:00 | | 6:00 | | 6:00 | | 6:00 | |
| July | 6:00 | | 6:00 | | 6:00 | | 6:00 | | 6:00 | | 6:00 | |
| August | 6:00 | | 6:00 | | 6:00 | | 6:00 | | 6:00 | | 6:00 | |
| September | 6:00 | | 6:00 | | 6:00 | | 6:00 | | 6:00 | | 6:00 | |
| Total hrs | 36:00 | | 36:00 | | 36:00 | | 36:00 | | 36:00 | | 36:00 | |
| VP locations ITM (Figure 1) | 587337 E 748665 N | | 585834 E 746017 N | | 588967 E 745061 N | | 587372 E 743512 N | | 590643 E 743279 N | | 592160 E 743701 N | |

It is good practice to ensure that where possible each monthly six-hour survey period is split over more than a single day. As such, the six-hour survey periods were divided into three-hour blocks which were alternated across consecutive days e.g., on day 1, VP1 would be completed in the morning and VP2 would be completed in the afternoon and on day 2, VP2 would be completed in the morning and VP1 in the afternoon. Breaks of at least 30 minutes were taken between watches to minimise observer fatigue.

VP watches aimed to quantify the flight activity of primary and secondary target species (as defined in Section 2.2.2.1) within the study area.

The main purpose of VP watches is to collect data on primary target species that will enable estimates to be made of:

- The time spent flying over the site;
- The relative use by birds of different parts of the site;
- The proportion of flying time spent within the provisional upper and lower risk height limits as determined by the potential rotor diameter and rotor hub height; and
- Ultimately, the analysis of the potential risk of collision of birds with rotating turbines.

For each primary target species observation, the following details were recorded:

- Time of observation;
- Duration of flying bout;
- Species, age and sex (where determinable);
- Time spent within each height band and;
- Notes on observation.

Recording height bands were determined based on the likely turbine specifications under consideration at the time of survey (upper tip height 180 m and lower tip height 18 m). Flight heights were attributed to five distinct height bands as follows:

- 1 = < 15 m (below the likely rotor swept area);
- 2 = 15 m to 30 m (potentially within the likely rotor swept area, at least in part);
- 3 = 30 m to 150 m (within the likely rotor swept area);
- 4 = 150 m to 200 m (potentially within the likely rotor swept area, at least in part); and
- 5 = >200 m (above the likely rotor swept area).

These height bands did not match the proposed turbine specification exactly in order to provide some flexibility in case the turbine model changed and to provide consistency with previous surveys.

In addition, a summary of observations of secondary target species was recorded at the end of each five-minute period during each VP watch to provide an index of flight activity for secondary target species within the site, in accordance with current NatureScot guidance. Data collected on secondary species included:

- The five-minute period start and end time;
- Species;
- Number of birds observed;
- If flying, the height band in which birds were observed flying;
- Whether birds were observed onsite, in the 500 m buffer or beyond;
- Flight behaviour; and
- Notes on observation.

Target Species

Target species for the surveys were defined by legal and/or conservation status and vulnerability to impacts caused by wind turbines, as defined in NatureScot (2017) Guidance.

Primary Target Species

The list of primary target species was limited to species upon which effects are most likely to be potentially significant in EIA terms, thereby enabling recording to focus on the species of greatest importance without the distraction of having to record detailed flight data for a larger number of more common species.

NatureScot (2017) guidelines state that “*in most circumstances the target species will be limited to those species which are afforded a higher level of legislative protection.*” Buzzard and sparrowhawk are not subject to a higher level of legislative protection than any other bird species and were therefore not recorded as primary target species during the breeding season 2021 surveys.

Primary target species were therefore specifically limited to species forming qualifying features for nearby SPAs and those other species upon which effects could be potentially significant in EIA terms, e.g. Annex I raptor and owl species.

As such, the primary target species for these VP surveys included the following bird species:

- Black-headed gull *Chroicocephalus ridibundus*;
- Curlew *Numenius arquata*;
- Golden plover *Pluvialis apricaria*;
- Hen harrier *Circus cyaneus*;
- Kestrel *Falco tinnunculus*;
- Lapwing *Vanellus vanellus*;

- Peregrine falcon *Falco peregrinus*;
- Snipe *Gallinago gallinago*; and
- Tufted duck *Aythya fuligula*.

Although lapwing, curlew, kestrel and snipe are not listed under Annex I of the Birds Directive, the breeding populations of these species are red-listed under the Birds of Conservation Concern in Ireland (BoCCI) 2020-2026⁴ scheme, as numbers of breeding pairs within the Irish landscape have suffered a serious decline in recent years. As such, any observations of these four species were also recorded as primary target species during the summer months.

Black-headed gull and tufted duck are not listed under Annex I of the Birds Directive and are amber-listed under the BoCCI scheme. Tufted duck is however a qualifying feature for nearby SPAs and so were included as primary target species. Black-headed gull is a qualifying feature for nearby SPAs but not in the breeding season. There is however, an important breeding colony of >100 individuals at Lough Ree, so this species was included as a primary target species.

Secondary Species

Local circumstances may indicate that survey information should also be acquired on other species, especially those of regional conservation concern. Such species are termed secondary species (NatureScot, 2017). Recording of secondary species is subsidiary to recording of primary target species.

Secondary target species included:

- Any other wildfowl, wader and gull species;
- Buzzard *Buteo buteo*;
- Sparrowhawk *Accipiter nisus*;
- Raven *Corvus corax*;
- Mallard *Anas platyrhynchos*;
- Grey heron *Ardea cinerea*; and
- Cormorant *Phalacrocorax carbo*.

2.2.3 Breeding Wader Surveys

Breeding wader surveys followed the methodology described in O'Brien and Smith (1992)⁵. The survey involved a walked transect which covered all habitat potentially suitable for breeding waders within the wind farm site.

Following a desktop assessment, it was determined that given that Wind Farm I is dominated by improved agricultural grassland habitat, Wind Farm I is not suitable for breeding waders and breeding wader surveys were therefore not undertaken there. Conversely, parts of Wind Farm II comprise a mosaic of wet grassland and rough, semi-improved agricultural grassland which is more suited to breeding waders. As such, a walked transect was undertaken covering potentially suitable habitat within the Wind Farm II site and a 500 m buffer zone. The same transect route was repeated three times across the 2021 breeding season on 27 April, 27 May and 23 June.

⁴ Gilbert, G., Stanbury, A. and Lewis, L. (2021). Birds of Conservation Concern in Ireland 4: 2020–2026. Irish Birds 43: 1–22

⁵ O'Brien, M. and Smith, K. W. (1992) Changes in the status of waders breeding on wet lowland grasslands in England and Wales between 1982 and 1989, Bird Study, 39:3, 165-176

The location, movement and behaviour of all wader species were recorded onto field maps using standard BTO species codes. The following criteria was recorded for each species:

- Lapwing – the total numbers of birds seen from the transect;
- Snipe – the number of drumming plus chipping birds heard or seen from the transect; and
- Other species – the number of pairs (where 'pairs' = (paired individuals/2), displaying birds, nests or broods and other single birds not in flocks).

Birds were considered to be confirmed breeding if:

- They were observed displaying or singing on more than one visit;
- Nests, eggs, or young were located;
- Adults repeatedly alarm called;
- Distraction displays were seen; and/ or
- Territorial disputes were observed.

Birds were considered to be probably or possibly (i.e. unconfirmed) breeding if:

- They were observed displaying or singing on one visit (i.e. possibly breeding) or more than one visit (i.e. probably breeding) (with the exception of obvious passage migrants in spring); or
- A pair of birds was observed in suitable habitat for nesting.

Other records were considered to be of non-breeding birds, failed breeders, birds loafing, feeding or on passage to other areas.

Please see **Figure 6** for an outline of the walked transect and Appendices I and II for metadata relating to these surveys.

2.2.4 Breeding Raptor Surveys

The survey methodology for breeding raptors used a driven transect with regular stops, to carry out watches of suitable habitat from appropriate viewpoints to identify potential nesting territories. A total of seven stops were made along the driven transect around both wind farm sites overlooking potentially suitable breeding habitat. The locations of these viewpoints are presented in **Figure 7** together with the outline of the driven survey route and the results of the surveys.

A driven survey was used due to limitations to access to third party land within the 2 km buffer zone and the availability of a good road network in the vicinity of the site. It is also noted that suitable breeding habitat for Annex 1 raptors within the sites and 2 km buffer is very limited and visibility from the survey route was sufficient to cover the vast majority of potentially suitable breeding habitat within the survey area.

Suitable breeding habitat differs for each raptor species⁶ and was limited within the survey area. Table 2-2 provides a summary of the potentially suitable raptor habitats within the 2 km buffer zone of the sites and the approximate locations of these in relation to the viewpoints used during the survey.

⁶ Hardey, J., Crick, H.Q.P., Wernham, C., Riley, H., Etheridge, B., Thompson, D. (2013). Raptors: A field guide for surveys and monitoring (3rd Edition). The Stationery Office Edinburgh.

Table 2-2

Potentially suitable habitats for breeding raptors within the study area, the viewpoints the habitats can be seen from and the target raptor species which could be expected within these habitats.

| Raptor Viewpoint No. (RVP) | Habitat Type | Target Raptor Species |
|----------------------------|--|--|
| RVP1 | Mixed deciduous woodland | Buzzard, sparrowhawk |
| RVP2; RVP3 | Lowland heather moor | Hen harrier, merlin |
| RVP3; RVP5 | Wet grassland with dense rush or bracken cover | Hen harrier |
| RVP6 | Mature forestry plantation | Buzzard, sparrowhawk |
| RVP4 | Quarries | Peregrine falcon, kestrel |
| RVP7 | Rocky outcrops | Peregrine falcon, merlin, kestrel, buzzard |

In addition to the driven transects, access was obtained to a nearby quarry because it represented suitable breeding habitat for peregrine falcon.

Survey timings followed those in Hardey *et al.* (2013)⁶, as per NatureScot guidelines. This survey was repeated along the same route monthly from April to July inclusive. Please see Appendices I and II for metadata relating to these surveys.

The location, movement and behaviour of all raptor species observed were recorded onto the field maps using standard BTO species codes.

2.3 Survey Limitations

The majority of vantage point surveys were undertaken in optimal weather conditions. However, during such an extensive series of surveys carried out it was inevitable that some surveys were completed in suboptimal conditions. There were 21 hours out of the total of 216 during which the visibility was recorded as “moderate”, i.e. 1-3 km. This comprises 10% of the total survey effort but in almost all cases all of the relevant 2 km viewing arc was visible and this is not considered to significantly affect the validity of the data collected. There were also three non-consecutive hours (c.1% of the total survey effort) in which the visibility was recorded as “poor”, i.e. less than 1 km, at some point. However, in no cases did visibility fall below 500 m (when survey would have been suspended) and in many cases visibility was better than this for part of the relevant hour. As such, given the low proportion of surveys affected this is not considered to significantly affect the validity of the data collected. Further details regarding weather conditions during surveys are provided in Appendix 02.

As shown in **Figure 2**, due to local topographical conditions a small area at the western end of Wind Farm I and a very small area within the 500 m buffer zone for Wind Farm II were not within the 2 km viewsheds from any of the VPs. All turbine locations and the vast majority of the 500 m buffer were visible from at least one VP however and the gaps in coverage are therefore not considered to represent a significant limitation.

3.0 Results

3.1 Desk-based Review

3.1.1 Natura 2000 Sites

There are no Special Protection Areas (SPA) within the proposed wind farm sites. However, there are a total of five SPAs within a 15 km⁷ radius of the survey area.

The five SPAs within 15 km are shown in Table 3-1, which also shows the qualifying interests for each site. For the purposes of this report, which deals specifically with breeding birds, qualifying interests which are only present during the non-breeding season have been excluded from Table 3-1.

Corncrake *Crex crex* is a SSSI of the Middle Shannon Callows SPA. Upon their arrival to suitable breeding habitat in Ireland following migration from sub-Saharan Africa, corncrake, a site faithful species, then become sedentary, rarely if ever, moving from the habitat they have chosen for breeding once they find a mate⁸. As such, given that the Middle Shannon Callows SPA is at a distance of 11.4 km from the proposed wind farm sites, dedicated corncrake surveys were not deemed necessary. There is also a lack of suitable habitat for corncrake (hay meadows) within the proposed wind farm sites.

Table 3-1

SPAs within 15 km of Seven Hills Wind Farms I and II and their qualifying interests (species present during the breeding season period only).

| Site Name | Site Code | Distance/ Direction from Site Boundary | Species of Special Conservation Interest Relevant to the Breeding Season |
|--------------------------|-----------|--|--|
| Lough Croan Turlough SPA | 004139 | 1.5 km north | Shoveler <i>Anas clypeata</i> Wetland and Waterbirds |
| River Suck Callows SPA | 004097 | 1.7 km west | Wetland and Waterbirds |
| Four Roads Turlough SPA | 004140 | 1.9 km north | Wetland and Waterbirds |
| Lough Ree SPA | 004064 | 8 km east | Tufted duck <i>Aythya fuligula</i> Common scoter <i>Melanitta nigra</i> Common tern <i>Sterna hirundo</i> Black-headed gull <i>Chroicocephalus ridibundus</i> Wetland and Waterbirds |

⁷ 15 km is the distance typically applied when considering wildfowl ranging from roost sites to foraging sites.

⁸ Duffy, M. (2018) The Corncrake Conservation Project Annual Report 2018. NPWS.

| Site Name | Site Code | Distance/ Direction from Site Boundary | Species of Special Conservation Interest Relevant to the Breeding Season |
|----------------------------|-----------|--|--|
| Middle Shannon Callows SPA | 004096 | 11.4 km southeast | Corncrake <i>Crex crex</i> Lapwing <i>Vanellus vanellus</i> Black-tailed godwit <i>Limosa limosa</i> Wetland and Waterbirds |

3.1.2 Previous Survey Data

To our knowledge, prior to the SLR surveys in 2019 and 2020, the only breeding season bird survey data available relating to the two proposed wind farm sites were collected on six site visits during the period April to June 2009⁹. Surveys involved a walkover survey on each date, although precise survey area boundaries are unclear. The ornithological assessment for Phase I reports that 28 species were recorded within the (Phase I) wind farm site and buffer zone (the size of the buffer zone is not stated), of which 21 showed evidence of breeding. These included four species defined as 'important' species¹⁰, namely black-headed gull (red-listed), swallow *Hirundo rustica*, house sparrow *Passer domesticus* and starling *Sturnus vulgaris* (each amber-listed). Black-headed gull was not recorded as breeding within the site or buffer zone.

The ornithological assessment for Phase II reports that 57 species were recorded within the 'greater survey area', of which 53 showed evidence of breeding. The greater survey area is not defined but is thought to include both wind farm sites plus some of the surrounding area. 18 'important' species were recorded within the greater survey area including the red-listed species curlew, redshank *Tringa totanus* and black-headed gull and the amber listed mute swan *Cygnus olor*, teal *Anas crecca*, tufted duck, coot *Fulica atra*, snipe and kestrel. Of these, mute swan, teal, coot, curlew, snipe and redshank (a pair at Lough Feacle) showed evidence of breeding. A further nine amber listed passerine species were also recorded within the greater survey area.

3.2 Flight Activity Surveys

Flight lines of primary target species recorded at both wind farm sites throughout the 2021 breeding season are presented in **Figures 3-5** and a summary of the survey findings are provided in Sections 3.2.1 and 3.2.2 for primary and secondary target species, respectively. Flight data for both primary and secondary target species are provided in Appendix 03.

3.2.1 Primary Target Species

Wind Farm I

In total, five primary target species were recorded flying within the study area on and around Wind Farm I during the six-month survey period. Flight activity recorded from Wind Farm I VP1 and VP2 by primary target species is

⁹ Forest, Environmental Research and Services Ltd. (2010) Proposed Seven Hills Windfarm Ornithological Assessment Report June 2010; Forest, Environmental Research and Services Ltd. (2011) Proposed Seven Hills Wind-farm (Phase II): Ornithological Assessment July 2011.

¹⁰ i.e. species listed on the red or amber lists of birds of conservation concern (Birdwatch Ireland) in place at that time.

summarised in Table 3-2. Primary target species flights from both VPs are shown on **Figures 3 to 5**. Detailed survey data are provided in Appendix 03.

Table 3-2
Number of Primary Target Species Flights from Wind Farm I VP1 and VP2 Combined – April 2021 – September 2021

| Species | Number of flights and birds by month* | | | | | | Total number of flights | Total number of flights potentially at-risk height** | Total number of birds recorded in flight | Total number of birds potentially at-risk height** |
|--|---------------------------------------|-----|---------|--------|-------|-------|-------------------------|--|--|--|
| | Apr | May | Jun | Jul | Aug | Sep | | | | |
| Black-headed gull | 8 (28) | 0 | 9 (10) | 4 (8) | 1 (5) | 0 | 22 | 10 | 42 | 15 |
| Curlew | 1 (4) | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 4 | 4 |
| Kestrel | 0 | 0 | 1 (1) | 2 (2) | 0 | 1 (1) | 4 | 1 | 4 | 1 |
| Peregrine falcon | 0 | 0 | 0 | 0 | 1 (1) | 0 | 1 | 0 | 1 | 0 |
| Tufted duck | 0 | 0 | 1 (1) | 0 | 0 | 0 | 1 | 0 | 1 | 0 |
| Total | 9 (32) | 0 | 11 (12) | 6 (10) | 2 (6) | 1 (1) | 29 | 11 | 52 | 19 |
| * numbers in parentheses represent the total number of birds observed that month | | | | | | | | | | |
| ** precautionary risk height assumed to be between 15 m – 200 m | | | | | | | | | | |

A total of 29 flights by five primary target species were recorded during flight activity surveys at Wind Farm I between April and September 2021. A summary of flight activity by species is presented below.

Black-headed gull

22 flights of black-headed gull were recorded at Wind Farm I during the flight activity surveys (**Figure 3**). Flights were approximately equally split between the Thomas Street Turlough and south of VP1 within the 500 m site infrastructure buffer. The maximum number of flights was recorded in June (n=9) but the maximum number of individuals was recorded in April (n=28). Nine flights were observed at potential collision risk heights, with most of the flights of short durations (around 60 seconds or less).

Curlew

A single curlew flight was recorded at Wind Farm I during the flight activity surveys in April (**Figure 4**). This was to the east of the Thomas Street Turlough and consisted of four individuals flying at potential collision risk heights for 45 seconds; however, the flight was outside the 500 m site infrastructure buffer.

Kestrel

Four flights of kestrel were recorded at Wind Farm I during the flight activity surveys (**Figure 5**). All of the flights were recorded outside of the 500 m site infrastructure buffer north of Dysart near the Thomas Street Turlough.

Two of the flights were at potential collision risk heights but were of short durations (around 60 seconds or less). Only adult birds were recorded (two males and two of unknown sex).

Peregrine falcon

A single peregrine falcon flight was recorded at Wind Farm I during the flight activity surveys (**Figure 5**). The flight was recorded north of the Thomas Street Turlough just along the edge of the 500 m site infrastructure buffer, below potential collision heights. The bird was an adult of unknown sex and was flying rapidly for approximately 60 seconds duration.

Tufted duck

A single tufted duck flight was recorded at Wind Farm I during the flight activity surveys (**Figure 4**). The bird was recorded within the 500 m site infrastructure buffer but below potential collision risk heights. The flight was of 15 seconds duration and was south of VP1.

Wind Farm II

In total, five primary target species were recorded flying within the study area on and around Wind Farm II during the breeding season survey period. Flight activity recorded from Wind Farm II VP1 to VP4 by primary target species is summarised in Table 3-3. Primary target species flights from all VPs are shown on **Figures 3 to 5**. Detailed survey data are provided in Appendix 03.

