



## CLAUCHRIE WINDFARM

ORNITHOLOGY  
Appendix 9.1

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Prepared: Nicola Goodship  
Reviewed: Sarah Sanders

Date: 03 October 2019

Tel: [REDACTED]  
Web: [www.macarthurgreen.com](http://www.macarthurgreen.com)

Address: 93 South Woodside Road | Glasgow | G20 6NT

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## 1 INTRODUCTION

MacArthur Green was commissioned by ScottishPower Renewables (SPR) to complete ornithological surveys at the proposed Clauchrie Windfarm (hereafter referred to as ‘the proposed Development’), which is located approximately 6 km to the north east of Barrhill and falls within South Ayrshire Council and Dumfries and Galloway Council administrative boundaries. The surveys were conducted between September 2012 and August 2019 to inform an assessment of the potential ornithological effects of the proposed Development on the species assemblage present.

This technical report summarises the methods employed and the results of the field surveys and is supported by the following Annexes:

- Annex A: Ornithological Legal Protection;
- Annex B: Ornithological Survey Methodologies;
- Annex C: Ornithological Survey Effort and General Information;
- Annex D: Ornithological Survey Results;
- Annex E: Collision Risk Assessments; and
- Annex F: Review of the effects of artificial light on birds in relation to deployment of obstruction lighting on wind turbines.

Confidential information relating to species listed on Annex 1 of the EU Birds Directive or Schedule 1 of the Wildlife and Countryside Act 1981 (as amended) is detailed in Confidential Appendix 9.2.

A range of surveys were employed to accurately record baseline conditions within the proposed Development and appropriate survey buffers (detailed in Annex B). Latin names for all species recorded within the proposed Development are presented in **Table D-9** in Annex D.

In this Technical Appendix, associated Annexes (A – F), Confidential Technical Appendix 9.2 and Chapter 9: Ornithology, terms referred to are as follows (and are shown on **Figure 9.2** to **Figure 9.4**):

- ‘the Site’ refers to the area within the red line application boundary;
- ‘survey area’ is defined as the area covered by each survey type at the time of survey; and
- ‘study area’ is defined as the area of consideration of effects on each species at the time of assessment.

## 2 LEGAL PROTECTION

With limited exceptions, all wild birds and their eggs are protected by law. Specific levels of protection are determined by a species’ inclusion on certain lists. Annex A to this report details the various levels of legal protection afforded to UK bird species.

## 3 METHODS

### 3.1 Consultations and Desk-Based Study

The following organisations and resources were consulted regarding the ornithological interests on and adjacent to the proposed Development:

- The Dumfries and Galloway Raptor Study Group for historical nesting raptor records; and
- SNH SiteLink [<https://Sitelink.nature.scot/home>] for designated site information.

### 3.2 Field Surveys

The following additional surveys were undertaken at the proposed development between September 2012 and August 2019:

- Flight activity surveys (two breeding seasons and two non-breeding seasons);
- Breeding bird surveys (two breeding seasons), 500 m survey buffer;
- Winter walkover surveys (three non-breeding seasons), 500 m survey buffer;
- Scarce breeding bird surveys (six breeding seasons), 2 km survey buffer;
- Black grouse surveys (four breeding seasons), 1.5 km survey buffer; and
- Woodland point count surveys (one non-breeding season and one breeding season).

Survey methods followed the recommended SNH (2017<sup>i</sup>, 2014<sup>ii</sup>, 2013<sup>iii</sup> and 2010<sup>iv</sup>) guidelines available at the time and methods are described in detail within Annex B. Where possible, each survey was carried out beyond the proposed Development within a buffer distance specific to that method (e.g. 2 km buffer for the scarce breeding bird surveys) and these are detailed within Annex B. The application boundary and planned infrastructure layout was subject to change during the baseline survey period (2012-2019), and so survey areas sometimes differed between years (refer to Annex B for details). These changes are not considered detrimental to the assessment, with all final infrastructure locations being sufficiently covered by all surveys during the baseline period.

The relative importance of the data collected was determined by the specific level of protection assigned to those species recorded, coupled with their perceived susceptibility to potential impacts resulting from the proposed Development. The resulting ‘target species’ and ‘secondary species’ lists are a standard assessment tool for windfarm ornithological studies (see Annex B).

## 4 FIELD SURVEY RESULTS

All valid surveys were undertaken during suitable weather conditions (as described within Annex B). Where weather conditions deteriorated below acceptable conditions (Annex B), surveys were either suspended or additional surveys were undertaken. In the case of flight activity surveys, any time where the visibility was <1 km was excluded from total survey effort and subsequent analysis (further detail in Section 4.1). Schedule 1/Annex 1 breeding species surveys were carried out by appropriately licensed surveyors. All survey data were reviewed, inputted, and analysed by MacArthur Green.

A total of 92 bird species were recorded within, or adjacent to, the proposed Development during the various ornithological surveys conducted. Survey effort and results of the field surveys are detailed within Annexes C & D and survey results are also illustrated within **Figure 9.1.1 to Figure 9.1.4** and **Confidential Figure 9.2.2 to Confidential Figure 9.2.4**. The following sections summarise the results from each survey undertaken.

### 4.1 Flight Activity

The flight activity surveys recorded all target species' flight activity within a 2 km viewshed. These data have been used in the collision risk modelling. The flights used included those within the 'Collision Risk Analysis Area' (CRAA) (i.e. the area to be occupied by operational turbines, together with a buffer of up to 500 m).

Flight activity surveys were undertaken across six Vantage Points (VPs) during the 2013 breeding season and 2012/2013 and 2013/2014 non-breeding seasons (VP numbers 1, 2, 3, 4, 5 and 6, **Figure 9.2**) and six VPs during the 2018 breeding season (VP numbers 7, 8, 9, 10 and 11, **Figure 9.3**).

Changes in VP locations occurred in 2018 as a result of refinements to the proposed Development layout. Valid survey effort<sup>1</sup> is detailed in **Table 9.1.2** and full details of flight activity surveys are contained in Annex C with methodology in Annex B.

**Table 9.1.1 Summary of total hours of valid survey per VP in each season**

Period	VP1	VP2	VP3	VP4	VP5	VP6
2012/2013 non-breeding season	36	36.25	36	35.5	36	36
2013 breeding season	36	36	36	36	36	42
2013/2014 non-breeding season	36	36	36	37	36	36.5
Period	VP7	VP8	VP9	VP10	VP11	VP6
2018 breeding season	36	36	36	36	36	36

A total of 11 target species were recorded during the flight activity surveys (**Figure 9.1.1** and **Figure 9.1.2** present observed flightlines and further details are provided in Annex D). No target species were recorded in the flight activity surveys during the 2012/2013 non-breeding season. For each species across the whole flight activity survey period, **Table 9.1.2** shows the number of flights recorded and the number of birds recorded<sup>2</sup>. Bird seconds are

<sup>1</sup> Hours where visibility was <1 km are not considered valid for use in collision risk modelling as less than half the 2 km viewshed can be seen.

<sup>2</sup> This includes flights that would not technically be 'at-risk' of collision (e.g. recorded outwith the CRAA and/or not at rotor height).

<sup>3</sup> In some cases, only part of a total flight duration was recorded at PCH, and it is assumed that this proportion is applicable for that part of the flight within the CRAA and 2 km viewshed area.

calculated for each observation as the product of flight duration and number of individuals. This is then summed per species to give the total bird seconds recorded across the entire surveyed period.

**Table 9.1.2 Target species recorded and total number of flights recorded during flight activity surveys, 2016-2018**

Species	Total number of flightlines recorded	Total number of birds recorded	Total bird seconds recorded
Black grouse	1	1	30
Golden plover	1	2	42
Goldeneye	1	1	45
Goshawk	16	16	1,005
Greylag goose	15	58	2,978
Hen harrier	7	8	711
Herring gull	1	5	150
Merlin	1	1	50
Osprey	1	1	75
Pink footed goose	2	235	35,640
Red kite	1	1	147

#### 4.1.1 Flightlines Used in Collision Risk Modelling

Only flightlines identified to be within the CRAA and recorded within the 2 km viewshed of the associated VP were considered in the collision risk modelling and Annex E provides details of the bird seconds from flights identified to be 'at-risk'.

- 'At-risk' is defined as – a flight having at least part of its duration (i) at Potential Collision Height (PCH)<sup>3</sup>; (ii) within the CRAA; and (iii) recorded within the 2 km viewshed of the associated VP.
- PCH is defined as – the altitude between the minimum and maximum blade height<sup>4</sup> (50 m to 200 m).

Black grouse, golden plover, goldeneye, herring gull, merlin and red kite were recorded during flight activity surveys but no flights were considered to be 'at-risk'<sup>5</sup>. Full survey results detailing the findings from each survey visit (including target species' flightlines considered not 'at-risk' and secondary species information) can be found within Annex D. Only bird seconds for observations identified as within the CRAA and associated viewshed are considered in the following discussions. Full target species results are detailed within Annex D and the collision risk calculations are detailed in Annex E.

#### 4.1.2 Collision Risk Model Outputs

The bird seconds for target species flights within the CRAA at PCH were then input into a Collision Risk Model (CRM) to calculate the predicted collision rates per season. The CRM calculations for each species can be found in Annex E. **Table 9.1.3** and **Table 9.1.4** provide the estimated collision rates and number of seasons per collision for

<sup>4</sup> Where the actual rotor blade altitude differs from the pre-defined survey height bands, the collision risk model accounts for this difference on the assumption of an even flight distribution within each particular survey height band, and an adjustment can be made to estimate total flight duration at actual rotor blade altitude.

<sup>5</sup> i.e. the flights were either not within the CRAA and associated viewshed or were only recorded flying above 150 m.

each species. A dashed line indicates that no “at-risk” flights were recorded during that season, and estimated collision risk is consequently zero.

**Table 9.1.3 Estimated collision rates**

Season	Goshawk	Greylag goose	Hen harrier	Osprey	Pink-footed goose
2012/2013 non-breeding season	-	0.0052	-	-	-
2013 breeding season	-	-	0.003	-	-
2013/2014 non-breeding season	-	-	0.0063	-	-
2017/2018 non-breeding season <sup>6</sup>	-	0.0026	-	-	1.1934
2018 breeding season	0.1259	-	-	0.018	-
Mean breeding season	0.0629	-	0.0015	0.009	-
Mean non-breeding season	-	0.0026	0.0032	-	0.3978
Mean annual	0.0629	0.0026	0.0046	0.0090	0.3978

**Table 9.1.4 Estimated number of seasons per collision**

Season	Goshawk	Greylag goose	Hen harrier	Osprey	Pink-footed goose
2012/2013 non-breeding season	-	192	-	-	-
2013 breeding season	-	-	338	-	-
2013/2014 non-breeding season	-	-	159	-	-
2017/2018 non-breeding season <sup>6</sup>	-	377	-	-	0.84
2018 breeding season	7.94	-	-	55.69	-
Mean breeding season	15.89	-	676	111	-
Mean non-breeding season	-	382	317	-	2.51
Mean annual	15.89	382	216	111	2.51

## 4.2 Moorland Breeding Birds

Complete breeding bird surveys were conducted in the 2013 and 2018 breeding seasons (monthly, from April to July 2013 and April and July 2018). Surveys recorded twice two snipe together in April 2013, but no breeding evidence was recorded. Full details of the breeding bird surveys are provided within Annexes C and D and survey methodology is provided within Annex B.

## 4.3 Winter Walkover

Winter walkover surveys were conducted during the 2012/2013, 2013/2014 and 2018/2019 non-breeding seasons. Surveys recorded 32 species of which four are considered to be target species (Table 9.1.5 , Figure 9.1.3). Full details of the winter walkover surveys are provided within Annexes C and D and survey methodology is provided within Annex B.

**Table 9.1.5 Winter walkover: target species records (number of birds recorded per visit), 2012/2013, 2013/2014 and 2018/2019**

Species	2012/2013 non-breeding season		2013/2014 non-breeding season		2018/2019 non-breeding season	
	Number of records	Total number of birds	Number of records	Total number of birds	Number of records	Total number of birds
Golden plover	-	-	-	-	1	34
Goldeneye					3	7
Hen harrier	-	-	-	-	2	2
Woodcock	1	1	1	1	2	7

## 4.4 Scarce Breeding Birds

Scarce breeding bird surveys were conducted during the 2013 (May to July), 2014 (April to August), 2015 (April to August), 2017 (March to August), 2018 (April to August) and 2019 (March to August) breeding seasons.

Osprey were confirmed to be breeding within the survey area, and barn owl and goshawk were recorded within the survey area during surveys, however breeding activity was not confirmed. Breeding activity of target raptor species is summarised in Table 9.1.6 . Confidential Technical Appendix 9.2 contains the full details of this breeding activity and is shown on Confidential Figures 9.2.2 to 9.2.4.

Buzzard, kestrel, sparrowhawk and tawny owl (secondary raptor species) were also recorded across the survey area and are likely to have bred within the survey area/wider area.

Full details of the scarce breeding bird surveys are provided within Annexes C and D and Confidential Technical Appendix 9.2 and survey methodology is provided within Annex B.

**Table 9.1.6 Scarce breeding bird summary, 2013, 2014, 2015, 2017, 2018 and 2019**

Species	2013	2014	2015	2017	2018	2019
Barn owl	Breeding unconfirmed	Two possible breeding birds: breeding unconfirmed	One roosting bird: no breeding	Two birds present but found dead in July: breeding unsuccessful	Birds not present	Birds not present

				A total of 16 flightlines recorded in VP surveys between April to August 2018 and one adult male observed carrying food, but no further breeding activity recorded	
Goshawk	No evidence	No evidence	No evidence	Display/copulation behaviour observed but no further activity recorded	No evidence

<sup>6</sup> Whilst flight activity surveys were only undertaken between March and August 2018, the seasons used for collision modelling are adjusted for different species groups (as per SNH 2017, refer to Annex E for further information). For geese, the non-

breeding season is considered to be from 1<sup>st</sup> September to 14<sup>th</sup> May and therefore the geese recorded during the 2018 flight activity surveys have been considered in the 2017/2018 non-breeding season for the purposes of collision modelling.

Species	2013	2014	2015	2017	2018	2019
Osprey	No evidence	Breeding successful: at least one chick fledged (but possibly two)	Breeding successful: one chick fledged	Breeding successful: one chick fledged	Breeding successful: likely at least one chick fledged	Breeding successful: likely two chicks fledged

#### 4.5 Black Grouse

Surveys to identify areas of black grouse activity, locate lek locations and establish lek size were conducted in the 2013, 2014, 2015 and 2017 breeding seasons during April and May. Surveys identified one lek location in 2014 and 2017 (**Table 9.1.7 , Figure 9.1.4**). Full details of the black grouse surveys are provided within Annexes C and D and survey methodology is provided within Annex B.

**Table 9.1.7 Black grouse lek activity: 2013, 2014, 2015 and 2017**

Lek Location	2013		2014		2015		2017	
	Max. number of males recorded	Max. number of females recorded	Max. number of males recorded	Max. number of females recorded	Max. number of males recorded	Max. number of females recorded	Max. number of males recorded	Max. number of females recorded
1 North of Knapps	-	-	1	1	-	-	1	0

#### 4.6 Woodland Point Counts

Surveys during the 2012/2013 non-breeding season and the 2013 breeding season recorded among other species, common crossbill (Schedule 1), cuckoo, lesser redpoll, marsh tit, skylark and song thrush (all BoCC Red listed<sup>v</sup>). Full details of the woodland point count surveys are provided within Annexes C and D and survey methodology is provided within Annex B.

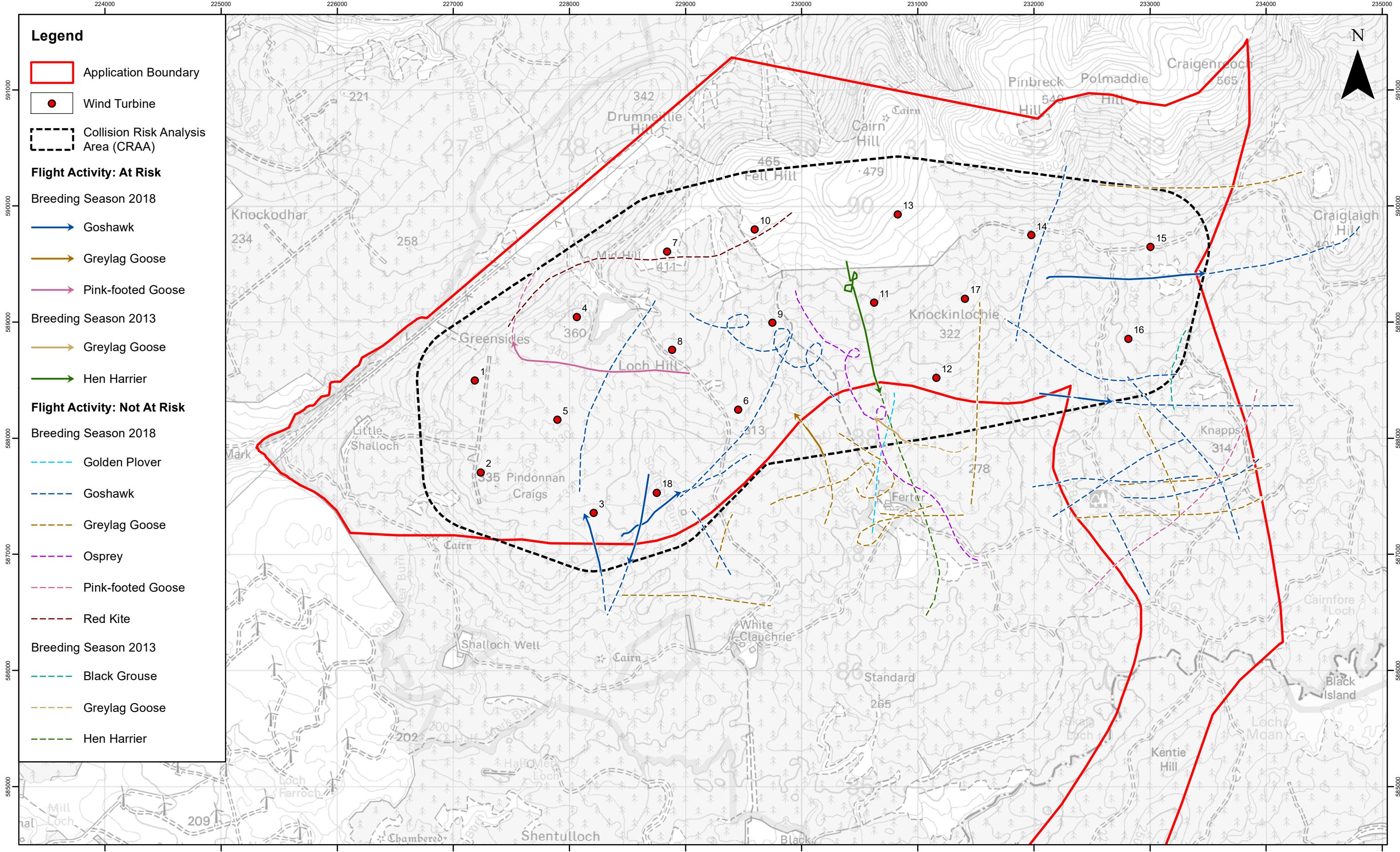
<sup>i</sup> Scottish Natural Heritage (2017) Recommended bird survey methods to inform impact assessment of onshore windfarms.

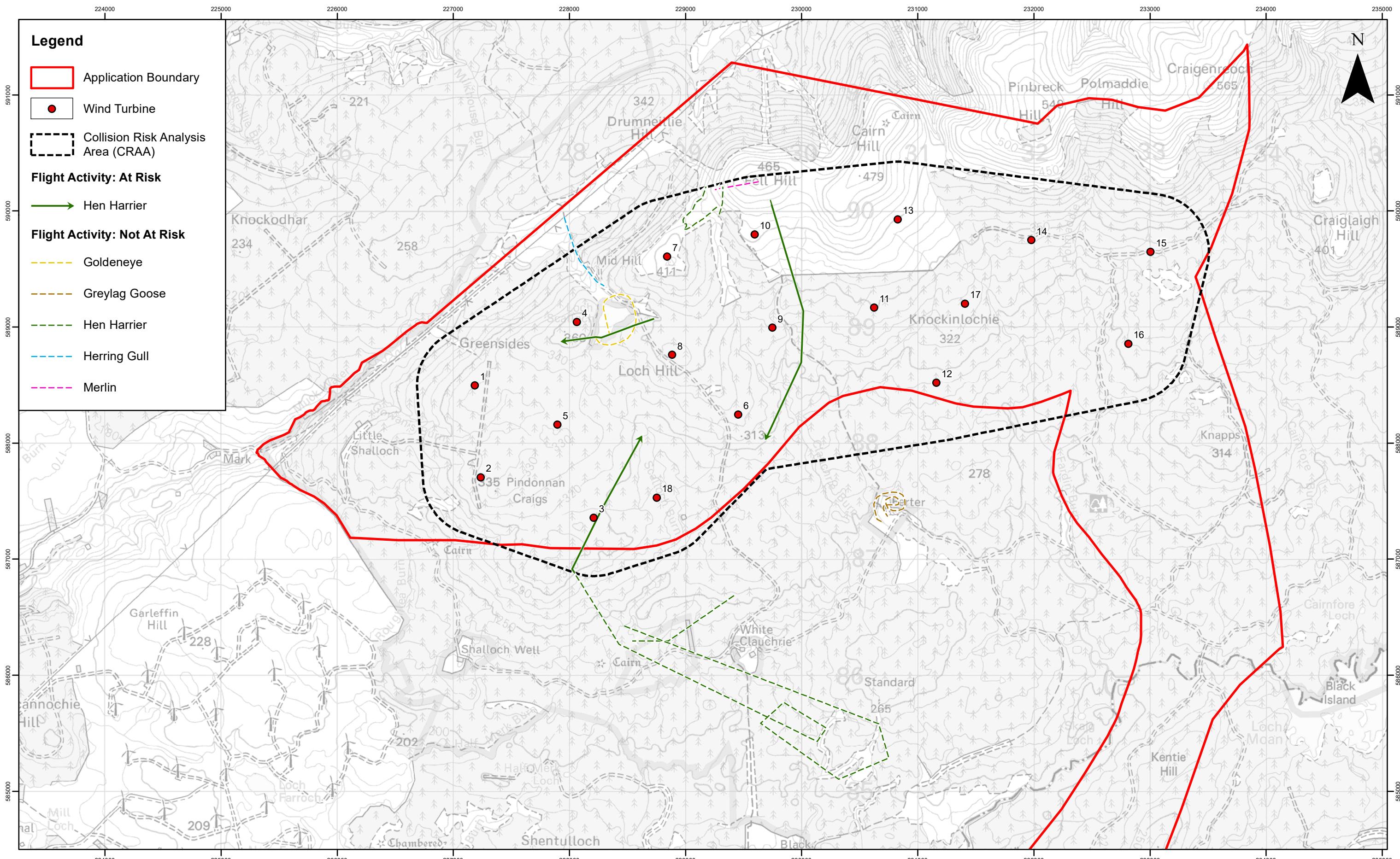
<sup>ii</sup> Scottish Natural Heritage (2014) Recommended bird survey methods to inform impact assessment of onshore windfarms.

<sup>iii</sup> Scottish Natural Heritage (2013) Recommended bird survey methods to inform impact assessment of onshore windfarms.

<sup>iv</sup> Scottish Natural Heritage (2010) Survey methods for use in assessing the impacts of onshore windfarms on bird communities.

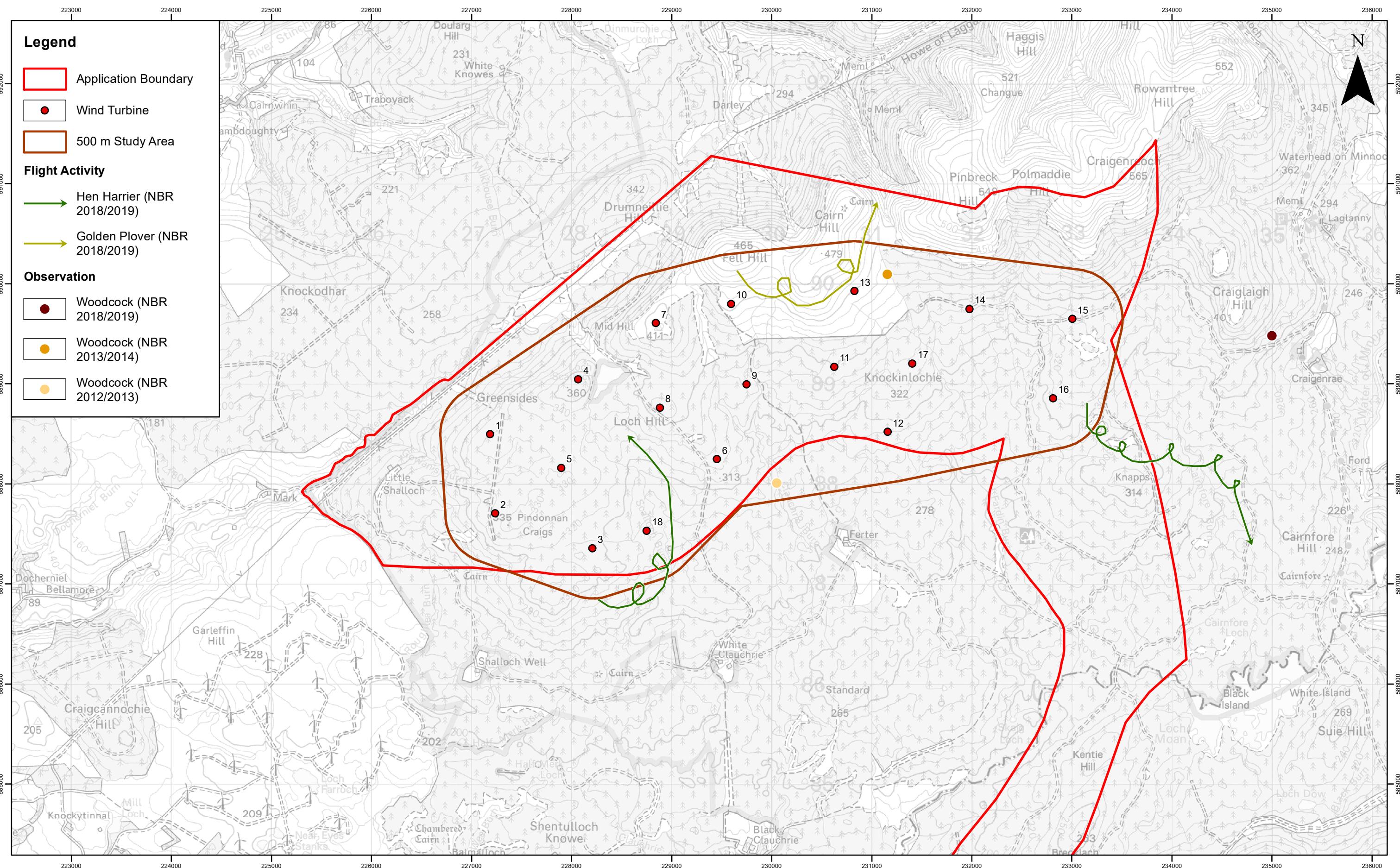
<sup>v</sup> BoCC = Birds of Conservation Concern, Eaton, M., Aebischer, N., Brown, A., Hearn, R., Lock, L., Musgrove, A., Noble, D., Stroud, D. and Gregory, R. (2015). Birds of Conservation Concern 4: The population status of birds in the UK, Channel Islands and Isle of Man. British Birds 108: 708-746.





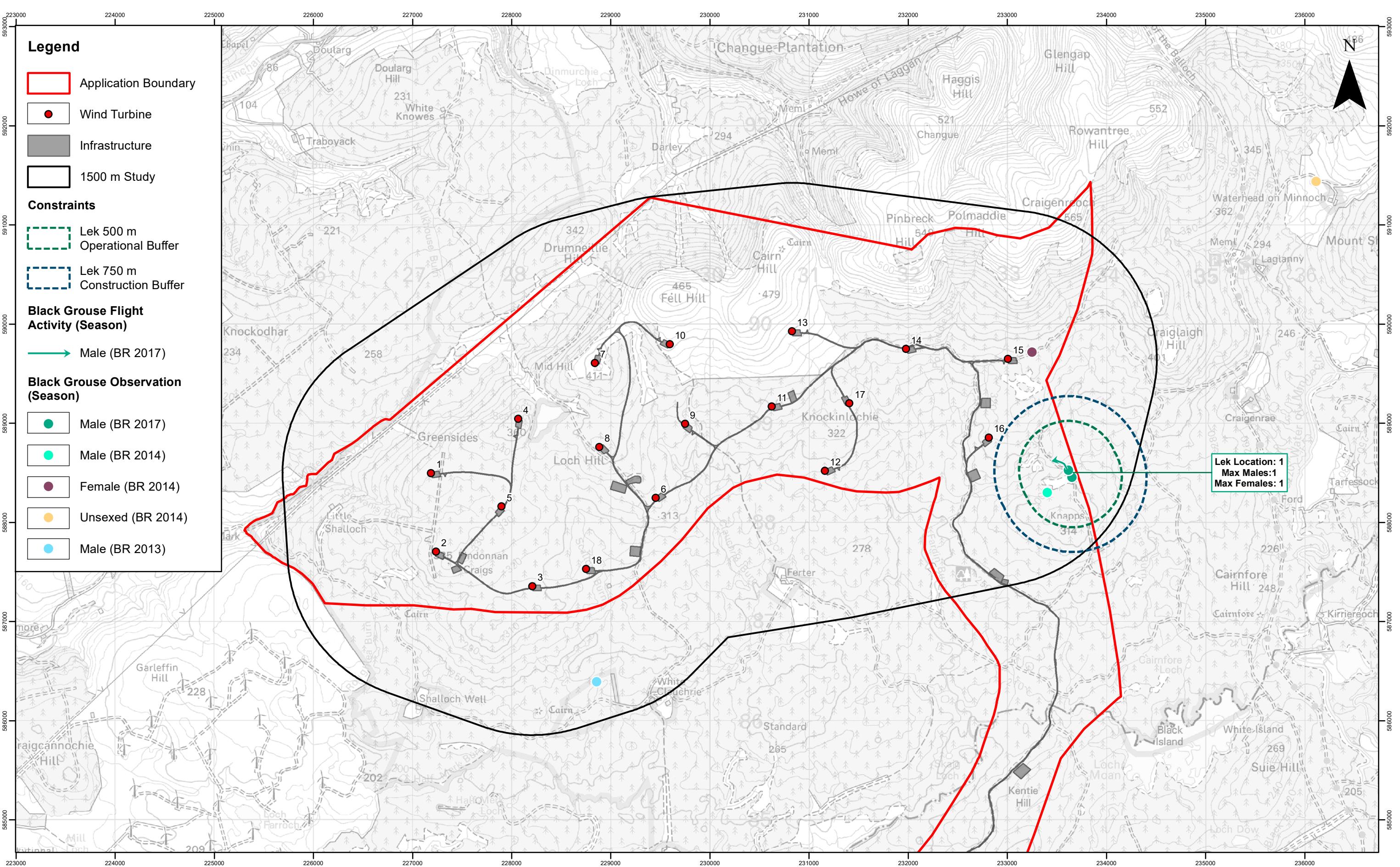
 <b>SCOTTISHPOWER RENEWABLES</b>					1:30,000 Scale @ A3		<b>Clauchrie Windfarm</b> <b>EIA Report</b> Flight Activity of Target Species: 2013/2014 Non-breeding Season	<b>Drg No</b>	EDL_1263_EIAR
	A	01/10/19	KS	First Issue.				<b>Rev</b>	A
	Rev	Date	By	Comment				<b>Date</b>	01/10/19
								<b>Figure</b>	9.1.2

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 SCOTTISHPOWER RENEWABLES					1:35,000 Scale @ A3	0 0.5 1 Km	<b>Clauchrie Windfarm</b> <b>EIA Report</b> Winter Walkover Target Species Records: 2012/2013, 2013/2014, and 2018/2019 Non-breeding Seasons	Drg No	EDL_1263_EIAR
	A	03/10/19	KS	First Issue.				Rev	A
	Rev	Date	By	Comment				Date	03/10/19
								Figure	9.1.3

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## ANNEX A ORNITHOLOGICAL LEGAL PROTECTION

In Scotland, all wild birds are protected under the Wildlife and Countryside Act 1981 (the ‘Act’), as amended by the Nature Conservation (Scotland) Act 2004. This protection also extends to their eggs and nests, with it being an offence to intentionally or recklessly<sup>1</sup>:

- Kill, injure or take any wild bird<sup>2</sup>;
- Take, damage, destroy or otherwise interfere with the nest of any wild bird while it is being built or is in use<sup>3</sup>;
- At any other time take, damage, destroy or otherwise interfere with any nest habitually used by any wild bird included in Schedule A1 (Protected Nests and Nest Sites for Birds: white-tailed eagle and golden eagle)<sup>4</sup>;
- Obstruct or prevent any wild bird from using its nest<sup>5</sup>; or
- Take or destroy an egg of any wild bird<sup>6</sup>.

It is also an offence to have in possession or control any live or dead wild bird or any part thereof; or any egg or part of an egg of any wild bird<sup>7</sup>.

Further special protection under this legislation is afforded to those species listed on Schedule 1 of the Act. For these species, it is an offence to:

- Intentionally or recklessly disturb any wild bird listed on Schedule 1 while it is nest building, or is in, on or near a nest containing eggs or young, or disturb the dependent young of such a bird<sup>8</sup>;
- Intentionally or recklessly disturb any wild birds included on Schedule 1 which leks, while it is doing so<sup>9</sup> (capercaillie is the only bird this offence applies to in Scotland);
- Intentionally or recklessly harass any wild bird included in Schedule 1A<sup>10</sup>. Section 1, subsection 5B states, ‘*Subject to the provisions of this Part, any person who intentionally or recklessly harasses any wild bird included in Schedule 1A shall be guilty of an offence*’. At this time, Schedule 1A includes golden eagle, hen harrier, red kite and white-tailed eagle. This updated legislation was introduced on 16 March 2013; or
- Intentionally or recklessly take, damage, destroy or otherwise interfere with any nest and/or nest site habitually used by any bird on Schedule A1 at any time. At this time, Schedule 1A includes golden eagle and white-tailed eagle<sup>11</sup>;

It is also an offence to knowingly cause or permit to be done an act which is made unlawful by any of the above provisions.

<sup>1</sup> Exceptions to these offences exist under various circumstances (e.g. controlling pest species; taking birds during specific season; and killing sick or injured birds etc.).

<sup>2</sup> Wildlife and Countryside Act 1981, Section 1(1)(a)

<sup>3</sup> Wildlife and Countryside Act 1981, Section 1(1)(b)

<sup>4</sup> Wildlife and Countryside Act 1981, Section 1(1)(ba)

<sup>5</sup> Wildlife and Countryside Act 1981, Section 1(1)(bb)

<sup>6</sup> Wildlife and Countryside Act 1981, Section 1(1)(c)

<sup>7</sup> Wildlife and Countryside Act 1981, Section 1(2)

<sup>8</sup> Wildlife and Countryside Act 1981, Section 1(5)

Further protection is described under the EU Birds Directive which requires member states to maintain wild bird species in favourable conservation status<sup>12</sup> and promote the conservation of bird species listed within Annex 1 of the Birds Directive through the protection of their habitat. This is achieved via the designation of Special Protection Areas (SPAs).

Birds of Conservation Concern Red List species (Eaton *et al.* 2015<sup>13</sup>) are those deemed to be suffering population or range declines within the UK. Although not legally enforceable, the conservation of Red List bird species represents a material consideration, in planning terms.

<sup>9</sup> Wildlife and Countryside Act 1981, Section 1(5A)

<sup>10</sup> Wildlife and Countryside Act 1981, Section 1(5B)

<sup>11</sup> This reflects the changes introduced by the Wildlife and Countryside Act 1981 (as amended by: Variation of Schedules A1 and 1A (Scotland) Order 2013

<sup>12</sup> While the term ‘favourable conservation status’ is not used in the Birds Directive, EU court cases over recent years have progressively interpreted the concept as meaningful in a Birds Directive context (SNH, 2006).

<sup>13</sup> Eaton MA, Aebsicher NJ, Brown AF, Hearn RD, Lock L, Musgrave AJ, Noble DG, Stroud DA and Gregory RD (2015). Birds of Conservation Concern 4: the population status of birds in the United Kingdom, Channel Islands and Isle of Man. British Birds 108, 708–746

## ANNEX B ORNITHOLOGICAL SURVEY METHODOLOGY

A range of ornithological surveys have been conducted at the proposed Clauchrie Windfarm (hereafter referred to as ('the Site'). The methodologies used in these surveys are summarised in the sections below; more detailed descriptions are provided in the SNH guidance (2010<sup>i</sup>, 2013<sup>ii</sup>, 2014<sup>iii</sup> and 2017<sup>iv</sup>) on which these surveys are based.

### Scottish Natural Heritage (SNH) Survey Guidance Updates

When baseline surveys for the Site commenced in September 2012, survey methodology was based on the available SNH 2010<sup>i</sup> guidance, however between September 2012 and August 2019, there have been multiple revisions to the SNH guidance and, where relevant, multiple guidance versions are referenced in the sections below. The time periods during which surveys were undertaken and the available guidance during the same time period is summarised below.

- September 2012 to August 2013<sup>1</sup> – SNH 2010<sup>i</sup> guidance;
- September 2013 to April 2014 – SNH 2013<sup>ii</sup> guidance;
- May 2014 to August 2015 – SNH 2014<sup>iii</sup> guidance; and
- March 2017 to August 2019 – SNH 2017<sup>iv</sup> guidance.

When surveys recommenced in 2017, SNH were consulted to ensure that the range of surveys and effort were appropriate and sufficient (refer to **Table 9.3.1, Chapter 9: Ornithology**).