Table 3-3
Number of Primary Target Species Flights from Wind Farm II VP1-VP4 Combined – April 2021 – September 2021

| Species | Number of flights and birds by month* | | | | | | Total number of flights | Total number of flights potentially at-risk height** | Total number of birds recorded in flight | Total number of birds potentially at-risk height** |
|--|---------------------------------------|---------|----------|-------|--------|--------|-------------------------|--|--|--|
| | Apr | May | Jun | Jul | Aug | Sep | | | | |
| Black-headed gull | 3 (9) | 8 (13) | 40 (67) | 5 (8) | 0 | 0 | 56 | 22 | 97 | 34 |
| Curlew | 2 (3) | 0 | 0 | 0 | 4 (21) | 3 (41) | 9 | 2 | 65 | 3 |
| Kestrel | 5 (5) | 2 (2) | 2 (2) | 0 | 0 | 0 | 9 | 9 | 9 | 9 |
| Lapwing | 0 | 0 | 5 (60) | 0 | 0 | 0 | 5 | 1 | 60 | 34 |
| Peregrine falcon | 0 | 0 | 3 (4) | 0 | 1 (1) | 1 (2) | 5 | 4 | 7 | 6 |
| Total | 10 (17) | 10 (15) | 50 (133) | 5 (8) | 5 (22) | 4 (43) | 84 | 39 | 238 | 87 |
| * numbers in parentheses represent the total number of birds observed that month | | | | | | | | | | |
| ** precautionary risk height assumed to be between 15 m – 200 m | | | | | | | | | | |

A total of 84 flights by five primary target species were recorded during flight activity surveys at Wind Farm II between April 2021 and September 2021. A summary of flight activity by species is presented below.

Black-headed gull

56 black-headed gull flights were recorded at Wind Farm II during the flight activity surveys (**Figure 3**). The birds were recorded almost entirely at Feacle Turlough or to the south of Brideswell and on the boundary of the 500 m site infrastructure buffer between April to July. Just under half of all flights for this species were recorded below potential collision risk heights. Most flights were under 60 seconds in duration, consisting of single or small groups (less than four individuals) birds commuting to and from Feacle Turlough.

Curlew

Nine curlew flights were recorded at Wind Farm II during the flight activity surveys (**Figure 4**) across April, August and September. All flights were recorded at or in the vicinity of Feacle Turlough on the boundary of the 500 m site infrastructure buffer. Approximately 20% of all flights and 5% of birds were recorded at potential collision risk heights. Observations ranged from single individuals up to small flock of 16 birds. All flights were 60 seconds or less in duration.

Kestrel

Nine kestrel flights were recorded at Wind Farm II during the flight activity surveys (**Figure 5**) across April to June. The majority of flights were recorded near VP1 and all flights were recorded within the 500 m site infrastructure buffer. All flights were recorded at potential collision risk heights and were of single birds, typically hovering or hunting for 2-3 minutes.

Lapwing

Five lapwing flights were recorded at Wind Farm II during the flight activity surveys (**Figure 4**). All flights were recorded at or in the vicinity of Feacle Turlough on the boundary of the 500 m site infrastructure buffer in June. Approximately 20% of all flights and 56% of birds were recorded at potential collision risk heights. Observations ranged from single individuals up to small flock of 34 birds. Both adults and immature birds were recorded. All flights were 60 seconds or less in duration.

Peregrine Falcon

Five peregrine flights were recorded at Wind Farm II during the flight activity surveys (**Figure 5**) in June, August and September. The majority flights were recorded at or in the vicinity of the breeding site within the 500 m site infrastructure buffer (see Section 3.4.2). Approximately 80% of all flights were recorded at potential collision risk heights. Observations were all of adults and ranged from single individuals to pairs of birds (male and female). Most flights were around 3 minutes in duration.

3.2.2 Secondary Species

Wind Farm I

Secondary species activity at Wind Farm I is summarised in Table 3-4. There were eight secondary species recorded throughout the season at Wind Farm I. Lesser black-backed gull was the most frequently recorded secondary species (in 30 five-minute periods out of a possible 864), and the most numerous (maximum flock size 17).

Table 3-4

Secondary Species Activity Summary for Wind Farm I VP1 and VP2 Combined – April 2021 – September 2021

| Species | Number of 5 min periods recorded * | Maximum number of birds recorded | Combined maximum total of birds recorded | Comments |
|---|------------------------------------|----------------------------------|--|--|
| Common buzzard | 11 | 1 | 11 | Activity in all months, within the wind farm site, survey buffer and off site. |
| Common gull | 12 | 1 | 12 | Activity in June only, within the wind farm site, survey buffer and beyond. |
| Great black-backed gull | 5 | 1 | 5 | Activity in June only, mainly within the wind farm site, but also survey buffer and off site. |
| Grey heron | 1 | 1 | 1 | Activity in June only, flew over the wind farm site, survey buffer and off site. |
| Herring gull | 5 | 3 | 7 | Recorded beyond the wind farm site and survey buffer. |
| Lesser black-backed gull | 30 | 17 | 68 | Activity in all months, within the wind farm site, survey buffer and off site. Although single birds were mainly observed, a few small flocks were observed in April and August. |
| Raven | 29 | 5 | 47 | Activity throughout all months, within the wind farm site, survey buffer and off site. Birds typically were recorded as single individuals or in small groups. |
| Sparrowhawk | 3 | 1 | 3 | Activity in August only. Recorded primarily off site outside the survey buffer immediately adjacent to VP2. |
| * total of 864 five-minute periods during surveys | | | | |

Wind Farm II

Secondary species activity at Wind Farm II is summarised in Table 3-5. There were 11 secondary species recorded throughout the season at Wind Farm II. Raven was the most frequently recorded secondary species (in 81 five-minute periods out of a possible 1,728), and mallard was the most numerous (27 individuals recorded in one five-minute period).

Table 3-5

Secondary Species Activity Summary for Wind Farm II VP1-VP4 Combined – April 2021 – September 2021

| Species | Number of 5 min periods recorded * | Maximum number of birds recorded | Combined maximum total of birds recorded | Comments |
|--------------------------|------------------------------------|----------------------------------|--|---|
| Common buzzard | 42 | 3 | 55 | Activity throughout all months, within the wind farm site and the survey buffer. |
| Cormorant | 1 | 1 | 1 | Activity in May only. Recorded beyond the survey buffer and outside the wind farm site. |
| Common gull | 8 | 2 | 9 | Recorded in June only. Mainly recorded in the survey buffer or beyond, with only one observation within the wind farm site. |
| Coot | 2 | 4 | 6 | Activity in May and July only. All records within the survey buffer associated with Feacle Lough and off site. Not recorded within the wind farm site. |
| Grey heron | 12 | 7 | 19 | Activity in May to August. Mainly recorded within the survey buffer but outside the wind farm site. Only a single observation was recorded within the wind farm site. |
| Herring gull | 2 | 1 | 2 | Recorded beyond the survey buffer. |
| Lesser black-backed gull | 31 | 2 | 40 | Recorded in all months except September. The majority of activity was recorded within the survey buffer of single birds. |
| Little egret | 2 | 2 | 3 | Activity recorded in June only, within the main wind farm, survey buffer and off site. |
| Mallard | 22 | 27 | 123 | Activity in all months, predominantly within the survey buffer and off site. There was one observation flying through the site. |
| Raven | 81 | 10 | 137 | Activity in all months within the main wind farm site, the survey buffer and off site. |

| Species | Number of 5 min periods recorded * | Maximum number of birds recorded | Combined maximum total of birds recorded | Comments |
|---|------------------------------------|----------------------------------|--|---|
| Sparrowhawk | 6 | 2 | 7 | Activity in August and September only, within the wind farm site, the survey buffer and beyond. |
| * total of 864 five-minute periods during surveys | | | | |

3.3 Breeding Wader Surveys

The wader walkover surveys at WFII during April, May and June yielded no records of waders, breeding or otherwise.

Please see **Figure 6** for transect route.

3.3.1 Incidental records of other species

During the three survey visits the following incidental records were made of other (non-wader) species of conservation concern:

- Wildfowl: grey heron and mute swan (both inside the 500 m survey buffer);
- Raptors: kestrel and buzzard (both hunting inside the 500 m survey buffer);
- Gulls: black-headed gull and lesser black-backed gull (both inside the 500 m survey buffer); and
- Other: raven and sand martin (ravens foraging and an active colony of sand martins inside the 500 m survey buffer).

3.4 Breeding Raptor Surveys

A total of four species of raptor was recorded during the surveys. The following species accounts provide summary details of the primary raptor species encountered during the 2021 surveys (all surveys combined). The results of the breeding raptor surveys can be seen in **Figure 7**.

3.4.1 Kestrel

Kestrel was occasionally recorded foraging over the site, but there was no evidence of breeding by this species within 2 km of the wind farm site in 2021.

3.4.2 Peregrine falcon

A pair of breeding peregrine falcons were observed within the known breeding site (shown in confidential Appendix 04), which is inside the 2 km survey buffer. A nest with two chicks was recorded on the 28 May 2021, with both adults present at the time of survey. No further sightings of juvenile peregrines were made during other surveys, so it is not clear whether the chicks fledged successfully.

3.4.3 Secondary target species

Buzzards were frequently observed within the 2 km survey buffer in 2021. While no nests were recorded, it is likely that a breeding territory was present to the northeast of Wind Farm I.

Sparrowhawk was recorded on a few occasions within the 2 km survey buffer north of Wind Farm I, but there was no evidence of breeding.

3.4.4 Incidental records of other species

During the four survey visits the following incidental records were made of other (non-raptor) species of conservation concern:

- Wildfowl: coot, grey heron, mallard and mute swan (all within or near waterbodies inside the 2 km survey buffer);
- Gulls: black-headed gull and lesser black-backed gull (both inside the 2 km survey buffer); and
- Other: raven and sand martin (ravens foraging and an active colony of sand martins inside the 2 km survey buffer).

4.0 Summary and Conclusions

A range of ornithology surveys were carried out at the site of the proposed Seven Hills Wind Farm during the 2021 breeding season. These were:

- Flight activity (VP) surveys;
- Breeding wader surveys; and
- Breeding raptor surveys.

The following primary target species were recorded during flight activity surveys at both proposed wind farm sites combined:

- Black-headed gull;
- Curlew;
- Herring gull;
- Kestrel;
- Lapwing;
- Peregrine falcon; and
- Tufted duck.

The most frequent flight activity was by black-headed gull (22 flights recorded at Wind Farm I and 56 at Wind Farm II), with other target species activity less frequent. The next most frequently recorded species was curlew (one at Wind Farm I and nine at Wind Farm II) and kestrel (four flights recorded at Wind Farm I and nine at Wind Farm II). All other target species were recorded five times or less.

Breeding wader surveys recorded no target species.

Breeding raptor surveys recorded two primary target species and two secondary species:

- Kestrel: non-breeding;
- Peregrine: confirmed breeding within the 500 m site infrastructure buffer;
- Buzzard: suspected breeding outside of the 500 m site infrastructure buffer; and
- Sparrowhawk: non-breeding.

Incidental records were made of other species of conservation concern including:

- Wildfowl: coot, mallard and mute swan;
- Passerines: skylark;
- Gulls: black-headed gull and lesser black-backed gull; and
- Sand martin, swallow and swift.

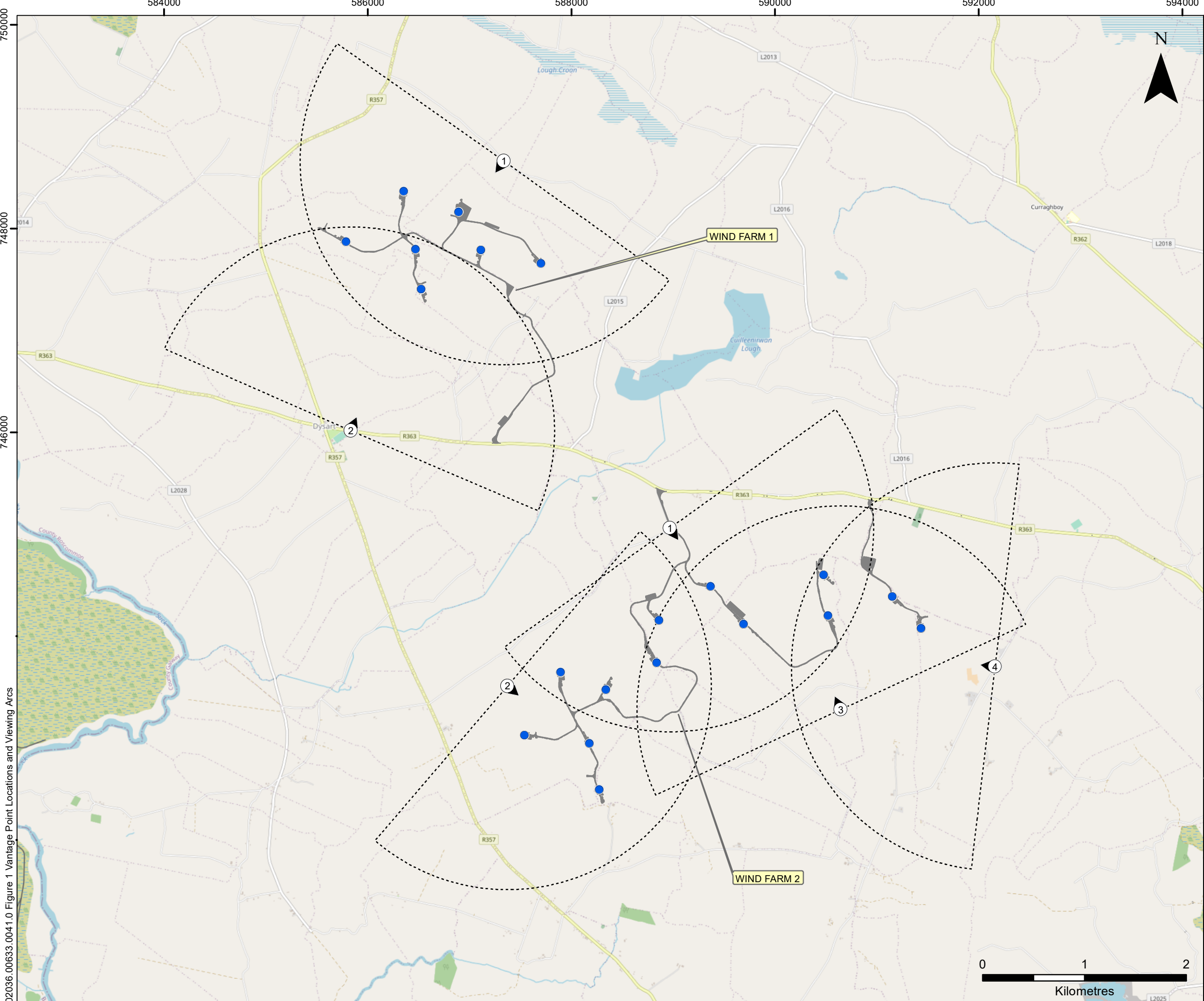
5.0 Legal and Conservation Status of Target Species Recorded

Table 5-1 summarises the legal and conservation status of the primary target species recorded during the range of ornithology surveys mentioned above.

Table 5-1
Legal and Conservation Status of Target Species

| Species | Legal & Conservation Status in Ireland |
|-------------------|--|
| Black-headed gull | WA; BoCCI4 Amber |
| Curlew | WA; BoCCI4 Red |
| Herring gull | WA; BoCCI4 Amber |
| Kestrel | WA; BoCCI4 Red |
| Lapwing | WA; BoCCI4 Red |
| Peregrine falcon | WA; Annex 1; BoCCI4 Green |
| Tufted duck | WA; BoCCI4 Amber |
| Key | <p>WA - the species is afforded general protection by the Wildlife Acts 2000 (as amended);</p> <p>Annex 1 – the species is listed in Annex 1 of the EC Birds Directive; and</p> <p>BoCCI4 status (green, amber or red) – indicates the current Birds of Conservation Concern in Ireland⁴ status category.</p> |

FIGURES



LEGEND

- Turbine Location
- Site Infrastructure
- Vantage Point
- Vantage Points 2km View Arc

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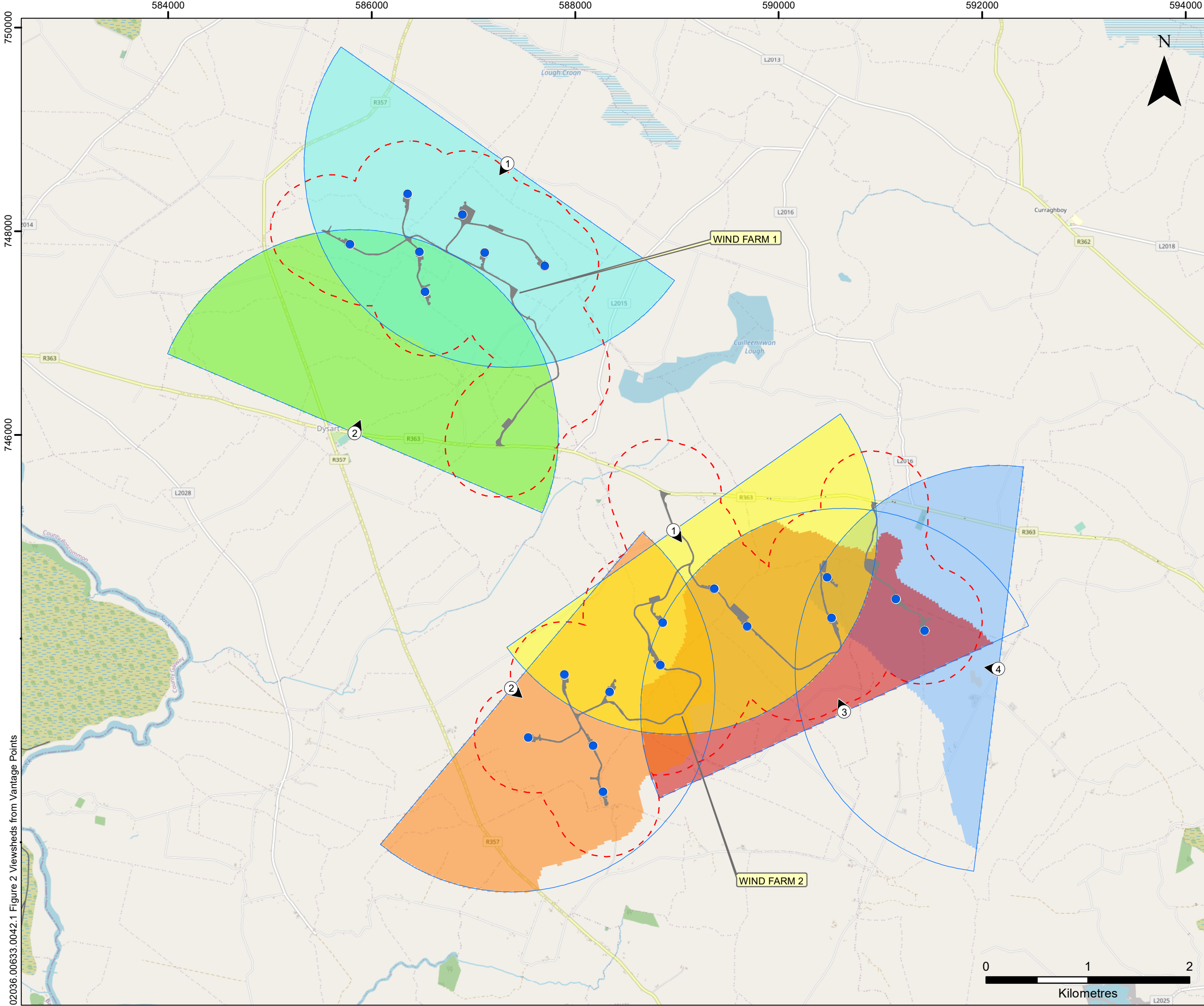
SEVEN HILLS WIND FARM SUMMER
BREEDING SEASON REPORT 2021

FIGURE 1 - VANTAGE POINT LOCATIONS
AND VIEWING ARCS

Scale
1:35,000 @ A3

Date
MAY 2022

02036.00633.0041.0 Figure 1 Vantage Point Locations and Viewing Arcs



NOTE

1. The Zones of Theoretical Visibility (ZTV) was calculated using ArcMAP 10.5.1 Spatial Analyst. The ZTV is calculated with a surface offset 18m & from a viewing height of 1.8m above ground level. The terrain model is derived from EU-DEM data with a vertical accuracy of $\pm 7m$.

LEGEND

- Turbine Location
- Site Infrastructure
- Site Infrastructure 500 m Buffer
- Vantage Point
- Distance of Viewing Arc
- Theoretical Visibility from Wind Farm 1 VP1
- Theoretical Visibility from Wind Farm 1 VP2
- Theoretical Visibility from Wind Farm 2 VP1
- Theoretical Visibility from Wind Farm 2 VP2
- Theoretical Visibility from Wind Farm 2 VP3
- Theoretical Visibility from Wind Farm 2 VP4

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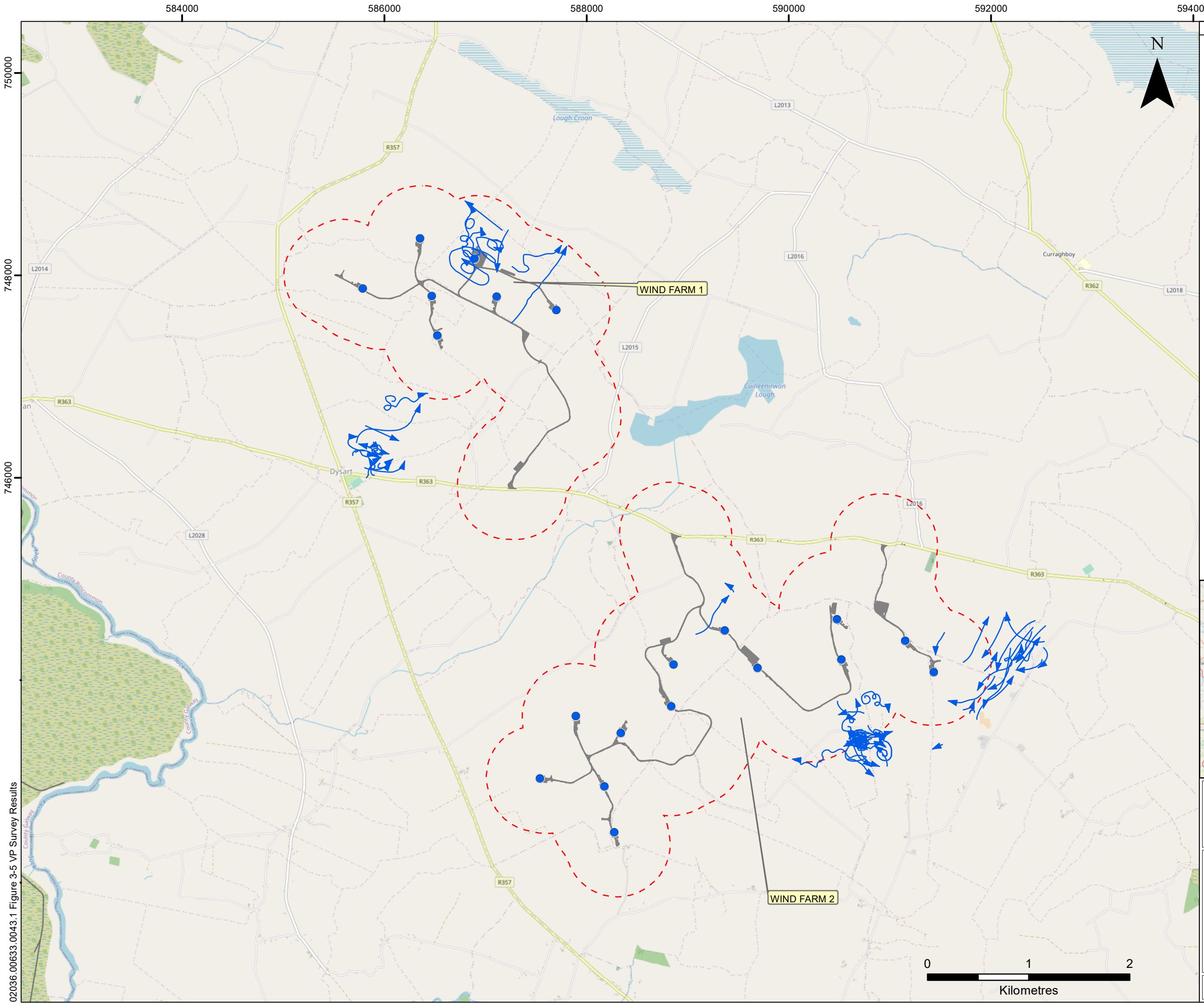
SEVEN HILLS WIND FARM SUMMER BREEDING SEASON REPORT 2021

FIGURE 2 - VANTAGE POINTS OVERLOOKING WINDFARMS I AND II

Scale 1:35,000 @ A3

Date MAY 2022

02036.00633.0042.1 Figure 2 Viewsheds from Vantage Points



LEGEND

- Turbine Location
- Site Infrastructure
- Site Infrastructure 500 m Buffer
- Species
 - Black-Headed Gull

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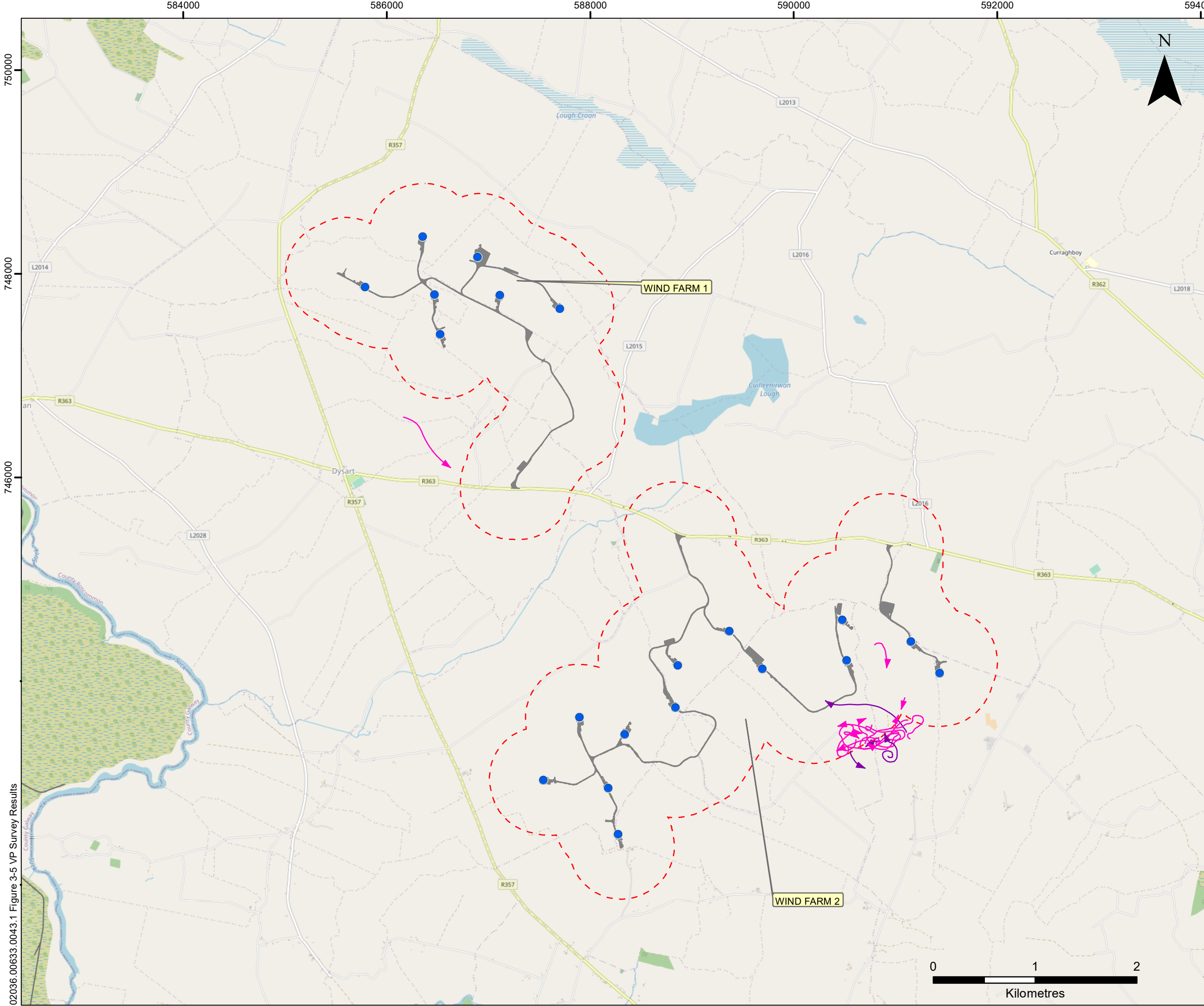
ORNITHOLOGY

SEVEN HILLS WIND FARM SUMMER BREEDING SEASON REPORT 2021

**FIGURE 3 - FLIGHT-LINES
BLACK-HEADED GULL**

Scale
1:35,000 @ A3

Date
MAY 2022



LEGEND

- Turbine Location
- Site Infrastructure
- Site Infrastructure 500 m Buffer
- Species**
- Curlew
- Lapwing

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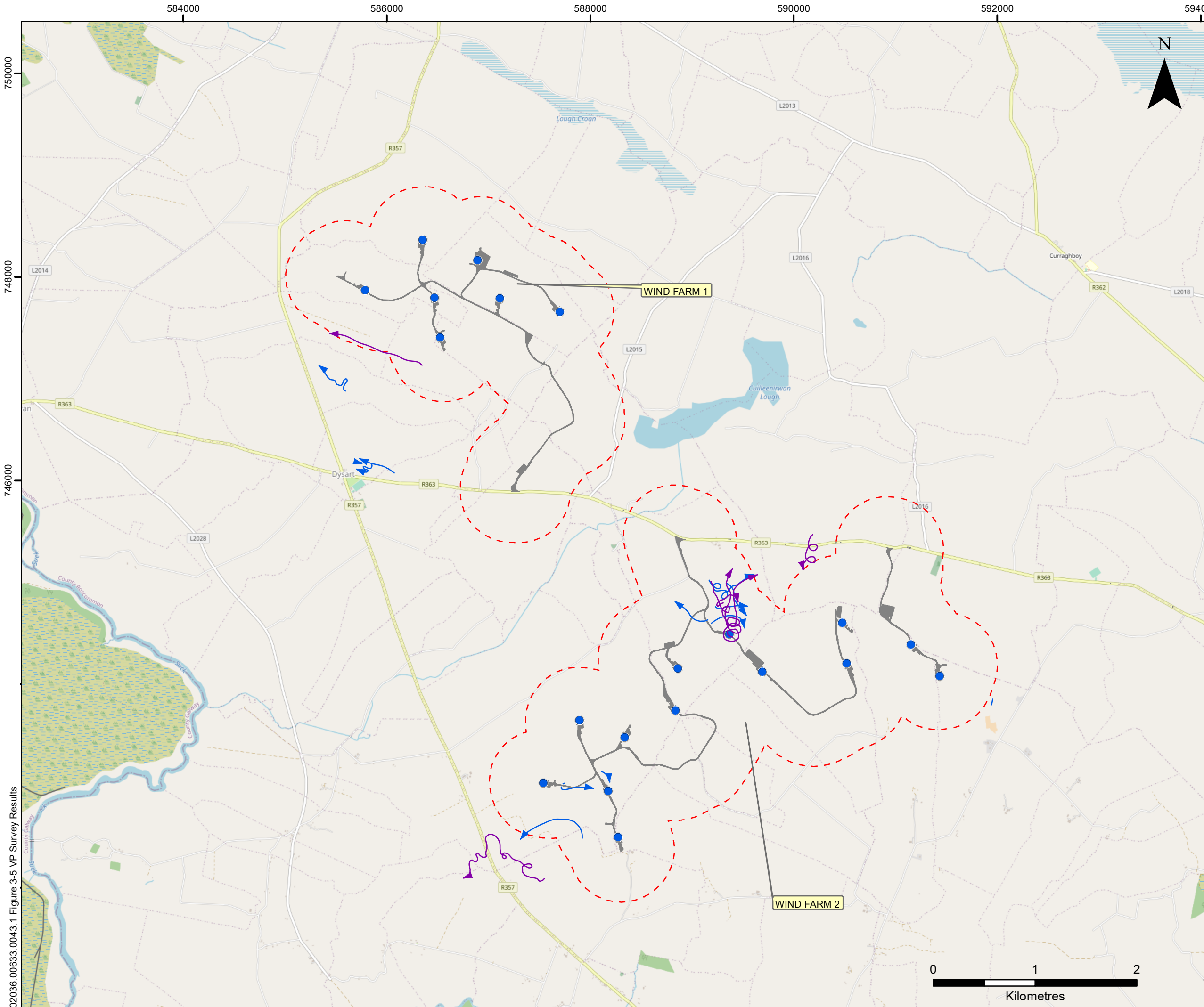
SEVEN HILLS WIND FARM SUMMER BREEDING SEASON REPORT 2021

FIGURE 4 - FLIGHT-LINES WADERS, WATERFOWL AND GULLS

Scale
1:35,000 @ A3

Date
MAY 2022

02036.00633.0043.1 Figure 3-5 VP Survey Results



LEGEND

- Turbine Location
- Site Infrastructure
- Site Infrastructure 500 m Buffer
- Species
 - Kestrel
 - Peregrine

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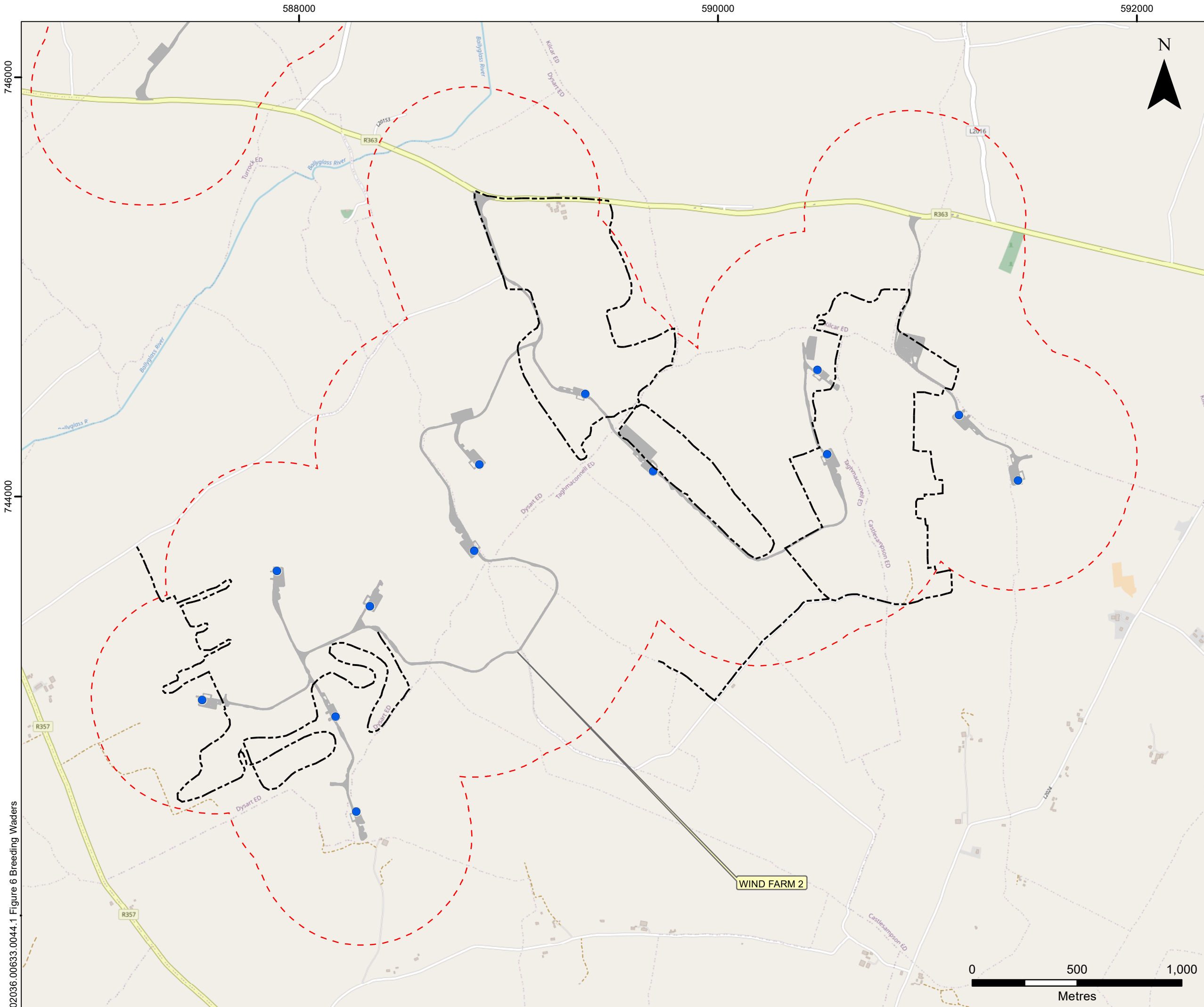
ORNITHOLOGY

SEVEN HILLS WIND FARM SUMMER BREEDING SEASON REPORT 2021

FIGURE 5 - FLIGHT-LINES RAPTORS

Scale
1:35,000 @ A3

Date
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LEGEND

- Turbine Location
- Site Infrastructure
- Site Infrastructure 500 m Buffer
- Walked Transect

Note:

No breeding wader bird species recorded throughout the season.