### Survey and Study Areas

Various surveys were undertaken across the 2013 to 2015 and 2017 to 2019 breeding seasons and the 2012/2013, 2013/2014 and 2018/2019 non-breeding seasons. Survey areas for surveys undertaken between September 2012 and August 2017 were all buffered from the preliminary application boundary provided by ScottishPower Renewables (SPR) when the Site was first considered for development in September 2012 (**Figure 9.2** and **Figure 9.4**). When surveys commenced for the 2018 breeding season the preliminary application boundary had been extended to the north east (**Figure 9.4**) and as a result, survey areas were adjusted to ensure adequate coverage of the Site. For the 2018 breeding season, the viewsheds were revised to provide improved coverage of the updated preliminary application boundary (**Figure 9.3**) and further breeding bird and scarce breeding bird surveys were undertaken to provide coverage of areas not covered by the original survey areas<sup>2</sup> (**Figure 9.4**). The survey area for the 2018/2019 winter walkover surveys was based off the updated preliminary application boundary and covered the entire Site (**Figure 9.4**). Surveys during the 2019 breeding season were specifically focussed on monitoring breeding activity at known breeding locations for barn owl and osprey (refer to **Confidential Technical Appendix 9.2** for detail).

Delaunay Triangulation<sup>3</sup> from the turbine points was used to create a windfarm area<sup>4</sup> and from this the Collision Risk Analysis Area (CRAA) was defined using a 500 m buffer (**Figure 9.2** and **Figure 9.3**). Using the larger 500 m

<sup>1</sup> It should be noted that the SNH 2013 guidance was released in August 2013, however surveys in August 2013 were undertaken in-line with the SNH 2010 guidance to ensure consistency across the 2013 breeding season.

<sup>2</sup> The aim of the 2018 breeding and scarce breeding bird surveys were to cover any areas that were not included in the original 2012-2017 survey areas. The 2018 survey areas were generated by overlaying the original 500 m/2 km survey areas with the ones generated from the updated preliminary application boundary (**Figure 9.1**).

<sup>3</sup> Delaunay triangulation is a form of mathematical/computational geometry where a given set of points (in this case the turbine locations) are all joined to create discrete triangles. Further information is available here:

area around the turbines accounts for possible inaccuracies in the recording of flightlines and ensures the assessment is precautionary. Target species flight activity within this area were used in collision modelling.

### B.1 Flight Activity Survey

The aims of the flight activity (Vantage Point (VP)) surveys are: (1) to record flight activity within the vicinity of the Site in order to identify areas of importance to birds; and (2) to quantify flight activity within 500 m of the proposed turbines in order to estimate the likelihood of collision (SNH, 2010<sup>i</sup> P.12-14 and P.42-45; SNH, 2013<sup>ii</sup> P.14-19; SNH, 2017<sup>iv</sup> P.14-19).

#### Timing

- A survey period of 36 hours is recommended as the minimum level of sampling intensity at each VP for each season (breeding, non-breeding, migratory) (SNH, 2010<sup>i</sup> P.14; SNH, 2013<sup>ii</sup> P.17; SNH, 2017<sup>iv</sup> P.17);
- Watches were spread appropriately throughout the year to ensure that temporally representative data were collected (see Annex C). Specific consideration was given to the period around dawn and twilight for breeding waders and to changing raptor behaviour across seasons (SNH, 2010<sup>i</sup> P.19-20; SNH, 2013<sup>ii</sup> P.16; SNH, 2017<sup>iv</sup> P.17);
- Watches were suspended and resumed to take account of changes in visibility (e.g. fluctuations in cloud base). Watches were undertaken in conditions of good ground visibility when the cloud base was higher than the most elevated ground being observed; and
- Watches were conducted in a range of weather conditions and were spread throughout the day (see Annexes C and D).

#### Field Methods

- Viewshed analysis was conducted using Arc GIS to confirm suitable VP locations and their associated visible areas<sup>5</sup>;
- Reconnaissance surveys were undertaken to refine VP locations;
- The VP locations and associated viewsheds are detailed in **Figure 9.2** and **Figure 9.3**;
- Care was taken to maximize the area visible whilst minimising disturbance to birds;
- The final VP locations were selected with the aim of achieving coverage of the potential windfarm area such that no part of the Site was greater than 2 kilometres (km) from a VP. Changes in VP locations occurred in 2018 as a result of a change in the preliminary application boundary (extended to the north east). Coverage of the whole study area was achieved for the majority of the CRAA, although an area (22 %) along the western and northern edge of the CRAA remained 'invisible'<sup>6</sup>;
- A maximum 180° view arc was scanned. This rule did not however apply when tracking migratory waterfowl or raptors across the CRAA;

<https://uk.mathworks.com/help/matlab/math/delaunay-triangulation.html>

<sup>4</sup> This was adjusted where appropriate depending on the spatial location of the turbines in relation to other turbines.

<sup>5</sup> The viewsheds are based on a 5m DTM to provide a representation of visibility from the observer locations; this is confirmed and refined through field site visits.

<sup>6</sup> The habitat here is of sufficient similarity such that the survey data collected and subsequently assessed are considered to be representative of the whole CRAA. In addition, there were no records made during any of the walkover surveys which would suggest that this area was of any particular importance to target species.

- Each watch lasted a maximum of three hours but was suspended and then resumed to take account of changes in visibility (e.g. fluctuations in the cloud base).

For each target and secondary species, the following data were recorded (SNH, 2010<sup>i</sup> P.43-43; SNH, 2013<sup>ii</sup> P.17-18; SNH, 2017<sup>iv</sup> P.17-18):

- The flightlines by individuals or flocks of birds;
- The time the target bird was detected and the duration (seconds) spent flying over a defined area (the viewshed);
- The birds' flight heights (defined into prescribed height bands<sup>7</sup>) were recorded at the point of detection and at 15 second intervals thereafter. From this the proportion of time spent flying below, within (referred to as Potential Collision Height (PCH)) and above approximate rotor height could be estimated. The actual rotor height is 50 m to 200 m. This difference is accounted for within the collision risk models on the assumption of even flight distribution;
- The route followed was plotted in the field onto 1:25,000 scale maps;
- Observations of target species took priority over recording secondary species if both species were present simultaneously;
- The number of birds recorded were the minimum number of individuals that could account for the activity observed; and
- Observers only recorded perched birds and birds on water-bodies once only on arrival at the VP. Thereafter only flying birds and newly noticed perched/swimming birds were included in the activity summaries.

## B.2 Moorland Breeding Bird Survey

Moorland breeding bird surveys were undertaken during the 2018 and 2013 breeding seasons. Upland breeding bird survey methodology was employed as detailed within SNH Guidance (SNH, 2010<sup>i</sup> P.14-15; SNH, 2017<sup>iv</sup> P.11). Survey areas are detailed on **Figure 9.4**. In summary, surveys involved the following:

- Open upland (including hedgerows, scrub, isolated trees and copses) was surveyed using a version of the Brown and Shepherd (1993<sup>v</sup>) method for upland bird survey;
- The objectives were to map the distribution of breeding bird territories and estimate the approximate size of breeding bird populations;
- The survey covered all areas within 500 m of the Site; and
- All upland wader species were recorded during the breeding bird survey, as well as any other target species.

### Timing

- As recommended in Calladine *et al.* (2009<sup>vi</sup>), four survey visits were undertaken between April and July in 2013 and April and June 2018;

<sup>7</sup> From the 1<sup>st</sup> April 2014, MacArthur Green increased their standard height bands from three bands (0-20 m, 21-125 m, >126 m) to five bands (0-20 m, 21-40 m, 41-100 m, 101-150 m, >151 m) to account for industry changes in maximum turbine heights. Consequently, baseline surveys for Clauchrie Windfarm (September 2012 to March 2014) were undertaken using

- Fieldwork was undertaken between sunrise and 1800hrs; and
- Fieldwork was not undertaken in conditions considered likely to affect bird detection rates, for example in winds greater than Beaufort Scale Force 4, persistent precipitation, poor visibility (less than 300 m), or in unusually hot weather.

### Field Methods

- Walk-routes which optimised ground visibility were used;
- Surveyors paused at appropriate vantage and listening points;
- Isolated trees, copses and patches of scrub were approached and examined;
- Streams, ditches and hedgerows were walked;
- All other areas were approached to within 100 m;
- Registrations were mapped at the first location that behaviour indicative of breeding was observed; and
- Standard BTO activity codes were used.

## B.3 Winter Walkover

Winter walkovers were undertaken during the 2012/2013, 2013/2014 and 2018/2019 non-breeding seasons to map wintering populations of birds within 500 m of the Site. Survey areas are detailed on **Figure 9.4**.

- The area was surveyed three times during the 2012/2013 and 2018/2019 non-breeding season and twice during the 2013/2014 non-breeding season;
- These surveys involved following a route that optimised ground coverage, such that observers walked within 250 m of every point; and
- Observers periodically stopped at appropriate viewing and listening points along the route and longer vantage point watches were included within the walkover to allow potentially important areas to be monitored in greater detail.

## B.4 Scarce Breeding Bird Survey

Scarce breeding bird surveys were undertaken during the 2013, 2014, 2015, 2017 and 2018 breeding seasons in order to determine the distribution of occupied nests/territories for target raptor and owl species within 2 km of the Site and record breeding success. Targeted monitoring of breeding activity at known barn owl and osprey nests was also undertaken during the 2019 breeding season. Secondary species such as buzzard, sparrowhawk and kestrel were also noted but location of their nests was not the key focus of the surveys. Survey areas are detailed in **Figure 9.4**.

Surveys were undertaken by experienced and Schedule 1 licensed field ornithologists. Extreme care was taken to avoid unnecessary disturbance to breeding birds.

Guidance from SNH (SNH, 2010<sup>i</sup> P.16-18; SNH, 2013<sup>ii</sup> P.11-12; SNH, 2014<sup>iii</sup> P.11-12; SNH, 2017<sup>iv</sup> P.11-12), 'Bird Monitoring Methods' (Gilbert *et al.* 1998<sup>vii</sup>) and 'Raptors: a field guide to survey and monitoring' (Hardey *et al.*

three height bands whilst the additional baseline surveys between April to August 2018 were undertaken using five height bands. Annex E details how the collision modelling accounts for these different height bands.

2009<sup>viii</sup>, Hardey *et al.* 2013<sup>ix</sup>) were all consulted to inform survey methodology and are referenced where appropriate in the species methodologies below.

### Barn Owl

- The surveys followed methodology outlined in Gilbert *et al.* (1998<sup>vii</sup>), as mentioned in SNH Guidance (SNH, 2010<sup>i</sup> P.26-27; SNH, 2013<sup>ii</sup> P.12-13; 2014<sup>iii</sup> P.12-13; SNH, 2017<sup>iv</sup> P.13);
- Surveys were undertaken based on a 1 km buffer from the relevant application boundary; and
- Surveyors checked for signs of occupation (moulted feathers, pellets) in any suitable buildings within this 1 km buffer.

### Golden Eagle

Following the reintroduction of three golden eagles into the Moffat Hills in Southern Scotland in July and August 2018 by the South of Scotland Golden Eagle Project, winter walkover surveys during the 2018/2019 non-breeding season were focussed on watching for ranging/foraging golden eagle.

### Goshawk

Methodology outlined in Hardey *et al.* (2009<sup>viii</sup> and 2013<sup>ix</sup>) was used as guidance for the surveying of areas for potential goshawk breeding. Extreme care was taken not to disturb potential nests especially around the time of year when females were likely to be laying or incubating.

- Areas of suitable woodland were observed for the presence of nests. Searches for goshawk nests were focused on mature forestry blocks, although their presence was not ruled out of other wooded areas;
- Searches carried out in March and April focussed on observing territorial and nest building behaviours;
- Where nests were known to be present, scans were carried out between mid-March and May to confirm breeding. Scans were kept brief – carried out for between 5-10 minutes and from a distance; and
- When breeding was confirmed, searches for further nests were deferred until such a time as the young had hatched. Searches were then undertaken between late May and late June for evidence of provisioning young and then between late July and early August to watch for fledgling activity, this included listening for the begging calls of newly fledged young.

### Hen Harrier

Methodology outlined in Hardey *et al.* (2009<sup>viii</sup> and 2013<sup>ix</sup>) was used as guidance for the surveying of areas for potential hen harrier breeding. Extreme care was taken not to disturb potential nests especially around the time of year when females were likely to be laying or in cold/wet weather when females were likely to be incubating or brooding. Areas of suitable habitat<sup>8</sup> were visited during four time periods across the breeding season to:

- Check for territory occupancy (between March and mid-April) – this consisted of watching over suitable habitat from a good vantage point for displaying males (and females) and checking all areas of suitable habitat to within 250 m (watching out for signs of kills);

- Locate incubating females (between mid-April and late May) by listening for female begging calls and watching for food passes between the male and female – surveyors watched for at least four hours as Hardey *et al.* (2009<sup>viii</sup> and 2013<sup>ix</sup>) notes that when the female is incubating it can be up to six hours between feeding visits from the male, but on average it is less than every four hours. Surveys were undertaken between 06:00 to 12:00 or 16:00 to 20:00;
- Check for young or breeding evidence (between late May and late June) again by listening for female begging calls and watching for food passes between male and female when the female is brooding and watching for the male and female provisioning the nest with food once brooding has ended– surveyors watched for at least two hours as Hardey *et al.* (2009<sup>viii</sup> and 2013<sup>ix</sup>) notes that an adult bird will visit the nest every 1-2 hours. Surveyors also watched for display behaviour which could indicate a failed breeding attempt; and
- Check for fledged young (between late June and late August).

### Merlin

Methodology outlined in Hardey *et al.* (2009<sup>viii</sup> and 2013<sup>ix</sup>) was used as guidance for the surveying of areas for potential merlin breeding.

- Areas of suitable nesting habitat (including forest edge where trees are >5 m high) were closely observed between 20<sup>th</sup> March and 30<sup>th</sup> April;
- Boulders, fence lines, isolated posts, stone dykes, grouse butts, hummocks, stream banks, crags, trees and recently burnt areas of heather were checked for signs of occupation (e.g. plucked prey, moulted feathers, pellets and faeces);
- If merlin were observed, or signs found, areas were visited at least twice to verify occupation of the territory; and
- Potential nest areas were watched for 4-6 hours if necessary.

### Osprey

Methodology outlined in Hardey *et al.* (2009<sup>viii</sup> and 2013<sup>ix</sup>) and Gilbert *et al.* (1998<sup>vii</sup>) was used as guidance for the surveying of areas for potential osprey breeding. Care was taken when carrying out the searches so as not to disturb any displaying or nesting birds, with nests checked from a distance.

- All wooded areas within the study area were searched for the possible presence of nests, especially those located close to freshwater lochs and rivers that could provide feeding sites. Artificial platforms were also checked;
- If breeding was suspected within the study area, the location was visited between April and May until nesting was confirmed;
- In line with the methods suggested by Gilbert *et al.* (1998<sup>vii</sup>) and Hardey *et al.* (2009<sup>viii</sup> and 2013<sup>ix</sup>), proof of occupancy was determined by:

<sup>8</sup> Unsuitable habitat areas include: land above 600 m; improved pasture and arable land; extensive areas of degraded land with no heather cover and low vegetation; the vicinity of cliffs, rocky outcrops, boulder fields and scree; areas within 100 m of hill farms and occupied dwellings.

- Two ospreys seen on the same eyrie on more than one occasion (with a week separating observations);
- Incubation; or
- Feeding of chicks.
- Further scans were undertaken between late May and early July to try and observe any young in the nests.

#### Peregrine Falcon

- Potential nest sites were visited and checked for evidence of occupation between March and April;
- Sites checked included crags and steep banks identified from OS maps and searches of the study area;
- Surveyors checked for signs of occupation (e.g. faecal splash, fresh plucked prey);
- If occupied sites were found they were re-visited to verify incubation; and
- Searches were made for eyries. Where this was not possible sites were watched from a suitable vantage point for 3-4 hours or until a nest was located.

#### Short-Eared Owl

- At least two visits between early April and the end of May were carried out;
- Suitable habitat was visited and checked for evidence of hunting males, territorial activity and other signs of presence; and
- If breeding was confirmed, a further visit was made in June to watch birds, locate nest-sites and confirm breeding behaviour wherever possible.

#### B.5 Black Grouse Survey

Black grouse surveys were undertaken during the 2013, 2014, 2015 and 2017 breeding seasons to identify and lekking activity within 1.5 km of the Site. The survey methodology used is detailed in SNH Guidance (SNH 2007<sup>x</sup>; SNH, 2010<sup>i</sup> P.24; SNH, 2013<sup>ii</sup> P.12; SNH, 2014<sup>iii</sup> P.12; SNH, 2017<sup>iv</sup> P.12). A summary is provided below. Survey areas are detailed in **Figure 9.4**.

- Surveys for breeding black grouse were undertaken based on a 1.5 km buffer from the relevant application boundary by counting total numbers of males and females at leks, most lekking activity taking place at or soon after dawn in spring;
- Known lek sites and other areas of suitable habitat which could host leks were identified and visited during April and May within 2 hours of dawn on calm dry days with good visibility;
- Visits involved listening and scanning for lekking black grouse from strategic locations (avoiding disturbance of leks) and during walks between these locations ensuring that all potential habitat was covered;
- The maximum count of males in the 2 hours around dawn gives the standard count estimate but the maximum number of females seen was also presented; and

- Leks that were at least 200 m apart within the same year were treated as separate leks.

#### B.6 Woodland Point Count Survey

Woodland point counts were undertaken during the 2013 breeding season and 2012/2013 non-breeding season to describe the species composition of the woodland bird community. The survey methodology used is detailed in SNH Guidance<sup>9</sup> (SNH, 2010<sup>i</sup> P25) and a summary is provided below. The count locations used were situated no closer than 200 meters (m) apart and spread across different forest types within the preliminary application boundary and are listed in Table B-1.

##### Timing

- Each sample point was visited two times in winter 2012/2013 (November and January) and three times in summer 2013 (April, May and July);
- The first and second survey visits are designed to capture resident species and potentially some migrants. The third visit should record later migrants possibly missed in the first visits; and
- Surveys were not undertaken in conditions considered likely to affect bird detection rates, for example strong winds (greater than Beaufort Scale Force 4), persistent precipitation, poor visibility (less than 300m), or in unusually hot weather.

##### Field methods

- Hedgerows, patches of scrub, isolated trees and copses were surveyed as part of the breeding bird survey of open habitats (see below);
- Woodland/forest breeding birds were surveyed at a sample of woodland count points stratified spatially across the relevant area;
- Counts were delayed for a few minutes after the observer arrived at a point to minimise any disturbance effects; and
- All birds seen and heard during a 5-minute recording period were noted, together with details of any breeding behaviour.

**Table B-1 Woodland point count locations**

Point count ID	Grid reference	Point count ID	Grid reference	Point count ID	Grid reference
1	232554, 586965	22	230722, 588617	43	227286, 588609
2	232269, 587172	23	230493, 589287	44	226991, 588344
3	232834, 587087	24	230221, 588854	45	226991, 587951
4	233642, 586302	25	229755, 588792	46	227845, 586746
5	233080, 587881	26	230337, 588243	47	228555, 586438
6	233072, 587437	27	229692, 589186	48	228644, 587101
7	233142, 586733	28	228915, 589211	49	227221, 587485
8	232820, 586696	29	229043, 588891	50	227465, 587656
9	233323, 587188	30	229866, 588020	51	227393, 588015
10	233493, 587579	31	229817, 587596	52	227839, 588663
11	233405, 588283	32	229462, 587261	53	227617, 588401
12	232650, 589185	33	229091, 586765	54	228015, 588412

<sup>9</sup> Please note: woodland point counts were not included in the revised 2013 SNH survey guidance and were therefore not undertaken in surveys after the release of the revised guidance.

Point count ID	Grid reference	Point count ID	Grid reference	Point count ID	Grid reference
13	232566, 588831	34	229192, 587826	55	227537, 587111
14	232115, 589772	35	228559, 588568	56	227795, 587876
15	231558, 589587	36	228563, 588129	57	227939, 587507
16	231781, 589162	37	228736, 587850	58	228079, 587143
17	232818, 588406	38	229438, 588387	59	228491, 587521
18	231154, 589256	39	228954, 587467	60	228102, 588141
19	231573, 588761	40	228085, 589092	61	227719, 588157
20	231570, 588339	41	227751, 588908	62	232516, 589638
21	231129, 588365	42	227448, 588810		

- <sup>i</sup> Scottish Natural Heritage (2010) Survey methods for use in assessing the impacts of onshore windfarms on bird communities.
- <sup>ii</sup> Scottish Natural Heritage (2013) Recommended bird survey methods to inform impact assessment of onshore windfarms.
- <sup>iii</sup> Scottish Natural Heritage (2014) Recommended bird survey methods to inform impact assessment of onshore windfarms.
- <sup>iv</sup> Scottish Natural Heritage (2017) Recommended bird survey methods to inform impact assessment of onshore windfarms.
- <sup>v</sup> Brown, A. F. and Shepherd, K. B. (1993) A method for censusing upland breeding waders. *Bird Study*, 40: 189-195.
- <sup>vi</sup> Calladine, J., Garner, G., Wernham, C., & Thiel, A. (2009) The influence of survey frequency on population estimates of moorland breeding birds. *Bird Study*, 56: 3, 381-388.

<sup>vii</sup> Gilbert, G., Gibbons, D. W. and Evans, J. (1998) *Bird Monitoring Methods*. RSPB, Sandy.

<sup>viii</sup> Hardey, J., Crick, H., Wernham, C., Riley, H., Etheridge, B. and Thompson, D. (2009) *Raptors: a field guide for surveys and monitoring* (2nd edition). The Stationery Office, Edinburgh.

<sup>ix</sup> Hardey, J., Crick, H., Wernham, C., Riley, H., Etheridge, B. and Thompson, D. (2013) *Raptors: a field guide for surveys and monitoring* (3rd edition). The Stationery Office, Edinburgh.

<sup>x</sup> Scottish Natural Heritage (2007) *Black grouse survey methodology*.

## ANNEX C ORNITHOLOGICAL SURVEY EFFORT & GENERAL INFORMATION

**Table C-1** shows the system used for recording weather conditions on all the surveys detailed in sections C-1 to C-6 below.

**Table C-1 Key to meteorological conditions recorded during all surveys**

Wind speed	Rain	Cloud cover	Cloud height			
Calm	0	None	0	In eighths	<150m	0
Light air	1	Drizzle/Mist	1	e.g.	150-500m	1
Light breeze	2	Light showers	2		>500m	2
Gentle breeze	3	Heavy showers	3			
Moderate breeze	4	Heavy rain	4			
Fresh breeze	5					
Strong breeze	6	Snow	Frost	Visibility		
Moderate gale	7	None	0	Poor (<1km)	0	
Fresh gale	8	On site	1	Moderate (1-2km)	1	
Strong gale	9	High ground	2	Good (>2km)	2	
Whole gale	10					
Storm	11					
Hurricane	12					

### C.1 Flight Activity Surveys

Flight activity surveys were undertaken during the 2013 and 2018 breeding seasons and 2012/2013 and 2013/2014 non-breeding seasons. Details of the flight activity surveys undertaken across each Vantage Point (VP) location are supplied in **Table C-2** and the associated weather data recorded is detailed in **Table C-3**. Refer to Annex B for survey methodology and Annex D for survey results.

**Table C-2 Summary of flight activity surveys undertaken at Clauchrie (sorted chronologically)**

Date	Season	VP	Observer	Survey start time	Survey finish time	No. hours <sup>1</sup> surveyed
19/09/2012	NBR 2012/2013	2	GJ	1030	1330	3
19/09/2012	NBR 2012/2013	2	GJ	1345	1645	3
19/09/2012	NBR 2012/2013	5	ZS	1045	1345	3
19/09/2012	NBR 2012/2013	5	ZS	1400	1700	3
19/09/2012	NBR 2012/2013	6	MW	1030	1330	3
19/09/2012	NBR 2012/2013	6	MW	1400	1700	3
25/09/2012	NBR 2012/2013	2	GJ	1230	1530	3
25/09/2012	NBR 2012/2013	2	GJ	1545	1630	0.75
25/09/2012	NBR 2012/2013	3	SS	1210	1510	3
25/09/2012	NBR 2012/2013	3	SS	1520	1620	1
25/09/2012	NBR 2012/2013	4	ZS	1220	1520	3
25/09/2012	NBR 2012/2013	4	ZS	1520	1620	1
28/09/2012	NBR 2012/2013	1	ZS	0730	1030	3
28/09/2012	NBR 2012/2013	1	ZS	1045	1345	3

<sup>1</sup> Note: only valid hours (i.e. where visibility was at least 1 km) are presented in this column.

Date	Season	VP	Observer	Survey start time	Survey finish time	No. hours <sup>1</sup> surveyed
28/09/2012	NBR 2012/2013	3	SS	0655	0955	3
28/09/2012	NBR 2012/2013	3	SS	1005	1305	3
28/09/2012	NBR 2012/2013	4	GJ	0700	1000	3
28/09/2012	NBR 2012/2013	4	GJ	1015	1315	3
04/10/2012	NBR 2012/2013	2	MW	1230	1530	3
04/10/2012	NBR 2012/2013	2	MW	1600	1900	3
04/10/2012	NBR 2012/2013	5	GJ	1245	1545	3
04/10/2012	NBR 2012/2013	5	GJ	1555	1855	3
04/10/2012	NBR 2012/2013	6	SS	1255	1555	3
04/10/2012	NBR 2012/2013	6	SS	1605	1905	3
05/10/2012	NBR 2012/2013	2	GJ	0945	1245	3
05/10/2012	NBR 2012/2013	2	GJ	1255	1525	2.5
05/10/2012	NBR 2012/2013	3	MW	0940	1240	3
05/10/2012	NBR 2012/2013	3	MW	1300	1600	3
05/10/2012	NBR 2012/2013	4	SS	0935	1235	3
05/10/2012	NBR 2012/2013	4	SS	1245	1545	3
09/10/2012	NBR 2012/2013	1	ZS	1230	1530	3
09/10/2012	NBR 2012/2013	1	ZS	1545	1745	2
09/10/2012	NBR 2012/2013	3	MW	1200	1500	3
09/10/2012	NBR 2012/2013	3	MW	1530	1830	3
09/10/2012	NBR 2012/2013	4	GJ	1200	1500	3
09/10/2012	NBR 2012/2013	4	GJ	1515	1745	2.5
16/11/2012	NBR 2012/2013	1	SS	1000	1230	2.5
16/11/2012	NBR 2012/2013	1	SS	1240	1510	2.5
16/11/2012	NBR 2012/2013	3	ZS	0930	1200	2.5
16/11/2012	NBR 2012/2013	3	ZS	1215	1445	2.5
07/12/2012	NBR 2012/2013	2	SS	0820	1050	2.5
07/12/2012	NBR 2012/2013	2	SS	1100	1330	2.5
07/12/2012	NBR 2012/2013	4	ZS	0845	1115	2.5
07/12/2012	NBR 2012/2013	4	ZS	1130	1400	2.5
07/12/2012	NBR 2012/2013	5	RA	0820	1050	2.5
07/12/2012	NBR 2012/2013	5	RA	1100	1330	2.5
07/12/2012	NBR 2012/2013	6	RC	0830	1100	2.5
07/12/2012	NBR 2012/2013	6	RC	1110	1340	2.5
08/01/2013	NBR 2012/2013	2	SS	1030	1300	2.5
08/01/2013	NBR 2012/2013	2	SS	1310	1540	2.5
08/01/2013	NBR 2012/2013	5	AR	1030	1300	2.5
08/01/2013	NBR 2012/2013	5	AR	1315	1545	2.5
08/01/2013	NBR 2012/2013	6	RA	1030	1300	2.5
08/01/2013	NBR 2012/2013	6	RA	1310	1540	2.5
10/01/2013	NBR 2012/2013	2	KJ	1000	1230	2.5
10/01/2013	NBR 2012/2013	2	KJ	1240	1510	2.5

Date	Season	VP	Observer	Survey start time	Survey finish time	No. hours <sup>1</sup> surveyed
10/01/2013	NBR 2012/2013	4	RC	1005	1205	2
10/01/2013	NBR 2012/2013	4	RC	1215	1415	2
10/01/2013	NBR 2012/2013	5	ZS	1000	1230	2.5
10/01/2013	NBR 2012/2013	5	ZS	1245	1415	1.5
07/02/2013	NBR 2012/2013	4	CB	0745	1045	3
07/02/2013	NBR 2012/2013	4	CB	1055	1255	2
07/02/2013	NBR 2012/2013	5	RC	0810	1040	2.5
07/02/2013	NBR 2012/2013	5	RC	1050	1320	2.5
07/02/2013	NBR 2012/2013	6	SS	0800	1030	2.5
07/02/2013	NBR 2012/2013	6	SS	1040	1310	2.5
22/02/2013	NBR 2012/2013	1	CB	1000	1300	3
22/02/2013	NBR 2012/2013	1	CB	1310	1410	1
22/02/2013	NBR 2012/2013	3	ZS	0945	1145	2
22/02/2013	NBR 2012/2013	3	ZS	1200	1400	2
04/03/2013	NBR 2012/2013	1	RA	1000	1300	3
04/03/2013	NBR 2012/2013	1	RA	1310	1540	2.5
04/03/2013	NBR 2012/2013	5	CB	1025	1325	3
04/03/2013	NBR 2012/2013	5	CB	1335	1535	2
04/03/2013	NBR 2012/2013	6	SS	1030	1300	2.5
04/03/2013	NBR 2012/2013	6	SS	1310	1540	2.5
05/03/2013	NBR 2012/2013	1	LC	0720	1020	3
05/03/2013	NBR 2012/2013	1	LC	1030	1300	2.5
05/03/2013	NBR 2012/2013	3	RA	0715	0945	2.5
05/03/2013	NBR 2012/2013	3	RA	1000	1230	2.5
08/03/2013	NBR 2012/2013	1	ZS	1230	1500	2.5
08/03/2013	NBR 2012/2013	1	ZS	1515	1745	2.5
08/03/2013	NBR 2012/2013	6	LC	1300	1600	3
08/03/2013	NBR 2012/2013	6	LC	1610	1710	1
19/03/2013	BR 2013	3	CB	1210	1510	3
19/03/2013	BR 2013	3	CB	1520	1620	1
19/03/2013	BR 2013	4	ZS	1215	1415	2
19/03/2013	BR 2013	4	ZS	1430	1630	2
19/03/2013	BR 2013	5	RA	1205	1405	2
19/03/2013	BR 2013	5	RA	1415	1615	2
20/03/2013	BR 2013	1	RDW	1140	1340	2
20/03/2013	BR 2013	1	RDW	1350	1550	2
20/03/2013	BR 2013	2	RC	1115	1345	2.5
20/03/2013	BR 2013	2	RC	1355	1655	3
20/03/2013	BR 2013	6	AR	1150	1350	2
20/03/2013	BR 2013	6	AR	1400	1600	2
25/04/2013	BR 2013	3	PR	1050	1350	3
25/04/2013	BR 2013	3	PR	1400	1700	3
25/04/2013	BR 2013	4	SS	1050	1350	3
25/04/2013	BR 2013	4	SS	1400	1700	3

Date	Season	VP	Observer	Survey start time	Survey finish time	No. hours <sup>1</sup> surveyed
26/04/2013	BR 2013	1	PR	0650	0850	2
26/04/2013	BR 2013	1	PR	0900	1100	2
26/04/2013	BR 2013	2	SS	0700	0900	2
26/04/2013	BR 2013	2	SS	0910	1110	2
26/04/2013	BR 2013	5	RDW	0740	1040	3
17/05/2013	BR 2013	1	DM	0530	0830	3
17/05/2013	BR 2013	1	DM	0840	1040	2
17/05/2013	BR 2013	3	JM	0615	0815	2
17/05/2013	BR 2013	3	JM	0825	1025	2
17/05/2013	BR 2013	4	ND	0445	0745	3
17/05/2013	BR 2013	4	ND	0800	1100	3
17/05/2013	BR 2013	5	CB	0600	0900	3
17/05/2013	BR 2013	5	CB	0910	1010	1
03/06/2013	BR 2013	2	CB	1610	1910	3
03/06/2013	BR 2013	2	CB	1920	2220	3
03/06/2013	BR 2013	5	FD	1610	1910	3
03/06/2013	BR 2013	5	FD	1920	2220	3
04/06/2013	BR 2013	1	CB	1400	1700	3
04/06/2013	BR 2013	6	FD	1050	1350	3
04/06/2013	BR 2013	6	FD	1400	1700	3
05/06/2013	BR 2013	3	FD	0500	0800	3
05/06/2013	BR 2013	3	FD	0810	1110	3
05/06/2013	BR 2013	6	CB	0525	0825	3
05/06/2013	BR 2013	6	CB	0835	1135	3
17/06/2013	BR 2013	1	FD	1615	1915	3
17/06/2013	BR 2013	1	FD	1925	2225	3
17/06/2013	BR 2013	3	ND	1600	1900	3
17/06/2013	BR 2013	3	ND	1915	2215	3
17/06/2013	BR 2013	4	CB	1610	1910	3
17/06/2013	BR 2013	4	CB	1920	2220	3
17/06/2013	BR 2013	6	PR	1535	1835	3
17/06/2013	BR 2013	6	PR	1845	2145	3
01/07/2013	BR 2013	1	CB	1555	1855	3
01/07/2013	BR 2013	1	CB	1905	2205	3
01/07/2013	BR 2013	4	PR	1545	1845	3
01/07/2013	BR 2013	4	PR	1855	2155	3
01/07/2013	BR 2013	6	FD	1520	1820	3
01/07/2013	BR 2013	6	FD	1830	2130	3
03/07/2013	BR 2013	2	PR	1030	1330	3
03/07/2013	BR 2013	2	PR	1340	1640	3
03/07/2013	BR 2013	5	FD	1035	1335	3
03/07/2013	BR 2013	5	FD	1345	1645	3
14/08/2013	BR 2013	4	SS	0530	0830	3
14/08/2013	BR 2013	4	SS	0840	1140	3

Date	Season	VP	Observer	Survey start time	Survey finish time	No. hours <sup>1</sup> surveyed
14/08/2013	BR 2013	5	PR	0530	0830	3
14/08/2013	BR 2013	5	PR	0840	1140	3
14/08/2013	BR 2013	5	PR	1150	1220	0.5
14/08/2013	BR 2013	6	FD	0530	0830	3
14/08/2013	BR 2013	6	FD	0840	1140	3
20/08/2013	BR 2013	1	FD	1005	1135	1.5
20/08/2013	BR 2013	2	FD	1410	1540	1.5
20/08/2013	BR 2013	4	FD	1155	1355	2
20/08/2013	BR 2013	6	ND	0930	1230	3
20/08/2013	BR 2013	6	ND	1240	1540	3
26/08/2013	BR 2013	2	FD	1400	1700	3
26/08/2013	BR 2013	2	FD	1710	2040	3.5
26/08/2013	BR 2013	3	SS	1420	1720	3
26/08/2013	BR 2013	3	SS	1730	2030	3
26/08/2013	BR 2013	5	CB	1410	1710	3
26/08/2013	BR 2013	5	CB	1720	2020	3
26/08/2013	BR 2013	5	CB	2030	2100	0.5
27/08/2013	BR 2013	1	CB	0625	0925	3
27/08/2013	BR 2013	1	CB	0935	1235	3
27/08/2013	BR 2013	1	CB	1245	1315	0.5
27/08/2013	BR 2013	2	SS	0620	0920	3
27/08/2013	BR 2013	2	SS	0930	1230	3
27/08/2013	BR 2013	2	SS	1240	1310	0.5
27/08/2013	BR 2013	3	FD	0925	1125	2
27/08/2013	BR 2013	3	FD	1135	1335	2
27/08/2013	BR 2013	6	FD	0645	0845	2
02/09/2013	NBR 2013/2014	1	FD	1330	1630	3
02/09/2013	NBR 2013/2014	1	FD	1330	1630	3
03/09/2013	NBR 2013/2014	3	CB	1010	1310	3
03/09/2013	NBR 2013/2014	3	CB	1320	1620	3
03/09/2013	NBR 2013/2014	5	FD	0950	1250	3
03/09/2013	NBR 2013/2014	5	FD	1300	1600	3
04/09/2013	NBR 2013/2014	6	FD	0635	0935	3
04/09/2013	NBR 2013/2014	6	FD	0945	1245	3
04/09/2013	NBR 2013/2014	2	CB	0650	0950	3
04/09/2013	NBR 2013/2014	2	CB	1000	1300	3
10/10/2013	NBR 2013/2014	5	MW	0730	1030	3
10/10/2013	NBR 2013/2014	5	MW	1100	1400	3
14/10/2013	NBR 2013/2014	1	CB	1040	1340	3
14/10/2013	NBR 2013/2014	1	CB	1410	1710	3
14/10/2013	NBR 2013/2014	4	MW	1015	1315	3
14/10/2013	NBR 2013/2014	4	MW	1345	1645	3
23/10/2013	NBR 2013/2014	6	MW	1030	1330	3
23/10/2013	NBR 2013/2014	6	MW	1400	1700	3

Date	Season	VP	Observer	Survey start time	Survey finish time	No. hours <sup>1</sup> surveyed
24/10/2013	NBR 2013/2014	4	MW	0840	1140	3
24/10/2013	NBR 2013/2014	4	MW	1210	1510	3
22/10/2013	NBR 2013/2014	3	MW	1045	1345	3
22/10/2013	NBR 2013/2014	3	MW	1415	1715	2.5
22/10/2013	NBR 2013/2014	5	CB	1035	1335	3
22/10/2013	NBR 2013/2014	5	CB	1405	1705	2.5
23/10/2013	NBR 2013/2014	2	CB	1025	1325	3
23/10/2013	NBR 2013/2014	2	CB	1355	1655	3
24/10/2013	NBR 2013/2014	1	CB	0845	1145	3
24/10/2013	NBR 2013/2014	1	CB	1215	1515	2.5
18/11/2013	NBR 2013/2014	6	FD	1030	1330	2.5
18/11/2013	NBR 2013/2014	6	FD	1400	1600	2
19/11/2013	NBR 2013/2014	4	FD	0950	1250	3
19/11/2013	NBR 2013/2014	4	FD	1320	1520	2
20/11/2013	NBR 2013/2014	1	FD	0855	1155	3
20/11/2013	NBR 2013/2014	1	FD	1225	1425	2
18/11/2013	NBR 2013/2014	2	MW	1025	1325	3
18/11/2013	NBR 2013/2014	2	MW	1405	1605	2
20/11/2013	NBR 2013/2014	3	MW	0830	1130	3
20/11/2013	NBR 2013/2014	3	MW	1200	1400	2
19/11/2013	NBR 2013/2014	5	MW	0945	1245	3
19/11/2013	NBR 2013/2014	5	MW	1315	1515	2
09/12/2013	NBR 2013/2014	4	PR	1030	1330	3
09/12/2013	NBR 2013/2014	4	PR	1400	1600	2
11/12/2013	NBR 2013/2014	6	PR	0830	1130	3
11/12/2013	NBR 2013/2014	6	PR	1200	1400	2
11/12/2013	NBR 2013/2014	2	CB	0830	1130	3
11/12/2013	NBR 2013/2014	2	CB	1200	1400	2
10/12/2013	NBR 2013/2014	5	CB	0935	1235	3
10/12/2013	NBR 2013/2014	5	CB	1305	1505	2
09/12/2013	NBR 2013/2014	6	CB	1030	1330	3
09/12/2013	NBR 2013/2014	6	CB	1400	1600	2
13/01/2014	NBR 2013/2014	2	CB	1105	1405	3
13/01/2014	NBR 2013/2014	2	CB	1435	1535	1
14/01/2014	NBR 2013/2014	1	CB	1010	1210	1
15/01/2014	NBR 2013/2014	5	CB	0845	1145	0
15/01/2014	NBR 2013/2014	5	CB	1215	1415	0
13/01/2014	NBR 2013/2014	1	FD	1100	1400	2
13/01/2014	NBR 2013/2014	1	FD	1430	1630	0
15/01/2014	NBR 2013/2014	4	FD	0850	1150	0
15/01/2014	NBR 2013/2014	4	FD	1150	1350	0
14/01/2014	NBR 2013/2014	3	FD	0940	1240	3
14/01/2014	NBR 2013/2014	3	FD	1310	1510	1
27/01/2014	NBR 2013/2014	1	CB	1240	1540	3