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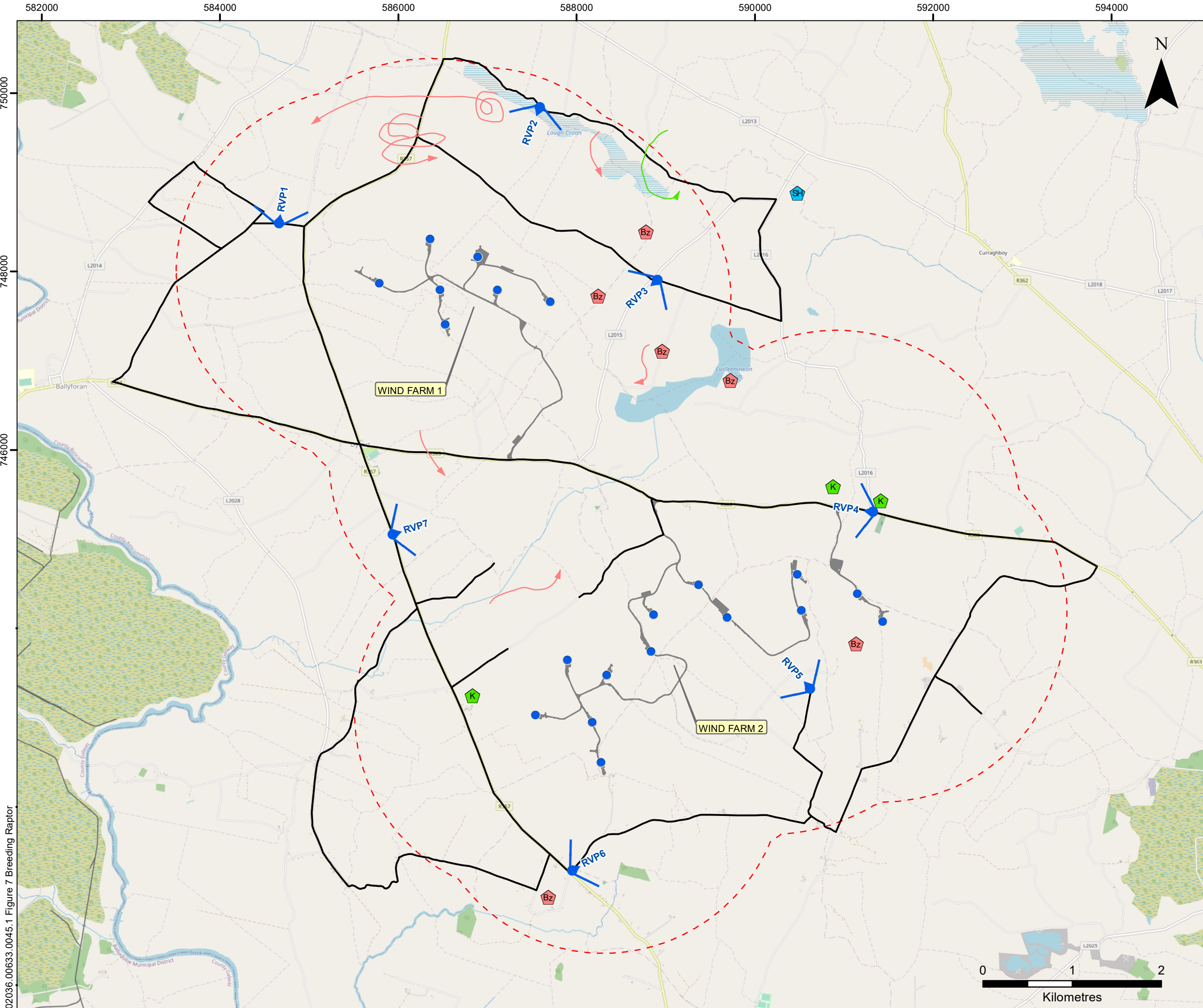
ORNITHOLOGY

SEVEN HILLS WIND FARM SUMMER BREEDING SEASON REPORT 2021

FIGURE 6 - BREEDING WADER WALKED TRANSECT RESULTS

Scale
1:17,000 @ A3

Date
MAY 2022



LEGEND

- Turbine Location
- Site Infrastructure
- Site Infrastructure 2 km Buffer
- Driven transect
- Raptor Viewpoint Locations (Stopping Point)
- Raptor Species Record**
 - Bz Buzzard
 - K Kestrel
 - SH Sparrowhawk
- Raptor Species Flightline**
 - Buzzard
 - Kestrel

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FIGURE 7 - BREEDING RAPTOR DRIVEN TRANSECT SURVEY RESULTS

Scale 1:40,000 @ A3

Date MAY 2022

APPENDIX 01

Survey dates, times and observers

Table A1-1
Details of VP surveys undertaken from Wind Farm I Vantage Point 1

| Date | Surveyor | Start | End | Survey Duration |
|--------------------|----------|-------|-------|-----------------|
| 14/04/2021 | SI | 09:30 | 12:30 | 03:00 |
| 15/04/2021 | SI | 12:30 | 15:30 | 03:00 |
| 21/05/2021 | JC | 12:30 | 15:30 | 03:00 |
| 24/05/2021 | JC | 14:40 | 17:40 | 03:00 |
| 21/06/2021 | AK | 18:00 | 21:00 | 03:00 |
| 22/06/2021 | AK | 06:45 | 09:45 | 03:00 |
| 19/07/2021 | JD | 14:10 | 17:10 | 03:00 |
| 20/07/2021 | JD | 07:15 | 10:15 | 03:00 |
| 12/08/2021 | JD | 14:30 | 17:30 | 03:00 |
| 18/08/2021 | JD | 14:00 | 17:00 | 03:00 |
| 08/09/2021 | JD | 17:30 | 20:30 | 03:00 |
| 10/09/2021 | JD | 07:15 | 10:15 | 03:00 |
| Total Hours | | | | 36 |

Table A1-2
Details of VP surveys undertaken from Wind Farm I Vantage Point 2

| Date | Surveyor | Start | End | Survey Duration |
|------------|----------|-------|-------|-----------------|
| 14/04/2021 | SI | 13:00 | 16:00 | 03:00 |
| 15/04/2021 | SI | 09:00 | 12:00 | 03:00 |
| 21/05/2021 | JC | 17:25 | 20:25 | 03:00 |
| 24/05/2021 | JC | 10:55 | 13:55 | 03:00 |
| 21/06/2021 | AK | 14:30 | 17:30 | 03:00 |
| 22/06/2021 | AK | 15:45 | 18:45 | 03:00 |
| 26/07/2021 | JD | 10:45 | 13:45 | 03:00 |
| 27/07/2021 | JD | 09:10 | 12:10 | 03:00 |
| 11/08/2021 | JD | 10:15 | 13:15 | 03:00 |

| Date | Surveyor | Start | End | Survey Duration |
|--------------------|----------|-------|-------|-----------------|
| 13/08/2021 | JD | 11:00 | 14:00 | 03:00 |
| 08/09/2021 | JD | 14:00 | 17:00 | 03:00 |
| 09/09/2021 | JD | 14:00 | 17:00 | 03:00 |
| Total Hours | | | | 36 |

Table A1-3
Details of VP surveys undertaken from Wind Farm II Vantage Point 1

| Date | Surveyor | Start | End | Survey Duration |
|--------------------|----------|-------|-------|-----------------|
| 16/04/2021 | SI | 10:30 | 13:30 | 03:00 |
| 21/04/2021 | SI | 08:10 | 11:10 | 03:00 |
| 24/05/2021 | JC | 18:20 | 21:20 | 03:00 |
| 28/05/2021 | JC | 06:55 | 09:55 | 03:00 |
| 28/06/2021 | AK | 16:15 | 19:15 | 03:00 |
| 29/06/2021 | AK | 11:00 | 14:00 | 03:00 |
| 20/07/2021 | JD | 18:00 | 21:00 | 03:00 |
| 21/07/2021 | JD | 06:30 | 09:30 | 03:00 |
| 12/08/2021 | JD | 11:00 | 14:00 | 03:00 |
| 13/08/2021 | JD | 07:30 | 10:30 | 03:00 |
| 09/09/2021 | JD | 10:30 | 13:30 | 03:00 |
| 22/09/2021 | JD | 07:00 | 10:00 | 03:00 |
| Total Hours | | | | 36 |

Table A1-4
Details of VP surveys undertaken from Wind Farm II Vantage Point 2

| Date | Surveyor | Start | End | Survey Duration |
|------------|----------|-------|-------|-----------------|
| 21/04/2021 | SI | 12:00 | 15:00 | 03:00 |
| 25/05/2021 | SI | 06:50 | 09:50 | 03:00 |
| 27/05/2021 | JC | 16:15 | 19:15 | 03:00 |
| 23/06/2021 | JC | 13:00 | 16:00 | 03:00 |

| Date | Surveyor | Start | End | Survey Duration |
|--------------------|----------|-------|-------|-----------------|
| 28/06/2021 | AK | 12:30 | 15:30 | 03:00 |
| 19/07/2021 | AK | 10:40 | 13:40 | 03:00 |
| 21/07/2021 | JD | 10:00 | 13:00 | 03:00 |
| 12/08/2021 | JD | 07:30 | 10:30 | 03:00 |
| 18/08/2021 | JD | 17:30 | 20:30 | 03:00 |
| 09/09/2021 | JD | 07:00 | 10:00 | 03:00 |
| 21/09/2021 | JD | 12:45 | 15:45 | 03:00 |
| 21/04/2021 | JD | 12:00 | 15:00 | 03:00 |
| Total Hours | | | | 36 |

Table A1-5
Details of VP surveys undertaken from Wind Farm II Vantage Point 3

| Date | Surveyor | Start | End | Survey Duration |
|--------------------|----------|-------|-------|-----------------|
| 19/04/2021 | SI | 13:00 | 16:00 | 03:00 |
| 20/04/2021 | SI | 14:50 | 17:50 | 03:00 |
| 25/05/2021 | JC | 14:40 | 17:40 | 03:00 |
| 26/05/2021 | JC | 18:20 | 21:20 | 03:00 |
| 24/06/2021 | AK | 09:45 | 12:45 | 03:00 |
| 25/06/2021 | AK | 11:05 | 14:05 | 03:00 |
| 27/07/2021 | JD | 14:30 | 17:30 | 03:00 |
| 28/07/2021 | JD | 07:00 | 10:00 | 03:00 |
| 19/08/2021 | JD | 09:00 | 12:00 | 03:00 |
| 20/08/2021 | JD | 12:30 | 15:30 | 03:00 |
| 21/09/2021 | JD | 09:15 | 12:15 | 03:00 |
| 22/09/2021 | JD | 12:10 | 15:10 | 03:00 |
| Total Hours | | | | 36 |

Table A1-6
Details of VP surveys undertaken from Wind Farm II Vantage Point 4

| Date | Surveyor | Start | End | Survey Duration |
|--------------------|----------|-------|-------|-----------------|
| 19/04/2021 | SI | 09:30 | 12:30 | 03:00 |
| 20/04/2021 | SI | 11:20 | 14:20 | 03:00 |
| 25/05/2021 | JC | 18:15 | 21:15 | 03:00 |
| 26/05/2021 | JC | 06:55 | 09:55 | 03:00 |
| 24/06/2021 | AK | 13:45 | 16:45 | 03:00 |
| 25/06/2021 | AK | 07:10 | 10:10 | 03:00 |
| 26/07/2021 | JD | 14:15 | 17:15 | 03:00 |
| 28/07/2021 | JD | 10:45 | 13:45 | 03:00 |
| 19/08/2021 | JD | 12:30 | 15:30 | 03:00 |
| 20/08/2021 | JD | 09:00 | 12:00 | 03:00 |
| 08/09/2021 | JD | 10:30 | 13:30 | 03:00 |
| 10/09/2021 | JD | 10:45 | 13:45 | 03:00 |
| Total Hours | | | | 36 |

Table A1-7
Details of breeding raptor surveys

| Date | Surveyor | Start | End | Survey Duration |
|--------------------|----------|-------|-------|-----------------|
| 26/04/2021 | SI | 10:00 | 20:00 | 10:00 |
| 27/05/2021 | JC | 13:25 | 15:25 | 02:00 |
| 22/06/2021 | AK | 10:30 | 15:30 | 05:00 |
| 20/07/2021 | JD | 10:28 | 15:15 | 04:47 |
| Total Hours | | | | 12:47 |

Table A1-8
Details of breeding wader surveys

| Date | Surveyor | Start | End | Survey Duration |
|--------------------|----------|-------|-------|-----------------|
| 27/04/2021 | SI | 07:20 | 14:00 | 06:40 |
| 27/05/2021 | JC | 07:30 | 11:50 | 04:20 |
| 23/06/2021 | AK | 06:45 | 09:15 | 02:30 |
| Total Hours | | | | 12:30 |

APPENDIX 02

Weather Data

Table A2-1
Weather data collected during flight activity surveys undertaken at WF1 VP1

| Date | Surveyor | Start | End | Survey Hour | Wind Speed | Wind Direction | Rain | Cloud Cover | Cloud Height | Visibility | Snow | Frost | Temp (°C) |
|------------|----------|-------|-------|-------------|------------|----------------|------|-------------|--------------|------------|------|-------|-----------|
| 14/04/2021 | SI | 09:30 | 12:30 | 1 | 1 | E | 0 | 0 | - | 2 | 0 | 0 | 6 |
| 14/04/2021 | SI | 09:30 | 12:30 | 2 | 1 | E | 0 | 2 | 2 | 2 | 0 | 0 | 7 |
| 14/04/2021 | SI | 09:30 | 12:30 | 3 | 1 | E | 0 | 2 | 2 | 2 | 0 | 0 | 9 |
| 15/04/2021 | SI | 12:30 | 15:30 | 1 | 1 | S | 0 | 1 | 2 | 2 | 0 | 0 | 13 |
| 15/04/2021 | SI | 12:30 | 15:30 | 2 | 2 | SE | 0 | 1 | 2 | 2 | 0 | 0 | 13 |
| 15/04/2021 | SI | 12:30 | 15:30 | 3 | 2 | SE | 0 | 3 | 2 | 2 | 0 | 0 | 13 |
| 21/05/2021 | JC | 12:30 | 15:30 | 1 | 2 | NW | 0 | 8 | 1 | 1 | 0 | 0 | 7 |
| 21/05/2021 | JC | 12:30 | 15:30 | 2 | 3 | NW | 3 | 8 | 1 | 1 | 0 | 0 | 8 |
| 21/05/2021 | JC | 12:30 | 15:30 | 3 | 3 | NW | 3 | 8 | 1 | 1 | 0 | 0 | 8 |
| 24/05/2021 | JC | 14:40 | 17:40 | 1 | 2 | NW | 0 | 5 | 2 | 2 | 0 | 0 | 13 |
| 24/05/2021 | JC | 14:40 | 17:40 | 2 | 3 | W | 0 | 5 | 2 | 2 | 0 | 0 | 12 |
| 24/05/2021 | JC | 14:40 | 17:40 | 3 | 3 | W | 0 | 6 | 2 | 2 | 0 | 0 | 12 |
| 21/06/2021 | AK | 18:00 | 21:00 | 1 | 3 | SE | 0 | 5 | 2 | 2 | 0 | 0 | 16 |
| 21/06/2021 | AK | 18:00 | 21:00 | 2 | 2 | SE | 0 | 5 | 2 | 2 | 0 | 0 | 14 |
| 21/06/2021 | AK | 18:00 | 21:00 | 3 | 2 | SE | 0 | 4 | 2 | 2 | 0 | 0 | 14 |
| 22/06/2021 | AK | 06:45 | 09:45 | 1 | 1 | SE | 0 | 8 | 1 | 1 | 0 | 0 | 7 |
| 22/06/2021 | AK | 06:45 | 09:45 | 2 | 1 | SE | 0 | 7 | 1 | 2 | 0 | 0 | 8 |
| 22/06/2021 | AK | 06:45 | 09:45 | 3 | 1 | SE | 0 | 6 | 1 | 2 | 0 | 0 | 10 |

| Date | Surveyor | Start | End | Survey Hour | Wind Speed | Wind Direction | Rain | Cloud Cover | Cloud Height | Visibility | Snow | Frost | Temp (°C) |
|----------------------------|----------|-------|--------------------------|-------------|------------|--------------------|------|-------------|-------------------|------------|------|--------------|-----------|
| 19/07/2021 | JD | 14:10 | 17:10 | 1 | 0 | E | 0 | 2 | 2 | 2 | 0 | 0 | 25 |
| 19/07/2021 | JD | 14:10 | 17:10 | 2 | 0 | E | 0 | 3 | 2 | 2 | 0 | 0 | 26 |
| 19/07/2021 | JD | 14:10 | 17:10 | 3 | 0 | SE | 0 | 3 | 2 | 2 | 0 | 0 | 28 |
| 20/07/2021 | JD | 07:15 | 10:15 | 1 | 1 | E | 0 | 1 | 2 | 2 | 0 | 0 | 16 |
| 20/07/2021 | JD | 07:15 | 10:15 | 2 | 1 | E | 0 | 1 | 2 | 2 | 0 | 0 | 17 |
| 20/07/2021 | JD | 07:15 | 10:15 | 3 | 1 | E | 0 | 0 | 2 | 2 | 0 | 0 | 19 |
| 12/08/2021 | JD | 14:30 | 17:30 | 1 | 4 | SW | 0 | 3 | 2 | 2 | 0 | 0 | 17 |
| 12/08/2021 | JD | 14:30 | 17:30 | 2 | 4 | SW | 0 | 3 | 2 | 2 | 0 | 0 | 18 |
| 12/08/2021 | JD | 14:30 | 17:30 | 3 | 4 | SW | 0 | 3 | 2 | 2 | 0 | 0 | 18 |
| 18/08/2021 | JD | 14:00 | 17:00 | 1 | 1 | NW | 0 | 7 | 2 | 2 | 0 | 0 | 17 |
| 18/08/2021 | JD | 14:00 | 17:00 | 2 | 1 | N | 0 | 7 | 2 | 2 | 0 | 0 | 18 |
| 18/08/2021 | JD | 14:00 | 17:00 | 3 | 1 | NW | 0 | 7 | 2 | 2 | 0 | 0 | 19 |
| 08/09/2021 | JD | 17:30 | 20:30 | 1 | 1 | SE | 1 | 8 | 2 | 2 | 0 | 0 | 22 |
| 08/09/2021 | JD | 17:30 | 20:30 | 2 | 1 | SE | 2 | 8 | 2 | 2 | 0 | 0 | 21 |
| 08/09/2021 | JD | 17:30 | 20:30 | 3 | 1 | SE | 1 | 8 | 2 | 2 | 0 | 0 | 20 |
| 10/09/2021 | JD | 07:15 | 10:15 | 1 | 0 | W | 0 | 8 | 1 | 1 | 0 | 0 | 16 |
| 10/09/2021 | JD | 07:15 | 10:15 | 2 | 0 | W | 0 | 8 | 1 | 1 | 0 | 0 | 16 |
| 10/09/2021 | JD | 07:15 | 10:15 | 3 | 0 | W | 0 | 8 | 1 | 1 | 0 | 0 | 16 |
| Rain/ Precipitation | | | Cloud Cover | | | Visibility | | | Lying Snow | | | Frost | |
| None 0 | | | Expressed in oktas (n/8) | | | Poor (<1km) 0 | | | None 0 | | | None 0 | |
| Drizzle 1 | | | Cloud Height | | | Moderate (1-3km) 1 | | | On site 1 | | | Ground 1 | |

| Date | Surveyor | Start | End | Survey Hour | Wind Speed | Wind Direction | Rain | Cloud Cover | Cloud Height | Visibility | Snow | Frost | Temp (°C) |
|--------------------|----------|-------|--|-------------|------------|----------------|------|-------------|------------------|------------|------|---------|-----------|
| Light showers/snow | 2 | | Height of cloud above average height of viewshed <150m 150-500m >500m | | | Good (>3km) | 2 | | On higher ground | 2 | | All day | 2 |
| Heavy showers/snow | 3 | | | 0 | | | | | | | | | |
| Heavy rain/snow | 4 | | | 1 | | | | | | | | | |
| | | | | 2 | | | | | | | | | |

Table A2-2
Weather data collected during flight activity surveys undertaken at WF1 VP2

| Date | Surveyor | Start | End | Survey Hour | Wind Speed | Wind Direction | Rain | Cloud Cover | Cloud Height | Visibility | Snow | Frost | Temp (°C) |
|------------|----------|-------|-------|-------------|------------|----------------|------|-------------|--------------|------------|------|-------|-----------|
| 14/04/2021 | SI | 13:00 | 16:00 | 1 | 1 | E | 0 | 5 | 2 | 2 | 0 | 0 | 13 |
| 14/04/2021 | SI | 13:00 | 16:00 | 2 | 1 | E | 0 | 3 | 2 | 2 | 0 | 0 | 14 |
| 14/04/2021 | SI | 13:00 | 16:00 | 3 | 1 | E | 0 | 4 | 2 | 2 | 0 | 0 | 15 |
| 15/04/2021 | SI | 09:00 | 12:00 | 1 | 1 | S | 0 | 0 | - | 2 | 0 | 0 | 9 |
| 15/04/2021 | SI | 09:00 | 12:00 | 2 | 1 | S | 0 | 0 | - | 2 | 0 | 0 | 10 |
| 15/04/2021 | SI | 09:00 | 12:00 | 3 | 1 | S | 0 | 1 | 2 | 2 | 0 | 0 | 10 |
| 21/05/2021 | JC | 17:25 | 20:25 | 1 | 3 | NW | 2 | 8 | 1 | 1 | 0 | 0 | 10 |
| 21/05/2021 | JC | 17:25 | 20:25 | 2 | 2 | N | 1 | 8 | 1 | 1 | 0 | 0 | 10 |
| 21/05/2021 | JC | 17:25 | 20:25 | 3 | 3 | N | 1 | 8 | 1 | 1 | 0 | 0 | 9 |
| 24/05/2021 | JC | 10:55 | 13:55 | 1 | 2 | NW | 0 | 4 | 2 | 2 | 0 | 0 | 10 |
| 24/05/2021 | JC | 10:55 | 13:55 | 2 | 3 | NW | 2 | 6 | 2 | 2 | 0 | 0 | 10 |

| Date | Surveyor | Start | End | Survey Hour | Wind Speed | Wind Direction | Rain | Cloud Cover | Cloud Height | Visibility | Snow | Frost | Temp (°C) |
|------------|----------|-------|-------|-------------|------------|----------------|------|-------------|--------------|------------|------|-------|-----------|
| 24/05/2021 | JC | 10:55 | 13:55 | 3 | 3 | NW | 0 | 6 | 2 | 2 | 0 | 0 | 12 |
| 21/06/2021 | AK | 14:30 | 17:30 | 1 | 3 | SE | 0 | 6 | 2 | 2 | 0 | 0 | 16 |
| 21/06/2021 | AK | 14:30 | 17:30 | 2 | 4 | SE | 0 | 7 | 1 | 2 | 0 | 0 | 16 |
| 21/06/2021 | AK | 14:30 | 17:30 | 3 | 4 | SE | 0 | 6 | 1 | 2 | 0 | 0 | 15 |
| 22/06/2021 | AK | 15:45 | 18:45 | 1 | 1 | SE | 1 | 8 | 2 | 2 | 0 | 0 | 14 |
| 22/06/2021 | AK | 15:45 | 18:45 | 2 | 1 | SE | 3 | 8 | 1 | 2 | 0 | 0 | 13 |
| 22/06/2021 | AK | 15:45 | 18:45 | 3 | 1 | SE | 1 | 8 | 2 | 2 | 0 | 0 | 12 |
| 26/07/2021 | JD | 10:45 | 13:45 | 1 | 2 | NW | 0 | 8 | 1 | 2 | 0 | 0 | 18 |
| 26/07/2021 | JD | 10:45 | 13:45 | 2 | 2 | NW | 0 | 8 | 1 | 2 | 0 | 0 | 19 |
| 26/07/2021 | JD | 10:45 | 13:45 | 3 | 2 | NW | 0 | 8 | 1 | 2 | 0 | 0 | 20 |
| 27/07/2021 | JD | 09:10 | 12:10 | 1 | 2 | NW | 1 | 8 | 1 | 2 | 0 | 0 | 15 |
| 27/07/2021 | JD | 09:10 | 12:10 | 2 | 2 | NW | 1 | 8 | 1 | 2 | 0 | 0 | 15 |
| 27/07/2021 | JD | 09:10 | 12:10 | 3 | 2 | NW | 1 | 8 | 1 | 2 | 0 | 0 | 15 |
| 11/08/2021 | JD | 10:15 | 13:15 | 1 | 1 | W | 0 | 7 | 2 | 2 | 0 | 0 | 15 |
| 11/08/2021 | JD | 10:15 | 13:15 | 2 | 1 | SW | 0 | 6 | 2 | 2 | 0 | 0 | 17 |
| 11/08/2021 | JD | 10:15 | 13:15 | 3 | 1 | W | 0 | 5 | 2 | 2 | 0 | 0 | 18 |
| 13/08/2021 | JD | 11:00 | 14:00 | 1 | 3 | SW | 0 | 8 | 2 | 2 | 0 | 0 | 16 |
| 13/08/2021 | JD | 11:00 | 14:00 | 2 | 3 | SW | 0 | 8 | 1 | 2 | 0 | 0 | 17 |
| 13/08/2021 | JD | 11:00 | 14:00 | 3 | 3 | SW | 0 | 8 | 2 | 2 | 0 | 0 | 17 |
| 08/09/2021 | JD | 14:00 | 17:00 | 1 | 1 | SE | 0 | 7 | 2 | 2 | 0 | 0 | 21 |
| 08/09/2021 | JD | 14:00 | 17:00 | 2 | 1 | SE | 1 | 7 | 2 | 2 | 0 | 0 | 22 |

| Date | Surveyor | Start | End | Survey Hour | Wind Speed | Wind Direction | Rain | Cloud Cover | Cloud Height | Visibility | Snow | Frost | Temp (°C) |
|----------------------------|----------|-------|----------------------------|-------------|------------|--------------------|------|-------------|--------------------|------------|------|--------------|-----------|
| 08/09/2021 | JD | 14:00 | 17:00 | 3 | 1 | SE | 2 | 8 | 2 | 2 | 0 | 0 | 22 |
| 09/09/2021 | JD | 14:00 | 17:00 | 1 | 2 | SE | 0 | 7 | 1 | 2 | 0 | 0 | 20 |
| 09/09/2021 | JD | 14:00 | 17:00 | 2 | 2 | SE | 1 | 7 | 1 | 2 | 0 | 0 | 20 |
| 09/09/2021 | JD | 14:00 | 17:00 | 3 | 2 | SE | 2 | 6 | 1 | 2 | 0 | 0 | 19 |
| Rain/ Precipitation | | | Cloud Cover | | | Visibility | | | Lying Snow | | | Frost | |
| None 0 | | | Expressed in oktas (n/8) | | | Poor (<1km) 0 | | | None 0 | | | None 0 | |
| Drizzle 1 | | | Cloud Height | | | Moderate (1-3km) 1 | | | On site 1 | | | Ground 1 | |
| Light showers/snow 2 | | | Height of cloud above | | | Good (>3km) 2 | | | On higher ground 2 | | | All day 2 | |
| Heavy showers/snow 3 | | | average height of viewshed | | | | | | | | | | |
| Heavy rain/snow 4 | | | <150m 0 | | | | | | | | | | |
| | | | 150-500m 1 | | | | | | | | | | |
| | | | >500m 2 | | | | | | | | | | |

Table A2-3
Weather data collected during flight activity surveys undertaken at WF2 VP1

| Date | Surveyor | Start | End | Survey Hour | Wind Speed | Wind Direction | Rain | Cloud Cover | Cloud Height | Visibility | Snow | Frost | Temp (°C) |
|------------|----------|-------|-------|-------------|------------|----------------|------|-------------|--------------|------------|------|-------|-----------|
| 16/04/2021 | SI | 10:30 | 13:30 | 1 | 4 | S | 0 | 4 | 2 | 2 | 0 | 0 | 9 |
| 16/04/2021 | SI | 10:30 | 13:30 | 2 | 4 | S | 0 | 6 | 2 | 2 | 0 | 0 | 10 |
| 16/04/2021 | SI | 10:30 | 13:30 | 3 | 4 | S | 0 | 7 | 2 | 2 | 0 | 0 | 11 |
| 21/04/2021 | SI | 08:10 | 11:10 | 1 | 1 | E | 0 | 8 | 2 | 2 | 0 | 0 | 10 |
| 21/04/2021 | SI | 08:10 | 11:10 | 2 | 1 | E | 0 | 8 | 2 | 2 | 0 | 0 | 1 |

| Date | Surveyor | Start | End | Survey Hour | Wind Speed | Wind Direction | Rain | Cloud Cover | Cloud Height | Visibility | Snow | Frost | Temp (°C) |
|------------|----------|-------|-------|-------------|------------|----------------|------|-------------|--------------|------------|------|-------|-----------|
| 21/04/2021 | SI | 08:10 | 11:10 | 3 | 1 | E | 0 | 8 | 2 | 2 | 0 | 0 | 13 |
| 24/05/2021 | JC | 18:20 | 21:20 | 1 | 3 | NW | 0 | 5 | 2 | 2 | 0 | 0 | 12 |
| 24/05/2021 | JC | 18:20 | 21:20 | 2 | 3 | NW | 0 | 6 | 2 | 2 | 0 | 0 | 11 |
| 24/05/2021 | JC | 18:20 | 21:20 | 3 | 2 | NW | 0 | 6 | 2 | 2 | 0 | 0 | 10 |
| 28/05/2021 | JC | 06:55 | 09:55 | 1 | 2 | NW | 0 | 8 | 1 | 2 | 0 | 0 | 7 |
| 28/05/2021 | JC | 06:55 | 09:55 | 2 | 1 | NW | 1 | 8 | 1 | 2 | 0 | 0 | 8 |
| 28/05/2021 | JC | 06:55 | 09:55 | 3 | 1 | NW | 0 | 8 | 1 | 2 | 0 | 0 | 10 |
| 28/06/2021 | AK | 16:15 | 19:15 | 1 | 0 | na | 6 | 2 | 2 | 2 | 0 | 0 | 19 |
| 28/06/2021 | AK | 16:15 | 19:15 | 2 | 1 | E | 4 | 2 | 2 | 2 | 0 | 0 | 19 |
| 28/06/2021 | AK | 16:15 | 19:15 | 3 | 1 | E | 4 | 2 | 2 | 2 | 0 | 0 | 19 |
| 29/06/2021 | AK | 11:00 | 14:00 | 1 | 3 | NW | 0 | 4 | 2 | 2 | 0 | 0 | 16 |
| 29/06/2021 | AK | 11:00 | 14:00 | 2 | 2 | NW | 0 | 2 | 2 | 2 | 0 | 0 | 16 |
| 29/06/2021 | AK | 11:00 | 14:00 | 3 | 0 | NW | 0 | 2 | 2 | 2 | 0 | 0 | 17 |
| 20/07/2021 | JD | 18:00 | 21:00 | 1 | 0 | SE | 0 | 3 | 2 | 2 | 0 | 0 | 27 |
| 20/07/2021 | JD | 18:00 | 21:00 | 2 | 0 | SE | 0 | 2 | 2 | 2 | 0 | 0 | 27 |
| 20/07/2021 | JD | 18:00 | 21:00 | 3 | 0 | SE | 0 | 1 | 2 | 2 | 0 | 0 | 26 |
| 21/07/2021 | JD | 06:30 | 09:30 | 1 | 1 | SE | 0 | 3 | 2 | 2 | 0 | 0 | 16 |
| 21/07/2021 | JD | 06:30 | 09:30 | 2 | 1 | SE | 0 | 4 | 2 | 2 | 0 | 0 | 17 |
| 21/07/2021 | JD | 06:30 | 09:30 | 3 | 1 | SE | 0 | 6 | 2 | 2 | 0 | 0 | 19 |
| 12/08/2021 | JD | 11:00 | 14:00 | 1 | 4 | SW | 0 | 7 | 2 | 0 | 0 | 0 | 16 |
| 12/08/2021 | JD | 11:00 | 14:00 | 2 | 3 | SW | 1 | 4 | 2 | 0 | 0 | 0 | 17 |

| Date | Surveyor | Start | End | Survey Hour | Wind Speed | Wind Direction | Rain | Cloud Cover | Cloud Height | Visibility | Snow | Frost | Temp (°C) |
|----------------------------|----------|-------|-------|----------------------------|------------|----------------|--------------------|-------------|--------------|--------------------|------|--------------|-----------|
| 12/08/2021 | JD | 11:00 | 14:00 | 3 | 4 | SW | 1 | 5 | 2 | 0 | 0 | 0 | 17 |
| 13/08/2021 | JD | 07:30 | 10:30 | 1 | 3 | SW | 0 | 3 | 2 | 2 | 0 | 0 | 14 |
| 13/08/2021 | JD | 07:30 | 10:30 | 2 | 3 | SW | 0 | 5 | 2 | 2 | 0 | 0 | 14 |
| 13/08/2021 | JD | 07:30 | 10:30 | 3 | 3 | SW | 1 | 7 | 2 | 2 | 0 | 0 | 14 |
| 09/09/2021 | JD | 10:30 | 13:30 | 1 | 2 | SE | 0 | 7 | 2 | 2 | 0 | 0 | 18 |
| 09/09/2021 | JD | 10:30 | 13:30 | 2 | 2 | SE | 0 | 5 | 2 | 2 | 0 | 0 | 19 |
| 09/09/2021 | JD | 10:30 | 13:30 | 3 | 2 | SE | 0 | 7 | 2 | 2 | 0 | 0 | 20 |
| 22/09/2021 | JD | 07:00 | 10:00 | 1 | 3 | SW | 0 | 2 | 2 | 2 | 0 | 0 | 14 |
| 22/09/2021 | JD | 07:00 | 10:00 | 2 | 3 | SW | 0 | 3 | 2 | 2 | 0 | 0 | 15 |
| 22/09/2021 | JD | 07:00 | 10:00 | 3 | 3 | SW | 0 | 3 | 2 | 2 | 0 | 0 | 16 |
| Rain/ Precipitation | | | | Cloud Cover | | | Visibility | | | Lying Snow | | Frost | |
| None 0 | | | | Expressed in oktas (n/8) | | | Poor (<1km) 0 | | | None 0 | | None 0 | |
| Drizzle 1 | | | | Cloud Height | | | Moderate (1-3km) 1 | | | On site 1 | | Ground 1 | |
| Light showers/snow 2 | | | | Height of cloud above | | | Good (>3km) 2 | | | On higher ground 2 | | All day 2 | |
| Heavy showers/snow 3 | | | | average height of viewshed | | | | | | | | | |
| Heavy rain/snow 4 | | | | <150m 0 | | | | | | | | | |
| | | | | 150-500m 1 | | | | | | | | | |
| | | | | >500m 2 | | | | | | | | | |

Table A2-4
Weather data collected during flight activity surveys undertaken at WF2 VP2

| Date | Surveyor | Start | End | Survey Hour | Wind Speed | Wind Direction | Rain | Cloud Cover | Cloud Height | Visibility | Snow | Frost | Temp (°C) |
|------------|----------|-------|-------|-------------|------------|----------------|------|-------------|--------------|------------|------|-------|-----------|
| 16/04/2021 | SI | 07:00 | 10:00 | 1 | 2 | S | 0 | 1 | 2 | 2 | 0 | 0 | 8 |
| 16/04/2021 | SI | 07:00 | 10:00 | 2 | 2 | S | 0 | 1 | 2 | 2 | 0 | 0 | 8 |
| 16/04/2021 | SI | 07:00 | 10:00 | 3 | 2 | S | 0 | 2 | 2 | 2 | 0 | 0 | 9 |
| 21/04/2021 | SI | 12:00 | 15:00 | 1 | 2 | SE | 0 | 3 | 2 | 2 | 0 | 0 | 11 |
| 21/04/2021 | SI | 12:00 | 15:00 | 2 | 2 | SE | 0 | 4 | 2 | 2 | 0 | 0 | 11 |
| 21/04/2021 | SI | 12:00 | 15:00 | 3 | 3 | SE | 0 | 5 | 2 | 2 | 0 | 0 | 11 |
| 25/05/2021 | JC | 06:50 | 09:50 | 1 | 2 | NW | 0 | 8 | 2 | 2 | 0 | 0 | 7 |
| 25/05/2021 | JC | 06:50 | 09:50 | 2 | 2 | NW | 0 | 8 | 2 | 2 | 0 | 0 | 7 |
| 25/05/2021 | JC | 06:50 | 09:50 | 3 | 2 | NW | 0 | 7 | 2 | 2 | 0 | 0 | 8 |
| 27/05/2021 | JC | 16:15 | 19:15 | 1 | 3 | SE | 2 | 8 | 1 | 1 | 0 | 0 | 13 |
| 27/05/2021 | JC | 16:15 | 19:15 | 2 | 3 | SE | 2 | 8 | 1 | 1 | 0 | 0 | 12 |
| 27/05/2021 | JC | 16:15 | 19:15 | 3 | 4 | S | 1 | 8 | 1 | 1 | 0 | 0 | 12 |
| 23/06/2021 | AK | 13:00 | 16:00 | 1 | 1 | SE | 0 | 8 | 1 | 2 | 0 | 0 | 17 |
| 23/06/2021 | AK | 13:00 | 16:00 | 2 | 1 | SE | 0 | 8 | 1 | 2 | 0 | 0 | 17 |
| 23/06/2021 | AK | 13:00 | 16:00 | 3 | 2 | SE | 0 | 8 | 1 | 2 | 0 | 0 | 17 |
| 28/06/2021 | AK | 12:30 | 15:30 | 1 | 2 | E | 0 | 5 | 2 | 2 | 0 | 0 | 17 |
| 28/06/2021 | AK | 12:30 | 15:30 | 2 | 2 | E | 0 | 4 | 2 | 2 | 0 | 0 | 18 |
| 28/06/2021 | AK | 12:30 | 15:30 | 3 | 2 | E | 0 | 6 | 2 | 2 | 0 | 0 | 19 |

| Date | Surveyor | Start | End | Survey Hour | Wind Speed | Wind Direction | Rain | Cloud Cover | Cloud Height | Visibility | Snow | Frost | Temp (°c) |
|----------------------------|----------|-------|--------------------------|-------------|------------|--------------------|------|-------------|-------------------|------------|------|--------------|-----------|
| 19/07/2021 | JD | 10:40 | 13:40 | 1 | 1 | SE | 0 | 6 | 2 | 2 | 0 | 0 | 21 |
| 19/07/2021 | JD | 10:40 | 13:40 | 2 | 1 | SE | 0 | 3 | 2 | 2 | 0 | 0 | 22 |
| 19/07/2021 | JD | 10:40 | 13:40 | 3 | 1 | SE | 0 | 5 | 2 | 2 | 0 | 0 | 23 |
| 21/07/2021 | JD | 10:00 | 13:00 | 1 | 1 | SE | 0 | 2 | 2 | 2 | 0 | 0 | 23 |
| 21/07/2021 | JD | 10:00 | 13:00 | 2 | 2 | SE | 0 | 1 | 2 | 2 | 0 | 0 | 24 |
| 21/07/2021 | JD | 10:00 | 13:00 | 3 | 2 | SE | 0 | 2 | 2 | 2 | 0 | 0 | 25 |
| 12/08/2021 | JD | 07:30 | 10:30 | 1 | 4 | S | 0 | 5 | 2 | 2 | 0 | 0 | 13 |
| 12/08/2021 | JD | 07:30 | 10:30 | 2 | 4 | S | 0 | 7 | 2 | 2 | 0 | 0 | 14 |
| 12/08/2021 | JD | 07:30 | 10:30 | 3 | 4 | S | 1 | 8 | 2 | 2 | 0 | 0 | 15 |
| 18/08/2021 | JD | 17:30 | 20:30 | 1 | 1 | W | 0 | 6 | 2 | 2 | 0 | 0 | 19 |
| 18/08/2021 | JD | 17:30 | 20:30 | 2 | 1 | W | 0 | 6 | 2 | 2 | 0 | 0 | 18 |
| 18/08/2021 | JD | 17:30 | 20:30 | 3 | 2 | W | 0 | 5 | 2 | 2 | 0 | 0 | 16 |
| 09/09/2021 | JD | 07:00 | 10:00 | 1 | 1 | SE | 1 | 8 | 1 | 1 | 0 | 0 | 16 |
| 09/09/2021 | JD | 07:00 | 10:00 | 2 | 0 | SE | 0 | 6 | 2 | 2 | 0 | 0 | 17 |
| 09/09/2021 | JD | 07:00 | 10:00 | 3 | 1 | SE | 0 | 7 | 2 | 2 | 0 | 0 | 17 |
| 21/09/2021 | JD | 12:45 | 15:45 | 1 | 2 | SW | 0 | 7 | 2 | 2 | 0 | 0 | 17 |
| 21/09/2021 | JD | 12:45 | 15:45 | 2 | 2 | SW | 1 | 8 | 2 | 2 | 0 | 0 | 16 |
| 21/09/2021 | JD | 12:45 | 15:45 | 3 | 2 | SW | 1 | 8 | 2 | 2 | 0 | 0 | 16 |
| Rain/ Precipitation | | | Cloud Cover | | | Visibility | | | Lying Snow | | | Frost | |
| None 0 | | | Expressed in oktas (n/8) | | | Poor (<1km) 0 | | | None 0 | | | None 0 | |
| Drizzle 1 | | | Cloud Height | | | Moderate (1-3km) 1 | | | On site 1 | | | Ground 1 | |

| Date | Surveyor | Start | End | Survey Hour | Wind Speed | Wind Direction | Rain | Cloud Cover | Cloud Height | Visibility | Snow | Frost | Temp (°c) |
|--------------------|----------|-------|--|-------------|------------|----------------|------|-------------|------------------|------------|------|---------|-----------|
| Light showers/snow | 2 | | | | | | | | | | | | |
| Heavy showers/snow | 3 | | | | | | | | | | | | |
| Heavy rain/snow | 4 | | | | | | | | | | | | |
| | | | Height of cloud above average height of viewshed | | | Good (>3km) | | | On higher ground | | | All day | |
| | | | <150m | | | | | | | | | | |
| | | | 150-500m | | | | | | | | | | |
| | | | >500m | | | | | | | | | | |