Date	Season	VP	Observer	Survey start time	Survey finish time	No. hours <sup>1</sup> surveyed
27/01/2014	NBR 2013/2014	1	CB	1610	1640	0.5
17/02/2014	NBR 2013/2014	2	FD	1115	1415	3
17/02/2014	NBR 2013/2014	2	FD	1445	1645	2
18/02/2014	NBR 2013/2014	4	FD	0945	1245	3
18/02/2014	NBR 2013/2014	4	FD	1315	1515	2
24/02/2014	NBR 2013/2014	5	JM	1210	1510	3
24/02/2014	NBR 2013/2014	5	JM	1540	1740	2
24/02/2014	NBR 2013/2014	3	CB	1215	1515	3
24/02/2014	NBR 2013/2014	3	CB	1545	1745	2
27/02/2014	NBR 2013/2014	2	CB	0950	1250	3
27/02/2014	NBR 2013/2014	2	CB	1320	1520	2
27/02/2014	NBR 2013/2014	1	JM	1020	1320	3
27/02/2014	NBR 2013/2014	1	JM	1350	1550	2
28/02/2014	NBR 2013/2014	6	CB	0745	1045	3
28/02/2014	NBR 2013/2014	6	CB	1115	1315	2
28/02/2014	NBR 2013/2014	4	JM	0755	1055	3
28/02/2014	NBR 2013/2014	4	JM	1125	1325	2
10/03/2014	NBR 2013/2014	4	CB	1215	1515	3
10/03/2014	NBR 2013/2014	4	CB	1545	1745	2
11/03/2014	NBR 2013/2014	6	CB	1035	1335	3
11/03/2014	NBR 2013/2014	6	CB	1405	1605	2
12/03/2014	NBR 2013/2014	3	CB	0925	1225	3
12/03/2014	NBR 2013/2014	3	CB	1255	1525	2.5
13/03/2014	NBR 2013/2014	5	CB	0720	1020	3
13/03/2014	NBR 2013/2014	5	CB	1050	1120	0.5
13/03/2014	NBR 2013/2014	1	CB	1215	1415	0
14/03/2014	NBR 2013/2014	3	CB	0730	1030	0
14/03/2014	NBR 2013/2014	3	CB	1110	1410	3
17/03/2014	NBR 2013/2014	1	SS	0945	1145	2
17/03/2014	NBR 2013/2014	3	SS	1215	1415	2
03/04/2018	BR 2018	6	PC	0710	1010	3
03/04/2018	BR 2018	6	PC	1040	1340	3
01/04/2018	BR 2018	9	PC	1400	1700	3
02/04/2018	BR 2018	8	PC	0915	1215	3
02/04/2018	BR 2018	8	PC	1245	1545	3
15/04/2018	BR 2018	7	PC	0830	1130	3
15/04/2018	BR 2018	7	PC	1200	1500	3
16/04/2018	BR 2018	9	PC	0545	8454	3
21/04/2018	BR 2018	11	PC	1030	1330	3
21/04/2018	BR 2018	11	PC	1400	1700	3
22/04/2018	BR 2018	10	PC	0710	1010	3
22/04/2018	BR 2018	10	PC	1040	1340	3
28/04/2018	BR 2018	11	PC	1120	1420	3
28/04/2018	BR 2018	11	PC	1450	1750	3

Date	Season	VP	Observer	Survey start time	Survey finish time	No. hours <sup>1</sup> surveyed
13/05/2018	BR 2018	8	PC	1115	1415	3
13/05/2018	BR 2018	8	PC	1445	1745	3
14/05/2018	BR 2018	6	PC	0445	0745	3
14/05/2018	BR 2018	6	PC	0815	1115	3
19/05/2018	BR 2018	9	PC	1045	1345	3
19/05/2018	BR 2018	9	PC	1415	1715	3
20/05/2018	BR 2018	10	PC	0945	1245	3
20/05/2018	BR 2018	10	PC	1315	1615	3
21/05/2018	BR 2018	7	PC	0550	0850	3
21/05/2018	BR 2018	7	PC	0920	1220	3
26/05/2018	BR 2018	8	PC	0945	1245	3
26/05/2018	BR 2018	8	PC	1315	1615	3
27/05/2018	BR 2018	11	PC	1500	1800	3
27/05/2018	BR 2018	11	PC	1830	2130	3
28/05/2018	BR 2018	7	PC	0510	0810	3
28/05/2018	BR 2018	7	PC	0840	1140	3
02/06/2018	BR 2018	6	PC	1035	1335	3
02/06/2018	BR 2018	6	PC	1405	1705	3
09/06/2018	BR 2018	9	PC	0940	1240	3
09/06/2018	BR 2018	9	PC	1310	1610	3
11/06/2018	BR 2018	11	PC	0520	0820	3
11/06/2018	BR 2018	11	PC	0850	1150	3
22/06/2018	BR 2018	10	PC	1100	1400	3
22/06/2018	BR 2018	10	PC	1430	1730	3
07/04/2018	BR 2018	6	PC	1150	1450	3
07/04/2018	BR 2018	6	PC	1520	1820	3
06/07/2018	BR 2018	7	PC	1520	1820	3
06/07/2018	BR 2018	7	PC	1850	2150	3
07/07/2018	BR 2018	6	PC	0610	0910	3
07/07/2018	BR 2018	6	PC	0940	1240	3
17/07/2018	BR 2018	8	PC	1125	1425	3
17/07/2018	BR 2018	8	PC	1455	1755	3
18/07/2018	BR 2018	9	PC	0900	1200	3
18/07/2018	BR 2018	9	PC	1230	1530	3
20/07/2018	BR 2018	11	PC	0720	1020	3
20/07/2018	BR 2018	11	PC	1050	1350	3
28/07/2018	BR 2018	7	PC	0815	1115	3
28/07/2018	BR 2018	7	PC	1145	1445	3
29/07/2018	BR 2018	8	PC	0920	1220	3
29/07/2018	BR 2018	8	PC	1250	1550	3
30/07/2018	BR 2018	9	PC	0520	0820	3
30/07/2018	BR 2018	9	PC	0850	1150	3
08/04/2018	BR 2018	10	PC	0825	1125	3
08/04/2018	BR 2018	10	PC	1155	1455	3

Date	Season	VP	Observer	Survey start time	Survey finish time	No. hours <sup>1</sup> surveyed
08/07/2018	BR 2018	10	PC	0515	0815	3
08/07/2018	BR 2018	10	PC	0845	1145	3
08/08/2018	BR 2018	9	MW	0830	1130	3
08/08/2018	BR 2018	9	MW	1200	1500	3
09/08/2018	BR 2018	11	MW	0830	1130	3
09/08/2018	BR 2018	11	MW	1200	1500	3
10/08/2018	BR 2018	6	MW	0815	1115	3
10/08/2018	BR 2018	6	MW	1145	1445	3
28/08/2018	BR 2018	7	MW	0630	0930	3
28/08/2018	BR 2018	7	MW	1000	1300	3
29/08/2018	BR 2018	8	MW	0830	1130	3
29/08/2018	BR 2018	8	MW	1200	1500	3
30/08/2018	BR 2018	10	MW	0645	0945	3
30/08/2018	BR 2018	10	MW	1015	1315	3

**Table C-3 Meteorological conditions during flight activity surveys at Clauchrie (sorted chronologically)**

Date	VP	Observer	Survey start time	Survey finish time	Survey hour	Wind speed	Wind direction	Rain	Cloud cover	Cloud height	Visibility	Frost	Snow
19/09/2012	2	GJ	1030	1330	1	1	W	1	3	2	2	0	0
19/09/2012	2	GJ	1030	1330	2	1	W	1	2	2	2	0	0
19/09/2012	2	GJ	1030	1330	3	3	W	1	7	2	1	0	0
19/09/2012	2	GJ	1345	1645	1	2	W	2	6	2	2	0	0
19/09/2012	2	GJ	1345	1645	2	2	SW	1	6	2	2	0	0
19/09/2012	2	GJ	1345	1645	3	3	SW	0	5	2	2	0	0
19/09/2012	5	ZS	1045	1345	1	2	W	2	7	2	2	0	0
19/09/2012	5	ZS	1045	1345	2	3	W	0	7	2	2	0	0
19/09/2012	5	ZS	1045	1345	3	3	NW	0	6	2	2	0	0
19/09/2012	5	ZS	1400	1700	1	2	NW	3	7	2	2	0	0
19/09/2012	5	ZS	1400	1700	2	4	NW	0	5	2	2	0	0
19/09/2012	5	ZS	1400	1700	3	4	NW	0	4	2	2	0	0
19/09/2012	6	MW	1030	1330	1	3	W	2	5	2	2	0	0
19/09/2012	6	MW	1030	1330	2	3	W	0	6	2	2	0	0
19/09/2012	6	MW	1030	1330	3	4	W	3	6	2	2	0	0
19/09/2012	6	MW	1400	1700	1	4	W	2	6	2	2	0	0
19/09/2012	6	MW	1400	1700	2	4	W	0	5	2	2	0	0
19/09/2012	6	MW	1400	1700	3	4	W	0	5	2	2	0	0
25/09/2012	2	GJ	1230	1530	1	6	NW	2	8	1	1	0	0
25/09/2012	2	GJ	1230	1530	2	6	NNW	3	8	2	2	0	0
25/09/2012	2	GJ	1230	1530	3	6	NNW	2	8	1	2	0	0
25/09/2012	2	GJ	1545	1630	1	6	N	2	8	1	1	0	0
25/09/2012	3	SS	1210	1510	1	6	NW	1	8	1	1	0	0
25/09/2012	3	SS	1210	1510	2	5	NW	0	8	1	2	0	0
25/09/2012	3	SS	1210	1510	3	6	NE	1	8	1	1	0	0
25/09/2012	3	SS	1520	1620	1	6	NE	1	8	1	1	0	0
25/09/2012	4	ZS	1220	1520	1	6	WNW	4	8	1	1	0	0
25/09/2012	4	ZS	1220	1520	2	5	WNW	2	8	2	2	0	0
25/09/2012	4	ZS	1220	1520	3	5	WNW	2	8	1	2	0	0
25/09/2012	4	ZS	1520	1620	1	5	WNW	1	8	2	2	0	0
28/09/2012	1	ZS	0730	1030	1	5	N	0	8	2	2	0	0
28/09/2012	1	ZS	0730	1030	2	6	N	0	8	2	2	0	0
28/09/2012	1	ZS	0730	1030	3	6	N	0	8	2	2	0	0
28/09/2012	1	ZS	1045	1345	1	6	N	0	8	2	2	0	0
28/09/2012	1	ZS	1045	1345	2	6	N	0	8	2	2	0	0
28/09/2012	1	ZS	1045	1345	3	6	N	0	8	2	2	0	0
28/09/2012	3	SS	0655	0955	1	3	NW	0	7	2	2	0	0
28/09/2012	3	SS	0655	0955	2	3	NW	0	8	2	2	0	0
28/09/2012	3	SS	0655	0955	3	3	SW	0	8	2	2	0	0
28/09/2012	3	SS	1005	1305	1	3	W	0	7	2	2	0	0
28/09/2012	3	SS	1005	1305	2	3	W	0	8	2	2	0	0
28/09/2012	3	SS	1005	1305	3	3	WSW	0	6	2	2	0	0

Date	VP	Observer	Survey start time	Survey finish time	Survey hour	Wind speed	Wind direction	Rain	Cloud cover	Cloud height	Visibility	Frost	Snow
28/09/2012	4	GJ	0700	1000	1	2	SW	0	7	2	2	0	0
28/09/2012	4	GJ	0700	1000	2	2	SW	0	8	2	2	0	0
28/09/2012	4	GJ	0700	1000	3	3	SW	0	8	2	1	0	0
28/09/2012	4	GJ	1015	1315	1	5	W	0	8	2	2	0	0
28/09/2012	4	GJ	1015	1315	2	5	SW	0	8	2	2	0	0
28/09/2012	4	GJ	1015	1315	3	4	W	0	7	2	2	0	0
04/10/2012	2	MW	1230	1530	1	2	SW	0	6	2	2	0	0
04/10/2012	2	MW	1230	1530	2	2	SW	0	5	2	2	0	0
04/10/2012	2	MW	1230	1530	3	2	SW	0	6	2	2	0	0
04/10/2012	2	MW	1600	1900	1	3	SW	0	5	2	2	0	0
04/10/2012	2	MW	1600	1900	2	2	SW	0	7	2	2	0	0
04/10/2012	2	MW	1600	1900	3	2	SW	0	6	2	2	0	0
04/10/2012	3	GJ	1245	1545	1	3	WSW	0	6	2	2	0	0
04/10/2012	3	GJ	1245	1545	2	4	SW	0	7	2	2	0	0
04/10/2012	3	GJ	1245	1545	3	3	SW	0	7	2	2	0	0
04/10/2012	3	GJ	1555	1855	1	3	SSW	0	7	2	2	0	0
04/10/2012	3	GJ	1555	1855	2	4	SW	0	7	2	2	0	0
04/10/2012	3	GJ	1555	1855	3	3	SW	0	7	2	2	0	0
04/10/2012	6	SS	1255	1555	1	3	SW	0	6	2	2	0	0
04/10/2012	6	SS	1255	1555	2	4	SW	0	5	2	2	0	0
04/10/2012	6	SS	1255	1555	3	3	SW	0	7	2	2	0	0
04/10/2012	6	SS	1605	1905	1	3	SW	0	6	2	2	0	0
04/10/2012	6	SS	1605	1905	2	3	SW	0	6	2	2	0	0
04/10/2012	6	SS	1605	1905	3	3	SW	0	6	1	2	0	0
05/10/2012	2	GJ	0945	1245	1	2	NW	3	8	1	1	0	0
05/10/2012	2	GJ	0945	1245	2	2	W	0	6	2	2	0	0
05/10/2012	2	GJ	0945	1245	3	2	W	0	7	2	2	0	0
05/10/2012	2	GJ	1255	1525	1	2	W	1	7	2	2	0	0
05/10/2012	2	GJ	1255	1525	2	1	W	0	5	2	2	0	0
05/10/2012	2	GJ	1255	1525	3	1	W	0	4	2	2	0	0
05/10/2012	3	MW	0940	1240	1	2	W	2	8	1	1	0	0
05/10/2012	3	MW	0940	1240	2	1	W	3	8	1	1	0	0
05/10/2012	3	MW	0940	1240	3	1	W	0	6	2	2	0	0
05/10/2012	3	MW	1300	1600	1	1	W	0	7	2	2	0	0
05/10/2012	3	MW	1300	1600	2	2	W	2	7	2	2	0	0
05/10/2012	3	MW	1300	1600	3	2	W	0	6	2	2	0	0
05/10/2012	4	SS	0935	1235	1	3	WNW	2	8	1	1	0	0
05/10/2012	4	SS	0935	1235	2	3	NNW	2	8	1	1	0	0
05/10/2012	4	SS	0935	1235	3	3	NNW	0	8	1	2	0	0
05/10/2012	4	SS	1245	1545	1	4	NNW	0	8	2	2	0	0
05/10/2012	4	SS	1245	1545	2	4	NNW	0	7	2	2	0	0
05/10/2012	4	SS	1245	1545	3	3	NNW	0	6	2	2	0	0
09/10/2012	1	ZS	1230	1530	1	1	W	0	4	2	2	0	0
09/10/2012	1	ZS	1230	1530	2	2	W	0	6	2	2	0	0

Date	VP	Observer	Survey start time	Survey finish time	Survey hour	Wind speed	Wind direction	Rain	Cloud cover	Cloud height	Visibility	Frost	Snow
09/10/2012	1	ZS	1230	1530	3	2	W	0	8	2	2	0	0
09/10/2012	1	ZS	1545	1745	1	2	W	0	8	2	2	0	0
09/10/2012	1	ZS	1545	1745	2	3	W	0	8	2	2	0	0
09/10/2012	1	ZS	1545	1745	3	3	W	0	8	2	2	0	0
09/10/2012	3	MW	1200	1500	1	0	N	0	1	2	2	0	0
09/10/2012	3	MW	1200	1500	2	0	N	0	3	2	2	0	0
09/10/2012	3	MW	1200	1500	3	1	N	0	5	2	2	0	0
09/10/2012	3	MW	1530	1830	1	1	N	0	6	2	2	0	0
09/10/2012	3	MW	1530	1830	2	1	N	0	7	2	2	0	0
09/10/2012	3	MW	1530	1830	3	1	N	0	7	2	2	0	0
09/10/2012	4	GJ	1200	1500	1	1	SE	0	1	2	2	0	0
09/10/2012	4	GJ	1200	1500	2	1	SE	0	4	2	2	0	0
09/10/2012	4	GJ	1200	1500	3	2	E	0	7	2	2	0	0
09/10/2012	4	GJ	1515	1745	1	2	E	0	7	2	2	0	0
09/10/2012	4	GJ	1515	1745	2	1	E	0	7	2	2	0	0
09/10/2012	4	GJ	1515	1745	3	2	E	0	8	2	2	0	0
16/11/2012	3	ZS	0930	1200	1	3	W	0	7	2	2	0	0
16/11/2012	3	ZS	0930	1200	2	3	W	0	7	2	2	0	0
16/11/2012	3	ZS	0930	1200	2.5	3	W	0	8	2	2	0	0
16/11/2012	3	ZS	1215	1445	1	3	W	0	8	2	2	0	0
16/11/2012	3	ZS	1215	1445	2	3	W	0	7	2	2	0	0
16/11/2012	3	ZS	1215	1445	2.5	3	W	0	6	2	2	0	0
16/11/2012	3	SS	0950	1220	1	5	SSW	0	8	2	2	0	0
16/11/2012	3	SS	0950	1220	2	5	SSW	0	6	2	2	0	0
16/11/2012	3	SS	0950	1220	2.5	5	SSW	0	7	2	2	0	0
16/11/2012	3	SS	1230	1510	1	5	SSW	0	8	2	2	0	0
16/11/2012	3	SS	1230	1510	2	5	SSW	0	6	2	2	0	0
16/11/2012	3	SS	1230	1510	2.5	5	SSW	0	7	2	2	0	0
07/12/2012	2	SS	0820	1050	1	4	NNW	0	8	2	2	2	2
07/12/2012	2	SS	0820	1050	2	6	NNW	0	5	2	2	2	2
07/12/2012	2	SS	0820	1050	2.5	6	NNW	0	7	2	2	2	2
07/12/2012	2	SS	1100	1330	1	6	NNW	0	6	2	2	2	2
07/12/2012	2	SS	1100	1330	2	6	NNW	0	6	2	2	2	2
07/12/2012	2	SS	1100	1330	2.5	6	NNW	0	6	2	2	2	2
07/12/2012	4	ZS	0845	1115	1	4	W	0	7	2	2	2	1
07/12/2012	4	ZS	0845	1115	2	3	W	0	6	2	2	2	1
07/12/2012	4	ZS	0845	1115	2.5	4	W	0	6	2	2	2	1
07/12/2012	4	ZS	1130	1400	1	4	W	0	6	2	2	2	1
07/12/2012	4	ZS	1130	1400	2	4	W	0	6	2	2	2	1
07/12/2012	4	ZS	1130	1400	2.5	4	W	0	6	2	2	2	1
07/12/2012	5	RA	0820	1050	1	6	NW	0	7	2	2	2	2
07/12/2012	5	RA	0820	1050	2	5	NW	0	2	2	2	2	2
07/12/2012	5	RA	0820	1050	2.5	5	NW	0	5-2	2	2	2	2
07/12/2012	5	RA	1100	1330	1	4	NW	0	3	2	2	2	2

Date	VP	Observer	Survey start time	Survey finish time	Survey hour	Wind speed	Wind direction	Rain	Cloud cover	Cloud height	Visibility	Frost	Snow
07/12/2012	5	RA	1100	1330	2	5	NW	0	4	2	2	2	2
07/12/2012	5	RA	1100	1330	2.5	6	NW	0	6	2	2	2	2
07/12/2012	6	RC	0830	1100	1	6	N	0	7	2	2	1	2
07/12/2012	6	RC	0830	1100	2	4	N	0	4	2	2	1	2
07/12/2012	6	RC	0830	1100	2.5	4	N	0	4	2	2	1	2
07/12/2012	6	RC	1110	1340	1	4	N	0	4	2	2	1	2
07/12/2012	6	RC	1110	1340	2	4	N	0	3	2	2	1	2
07/12/2012	6	RC	1110	1340	2.5	3	N	0	5	2	2	1	2
08/01/2013	2	SS	1030	1300	1	4	WSW	3	8	1	1	0	0
08/01/2013	2	SS	1030	1300	2	4	WSW	1	8	2	2	0	0
08/01/2013	2	SS	1030	1300	2.5	5	WSW	0	7	1	2	0	0
08/01/2013	2	SS	1310	1540	1	4	WSW	0	7	2	2	0	0
08/01/2013	2	SS	1310	1540	2	4	WSW	0	6	2	2	0	0
08/01/2013	2	SS	1310	1540	2.5	4	WSW	0	6	2	2	0	0
08/01/2013	5	AR	1030	1300	1	3	W	1	6	2	1	0	0
08/01/2013	5	AR	1030	1300	2	2	W	0	4	2	2	0	0
08/01/2013	5	AR	1030	1300	2.5	2	W	0	7	2	2	0	0
08/01/2013	5	AR	1315	1545	1	2	W	0	5	2	2	0	0
08/01/2013	5	AR	1315	1545	2	2	W	0	6	2	2	0	0
08/01/2013	5	AR	1315	1545	2.5	0	0	0	5	2	2	0	0
08/01/2013	6	RA	1030	1300	1	5	SSW	1	8	1	1	0	0
08/01/2013	6	RA	1030	1300	2	4	SSW	0	6	2	2	0	0
08/01/2013	6	RA	1030	1300	2.5	4	SSW	0	8	2	2	0	0
08/01/2013	6	RA	1310	1540	1	4	SSW	0	7	2	2	0	0
08/01/2013	6	RA	1310	1540	2	4	SSW	0	7	2	2	0	0
08/01/2013	6	RA	1310	1540	2.5	3	SSW	0	7	2	2	0	0
10/01/2013	2	KJ	1000	1230	1	0	0	0	3	2	2	2	0
10/01/2013	2	KJ	1000	1230	2	0	0	0	4	2	2	2	0
10/01/2013	2	KJ	1000	1230	2.5	0	0	0	8	2	2	2	0
10/01/2013	2	KJ	1240	1510	1	0	0	0	8	2	1	2	0
10/01/2013	2	KJ	1240	1510	2	0	0	0	8	2	1	2	0
10/01/2013	2	KJ	1240	1510	2.5	0	0	0	8	2	2	2	0
10/01/2013	4	RC	1005	1205	1	0	0	0	7	2	2	1	0
10/01/2013	4	RC	1005	1205	2	0	0	0	5	2	2	1	0
10/01/2013	4	RC	1215	1415	1	1	E	0	3	1	1	1	0
10/01/2013	4	RC	1215	1415	2	2	E	0	8	0	1	1	0
10/01/2013	5	ZS	1000	1230	1	1	SW	0	6	2	2	2	0
10/01/2013	5	ZS	1000	1230	2	1	SW	0	5	2	2	2	0
10/01/2013	5	ZS	1000	1230	2.5	2	SW	0	4	2	2	2	0
10/01/2013	5	ZS	1245	1415	1	2	SW	0	5	2	2	2	0
10/01/2013	5	ZS	1245	1415	1.5	2	SW	0	6	2	2	2	0
07/02/2013	4	CB	0745	1045	1	1	NW	0	8	2	2	2	2
07/02/2013	4	CB	0745	1045	2	1	NW	0	8	1	2	2	2
07/02/2013	4	CB	0745	1045	3	1	NW	0	8	1	2	2	2

Date	VP	Observer	Survey start time	Survey finish time	Survey hour	Wind speed	Wind direction	Rain	Cloud cover	Cloud height	Visibility	Frost	Snow
07/02/2013	4	CB	1055	1255	1	1	NW	0	8	1	2	2	2
07/02/2013	4	CB	1055	1255	2	2	NW	2	8	1	2	2	2
07/02/2013	5	RC	0810	1040	1	1	SW	0	8	1	2	0	1
07/02/2013	5	RC	0810	1040	2	2	SW	0	8	1	2	0	1
07/02/2013	5	RC	0810	1040	2.5	2	SW	0	8	2	2	0	1
07/02/2013	5	RC	1050	1320	1	0	0	0	8	2	2	0	1
07/02/2013	5	RC	1050	1320	2	0	0	0	8	1	2	0	1
07/02/2013	5	RC	1050	1320	2.5	0	0	0	8	2	2	0	1
07/02/2013	6	SS	0800	1030	1	3	W	0	7	2	2	1	1
07/02/2013	6	SS	0800	1030	2	3	W	0	7	2	2	1	1
07/02/2013	6	SS	0800	1030	2.5	3	W	0	8	2	2	0	1
07/02/2013	6	SS	1040	1310	1	2	W	0	8	2	2	0	1
07/02/2013	6	SS	1040	1310	2	2	W	0	8	2	2	0	1
07/02/2013	6	SS	1040	1310	2.5	1	W	0	8	2	2	0	1
22/02/2013	1	CB	1000	1300	1	3	SE	0	8	2	2	2	2
22/02/2013	1	CB	1000	1300	2	4	SE	0	8	2	2	2	2
22/02/2013	1	CB	1000	1300	3	4	SE	0	8	2	2	2	2
22/02/2013	1	CB	1310	1410	1	3	SE	0	8	2	2	2	2
22/02/2013	3	ZS	0945	1145	1	2	SE	0	8	2	2	2	2
22/02/2013	3	ZS	0945	1145	2	3	SE	0	8	2	2	2	2
22/02/2013	3	ZS	1200	1400	1	3	SE	0	8	2	2	2	2
22/02/2013	3	ZS	1200	1400	2	4	SE	0	8	2	2	2	2
04/03/2013	1	RA	1000	1300	1	6	SSE	0	8	1	2	0	0
04/03/2013	1	RA	1000	1300	2	6	SSE	0	8	1	1	0	0
04/03/2013	1	RA	1000	1300	3	5	SSE	0	8	1	1	0	0
04/03/2013	1	RA	1310	1540	1	4	SSE	0	7	1	2	0	0
04/03/2013	1	RA	1310	1540	2	5	SSE	0	7	1	2	0	0
04/03/2013	1	RA	1310	1540	2.5	6	SE	0	8	1	1	0	0
04/03/2013	5	CB	1025	1325	1	2	S	0	8	1	2	0	0
04/03/2013	5	CB	1025	1325	2	2	S	0	8	1	2	0	0
04/03/2013	5	CB	1025	1325	3	2	S	0	7	1	2	0	0
04/03/2013	5	CB	1335	1535	1	2	S	0	7	1	2	0	0
04/03/2013	5	CB	1335	1535	2	2	S	0	7	1	2	0	0
04/03/2013	6	SS	1030	1300	1	5	W	0	8	1	2	0	0
04/03/2013	6	SS	1030	1300	2	5	W	0	8	1	1	0	0
04/03/2013	6	SS	1030	1300	2.5	5	W	0	8	1	1	0	0
04/03/2013	6	SS	1310	1540	1	5	W	0	7	1	1	0	0
04/03/2013	6	SS	1310	1540	2	5	W	0	8	1	1	0	0
04/03/2013	6	SS	1310	1540	2.5	5	W	0	8	1	1	0	0
05/03/2013	1	LC	0720	1020	1	1	E	0	8	1	1	1	0
05/03/2013	1	LC	0720	1020	2	1	E	0	8	1	1	1	0
05/03/2013	1	LC	0720	1020	3	2	E	0	2	2	1	0	0
05/03/2013	1	LC	1030	1300	1	1	E	0	1	2	1	0	0
05/03/2013	1	LC	1030	1300	2	1	E	0	1	2	1	0	0

Date	VP	Observer	Survey start time	Survey finish time	Survey hour	Wind speed	Wind direction	Rain	Cloud cover	Cloud height	Visibility	Frost	Snow
05/03/2013	1	LC	1030	1300	2.5	1	E	0	1	2	1	0	0
05/03/2013	3	RA	0715	0945	1	0	0	0	2	1	2	1	0
05/03/2013	3	RA	0715	0945	2	2	SE	0	2	1	2	1	0
05/03/2013	3	RA	0715	0945	2.5	1	SE	0	0	2	2	0	0
05/03/2013	3	RA	1000	1230	1	2	SE	0	0	2	2	0	0
05/03/2013	3	RA	1000	1230	2	1	SE	0	0	2	2	0	0
05/03/2013	3	RA	1000	1230	2.5	2	NW	0	2	2	2	0	0
08/03/2013	1	ZS	1230	1500	1	6	SE	0	8	2	2	0	0
08/03/2013	1	ZS	1230	1500	2	6	SE	0	8	2	2	0	0
08/03/2013	1	ZS	1230	1500	2.5	6	SE	0	8	2	2	0	0
08/03/2013	1	ZS	1515	1745	1	6	SE	0	8	2	2	0	0
08/03/2013	1	ZS	1515	1745	2	6	SE	0	8	2	2	0	0
08/03/2013	1	ZS	1515	1745	2.5	6	SE	0	8	2	2	0	0
08/03/2013	6	LC	1300	1600	1	7	NE	0	8	1	2	0	0
08/03/2013	6	LC	1300	1600	2	7	NE	0	8	1	1	0	0
08/03/2013	6	LC	1300	1600	3	7	NE	0	8	1	1	0	0
08/03/2013	6	LC	1610	1710	1	7	NE	0	8	1	1	0	0
19/03/2013	3	CB	1210	1510	3	5	E	2	8	2	2	2	1
19/03/2013	3	CB	1210	1510	3	5	E	2	7	2	2	2	1
19/03/2013	3	CB	1210	1510	3	5	E	2	8	2	2	2	1
19/03/2013	3	CB	1520	1620	3	5	E	3	8	1	1	2	1
19/03/2013	4	ZS	1215	1415	1	4	E	2	8	2	2	2	1
19/03/2013	4	ZS	1215	1415	2	4	E	2	8	2	2	2	1
19/03/2013	4	ZS	1430	1630	1	4	E	4	8	2	2	2	1
19/03/2013	4	ZS	1430	1630	2	4	E	4	8	0	2	2	1
19/03/2013	5	RA	1205	1405	1	6	E	2	8	1	1	2	1
19/03/2013	5	RA	1205	1405	2	6	E	1	8	1	2	2	1
19/03/2013	5	RA	1415	1615	1	6	ENE	3	8	1	1	2	1
19/03/2013	5	RA	1415	1615	2	6	ENE	3	8	1	1	2	1
20/03/2013	1	RDW	1140	1340	1	5	ENE	0	8	2	2	0	1
20/03/2013	1	RDW	1140	1340	2	5	ENE	0	8	2	2	0	1
20/03/2013	1	RDW	1350	1550	1	5	ENE	0	8	2	2	0	1
20/03/2013	1	RDW	1350	1550	2	5	ENE	2	8	2	2	0	1
20/03/2013	2	RC	1115	1345	1	4	S	0	7	2	2	0	1
20/03/2013	2	RC	1115	1345	2	4	S	0	6	2	1	0	1
20/03/2013	2	RC	1115	1345	2.5	3	S	0	8	2	2	0	1
20/03/2013	2	RC	1355	1655	1	4	S	2	8	2	2	0	1
20/03/2013	2	RC	1355	1655	2	4	S	2	8	2	2	0	1
20/03/2013	2	RC	1355	1655	3	4	S	2	8	2	1	0	1
20/03/2013	6	AR	1150	1350	1	5	W	0	7	2	2	2	1
20/03/2013	6	AR	1150	1350	2	5	W	0	7	2	2	2	1
20/03/2013	6	AR	1400	1600	1	4	W	0	8	2	2	2	1
20/03/2013	6	AR	1400	1600	1	4	W	0	8	2	2	2	1
25/04/2013	3	PR	1050	1350	1	2	SW	0	8	2	1	0	0

Date	VP	Observer	Survey start time	Survey finish time	Survey hour	Wind speed	Wind direction	Rain	Cloud cover	Cloud height	Visibility	Frost	Snow
25/04/2013	3	PR	1050	1350	2	3	SW	0	8	2	2	0	0
25/04/2013	3	PR	1050	1350	3	4	W	0	4	2	2	0	0
25/04/2013	3	PR	1400	1700	1	4	W	0	4	2	2	0	0
25/04/2013	3	PR	1400	1700	2	6	W	0	4	2	2	0	0
25/04/2013	3	PR	1400	1700	3	6	NW	0	3	2	2	0	0
25/04/2013	4	SS	1050	1350	1	2	WSW	0	8	1	2	0	0
25/04/2013	4	SS	1050	1350	2	2	WSW	0	8	1	2	0	0
25/04/2013	4	SS	1050	1350	3	2	WSW	0	8	1	2	0	0
25/04/2013	4	SS	1400	1700	1	4	WSW	0	6	2	2	0	0
25/04/2013	4	SS	1400	1700	2	5	WSW	0	5	2	2	0	0
25/04/2013	4	SS	1400	1700	3	5	WSW	0	4	2	2	0	0
26/04/2013	1	PR	0650	0850	1	4	WNW	0	4	2	2	0	0
26/04/2013	1	PR	0650	0850	2	4	NW	0	4	2	2	0	0
26/04/2013	1	PR	0900	1100	1	7	NW	3	8	2	1	0	0
26/04/2013	1	PR	0900	1100	2	7	W	2	7	2	2	0	0
26/04/2013	2	SS	0700	0900	1	3	WNW	0	7	2	2	0	0
26/04/2013	2	SS	0700	0900	2	3	WNW	2	8	2	2	0	0
26/04/2013	2	SS	0910	1110	1	3	WNW	1	7	1	2	0	0
26/04/2013	2	SS	0910	1110	2	5	WNW	2	7	1	2	0	0
26/04/2013	5	RDW	0740	1040	1	3	WNW	0	4	2	2	0	0
26/04/2013	5	RDW	0740	1040	2	3	WNW	0	8	2	2	0	0
26/04/2013	5	RDW	0740	1040	3	4	WNW	1	8	2	2	0	0
17/05/2013	1	DM	0530	0830	1	3	ENE	0	1	0	2	0	0
17/05/2013	1	DM	0530	0830	2	4	ENE	0	2	0	2	0	0
17/05/2013	1	DM	0530	0830	3	4	ENE	0	3	0	2	0	0
17/05/2013	1	DM	0840	1040	1	4	ENE	0	3	0	2	0	0
17/05/2013	1	DM	0840	1040	2	4	ENE	0	3	0	2	0	0
17/05/2013	3	JM	0615	0815	1	0	0	0	2	2	2	0	0
17/05/2013	3	JM	0615	0815	2	0	0	0	3	2	2	0	0
17/05/2013	3	JM	0825	1025	1	3	NE	0	3	2	2	0	0
17/05/2013	3	JM	0825	1025	2	4	NE	0	3	2	2	0	0
17/05/2013	4	ND	0445	0745	1	1	NNW	0	3	2	2	0	0
17/05/2013	4	ND	0445	0745	2	1	NNW	0	2	2	2	0	0
17/05/2013	4	ND	0445	0745	3	1	NNW	0	1	2	2	0	0
17/05/2013	4	ND	0800	1100	1	1	NNW	0	4	2	2	0	0
17/05/2013	4	ND	0800	1100	2	2	ENE	0	3	2	2	0	0
17/05/2013	4	ND	0800	1100	3	2	NE	0	3	2	2	0	0
17/05/2013	5	CB	0600	0900	1	2	NE	0	2	2	2	0	0
17/05/2013	5	CB	0600	0900	2	2	NE	0	3	2	2	0	0
17/05/2013	5	CB	0600	0900	1	2	NE	0	4	2	2	0	0
17/05/2013	5	CB	0910	1010	2	1	NE	0	4	2	2	0	0
03/06/2013	2	CB	1610	1910	1	2	SSE	1	7	2	2	0	0
03/06/2013	2	CB	1610	1910	2	2	SSE	0	7	1	2	0	0
03/06/2013	2	CB	1610	1910	3	1	SSE	2	8	1	1	0	0

Date	VP	Observer	Survey start time	Survey finish time	Survey hour	Wind speed	Wind direction	Rain	Cloud cover	Cloud height	Visibility	Frost	Snow
03/06/2013	2	CB	1920	2220	1	0	0	0	8	1	1	0	0
03/06/2013	2	CB	1920	2220	2	0	0	0	8	1	1	0	0
03/06/2013	2	CB	1920	2220	3	0	0	0	7	2	2	0	0
03/06/2013	5	FD	1610	1910	1	1	SW	1	7	2	2	0	0
03/06/2013	5	FD	1610	1910	2	2	SW	2	8	1	2	0	0
03/06/2013	5	FD	1610	1910	3	1	SW	0	7	1	2	0	0
03/06/2013	5	FD	1920	2220	1	1	SW	0	7	1	2	0	0
03/06/2013	5	FD	1920	2220	2	1	SW	0	7	1	2	0	0
03/06/2013	5	FD	1920	2220	3	0	SW	0	6	2	2	0	0
04/06/2013	1	CB	1400	1700	1	2	SW	0	6	2	2	0	0
04/06/2013	1	CB	1400	1700	2	2	SW	0	6	2	2	0	0
04/06/2013	1	CB	1400	1700	3	2	SW	0	6	2	2	0	0
04/06/2013	6	FD	1050	1350	1	0	0	0	4	2	2	0	0
04/06/2013	6	FD	1050	1350	2	3	SE	0	4	2	2	0	0
04/06/2013	6	FD	1050	1350	3	3	SE	0	5	2	2	0	0
04/06/2013	6	FD	1400	1700	1	2	WNW	0	5	2	2	0	0
04/06/2013	6	FD	1400	1700	2	2	NW	0	6	2	2	0	0
04/06/2013	6	FD	1400	1700	3	3	W	0	5	2	2	0	0
05/06/2013	3	FD	0500	0800	1	1	E	0	6	2	2	0	0
05/06/2013	3	FD	0500	0800	2	1	E	0	6	2	2	0	0
05/06/2013	3	FD	0500	0800	3	1	W	0	7	2	2	0	0
05/06/2013	3	FD	0810	1110	1	1	WNW	2	7	2	2	0	0
05/06/2013	3	FD	0810	1110	2	1	WNW	1	7	2	2	0	0
05/06/2013	3	FD	0810	1110	3	1	WNW	0	7	2	2	0	0
05/06/2013	6	CB	0525	0825	1	0	0	0	5	2	2	0	0
05/06/2013	6	CB	0525	0825	2	0	0	0	5	2	2	0	0
05/06/2013	6	CB	0525	0825	3	1	W	0	5	2	2	0	0
05/06/2013	6	CB	0835	1135	1	1	W	0	7	2	2	0	0
05/06/2013	6	CB	0835	1135	2	1	W	0	8	2	2	0	0
05/06/2013	6	CB	0835	1135	3	1	W	0	7	2	2	0	0
17/06/2013	1	FD	1615	1915	1	1	NNW	0	7	2	2	0	0
17/06/2013	1	FD	1615	1915	2	0	0	1	7	2	2	0	0
17/06/2013	1	FD	1615	1915	3	1	WNW	1	8	2	2	0	0
17/06/2013	1	FD	1925	2225	1	1	W	0	7	2	2	0	0
17/06/2013	1	FD	1925	2225	2	1	NW	0	7	2	2	0	0
17/06/2013	1	FD	1925	2225	3	1	N	0	8	2	2	0	0
17/06/2013	3	ND	1600	1900	1	2	NW	0	8	2	2	0	0
17/06/2013	3	ND	1600	1900	2	2	NW	2	8	2	2	0	0
17/06/2013	3	ND	1600	1900	3	1	NW	0	8	2	2	0	0
17/06/2013	3	ND	1915	2215	1	2	NW	0	8	2	2	0	0
17/06/2013	3	ND	1915	2215	2	2	NW	0	7	2	2	0	0
17/06/2013	3	ND	1915	2215	3	2	NW	0	8	2	2	0	0
17/06/2013	4	CB	1610	1910	1	1	N	0	8	2	2	0	0
17/06/2013	4	CB	1610	1910	2	1	N	0	8	2	2	0	0

Date	VP	Observer	Survey start time	Survey finish time	Survey hour	Wind speed	Wind direction	Rain	Cloud cover	Cloud height	Visibility	Frost	Snow
17/06/2013	4	CB	1610	1910	3	1	N	0	8	2	2	0	0
17/06/2013	4	CB	1920	2220	1	0	-	0	8	2	2	0	0
17/06/2013	4	CB	1920	2220	2	2	N	0	7	2	2	0	0
17/06/2013	4	CB	1920	2220	3	0	-	0	8	2	2	0	0
17/06/2013	6	PR	1535	1835	1	2	S	0	7	2	2	0	0
17/06/2013	6	PR	1535	1835	2	1	S	0	8	2	2	0	0
17/06/2013	6	PR	1535	1835	3	1	S	0	8	2	2	0	0
17/06/2013	6	PR	1845	2145	1	1	S	0	8	2	2	0	0
17/06/2013	6	PR	1845	2145	2	1	S	0	7	2	2	0	0
17/06/2013	6	PR	1845	2145	3	1	S	0	7	2	2	0	0
01/07/2013	1	CB	1555	1855	1	3	NW	0	7	2	2	0	0
01/07/2013	1	CB	1555	1855	2	3	NW	0	6	2	2	0	0
01/07/2013	1	CB	1555	1855	3	3	NW	0	6	2	2	0	0
01/07/2013	1	CB	1905	2205	1	3	NW	0	7	2	2	0	0
01/07/2013	1	CB	1905	2205	2	2	NW	0	7	2	2	0	0
01/07/2013	1	CB	1905	2205	3	2	NW	0	6	2	2	0	0
01/07/2013	4	PR	1545	1845	1	2	NW	0	6	2	2	0	0
01/07/2013	4	PR	1545	1845	2	2	NW	0	5	2	2	0	0
01/07/2013	4	PR	1545	1845	3	2	NW	0	5	2	2	0	0
01/07/2013	4	PR	1855	2155	1	3	NW	0	6	2	2	0	0
01/07/2013	4	PR	1855	2155	2	2	NW	0	6	2	2	0	0
01/07/2013	4	PR	1855	2155	3	2	NW	0	6	2	2	0	0
01/07/2013	4	PR	1855	2155	1	1	-	0	6	2	2	0	0
01/07/2013	6	FD	1520	1820	1	4	W	0	4	2	2	0	0
01/07/2013	6	FD	1520	1820	2	2	W	0	5	2	2	0	0
01/07/2013	6	FD	1520	1820	3	2	W	0	4	2	2	0	0
01/07/2013	6	FD	1830	2130	1	1	W	0	6	2	2	0	0
01/07/2013	6	FD	1830	2130	2	0	-	0	7	2	2	0	0
01/07/2013	6	FD	1830	2130	3	1	WNW	0	6	2	2	0	0
03/07/2013	2	PR	1030	1340	1	1	-	0	8	2	2	0	0
03/07/2013	2	PR	1030	1340	2	2	NW	1	7	2	2	0	0
03/07/2013	2	PR	1030	1340	3	2	NW	0	6	2	2	0	0
03/07/2013	2	PR	1340	1640	1	2	NW	0	7	2	2	0	0
03/07/2013	2	PR	1340	1640	2	3	W	0	6	2	2	0	0
03/07/2013	2	PR	1340	1640	3	3	W	0	7	2	2	0	0
03/07/2013	5	FD	1035	1335	1	2	WNW	1	7	2	2	0	0
03/07/2013	5	FD	1035	1335	2	3	WSW	2	8	2	2	0	0
03/07/2013	5	FD	1035	1335	3	3	W	0	6	2	2	0	0
03/07/2013	5	FD	1345	1645	1	3	W	0	5	2	2	0	0
03/07/2013	5	FD	1345	1645	2	3	WNW	0	7	2	2	0	0
03/07/2013	5	FD	1345	1645	3	4	WNW	0	6	2	2	0	0
14/08/2013	4	SS	0530	0830	1	0	-	0	8	1	2	0	0
14/08/2013	4	SS	0530	0830	2	1	WSW	0	8	1	2	0	0
14/08/2013	4	SS	0530	0830	3	2	WSW	0	8	1	1	0	0
14/08/2013	4	SS	0840	1140	1	4	WSW	0	8	1	2	0	0

Date	VP	Observer	Survey start time	Survey finish time	Survey hour	Wind speed	Wind direction	Rain	Cloud cover	Cloud height	Visibility	Frost	Snow
14/08/2013	4	SS	0840	1140	2	4	WSW	0	8	2	2	0	0
14/08/2013	4	SS	0840	1140	3	4	WSW	0	8	2	2	0	0
14/08/2013	5	PR	0530	0830	1	2	SW	0	8	2	2	0	0
14/08/2013	5	PR	0530	0830	2	2	SW	0	8	1	1	0	0
14/08/2013	5	PR	0530	0830	3	2	SW	0	8	1	1	0	0
14/08/2013	5	PR	0840	1130	1	4	SW	0	7	2	2	0	0
14/08/2013	5	PR	0840	1130	2	4	SW	0	7	2	2	0	0
14/08/2013	5	PR	0840	1130	3	4	SW	0	7	2	2	0	0
14/08/2013	5	PR	1150	1220	1	4	SW	0	7	2	2	0	0
14/08/2013	6	FD	0530	0830	1	1	SSE	0	8	1	1	0	0
14/08/2013	6	FD	0530	0830	2	2	SSE	0	8	1	1	0	0
14/08/2013	6	FD	0530	0830	3	3	SSE	0	8	1	1	0	0
14/08/2013	6	FD	0840	1140	1	3	SSE	0	7	1	2	0	0
14/08/2013	6	FD	0840	1140	2	3	SSE	0	7	1	2	0	0
14/08/2013	6	FD	0840	1140	3	4	SSE	0	7	2	2	0	0
20/08/2013	1	FD	1005	1135	1	2	S	0	8	2	2	0	0
20/08/2013	1	FD	1005	1135	2	3	SSW	0	7	2	2	0	0
20/08/2013	2	FD	1410	1540	1	4	S	0	7	2	2	0	0
20/08/2013	2	FD	1410	1540	2	3	SSW	0	8	2	2	0	0
20/08/2013	4	FD	1155	1355	1	3	SSW	0	7	2	2	0	0
20/08/2013	4	FD	1155	1355	2	4	SW	0	8	2	2	0	0
20/08/2013	6	ND	0930	1230	1	2	SW	0	8	1	2	0	0
20/08/2013	6	ND	0930	1230	2	3	SSW	0	8	1	2	0	0
20/08/2013	6	ND	0930	1230	3	3	S	0	8	2	2	0	0
20/08/2013	6	ND	1240	1540	1	4	SSW	0	8	2	2	0	0
20/08/2013	6	ND	1240	1540	2	4	S	0	8	2	2	0	0
20/08/2013	6	ND	1240	1540	3	4	SSW	0	8	2	2	0	0
26/08/2013	2	FD	1400	1700	1	2	W	0	8	2	2	0	0
26/08/2013	2	FD	1400	1700	2	1	W	0	7	2	2	0	0
26/08/2013	2	FD	1400	1700	3	1	W	0	4	2	2	0	0
26/08/2013	2	FD	1710	2040	1	2	W	0	7	2	2	0	0
26/08/2013	2	FD	1710	2040	2	3	WNW	0	7	2	2	0	0
26/08/2013	2	FD	1710	2040	3	1	WNW	0	3	2	2	0	0
26/08/2013	2	FD	1710	2040	4	0	-	0	2	2	2	0	0
26/08/2013	3	SS	1420	1720	1	1	SW	0	7	2	2	0	0
26/08/2013	3	SS	1420	1720	2	1	SW	0	5	2	2	0	0
26/08/2013	3	SS	1420	1720	3	1	SW	0	4	2	2	0	0
26/08/2013	3	SS	1730	2030	1	3	SW	0	5	2	2	0	0
26/08/2013	3	SS	1730	2030	2	2	SW	0	4	2	2	0	0
26/08/2013	3	SS	1730	2030	3	2	SW	0	4	2	2	0	0
26/08/2013	5	CB	1410	1710	1	2	SW	0	8	1	2	0	0
26/08/2013	5	CB	1410	1710	2	2	SW	0	8	1	2	0	0
26/08/2013	5	CB	1410	1710	3	1	SW	0	8	1	2	0	0
26/08/2013	5	CB	1720	2020	1	2	SW	0	6	2	2	0	0

Date	VP	Observer	Survey start time	Survey finish time	Survey hour	Wind speed	Wind direction	Rain	Cloud cover	Cloud height	Visibility	Frost	Snow
26/08/2013	5	CB	1720	2020	2	2	NW	0	8	2	2	0	0
26/08/2013	5	CB	1720	2020	3	2	NW	0	8	2	2	0	0
26/08/2013	5	CB	2030	2100	1	1	NW	0	8	2	2	0	0
27/08/2013	1	CB	0625	0925	1	2	E	0	8	2	2	0	0
27/08/2013	1	CB	0625	0925	2	2	NW	0	8	2	2	0	0
27/08/2013	1	CB	0625	0925	3	2	NW	0	8	2	2	0	0
27/08/2013	1	CB	0935	1235	1	1	NW	0	8	2	2	0	0
27/08/2013	1	CB	0935	1235	2	2	NW	0	7	2	2	0	0
27/08/2013	1	CB	0935	1235	3	2	NW	0	7	2	2	0	0
27/08/2013	1	CB	1245	1315	1	2	NW	0	8	2	2	0	0
27/08/2013	2	SS	0620	0920	1	0	0	0	2	2	2	0	0
27/08/2013	2	SS	0620	0920	2	0	0	1	8	2	2	0	0
27/08/2013	2	SS	0620	0920	3	0	0	0	8	2	2	0	0
27/08/2013	2	SS	0930	1230	1	0	0	0	1	8	2	2	0
27/08/2013	2	SS	0930	1230	2	0	0	0	7	2	2	0	0
27/08/2013	2	SS	0930	1230	3	2	WSW	0	6	2	2	0	0
27/08/2013	2	SS	1240	1315	1	2	WSW	0	7	2	2	0	0
27/08/2013	3	FD	0925	1125	1	1	NW	1	7	2	2	0	0
27/08/2013	3	FD	0925	1125	2	3	WNW	0	6	2	2	0	0
27/08/2013	3	FD	1135	1335	1	3	WNW	0	7	2	2	0	0
27/08/2013	3	FD	1135	1335	2	1	NW	0	5	2	2	0	0
27/08/2013	6	FD	0645	0845	1	1	WNW	1	3	2	2	0	0
27/08/2013	6	FD	0645	0845	2	3	NW	1	8	1	2	0	0
02/09/2013	1	FD	1330	1630	1	5	WSW	1	7	2	2	0	0
02/09/2013	1	FD	1330	1630	2	6	W	0	7	2	2	0	0
02/09/2013	1	FD	1330	1630	3	5	W	0	6	2	2	0	0
02/09/2013	1	FD	1640	1940	1	5	W	0	4	2	2	0	0
02/09/2013	1	FD	1640	1940	2	5	W	0	6	2	2	0	0
02/09/2013	1	FD	1640	1940	3	4	WNW	0	5	2	2	0	0
03/09/2013	3	CB	1010	1310	1	2	SW	0	8	1	2	0	0
03/09/2013	3	CB	1010	1310	2	3	SE	0	7	2	2	0	0
03/09/2013	3	CB	1010	1310	3	3	SSW	0	4	2	2	0	0
03/09/2013	3	CB	1320	1620	1	4	SSW	0	2	2	2	0	0
03/09/2013	3	CB	1320	1620	2	3	SSW	0	5	2	2	0	0
03/09/2013	3	CB	1320	1620	3	2	SE	0	6	2	2	0	0
03/09/2013	5	FD	0950	1250	1	4	SW	1	8	1	2	0	0
03/09/2013	5	FD	0950	1250	2	4	S	0	4	2	2	0	0
03/09/2013	5	FD	0950	1250	3	4	S	0	3	2	2	0	0
03/09/2013	5	FD	1300	1600	1	5	WSW	0	3	2	2	0	0
03/09/2013	5	FD	1300	1600	2	6	S	0	6	2	2	0	0
03/09/2013	5	FD	1300	1600	3	6	SW	0	6	2	2	0	0
04/09/2013	6	FD	0635	0935	1	4	SSW	0	8	1	1	0	0
04/09/2013	6	FD	0635	0935	2	5	S	0	8	1	1	0	0
04/09/2013	6	FD	0635	0935	3	4	SSE	0	7	1	2	0	0

Date	VP	Observer	Survey start time	Survey finish time	Survey hour	Wind speed	Wind direction	Rain	Cloud cover	Cloud height	Visibility	Frost	Snow
04/09/2013	6	FD	0945	1245	1	5	SSE	0	7	2	2	0	0
04/09/2013	6	FD	0945	1245	2	4	SSW	0	7	2	2	0	0
04/09/2013	6	FD	0945	1245	3	5	SSW	0	6	2	2	0	0
04/09/2013	2	CB	0650	0950	1	2	SSW	1	8	1	1	0	0
04/09/2013	2	CB	0650	0950	2	3	SSW	0	8	1	1	0	0
04/09/2013	2	CB	0650	0950	3	3	SSW	0	7	1	1	0	0
04/09/2013	2	CB	1000	1300	1	3	SSW	0	7	1	2	0	0
04/09/2013	2	CB	1000	1300	2	4	SSW	0	7	1	2	0	0
04/09/2013	2	CB	1000	1300	3	4	SSW	0	7	1	2	0	0
10/10/2013	5	MW	0730	1030	1	5	N	0	1	2	2	1	0
10/10/2013	5	MW	0730	1030	2	5	N	0	1	2	2	0	0
10/10/2013	5	MW	0730	1030	3	6	N	0	2	2	2	0	0
10/10/2013	5	MW	1100	1400	1	6	N	0	2	2	2	0	0
10/10/2013	5	MW	1100	1400	2	7	N	0	3	2	2	0	0
10/10/2013	5	MW	1100	1400	3	7	N	0	4	2	2	0	0
14/10/2013	1	CB	1040	1340	1	3	ENE	0	2	2	2	0	0
14/10/2013	1	CB	1040	1340	2	4	ENE	0	2	2	2	0	0
14/10/2013	1	CB	1040	1340	3	5	ENE	0	3	2	2	0	0
14/10/2013	1	CB	1410	1710	1	4	ENE	0	3	2	2	0	0
14/10/2013	1	CB	1410	1710	2	4	ENE	0	3	2	2	0	0
14/10/2013	1	CB	1410	1710	3	3	ENE	0	4	2	2	0	0
14/10/2013	4	MW	1015	1315	1	3	NE	0	2	2	2	0	0
14/10/2013	4	MW	1015	1315	2	4	NE	0	2	2	2	0	0
14/10/2013	4	MW	1015	1315	3	4	NE	0	3	2	2	0	0
14/10/2013	4	MW	1345	1645	1	4	NE	0	4	2	2	0	0
14/10/2013	4	MW	1345	1645	2	5	NE	0	4	2	2	0	0
14/10/2013	4	MW	1345	1645	3	4	NE	0	5	2	2	0	0
23/10/2013	6	MW	1030	1330	1	5	NW	3	8	1	1	0	0
23/10/2013	6	MW	1030	1330	2	6	NW	3	8	2	2	0	0
23/10/2013	6	MW	1030	1330	3	6	WNW	3	7	2	2	0	0
23/10/2013	6	MW	1400	1700	1	7	WNW	0	6	2	2	0	0
23/10/2013	6	MW	1400	1700	2	7	WNW	0	5	2	2	0	0
23/10/2013	6	MW	1400	1700	3	6	WNW	2	8	2	2	0	0
24/10/2013	4	MW	0840	1140	1	1	SW	0	3	2	2	0	0
24/10/2013	4	MW	0840	1140	2	2	SW	0	4	2	2	0	0
24/10/2013	4	MW	0840	1140	3	3	SW	0	4	2	2	0	0
24/10/2013	4	MW	1210	1510	1	3	SW	0	5	2	2	0	0
24/10/2013	4	MW	1210	1510	2	4	SSW	0	6	2	2	0	0
24/10/2013	4	MW	1210	1510	3	5	SSW	0	6	2	2	0	0
22/10/2013	3	MW	1045	1345	1	2	SE	4	8	1	1	0	0
22/10/2013	3	MW	1045	1345	2	3	SSE	3	8	1	2	0	0
22/10/2013	3	MW	1045	1345	3	4	SSE	0	7	2	2	0	0
22/10/2013	3	MW	1415	1715	1	4	SSE	0	8	1	1	0	0
22/10/2013	3	MW	1415	1715	2	5	S	3	8	1	2	0	0

Date	VP	Observer	Survey start time	Survey finish time	Survey hour	Wind speed	Wind direction	Rain	Cloud cover	Cloud height	Visibility	Frost	Snow
22/10/2013	3	MW	1415	1715	3	4	S	4	8	1	1	0	0
22/10/2013	5	CB	1035	1335	1	2	SSW	4	8	0	1	0	0
22/10/2013	5	CB	1035	1335	2	2	SSW	0	8	1	2	0	0
22/10/2013	5	CB	1035	1335	3	3	SSW	0	8	1	2	0	0
22/10/2013	5	CB	1405	1705	1	3	SSW	3	7	1	2	0	0
22/10/2013	5	CB	1405	1705	2	3	SSW	4	8	1	1	0	0
22/10/2013	5	CB	1405	1705	3	4	SSW	2	8	0	1	0	0
23/10/2013	2	CB	1025	1325	1	4	WSW	3	8	1	1	0	0
23/10/2013	2	CB	1025	1325	2	4	SW	3	8	1	1	0	0
23/10/2013	2	CB	1025	1325	3	4	SW	2	7	1	2	0	0
23/10/2013	2	CB	1355	1655	1	5	W	2	7	2	2	0	0
23/10/2013	2	CB	1355	1655	2	5	NW	0	6	2	2	0	0
23/10/2013	2	CB	1355	1655	3	5	NW	3	6	2	2	0	0
24/10/2013	1	CB	0845	1145	1	2	SSW	0	1	2	1	0	0
24/10/2013	1	CB	0845	1145	2	3	SW	0	1	2	2	0	0
24/10/2013	1	CB	0845	1145	3	3	SW	0	1	2	2	0	0
24/10/2013	1	CB	1215	1515	1	2	SW	0	2	2	2	0	0
24/10/2013	1	CB	1215	1515	2	2	SSW	0	2	2	2	0	0
24/10/2013	1	CB	1215	1515	3	3	SSE	0	2	2	2	0	0
18/11/2013	6	FD	1030	1330	1	3	NW	0	4	2	2	0	0
18/11/2013	6	FD	1030	1330	2	4	NW	3	6	1	2	0	0
18/11/2013	6	FD	1030	1330	3	4	NW	0	3	2	2	0	0
18/11/2013	6	FD	1400	1600	1	3	NNW	2	7	1	2	0	0
18/11/2013	6	FD	1400	1600	2	3	NNW	0	3	2	2	0	0
19/11/2013	4	FD	0950	1250	1	2	NNW	0	2	2	2	0	1
19/11/2013	4	FD	0950	1250	2	2	NNW	0	5	2	2	0	1
19/11/2013	4	FD	0950	1250	3	1	NNW	0	3	2	2	0	1
19/11/2013	4	FD	1320	1520	1	0	-	0	6	2	2	0	1
19/11/2013	4	FD	1320	1520	2	1	NW	0	4	2	2	0	1
20/11/2013	1	FD	0855	1155	1	5	NW	3	7	2	2	0	1
20/11/2013	1	FD	0855	1155	2	5	NW	2	7	2	2	0	1
20/11/2013	1	FD	0855	1155	3	6	NW	0	6	2	2	0	1
20/11/2013	1	FD	1225	1425	1	5	NW	0	5	2	2	0	1
20/11/2013	1	FD	1225	1425	2	5	WNW	0	4	2	2	0	1
18/11/2013	2	MW	1025	1325	1	2	NW	0	6	2	2	0	0
18/11/2013	2	MW	1025	1325	2	3	NW	3	8	1	1	0	0
18/11/2013	2	MW	1025	1325	3	3	NW	0	6	2	2	0	0
18/11/2013	2	MW	1405	1605	1	3	NNW	0	5	2	2	0	0
18/11/2013	2	MW	1405	1605	2	2	NNW	0	4	2	2	0	0
20/11/2013	3	MW	0830	1130	1	6	NNW	4	7	2	2	0	1
20/11/2013	3	MW	0830	1130	2	6	NNW	4	7	2	2	0	1
20/11/2013	3	MW	0830	1130	3	7	NNW	0	8	2	2	0	1
20/11/2013	3	MW	1200	1400	1	7	NNW	0	8	2	2	0	1
20/11/2013	3	MW	1200	1400	2	6	NNW	0	7	2	2	0	0

Date	VP	Observer	Survey start time	Survey finish time	Survey hour	Wind speed	Wind direction	Rain	Cloud cover	Cloud height	Visibility	Frost	Snow
19/11/2013	5	MW	0945	1245	1	3	N	0	1	2	2	0	0
19/11/2013	5	MW	0945	1245	2	3	N	0	2	2	2	0	0
19/11/2013	5	MW	0945	1245	3	2	N	0	4	2	2	0	0
19/11/2013	5	MW	1315	1515	1	2	N	2	6	2	2	0	0
19/11/2013	5	MW	1315	1515	2	2	N	0	6	2	2	0	0
09/12/2013	4	PR	1030	1330	1	2	S	0	3	2	2	0	0
09/12/2013	4	PR	1030	1330	2	2	S	0	5	2	2	0	0
09/12/2013	4	PR	1030	1330	3	2	S	0	7	2	2	0	0
09/12/2013	4	PR	1030	1330	1	3	S	0	7	2	2	0	0
09/12/2013	4	PR	1030	1330	2	3	SW	0	7	2	2	0	0
11/12/2013	6	PR	0830	1130	1	5	S	0	8	1	1	0	0
11/12/2013	6	PR	0830	1130	2	5	S	0	8	1	1	0	0
11/12/2013	6	PR	0830	1130	3	4	S	0	8	1	1	0	0
11/12/2013	6	PR	1200	1400	1	5	SSW	0	8	1	2	0	0
11/12/2013	6	PR	1200	1400	2	4	SSW	0	8	1	1	0	0
11/12/2013	2	CB	0830	1130	1	4	SSW	0	8	1	2	0	0
11/12/2013	2	CB	0830	1130	2	4	SSE	0	8	0	1	0	0
11/12/2013	2	CB	0830	1130	3	4	SSE	0	8	0	1	0	0
11/12/2013	2	CB	1200	1400	1	3	SSE	0	8	0	1	0	0
11/12/2013	2	CB	1200	1400	2	3	SSE	0	8	0	1	0	0
10/12/2013	5	CB	0935	1235	1	4	SSW	0	8	1	1	0	0
10/12/2013	5	CB	0935	1235	2	4	SSW	0	8	1	1	0	0
10/12/2013	5	CB	0935	1235	3	4	SSW	0	8	1	1	0	0
10/12/2013	5	CB	1305	1505	1	4	SSW	0	8	1	2	0	0
10/12/2013	5	CB	1305	1505	2	4	SW	0	8	1	2	0	0
09/12/2013	6	CB	1030	1330	1	2	SW	0	8	1	2	0	0
09/12/2013	6	CB	1030	1330	2	2	SW	0	6	1	2	0	0
09/12/2013	6	CB	1030	1330	3	2	SW	0	7	2	2	0	0
09/12/2013	6	CB	1030	1330	1	2	SSW	0	8	1	2	0	0
09/12/2013	6	CB	1030	1330	2	2	SSW	0	8	1	2	0	0
09/12/2013	6	CB	1030	1330	3	2	SSW	0	8	1	2	0	0
13/01/2014	2	CB	1105	1405	1	2	SSE	0	7	1	2	0	2
13/01/2014	2	CB	1105	1405	2	3	SE	3	8	2	2	0	2
13/01/2014	2	CB	1105	1405	3	3	SE	3	8	1	1	0	2
13/01/2014	2	CB	1435	1535	1	3	SE	3	8	1	1	0	2
14/01/2014	1	CB	1010	1210	1	1	SSE	0	8	1	2	2	1
14/01/2014	1	CB	1010	1210	2	2	SSE	0	8	2	0	2	1
15/01/2014	5	CB	0845	1145	1	4	SSE	0	8	1	0	0	0
15/01/2014	5	CB	0845	1145	2	5	SE	0	8	1	0	0	0
15/01/2014	5	CB	0845	1145	3	5	SE	1	8	1	0	0	0
15/01/2014	5	CB	1215	1415	4	5	SE	1	8	1	0	0	0
15/01/2014	5	CB	1215	1415	5	5	SSE	0	8	1	0	0	0
13/01/2014	1	FD	1100	1400	1	4	S	0	6	2	1	0	2
13/01/2014	1	FD	1100	1400	2	4	S	2	7	2	2	0	2
13/01/2014	1	FD	1100	1400	3	5	S	2	8	1	0	0	2

Date	VP	Observer	Survey start time	Survey finish time	Survey hour	Wind speed	Wind direction	Rain	Cloud cover	Cloud height	Visibility	Frost	Snow
13/01/2014	1	FD	1430	1630	1	5	SSE	2	8	1	0	0	2
13/01/2014	1	FD	1430	1630	2	5	SE	2	8	1	0	0	2
15/01/2014	4	FD	0850	1150	1	4	SE	0	8	1	0	0	0
15/01/2014	4	FD	0850	1150	2	4	SE	0	8	1	0	0	0
15/01/2014	4	FD	0850	1150	3	5	SE	1	8	1	0	0	0
15/01/2014	4	FD	1150	1350	1	5	SSE	1	8	1	0	0	0
15/01/2014	4	FD	1150	1350	2	5	ESE	2	8	1	0	0	0
14/01/2014	3	FD	0940	1240	1	1	ESE	0	7	2	2	2	1
14/01/2014	3	FD	0940	1240	2	2	ESE	0	7	2	2	2	1
14/01/2014	3	FD	0940	1240	3	2	ESE	0	8	1	1	2	1
14/01/2014	3	FD	1310	1510	1	3	ESE	0	8	1	0	2	1
14/01/2014	3	FD	1310	1510	2	3	ESE	0	8	2	1	2	1
27/01/2014	1	CB	1240	1540	1	3	SW	2	8	1	2	0	0
27/01/2014	1	CB	1240	1540	2	2	SW	2	8	1	2	0	0
27/01/2014	1	CB	1240	1540	3	3	SW	2	8	1	1	0	0
27/01/2014	1	CB	1610	1640	1	3	SW	2	8	1	2	0	0
17/02/2014	2	FD	1115	1415	1	3	ESE	3	8	1	1	0	2
17/02/2014	2	FD	1115	1415	2	2	ESE	2	8	1	1	0	2
17/02/2014	2	FD	1445	1645	1	3	S	2	8	1	1	0	2
17/02/2014	2	FD	1445	1645	2	2	SE	3	8	1	1	0	2
18/02/2014	4	FD	0945	1245	1	1	S	1	8	1	1	0	2
18/02/2014	4	FD	0945	1245	2	2	SW	0	7	2	2	0	2
18/02/2014	4	FD	0945	1245	3	1	SSW	1	8	1	1	0	2
18/02/2014	4	FD	1315	1515	1	2	WSW	2	8	1	1	0	2
18/02/2014	4	FD	1315	1515	2	3	WSW	3	8	1	1	0	2
24/02/2014	5	JM	1210	1510	1	4	S	0	7	2	2	0	0
24/02/2014	5	JM	1210	1510	2	4	S	0	7	2	2	0	0
24/02/2014	5	JM	1210	1510	3	5	S	0	7	2	2	0	0
24/02/2014	5	JM	1540	1740	1	5	S	0	8	1	2	0	0
24/02/2014	5	JM	1540	1740	2	5	S	0	8	1	2	0	0
24/02/2014	3	CB	1215	1515	1	3	SE	0	7	2	2	0	0
24/02/2014	3	CB	1215	1515	2	3	SE	0	7	2	2	0	0
24/02/2014	3	CB	1215	1515	3	3	SE	0	8	2	2	0	0
24/02/2014	3	CB	1545	1745	1	4	SE	0	8	2	2	0	0
24/02/2014	3	CB	1545	1745	2	4	SE	0	8	2	2	0	0
27/02/2014	2	CB	0950	1250	1	2	SW	0	8	2	2	0	2
27/02/2014	2	CB	0950	1250	2	2	SW	0	7	2	2	0	2
27/02/2014	2	CB	0950	1250	3	2	SW	2	7	2	2	0	2
27/02/2014	2	CB	1320	1520	1	2	SW	0	7	2	2	0	2
27/02/2014	2	CB	1320	1520	2	2	SW	0	6	2	2	0	2
27/02/2014	1	JM	1020	1320	1	4	W	0	6	2	2	0	0
27/02/2014	1	JM	1020	1320	2	5	W	0	8	2	2	0	0
27/02/2014	1	JM	1020	1320	3	5	W	0	7	2	2	0	0

Date	VP	Observer	Survey start time	Survey finish time	Survey hour	Wind speed	Wind direction	Rain	Cloud cover	Cloud height	Visibility	Frost	Snow
27/02/2014	1	JM	1350	1550	1	5	W	3	8	2	2	0	0
27/02/2014	1	JM	1350	1550	2	4	W	0	6	2	2	0	0
28/02/2014	6	CB	0745	1045	1	0	-	0	7	2	2	1	1
28/02/2014	6	CB	0745	1045	2	0	-	0	7	2	2	1	1
28/02/2014	6	CB	0745	1045	3	1	SW	0	7	1	2	1	1
28/02/2014	6	CB	1115	1315	1	1	SW	0	8	1	2	0	1
28/02/2014	6	CB	1115	1315	2	1	SW	0	7	2	2	0	1
28/02/2014	4	JM	0755	1055	1	0	-	0	5	2	2	1	0
28/02/2014	4	JM	0755	1055	2	0	-	0	6	2	2	1	0
28/02/2014	4	JM	0755	1055	3	0	-	0	6	2	2	1	0
28/02/2014	4	JM	1055	1325	1	2	SW	0	7	2	2	0	0
28/02/2014	4	JM	1055	1325	2	3	SW	0	6	2	2	0	0
10/03/2014	4	CB	1215	1515	1	1	SW	0	5	2	2	0	0
10/03/2014	4	CB	1215	1515	2	3	SW	0	5	2	2	0	0
10/03/2014	4	CB	1215	1515	3	3	SW	0	5	2	2	0	0
10/03/2014	4	CB	1545	1745	1	3	SW	0	4	2	2	0	0
10/03/2014	4	CB	1545	1745	2	3	SW	0	2	2	2	0	0
11/03/2014	6	CB	1035	1335	1	2	SSW	0	3	2	2	1	2
11/03/2014	6	CB	1035	1335	2	2	SSW	0	4	2	2	1	2
11/03/2014	6	CB	1035	1335	3	2	SSW	0	4	2	2	0	2
11/03/2014	6	CB	1405	1605	1	1	SSW	0	5	2	2	0	2
11/03/2014	6	CB	1405	1605	2	1	S	0	4	2	2	0	2
12/03/2014	3	CB	0925	1225	1	3	SE	0	1	2	2	1	2
12/03/2014	3	CB	0925	1225	2	4	SE	0	1	2	2	1	2
12/03/2014	3	CB	0925	1225	3	3	SE	0	1	2	2	0	2
12/03/2014	3	CB	1255	1525	1	3	SE	0	1	2	2	0	2
12/03/2014	3	CB	1255	1525	2	1	SE	0	1	2	2	0	2
12/03/2014	3	CB	1255	1525	3	1	SE	0	1	2	2	0	2
13/03/2014	5	CB	0720	1020	1	1	NW	0	7	2	1	1	0
13/03/2014	5	CB	0720	1020	2	2	NW	0	8	2	2	0	0
13/03/2014	5	CB	0720	1020	3	2	NW	0	8	1	2	0	0
13/03/2014	5	CB	1050	1120	1	2	NW	0	8	1	2	0	0
13/03/2014	1	CB	1215	1415	1	2	NW	1	8	1	0	0	0
13/03/2014	1	CB	1215	1415	2	2	NW	1	8	1	0	0	0
14/03/2014	3	CB	0730	1030	1	2	S	1	8	1	0	0	0
14/03/2014	3	CB	0730	10030	2	2	S	1	8	1	0	0	0
14/03/2014	3	CB	0730	1030	3	2	SW	0	8	1	0	0	0
14/03/2014	3	CB	1110	1410	1	3	SW	0	8	1	0	0	0
14/03/2014	3	CB	1110	1410	2	2	W	0	8	1	1	0	0
14/03/2014	3	CB	1110	1410	3	2	W	0	8	1	2	0	0
14/03/2014	3	CB	1110	1410	4	3	W	3	8	1	1	0	0
17/03/2014	1	SS	0945	1145	1	5	NW	0	8	2	2	0	0
17/03/2014	1	SS	0945	1145	2	5	NW	0	5	2	2	0	0
17/03/2014	3	SS	1215	1415	1	3	NW	0	5	2	2	0	0

Date	VP	Observer	Survey start time	Survey finish time	Survey hour	Wind speed	Wind direction	Rain	Cloud cover	Cloud height	Visibility	Frost	Snow
17/03/2014	3	SS	1215	1415	2	3	NW	0	8	2	2	0	0
01/04/2018	9	PC	1400	1700	1	2	E	0	7	2	2	0	0
01/04/2018	9	PC	1400	1700	2	1	E	0	7	2	2	0	0
01/04/2018	9	PC	1400	1700	3	1	E	2	8	2	2	0	0
02/04/2018	8	PC	0915	1545	1	4	E	0	8	1	2	1	1
02/04/2018	8	PC	0915	1545	1	4	ESE	2	8	2	2	0	0
02/04/2018	8	PC	0915	1545	2	4	E	2	8	1	1	0	1
02/04/2018	8	PC	0915	1545	2	5	ESE	0	8	2	2	0	0
02/04/2018	8	PC	0915	1545	3	4	E	3	8	1	2	0	1
02/04/2018	8	PC	0915	1545	3	5	SE	0	8	2	2	0	0
03/04/2018	6	PC	0710	1340	1	2	E	0	8	2	2	0	1
03/04/2018	6	PC	0710	1340	1	0	ENE	0	8	2	2	0	1
03/04/2018	6	PC	0710	1340	2	1	ENE	0	8	2	2	0	1
03/04/2018	6	PC	0710	1340	2	1	E	0	8	1	2	0	1
03/04/2018	6	PC	0710	1340	3	0	ENE	0	8	2	2	0	1
03/04/2018	6	PC	0710	1340	3	1	E	1	8	1	2	0	1
07/04/2018	6	PC	1150	1820	1	2	SW	0	8	1	2	0	0
07/04/2018	6	PC	1150	1820	1	1	SW	2	8	1	2	0	0
07/04/2018	6	PC	1150	1820	2	2	SW	0	8	2	2	0	0
07/04/2018	6	PC	1150	1820	2	1	SW	2	8	1	2	0	0
07/04/2018	6	PC	1150	1820	3	1	SW	2	8	1	2	0	0
07/04/2018	6	PC	1150	1820	3	1	SW	2	8	1	2	0	0
08/04/2018	10	PC	0825	1455	1	1	SE	0	8	2	2	0	0
08/04/2018	10	PC	0825	1455	1	1	SSE	0	8	2	2	0	0
08/04/2018	10	PC	0825	1455	2	1	SE	0	8	2	2	0	0
08/04/2018	10	PC	0825	1455	2	2	SE	0	8	1	1	0	0
08/04/2018	10	PC	0825	1455	3	1	SSE	0	8	2	2	0	0
08/04/2018	10	PC	0825	1455	3	2	SE	0	8	1	1	0	0
15/04/2018	7	PC	0830	1500	1	4	E	0	4	2	2	0	0
15/04/2018	7	PC	0830	1500	1	4	E	3	8	1	2	0	0
15/04/2018	7	PC	0830	1500	2	4	ESE	0	6	2	2	0	0
15/04/2018	7	PC	0830	1500	2	3	E	2	8	1	2	0	0
15/04/2018	7	PC	0830	1500	3	4	ESE	0	7	2	2	0	0
15/04/2018	7	PC	0830	1500	3	3	E	2	8	2	2	0	0
16/04/2018	9	PC	1400	1700	1	1	E	0	8	0	1	0	0
16/04/2018	9	PC	1400	1700	2	2	E	0	8	0	1	0	0
16/04/2018	9	PC	1400	1700	3	2	SE	0	8	0	2	0	0
21/04/2018	11	PC	1030	1700	1	3	SSE	0	1	2	2	0	0
21/04/2018	11	PC	1030	1700	1	4	SSE	0	0	2	2	0	0
21/04/2018	11	PC	1030	1700	2	4	SSE	0	1	2	2	0	0
21/04/2018	11	PC	1030	1700	2	3	SSE	0	0	2	2	0	0
21/04/2018	11	PC	1030	1700	3	4	SSE	0	0	2	2	0	0
21/04/2018	11	PC	1030	1700	3	4	SSE	0	0	2	2	0	0
22/04/2018	10	PC	0710	1340	1	1	S	0	8	1	2	0	0