Table A2-5
Weather data collected during flight activity surveys undertaken at WF2 VP3

| Date | Surveyor | Start | End | Survey Hour | Wind Speed | Wind Direction | Rain | Cloud Cover | Cloud Height | Visibility | Snow | Frost | Temp (°c) |
|------------|----------|-------|-------|-------------|------------|----------------|------|-------------|--------------|------------|------|-------|-----------|
| 19/04/2021 | SI | 13:00 | 16:00 | 1 | 1 | S | 2 | 8 | 2 | 2 | 0 | 0 | 10 |
| 19/04/2021 | SI | 13:00 | 16:00 | 2 | 1 | S | 1 | 8 | 2 | 2 | 0 | 0 | 10 |
| 19/04/2021 | SI | 13:00 | 16:00 | 3 | 1 | S | 0 | 8 | 2 | 2 | 0 | 0 | 11 |
| 20/04/2021 | SI | 14:50 | 17:50 | 1 | 1 | N | 0 | 8 | 2 | 2 | 0 | 0 | 11 |
| 20/04/2021 | SI | 14:50 | 17:50 | 2 | 1 | N | 0 | 8 | 2 | 2 | 0 | 0 | 11 |
| 20/04/2021 | SI | 14:50 | 17:50 | 3 | 1 | N | 0 | 8 | 2 | 2 | 0 | 0 | 11 |
| 25/05/2021 | JC | 14:40 | 17:40 | 1 | 3 | NW | 1 | 4 | 2 | 2 | 0 | 0 | 14 |
| 25/05/2021 | JC | 14:40 | 17:40 | 2 | 3 | NW | 0 | 3 | 2 | 2 | 0 | 0 | 14 |
| 25/05/2021 | JC | 14:40 | 17:40 | 3 | 2 | NW | 0 | 3 | 2 | 2 | 0 | 0 | 13 |
| 26/05/2021 | JC | 18:20 | 21:20 | 1 | 1 | NW | 0 | 3 | 2 | 2 | 0 | 0 | 16 |
| 26/05/2021 | JC | 18:20 | 21:20 | 2 | 1 | NW | 0 | 4 | 2 | 2 | 0 | 0 | 14 |

| Date | Surveyor | Start | End | Survey Hour | Wind Speed | Wind Direction | Rain | Cloud Cover | Cloud Height | Visibility | Snow | Frost | Temp (°C) |
|------------|----------|-------|-------|-------------|------------|----------------|------|-------------|--------------|------------|------|-------|-----------|
| 26/05/2021 | JC | 18:20 | 21:20 | 3 | 2 | NW | 0 | 4 | 2 | 2 | 0 | 0 | 14 |
| 24/06/2021 | AK | 09:45 | 12:45 | 1 | 2 | NW | 0 | 8 | 2 | 2 | 0 | 0 | 15 |
| 24/06/2021 | AK | 09:45 | 12:45 | 2 | 3 | NW | 0 | 8 | 2 | 2 | 0 | 0 | 15 |
| 24/06/2021 | AK | 09:45 | 12:45 | 3 | 3 | NW | 0 | 8 | 2 | 2 | 0 | 0 | 15 |
| 25/06/2021 | AK | 11:05 | 14:05 | 1 | 2 | SE | 0 | 8 | 2 | 2 | 0 | 0 | 13 |
| 25/06/2021 | AK | 11:05 | 14:05 | 3 | 3 | SE | 0 | 8 | 2 | 2 | 0 | 0 | 13 |
| 27/07/2021 | JD | 14:30 | 17:30 | 1 | 3 | NW | 2 | 8 | 2 | 2 | 0 | 0 | 17 |
| 27/07/2021 | JD | 14:30 | 17:30 | 2 | 3 | NW | 1 | 8 | 2 | 2 | 0 | 0 | 18 |
| 27/07/2021 | JD | 14:30 | 17:30 | 3 | 3 | N | 0 | 7 | 2 | 2 | 0 | 0 | 18 |
| 28/07/2021 | JD | 07:00 | 10:00 | 1 | 1 | SW | 0 | 7 | 2 | 2 | 0 | 0 | 12 |
| 28/07/2021 | JD | 07:00 | 10:00 | 2 | 1 | SW | 1 | 7 | 2 | 2 | 0 | 0 | 12 |
| 28/07/2021 | JD | 07:00 | 10:00 | 3 | 2 | NW | 1 | 7 | 2 | 2 | 0 | 0 | 13 |
| 19/08/2021 | JD | 09:00 | 12:00 | 1 | 0 | SE | 0 | 8 | 2 | 2 | 0 | 0 | 13 |
| 19/08/2021 | JD | 09:00 | 12:00 | 2 | 2 | SE | 1 | 8 | 1 | 2 | 0 | 0 | 13 |
| 19/08/2021 | JD | 09:00 | 12:00 | 3 | 1 | SE | 0 | 8 | 1 | 2 | 0 | 0 | 15 |
| 20/08/2021 | JD | 12:30 | 15:30 | 1 | 3 | SE | 1 | 8 | 1 | 1 | 0 | 0 | 18 |
| 20/08/2021 | JD | 12:30 | 15:30 | 2 | 2 | SE | 0 | 7 | 1 | 2 | 0 | 0 | 19 |
| 20/08/2021 | JD | 12:30 | 15:30 | 3 | 2 | SE | 1 | 8 | 1 | 2 | 0 | 0 | 19 |
| 21/09/2021 | JD | 09:15 | 12:15 | 1 | 1 | SW | 1 | 8 | 1 | 1 | 0 | 0 | 14 |
| 21/09/2021 | JD | 09:15 | 12:15 | 2 | 1 | SW | 0 | 7 | 2 | 2 | 0 | 0 | 15 |
| 21/09/2021 | JD | 09:15 | 12:15 | 3 | 1 | SW | 0 | 8 | 2 | 2 | 0 | 0 | 16 |

| Date | Surveyor | Start | End | Survey Hour | Wind Speed | Wind Direction | Rain | Cloud Cover | Cloud Height | Visibility | Snow | Frost | Temp (°C) |
|----------------------------|----------|-------|----------------------------|-------------|------------|--------------------|------|-------------|--------------------|------------|------|--------------|-----------|
| 19/04/2021 | SI | 13:00 | 16:00 | 1 | 1 | S | 2 | 8 | 2 | 2 | 0 | 0 | 10 |
| 19/04/2021 | SI | 13:00 | 16:00 | 2 | 1 | S | 1 | 8 | 2 | 2 | 0 | 0 | 10 |
| Rain/ Precipitation | | | Cloud Cover | | | Visibility | | | Lying Snow | | | Frost | |
| None 0 | | | Expressed in oktas (n/8) | | | Poor (<1km) 0 | | | None 0 | | | None 0 | |
| Drizzle 1 | | | Cloud Height | | | Moderate (1-3km) 1 | | | On site 1 | | | Ground 1 | |
| Light showers/snow 2 | | | Height of cloud above | | | Good (>3km) 2 | | | On higher ground 2 | | | All day 2 | |
| Heavy showers/snow 3 | | | average height of viewshed | | | | | | | | | | |
| Heavy rain/snow 4 | | | <150m 0 | | | | | | | | | | |
| | | | 150-500m 1 | | | | | | | | | | |
| | | | >500m 2 | | | | | | | | | | |

Table A2-6
Weather data collected during flight activity surveys undertaken at WF2 VP4

| Date | Surveyor | Start | End | Survey Hour | Wind Speed | Wind Direction | Rain | Cloud Cover | Cloud Height | Visibility | Snow | Frost | Temp (°C) |
|------------|----------|-------|-------|-------------|------------|----------------|------|-------------|--------------|------------|------|-------|-----------|
| 19/04/2021 | SI | 09:30 | 12:30 | 1 | 2 | S | 1 | 8 | 1 | 1 | 0 | 0 | 8 |
| 19/04/2021 | SI | 09:30 | 12:30 | 2 | 2 | S | 1 | 8 | 1 | 1 | 0 | 0 | 9 |
| 19/04/2021 | SI | 09:30 | 12:30 | 3 | 1 | S | 0 | 8 | 2 | 2 | 0 | 0 | 10 |
| 20/04/2021 | SI | 11:20 | 14:20 | 1 | 1 | N | 0 | 8 | 2 | 2 | 0 | 0 | 10 |
| 20/04/2021 | SI | 11:20 | 14:20 | 2 | 1 | N | 0 | 8 | 2 | 2 | 0 | 0 | 10 |

| Date | Surveyor | Start | End | Survey Hour | Wind Speed | Wind Direction | Rain | Cloud Cover | Cloud Height | Visibility | Snow | Frost | Temp (°C) |
|------------|----------|-------|-------|-------------|------------|----------------|------|-------------|--------------|------------|------|-------|-----------|
| 20/04/2021 | SI | 11:20 | 14:20 | 3 | 1 | N | 0 | 8 | 2 | 2 | 0 | 0 | 11 |
| 25/05/2021 | JC | 18:15 | 21:15 | 1 | 3 | NW | 0 | 3 | 2 | 2 | 0 | 0 | 12 |
| 25/05/2021 | JC | 18:15 | 21:15 | 2 | 3 | NW | 0 | 6 | 2 | 2 | 0 | 0 | 12 |
| 25/05/2021 | JC | 18:15 | 21:15 | 3 | 2 | NW | 0 | 8 | 2 | 2 | 0 | 0 | 10 |
| 26/05/2021 | JC | 06:55 | 09:55 | 1 | 2 | NW | 0 | 8 | 2 | 2 | 0 | 0 | 6 |
| 26/05/2021 | JC | 06:55 | 09:55 | 2 | 2 | NW | 0 | 7 | 2 | 2 | 0 | 0 | 8 |
| 26/05/2021 | JC | 06:55 | 09:55 | 3 | 1 | NW | 0 | 7 | 2 | 2 | 0 | 0 | 10 |
| 24/06/2021 | AK | 13:45 | 16:45 | 1 | 3 | NE | 1 | 8 | 1 | 2 | 0 | 0 | 16 |
| 24/06/2021 | AK | 13:45 | 16:45 | 2 | 3 | NE | 1 | 8 | 1 | 2 | 0 | 0 | 16 |
| 24/06/2021 | AK | 13:45 | 16:45 | 3 | 3 | NE | 1 | 8 | 1 | 2 | 0 | 0 | 16 |
| 25/06/2021 | AK | 07:10 | 10:10 | 1 | 2 | SE | 0 | 7 | 2 | 2 | 0 | 0 | 10 |
| 25/06/2021 | AK | 07:10 | 10:10 | 2 | 3 | Se | 0 | 7 | 2 | 2 | 0 | 0 | 11 |
| 25/06/2021 | AK | 07:10 | 10:10 | 3 | 3 | SE | 0 | 8 | 2 | 2 | 0 | 0 | 12 |
| 26/07/2021 | JD | 14:15 | 17:15 | 1 | 1 | NW | 0 | 8 | 1 | 2 | 0 | 0 | 21 |
| 26/07/2021 | JD | 14:15 | 17:15 | 2 | 1 | NW | 0 | 8 | 1 | 2 | 0 | 0 | 22 |
| 26/07/2021 | JD | 14:15 | 17:15 | 3 | 1 | NW | 0 | 8 | 1 | 2 | 0 | 0 | 21 |
| 28/07/2021 | JD | 10:45 | 13:45 | 1 | 1 | W | 0 | 7 | 2 | 2 | 0 | 0 | 14 |
| 28/07/2021 | JD | 10:45 | 13:45 | 2 | 2 | NW | 0 | 5 | 2 | 2 | 0 | 0 | 15 |
| 28/07/2021 | JD | 10:45 | 13:45 | 3 | 2 | W | 0 | 7 | 2 | 2 | 0 | 0 | 16 |
| 19/08/2021 | JD | 12:30 | 15:30 | 1 | 1 | SE | 0 | 8 | 1 | 2 | 0 | 0 | 17 |
| 19/08/2021 | JD | 12:30 | 15:30 | 2 | 1 | SE | 0 | 5 | 2 | 2 | 0 | 0 | 18 |

| Date | Surveyor | Start | End | Survey Hour | Wind Speed | Wind Direction | Rain | Cloud Cover | Cloud Height | Visibility | Snow | Frost | Temp (°C) |
|--|----------|-------|-------|---|------------|----------------|---|-------------|--------------|--|------|---|-----------|
| 19/08/2021 | JD | 12:30 | 15:30 | 3 | 1 | SE | 0 | 8 | 2 | 2 | 0 | 0 | 19 |
| 20/08/2021 | JD | 09:00 | 12:00 | 1 | 3 | SE | 0 | 7 | 2 | 2 | 0 | 0 | 17 |
| 20/08/2021 | JD | 09:00 | 12:00 | 2 | 3 | SE | 0 | 8 | 1 | 2 | 0 | 0 | 18 |
| 20/08/2021 | JD | 09:00 | 12:00 | 3 | 3 | SE | 2 | 8 | 1 | 2 | 0 | 0 | 18 |
| 08/09/2021 | JD | 10:30 | 13:30 | 1 | 1 | E | 1 | 7 | 2 | 2 | 0 | 0 | 19 |
| 08/09/2021 | JD | 10:30 | 13:30 | 2 | 1 | E | 0 | 7 | 2 | 2 | 0 | 0 | 20 |
| 08/09/2021 | JD | 10:30 | 13:30 | 3 | 1 | E | 0 | 7 | 2 | 2 | 0 | 0 | 21 |
| 10/09/2021 | JD | 10:45 | 13:45 | 1 | 1 | W | 0 | 8 | 1 | 1 | 0 | 0 | 17 |
| 10/09/2021 | JD | 10:45 | 13:45 | 2 | 1 | W | 0 | 8 | 1 | 1 | 0 | 0 | 18 |
| 10/09/2021 | JD | 10:45 | 13:45 | 3 | 1 | W | 0 | 8 | 1 | 1 | 0 | 0 | 18 |
| Rain/ Precipitation None 0 Drizzle 1 Light showers/snow 2 Heavy showers/snow 3 Heavy rain/snow 4 | | | | Cloud Cover Expressed in oktas (n/8) Cloud Height Height of cloud above average height of viewshed <150m 0 150-500m 1 >500m 2 | | | Visibility Poor (<1km) 0 Moderate (1-3km) 1 Good (>3km) 2 | | | Lying Snow None 0 On site 1 On higher ground 2 | | Frost None 0 Ground 1 All day 2 | |

APPENDIX 03

Flight activity survey data

Table A3-1
Primary target species recorded during flight activity surveys undertaken at WF1 VP1

| Date | Surveyor | Flight ID | Species | Num. Birds | Age | Sex | Obs. Time | Flight time (s) |
|------------|----------|-----------|---------|------------|-----|-----|-----------|-----------------|
| 15/04/2021 | SI | 1 | BH | 3 | Ad | U | 09:10 | 30 |
| 15/04/2021 | SI | 2 | BH | 1 | Ad | U | 10:05 | 45 |
| 15/04/2021 | SI | 3 | BH | 2 | Ad | U | 10:27 | 30 |
| 15/04/2021 | SI | 4 | BH | 1 | Ad | U | 11:26 | 45 |
| 15/04/2021 | SI | 5 | CU | 4 | U | U | 11:57 | 45 |
| 15/04/2021 | SI | 1 | BH | 12 | Ad | U | 12:30 | 240 |
| 21/06/2021 | AK | 1 | TD | 1 | Ad | U | 18:11 | 15 |
| 21/06/2021 | AK | 2 | BH | 1 | Ad | U | 18:27 | 60 |
| 21/06/2021 | AK | 3 | BH | 1 | Ad | U | 18:46 | 30 |
| 19/07/2021 | JD | 1 | BH | 4 | Ad | U | 14:40 | 165 |
| 19/07/2021 | JD | 2 | BH | 2 | Ad | U | 14:52 | 60 |
| 20/07/2021 | JD | 1 | BH | 1 | Ad | U | 07:49 | 90 |
| 20/07/2021 | JD | 2 | BH | 1 | Ad | U | 08:23 | 15 |
| 12/08/2021 | JD | 1 | BH | 5 | U | U | 16:02 | 45 |

Table A3-2
Primary target species recorded during flight activity surveys undertaken at WF1 VP2

| Date | Surveyor | Flight ID | Species | Num. Birds | Age | Sex | Obs. Time | Flight time (s) |
|------------|----------|-----------|---------|------------|-----|-----|-----------|-----------------|
| 14/04/2021 | SI | 1 | BH | 2 | Ad | U | 13:25 | 30 |
| 14/04/2021 | SI | 2 | BH | 4 | Ad | U | 14:17 | 30 |
| 14/04/2021 | SI | 3 | BH | 3 | Ad | U | 15:03 | 45 |
| 21/06/2021 | AK | 1 | BH | 1 | Ad | U | 14:53 | 45 |
| 21/06/2021 | AK | 2 | BH | 1 | Ad | U | 15:34 | 15 |
| 21/06/2021 | AK | 3 | BH | 1 | Ad | U | 15:47 | 15 |
| 21/06/2021 | AK | 4 | BH | 1 | Ad | U | 16:13 | 75 |
| 21/06/2021 | AK | 5 | BH | 1 | Ad | U | 16:18 | 15 |
| 21/06/2021 | AK | 6 | BH | 2 | Ad | U | 16:38 | 30 |
| 22/06/2021 | AK | 1 | BH | 1 | Ad | U | 16:19 | 60 |
| 22/06/2021 | AK | 2 | K. | 1 | Ad | U | 16:36 | 15 |
| 27/07/2021 | JD | 1 | K. | 1 | Ad | M | 11:50 | 45 |
| 27/07/2021 | JD | 2 | K. | 1 | Ad | M | 12:00 | 15 |
| 13/08/2021 | JD | 1 | PE | 1 | Ad | U | 11:51 | 60 |
| 09/09/2021 | JD | 1 | K. | 1 | Ad | U | 15:10 | 45 |