Date	VP	Observer	Survey start time	Survey finish time	Survey hour	Wind speed	Wind direction	Rain	Cloud cover	Cloud height	Visibility	Frost	Snow
22/04/2018	10	PC	0710	1340	1	3	S	1	8	1	2	0	0
22/04/2018	10	PC	0710	1340	2	1	S	2	8	1	2	0	0
22/04/2018	10	PC	0710	1340	2	3	S	1	8	0	2	0	0
22/04/2018	10	PC	0710	1340	3	2	S	2	8	1	2	0	0
22/04/2018	10	PC	0710	1340	3	3	S	0	8	1	2	0	0
28/04/2018	11	PC	1120	1750	1	2	NE	0	3	2	2	0	0
28/04/2018	11	PC	1120	1750	1	3	ENE	0	7	2	2	0	0
28/04/2018	11	PC	1120	1750	2	2	NE	0	5	2	2	0	0
28/04/2018	11	PC	1120	1750	2	3	S	2	8	1	2	0	0
28/04/2018	11	PC	1120	1750	3	3	ENE	0	7	1	2	0	0
28/04/2018	11	PC	1120	1750	3	4	SW	2	8	1	2	0	0
13/05/2018	8	PC	1115	1415	1	2	SE	0	2	2	2	0	0
13/05/2018	8	PC	1115	1415	2	2	SSE	0	3	2	2	0	0
13/05/2018	8	PC	1115	1415	3	3	SSE	0	1	2	2	0	0
13/05/2018	8	PC	1445	1745	1	3	SE	0	1	2	2	0	0
13/05/2018	8	PC	1445	1745	2	3	SE	0	2	2	2	0	0
13/05/2018	8	PC	1445	1745	3	3	SSE	0	2	2	2	0	0
14/05/2018	6	PC	0445	0745	1	0	SSW	0	0	2	2	0	0
14/05/2018	6	PC	0445	0745	2	0	SSW	0	1	2	2	0	0
14/05/2018	6	PC	0445	0745	3	0	S	0	0	2	2	0	0
14/05/2018	6	PC	0815	1115	1	1	S	0	1	2	2	0	0
14/05/2018	6	PC	0815	1115	2	2	S	0	3	2	2	0	0
14/05/2018	6	PC	0815	1115	3	2	S	0	2	2	2	0	0
19/05/2018	9	PC	1045	1345	1	3	SSE	0	1	2	2	0	0
19/05/2018	9	PC	1045	1345	2	4	SSE	0	0	2	2	0	0
19/05/2018	9	PC	1045	1345	3	4	S	0	1	2	2	0	0
19/05/2018	9	PC	1415	1715	1	4	S	0	1	2	2	0	0
19/05/2018	9	PC	1415	1715	2	4	SSE	0	0	2	2	0	0
19/05/2018	9	PC	1415	1715	3	5	S	0	1	2	2	0	0
20/05/2018	10	PC	0945	1245	1	5	S	0	7	2	2	0	0
20/05/2018	10	PC	0945	1245	2	6	SSW	0	7	2	2	0	0
20/05/2018	10	PC	0945	1245	3	6	SSW	0	6	2	2	0	0
20/05/2018	10	PC	1315	1615	1	5	S	0	6	2	2	0	0
20/05/2018	10	PC	1315	1615	2	4	S	0	6	2	2	0	0
20/05/2018	10	PC	1315	1615	3	4	S	0	7	2	2	0	0
21/05/2018	7	PC	0550	0850	1	2	S	0	7	2	2	0	0
21/05/2018	7	PC	0550	0850	2	3	S	0	6	2	2	0	0
21/05/2018	7	PC	0550	0850	3	2	S	0	6	2	2	0	0
21/05/2018	7	PC	0920	1220	1	3	S	0	5	2	2	0	0
21/05/2018	7	PC	0920	1220	2	2	S	0	6	2	2	0	0
21/05/2018	7	PC	0920	1220	3	2	S	0	6	2	2	0	0
26/05/2018	8	PC	0945	1245	1	5	E	0	1	2	2	0	0
26/05/2018	8	PC	0945	1245	2	5	E	0	0	2	2	0	0
26/05/2018	8	PC	0945	1245	3	4	ENE	0	1	2	2	0	0

Date	VP	Observer	Survey start time	Survey finish time	Survey hour	Wind speed	Wind direction	Rain	Cloud cover	Cloud height	Visibility	Frost	Snow
26/05/2018	8	PC	1315	1615	1	5	ENE	0	3	2	2	0	0
26/05/2018	8	PC	1315	1615	2	5	E	0	2	2	2	0	0
26/05/2018	8	PC	1315	1615	3	4	E	0	3	2	2	0	0
27/05/2018	11	PC	1500	1800	1	5	E	0	1	2	2	0	0
27/05/2018	11	PC	1500	1800	2	5	ESE	0	1	2	2	0	0
27/05/2018	11	PC	1500	1800	3	4	E	0	1	2	2	0	0
27/05/2018	11	PC	1830	2130	1	5	ESE	0	1	2	2	0	0
27/05/2018	11	PC	1830	2130	2	4	E	0	3	2	2	0	0
27/05/2018	11	PC	1830	2130	3	4	E	0	3	2	2	0	0
28/05/2018	7	PC	0510	0810	1	3	E	0	1	2	2	0	0
28/05/2018	7	PC	0510	0810	2	2	E	0	1	2	2	0	0
28/05/2018	7	PC	0510	0810	3	2	E	0	0	2	2	0	0
28/05/2018	7	PC	0840	1140	1	1	E	0	0	2	2	0	0
28/05/2018	7	PC	0840	1140	2	0	E	0	0	2	2	0	0
28/05/2018	7	PC	0840	1140	3	1	E	0	0	2	2	0	0
02/06/2018	6	PC	1035	1335	1	0	SW	0	8	2	2	0	0
02/06/2018	6	PC	1035	1335	2	0	SW	0	8	2	2	0	0
02/06/2018	6	PC	1035	1335	3	1	SW	0	7	2	2	0	0
02/06/2018	6	PC	1405	1705	1	0	SW	0	7	2	2	0	0
02/06/2018	6	PC	1405	1705	2	1	SW	0	8	2	2	0	0
02/06/2018	6	PC	1405	1705	3	0	SW	0	7	2	2	0	0
09/06/2018	9	PC	0940	1240	1	0	E	0	1	2	2	0	0
09/06/2018	9	PC	0940	1240	2	0	E	0	2	2	2	0	0
09/06/2018	9	PC	0940	1240	3	2	SE	0	3	2	2	0	0
09/06/2018	9	PC	1310	1610	1	3	SE	0	5	2	2	0	0
09/06/2018	9	PC	1310	1610	2	3	NE	0	4	2	2	0	0
09/06/2018	9	PC	1310	1610	3	3	N	0	2	2	2	0	0
11/06/2018	11	PC	0520	0820	1	3	WNW	0	6	1	2	0	0
11/06/2018	11	PC	0520	0820	2	3	W	0	7	1	2	0	0
11/06/2018	11	PC	0520	0820	3	4	WNW	0	8	2	2	0	0
11/06/2018	11	PC	0850	1150	1	4	WNW	0	8	2	2	0	0
11/06/2018	11	PC	0850	1150	2	3	NW	0	7	2	2	0	0
11/06/2018	11	PC	1850	1150	3	2	NW	0	7	2	2	0	0
22/06/2018	10	PC	1100	1400	1	4	NW	0	2	2	2	0	0
22/06/2018	10	PC	1100	1400	2	4	NW	0	2	2	2	0	0
22/06/2018	10	PC	1100	1400	3	4	WNW	0	1	2	2	0	0
22/06/2018	10	PC	1430	1730	1	4	NW	0	2	2	2	0	0
22/06/2018	10	PC	1430	1730	2	3	NW	0	1	2	2	0	0
22/06/2018	10	PC	1430	1730	3	3	NW	0	1	2	2	0	0
06/07/2018	7	PC	1520	1820	1	3	E	0	2	2	2	0	0
06/07/2018	7	PC	1520	1820	2	2	ENE	0	2	2	2	0	0
06/07/2018	7	PC	1520	1820	3	2	ENE	0	2	2	2	0	0
06/07/2018	7	PC	1850	2150	1	2	NE	0	1	2	2	0	0
06/07/2018	7	PC	1850	2150	2	1	NE	0	1	2	2	0	0

Date	VP	Observer	Survey start time	Survey finish time	Survey hour	Wind speed	Wind direction	Rain	Cloud cover	Cloud height	Visibility	Frost	Snow
06/07/2018	7	PC	1850	2150	3	1	NE	0	2	2	2	0	0
07/07/2018	6	PC	0610	0910	1	1	SSW	0	5	2	2	0	0
07/07/2018	6	PC	0610	0910	2	1	SSW	0	4	2	2	0	0
07/07/2018	6	PC	0610	0910	3	2	SW	0	5	2	2	0	0
07/07/2018	6	PC	0940	1240	1	1	SW	0	6	2	2	0	0
07/07/2018	6	PC	0940	1240	2	1	SW	0	6	2	2	0	0
07/07/2018	6	PC	0940	1240	3	1	SSW	0	7	2	2	0	0
08/07/2018	8	PC	0515	0815	1	2	WSW	0	4	2	2	0	0
08/07/2018	8	PC	0515	0815	2	2	WSW	0	4	2	2	0	0
08/07/2018	8	PC	0515	0815	3	3	WSW	0	6	2	2	0	0
08/07/2018	8	PC	0845	1145	1	3	W	0	6	2	2	0	0
08/07/2018	8	PC	0845	1145	2	3	W	0	7	2	2	0	0
08/07/2018	8	PC	0845	1145	3	3	W	0	8	2	2	0	0
17/07/2018	8	PC	1125	1425	1	3	SW	0	4	2	2	0	0
17/07/2018	8	PC	1125	1425	2	3	SW	0	5	2	2	0	0
17/07/2018	8	PC	1125	1425	3	3	SW	0	4	2	2	0	0
17/07/2018	8	PC	1455	1755	1	3	SW	0	7	2	2	0	0
17/07/2018	8	PC	1455	1755	2	2	SW	0	7	2	2	0	0
17/07/2018	8	PC	1455	1755	3	2	SW	0	7	2	2	0	0
18/07/2018	9	PC	0900	1200	1	1	SE	0	7	2	2	0	0
18/07/2018	9	PC	0900	1200	2	2	SSE	0	6	2	2	0	0
18/07/2018	9	PC	0900	1200	3	2	SE	0	7	2	2	0	0
18/07/2018	9	PC	1230	1530	1	2	SE	0	7	2	2	0	0
18/07/2018	9	PC	1230	1530	2	1	SE	0	8	2	2	0	0
18/07/2018	9	PC	1230	1530	3	1	SE	0	8	2	2	0	0
20/07/2018	11	PC	0720	1020	1	1	SE	0	8	0	1	0	0
20/07/2018	11	PC	0720	1020	2	2	SE	1	8	0	1	0	0
20/07/2018	11	PC	0720	1020	3	2	SE	1	8	0	1	0	0
20/07/2018	11	PC	1050	1350	1	1	SE	1	8	0	1	0	0
20/07/2018	11	PC	1050	1350	2	0	SE	1	8	0	1	0	0
20/07/2018	11	PC	1050	1350	3	1	SSE	1	8	0	1	0	0
28/07/2018	7	PC	0815	1115	1	2	ESE	2	8	1	2	0	0
28/07/2018	7	PC	0815	1115	2	3	ESE	2	8	1	2	0	0
28/07/2018	7	PC	0815	1115	3	3	E	3	8	1	2	0	0
28/07/2018	7	PC	1145	1445	1	4	E	0	8	1	2	0	0
28/07/2018	7	PC	1145	1445	2	5	E	4	8	1	2	0	0
28/07/2018	7	PC	1145	1445	3	6	E	4	8	1	1	0	0
29/07/2018	8	PC	0920	1220	1	1	E	1	8	1	2	0	0
29/07/2018	8	PC	0920	1220	2	2	E	2	8	1	2	0	0
29/07/2018	8	PC	0920	1220	3	2	E	2	8	1	2	0	0
29/07/2018	8	PC	1250	1550	1	1	ESE	1	8	1	2	0	0
29/07/2018	8	PC	1250	1550	2	1	ESE	1	8	1	2	0	0
29/07/2018	8	PC	1250	1550	3	1	SE	1	8	1	2	0	0
30/07/2018	9	PC	0520	0820	1	3	SSE	1	8	1	2	0	0

Date	VP	Observer	Survey start time	Survey finish time	Survey hour	Wind speed	Wind direction	Rain	Cloud cover	Cloud height	Visibility	Frost	Snow
30/07/2018	9	PC	0520	0820	2	2	SSE	1	8	1	2	0	0
30/07/2018	9	PC	0520	0820	3	2	S	2	8	1	2	0	0
30/07/2018	9	PC	0850	1150	1	3	S	0	7	2	2	0	0
30/07/2018	9	PC	0850	1150	2	3	S	2	8	2	2	0	0
30/07/2018	9	PC	0850	1150	3	3	S	3	8	2	2	0	0
08/08/2018	9	MW	0830	1130	1	2	SSW	0	8	2	2	0	0
08/08/2018	9	MW	0830	1130	2	3	SSW	4	8	2	2	0	0
08/08/2018	9	MW	0830	1130	3	4	SSW	0	7	1	1	0	0
08/08/2018	9	MW	1200	1500	1	5	SSW	0	7	2	2	0	0
08/08/2018	9	MW	1200	1500	2	5	SSW	3	8	2	2	0	0
08/08/2018	9	MW	1200	1500	3	5	SSW	0	7	2	2	0	0
09/08/2018	11	MW	0830	1130	1	3	SW	0	2	2	2	0	0
09/08/2018	11	MW	0830	1130	2	4	SW	0	3	2	2	0	0
09/08/2018	11	MW	0830	1130	3	5	SW	0	4	2	2	0	0
09/08/2018	11	MW	1200	1500	1	6	SW	0	5	2	2	0	0
09/08/2018	11	MW	1200	1500	2	6	SW	0	4	2	2	0	0
09/08/2018	11	MW	1200	1500	3	5	SW	0	4	2	2	0	0
10/08/2018	6	MW	0815	1115	1	4	WNW	0	8	2	2	0	0
10/08/2018	6	MW	0815	1115	2	4	WNW	0	8	2	2	0	0
10/08/2018	6	MW	0815	1115	3	5	WNW	2	7	2	2	0	0
10/08/2018	6	MW	1145	1445	1	4	WNW	3	8	2	2	0	0
10/08/2018	6	MW	1145	1445	2	4	WNW	0	8	2	2	0	0
10/08/2018	6	MW	1145	1445	3	4	WNW	3	8	2	2	0	0
28/08/2018	7	MW	0630	0930	1	5	SSW	0	8	1	1	0	0
28/08/2018	7	MW	0630	0930	2	5	SSW	0	8	2	2	0	0
28/08/2018	7	MW	0630	0930	3	5	SSW	0	8	2	2	0	0
28/08/2018	7	MW	1000	1300	1	6	SSW	2	8	2	2	0	0
28/08/2018	7	MW	1000	1300	2	6	SSW	0	8	2	2	0	0
28/08/2018	7	MW	1000	1300	3	6	SSW	2	8	2	2	0	0
29/08/2018	8	MW	0830	1130	1	2	WNW	0	3	2	2	0	0
29/08/2018	8	MW	0830	1130	2	3	WNW	0	5	2	2	0	0
29/08/2018	8	MW	0830	1130	3	5	WNW	0	6	2	2	0	0
29/08/2018	8	MW	1200	1500	1	6	WNW	3	8	1	2	0	0
29/08/2018	8	MW	1200	1500	2	6	WNW	2	7	2	2	0	0
29/08/2018	8	MW	1200	1500	3	6	WNW	3	8	2	2	0	0
30/08/2018	10	MW	0645	0945	1	2	S	0	6	2	2	0	0
30/08/2018	10	MW	0645	0945	2	3	S	0	7	2	2	0	0
30/08/2018	10	MW	0645	0945	3	4	S	0	6	2	2	0	0
30/08/2018	10	MW	1015	1315	1	4	S	0	8	2	2	0	0
30/08/2018	10	MW	1015	1315	2	4	SSW	3	8	2	2	0	0
30/08/2018	10	MW	1015	1315	3	4	SSW	3	8	2	2	0	0

## C.2 Moorland Breeding Bird Surveys

Moorland breeding bird surveys were undertaken during the 2013 and 2018 breeding seasons. **Table C-4** details survey dates and weather data recorded. Refer to Annex B for survey methodology and Annex D for survey results.

**Table C-4 Meteorological conditions during breeding bird surveys at Clauchrie (sorted chronologically)**

Date	Survey visit	Observer	Survey start time	Survey finish time	Survey hour	Wind speed	Wind direction	Rain	Cloud cover	Cloud height	Visibility	Frost	Snow
15/04/2013	1	RA	1145	1705	1	5	SW	2	8	1	1	0	0
15/04/2013	1	RA	1145	1705	2	5	SW	2	8	1	1	0	0
15/04/2013	1	RA	1145	1705	3	4	SW	2	8	1	1	0	0
15/04/2013	1	RA	1145	1705	4	4	SW	1	8	2	2	0	0
15/04/2013	1	RA	1145	1705	5	4	SW	0	5	2	2	0	0
15/04/2013	1	FD	1140	1705	1	5	SW	2	8	1	1	0	0
15/04/2013	1	FD	1140	1705	2	5	SW	2	8	1	1	0	0
15/04/2013	1	FD	1140	1705	3	4	SW	2	8	1	1	0	0
15/04/2013	1	FD	1140	1705	4	4	SW	1	8	2	2	0	0
15/04/2013	1	FD	1140	1705	5	4	SW	0	5	2	2	0	0
15/04/2013	1	ND	1210	1710	1	4	S	2	8	1	2	0	0
15/04/2013	1	ND	1210	1710	2	3	SW	2	8	1	1	0	0
15/04/2013	1	ND	1210	1710	3	3	SW	2	8	1	1	0	0
15/04/2013	1	ND	1210	1710	4	3	SW	2	7	1	2	0	0
15/04/2013	1	ND	1210	1710	5	3	SW	0	6	1	2	0	0
16/05/2013	2	BH	1030	1430	1	3	SE	0	6	2	2	0	0
16/05/2013	2	BH	1030	1430	2	3	SE	0	6	2	2	0	0
16/05/2013	2	BH	1030	1430	3	3	SE	0	7	2	2	0	0
16/05/2013	2	BH	1030	1430	4	3	SE	0	6	2	2	0	0
16/05/2013	2	JWS	1030	1440	1	4	SE	0	6	2	2	0	0
16/05/2013	2	JWS	1030	1440	2	3	SE	1	6	2	2	0	0
16/05/2013	2	JWS	1030	1440	3	3	SE	0	7	2	2	0	0
16/05/2013	2	JWS	1030	1440	4	2	SE	1	5	2	2	0	0
16/05/2013	2	JWS	1030	1440	5	2	SE	0	5	2	2	0	0
16/05/2013	2	JM	1030	1440	1	4	E	0	6	2	2	0	0
16/05/2013	2	JM	1030	1440	2	3	SE	2	7	2	2	0	0
16/05/2013	2	JM	1030	1440	3	3	SE	0	7	2	2	0	0
16/05/2013	2	JM	1030	1440	4	2	SE	1	7	2	2	0	0
16/05/2013	2	JM	1030	1440	5	2	SE	0	6	2	2	0	0
04/06/2013	3	CB	1100	1400	1	3	W	0	5	2	2	0	0
04/06/2013	3	CB	1100	1400	2	1	SW	0	6	2	2	0	0
04/06/2013	3	CB	1100	1400	3	2	SSE	0	6	2	2	0	0
02/07/2013	4	PR	1040	1430	1	4	W	0	8	2	2	0	0
02/07/2013	4	PR	1040	1430	2	5	W	3	8	2	2	0	0
02/07/2013	4	PR	1040	1430	3	6	W	3	8	2	2	0	0
02/07/2013	4	PR	1040	1430	4	6	NE	3	8	2	2	0	0
14/04/2018	5	PC	0810	1440	1	3	SW	0	8	0	1	0	0
14/04/2018	5	PC	0810	1440	2	4	SW	0	8	0	1	0	0
14/04/2018	5	PC	0810	1440	3	4	SSW	0	8	0	0	0	0

Date	Survey visit	Observer	Survey start time	Survey finish time	Survey hour	Wind speed	Wind direction	Rain	Cloud cover	Cloud height	Visibility	Frost	Snow
14/04/2018	5	PC	0810	1440	4	3	SSW	0	8	0	1	0	0
14/04/2018	5	PC	0810	1440	5	3	SSW	0	8	0	2	0	0
14/04/2018	5	PC	0810	1440	6	3	SSW	0	8	0	2	0	0
14/04/2018	5	PC	0810	1440	7	3	SSW	0	8	0	2	0	0
04/06/2018	6	PC	0420	1020	1	1	E	0	6	2	2	0	0
04/06/2018	6	PC	0420	1020	2	1	E	0	8	2	2	0	0
04/06/2018	6	PC	0420	1020	3	2	E	0	8	2	2	0	0
04/06/2018	6	PC	0420	1020	4	2	SE	0	7	2	2	0	0
04/06/2018	6	PC	0420	1020	5	1	ESE	0	6	2	2	0	0
04/06/2018	6	PC	0420	1020	6	1	E	0	6	2	2	0	0
10/06/2018	7	PC	0510	1610	1	2	W	0	5	2	2	0	0
10/06/2018	7	PC	0510	1610	2	2	W	0	6	2	2	0	0
10/06/2018	7	PC	0510	1610	3	2	WNW	0	6	2	2	0	0
10/06/2018	7	PC	0510	1610	4	3	NW	0	7	2	2	0	0
10/06/2018	7	PC	0510	1610	5	3	NW	0	6	2	2	0	0
10/06/2018	7	PC	0510	1610	6	4	NW	0	5	2	2	0	0
22/06/2018	8	PC	0510	1025	1	3	N	0	3	2	2	0	0
22/06/2018	8	PC	0510	1025	2	3	N	0	3	2	2	0	0
22/06/2018	8	PC	0510	1025	3	4	NNW	0	2	2	2	0	0
22/06/2018	8	PC	0510	1025	4	4	NW	0	2	2	2	0	0
22/06/2018	8	PC	0510	1025	5	3	NW	0	2	2	2	0	0

### C.3 Winter Walkover Surveys

Generic winter walkover surveys were undertaken during the 2012/2013, 2013/2014 and 2018/2019 non-breeding seasons. **Table C-5** details survey dates and weather data recorded. Refer to Annex B for survey methodology and Annex D for survey results.

**Table C-5 Meteorological conditions during winter walkover surveys at Clauchrie (sorted chronologically)**

Date	Survey visit	Observer	Survey start time	Survey finish time	Survey hour	Wind speed	Wind direction	Rain	Cloud cover	Cloud height	Visibility	Frost	Snow
21/11/2012	1	KJ	0900	1300	1	3	S	0	4	2	2	0	0
21/11/2012	1	KJ	0900	1300	2	3	S	0	3	2	2	0	0
21/11/2012	1	KJ	0900	1300	3	3	S	0	3	2	2	0	0
21/11/2012	1	KJ	0900	1300	4	3	S	0	3	2	2	0	0
21/11/2012	1	RA	0900	1300	1	1	S	0	7	2	2	0	0
21/11/2012	1	RA	0900	1300	2	1	S	0	8	2	2	0	0
21/11/2012	1	RA	0900	1300	3	4	S	0	6	2	2	0	0
21/11/2012	1	RA	0900	1300	4	3	S	0	6	2	2	0	0
21/11/2012	1	SS	0900	1300	1	1	S	0	7	2	2	0	0
21/11/2012	1	SS	0900	1300	2	1	S	0	8	2	2	0	0
21/11/2012	1	SS	0900	1300	3	4	S	0	6	2	2	0	0
21/11/2012	1	SS	0900	1300	4	3	S	0	6	2	2	0	0
09/01/2013	2	RA	1000	1300	1	1	SW	0	8	1	1	0	0
09/01/2013	2	RA	1000	1300	2	2	SW	0	7	1	2	0	0
09/01/2013	2	RA	1000	1300	3	2	SW	0	7	1	2	0	0
09/01/2013	2	SS	1000	1300	1	0	0	0	6	1	1	0	0
09/01/2013	2	SS	1000	1300	2	0	0	0	6	1	1	0	0
09/01/2013	2	SS	1000	1300	3	1	SW	0	6	1	2	0	0
22/02/2013	3	SS+RC	1000	1400	1	3	WNW	0	8	2	2	0	2
22/02/2013	3	SS+RC	1000	1400	2	4	WNW	0	7	2	2	0	2
22/02/2013	3	SS+RC	1000	1400	3	5	SE	0	8	2	2	0	2
22/02/2013	3	SS+RC	1000	1400	4	4	SE	0	8	2	2	0	2
10/12/2013	4	PR	1015	1345	1	5	SSE	1	8	1	1	0	0
10/12/2013	4	PR	1015	1345	2	4	S	1	8	1	1	0	0
10/12/2013	4	PR	1015	1345	3	4	S	0	8	1	1	0	0
10/12/2013	4	PR	1015	1345	4	5	S	0	7	2	2	0	0
14/01/2014	5	CB	1210	1535	1	2	SSE	0	8	1	1	2	1
14/01/2014	5	CB	1210	1535	2	2	SSE	0	8	1	1	2	1
14/01/2014	5	CB	1210	1535	3	3	SSE	0	8	1	1	2	1
14/01/2014	5	CB	1210	1535	4	2	SW	0	8	1	1	2	1
27/01/2014	5	CB	1105	1215	5	3	SW	2	8	1	2	0	0
27/01/2014	5	CB	1105	1215	6	3	SW	2	8	1	2	0	0
29/11/2018	6	MW	0930	1530	1	3	SSE	4	8	1	1	0	0
29/11/2018	6	MW	0930	1530	2	5	SSE	4	8	1	1	0	0
29/11/2018	6	MW	0930	1530	3	5	SSE	3	8	2	2	0	0
29/11/2018	6	MW	0930	1530	4	5	SSE	3	8	2	2	0	0
29/11/2018	6	MW	0930	1530	5	6	SSE	2	8	1	1	0	0
29/11/2018	6	MW	0930	1530	6	6	SSE	2	8	2	2	0	0

Date	Survey visit	Observer	Survey start time	Survey finish time	Survey hour	Wind speed	Wind direction	Rain	Cloud cover	Cloud height	Visibility	Frost	Snow
30/11/2018	6	MW	0900	1500	1	4	WNW	0	8	2	2	0	0
30/11/2018	6	MW	0900	1500	2	5	WNW	0	8	2	2	0	0
30/11/2018	6	MW	0900	1500	3	6	WNW	2	8	2	2	0	0
30/11/2018	6	MW	0900	1500	4	6	WNW	2	7	2	2	0	0
30/11/2018	6	MW	0900	1500	5	6	WNW	2	8	2	2	0	0
30/11/2018	6	MW	0900	1500	6	6	WNW	4	8	2	2	0	0
01/12/2018	7	MW	0845	1445	1	3	WSW	4	8	2	2	0	0
01/12/2018	7	MW	0845	1445	2	3	WSW	4	8	2	2	0	0
01/12/2018	7	MW	0845	1445	3	3	WSW	4	8	2	2	0	0
01/12/2018	7	MW	0845	1445	4	4	SE	0	8	2	2	0	0
01/12/2018	7	MW	0845	1445	5	5	SE	0	8	2	2	0	0
01/12/2018	7	MW	0845	1445	6	5	E	0	7	2	2	0	0
02/12/2018	7	MW	0900	1400	1	1	SW	1	8	0	0	0	0
02/12/2018	7	MW	0900	1400	2	1	SW	1	8	0	0	0	0
02/12/2018	7	MW	0900	1400	3	2	SW	4	8	1	1	0	0
02/12/2018	7	MW	0900	1400	4	2	SW	4	8	1	1	0	0
02/12/2018	7	MW	0900	1400	5	2	SW	4	8	1	1	0	0
18/12/2018	7	MW	0800	1300	1	8	SW	4	8	1	1	0	0
18/12/2018	7	MW	0800	1300	2	9	SW	4	8	1	1	0	0
18/12/2018	7	MW	0800	1300	3	9	SW	4	8	1	1	0	0
18/12/2018	7	MW	0800	1300	4	8	SW	4	8	1	1	0	0
18/12/2018	7	MW	0800	1300	5	7	SW	4	8	1	1	0	0
19/12/2018	7	MW	0900	1400	1	2	SW	0	3	2	2	1	0
19/12/2018	7	MW	0900	1400	2	2	SW	0	4	2	2	1	0
19/12/2018	7	MW	0900	1400	3	4	SW	0	5	2	2	0	0
19/12/2018	7	MW	0900	1400	4	5	SW	0	6	2	2	0	0
19/12/2018	7	MW	0900	1400	5	5	SW	4	8	2	2	0	0
20/12/2018	7	MW	0900	1400	1	1	SW	1	8	0	0	0	0
20/12/2018	7	MW	0900	1400	2	2	SW	0	8	1	1	0	0
20/12/2018	7	MW	0900	1400	3	4	SW	0	8	2	2	0	0
20/12/2018	7	MW	0900	1400	4	4	SW	4	8	2	2	0	0
20/12/2018	7	MW	0900	1400	5	5	SW	4	8	2	2	0	0
21/12/2018	7	MW	0900	1400	1	2	WSW	1	8	0	0	0	0
21/12/2018	7	MW	0900	1400	2	2	WSW	2	8	1	1	0	0
21/12/2018	7	MW	0900	1400	3	3	WSW	0	8	1	1	0	0
21/12/2018	7	MW	0900	1400	4	4	WSW	1	8	1	1	0	0
21/12/2018	7	MW	0900	1400	5	4	WSW	0	8	1	1	0	0
11/02/2019	8	MW	0715	1215	1	1	NE	0	2	2	2	1	2
11/02/2019	8	MW	0715	1215	2	2	S	0	3	2	2	1	2
11/02/2019	8	MW	0715	1215	3	2	S	0	4	2	2	1	2
11/02/2019	8	MW	0715	1215	4	3	SW	0	5	2	2	0	2
11/02/2019	8	MW	0715	1215	5	4	SW	0	6	2	2	0	2
12/02/2019	8	MW	0815	1315	1	3	SE	0	8	2	2	0	0
12/02/2019	8	MW	0815	1315	2	3	SE	0	8	2	2	0	0

Date	Survey visit	Observer	Survey start time	Survey finish time	Survey hour	Wind speed	Wind direction	Rain	Cloud cover	Cloud height	Visibility	Frost	Snow
12/02/2019	8	MW	0815	1315	3	4	SE	0	8	2	2	0	0
12/02/2019	8	MW	0815	1315	4	4	SE	0	8	2	2	0	0
12/02/2019	8	MW	0815	1315	5	5	SE	0	8	2	2	0	0
13/02/2019	8	MW	0830	1330	1	3	SW	0	8	2	2	0	0
13/02/2019	8	MW	0830	1330	2	4	SW	0	8	2	2	0	0
13/02/2019	8	MW	0830	1330	3	5	SW	0	8	2	2	0	0
13/02/2019	8	MW	0830	1330	4	6	SW	0	8	2	2	0	0
13/02/2019	8	MW	0830	1330	5	6	SW	0	8	2	2	0	0
14/02/2019	8	MW	0830	1330	1	4	SW	0	8	2	2	0	0
14/02/2019	8	MW	0830	1330	2	4	SW	0	8	2	2	0	0
14/02/2019	8	MW	0830	1330	3	5	SW	0	8	2	2	0	0
14/02/2019	8	MW	0830	1330	4	5	SW	0	8	2	2	0	0
14/02/2019	8	MW	0830	1330	5	6	SW	0	8	2	2	0	0

#### C.4 Scarce Breeding Bird Surveys

Scarce breeding bird surveys were undertaken during the 2013, 2014, 2015, 2017, 2018 and 2019 breeding seasons. **Table C-6** details survey dates and weather data recorded. Refer to Annex B for survey methodology, Annex D for survey results and Confidential Technical Appendix 9.2 for key information relating to breeding birds listed on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended).

**Table C-6 Meteorological conditions during scarce breeding bird surveys at Clauchrie (sorted chronologically)**

Date	Survey visit	Observer	Survey start time	Survey finish time	Survey hour	Wind speed	Wind direction	Rain	Cloud cover	Cloud height	Visibility	Frost	Snow
08/05/2013	1	TG	-	-	No weather data recorded								
12/05/2013	1	TG	-	-	No weather data recorded								
28/05/2013	1	TG	-	-	No weather data recorded								
31/05/2013	1	TG	-	-	No weather data recorded								
03/06/2013	2	TG	-	-	No weather data recorded								
05/06/2013	2	TG	-	-	No weather data recorded								
08/06/2013	2	TG	-	-	No weather data recorded								
11/06/2013	3	TG	-	-	No weather data recorded								
14/06/2013	3	TG	-	-	No weather data recorded								
15/07/2013	4	TG	-	-	No weather data recorded								
16/07/2013	4	TG	-	-	No weather data recorded								
20/07/2013	4	TG	-	-	No weather data recorded								
15/04/2014	5	AM	1130	1630	1	3	SE	0	4	2	2	0	0
15/04/2014	5	AM	1130	1630	2	3	SE	0	4	2	2	0	0
15/04/2014	5	AM	1130	1630	3	4	SE	0	4	2	2	0	0
15/04/2014	5	AM	1130	1630	4	4	SE	0	4	2	2	0	0
15/04/2014	5	AM	1130	1630	5	4	SE	0	4	2	2	0	0
19/04/2014	5	AM	0930	1430	1	1	SE	0	3	2	2	0	0
19/04/2014	5	AM	0930	1430	2	1	SE	0	3	2	2	0	0
19/04/2014	5	AM	0930	1430	3	2	SE	0	4	2	2	0	0
19/04/2014	5	AM	0930	1430	4	2	SE	0	4	2	2	0	0
19/04/2014	5	AM	0930	1430	5	3	SE	0	4	2	2	0	0
12/05/2014	6	AM	1015	1430	1	3	NW	2	7	1	2	0	0
12/05/2014	6	AM	1015	1430	2	3	NW	2	7	2	2	0	0
12/05/2014	6	AM	1015	1430	3	3	NW	0	7	2	2	0	0
12/05/2014	6	AM	1015	1430	4	3	NW	0	6	2	2	0	0
16/05/2014	6	AM	1000	1400	1	3	SSW	0	8	1	2	0	0
16/05/2014	6	AM	1000	1400	2	4	SSW	0	7	2	2	0	0
16/05/2014	6	AM	1000	1400	3	4	SSW	0	6	2	2	0	0
16/05/2014	6	AM	1000	1400	4	4	SSW	0	5	2	2	0	0
26/05/2014	6	AM	0930	1530	1	1	ESE	1	8	1	2	0	0
26/05/2014	6	AM	0930	1530	2	1	ESE	2	8	1	2	0	0
26/05/2014	6	AM	0930	1530	3	1	ESE	2	8	1	2	0	0
26/05/2014	6	AM	0930	1530	4	2	SE	0	8	2	2	0	0
26/05/2014	6	AM	0930	1530	5	2	SE	0	7	2	2	0	0
26/05/2014	6	AM	0930	1530	6	3	S	0	7	2	2	0	0
27/05/2014	6	AM	1030	1700	1	3	ENE	0	6	2	2	0	0
27/05/2014	6	AM	1030	1700	2	3	ENE	0	6	2	2	0	0

Date	Survey visit	Observer	Survey start time	Survey finish time	Survey hour	Wind speed	Wind direction	Rain	Cloud cover	Cloud height	Visibility	Frost	Snow
27/05/2014	6	AM	1030	1700	3	1	S	0	7	2	2	0	0
27/05/2014	6	AM	1030	1700	4	1	SSW	0	7	2	2	0	0
27/05/2014	6	AM	1030	1700	5	1	SE	3	7	2	2	0	0
27/05/2014	6	AM	1030	1700	6	1	ESE	3	7	2	2	0	0
25/06/2014	7	MW	0900	1500	1	2	E	1	8	1	1	0	0
25/06/2014	7	MW	0900	1500	2	2	E	1	8	1	1	0	0
25/06/2014	7	MW	0900	1500	3	4	ENE	0	8	1	1	0	0
25/06/2014	7	MW	0900	1500	4	4	ENE	1	8	1	1	0	0
25/06/2014	7	MW	0900	1500	5	3	ENE	1	8	1	1	0	0
25/06/2014	7	MW	0900	1500	6	3	ENE	1	8	1	1	0	0
26/06/2014	7	MW	0900	1500	1	1	SE	0	8	2	2	0	0
26/06/2014	7	MW	0900	1500	2	2	SE	0	8	2	2	0	0
26/06/2014	7	MW	0900	1500	3	3	SE	0	8	2	2	0	0
26/06/2014	7	MW	0900	1500	4	3	SE	0	8	2	2	0	0
26/06/2014	7	MW	0900	1500	5	4	SE	0	8	2	2	0	0
26/06/2014	7	MW	0900	1500	6	3	SE	0	7	2	2	0	0
27/06/2014	7	MW	0400	1400	1	3	SW	0	8	2	2	0	0
27/06/2014	7	MW	0400	1400	2	3	SW	0	8	2	2	0	0
27/06/2014	7	MW	0400	1400	3	4	SW	0	8	2	2	0	0
27/06/2014	7	MW	0400	1400	4	4	SW	0	8	2	2	0	0
27/06/2014	7	MW	0400	1400	5	4	SW	0	8	2	2	0	0
27/06/2014	7	MW	0400	1400	6	4	SW	0	8	2	2	0	0
14/07/2014	8	FD	0900	1500	1	3	SSW	0	7	2	2	0	0
14/07/2014	8	FD	0900	1500	2	4	SSW	1	6	2	2	0	0
14/07/2014	8	FD	0900	1500	3	4	SW	2	8	2	2	0	0
14/07/2014	8	FD	0900	1500	4	4	SSW	2	8	1	1	0	0
14/07/2014	8	FD	0900	1500	5	4	S	3	8	1	1	0	0
14/07/2014	8	FD	0900	1500	6	4	SSE	3	8	1	0	0	0
14/07/2014	8	JR	0900	1500	1	2	S	2	8	2	2	0	0
14/07/2014	8	JR	0900	1500	2	3	S	2	8	2	2	0	0
14/07/2014	8	JR	0900	1500	3	5	S	3	8	2	2	0	0
14/07/2014	8	JR	0900	1500	4	4	SSW	3	8	1	1	0	0
14/07/2014	8	JR	0900	1500	5	4	SW	4	8	1	1	0	0
14/07/2014	8	JR	0900	1500	6	3	SW	4	8	0	0	0	0
15/07/2014	8	FD	0930	1530	1	3	W	0	4	2	2	0	0
15/07/2014	8	FD	0930	1530	2	4	W	0	6	2	2	0	0
15/07/2014	8	FD	0930	1530	3	3	WNW	0	5	2	2	0	0
15/07/2014	8	FD	0930	1530	4	3	W	0	5	2	2	0	0
15/07/2014	8	FD	0930	1530	5	2	WSW	0	6	2	2	0	0
15/07/2014	8	FD	0930	1530	6	3	W	0	6	2	2	0	0
15/07/2014	8	JR	0930	1530	1	2	NW	0	5	2	2	0	0
15/07/2014	8	JR	0930	1530	2	2	W	0	5	2	2	0	0
15/07/2014	8	JR	0930	1530	3	3	W	0	5	2	2	0	0
15/07/2014	8	JR	0930	1530	4	3	W	0	5	2	2	0	0

Date	Survey visit	Observer	Survey start time	Survey finish time	Survey hour	Wind speed	Wind direction	Rain	Cloud cover	Cloud height	Visibility	Frost	Snow
15/07/2014	8	JR	0930	1530	5	2	W	0	4	2	2	0	0
15/07/2014	8	JR	0930	1530	6	2	W	0	6	2	2	0	0
20/08/2014	9	FD	0930	1530	1	3	NW	0	6	2	2	0	0
20/08/2014	9	FD	0930	1530	2	3	NW	0	5	2	2	0	0
20/08/2014	9	FD	0930	1530	3	3	NW	1	7	2	2	0	0
20/08/2014	9	FD	0930	1530	4	3	NNW	0	4	2	2	0	0
20/08/2014	9	FD	0930	1530	5	3	NNW	0	5	2	2	0	0
20/08/2014	9	FD	0930	1530	6	3	NNW	0	6	2	2	0	0
20/08/2014	9	JR	0930	1530	1	3	NW	0	5	2	2	0	0
20/08/2014	9	JR	0930	1530	2	3	NW	0	5	2	2	0	0
20/08/2014	9	JR	0930	1530	3	3	NW	2	6	2	2	0	0
20/08/2014	9	JR	0930	1530	4	3	NW	0	5	2	2	0	0
20/08/2014	9	JR	0930	1530	5	3	NW	0	5	2	2	0	0
20/08/2014	9	JR	0930	1530	6	3	NW	0	6	2	2	0	0
14/01/2015	BO 1	MW	0900	1400	1	5	SSW	0	8	2	2	1	1
14/01/2015	BO 1	MW	0900	1400	2	5	SSW	0	8	2	2	1	1
14/01/2015	BO 1	MW	0900	1400	3	6	SSW	0	7	2	2	1	1
14/01/2015	BO 1	MW	0900	1400	4	6	SSW	0	8	2	2	1	1
14/01/2015	BO 1	MW	0900	1400	5	6	SSW	0	8	2	2	1	1
15/01/2015	BO 1	MW	0750	1250	1	6	SSW	0	8	2	2	0	0
15/01/2015	BO 1	MW	0750	1250	2	6	SSW	0	8	2	2	0	0
15/01/2015	BO 1	MW	0750	1250	3	7	SSW	0	8	2	2	0	0
15/01/2015	BO 1	MW	0750	1250	4	7	SSW	0	8	2	2	0	0
15/01/2015	BO 1	MW	0750	1250	5	7	SSW	0	8	2	2	0	0
05/03/2015	BO 2	MW	0830	1330	1	5	SSW	0	8	2	2	0	0
05/03/2015	BO 2	MW	0830	1330	2	6	SSW	2	8	2	2	0	0
05/03/2015	BO 2	MW	0830	1330	3	6	SSW	2	8	2	2	0	0
05/03/2015	BO 2	MW	0830	1330	4	6	SSW	0	8	2	2	0	0
05/03/2015	BO 2	MW	0830	1330	5	6	SSW	0	8	2	2	0	0
20/04/2015	10	AM	0930	1600	1	2	SSW	0	5	2	2	0	0
20/04/2015	10	AM	0930	1600	2	2	SSW	0	5	2	2	0	0
20/04/2015	10	AM	0930	1600	3	2	SSW	0	5	2	2	0	0
20/04/2015	10	AM	0930	1600	4	2	SSW	0	5	2	2	0	0
20/04/2015	10	AM	0930	1600	5	2	SSW	0	5	2	2	0	0
20/04/2015	10	AM	0930	1600	6	2	SSW	0	4	2	2	0	0
21/04/2015	10	AM	0930	1300	1	1	WSW	0	2	2	2	0	0
21/04/2015	10	AM	0930	1300	2	1	WSW	0	2	2	2	0	0
21/04/2015	10	AM	0930	1300	3	2	WSW	0	2	2	2	0	0
21/04/2015	10	AM	0930	1300	4	2	WSW	0	2	2	2	0	0
28/04/2015	10	AM	0930	1245	1	3	WSW	0	5	2	2	0	1
28/04/2015	10	AM	0930	1245	2	3	WSW	0	5	2	2	0	1
28/04/2015	10	AM	0930	1245	3	3	WSW	2	5	2	2	0	1
14/05/2015	11	AM	0800	1330	1	3	E	0	5	2	2	0	0
14/05/2015	11	AM	0800	1330	2	3	E	0	5	2	2	0	0

Date	Survey visit	Observer	Survey start time	Survey finish time	Survey hour	Wind speed	Wind direction	Rain	Cloud cover	Cloud height	Visibility	Frost	Snow
14/05/2015	11	AM	0800	1330	3	4	E	0	5	2	2	0	0
14/05/2015	11	AM	0800	1330	4	4	E	0	5	2	2	0	0
14/05/2015	11	AM	0800	1330	5	4	E	0	5	2	2	0	0
14/05/2015	11	AM	0800	1330	6	4	E	0	5	2	2	0	0
15/05/2015	11	AM	0830	1430	1	3	S	0	7	2	2	0	0
15/05/2015	11	AM	0830	1430	2	3	S	0	7	2	2	0	0
15/05/2015	11	AM	0830	1430	3	4	SSW	0	8	2	2	0	0
15/05/2015	11	AM	0830	1430	4	4	SSW	0	8	2	2	0	0
15/05/2015	11	AM	0830	1430	5	3	SSW	0	8	2	2	0	0
15/05/2015	11	AM	0830	1430	6	3	SSW	4	8	2	2	0	0
28/05/2015	12	AM	1030	1630	1	5	W	3	6	2	2	0	0
28/05/2015	12	AM	1030	1630	2	5	W	0	6	2	2	0	0
28/05/2015	12	AM	1030	1630	3	5	W	0	6	2	2	0	0
28/05/2015	12	AM	1030	1630	4	5	W	0	6	2	2	0	0
28/05/2015	12	AM	1030	1630	5	5	W	2	7	2	2	0	0
28/05/2015	12	AM	1030	1630	6	5	W	0	7	2	2	0	0
13/06/2015	13	AM	1000	1620	1	2	WNW	0	5	2	2	0	0
13/06/2015	13	AM	1000	1620	2	2	WNW	0	5	2	2	0	0
13/06/2015	13	AM	1000	1620	3	3	NW	0	5	2	2	0	0
13/06/2015	13	AM	1000	1620	4	3	NW	0	6	2	2	0	0
13/06/2015	13	AM	1000	1620	5	3	NW	0	6	2	2	0	0
13/06/2015	13	AM	1000	1620	6	3	NW	0	6	2	2	0	0
15/06/2015	13	AM	0930	1530	1	1	SSE	0	8	2	2	0	0
15/06/2015	13	AM	0930	1530	2	1	SSE	0	8	2	2	0	0
15/06/2015	13	AM	0930	1530	3	1	SSE	2	8	2	2	0	0
15/06/2015	13	AM	0930	1530	4	2	S	2	8	2	2	0	0
15/06/2015	13	AM	0930	1530	5	2	S	2	7	2	2	0	0
15/06/2015	13	AM	0930	1530	6	2	S	0	7	2	2	0	0
19/06/2015	13	AM	0930	1430	1	4	WNW	0	8	2	2	0	0
19/06/2015	13	AM	0930	1430	2	4	WNW	0	8	2	2	0	0
19/06/2015	13	AM	0930	1430	3	4	WNW	2	8	2	2	0	0
19/06/2015	13	AM	0930	1430	4	4	WNW	2	8	2	2	0	0
19/06/2015	13	AM	0930	1430	5	4	WNW	2	8	2	2	0	0
10/07/2015	14	AM	1100	1630	1	4	S	1	8	1	1	0	0
10/07/2015	14	AM	1100	1630	2	4	S	1	8	1	1	0	0
10/07/2015	14	AM	1100	1630	3	4	S	0	7	2	2	0	0
10/07/2015	14	AM	1100	1630	4	4	S	0	6	2	2	0	0
10/07/2015	14	AM	1100	1630	5	4	S	0	6	2	2	0	0
10/07/2015	14	AM	1100	1630	6	4	S	0	6	2	2	0	0
13/07/2015	14	AM	0900	1400	1	2	SE	1	8	1	2	0	0
13/07/2015	14	AM	0900	1400	2	2	SE	0	8	1	2	0	0
13/07/2015	14	AM	0900	1400	3	2	S	1	8	1	2	0	0
13/07/2015	14	AM	0900	1400	4	2	S	1	8	2	2	0	0
13/07/2015	14	AM	0900	1400	5	2	S	3	8	2	2	0	0

Date	Survey visit	Observer	Survey start time	Survey finish time	Survey hour	Wind speed	Wind direction	Rain	Cloud cover	Cloud height	Visibility	Frost	Snow
20/07/2015	14	AM	1515	2030	1	4	SSE	1	8	1	1	0	0
20/07/2015	14	AM	1515	2030	2	4	SSE	1	8	1	1	0	0
20/07/2015	14	AM	1515	2030	3	4	SSW	1	8	2	1	0	0
20/07/2015	14	AM	1515	2030	4	4	SSW	0	7	2	2	0	0
20/07/2015	14	AM	1515	2030	5	4	SSW	0	7	2	2	0	0
13/08/2015	15	AM	1100	1730	1	1	SW	0	3	2	2	0	0
13/08/2015	15	AM	1100	1730	2	1	SW	0	3	2	2	0	0
13/08/2015	15	AM	1100	1730	3	2	SSW	0	3	2	2	0	0
13/08/2015	15	AM	1100	1730	4	2	SSW	0	3	2	2	0	0
13/08/2015	15	AM	1100	1730	5	1	SSW	0	3	2	2	0	0
13/08/2015	15	AM	1100	1730	6	1	SSW	0	5	2	2	0	0
27/03/2017	16	JR	1230	1830	1	3	S	0	1	2	2	0	2
27/03/2017	16	JR	1230	1830	2	3	SSW	0	1	2	2	0	2
27/03/2017	16	JR	1230	1830	3	2	SW	0	1	2	2	0	2
27/03/2017	16	JR	1230	1830	4	1	NW	0	1	2	2	0	2
27/03/2017	16	JR	1230	1830	5	1	W	0	1	2	2	0	2
27/03/2017	16	JR	1230	1830	6	1	SW	0	2	2	2	0	2
28/03/2017	16	JR	0810	1410	1	0	0	1	8	0	1	0	2
28/03/2017	16	JR	0810	1410	2	0	0	1	8	0	1	0	2
28/03/2017	16	JR	0810	1410	3	0	0	1	8	0	1	0	2
28/03/2017	16	JR	0810	1410	4	1	SW	0	8	0	1	0	2
28/03/2017	16	JR	0810	1410	5	2	SW	0	8	0	1	0	2
28/03/2017	16	JR	0810	1410	6	3	SW	0	8	0	1	0	2
26/04/2017	17	AM	1445	1945	1	2	NW	0	6	2	2	0	0
26/04/2017	17	AM	1445	1945	2	2	NW	0	7	2	2	0	0
26/04/2017	17	AM	1445	1945	3	2	NW	0	7	2	2	0	0
26/04/2017	17	AM	1445	1945	4	2	NW	0	7	2	2	0	0
26/04/2017	17	AM	1445	1945	5	2	NW	0	6	2	2	0	0
27/04/2017	17	AM	0930	1230	1	3	NW	2	7	2	2	0	0
27/04/2017	17	AM	0930	1230	2	3	NW	2	6	2	2	0	0
27/04/2017	17	AM	0930	1230	3	3	NW	2	5	2	2	0	0
28/04/2017	17	AM	0930	1230	1	1	NW	0	6	2	2	0	0
28/04/2017	17	AM	0930	1230	2	2	WNW	2	7	2	2	0	0
28/04/2017	17	AM	0930	1230	3	1	SSW	3	7	2	2	0	0
29/04/2017	17	AM	0810	1330	1	2	SW	0	8	1	2	0	0
29/04/2017	17	AM	0810	1330	2	2	SW	3	7	2	2	0	0
29/04/2017	17	AM	0810	1330	3	2	SW	2	7	2	2	0	0
29/04/2017	17	AM	0810	1330	4	3	SSE	2	7	2	2	0	0
29/04/2017	17	AM	0810	1330	5	3	SE	3	7	2	2	0	0
10/05/2017	18	AM	0845	1215	1	1	NW	0	4	2	2	0	0
10/05/2017	18	AM	0845	1215	2	1	NW	0	4	2	2	0	0
10/05/2017	18	AM	0845	1215	3	1	NW	0	4	2	2	0	0
11/05/2017	18	AM	0830	1200	1	1	SE	0	1	2	2	0	0
11/05/2017	18	AM	0830	1200	2	1	SE	0	3	2	2	0	0

Date	Survey visit	Observer	Survey start time	Survey finish time	Survey hour	Wind speed	Wind direction	Rain	Cloud cover	Cloud height	Visibility	Frost	Snow
11/05/2017	18	AM	0830	1200	3	1	SE	0	4	2	2	0	0
24/05/2017	18	AM	1130	1800	1	1	WSW	0	8	2	2	0	0
24/05/2017	18	AM	1130	1800	2	1	WSW	0	7	2	2	0	0
24/05/2017	18	AM	1130	1800	3	1	SW	0	8	2	2	0	0
24/05/2017	18	AM	1130	1800	4	1	SW	0	7	2	2	0	0
24/05/2017	18	AM	1130	1800	5	1	SW	0	5	2	2	0	0
24/05/2017	18	AM	1130	1800	6	1	SW	0	5	2	2	0	0
25/05/2017	18	AM	0940	1440	1	1	SSE	0	2	2	2	0	0
25/05/2017	18	AM	0940	1440	2	1	SE	0	1	2	2	0	0
25/05/2017	18	AM	0940	1440	3	2	SE	0	1	2	2	0	0
25/05/2017	18	AM	0940	1440	4	2	SE	0	1	2	2	0	0
25/05/2017	18	AM	0940	1440	5	2	SE	0	1	2	2	0	0
21/06/2017	19	AM	1400	1915	1	2	SSE	2	7	1	2	0	0
21/06/2017	19	AM	1400	1915	2	2	SSE	0	7	2	2	0	0
21/06/2017	19	AM	1400	1915	3	2	SE	0	7	2	2	0	0
21/06/2017	19	AM	1400	1915	4	2	SE	0	7	2	2	0	0
21/06/2017	19	AM	1400	1915	5	2	SE	0	7	2	2	0	0
22/06/2017	19	AM	0845	1500	1	2	NW	1	8	2	2	0	0
22/06/2017	19	AM	0845	1500	2	2	NW	1	8	2	2	0	0
22/06/2017	19	AM	0845	1500	3	3	NW	0	7	2	2	0	0
22/06/2017	19	AM	0845	1500	4	3	NW	0	7	2	2	0	0
22/06/2017	19	AM	0845	1500	5	3	NW	0	7	2	2	0	0
22/06/2017	19	AM	0845	1500	6	3	NW	0	7	2	2	0	0
23/06/2017	19	AM	0900	1500	1	3	WSW	1	8	1	2	0	0
23/06/2017	19	AM	0900	1500	2	3	WSW	2	8	1	2	0	0
23/06/2017	19	AM	0900	1500	3	3	SW	4	8	1	2	0	0
23/06/2017	19	AM	0900	1500	4	3	SW	2	8	2	2	0	0
23/06/2017	19	AM	0900	1500	5	3	SW	0	7	2	2	0	0
23/06/2017	19	AM	0900	1500	6	3	SW	0	7	2	2	0	0
19/07/2017	20	MW	0830	1130	1	7	ESE	0	4	2	2	0	0
19/07/2017	20	MW	0830	1130	2	7	ESE	0	3	2	2	0	0
19/07/2017	20	MW	0830	1130	3	7	ESE	0	4	2	2	0	0
19/07/2017	20	MW	1200	1500	1	8	ESE	0	3	2	2	0	0
19/07/2017	20	MW	1200	1500	2	8	ESE	0	4	2	2	0	0
19/07/2017	20	MW	1200	1500	3	8	ESE	0	3	2	2	0	0
20/07/2017	20	MW	0730	1030	1	5	NW	0	7	2	2	0	0
20/07/2017	20	MW	0730	1030	2	5	NW	2	8	2	2	0	0
20/07/2017	20	MW	0730	1030	3	5	NW	0	7	2	2	0	0
20/07/2017	20	MW	1100	1400	1	5	NW	0	8	2	2	0	0
20/07/2017	20	MW	1100	1400	2	5	NW	0	8	2	2	0	0
20/07/2017	20	MW	1100	1400	3	5	NW	0	8	2	2	0	0
18/08/2017	21	MW	0800	1100	1	4	WSW	0	8	2	2	0	0
18/08/2017	21	MW	0800	1100	2	5	WSW	0	8	2	2	0	0
18/08/2017	21	MW	0800	1100	3	5	WSW	2	8	2	2	0	0

Date	Survey visit	Observer	Survey start time	Survey finish time	Survey hour	Wind speed	Wind direction	Rain	Cloud cover	Cloud height	Visibility	Frost	Snow
18/08/2017	21	MW	1130	1430	1	5	WSW	2	8	2	2	0	0
18/08/2017	21	MW	1130	1430	2	5	WSW	0	8	2	2	0	0
18/08/2017	21	MW	1130	1430	3	6	WSW	0	7	2	2	0	0
09/04/2018	22	PC	0620	1220	1	1	SE	0	8	0	1	0	0
09/04/2018	22	PC	0620	1220	2	1	SE	0	8	0	1	0	0
09/04/2018	22	PC	0620	1220	3	1	ESE	0	8	1	1	0	0
09/04/2018	22	PC	0620	1220	4	2	ESE	0	8	1	2	0	0
09/04/2018	22	PC	0620	1220	5	2	ESE	0	7	1	2	0	0
09/04/2018	22	PC	0620	1220	6	2	ESE	0	6	1	2	0	0
29/04/2018	22	PC	0800	1400	1	3	E	0	1	2	2	0	0
29/04/2018	22	PC	0800	1400	2	2	E	0	1	2	2	0	0
29/04/2018	22	PC	0800	1400	3	1	E	0	3	2	2	0	0
29/04/2018	22	PC	0800	1400	4	1	ESE	0	4	2	2	0	0
29/04/2018	22	PC	0800	1400	5	2	ESE	0	3	2	2	0	0
29/04/2018	22	PC	0800	1400	6	1	SE	0	6	2	2	0	0
03/06/2018	23	PC	0525	1125	1	0	W	0	7	2	2	0	0
03/06/2018	23	PC	0525	1125	2	0	W	0	7	2	2	0	0
03/06/2018	23	PC	0525	1125	3	1	W	0	8	2	2	0	0
03/06/2018	23	PC	0525	1125	4	1	W	0	8	2	2	0	0
03/06/2018	23	PC	0525	1125	5	0	W	0	7	2	2	0	0
03/06/2018	23	PC	0525	1125	6	0	W	0	7	2	2	0	0
03/06/2018	23	PC	1200	1800	1	0	W	0	7	2	2	0	0
03/06/2018	23	PC	1200	1800	2	0	W	0	7	2	2	0	0
03/06/2018	23	PC	1200	1800	3	0	W	0	8	2	2	0	0
03/06/2018	23	PC	1200	1800	4	0	W	0	6	2	2	0	0
03/06/2018	23	PC	1200	1800	5	1	W	0	6	2	2	0	0
03/06/2018	23	PC	1200	1800	6	0	W	0	6	2	2	0	0
10/06/2018	23	PC	1110	1010	1	4	NW	0	4	2	2	0	0
10/06/2018	23	PC	1110	1010	2	4	NW	0	3	2	2	0	0
10/06/2018	23	PC	1110	0010	3	4	WNW	0	1	2	2	0	0
10/06/2018	23	PC	1110	1610	4	3	W	0	1	2	2	0	0
10/06/2018	23	PC	1110	1610	5	3	W	0	1	2	2	0	0
23/06/2018	24	PC	0445	0945	1	3	NW	0	3	2	2	0	0
23/06/2018	24	PC	0445	0945	2	3	NW	0	3	2	2	0	0
23/06/2018	24	PC	0445	0945	3	4	WNW	0	4	2	2	0	0
23/06/2018	24	PC	0445	0945	4	3	WNW	0	5	2	2	0	0
23/06/2018	24	PC	0445	0945	5	4	WNW	0	5	2	2	0	0
23/06/2018	24	PC	1000	1600	1	4	WNW	0	6	2	2	0	0
23/06/2018	24	PC	1000	1600	2	3	WNW	0	5	2	2	0	0
23/06/2018	24	PC	1000	1600	3	4	WNW	0	5	2	2	0	0
23/06/2018	24	PC	1000	1600	4	5	NW	0	6	2	2	0	0
23/06/2018	24	PC	1000	1600	5	4	NW	0	5	2	2	0	0
23/06/2018	24	PC	1000	1600	6	4	NW	0	5	2	2	0	0
17/07/2018	25	PC	0535	1050	1	2	SW	0	5	2	2	0	0

Date	Survey visit	Observer	Survey start time	Survey finish time	Survey hour	Wind speed	Wind direction	Rain	Cloud cover	Cloud height	Visibility	Frost	Snow
17/07/2018	25	PC	0535	1050	2	2	SW	0	5	2	2	0	0
17/07/2018	25	PC	0535	1050	3	3	SW	0	4	2	2	0	0
17/07/2018	25	PC	0535	1050	4	3	SW	0	4	2	2	0	0
17/07/2018	25	PC	0535	1050	5	3	SW	0	4	2	2	0	0
19/07/2018	25	PC	0910	1510	1	1	ENE	0	1	2	2	0	0
19/07/2018	25	PC	0910	1510	2	2	NNE	0	2	2	2	0	0
19/07/2018	25	PC	0910	1510	3	2	N	0	1	2	2	0	0
19/07/2018	25	PC	0910	1510	4	2	N	0	2	2	2	0	0
19/07/2018	25	PC	0910	1510	5	3	NW	0	1	2	2	0	0
19/07/2018	25	PC	0910	1510	6	3	W	0	1	2	2	0	0
06/08/2018	26	MW	0900	1200	1	2	SW	3	8	1	1	0	0
06/08/2018	26	MW	0900	1200	2	3	SW	3	8	1	1	0	0
06/08/2018	26	MW	0900	1200	3	3	SW	0	8	1	1	0	0
06/08/2018	26	MW	1230	1530	1	3	SW	0	8	1	1	0	0
06/08/2018	26	MW	1230	1530	2	3	SW	0	8	1	1	0	0
06/08/2018	26	MW	1230	1530	3	3	SW	0	8	1	1	0	0
07/08/2018	26	MW	0830	1130	1	2	W	2	8	1	1	0	0
07/08/2018	26	MW	0830	1130	2	2	W	0	8	2	2	0	0
07/08/2018	26	MW	0830	1130	3	3	W	0	7	2	2	0	0
07/08/2018	26	MW	1200	1500	1	4	W	0	7	2	2	0	0
07/08/2018	26	MW	1200	1500	2	4	W	0	6	2	2	0	0
07/08/2018	26	MW	1200	1500	3	5	W	0	5	2	2	0	0
07/03/2019	27	JR	0830	1430	1	2	SW	4	8	1	1	0	0
07/03/2019	27	JR	0830	1430	2	3	W	3	7	1	1	0	0
07/03/2019	27	JR	0830	1430	3	4	WNW	2	7	2	2	0	0
07/03/2019	27	JR	0830	1430	4	5	WNW	2	7	2	2	0	0
07/03/2019	27	JR	0830	1430	5	4	WNW	0	7	2	2	0	0
07/03/2019	27	JR	0830	1430	6	4	WNW	0	7	2	2	0	0
21/03/2019	28	JR	0830	1330	1	2	SW	1	8	1	0	0	2
21/03/2019	28	JR	0830	1330	2	1	SW	1	8	1	0	0	2
21/03/2019	28	JR	0830	1330	3	2	SW	1	8	1	0	0	2
21/03/2019	28	JR	0830	1330	4	2	SW	0	8	2	0	0	2
21/03/2019	28	JR	0830	1330	5	2	SW	0	8	2	0	0	2
05/04/2019	29	MW	0745	1345	1	4	ESE	0	6	2	2	0	2
05/04/2019	29	MW	0745	1345	2	4	ESE	0	5	2	2	0	2
05/04/2019	29	MW	0745	1345	3	5	ESE	0	5	2	2	0	2
05/04/2019	29	MW	0745	1345	4	5	ESE	0	5	2	2	0	2
05/04/2019	29	MW	0745	1345	5	5	ESE	0	4	2	2	0	2
05/04/2019	29	MW	0745	1345	6	6	ESE	0	5	2	2	0	2
19/04/2019	30	MW	0600	1200	1	3	SSE	0	1	2	2	0	0
19/04/2019	30	MW	0600	1200	2	3	SSE	0	1	2	2	0	0
19/04/2019	30	MW	0600	1200	3	3	SSE	0	1	2	2	0	0
19/04/2019	30	MW	0600	1200	4	4	SSE	0	1	2	2	0	0
19/04/2019	30	MW	0600	1200	5	4	SSE	0	1	2	2	0	0

Date	Survey visit	Observer	Survey start time	Survey finish time	Survey hour	Wind speed	Wind direction	Rain	Cloud cover	Cloud height	Visibility	Frost	Snow
19/04/2019	30	MW	0600	1200	6	4	SSE	0	1	2	2	0	0
31/05/2019	31	MW	0600	1200	1	1	SW	4	8	0	0	0	0
31/05/2019	31	MW	0600	1200	2	2	SW	4	8	0	0	0	0
31/05/2019	31	MW	0600	1200	3	3	SSW	4	8	1	1	0	0
31/05/2019	31	MW	0600	1200	4	4	SSW	4	8	1	1	0	0
31/05/2019	31	MW	0600	1200	5	4	SSW	4	8	1	1	0	0
31/05/2019	31	MW	0600	1200	6	4	SSW	4	8	1	1	0	0
27/06/2019	32	MW	0530	1130	1	2	SW	0	8	2	2	0	0
27/06/2019	32	MW	0530	1130	2	3	SW	0	7	2	2	0	0
27/06/2019	32	MW	0530	1130	3	3	SW	0	6	2	2	0	0
27/06/2019	32	MW	0530	1130	4	4	SW	0	3	2	2	0	0
27/06/2019	32	MW	0530	1130	5	3	SW	0	2	2	2	0	0
27/06/2019	32	MW	0530	1130	6	4	SW	0	1	2	2	0	0
12/07/2019	33	MW	0600	1200	1	3	SW	2	8	1	1	0	0
12/07/2019	33	MW	0600	1200	2	3	SW	0	8	2	2	0	0
12/07/2019	33	MW	0600	1200	3	4	SW	0	8	2	2	0	0
12/07/2019	33	MW	0600	1200	4	4	SW	0	8	2	2	0	0
12/07/2019	33	MW	0600	1200	5	4	SW	0	8	2	2	0	0
12/07/2019	33	MW	0600	1200	6	4	SW	0	7	2	2	0	0
05/08/2019	34	MW	0715	1315	1	3	SW	4	8	1	1	0	0
05/08/2019	34	MW	0715	1315	2	3	SW	4	8	1	1	0	0
05/08/2019	34	MW	0715	1315	3	4	SW	0	8	2	2	0	0
05/08/2019	34	MW	0715	1315	4	4	SW	0	7	2	2	0	0
05/08/2019	34	MW	0715	1315	5	5	SW	0	8	2	2	0	0
05/08/2019	34	MW	0715	1315	6	5	SW	0	7	2	2	0	0

## C.5 Black Grouse Surveys

Black grouse surveys were undertaken during the 2013, 2014, 2015 and 2017 breeding seasons. **Table C-7** details survey dates and weather data recorded. Refer to Annex B for survey methodology and Annex D for survey results.

**Table C-7 Meteorological conditions during black grouse surveys at Clauchrie (sorted chronologically)**

Date	Survey visit	Observer	Survey start time	Survey finish time	Survey hour	Wind speed	Wind direction	Rain	Cloud cover	Cloud height	Visibility	Frost	Snow
26/04/2013	1	SS/RDW/PR	0440	0700	1	3	WNW	1	6	2	2	0	0
26/04/2013	1	SS/RDW/PR	0440	0700	2	1	WNW	0	7	2	2	0	0
17/05/2013	2	DM/JM/CB	0400	0530	1	2	ENE	0	1	0	2	0	0
17/05/2013	2	DM/JM/CB	0400	0530	2	2	ENE	0	1	0	2	0	0
15/04/2014	3	AM	0440	0840	1	1	SE	0	3	2	2	1	0
15/04/2014	3	AM	0440	0840	2	1	SE	0	3	2	2	1	0
15/04/2014	3	AM	0440	0840	3	1	SE	0	3	2	2	1	0
15/04/2014	3	AM	0440	0840	4	1	SE	0	3	2	2	0	0
19/04/2014	3	AM	0515	0845	1	0	0	0	1	2	2	1	0
19/04/2014	3	AM	0515	0845	2	0	0	0	1	2	2	1	0
19/04/2014	3	AM	0515	0845	3	1	SE	0	3	2	2	1	0
19/04/2014	3	AM	0515	0845	4	1	SE	0	3	2	2	0	0
21/04/2014	3	AM	0515	0830	1	1	ENE	0	1	2	2	0	0
21/04/2014	3	AM	0515	0830	2	1	ENE	0	1	2	2	0	0
21/04/2014	3	AM	0515	0830	3	1	ENE	0	1	2	2	0	0
12/05/2014	4	AM	0500	0900	1	1	WNW	3	8	1	2	0	0
12/05/2014	4	AM	0500	0900	2	1	WNW	3	8	1	2	0	0
12/05/2014	4	AM	0500	0900	3	1	WNW	2	7	2	2	0	0
12/05/2014	4	AM	0500	0900	4	1	WNW	2	7	2	2	0	0
16/05/2014	4	AM	0440	0840	1	0	0	1	8	0	0	0	0
16/05/2014	4	AM	0440	0840	2	0	0	1	8	0	0	0	0
16/05/2014	4	AM	0440	0840	3	1	WNW	1	8	1	1	0	0
16/05/2014	4	AM	0440	0840	4	1	SW	0	8	1	1	0	0
28/04/2015	5	AM	0510	0830	1	2	WSW	3	7	2	2	1	1
28/04/2015	5	AM	0510	0830	2	2	WSW	3	7	2	2	1	1
28/04/2015	5	AM	0510	0830	3	2	WSW	3	7	2	2	0	1
14/05/2015	6	AM	0410	0730	1	2	E	0	6	2	2	0	0
14/05/2015	6	AM	0410	0730	2	3	E	0	6	2	2	0	0
14/05/2015	6	AM	0410	0730	3	3	E	0	6	2	2	0	0
15/05/2015	6	AM	0400	0730	1	0	0	0	6	2	2	0	0
15/05/2015	6	AM	0400	0730	2	1	SE	0	6	2	2	0	0
15/05/2015	6	AM	0400	0730	3	1	SE	0	6	2	2	0	0
15/05/2015	6	AM	0400	0730	4	1	SE	0	5	2	2	0	0
27/04/2017	7	AM	0510	0830	1	2	NW	0	7	1	2	0	0
27/04/2017	7	AM	0510	0830	2	2	NW	2	7	1	2	0	0
27/04/2017	7	AM	0510	0830	3	3	NW	3	7	2	2	0	0
28/04/2017	7	AM	0450	0800	1	0	0	1	8	1	2	0	0
28/04/2017	7	AM	0450	0800	2	1	NW	1	7	1	2	0	0

Date	Survey visit	Observer	Survey start time	Survey finish time	Survey hour	Wind speed	Wind direction	Rain	Cloud cover	Cloud height	Visibility	Frost	Snow
28/04/2017	7	AM	0450	0800	3	1	NW	0	6	2	2	0	0
10/05/2017	8	AM	0440	0800	1	0	0	0	7	2	2	1	0
10/05/2017	8	AM	0440	0800	2	0	0	0	5	2	2	0	0
10/05/2017	8	AM	0440	0800	3	1	NNW	0	3	2	2	0	0
11/05/2017	8	AM	0445	0800	1	0	0	0	4	2	2	1	0
11/05/2017	8	AM	0445	0800	2	1	ENE	0	4	2	2	0	0
11/05/2017	8	AM	0445	0800	3	1	ENE	0	4	2	2	0	0

### C.6 Woodland Point Count Surveys

Woodland Point Count surveys were undertaken during the 2012/2013 non-breeding season and 2013 breeding season. **Table C-8** details survey dates and weather data recorded. Refer to Annex B for survey methodology and Annex D for survey results.