Table A3-3
Primary target species recorded during flight activity surveys undertaken at WF2 VP1

| Date | Surveyor | Flight ID | Species | Num. Birds | Sex | Age | Obs. Time | Flight time (s) |
|------------|----------|-----------|---------|------------|-----|-----|-----------|-----------------|
| 16/04/2021 | SI | 1 | K. | 1 | Ad | F | 10:34 | 210 |
| 16/04/2021 | SI | 2 | K. | 1 | Ad | F | 10:45 | 120 |
| 16/04/2021 | SI | 3 | K. | 1 | Ad | U | 11:04 | 120 |
| 16/04/2021 | SI | 4 | K. | 1 | Ad | U | 11:13 | 240 |
| 28/06/2021 | AK | 1 | BH | 1 | Ad | U | 18:58 | 15 |
| 28/06/2021 | AK | 2 | BH | 1 | Ad | U | 19:11 | 15 |
| 29/06/2021 | AK | 1 | K. | 1 | Ad | F | 11:14 | 90 |
| 29/06/2021 | AK | 2 | PE | 1 | Ad | U | 11:34 | 180 |
| 29/06/2021 | AK | 3 | PE | 1 | Ad | U | 12:12 | 195 |
| 29/06/2021 | AK | 4 | PE | 2 | Ad | M+F | 12:15 | 120 |
| 13/08/2021 | JD | 1 | PE | 1 | Ad | F | 10:07 | 15 |

Table A3-4
Primary target species recorded during flight activity surveys undertaken at WF2 VP2

| Date | Surveyor | Flight ID | Species | Num. Birds | Age | Sex | Obs. Time | Flight time (s) |
|------------|----------|-----------|---------|------------|-----|-----|-----------|-----------------|
| 16/04/2021 | SI | 1 | K. | 1 | Ad | U | 09:12 | 60 |
| 21/02/2021 | SI | 1 | K. | 1 | Ad | U | 13:54 | 60 |
| 27/05/2021 | JC | 1 | K. | 1 | Ad | U | 18:02 | 90 |
| 28/06/2021 | AK | 1 | K. | 1 | Ad | U | 14:~1 | 225 |
| 21/09/2021 | JD | 1 | PE | 2 | U | U | 14:07 | 165 |

Table A3-5
Primary target species recorded during flight activity surveys undertaken at WF2 VP3

| Date | Surveyor | Flight ID | Species | Num. Birds | Age | Sex | Obs. Time | Flight time (s) |
|------------|----------|-----------|---------|------------|-----|-----|-----------|-----------------|
| 19/04/2021 | SI | 1 | BH | 4 | Ad | U | 13:47 | 75 |
| 19/04/2021 | SI | 2 | CU | 2 | U | U | 14:28 | 45 |
| 20/04/2021 | SI | 1 | BH | 3 | Ad | U | 11:52 | 60 |
| 20/04/2021 | SI | 2 | CU | 1 | Ad | U | 13:58 | 60 |
| 20/04/2021 | SI | 3 | BH | 2 | Ad | U | 14:10 | 60 |

| Date | Surveyor | Flight ID | Species | Num. Birds | Age | Sex | Obs. Time | Flight time (s) |
|------------|----------|-----------|---------|------------|--------|-----|-----------|-----------------|
| 25/05/2021 | JC | 1 | BH | 2 | Ad | U | 16:06 | 30 |
| 25/05/2021 | JC | 2 | BH | 2 | Ad | U | 16:32 | 75 |
| 25/05/2021 | JC | 3 | BH | 2 | Ad | U | 16:56 | 15 |
| 25/05/2021 | JC | 4 | BH | 1 | Ad | U | 17:25 | 105 |
| 26/05/2021 | JC | 1 | BH | 1 | Ad | U | 18:56 | 30 |
| 26/05/2021 | JC | 2 | BH | 2 | Ad | U | 19:24 | 15 |
| 26/05/2021 | JC | 3 | BH | 2 | Ad | U | 19:43 | 45 |
| 24/06/2021 | AK | 1 | BH | 1 | Ad | U | 09:49 | 15 |
| 24/06/2021 | AK | 2 | L. | 1 | Ad | U | 09:50 | 15 |
| 24/06/2021 | AK | 3 | BH | 2 | Ad | U | 10:23 | 30 |
| 24/06/2021 | AK | 4 | BH | 2 | Ad | U | 10:27 | 15 |
| 24/06/2021 | AK | A | L. | 9 | Ad | U | 10:30 | 15 |
| 24/06/2021 | AK | 5 | BH | 1 | Ad | U | 10:32 | 15 |
| 24/06/2021 | AK | 6 | BH | 2 | Ad | U | 10:41 | 15 |
| 24/06/2021 | AK | 7 | BH | 1 | Ad | U | 10:47 | 15 |
| 24/06/2021 | AK | 8 | BH | 2 | Ad | U | 10:52 | 15 |
| 24/06/2021 | AK | 9 | BH | 1 | Ad | U | 11:17 | 30 |
| 24/06/2021 | AK | 10 | BH | 1 | Ad | U | 11:21 | 15 |
| 24/06/2021 | AK | 11 | BH | 1 | Ad | U | 11:31 | 30 |
| 24/06/2021 | AK | 12 | BH | 3 | Ad | U | 12:11 | 120 |
| 24/06/2021 | AK | 13 | L. | 15 | Ad | U | 12:25 | 15 |
| 24/06/2021 | AK | 13 | BH | 8 | Ad | U | 12:25 | 15 |
| 25/06/2021 | AK | 1 | BH | 2 | Ad | U | 10:57 | 15 |
| 25/06/2021 | AK | 2 | BH | 3 | Ad | U | 11:58 | 30 |
| 25/06/2021 | AK | 3 | BH | 2 | Ad | U | 12:15 | 15 |
| 25/06/2021 | AK | 4 | BH | 1 | Ad | U | 12:17 | 15 |
| 25/06/2021 | AK | 5 | BH | 1 | Imm | U | 12:21 | 15 |
| 25/06/2021 | AK | 6 | L. | 1 | Ad | U | 12:25 | 15 |
| 25/06/2021 | AK | 7 | L. | 34 | Ad+Imm | U | 12:49 | 285 |
| 25/06/2021 | AK | 8 | BH | 1 | Ad | U | 13:12 | 15 |
| 25/06/2021 | AK | 9 | BH | 2 | Ad | U | 13:34 | 45 |
| 27/07/2021 | JD | 1 | BH | 1 | Juv | U | 14:30 | 0 |
| 27/07/2021 | JD | 2 | BH | 1 | Juv | U | 15:14 | 90 |
| 28/07/2021 | JD | 1 | BH | 1 | Ad | U | 08:04 | 15 |
| 28/07/2021 | JD | 2 | BH | 2 | Ad | U | 08:15 | 15 |
| 28/07/2021 | JD | 3 | BH | 3 | Ad | U | 08:48 | 15 |
| 20/08/2021 | JD | 1 | CU | 1 | Ad | U | 13:33 | 15 |

| Date | Surveyor | Flight ID | Species | Num. Birds | Age | Sex | Obs. Time | Flight time (s) |
|------------|----------|-----------|---------|------------|-----|-----|-----------|-----------------|
| 20/08/2021 | JD | 2 | CU | 12 | Ad | U | 14:45 | 45 |
| 20/08/2021 | JD | 3 | CU | 1 | Ad | U | 14:49 | 15 |
| 20/08/2021 | JD | 4 | CU | 7 | Ad | U | 15:10 | 15 |
| 21/09/2021 | JD | 1 | CU | 16 | Ad | U | 10:02 | 60 |
| 21/09/2021 | JD | 2 | CU | 15 | Ad | U | 10:12 | 45 |
| 21/09/2021 | JD | 4 | CU | 10 | Ad | U | 11:32 | 60 |

Table A3-6
Primary target species recorded during flight activity surveys undertaken at WF2 VP4

| Date | Surveyor | Flight ID | Species | Num. Birds | M/F | Age | Obs. Time | Flight time (s) |
|------------|----------|-----------|---------|------------|-----|-----|-----------|-----------------|
| 25/05/2021 | JC | 1 | BH | 1 | Ad | U | 20:56 | 45 |
| 26/05/2021 | JC | 1 | K. | 1 | Ad | U | 07:25 | 75 |
| 24/06/2021 | AK | 1 | BH | 1 | Ad | U | 12:58 | 15 |
| 24/06/2021 | AK | 2 | BH | 1 | Ad | U | 14:10 | 30 |
| 24/06/2021 | AK | 3 | BH | 6 | Ad | U | 14:10 | 15 |
| 24/06/2021 | AK | 4 | BH | 2 | Ad | U | 14:12 | 30 |
| 24/06/2021 | AK | 5 | BH | 1 | Ad | U | 15:16 | 75 |
| 24/06/2021 | AK | 6 | BH | 1 | Ad | U | 15:18 | 75 |
| 24/06/2021 | AK | 7 | BH | 1 | Ad | U | 15:20 | 45 |
| 24/06/2021 | AK | 8 | BH | 1 | Ad | U | 15:31 | 15 |
| 24/06/2021 | AK | 9 | BH | 2 | Ad | U | 15:38 | 30 |
| 24/06/2021 | AK | 10 | BH | 2 | Ad | U | 16:27 | 45 |
| 25/06/2021 | AK | 1 | BH | 1 | Ad | U | 07:31 | 30 |
| 25/06/2021 | AK | 2 | BH | 1 | Ad | U | 07:42 | 75 |
| 25/06/2021 | AK | 3 | BH | 1 | Ad | U | 07:50 | 30 |
| 25/06/2021 | AK | 4 | BH | 1 | Ad | U | 08:18 | 45 |
| 25/06/2021 | AK | 5 | BH | 2 | Ad | U | 08:41 | 30 |
| 25/06/2021 | AK | 6 | BH | 1 | Ad | U | 08:51 | 30 |
| 25/06/2021 | AK | 7 | BH | 1 | Ad | U | 08:57 | 15 |
| 25/06/2021 | AK | 8 | BH | 1 | Ad | U | 09:45 | 15 |
| 25/06/2021 | AK | 9 | BH | 1 | Ad | U | 09:55 | 15 |

Table A3-7
Secondary target species recorded during flight activity surveys undertaken at WF1 VP1

| Date | Survey Start | Survey End | Species | Count | 5 min period |
|------------|--------------|------------|---------|-------|--------------|
| 14/04/2021 | 09:30 | 12:30 | RN | 2 | 09:35 |
| 14/04/2021 | 09:30 | 12:30 | RN | 2 | 09:50 |
| 14/04/2021 | 09:30 | 12:30 | RN | 1 | 10:15 |
| 14/04/2021 | 09:30 | 12:30 | RN | 3 | 11:40 |
| 15/04/2021 | 12:30 | 15:30 | LB | 17 | 13:55 |
| 15/04/2021 | 12:30 | 15:30 | BZ | 1 | 14:00 |
| 15/04/2021 | 12:30 | 15:30 | LB | 2 | 14:20 |
| 15/04/2021 | 12:30 | 15:30 | LB | 2 | 14:25 |
| 21/05/2021 | 12:30 | 15:30 | RN | 1 | 13:50 |
| 24/05/2021 | 14:40 | 17:40 | RN | 1 | 15:05 |
| 21/06/2021 | 18:00 | 21:00 | GB | 1 | 18:20 |
| 21/06/2021 | 18:00 | 21:00 | CM | 1 | 18:55 |
| 21/06/2021 | 18:00 | 21:00 | H. | 1 | 19:05 |
| 21/06/2021 | 18:00 | 21:00 | CM | 1 | 19:25 |
| 21/06/2021 | 18:00 | 21:00 | CM | 1 | 19:35 |
| 21/06/2021 | 18:00 | 21:00 | CM | 1 | 19:45 |
| 21/06/2021 | 18:00 | 21:00 | CM | 1 | 19:55 |
| 21/06/2021 | 18:00 | 21:00 | LB | 1 | 20:00 |
| 21/06/2021 | 18:00 | 21:00 | GB | 1 | 20:00 |
| 21/06/2021 | 18:00 | 21:00 | LB | 2 | 20:20 |
| 21/06/2021 | 18:00 | 21:00 | LB | 1 | 20:20 |
| 21/06/2021 | 18:00 | 21:00 | BZ | 1 | 20:40 |
| 21/06/2021 | 18:00 | 21:00 | GB | 1 | 20:45 |
| 22/06/2021 | 06:45 | 09:45 | CM | 1 | 06:50 |
| 22/06/2021 | 06:45 | 09:45 | CM | 1 | 06:55 |
| 22/06/2021 | 06:45 | 09:45 | RN | 1 | 07:25 |
| 22/06/2021 | 06:45 | 09:45 | RN | 2 | 07:30 |
| 22/06/2021 | 06:45 | 09:45 | RN | 3 | 07:50 |
| 22/06/2021 | 06:45 | 09:45 | LB | 1 | 08:00 |
| 22/06/2021 | 06:45 | 09:45 | LB | 1 | 08:05 |
| 22/06/2021 | 06:45 | 09:45 | RN | 1 | 08:35 |
| 22/06/2021 | 06:45 | 09:45 | CM | 1 | 08:45 |
| 19/07/2021 | 14:10 | 17:10 | BZ | 1 | 14:35 |
| 20/07/2021 | 07:15 | 10:15 | LB | 1 | 07:50 |

| Date | Survey Start | Survey End | Species | Count | 5 min period |
|------------|--------------|------------|---------|-------|--------------|
| 20/07/2021 | 07:15 | 10:15 | LB | 2 | 08:35 |
| 20/07/2021 | 07:15 | 10:15 | LB | 1 | 08:40 |
| 20/07/2021 | 07:15 | 10:15 | HG | 1 | 09:00 |
| 20/07/2021 | 07:15 | 10:15 | HG | 1 | 09:10 |
| 20/07/2021 | 07:15 | 10:15 | LB | 2 | 09:25 |
| 20/07/2021 | 07:15 | 10:15 | LB | 1 | 09:35 |
| 20/07/2021 | 07:15 | 10:15 | RN | 1 | 09:45 |
| 12/08/2021 | 14:30 | 17:30 | SH | 1 | 14:25 |
| 12/08/2021 | 14:30 | 17:30 | BZ | 1 | 14:35 |
| 18/08/2021 | 14:00 | 17:00 | SH | 1 | 14:15 |
| 18/08/2021 | 14:00 | 17:00 | LB | 9 | 14:15 |
| 18/08/2021 | 14:00 | 17:00 | BZ | 1 | 14:30 |
| 18/08/2021 | 14:00 | 17:00 | RN | 2 | 15:00 |
| 18/08/2021 | 14:00 | 17:00 | SH | 1 | 15:10 |
| 08/09/2021 | 17:30 | 20:30 | LB | 5 | 17:40 |
| 10/09/2021 | 07:15 | 10:15 | RN | 1 | 09:25 |
| 10/09/2021 | 07:15 | 10:15 | RN | 1 | 09:40 |

Table A3-8
Secondary target species recorded during flight activity surveys undertaken at WF1 VP2

| Date | Survey Start | Survey End | Species | Count | 5 min period |
|------------|--------------|------------|---------|-------|--------------|
| 14/04/2021 | 13:00 | 16:00 | BZ | 1 | 13:40 |
| 14/04/2021 | 13:00 | 16:00 | BZ | 1 | 14:10 |
| 14/04/2021 | 13:00 | 16:00 | RN | 1 | 14:15 |
| 14/04/2021 | 13:00 | 16:00 | HG | 3 | 14:35 |
| 15/04/2021 | 09:00 | 12:00 | BZ | 1 | 11:00 |
| 15/04/2021 | 09:00 | 12:00 | BZ | 1 | 11:05 |
| 15/04/2021 | 09:00 | 12:00 | BZ | 1 | 11:05 |
| 15/04/2021 | 09:00 | 12:00 | LB | 1 | 11:25 |
| 15/04/2021 | 09:00 | 12:00 | RN | 1 | 11:40 |
| 21/05/2021 | 17:25 | 20:25 | LB | 1 | 19:00 |
| 21/05/2021 | 17:25 | 20:25 | RN | 1 | 19:00 |
| 24/05/2021 | 10:55 | 13:55 | RN | 2 | 11:20 |
| 24/05/2021 | 10:55 | 13:55 | RN | 1 | 12:50 |
| 21/06/2021 | 14:30 | 17:30 | CM | 1 | 15:15 |

| Date | Survey Start | Survey End | Species | Count | 5 min period |
|------------|--------------|------------|---------|-------|--------------|
| 21/06/2021 | 14:30 | 17:30 | GB | 1 | 15:30 |
| 21/06/2021 | 14:30 | 17:30 | RN | 2 | 15:40 |
| 21/06/2021 | 14:30 | 17:30 | GB | 1 | 15:40 |
| 21/06/2021 | 14:30 | 17:30 | RN | 1 | 15:45 |
| 21/06/2021 | 14:30 | 17:30 | RN | 2 | 16:15 |
| 21/06/2021 | 14:30 | 17:30 | LB | 1 | 16:30 |
| 21/06/2021 | 14:30 | 17:30 | LB | 1 | 16:35 |
| 21/06/2021 | 14:30 | 17:30 | LB | 2 | 16:40 |
| 21/06/2021 | 14:30 | 17:30 | CM | 1 | 16:45 |
| 21/06/2021 | 14:30 | 17:30 | LB | 1 | 16:55 |
| 22/06/2021 | 15:45 | 18:45 | CM | 1 | 16:55 |
| 22/06/2021 | 15:45 | 18:45 | CM | 1 | 17:25 |
| 22/06/2021 | 15:45 | 18:45 | LB | 1 | 17:35 |
| 22/06/2021 | 15:45 | 18:45 | LB | 1 | 18:15 |
| 22/06/2021 | 15:45 | 18:45 | LB | 1 | 18:35 |
| 26/07/2021 | 10:45 | 13:45 | HG | 1 | 12:15 |
| 27/07/2021 | 09:10 | 12:10 | LB | 1 | 10:25 |
| 27/07/2021 | 09:10 | 12:10 | LB | 1 | 11:40 |
| 27/07/2021 | 09:10 | 12:10 | LB | 1 | 12:05 |
| 11/08/2021 | 10:15 | 13:15 | LB | 1 | 10:40 |
| 11/08/2021 | 10:15 | 13:15 | LB | 5 | 11:10 |
| 13/08/2021 | 11:00 | 14:00 | RN | 2 | 11:45 |
| 13/08/2021 | 11:00 | 14:00 | RN | 1 | 12:00 |
| 13/08/2021 | 11:00 | 14:00 | RN | 5 | 12:05 |
| 13/08/2021 | 11:00 | 14:00 | RN | 2 | 12:50 |
| 13/08/2021 | 11:00 | 14:00 | LB | 1 | 13:05 |
| 08/09/2021 | 14:00 | 17:00 | RN | 2 | 14:15 |
| 08/09/2021 | 14:00 | 17:00 | HG | 1 | 15:00 |
| 09/09/2021 | 14:00 | 17:00 | BZ | 1 | 14:40 |
| 09/09/2021 | 14:00 | 17:00 | RN | 1 | 14:45 |
| 09/09/2021 | 14:00 | 17:00 | RN | 1 | 15:10 |