**Table C-8 Meteorological conditions during Woodland Point Count surveys at Clauchrie (sorted chronologically)**

Date	Survey visit	Observer	Survey start time	Survey finish time	Survey hour	Wind speed	Wind direction	Rain	Cloud cover	Cloud height	Visibility	Frost	Snow
15/11/2012	NBR 1	MW	1030	1530	1	2	SW	1	8	1	0	0	0
15/11/2012	NBR 1	MW	1030	1530	2	2	SW	1	8	1	1	0	0
15/11/2012	NBR 1	MW	1030	1530	3	2	SW	0	8	1	1	0	0
15/11/2012	NBR 1	MW	1030	1530	4	2	SW	1	8	1	1	0	0
15/11/2012	NBR 1	MW	1030	1530	5	2	SW	1	8	1	1	0	0
16/11/2012	NBR 1	MW	830	1330	1	2	W	0	7	2	2	0	0
16/11/2012	NBR 1	MW	830	1330	2	2	W	0	7	2	2	0	0
16/11/2012	NBR 1	MW	830	1330	3	2	W	0	6	2	2	0	0
16/11/2012	NBR 1	MW	830	1330	4	2	W	0	6	2	2	0	0
16/11/2012	NBR 1	MW	830	1330	5	2	W	0	5	2	2	0	0
21/11/2012	NBR 1	ZS	900	1300	1	1	SW	0	5	2	2	0	0
21/11/2012	NBR 1	ZS	900	1300	2	2	SW	0	4	2	2	0	0
21/11/2012	NBR 1	ZS	900	1300	3	4	S	0	6	2	2	0	0
21/11/2012	NBR 1	ZS	900	1300	4	3	S	0	6	2	2	0	0
21/11/2012	NBR 1	RC	900	1530	1	2	SW	0	6	2	2	0	0
21/11/2012	NBR 1	RC	900	1530	2	2	SW	0	4	2	2	0	0
21/11/2012	NBR 1	RC	900	1530	3	1	S	0	8	1	1	0	0
21/11/2012	NBR 1	RC	900	1530	4	1	S	0	8	1	1	0	0
21/11/2012	NBR 1	RC	900	1530	5	0	0	0	4	2	2	0	0
21/11/2012	NBR 1	RC	900	1530	6	2	S	0	2	2	2	0	0
21/11/2012	NBR 1	RC	900	1530	6.5	3	S	0	1	2	2	0	0
09/01/2013	NBR 2	AR	1015	1415	1	1	S	0	7	2	2	0	0
09/01/2013	NBR 2	AR	1015	1415	2	0	0	0	6	2	2	0	0
09/01/2013	NBR 2	AR	1015	1415	3	1	W	0	7	2	2	0	0
09/01/2013	NBR 2	AR	1015	1415	4	1	W	0	7	2	2	0	0
09/01/2013	NBR 2	SS	1245	1545	1	2	SW	0	7	2	2	0	0

Date	Survey visit	Observer	Survey start time	Survey finish time	Survey hour	Wind speed	Wind direction	Rain	Cloud cover	Cloud height	Visibility	Frost	Snow
09/01/2013	NBR 2	SS	1245	1545	2	1	SW	0	6	2	2	0	0
09/01/2013	NBR 2	SS	1245	1545	3	2	SW	0	6	2	2	0	0
09/01/2013	NBR 2	RC	1020	1420	1	0	0	0	8	1	1	0	0
09/01/2013	NBR 2	RC	1020	1420	2	0	0	0	8	1	0	0	0
09/01/2013	NBR 2	RC	1020	1420	3	2	NE	0	6	2	2	0	0
09/01/2013	NBR 2	RC	1020	1420	4	0	0	0	7	1	2	0	0
09/01/2013	NBR 2	ZS	1025	1425	1	0	0	0	8	1	1	0	0
09/01/2013	NBR 2	ZS	1025	1425	2	0	0	0	8	1	0	0	0
09/01/2013	NBR 2	ZS	1025	1425	3	2	NE	0	6	2	2	0	0
09/01/2013	NBR 2	ZS	1025	1425	4	0	0	0	7	1	2	0	0
09/01/2013	NBR 2	KJ	1030	1430	1	2	SW	0	7	2	2	0	0
09/01/2013	NBR 2	KJ	1030	1430	2	1	SW	0	6	2	2	0	0
09/01/2013	NBR 2	KJ	1030	1430	3	2	SW	0	6	2	2	0	0
09/01/2013	NBR 2	KJ	1030	1430	4	2	SW	0	6	2	2	0	0
15/04/2013	BR 1	CB	1155	1550	1	6	SW	2	8	1	1	0	0
15/04/2013	BR 1	CB	1155	1550	2	6	SW	0	8	1	1	0	0
15/04/2013	BR 1	CB	1155	1550	3	6	SW	0	8	1	1	0	0
15/04/2013	BR 1	CB	1155	1550	4	5	SW	0	8	1	2	0	0
15/04/2013	BR 1	RC	1230	1600	1	4	S	3	8	1	1	0	0
15/04/2013	BR 1	RC	1230	1600	2	5	S	3	8	1	1	0	0
15/04/2013	BR 1	RC	1230	1600	3	4	S	0	8	1	1	0	0
15/04/2013	BR 1	RC	1230	1600	3.5	3	S	0	6	1	1	0	0
25/04/2013	BR 1	RDW	1045	1715	1	1	SSW	1	8	2	2	0	0
25/04/2013	BR 1	RDW	1045	1715	2	1	SSW	0	8	2	2	0	0
25/04/2013	BR 1	RDW	1045	1715	3	1	SSW	0	7	2	2	0	0
25/04/2013	BR 1	RDW	1045	1715	4	2	SSW	0	4	2	2	0	0
25/04/2013	BR 1	RDW	1045	1715	5	2	W	0	6	2	2	0	0
25/04/2013	BR 1	RDW	1045	1715	6	2	W	0	4	2	2	0	0
16/05/2013	BR 2	RDW	0950	1400	1	3	SSW	0	7	2	2	0	0
16/05/2013	BR 2	RDW	0950	1400	2	3	SSW	0	7	2	2	0	0
16/05/2013	BR 2	RDW	0950	1400	3	2	SSW	0	7	2	2	0	0
16/05/2013	BR 2	RDW	0950	1400	4	2	SSW	0	8	2	2	0	0
16/05/2013	BR 2	SS	1000	1400	1	3	SSW	0	6	2	2	0	0
16/05/2013	BR 2	SS	1000	1400	2	4	SSW	0	7	2	2	0	0
16/05/2013	BR 2	SS	1000	1400	3	4	SSW	0	8	2	2	0	0
16/05/2013	BR 2	SS	1000	1400	4	4	SSW	1	8	2	2	0	0
17/05/2013	BR 2	AR	0540	1050	1	1	N	0	2	2	2	0	0
17/05/2013	BR 2	AR	0540	1050	2	1	N	0	2	2	2	0	0
17/05/2013	BR 2	AR	0540	1050	3	0	0	0	2	2	2	0	0
17/05/2013	BR 2	AR	0540	1050	4	0	NE	0	2	2	2	0	0
17/05/2013	BR 2	AR	0540	1050	5	1	NE	0	2	2	2	0	0
02/07/2013	BR 3	CB	1010	1600	1	6	SE	0	8	2	2	0	0
02/07/2013	BR 3	CB	1010	1600	2	6	SE	1	8	2	2	0	0

Date	Survey visit	Observer	Survey start time	Survey finish time	Survey hour	Wind speed	Wind direction	Rain	Cloud cover	Cloud height	Visibility	Frost	Snow
02/07/2013	BR 3	CB	1010	1600	3	6	SE	4	8	2	2	0	0
02/07/2013	BR 3	CB	1010	1600	4	6	SE	4	8	1	1	0	0
02/07/2013	BR 3	CB	1010	1600	5	6	SE	4	8	1	0	0	0
02/07/2013	BR 3	CB	1010	1600	6	6	SE	4	8	1	0	0	0
02/07/2013	BR 3	FD	1000	1500	1	5	SSE	1	8	1	2	0	0
02/07/2013	BR 3	FD	1000	1500	2	5	S	2	8	1	2	0	0
02/07/2013	BR 3	FD	1000	1500	3	5	SSW	2	8	1	1	0	0
02/07/2013	BR 3	FD	1000	1500	4	5	SSW	2	8	1	0	0	0
02/07/2013	BR 3	FD	1000	1500	5	6	SSW	3	8	1	0	0	0
03/07/2013	BR 3	CB	1045	1630	1	3	NW	0	7	1	2	0	0
03/07/2013	BR 3	CB	1045	1630	2	3	NW	0	7	1	2	0	0
03/07/2013	BR 3	CB	1045	1630	3	3	W	0	7	1	2	0	0
03/07/2013	BR 3	CB	1045	1630	4	3	W	0	7	2	2	0	0
03/07/2013	BR 3	CB	1045	1630	5	4	W	0	7	2	2	0	0
03/07/2013	BR 3	CB	1045	1630	6	4	W	0	7	2	2	0	0

## ANNEX D ORNITHOLOGICAL SURVEY RESULTS

### D.1 Flight Activity Records: Target Species

In accordance with SNH Guidance (2010<sup>i</sup>, 2013<sup>ii</sup>, 2014<sup>iii</sup> and 2017<sup>iv</sup>), target species are those which may be considered to be at risk from the potential effects of windfarms. All flights of target species within the turbine area and the surrounding area were mapped and are detailed in **Table D-1** and **Table D-2**.

**Table D-1 Details of target species recorded during flight activity surveys (sorted by species): 2012 to 2014**

Date	VP	Observer	Species	No. of birds	Duration (s)	Inside CRAA <sup>1</sup> (seconds)			Outside CRAA (seconds)		
						0-20m	21-125m	>126m	0-20m	21-125m	>126m
03/06/2013	5	FD	Black grouse	1	30.00	0.00	0.00	0.00	30.00	0.00	0.00
14/01/2014	3	FD	Goldeneye	1	45.00	0.00	0.00	22.91	0.00	0.00	37.09
26/04/2013	2	SS	Greylag goose	20	60.00	6.55	13.11	17.47	8.45	16.89	22.53
13/01/2014	2	CB	Greylag goose	6	91.00	0.24	0.00	0.00	6.76	0.00	0.00
13/01/2014	2	CB	Greylag goose	6	19.00	26.57	0.00	0.00	35.43	0.00	0.00
01/07/2013	1	CB	Hen harrier	2	85.00	0.24	0.00	0.00	6.76	0.00	0.00
24/10/2013	1	CB	Hen harrier	1	7.00	26.57	0.00	0.00	35.43	0.00	0.00
24/10/2013	1	CB	Hen harrier	1	62.00	0.00	90.00	0.00	0.00	0.00	0.00
14/01/2014	3	FD	Hen harrier	1	90.00	44.17	28.47	0.00	0.83	0.53	0.00
27/02/2014	1	JM	Hen harrier	1	74.00	0.00	0.00	0.00	23.00	0.00	0.00
28/02/2014	4	JM	Hen harrier	1	23.00	2.27	34.10	6.82	12.73	190.90	38.18
28/02/2014	4	JM	Hen harrier	1	285.00	0.00	0.00	0.00	0.00	30.00	0.00
24/10/2013	1	CB	Herring gull	5	30.00	0.00	0.00	0.00	50.00	0.00	0.00
24/10/2013	1	CB	Merlin	1	50.00	0.00	0.00	0.00	30.00	0.00	0.00

**Table D-2 Details of target species recorded during flight activity surveys (sorted by species): 2018**

Date	VP	Observer	Species	No. of birds	Duration (s)	Inside CRAA <sup>1</sup> (seconds)					Outside CRAA (seconds)				
						0-20m	21-40m	41-100m	101-150m	>150m	0-20m	21-40m	41-100m	101-150m	>150m
02/04/2018	8	PC	Golden plover	2	21.00	0.00	6.48	0.00	0.00	0.00	0.00	14.52	0.00	0.00	0.00
01/04/2018	9	PC	Goshawk	1	44.00	0.00	0.00	21.04	0.00	0.00	0.00	0.00	0.00	22.96	0.00
01/04/2018	9	PC	Goshawk	1	32.00	0.00	0.00	19.76	0.00	0.00	0.00	0.00	0.00	12.24	0.00
08/04/2018	10	PC	Goshawk	1	63.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	63.00	0.00
08/04/2018	10	PC	Goshawk	1	61.00	0.00	0.00	0.00	0.00	0.00	0.00	61.00	0.00	0.00	0.00
08/04/2018	10	PC	Goshawk	1	38.00	0.00	0.00	0.00	0.00	0.00	0.00	38.00	0.00	0.00	0.00
16/04/2018	9	PC	Goshawk	1	37.00	0.00	11.32	0.00	0.00	0.00	0.00	25.68	0.00	0.00	0.00
21/04/2018	11	PC	Goshawk	1	210.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	120.00	90.00	0.00
28/04/2018	11	PC	Goshawk	1	80.00	0.00	0.00	38.91	0.00	0.00	0.00	0.00	0.00	41.09	0.00
20/05/2018	10	PC	Goshawk	1	76.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	76.00	0.00	0.00

<sup>1</sup> CRAA = Collision Risk Analysis Area, 500 m buffer from the proposed turbine locations.

Date	VP	Observer	Species	No. of birds	Duration (s)	Inside CRAA <sup>1</sup> (seconds)					Outside CRAA (seconds)				
						0-20m	21-40m	41-100m	101-150m	>150m	0-20m	21-40m	41-100m	101-150m	>150m
09/06/2018	9	PC	Goshawk	1	47.00	0.00	0.00	27.89	0.00	0.00	0.00	0.00	19.11	0.00	0.00
22/06/2018	10	PC	Goshawk	1	62.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	62.00	0.00	0.00
07/07/2018	6	PC	Goshawk	1	96.00	0.00	0.00	0.00	24.32	0.00	0.00	0.00	0.00	71.68	0.00
09/08/2018	11	MW	Goshawk	1	36.00	18.30	13.07	0.00	0.00	0.00	2.70	1.93	0.00	0.00	0.00
28/08/2018	7	MW	Goshawk	1	45.00	0.00	42.45	0.00	0.00	0.00	0.00	2.55	0.00	0.00	0.00
29/08/2018	8	MW	Goshawk	1	50.00	4.14	37.29	0.00	0.00	0.00	0.86	7.71	0.00	0.00	0.00
30/08/2018	10	MW	Goshawk	1	28.00	0.00	0.00	0.00	0.00	0.00	0.00	28.00	0.00	0.00	0.00
02/04/2018	8	PC	Greylag goose	2	55.00	0.00	0.00	0.00	0.00	0.00	10.00	30.00	15.00	0.00	0.00
02/04/2018	8	PC	Greylag goose	2	36.00	1.33	6.64	0.00	0.00	0.00	4.67	23.36	0.00	0.00	0.00
03/04/2018	6	PC	Greylag goose	2	66.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	66.00	0.00	0.00
08/04/2018	10	PC	Greylag goose	2	57.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	57.00	0.00	0.00
08/04/2018	10	PC	Greylag goose	1	39.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	39.00	0.00	0.00
08/04/2018	10	PC	Greylag goose	2	48.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	48.00	0.00	0.00
16/04/2018	9	PC	Greylag goose	2	22.00	0.00	0.00	0.00	0.00	0.00	0.00	22.00	0.00	0.00	0.00
13/05/2018	8	PC	Greylag goose	2	43.00	0.00	0.00	0.00	0.00	0.00	13.00	30.00	0.00	0.00	0.00
13/05/2018	8	PC	Greylag goose	5	21.00	0.00	0.00	0.00	0.00	0.00	21.00	0.00	0.00	0.00	0.00
13/05/2018	8	PC	Greylag goose	2	58.00	0.00	0.00	20.51	0.00	0.00	0.00	0.00	37.49	0.00	0.00
20/05/2018	10	PC	Greylag goose	2	49.00	0.00	0.00	0.00	0.00	0.00	0.00	49.00	0.00	0.00	0.00
09/06/2018	9	PC	Greylag goose	2	53.00	0.00	0.00	0.00	0.00	0.00	0.00	53.00	0.00	0.00	0.00
29/08/2018	8	MW	Osprey	1	75.00	0.00	22.51	15.01	0.00	0.00	0.00	22.49	14.99	0.00	0.00
08/04/2018	10	PC	Pink-footed goose	96	128.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	128.00	0.00	0.00
15/04/2018	7	PC	Pink-footed goose	139	168.00	0.00	0.00	0.00	119.25	0.00	0.00	0.00	0.00	48.75	0.00
21/04/2018	11	PC	Red kite	1	147.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	75.00	72.00	0.00

## D.2 Flight Activity Records: Secondary Species

**Table D-3** details secondary species recorded per season during flight activity surveys. Secondary species were recorded to give an indication of the use of the site by these species. Refer to Annex B for survey methodology and Annex C for weather data.

**Table D-3 Summary of secondary species recorded during flight activity surveys**

Species	2012/2013 non-breeding season		2013 breeding season		2013/2014 non-breeding season		2018 breeding season	
	No. of records	No. of birds	No. of records	No. of birds	No. of records	No. of birds	No. of records	No. of birds
Buzzard	36	46	39	47	95	107	77	88
Carrion crow	0	0	2	2	17	24	2	2
Cormorant	0	0	2	2	1	6	0	0
Goosander	1	1	1	1	0	0	0	0
Grey heron	2	2	7	8	6	6	2	2
Jackdaw	0	0	0	0	1	1	0	0
Jay	3	2	1	1	6	14	2	4
Kestrel	4	4	7	9	20	21	0	0
Mallard	16	109	9	11	10	146	6	16
Moorhen	0	0	0	0	1	4	0	0
Raven	86	133	16	25	110	189	60	95
Red grouse	2	3	1	1	4	4	0	0
Sparrowhawk	8	9	5	5	11	12	15	15
Tawny owl	0	0	0	0	0	0	1	1
Teal	1	6	3	3	5	19	1	2
Wigeon	0	0	1	1	0	0	0	0
Woodcock	1	15	0	47	0	0	0	0

### D.3 Moorland Breeding Bird Records

Moorland breeding bird surveys were undertaken during the 2013 and 2018 breeding seasons and focussed on recording activity of upland wader species within the survey area (**Table D-4**). Survey methodology is detailed in Annex B and survey timing/weather conditions in Annex C.

**Table D-4 Wader activity recorded during moorland breeding bird surveys: 2013 and 2018 breeding seasons**

Date	Survey visit	Observer	Species	Number recorded	Notes
15/04/2013	1	RA	Snipe	2	
15/04/2013	1	RA	Snipe	2	

### D.4 Winter Walkover Records

**Table D-5** details all the species recorded during the 2012/2013, 2013/2014 and 2018/2019 non-breeding seasons. Refer to Annex B for survey methodology and Annex C for weather data.

**Table D-5 Winter walkover survey records: 2012/2013, 2013/2014 and 2018/2019 non-breeding seasons**

Date	Survey visit	Observer	Species	Number recorded	Notes
21/11/2012	1	SS	Snipe	1	Flushed
21/11/2012	1	SS	Snipe	1	Flushed
21/11/2012	1	SS	Snipe	1	Flushed
21/11/2012	1	RA	Snipe	1	Flushed
21/11/2012	1	SS	Snipe	1	Flushed
21/11/2012	1	SS	Wren	1	
21/11/2012	1	SS	Snipe	1	Flushed
21/11/2012	1	RA	Raven	1	Calling
21/11/2012	1	RA	Raven	1	
21/11/2012	1	RA	Raven	2	
21/11/2012	1	KJ	Wren	2	
21/11/2012	1	KJ	Raven	1	
21/11/2012	1	SS	Great spotted woodpecker	1	
21/11/2012	1	SS	Raven	1	displaying
21/11/2012	1	RA	Raven	1	
21/11/2012	1	RA	Raven	1	
21/11/2012	1	RA	Raven	1	
21/11/2012	1	RA	Buzzard	1	circling above trees
21/11/2012	1	ZS	Woodcock	1	flushed
09/01/2013	2	RA	Raven	2	
09/01/2013	2	RA	Raven	1	
09/01/2013	2	RA	Carriion crow	1	Calling
09/01/2013	2	RA	Raven	1	
09/01/2013	2	RA	Buzzard	1	perched, on drive in
09/01/2013	2	RA	Buzzard	1	perched, on drive in

Date	Survey visit	Observer	Species	Number recorded	Notes
09/01/2013	2	RA	Raven	2	calling
09/01/2013	2	RA	Carriion crow	1	Calling
09/01/2013	2	RA	Wren	1	Calling
09/01/2013	2	SS	Wren	1	
09/01/2013	2	SS	Wren	1	
09/01/2013	2	SS	Robin	1	
09/01/2013	2	SS	Buzzard	1	
22/02/2013	3	SS	Raven	2	
22/02/2013	3	SS	Buzzard	2	
22/02/2013	3	SS	Wren	2	
22/02/2013	3	SS	Bullfinch	2	1 pair
22/02/2013	3	SS	Jay	1	
22/02/2013	3	SS	Robin	1	
22/02/2013	3	SS	Buzzard	1	
22/02/2013	3	SS	Bullfinch	2	
22/02/2013	3	RC	Raven	1	
22/02/2013	3	RC	Raven	1	
22/02/2013	3	RC	Raven	1	
22/02/2013	3	RC	Raven	2	
22/02/2013	3	RC	Raven	2	
22/02/2013	3	RC	Raven	2	
22/02/2013	3	RC	Raven	1	
22/02/2013	3	RC	Raven	1	
22/02/2013	3	RC	Raven	1	
22/02/2013	3	RC	Raven	2	
22/02/2013	3	RC	Raven	2	
22/02/2013	3	RC	Raven	2	
22/02/2013	3	RC	Raven	1	
10/12/2013	4	PR	Jay	1	
10/12/2013	4	PR	Coal tit	4	
10/12/2013	4	PR	Raven	3	
10/12/2013	4	PR	Meadow pipit	2	
10/12/2013	4	PR	Woodcock	1	
10/12/2013	4	PR	Wren	2	
14/01/2014	5	CB	Carriion crow	2	
14/01/2014	5	CB	Raven	1	
14/01/2014	5	CB	Wren	1	
14/01/2014	5	CB	Great spotted woodpecker	1	
14/01/2014	5	CB	Dunnock	1	
27/01/2014	5	CB	Red grouse	1	
27/01/2014	5	CB	Meadow pipit	1	
27/01/2014	5	CB	Lesser redpoll	1	
29/11/2018	6	MW	Blackbird	1	
29/11/2018	6	MW	Bullfinch	8	
29/11/2018	6	MW	Chaffinch	60	
29/11/2018	6	MW	Coal tit	1	
29/11/2018	6	MW	Dunnock	1	
29/11/2018	6	MW	Meadow pipit	25	
29/11/2018	6	MW	Meadow pipit	35	

Date	Survey visit	Observer	Species	Number recorded	Notes
29/11/2018	6	MW	Mistle thrush	4	
29/11/2018	6	MW	Robin	1	
29/11/2018	6	MW	Song thrush	6	
29/11/2018	6	MW	Woodpigeon	1	
29/11/2018	6	MW	Wren	1	
30/11/2018	6	MW	Blackbird	1	
30/11/2018	6	MW	Bullfinch	10	
30/11/2018	6	MW	Buzzard	2	
30/11/2018	6	MW	Chaffinch	40	
30/11/2018	6	MW	Coal tit	1	
30/11/2018	6	MW	Common crossbill	30	
30/11/2018	6	MW	Dunnock	1	
30/11/2018	6	MW	Golden plover	34	
30/11/2018	6	MW	Great spotted woodpecker	1	
30/11/2018	6	MW	Jay	1	
30/11/2018	6	MW	Meadow pipit	35	
30/11/2018	6	MW	Mistle thrush	1	
30/11/2018	6	MW	Raven	6	
30/11/2018	6	MW	Robin	1	
30/11/2018	6	MW	Song thrush	1	
30/11/2018	6	MW	Wren	1	
01/12/2018	7	MW	Blackbird	1	
01/12/2018	7	MW	Blue tit	3	
01/12/2018	7	MW	Bullfinch	6	
01/12/2018	7	MW	Buzzard	2	
01/12/2018	7	MW	Chaffinch	35	
01/12/2018	7	MW	Common crossbill	15	
01/12/2018	7	MW	Fieldfare	20	
01/12/2018	7	MW	Goldcrest	10	
01/12/2018	7	MW	Great spotted woodpecker	1	
01/12/2018	7	MW	Meadow pipit	35	
01/12/2018	7	MW	Mistle thrush	4	
01/12/2018	7	MW	Raven	8	
01/12/2018	7	MW	Redwing	12	
01/12/2018	7	MW	Reed bunting	1	
01/12/2018	7	MW	Robin	1	
01/12/2018	7	MW	Woodpigeon	1	
01/12/2018	7	MW	Wren	6	Minimum count
02/12/2018	7	MW	Carriion crow	1	
02/12/2018	7	MW	Coal tit	10	Minimum count
02/12/2018	7	MW	Dunnock	1	
02/12/2018	7	MW	Meadow pipit	30	
02/12/2018	7	MW	Robin	1	
02/12/2018	7	MW	Wren	1	

Date	Survey visit	Observer	Species	Number recorded	Notes
18/12/2018	7	MW	Blackbird	1	
18/12/2018	7	MW	Bullfinch	8	
18/12/2018	7	MW	Buzzard	1	
18/12/2018	7	MW	Chaffinch	1	
18/12/2018	7	MW	Common crossbill	25	Minimum count
18/12/2018	7	MW	Meadow pipit	1	
18/12/2018	7	MW	Robin	1	
18/12/2018	7	MW	Woodcock	6	Minimum count, no locations given
19/12/2018	7	MW	Blue tit	1	
19/12/2018	7	MW	Bullfinch	15	Minimum count
19/12/2018	7	MW	Chaffinch	30	
19/12/2018	7	MW	Coal tit	1	
19/12/2018	7	MW	Common crossbill	10	Minimum count
19/12/2018	7	MW	Robin	1	
20/12/2018	7	MW	Blue tit	4	
20/12/2018	7	MW	Bullfinch	8	
20/12/2018	7	MW	Buzzard	2	
20/12/2018	7	MW	Chaffinch	60	
20/12/2018	7	MW	Coal tit	10	
20/12/2018	7	MW	Goldcrest	1	
20/12/2018	7	MW	Raven	6	
21/12/2018	7	MW	Blackbird	1	
21/12/2018	7	MW	Blue tit	1	
21/12/2018	7	MW	Bullfinch	12	
21/12/2018	7	MW	Buzzard	1	
21/12/2018	7	MW	Carriion crow	1	
21/12/2018	7	MW	Chaffinch	25	Minimum count
21/12/2018	7	MW	Coal tit	1	
21/12/2018	7	MW	Goldcrest	1	
21/12/2018	7	MW	Goldeneye	2	Pair
21/12/2018	7	MW	Mallard	47	
21/12/2018	7	MW	Meadow pipit	4	
21/12/2018	7	MW	Raven	1	
21/12/2018	7	MW	Reed bunting	1	
21/12/2018	7	MW	Teal	1	
21/12/2018	7	MW	Woodcock	1	
11/02/2019	8	MW	Blue tit	1	
11/02/2019	8	MW	Bullfinch	8	
11/02/2019	8	MW	Coal tit	1	
11/02/2019	8	MW	Common crossbill	15	
11/02/2019	8	MW	Goldcrest	1	
11/02/2019	8	MW	Jay	1	
11/02/2019	8	MW	Robin	1	

Date	Survey visit	Observer	Species	Number recorded	Notes
12/02/2019	8	MW	Blackbird	1	
12/02/2019	8	MW	Buzzard	1	
12/02/2019	8	MW	Chaffinch	1	
12/02/2019	8	MW	Coal tit	1	
12/02/2019	8	MW	Common crossbill	1	
12/02/2019	8	MW	Goldcrest	1	
12/02/2019	8	MW	Hen harrier	1	Female
12/02/2019	8	MW	Mallard	1	
12/02/2019	8	MW	Mistle thrush	1	
12/02/2019	8	MW	Raven	1	
12/02/2019	8	MW	Song thrush	1	
12/02/2019	8	MW	Teal	1	
13/02/2019	8	MW	Blackbird	1	
13/02/2019	8	MW	Bullfinch	1	
13/02/2019	8	MW	Buzzard	1	
13/02/2019	8	MW	Carriion crow	1	
13/02/2019	8	MW	Chaffinch	1	
13/02/2019	8	MW	Coal tit	1	
13/02/2019	8	MW	Common crossbill	1	
13/02/2019	8	MW	Dunnock	1	
13/02/2019	8	MW	Goldeneye	2	Two males
13/02/2019	8	MW	Grey heron	1	
13/02/2019	8	MW	Hen harrier	1	Female
13/02/2019	8	MW	Mallard	28	
13/02/2019	8	MW	Meadow pipit	1	
13/02/2019	8	MW	Raven	1	
13/02/2019	8	MW	Robin	1	
13/02/2019	8	MW	Teal	1	
13/02/2019	8	MW	Wren	1	
14/02/2019	8	MW	Blackbird	1	
14/02/2019	8	MW	Bullfinch	1	
14/02/2019	8	MW	Buzzard	1	
14/02/2019	8	MW	Carriion crow	1	
14/02/2019	8	MW	Chaffinch	1	
14/02/2019	8	MW	Coal tit	1	
14/02/2019	8	MW	Common crossbill	25	
14/02/2019	8	MW	Dunnock	1	
14/02/2019	8	MW	Goldcrest	1	
14/02/2019	8	MW	Goldeneye	3	
14/02/2019	8	MW	Meadow pipit	4	
14/02/2019	8	MW	Mistle thrush	1	
14/02/2019	8	MW	Raven	1	
14/02/2019	8	MW	Robin	1	
14/02/2019	8	MW	Song thrush	1	

Date	Survey visit	Observer	Species	Number recorded	Notes
14/02/2019	8	MW	Teal	2	
14/02/2019	8	MW	Woodpigeon	1	
14/02/2019	8	MW	Wren	1	

## D.5 Scarce Breeding Bird Records

**Table D-6** details all records of raptors and owls recorded during breeding bird surveys in 2013, 2014, 2015, 2017, 2018 and 2019, however only Annex 1<sup>2</sup> or Schedule 1<sup>3</sup> species are considered to be scarce breeding birds (i.e. target species). Refer to Annex B for survey methodology, Annex C for weather data and Confidential Technical Appendix 9.2 for confidential data relating to goshawk, osprey and barn owl.

**Table D-6 Raptor and owl records: 2013, 2014, 2015, 2017, 2018 and 2019 breeding seasons**

Date	Species	Annex 1/ Schedule 1	Number recorded	Sex	Age	Notes
15/04/2013	Buzzard	No	2	-	-	
15/04/2013	Buzzard	No	1	-	-	
25/04/2013	Merlin	Yes	1	Female	Adult	1618: east of Loch Scalloch boat house
08/05/2013	Buzzard	No	2	-	-	
12/05/2013	Buzzard	No	3	-	-	
16/05/2013	Buzzard	No	4	-	-	2 individuals, 1 pair
16/05/2013	Merlin	Yes	1	Male	Adult	Seen on drive round
16/05/2013	Buzzard	No	1	Female	Adult	
21/05/2013	Osprey	Yes	1	-	Adult	
24/05/2013	Barn owl	Yes	2	-	Adult	Known productive site, two nest boxes commonly occupied, this year one pair of owls on site, but no breeding success
28/05/2013	Buzzard	No	1	-	-	Black Clauchrie
28/05/2013	Kestrel	No	1	-	-	Black Clauchrie
28/05/2013	Osprey	Yes	1	-	Adult	
03/06/2013	Buzzard	No	1	-	-	Pale morph, Loch Scalloch
05/06/2013	Golden eagle	Yes	1	-	Juvenile	Mobbed by 2 ravens above Loch Moan
08/06/2013	Osprey	Yes	1	-	Adult	
11/06/2013	Short-eared owl	Yes	1	-	Adult	Black Clauchrie
14/06/2013	Merlin	Yes	1	-	Adult	White Clauchrie
02/07/2013	Buzzard	No	2	-	-	
16/07/2013	Buzzard	No	2	-	-	Black Clauchrie
19/06/2013	Barn owl	Yes	1	-	Adult	
20/07/2013	Honey buzzard	Yes	1	-	-	Passing through
10/10/2013	Merlin	Yes	1	-	Adult	Seen after VP ended
15/04/2014	Buzzard	No	5	-	-	
19/04/2014	Buzzard	No	3	-	-	
19/04/2014	Osprey	Yes	1	-	Adult	Seen at 0653 during black grouse survey
12/05/2014	Buzzard	No	4	-	-	
12/05/2014	Osprey	Yes	1	-	Adult	1353: Landed on pine tree (Default height band 2 & 3)
12/05/2014	Osprey	Yes	1	-	Adult	1400: Circling above pines, default height band 3
12/05/2014	Osprey	Yes	1	-	Adult	Circling with buzzard for short while, default height band 3
12/05/2014	Sparrowhawk	No	1	-	-	
12/05/2014	Sparrowhawk	No	1	Female	Adult	
16/05/2014	Sparrowhawk	No	1	Female	Adult	
26/05/2014	Buzzard	No	13	-	-	
27/05/2014	Osprey	Yes	1	Male	Adult	Flew in, carrying a fish, landed at nest platform, fed the female, flew away with fish and landed on second platform just to east of platform with nest on it.
27/05/2014	Sparrowhawk	No	1	Female	Adult	

<sup>2</sup> Annex 1 of the EU Bird Directive

<sup>3</sup> Schedule 1 of the Wildlife and Countryside Act 1981, as amended by the Nature Conservation Act (Scotland) 2004

Date	Species	Annex 1/ Schedule 1	Number recorded	Sex	Age	Notes
25/06/2014	Buzzard	No	6	-	-	
25/06/2014	Osprey	Yes	2	-	Adult	
26/06/2014	Buzzard	No	1	-	-	
26/06/2014	Goshawk	Yes	1	-	Adult	Seen at 11:48
26/06/2014	Osprey	Yes	2	-	Adult	
27/06/2014	Sparrowhawk	No	1	-	-	
14/07/2014	Buzzard	No	3	-	-	
14/07/2014	Buzzard	No	4	-	-	
15/07/2014	Buzzard	No	3	-	-	
15/07/2014	Kestrel	No	1	-	-	
15/07/2014	Buzzard	No	4	-	-	One of the buzzards was hunting
15/07/2014	Kestrel	No	1	-	-	
15/07/2014	Kestrel	No	1	-	-	
15/07/2014	Kestrel	No	1	-	-	Hunting
20/08/2014	Buzzard	No	5	-	-	
20/08/2014	Kestrel	No	1	-	-	
20/08/2014	Kestrel	No	1	-	-	
20/08/2014	Osprey	Yes	3	-	Adult/Juvenile	Flying around loch near nest, either adult and 2 juveniles or pair and one juvenile
20/08/2014	Sparrowhawk	No	3	-	-	
20/08/2014	Buzzard	No	4	-	-	
20/08/2014	Kestrel	No	1	-	-	
20/08/2014	Sparrowhawk	No	1	Female	Adult	
14/01/2015	Barn owl	Yes	1	-	Adult	
15/01/2015	Barn owl	Yes	1	-	Adult	
05/03/2015	Barn owl	Yes	2	-	Adult	Pair in an empty building
20/04/2015	Buzzard	No	1	-	-	
20/04/2015	Buzzard	No	1	-	-	
20/04/2015	Buzzard	No	1	-	-	
20/04/2015	Buzzard	No	1	-	-	
21/04/2015	Buzzard	No	1	-	-	
21/04/2015	Buzzard	No	1	-	-	
21/04/2015	Goshawk	Yes	1	Male	Adult	Seen at 1146, displaying then soaring/circling. Drifted off to east.
28/04/2015	Sparrowhawk	No	1	Male	Adult	Hunting
14/05/2015	Buzzard	No	1	-	-	
14/05/2015	Buzzard	No	1	-	-	
15/05/2015	Buzzard	No	1	-	-	
28/05/2015	Buzzard	No	1	-	-	Soaring/hunting
28/05/2015	Buzzard	No	1	-	-	
28/05/2015	Osprey	Yes	1	-	Adult	Flew and landed in pine on south side of loch and then ate a fish. No birds noted on nest
13/06/2015	Buzzard	No	1	-	-	
13/06/2015	Buzzard	No	1	-	-	
13/06/2015	Buzzard	No	1	-	-	
13/06/2015	Buzzard	No	1	-	-	Hunting/hovering
13/06/2015	Sparrowhawk	No	1	Male	Adult	
15/06/2015	Buzzard	No	1	-	-	
15/06/2015	Buzzard	No	1	-	-	

Date	Species	Annex 1/ Schedule 1	Number recorded	Sex	Age	Notes
15/06/2015	Osprey	Yes	1	Male	Adult	
19/06/2015	Buzzard	No	2	-	-	Soaring, chasing each other
19/06/2015	Buzzard	No	1	-	-	
10/07/2015	Buzzard	No	1	-	-	Circling, dropped quickly into trees
10/07/2015	Kestrel	No	1	-	-	Hovering
13/07/2015	Buzzard	No	1	-	Juvenile	
13/07/2015	Buzzard	No	2	-	-	
13/07/2015	Buzzard	No	1	-	-	Calls
13/07/2015	Buzzard	No	1	-	-	
13/07/2015	Buzzard	No	2	-	Juvenile	Calls
13/07/2015	Buzzard	No	1	-	-	
20/07/2015	Buzzard	No	1	-	-	
20/07/2015	Buzzard	No	1	-	-	
20/07/2015	Buzzard	No	1	-	-	
20/07/2015	Buzzard	No	1	-	-	
13/08/2015	Buzzard	No	3	-	Adult/Juvenile	1 juvenile
13/08/2015	Buzzard	No	1	-	-	
13/08/2015	Buzzard	No	1	-	-	
13/08/2015	Buzzard	No	3	-	-	
13/08/2015	Buzzard	No	1	-	-	
13/08/2015	Buzzard	No	1	-	Juvenile	
13/08/2015	Sparrowhawk	No	1	-	-	
27/03/2017	Barn owl	Yes	1	-	Adult	Hunting near Shalloch Well
27/03/2017	Buzzard	No	1	-	-	In flight
27/03/2017	Buzzard	No	1	-	-	In flight
27/03/2017	Buzzard	No	1	-	-	In flight
27/03/2017	Buzzard	No	1	-	-	In flight
27/03/2017	Buzzard	No	1	-	-	In flight
27/03/2017	Buzzard	No	1	-	-	
27/03/2017	Goshawk	Yes	2	Male/Female	Adult	Copulation, calls, display then flew out of sight into trees - possible nest.
28/03/2017	Buzzard	No	1	-	-	
28/03/2017	Buzzard	No	2	-	-	With material
28/03/2017	Buzzard	No	1	-	-	Being mobbed by raven near possible nest
28/03/2017	Buzzard	No	1	-	-	In flight
26/04/2017	Buzzard	No	1	-	-	
27/04/2017	Buzzard	No	1	-	-	In flight
28/04/2017	Buzzard	No	1	-	-	In flight
28/04/2017	Buzzard	No	1	-	-	In flight
28/04/2017	Buzzard	No	1	-	-	
28/04/2017	Buzzard	No	1	-	-	In flight
28/04/2017	Sparrowhawk	No	1	Male	Adult	In flight, male
29/04/2017	Buzzard	No	1	-	-	Hunting, hovering
29/04/2017	Buzzard	No	1	-	-	In flight
29/04/2017	Osprey	Yes	1	Male	Adult	Mobbed by 3 common gulls
10/05/2017	Buzzard	No	1	-	-	
10/05/2017	Buzzard	No	2	-	-	
10/05/2017	Buzzard	No	1	-	-	In flight

Date	Species	Annex 1/ Schedule 1	Number recorded	Sex	Age	Notes
10/05/2017	Buzzard	No	1	-	-	In flight
10/05/2017	Kestrel	No	1	Male	Adult	Landed in clearfell area, male
11/05/2017	Buzzard	No	1	-	-	
24/05/2017	Buzzard	No	2	-	-	In flight one bird drifted off south east
24/05/2017	Buzzard	No	1	-	-	
24/05/2017	Buzzard	No	1	-	-	In flight
24/05/2017	Buzzard	No	1	-	-	In flight
24/05/2017	Goshawk	Yes	1	Male	Adult	Adult, soaring 1705-1708, moved off north
25/05/2017	Buzzard	No	1	-	-	In flight
25/05/2017	Osprey	Yes	2	Male/Female	Adult	Pair present throughout survey, not much flight activity. Male perched low on dead tree west of nest beginning of survey, Flew and landed on platform at 1130, between 1155 and 1210 circling and hovering then landed again in tree by nest, 1216 circled and flew off south west. Female on nest, presumably incubating
21/06/2017	Buzzard	No	1	-	-	
21/06/2017	Buzzard	No	1	-	-	Hunting, hovering. Then moved south, vocal
21/06/2017	Buzzard	No	2	-	-	In flight
21/06/2017	Buzzard	No	1	-	-	Vocal, circling over area mature pines, very vocal, agitated
21/06/2017	Buzzard	No	1	-	-	
21/06/2017	Buzzard	No	1	-	-	Hunting, hovering
21/06/2017	Sparrowhawk	No	1	Female	Adult	In flight, female
22/06/2017	Buzzard	No	1	-	-	Hunting, hovering
22/06/2017	Buzzard	No	1	-	-	Hunting, hovering
22/06/2017	Buzzard	No	1	-	-	Hunting, hovering
22/06/2017	Buzzard	No	1	-	-	Hunting
22/06/2017	Osprey	Yes	1	Male	Adult	1020-1024 male osprey landing on nest from south west, dropped fish and flew off south west.
23/06/2017	Buzzard	No	1	-	-	In flight
23/06/2017	Buzzard	No	1	-	-	Hunting, hovering
23/06/2017	Buzzard	No	1	-	-	In flight
23/06/2017	Buzzard	No	1	-	-	In flight
23/06/2017	Buzzard	No	1	-	-	In flight
23/06/2017	Buzzard	No	1	-	-	
19/07/2017	Buzzard	No	1	-	-	
20/07/2017	Buzzard	No	1	-	-	
20/07/2017	Kestrel	No	1	-	-	
20/07/2017	Osprey	Yes	1	Male/Female	Adult/Juvenile	
18/08/2017	Buzzard	No	1	-	-	
18/08/2017	Sparrowhawk	No	1	-	-	
14/04/2018	Buzzard	No	1	-	-	Flying slowly south west from Craigenreoch
14/04/2018	Buzzard	No	1	-	-	Circling at 70m height slowly moving between Pinbreck and Polmaddie Hill
14/04/2018	Buzzard	No	1	-	-	Circling at 50m height north towards Cairn Hill
14/04/2018	Goshawk	Yes	1	Male	Adult	Adult male flying quickly west towards Loch Hill at 40m height. No food seen in talons
14/04/2018	Sparrowhawk	No	1	Male	Adult	Male, circling at 50m height
29/04/2018	Osprey	Yes	1	-	Adult	Commuting, lost to view but very probably landed
29/04/2018	Osprey	Yes	1	-	Adult	Hunting, did not catch prey and landed
29/04/2018	Osprey	Yes	1	-	Adult	Hunting, did not catch prey and landed
29/04/2018	Osprey	Yes	1	-	Adult	Hunting, no prey caught and lost to view
03/06/2018	Osprey	Yes	1	-	Adult	Commuting

Date	Species	Annex 1/ Schedule 1	Number recorded	Sex	Age	Notes
03/06/2018	Osprey	Yes	1	-	Adult	Carrying food, landed on nest
03/06/2018	Osprey	Yes	1	-	Adult	Commuting, circled high
03/06/2018	Osprey	Yes	1	-	Adult	Carrying food, landed on nest
03/06/2018	Osprey	Yes	1	-	Adult	Left nest
03/06/2018	Red kite	Yes	1	-	Adult	
04/06/2018	Goshawk	Yes	1	Male	Adult	Hunting
10/06/2018	Goshawk	Yes	1	Male	Adult	Adult male carrying food
10/06/2018	Osprey	Yes	1	-	Adult	Leaving loch, flying east. This coincides with behaviour viewed last week
22/06/2018	Buzzard	No	1	-	-	Seen flying to the north of site
23/06/2018	Osprey	Yes	1	-	Adult	
17/07/2018	Buzzard	No	4	-	-	
19/07/2018	Osprey	Yes	1	-	Adult	Sat in a tree next to the nest on arrival. Left tree at 0944, hovering over loch and then flying south out of view
19/07/2018	Osprey	Yes	1	-	Adult	Bird returned and sat in tree from 1020-1056, then hovered over loch and sat in tree on northern side of loch
19/07/2018	Osprey	Yes	2	-	Adult	1120: bird was joined by a second bird, and they both circled loch very high for 15 minutes before drifting off to south east. Both birds returned to nest from a southerly direction at 1149
19/07/2018	Osprey	Yes	2	-	Adult	1203: birds left nest and flew south, returning to nest at 1224
19/07/2018	Osprey	Yes	1	-	Adult	1318: one bird returned to nest and sat in adjacent tree
19/07/2018	Osprey	Yes	1	-	Adult	1332: second bird returned, circled loch and drifted off high south west
06/08/2018	Buzzard	No	1	-	-	
06/08/2018	Osprey	Yes	2	-	Adult/juvenile	Adult provisioning juvenile with fish back and forth over loch
07/08/2018	Buzzard	No	1	-	-	
07/08/2018	Kestrel	No	1	-	-	
06/08/2019	Osprey	Yes	2	-	Adult/juvenile	Adult provisioning juvenile with fish back and forth over loch
07/03/2019	Buzzard	No	1	-	-	
07/03/2019	Buzzard	No	2	-	-	
07/03/2019	Buzzard	No	1	-	-	
07/03/2019	Buzzard	No	1	-	-	
07/03/2019	Buzzard	No	2	-	-	Pair
07/03/2019	Buzzard	No	1	-	-	
07/03/2019	Buzzard	No	1	-	-	
07/03/2019	Goshawk	Yes	1	-	Adult	
07/03/2019	Sparrowhawk	No	1	Female	Adult	
21/03/2019	Buzzard	No	1	-	-	
05/04/2019	Buzzard	No	4	-	-	
19/04/2019	Buzzard	No	1	-	-	
31/05/2019	Buzzard	No	1	-	-	
27/06/2019	Buzzard	No	1	-	-	
12/07/2019	Buzzard	No	1	-	-	
12/07/2019	Goshawk	Yes	1	-	Adult	
12/07/2019	Tawny owl	No	1	-	-	

## D.6 Black Grouse Records

**Table D-7** details all black grouse records recorded during surveys in 2013, 2014, 2015 and 2017 with lek numbers indicated where appropriate. Refer to Annex B for survey methodology and Annex C for weather data.