Table A3-9
Secondary target species recorded during flight activity surveys undertaken at WF2 VP1

| Date | Survey Start | Survey End | Species | Count | 5 min period |
|------------|--------------|------------|---------|-------|--------------|
| 16/04/2021 | 10:30 | 13:30 | BZ | 1 | 10:50 |
| 16/04/2021 | 10:30 | 13:30 | LB | 2 | 10:50 |
| 16/04/2021 | 10:30 | 13:30 | BZ | 1 | 11:10 |
| 16/04/2021 | 10:30 | 13:30 | LB | 1 | 11:15 |
| 16/04/2021 | 10:30 | 13:30 | RN | 1 | 11:25 |
| 16/04/2021 | 10:30 | 13:30 | BZ | 2 | 12:40 |
| 21/04/2021 | 08:10 | 11:10 | BZ | 1 | 09:05 |
| 21/04/2021 | 08:10 | 11:10 | BZ | 1 | 09:45 |
| 21/04/2021 | 08:10 | 11:10 | BZ | 1 | 10:35 |
| 24/05/2021 | 18:20 | 21:20 | LB | 2 | 19:25 |
| 24/05/2021 | 18:20 | 21:20 | LB | 1 | 19:35 |
| 24/05/2021 | 18:20 | 21:20 | HG | 1 | 21:05 |
| 24/05/2021 | 18:20 | 21:20 | LB | 2 | 21:15 |
| 28/05/2021 | 06:55 | 09:55 | RN | 1 | 07:20 |
| 28/05/2021 | 06:55 | 09:55 | RN | 1 | 07:55 |
| 28/06/2021 | 16:15 | 19:15 | BZ | 1 | 16:45 |
| 28/06/2021 | 16:15 | 19:15 | BZ | 1 | 16:55 |
| 28/06/2021 | 16:15 | 19:15 | BZ | 1 | 17:20 |
| 28/06/2021 | 16:15 | 19:15 | BZ | 1 | 17:40 |
| 28/06/2021 | 16:15 | 19:15 | BZ | 1 | 18:30 |
| 28/06/2021 | 16:15 | 19:15 | RN | 1 | 18:45 |
| 29/06/2021 | 11:00 | 14:00 | BZ | 1 | 11:20 |
| 29/06/2021 | 11:00 | 14:00 | RN | 1 | 11:45 |
| 29/06/2021 | 11:00 | 14:00 | RN | 2 | 12:35 |
| 29/06/2021 | 11:00 | 14:00 | RN | 2 | 12:55 |
| 29/06/2021 | 11:00 | 14:00 | BZ | 1 | 13:10 |
| 29/06/2021 | 11:00 | 14:00 | BZ | 1 | 13:12 |
| 29/06/2021 | 11:00 | 14:00 | BZ | 1 | 13:55 |
| 21/07/2021 | 06:30 | 09:30 | HG | 1 | 07:50 |
| 21/07/2021 | 06:30 | 09:30 | LB | 1 | 09:00 |
| 12/08/2021 | 11:00 | 14:00 | BZ | 1 | 12:00 |
| 12/08/2021 | 11:00 | 14:00 | LB | 2 | 12:25 |
| 12/08/2021 | 11:00 | 14:00 | LB | 2 | 12:30 |
| 12/08/2021 | 11:00 | 14:00 | SH | 1 | 13:15 |

| Date | Survey Start | Survey End | Species | Count | 5 min period |
|------------|--------------|------------|---------|-------|--------------|
| 13/08/2021 | 07:30 | 10:30 | LB | 2 | 09:55 |
| 13/08/2021 | 07:30 | 10:30 | BZ | 1 | 10:00 |
| 09/09/2021 | 10:30 | 13:30 | BZ | 1 | 11:30 |
| 09/09/2021 | 10:30 | 13:30 | RN | 2 | 11:55 |
| 22/09/2021 | 07:00 | 10:00 | BZ | 1 | 07:00 |

Table A3-10
Secondary target species recorded during flight activity surveys undertaken at WF2 VP2

| Date | Survey Start | Survey End | Species | Count | 5 min period |
|------------|--------------|------------|---------|-------|--------------|
| 16/04/2021 | 07:00 | 10:00 | RN | 2 | 07:10 |
| 16/04/2021 | 07:00 | 10:00 | LB | 1 | 08:20 |
| 16/04/2021 | 07:00 | 10:00 | RN | 3 | 08:40 |
| 16/04/2021 | 07:00 | 10:00 | RN | 1 | 09:15 |
| 21/04/2021 | 12:00 | 15:00 | RN | 1 | 12:30 |
| 21/04/2021 | 12:00 | 15:00 | RN | 2 | 13:15 |
| 25/05/2021 | 06:50 | 09:50 | BZ | 2 | 07:10 |
| 25/05/2021 | 06:50 | 09:50 | BZ | 1 | 07:30 |
| 25/05/2021 | 06:50 | 09:50 | LB | 1 | 08:05 |
| 25/05/2021 | 06:50 | 09:50 | RN | 1 | 08:40 |
| 25/05/2021 | 06:50 | 09:50 | BZ | 2 | 09:05 |
| 27/05/2021 | 16:15 | 19:15 | H. | 1 | 16:55 |
| 27/05/2021 | 16:15 | 19:15 | RN | 1 | 17:25 |
| 27/05/2021 | 16:15 | 19:15 | RN | 1 | 17:35 |
| 27/05/2021 | 16:15 | 19:15 | RN | 1 | 18:20 |
| 23/06/2021 | 13:00 | 16:00 | RN | 2 | 13:15 |
| 23/06/2021 | 13:00 | 16:00 | RN | 1 | 13:35 |
| 23/06/2021 | 13:00 | 16:00 | RN | 1 | 13:35 |
| 23/06/2021 | 13:00 | 16:00 | RN | 1 | 13:40 |
| 23/06/2021 | 13:00 | 16:00 | RN | 2 | 14:10 |
| 23/06/2021 | 13:00 | 16:00 | RN | 1 | 14:30 |
| 23/06/2021 | 13:00 | 16:00 | RN | 1 | 14:45 |
| 23/06/2021 | 13:00 | 16:00 | RN | 2 | 14:45 |
| 28/06/2021 | 12:30 | 15:30 | RN | 1 | 12:50 |
| 28/06/2021 | 12:30 | 15:30 | RN | 1 | 12:55 |
| 28/06/2021 | 12:30 | 15:30 | BZ | 3 | 13:05 |

| Date | Survey Start | Survey End | Species | Count | 5 min period |
|------------|--------------|------------|---------|-------|--------------|
| 28/06/2021 | 12:30 | 15:30 | BZ | 2 | 13:25 |
| 28/06/2021 | 12:30 | 15:30 | BZ | 2 | 13:40 |
| 28/06/2021 | 12:30 | 15:30 | RN | 1 | 13:45 |
| 28/06/2021 | 12:30 | 15:30 | LB | 1 | 13:55 |
| 19/07/2021 | 10:40 | 13:40 | SH | 1 | 10:40 |
| 19/07/2021 | 10:40 | 13:40 | H. | 1 | 11:45 |
| 19/07/2021 | 10:40 | 13:40 | RN | 2 | 12:30 |
| 21/07/2021 | 10:00 | 13:00 | BZ | 1 | 11:30 |
| 21/07/2021 | 10:00 | 13:00 | BZ | 1 | 11:40 |
| 21/07/2021 | 10:00 | 13:00 | BZ | 1 | 11:55 |
| 21/07/2021 | 10:00 | 13:00 | BZ | 1 | 12:20 |
| 21/07/2021 | 10:00 | 13:00 | BZ | 1 | 12:25 |
| 12/08/2021 | 07:30 | 10:30 | RN | 1 | 08:40 |
| 12/08/2021 | 07:30 | 10:30 | RN | 1 | 09:05 |
| 12/08/2021 | 07:30 | 10:30 | RN | 5 | 09:40 |
| 12/08/2021 | 07:30 | 10:30 | RN | 6 | 10:05 |
| 18/08/2021 | 17:30 | 20:30 | BZ | 2 | 17:30 |
| 18/08/2021 | 17:30 | 20:30 | BZ | 2 | 17:35 |
| 18/08/2021 | 17:30 | 20:30 | RN | 4 | 17:35 |
| 18/08/2021 | 17:30 | 20:30 | RN | 6 | 17:40 |
| 18/08/2021 | 17:30 | 20:30 | RN | 3 | 17:45 |
| 18/08/2021 | 17:30 | 20:30 | RN | 4 | 18:35 |
| 18/08/2021 | 17:30 | 20:30 | RN | 2 | 18:50 |
| 09/09/2021 | 07:00 | 10:00 | RN | 2 | 08:50 |
| 09/09/2021 | 07:00 | 10:00 | RN | 1 | 09:30 |
| 09/09/2021 | 07:00 | 10:00 | RN | 2 | 09:40 |
| 09/09/2021 | 07:00 | 10:00 | RN | 1 | 09:45 |
| 09/09/2021 | 07:00 | 10:00 | RN | 2 | 09:50 |
| 21/09/2021 | 12:45 | 15:45 | RN | 2 | 13:20 |
| 21/09/2021 | 12:45 | 15:45 | RN | 2 | 13:35 |
| 21/09/2021 | 12:45 | 15:45 | RN | 2 | 13:45 |
| 21/09/2021 | 12:45 | 15:45 | RN | 3 | 13:55 |
| 21/09/2021 | 12:45 | 15:45 | BZ | 1 | 14:45 |
| 21/09/2021 | 12:45 | 15:45 | RN | 1 | 14:55 |

Table A3-11
Secondary target species recorded during flight activity surveys undertaken at WF2 VP3

| Date | Survey Start | Survey End | Species | Count | 5 min period |
|------------|--------------|------------|---------|-------|--------------|
| 19/04/2021 | 13:00 | 16:00 | MA | 4 | 13:40 |
| 19/04/2021 | 13:00 | 16:00 | LB | 1 | 15:00 |
| 25/05/2021 | 14:40 | 17:40 | MA | 2 | 15:10 |
| 25/05/2021 | 14:40 | 17:40 | H. | 1 | 16:20 |
| 25/05/2021 | 14:40 | 17:40 | MA | 1 | 16:50 |
| 26/05/2021 | 18:20 | 21:20 | CO | 2 | 18:50 |
| 26/05/2021 | 18:20 | 21:20 | LB | 2 | 19:05 |
| 26/05/2021 | 18:20 | 21:20 | LB | 1 | 19:15 |
| 26/05/2021 | 18:20 | 21:20 | RN | 1 | 20:00 |
| 26/05/2021 | 18:20 | 21:20 | LB | 1 | 20:05 |
| 26/05/2021 | 18:20 | 21:20 | RN | 1 | 20:35 |
| 24/06/2021 | 09:45 | 12:45 | RN | 1 | 09:50 |
| 24/06/2021 | 09:45 | 12:45 | MA | 27 | 10:15 |
| 24/06/2021 | 09:45 | 12:45 | MA | 6 | 10:20 |
| 24/06/2021 | 09:45 | 12:45 | MA | 10 | 10:20 |
| 24/06/2021 | 09:45 | 12:45 | H. | 1 | 10:20 |
| 24/06/2021 | 09:45 | 12:45 | CM | 1 | 10:35 |
| 24/06/2021 | 09:45 | 12:45 | LB | 1 | 10:45 |
| 24/06/2021 | 09:45 | 12:45 | CM | 1 | 11:00 |
| 24/06/2021 | 09:45 | 12:45 | H. | 1 | 11:10 |
| 24/06/2021 | 09:45 | 12:45 | H. | 1 | 11:20 |
| 24/06/2021 | 09:45 | 12:45 | LB | 1 | 11:40 |
| 24/06/2021 | 09:45 | 12:45 | MA | 5 | 11:45 |
| 24/06/2021 | 09:45 | 12:45 | H. | 1 | 11:50 |
| 24/06/2021 | 09:45 | 12:45 | RN | 3 | 11:50 |
| 24/06/2021 | 09:45 | 12:45 | RN | 1 | 12:20 |
| 24/06/2021 | 09:45 | 12:45 | BZ | 1 | 12:40 |
| 24/06/2021 | 09:45 | 12:45 | LB | 2 | 12:40 |
| 24/06/2021 | 09:45 | 12:45 | MA | 6 | 12:40 |
| 24/06/2021 | 09:45 | 12:45 | MA | 1 | 12:40 |
| 24/06/2021 | 09:45 | 12:45 | MA | 6 | 12:45 |
| 25/06/2021 | 11:05 | 14:05 | MA | 13 | 10:50 |
| 25/06/2021 | 11:05 | 14:05 | LB | 1 | 11:20 |
| 25/06/2021 | 11:05 | 14:05 | H. | 1 | 11:20 |

| Date | Survey Start | Survey End | Species | Count | 5 min period |
|------------|--------------|------------|---------|-------|--------------|
| 25/06/2021 | 11:05 | 14:05 | BZ | 3 | 11:20 |
| 25/06/2021 | 11:05 | 14:05 | MA | 9 | 11:40 |
| 25/06/2021 | 11:05 | 14:05 | MA | 5 | 11:50 |
| 25/06/2021 | 11:05 | 14:05 | LB | 1 | 11:50 |
| 25/06/2021 | 11:05 | 14:05 | LB | 1 | 11:55 |
| 25/06/2021 | 11:05 | 14:05 | H. | 1 | 11:55 |
| 25/06/2021 | 11:05 | 14:05 | RN | 1 | 11:55 |
| 25/06/2021 | 11:05 | 14:05 | ET | 2 | 12:05 |
| 25/06/2021 | 11:05 | 14:05 | ET | 1 | 12:10 |
| 25/06/2021 | 11:05 | 14:05 | BZ | 1 | 12:25 |
| 25/06/2021 | 11:05 | 14:05 | H. | 7 | 12:55 |
| 25/06/2021 | 11:05 | 14:05 | MA | 1 | 13:15 |
| 25/06/2021 | 11:05 | 14:05 | CM | 2 | 13:25 |
| 25/06/2021 | 11:05 | 14:05 | MA | 1 | 14:00 |
| 27/07/2021 | 14:30 | 17:30 | SH | 1 | 14:30 |
| 27/07/2021 | 14:30 | 17:30 | MA | 2 | 14:40 |
| 27/07/2021 | 14:30 | 17:30 | MA | 3 | 14:45 |
| 27/07/2021 | 14:30 | 17:30 | CO | 4 | 14:50 |
| 27/07/2021 | 14:30 | 17:30 | RN | 1 | 16:00 |
| 27/07/2021 | 14:30 | 17:30 | RN | 2 | 16:15 |
| 27/07/2021 | 14:30 | 17:30 | RN | 2 | 16:25 |
| 27/07/2021 | 14:30 | 17:30 | RN | 2 | 16:35 |
| 28/07/2021 | 07:00 | 10:00 | BZ | 1 | 09:00 |
| 19/08/2021 | 09:00 | 12:00 | RN | 1 | 09:00 |
| 19/08/2021 | 09:00 | 12:00 | MA | 2 | 10:00 |
| 19/08/2021 | 09:00 | 12:00 | H. | 1 | 11:00 |
| 19/08/2021 | 09:00 | 12:00 | RN | 1 | 11:05 |
| 20/08/2021 | 12:30 | 15:30 | SH | 2 | 13:25 |
| 20/08/2021 | 12:30 | 15:30 | RN | 1 | 13:40 |
| 20/08/2021 | 12:30 | 15:30 | RN | 1 | 13:45 |
| 20/08/2021 | 12:30 | 15:30 | RN | 2 | 13:55 |
| 20/08/2021 | 12:30 | 15:30 | LB | 1 | 14:15 |
| 20/08/2021 | 12:30 | 15:30 | BZ | 2 | 14:50 |
| 21/09/2021 | 09:15 | 12:15 | SH | 1 | 09:45 |
| 21/09/2021 | 09:15 | 12:15 | RN | 2 | 10:00 |

| Date | Survey Start | Survey End | Species | Count | 5 min period |
|------------|--------------|------------|---------|-------|--------------|
| 21/09/2021 | 09:15 | 12:15 | RN | 2 | 10:25 |
| 21/09/2021 | 09:15 | 12:15 | RN | 1 | 10:40 |
| 21/09/2021 | 09:15 | 12:15 | MA | 2 | 10:45 |
| 21/09/2021 | 09:15 | 12:15 | RN | 3 | 11:15 |
| 21/09/2021 | 09:15 | 12:15 | RN | 1 | 11:45 |
| 22/09/2021 | 12:10 | 15:10 | RN | 1 | 12:15 |
| 22/09/2021 | 12:10 | 15:10 | RN | 2 | 12:20 |
| 22/09/2021 | 12:10 | 15:10 | RN | 3 | 12:30 |
| 22/09/2021 | 12:10 | 15:10 | RN | 10 | 13:30 |
| 22/09/2021 | 12:10 | 15:10 | RN | 3 | 14:10 |

Table A3-12
Secondary target species recorded during flight activity surveys undertaken at WF2 VP4

| Date | Survey Start | Survey End | Species | Count | 5 min period |
|------------|--------------|------------|---------|-------|--------------|
| 19/04/2021 | 13:45 | 16:45 | RN | 1 | 09:45 |
| 25/05/2021 | 13:45 | 16:45 | LB | 1 | 19:05 |
| 25/05/2021 | 13:45 | 16:45 | RN | 1 | 19:30 |
| 25/05/2021 | 07:10 | 10:10 | RN | 1 | 19:55 |
| 25/05/2021 | 07:10 | 10:10 | BZ | 2 | 20:50 |
| 25/05/2021 | 07:10 | 10:10 | CA | 1 | 21:10 |
| 26/05/2021 | 07:10 | 10:10 | BZ | 1 | 07:05 |
| 26/05/2021 | 07:10 | 10:10 | RN | 1 | 07:45 |
| 26/05/2021 | 07:10 | 10:10 | RN | 1 | 07:55 |
| 26/05/2021 | 07:10 | 10:10 | LB | 2 | 09:05 |
| 26/05/2021 | 07:10 | 10:10 | BZ | 1 | 09:20 |
| 24/06/2021 | 07:10 | 10:10 | LB | 1 | 14:10 |
| 24/06/2021 | 14:15 | 17:15 | CM | 1 | 15:00 |
| 24/06/2021 | 10:45 | 13:45 | LB | 1 | 15:05 |
| 24/06/2021 | 12:30 | 15:30 | MA | 2 | 15:30 |
| 25/06/2021 | 12:30 | 15:30 | MA | 15 | 07:10 |
| 25/06/2021 | 09:00 | 12:00 | LB | 1 | 08:25 |
| 25/06/2021 | 10:30 | 13:30 | RN | 1 | 08:55 |
| 25/06/2021 | 13:45 | 16:45 | H. | 2 | 09:05 |
| 25/06/2021 | 13:45 | 16:45 | CM | 1 | 09:15 |
| 25/06/2021 | 13:45 | 16:45 | CM | 1 | 09:20 |

| Date | Survey Start | Survey End | Species | Count | 5 min period |
|------------|--------------|------------|---------|-------|--------------|
| 25/06/2021 | 07:10 | 10:10 | LB | 1 | - |
| 25/06/2021 | 07:10 | 10:10 | CM | 1 | 09:40 |
| 25/06/2021 | 07:10 | 10:10 | CM | 1 | 09:50 |
| 26/04/2021 | 07:10 | 10:10 | SH | 1 | 15:20 |
| 28/07/2021 | 07:10 | 10:10 | LB | 1 | 11:20 |
| 19/08/2021 | 07:10 | 10:10 | BZ | 1 | 13:35 |
| 19/08/2021 | 07:10 | 10:10 | LB | 1 | 14:40 |
| 20/08/2021 | 07:10 | 10:10 | RN | 1 | 10:40 |
| 08/09/2021 | 07:10 | 10:10 | RN | 1 | 11:35 |

APPENDIX 04

Confidential Appendix

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