**Table D-7 Black grouse activity records: 2013, 2014, 2015 and 2017**

Lek ID	Date	No. males	No. females	No. unsexed	Notes
-	15/04/2013	1	0	0	Incidental sighting recorded during the 2013 breeding season
-	26/04/2013	0	0	0	No black grouse or signs of black grouse
-	17/05/2013	0	0	0	No black grouse or signs of black grouse
1	15/04/2014	1	0	0	Displaying male heard not seen. Off site at Eldride Hill to north of Waterhead
-	19/04/2014	0	0	0	No black grouse or signs of black grouse
1	12/05/2014	1	0	0	0724: male on track, same male seen at 0727-0740 sitting on mound of heather in open area west of track opposite large pull off. Not displaying. Surveyor left it at 0740 still on mound
-	12/05/2014	0	1	0	Female on track, first seen at 0840. Walked to the south, feeding
-	16/05/2014	1	0	0	No black grouse or signs of black grouse
-	21/04/2015	1	0	0	No black grouse or signs of black grouse
-	28/04/2015	1	0	0	No black grouse or signs of black grouse
-	14/05/2015	1	0	0	No black grouse or signs of black grouse
-	15/05/2015	1	0	0	No black grouse or signs of black grouse
1	27/04/2017	1	0	0	Disturbed unintentionally from area young trees at end of forest. Bird flew towards clearfell area to the west north west
1	28/04/2017	1	0	0	Displaying on west side of forestry track when flew off south
1	10/05/2017	1	0	0	Displaying to the west of track

## D.7 Woodland Point Count Surveys

**Table D-8** summarises the birds recorded during woodland point count surveys. Refer to Annex B for survey methodology and Annex C for weather data.

**Table D-8 Woodland point count records: 2012 – 2013**

Date	Visit	Point count	Species	Number
15/11/2012	NBR 1	40	Coal tit	1
15/11/2012	NBR 1	40	Goldcrest	2
15/11/2012	NBR 1	40	Robin	1
15/11/2012	NBR 1	40	Siskin	2
15/11/2012	NBR 1	41	No birds recorded	0
15/11/2012	NBR 1	42	Wren	1
15/11/2012	NBR 1	43	Goldcrest	2
15/11/2012	NBR 1	44	No birds recorded	0
15/11/2012	NBR 1	45	Blackbird	1
15/11/2012	NBR 1	45	Goldcrest	2
15/11/2012	NBR 1	46	Coal tit	1
15/11/2012	NBR 1	46	Goldcrest	3
15/11/2012	NBR 1	46	Robin	2
15/11/2012	NBR 1	46	Wren	1
15/11/2012	NBR 1	49	Goldcrest	1
15/11/2012	NBR 1	50	Goldcrest	1
15/11/2012	NBR 1	51	No birds recorded	0
15/11/2012	NBR 1	52	No birds recorded	0
15/11/2012	NBR 1	53	No birds recorded	0
15/11/2012	NBR 1	54	Coal tit	1
15/11/2012	NBR 1	54	Dunnock	1
15/11/2012	NBR 1	54	Jay	1
15/11/2012	NBR 1	55	Coal tit	1
15/11/2012	NBR 1	55	Dunnock	1
15/11/2012	NBR 1	55	Jay	1
15/11/2012	NBR 1	55	Robin	3
15/11/2012	NBR 1	56	Coal tit	1
15/11/2012	NBR 1	57	Carrion crow	1
15/11/2012	NBR 1	57	Coal tit	1
15/11/2012	NBR 1	57	Goldcrest	1
15/11/2012	NBR 1	58	Coal tit	2
15/11/2012	NBR 1	61	Buzzard	1
15/11/2012	NBR 1	61	Coal tit	1
15/11/2012	NBR 1	61	Goldcrest	3
15/11/2012	NBR 1	61	Jay	1

Date	Visit	Point count	Species	Number
15/11/2012	NBR 1	61	Robin	2
16/11/2012	NBR 1	1	Wren	1
16/11/2012	NBR 1	2	Common crossbill	1
16/11/2012	NBR 1	2	Meadow pipit	6
16/11/2012	NBR 1	2	Wren	1
16/11/2012	NBR 1	3	Meadow pipit	1
16/11/2012	NBR 1	3	Wren	1
16/11/2012	NBR 1	4	Chaffinch	1
16/11/2012	NBR 1	4	Goldcrest	1
16/11/2012	NBR 1	4	Wren	1
16/11/2012	NBR 1	5	Chaffinch	1
16/11/2012	NBR 1	5	Coal tit	1
16/11/2012	NBR 1	5	Meadow pipit	4
16/11/2012	NBR 1	6	Buzzard	1
16/11/2012	NBR 1	6	Common crossbill	2
16/11/2012	NBR 1	6	Raven	1
16/11/2012	NBR 1	6	Sparrowhawk	1
16/11/2012	NBR 1	6	Wren	1
16/11/2012	NBR 1	7	Coal tit	1
16/11/2012	NBR 1	7	Goldcrest	1
16/11/2012	NBR 1	7	Great spotted woodpecker	2
16/11/2012	NBR 1	7	Meadow pipit	1
16/11/2012	NBR 1	7	Raven	2
16/11/2012	NBR 1	8	Bullfinch	1
16/11/2012	NBR 1	8	Wren	1
16/11/2012	NBR 1	9	Jay	1
16/11/2012	NBR 1	9	Wren	1
16/11/2012	NBR 1	10	Carrion crow	1
16/11/2012	NBR 1	10	Coal tit	1
16/11/2012	NBR 1	10	Common crossbill	1
16/11/2012	NBR 1	10	Goldcrest	1
16/11/2012	NBR 1	10	Kestrel	1
16/11/2012	NBR 1	10	Wren	1
16/11/2012	NBR 1	11	Bullfinch	1
16/11/2012	NBR 1	11	Wren	1
16/11/2012	NBR 1	12	Goldcrest	1
16/11/2012	NBR 1	12	Robin	1
16/11/2012	NBR 1	13	Goldcrest	1
16/11/2012	NBR 1	13	Meadow pipit	1
16/11/2012	NBR 1	13	Robin	4
16/11/2012	NBR 1	13	Wren	2

Date	Visit	Point count	Species	Number
16/11/2012	NBR 1	14	Chaffinch	1
16/11/2012	NBR 1	14	Coal tit	1
16/11/2012	NBR 1	14	Goldcrest	1
16/11/2012	NBR 1	14	Robin	1
16/11/2012	NBR 1	17	Carrion crow	1
16/11/2012	NBR 1	17	Dunnock	1
16/11/2012	NBR 1	17	Goldcrest	1
16/11/2012	NBR 1	17	Meadow pipit	1
16/11/2012	NBR 1	17	Wren	3
16/11/2012	NBR 1	62	Coal tit	1
16/11/2012	NBR 1	62	Goldcrest	1
16/11/2012	NBR 1	62	Robin	3
21/11/2012	NBR 1	19	Goldcrest	2
21/11/2012	NBR 1	19	Raven	1
21/11/2012	NBR 1	20	Chaffinch	1
21/11/2012	NBR 1	20	Coal tit	7
21/11/2012	NBR 1	20	Goldcrest	1
21/11/2012	NBR 1	20	Robin	1
21/11/2012	NBR 1	20	Wren	2
21/11/2012	NBR 1	21	Coal tit	3
21/11/2012	NBR 1	22	Goldcrest	1
21/11/2012	NBR 1	22	Wren	1
21/11/2012	NBR 1	23	Goldcrest	1
21/11/2012	NBR 1	23	Robin	1
21/11/2012	NBR 1	24	Lesser redpoll	1
21/11/2012	NBR 1	24	Wren	1
21/11/2012	NBR 1	25	Coal tit	1
21/11/2012	NBR 1	25	Goldcrest	2
21/11/2012	NBR 1	26	Robin	1
21/11/2012	NBR 1	27	Dunnock	1
21/11/2012	NBR 1	27	Robin	1
21/11/2012	NBR 1	28	Robin	1
21/11/2012	NBR 1	29	Chaffinch	1
21/11/2012	NBR 1	29	Coal tit	1
21/11/2012	NBR 1	29	Raven	1
21/11/2012	NBR 1	29	Robin	1
21/11/2012	NBR 1	30	Wren	2
21/11/2012	NBR 1	31	Long-tailed tit	10
21/11/2012	NBR 1	31	Siskin	3
21/11/2012	NBR 1	32	Coal tit	2
21/11/2012	NBR 1	32	Wren	2

Date	Visit	Point count	Species	Number
21/11/2012	NBR 1	33	No birds recorded	0
21/11/2012	NBR 1	34	Coal tit	2
21/11/2012	NBR 1	34	Goldcrest	2
21/11/2012	NBR 1	34	Siskin	3
21/11/2012	NBR 1	35	Coal tit	1
21/11/2012	NBR 1	35	Goldcrest	1
21/11/2012	NBR 1	35	Wren	2
21/11/2012	NBR 1	36	Coal tit	1
21/11/2012	NBR 1	37	Blackbird	1
21/11/2012	NBR 1	37	Coal tit	3
21/11/2012	NBR 1	37	Goldcrest	1
21/11/2012	NBR 1	38	Goldcrest	2
21/11/2012	NBR 1	38	Wren	1
21/11/2012	NBR 1	39	Wren	1
21/11/2012	NBR 1	46	Goldcrest	1
21/11/2012	NBR 1	47	Coal tit	1
21/11/2012	NBR 1	47	Robin	1
21/11/2012	NBR 1	48	Wren	1
21/11/2012	NBR 1	59	Common crossbill	9
21/11/2012	NBR 1	60	Coal tit	1
21/11/2012	NBR 1	60	Goldcrest	1
09/01/2013	NBR 2	1	Raven	1
09/01/2013	NBR 2	2	Raven	1
09/01/2013	NBR 2	3	Goldcrest	1
09/01/2013	NBR 2	4	Chaffinch	1
09/01/2013	NBR 2	5	No birds recorded	0
09/01/2013	NBR 2	6	No birds recorded	0
09/01/2013	NBR 2	7	Coal tit	2
09/01/2013	NBR 2	8	No birds recorded	0
09/01/2013	NBR 2	9	Coal tit	1
09/01/2013	NBR 2	10	Coal tit	1
09/01/2013	NBR 2	11	Chaffinch	1
09/01/2013	NBR 2	11	Raven	1
09/01/2013	NBR 2	12	Coal tit	1
09/01/2013	NBR 2	13	Coal tit	1
09/01/2013	NBR 2	13	Robin	1
09/01/2013	NBR 2	13	Wren	1
09/01/2013	NBR 2	14	Coal tit	1
09/01/2013	NBR 2	15	No birds recorded	0
09/01/2013	NBR 2	16	No birds recorded	0
09/01/2013	NBR 2	17	Robin	1

Date	Visit	Point count	Species	Number
09/01/2013	NBR 2	17	Wren	2
09/01/2013	NBR 2	18	Coal tit	2
09/01/2013	NBR 2	19	No birds recorded	0
09/01/2013	NBR 2	20	Coal tit	1
09/01/2013	NBR 2	20	Robin	1
09/01/2013	NBR 2	21	Coal tit	2
09/01/2013	NBR 2	21	Jay	1
09/01/2013	NBR 2	21	Wren	1
09/01/2013	NBR 2	22	No birds recorded	0
09/01/2013	NBR 2	23	Coal tit	12
09/01/2013	NBR 2	23	Goldcrest	1
09/01/2013	NBR 2	23	Robin	1
09/01/2013	NBR 2	24	Wren	2
09/01/2013	NBR 2	25	Coal tit	1
09/01/2013	NBR 2	25	Goldcrest	2
09/01/2013	NBR 2	25	Robin	1
09/01/2013	NBR 2	25	Wren	1
09/01/2013	NBR 2	26	Carrion crow	1
09/01/2013	NBR 2	26	Coal tit	1
09/01/2013	NBR 2	27	Coal tit	2
09/01/2013	NBR 2	28	Coal tit	4
09/01/2013	NBR 2	28	Robin	1
09/01/2013	NBR 2	29	No birds recorded	0
09/01/2013	NBR 2	30	Goldcrest	1
09/01/2013	NBR 2	31	Coal tit	3
09/01/2013	NBR 2	31	Robin	1
09/01/2013	NBR 2	32	Wren	1
09/01/2013	NBR 2	33	No birds recorded	0
09/01/2013	NBR 2	34	Coal tit	3
09/01/2013	NBR 2	35	Coal tit	1
09/01/2013	NBR 2	36	Coal tit	2
09/01/2013	NBR 2	36	Goldcrest	1
09/01/2013	NBR 2	37	Wren	3
09/01/2013	NBR 2	38	Coal tit	2
09/01/2013	NBR 2	39	No birds recorded	0
09/01/2013	NBR 2	40	Carrion crow	1
09/01/2013	NBR 2	40	Chaffinch	1
09/01/2013	NBR 2	41	No birds recorded	0
09/01/2013	NBR 2	42	No birds recorded	0
09/01/2013	NBR 2	43	No birds recorded	0
09/01/2013	NBR 2	44	No birds recorded	0

Date	Visit	Point count	Species	Number
09/01/2013	NBR 2	45	No birds recorded	0
09/01/2013	NBR 2	46	No birds recorded	0
09/01/2013	NBR 2	47	Wren	1
09/01/2013	NBR 2	48	Chaffinch	1
09/01/2013	NBR 2	48	Raven	1
09/01/2013	NBR 2	49	Coal tit	1
09/01/2013	NBR 2	50	No birds recorded	0
09/01/2013	NBR 2	51	Carrion crow	1
09/01/2013	NBR 2	52	Coal tit	2
09/01/2013	NBR 2	53	No birds recorded	0
09/01/2013	NBR 2	54	No birds recorded	0
09/01/2013	NBR 2	55	Coal tit	2
09/01/2013	NBR 2	55	Raven	1
09/01/2013	NBR 2	56	Coal tit	1
09/01/2013	NBR 2	56	Lesser redpoll	1
09/01/2013	NBR 2	57	Coal tit	1
09/01/2013	NBR 2	58	Coal tit	2
09/01/2013	NBR 2	59	No birds recorded	0
09/01/2013	NBR 2	60	No birds recorded	0
09/01/2013	NBR 2	61	No birds recorded	0
09/01/2013	NBR 2	62	Goldcrest	1
09/01/2013	NBR 2	62	Wren	1
15/04/2013	BR 1	2	Chaffinch	1
15/04/2013	BR 1	4	Chaffinch	2
15/04/2013	BR 1	4	Meadow pipit	1
15/04/2013	BR 1	4	Robin	1
15/04/2013	BR 1	5	No birds recorded	0
15/04/2013	BR 1	8	Chaffinch	1
15/04/2013	BR 1	8	Swallow	1
15/04/2013	BR 1	10	Chaffinch	1
15/04/2013	BR 1	12	Chaffinch	1
15/04/2013	BR 1	12	Robin	1
15/04/2013	BR 1	14	Robin	2
15/04/2013	BR 1	17	Meadow pipit	1
15/04/2013	BR 1	17	Robin	1
15/04/2013	BR 1	17	Robin	1
15/04/2013	BR 1	18	Coal tit	1
15/04/2013	BR 1	18	Goldcrest	1
15/04/2013	BR 1	18	Robin	1
15/04/2013	BR 1	18	Wren	1
15/04/2013	BR 1	19	Coal tit	3

Date	Visit	Point count	Species	Number
15/04/2013	BR 1	19	Robin	2
15/04/2013	BR 1	19	Wren	1
15/04/2013	BR 1	21	Coal tit	1
15/04/2013	BR 1	21	Goldcrest	1
15/04/2013	BR 1	21	Great tit	2
15/04/2013	BR 1	22	Coal tit	3
15/04/2013	BR 1	23	Coal tit	2
15/04/2013	BR 1	25	Coal tit	2
15/04/2013	BR 1	25	Goldcrest	1
15/04/2013	BR 1	25	Great tit	1
15/04/2013	BR 1	26	Robin	1
15/04/2013	BR 1	30	Bullfinch	1
15/04/2013	BR 1	30	Coal tit	4
15/04/2013	BR 1	30	Goldcrest	3
15/04/2013	BR 1	30	Robin	2
15/04/2013	BR 1	31	Coal tit	1
15/04/2013	BR 1	38	Coal tit	2
15/04/2013	BR 1	38	Wren	1
15/04/2013	BR 1	62	Meadow pipit	1
15/04/2013	BR 1	62	Raven	1
15/04/2013	BR 1	62	Robin	2
15/04/2013	BR 1	62	Wren	2
25/04/2013	BR 1	28	No birds recorded	0
25/04/2013	BR 1	29	Robin	1
25/04/2013	BR 1	29	Wren	1
25/04/2013	BR 1	35	No birds recorded	0
25/04/2013	BR 1	36	Robin	1
25/04/2013	BR 1	36	Wren	1
25/04/2013	BR 1	37	Coal tit	2
25/04/2013	BR 1	37	Great tit	1
25/04/2013	BR 1	37	Wren	1
25/04/2013	BR 1	38	Chaffinch	1
25/04/2013	BR 1	38	Robin	1
25/04/2013	BR 1	40	Robin	2
25/04/2013	BR 1	41	Chaffinch	4
25/04/2013	BR 1	41	Robin	3
25/04/2013	BR 1	43	Blackbird	1
25/04/2013	BR 1	43	Coal tit	1
25/04/2013	BR 1	43	Robin	3
25/04/2013	BR 1	44	Blackbird	1
25/04/2013	BR 1	44	Robin	5

Date	Visit	Point count	Species	Number
25/04/2013	BR 1	44	Wren	1
25/04/2013	BR 1	47	Chaffinch	1
25/04/2013	BR 1	47	Coal tit	1
25/04/2013	BR 1	47	Willow warbler	1
25/04/2013	BR 1	48	Chaffinch	1
25/04/2013	BR 1	48	Coal tit	1
25/04/2013	BR 1	48	Great tit	1
25/04/2013	BR 1	49	Coal tit	2
25/04/2013	BR 1	49	Wren	1
25/04/2013	BR 1	50	Blackbird	1
25/04/2013	BR 1	50	Chaffinch	1
25/04/2013	BR 1	50	Robin	2
25/04/2013	BR 1	52	Coal tit	1
25/04/2013	BR 1	52	Willow warbler	3
25/04/2013	BR 1	53	Blackbird	1
25/04/2013	BR 1	53	Coal tit	1
25/04/2013	BR 1	53	Robin	2
25/04/2013	BR 1	53	Wren	1
25/04/2013	BR 1	55	Chaffinch	1
25/04/2013	BR 1	55	Coal tit	2
25/04/2013	BR 1	55	Robin	1
25/04/2013	BR 1	56	Robin	2
25/04/2013	BR 1	57	Robin	1
25/04/2013	BR 1	58	Robin	5
25/04/2013	BR 1	59	Goldcrest	1
16/05/2013	BR 2	25	Chaffinch	2
16/05/2013	BR 2	25	Common crossbill	3
16/05/2013	BR 2	25	Dunnock	1
16/05/2013	BR 2	25	Robin	1
16/05/2013	BR 2	26	Goldcrest	3
16/05/2013	BR 2	26	Great tit	2
16/05/2013	BR 2	26	Robin	3
16/05/2013	BR 2	28	Chaffinch	3
16/05/2013	BR 2	28	Robin	1
16/05/2013	BR 2	29	Chaffinch	2
16/05/2013	BR 2	29	Goldcrest	2
16/05/2013	BR 2	29	Robin	1
16/05/2013	BR 2	30	Chaffinch	2
16/05/2013	BR 2	30	Dunnock	2
16/05/2013	BR 2	30	Goldcrest	1
16/05/2013	BR 2	30	Robin	2

Date	Visit	Point count	Species	Number
16/05/2013	BR 2	31	Goldcrest	2
16/05/2013	BR 2	31	Robin	1
16/05/2013	BR 2	31	Siskin	2
16/05/2013	BR 2	35	Common crossbill	3
16/05/2013	BR 2	35	Goldcrest	1
16/05/2013	BR 2	36	Chaffinch	1
16/05/2013	BR 2	37	Goldcrest	2
16/05/2013	BR 2	38	Chaffinch	2
16/05/2013	BR 2	38	Great tit	1
16/05/2013	BR 2	38	Wren	1
16/05/2013	BR 2	40	Chaffinch	2
16/05/2013	BR 2	40	Willow warbler	4
16/05/2013	BR 2	41	Chaffinch	2
16/05/2013	BR 2	41	Willow warbler	4
16/05/2013	BR 2	41	Wren	1
16/05/2013	BR 2	43	Robin	1
16/05/2013	BR 2	43	Willow warbler	2
16/05/2013	BR 2	44	Robin	2
16/05/2013	BR 2	44	Willow warbler	2
16/05/2013	BR 2	47	Blackbird	1
16/05/2013	BR 2	47	Chaffinch	1
16/05/2013	BR 2	47	Robin	1
16/05/2013	BR 2	48	Robin	1
16/05/2013	BR 2	49	Chaffinch	2
16/05/2013	BR 2	49	Wren	1
16/05/2013	BR 2	50	Blackbird	2
16/05/2013	BR 2	50	Cuckoo	1
16/05/2013	BR 2	50	Robin	2
16/05/2013	BR 2	50	Willow warbler	1
16/05/2013	BR 2	50	Wren	2
16/05/2013	BR 2	52	Chaffinch	3
16/05/2013	BR 2	52	Great tit	1
16/05/2013	BR 2	52	Robin	1
16/05/2013	BR 2	52	Willow warbler	3
16/05/2013	BR 2	52	Wren	1
16/05/2013	BR 2	53	Common crossbill	1
16/05/2013	BR 2	53	Robin	2
16/05/2013	BR 2	53	Willow warbler	4
16/05/2013	BR 2	53	Wren	2
16/05/2013	BR 2	55	Blackbird	2
16/05/2013	BR 2	55	Chaffinch	2

Date	Visit	Point count	Species	Number
16/05/2013	BR 2	55	Great tit	2
16/05/2013	BR 2	55	Robin	1
16/05/2013	BR 2	55	Willow warbler	4
16/05/2013	BR 2	55	Wren	1
16/05/2013	BR 2	56	Robin	2
16/05/2013	BR 2	56	Wren	1
16/05/2013	BR 2	57	Blackbird	1
16/05/2013	BR 2	57	Chaffinch	2
16/05/2013	BR 2	57	Great tit	2
16/05/2013	BR 2	57	Song thrush	1
16/05/2013	BR 2	57	Willow warbler	3
16/05/2013	BR 2	57	Wren	1
16/05/2013	BR 2	58	Chaffinch	2
16/05/2013	BR 2	58	Robin	1
16/05/2013	BR 2	59	Chaffinch	1
16/05/2013	BR 2	59	Great tit	2
16/05/2013	BR 2	59	Robin	1
16/05/2013	BR 2	59	Wren	1
17/05/2013	BR 2	2	Buzzard	1
17/05/2013	BR 2	2	Common crossbill	2
17/05/2013	BR 2	2	Cuckoo	1
17/05/2013	BR 2	2	Goldcrest	1
17/05/2013	BR 2	2	Siskin	2
17/05/2013	BR 2	2	Willow warbler	1
17/05/2013	BR 2	2	Wren	2
17/05/2013	BR 2	4	Chaffinch	3
17/05/2013	BR 2	4	Dunnock	1
17/05/2013	BR 2	4	Goldcrest	1
17/05/2013	BR 2	4	Siskin	2
17/05/2013	BR 2	4	Song thrush	1
17/05/2013	BR 2	4	Willow warbler	3
17/05/2013	BR 2	5	Meadow pipit	1
17/05/2013	BR 2	5	Skylark	1
17/05/2013	BR 2	5	Willow warbler	3
17/05/2013	BR 2	5	Wren	1
17/05/2013	BR 2	8	Chaffinch	1
17/05/2013	BR 2	8	Cuckoo	1
17/05/2013	BR 2	8	Goldcrest	1
17/05/2013	BR 2	8	Siskin	2
17/05/2013	BR 2	8	Treecreeper	1
17/05/2013	BR 2	10	Chaffinch	1

Date	Visit	Point count	Species	Number
17/05/2013	BR 2	10	Coal tit	1
17/05/2013	BR 2	10	Siskin	2
17/05/2013	BR 2	10	Willow warbler	1
17/05/2013	BR 2	12	Dunnock	1
17/05/2013	BR 2	12	Marsh tit	1
17/05/2013	BR 2	12	Willow warbler	2
17/05/2013	BR 2	12	Wren	2
17/05/2013	BR 2	14	Siskin	1
17/05/2013	BR 2	14	Swallow	1
17/05/2013	BR 2	14	Willow warbler	1
17/05/2013	BR 2	14	Wren	1
17/05/2013	BR 2	17	Chaffinch	3
17/05/2013	BR 2	17	Dunnock	1
17/05/2013	BR 2	17	Meadow pipit	1
17/05/2013	BR 2	17	Robin	1
17/05/2013	BR 2	17	Willow warbler	2
17/05/2013	BR 2	17	Wren	2
17/05/2013	BR 2	18	Chaffinch	2
17/05/2013	BR 2	18	Robin	2
17/05/2013	BR 2	18	Swallow	1
17/05/2013	BR 2	18	Willow warbler	1
17/05/2013	BR 2	19	Chaffinch	2
17/05/2013	BR 2	19	Coal tit	1
17/05/2013	BR 2	19	Willow warbler	3
17/05/2013	BR 2	21	Chaffinch	1
17/05/2013	BR 2	21	Coal tit	1
17/05/2013	BR 2	21	Goldcrest	1
17/05/2013	BR 2	21	Willow warbler	1
17/05/2013	BR 2	22	Chaffinch	3
17/05/2013	BR 2	22	Robin	2
17/05/2013	BR 2	22	Wren	1
17/05/2013	BR 2	62	Chaffinch	1
17/05/2013	BR 2	62	Dunnock	1
17/05/2013	BR 2	62	Garden warbler	1
17/05/2013	BR 2	62	Robin	1
17/05/2013	BR 2	62	Willow warbler	2
17/05/2013	BR 2	62	Wren	2
02/07/2013	BR3	25	Siskin	2
02/07/2013	BR3	28	Robin	1
02/07/2013	BR3	28	Willow warbler	1
02/07/2013	BR3	29	No birds recorded	0

Date	Visit	Point count	Species	Number
02/07/2013	BR3	30	No birds recorded	0
02/07/2013	BR3	31	No birds recorded	0
02/07/2013	BR3	35	Robin	2
02/07/2013	BR3	36	Chaffinch	1
02/07/2013	BR3	36	Robin	1
02/07/2013	BR3	36	wren	1
02/07/2013	BR3	37	No birds recorded	0
02/07/2013	BR3	38	Chaffinch	2
02/07/2013	BR3	38	Siskin	2
02/07/2013	BR3	40	Chaffinch	1
02/07/2013	BR3	40	Siskin	2
02/07/2013	BR3	41	Chaffinch	1
02/07/2013	BR3	41	Great tit	1
02/07/2013	BR3	41	Robin	1
02/07/2013	BR3	43	Siskin	1
02/07/2013	BR3	44	No birds recorded	0
02/07/2013	BR3	47	Treecreeper	2
02/07/2013	BR3	47	Wren	1
02/07/2013	BR3	48	No birds recorded	0
02/07/2013	BR3	49	No birds recorded	0
02/07/2013	BR3	50	Willow warbler	1
02/07/2013	BR3	52	No birds recorded	0
02/07/2013	BR3	53	Chaffinch	1
02/07/2013	BR3	53	Siskin	1
02/07/2013	BR3	53	Treecreeper	1
02/07/2013	BR3	53	Wren	1
02/07/2013	BR3	55	Wren	1
02/07/2013	BR3	56	No birds recorded	0
02/07/2013	BR3	57	Willow warbler	1
02/07/2013	BR3	58	No birds recorded	0
03/07/2013	BR3	2	Meadow pipit	4
03/07/2013	BR3	2	Willow warbler	2
03/07/2013	BR3	4	Lesser redpoll	1
03/07/2013	BR3	4	Wren	1
03/07/2013	BR3	5	Lesser redpoll	3
03/07/2013	BR3	5	Meadow pipit	4
03/07/2013	BR3	5	Whitethroat	1
03/07/2013	BR3	5	Willow warbler	1
03/07/2013	BR3	8	Chaffinch	1
03/07/2013	BR3	8	Coal tit	1
03/07/2013	BR3	8	Wren	1

Date	Visit	Point count	Species	Number
03/07/2013	BR3	10	Chaffinch	1
03/07/2013	BR3	10	Robin	2
03/07/2013	BR3	10	Siskin	1
03/07/2013	BR3	10	Willow warbler	1
03/07/2013	BR3	12	Meadow pipit	1
03/07/2013	BR3	12	Pied wagtail	2
03/07/2013	BR3	12	Willow warbler	3
03/07/2013	BR3	12	Wren	1
03/07/2013	BR3	14	Chaffinch	1
03/07/2013	BR3	17	Lesser redpoll	2
03/07/2013	BR3	17	Meadow pipit	1
03/07/2013	BR3	17	Willow warbler	1
03/07/2013	BR3	18	Goldcrest	1
03/07/2013	BR3	19	Chaffinch	2
03/07/2013	BR3	19	Goldcrest	1
03/07/2013	BR3	19	Willow warbler	1
03/07/2013	BR3	21	Lesser redpoll	1
03/07/2013	BR3	21	Willow warbler	2
03/07/2013	BR3	21	Wren	1
03/07/2013	BR3	22	Goldcrest	1
03/07/2013	BR3	22	Robin	1
03/07/2013	BR3	23	Chaffinch	1
03/07/2013	BR3	26	Chaffinch	2
03/07/2013	BR3	26	Robin	1
03/07/2013	BR3	26	Willow warbler	3
03/07/2013	BR3	62	Lesser redpoll	1
03/07/2013	BR3	62	Robin	2
03/07/2013	BR3	62	Willow warbler	1
03/07/2013	BR3	62	Wren	1

## D.8 Bird Species Index

A total of 92 bird species or signs was recorded at, or adjacent, to the Site during the ornithological surveys. **Table D-9** comprises a list of all these species along with their conservation status.

**Table D-9 All bird species recorded at Clauchrie (September 2012 to August 2019)**

Species	Conservation status	Species	Conservation status	Species	Conservation status
Barn owl ( <i>Tyto alba</i> )	Schedule 1, BoCC Green	Goshawk ( <i>Accipiter gentilis</i> )	Schedule 1, BoCC Green	Red grouse ( <i>Lagopus lagopus scotica</i> )	BoCC Amber
Black grouse ( <i>Tetrao tetrix</i> )	BoCC Red	Grasshopper warbler ( <i>Locustella naevia</i> )	BoCC Red	Red kite ( <i>Milvus milvus</i> )	Annex 1, Schedule 1, BoCC Green
Blackbird ( <i>Turdus merula</i> )	BoCC Green	Great spotted woodpecker ( <i>Dendrocopos major</i> )	BoCC Green	Redstart ( <i>Phoenicurus phoenicurus</i> )	BoCC Amber
Blackcap ( <i>Sylvia atricapilla</i> )	BoCC Green	Great tit ( <i>Parus major</i> )	BoCC Green	Redwing ( <i>Turdus iliacus</i> )	Schedule 1, BoCC Red
Black-headed gull ( <i>Chroicocephalus ridibundus</i> )	BoCC Green	Greenfinch ( <i>Carduelis chloris</i> )	BoCC Green	Reed bunting ( <i>Emberiza schoeniclus</i> )	BoCC Amber
Blue tit ( <i>Cyanistes caeruleus</i> )	BoCC Green	Grey heron ( <i>Ardea cinerea</i> )	BoCC Green	Robin ( <i>Erythacus rubecula</i> )	BoCC Green
Bullfinch ( <i>Pyrrhula pyrrhula</i> )	BoCC Green	Grey wagtail ( <i>Motacilla cinerea</i> )	BoCC Red	Sand martin ( <i>Riparia riparia</i> )	BoCC Green
Buzzard ( <i>Buteo buteo</i> )	BoCC Green	Greylag goose ( <i>Anser anser</i> )	BoCC Amber	Short-eared owl ( <i>Asio flammeus</i> )	Annex 1, BoCC Amber
Canada goose ( <i>Branta canadensis</i> )	BoCC Green	Hen harrier ( <i>Circus cyaneus</i> )	Annex 1, Schedule 1, BoCC Red	Siskin ( <i>Carduelis spinus</i> )	BoCC Green
Carriion crow ( <i>Corvus corone</i> )	BoCC Green	Herring gull ( <i>Larus argentatus</i> )	BoCC Red	Skylark ( <i>Alauda arvensis</i> )	BoCC Red
Chaffinch ( <i>Fringilla coelebs</i> )	BoCC Green	Honey buzzard ( <i>Pernis apivorus</i> )	Annex 1, Schedule 1, BoCC Amber	Snipe ( <i>Gallinago gallinago</i> )	BoCC Amber
Chiffchaff ( <i>Phylloscopus collybita</i> )	BoCC Green	Hooded crow ( <i>Corvus cornix</i> )	BoCC Green	Song thrush ( <i>Turdus philomelos</i> )	BoCC Red
Coal tit ( <i>Periparus ater</i> )	BoCC Green	House martin ( <i>Delichon urbicum</i> )	BoCC Amber	Sparrowhawk ( <i>Accipiter nisus</i> )	BoCC Green
Collared dove ( <i>Streptopelia decaocto</i> )	BoCC Green	Jackdaw ( <i>Corvus monedula</i> )	BoCC Green	Spotted flycatcher ( <i>Muscicapa striata</i> )	BoCC Red
Common crossbill ( <i>Loxia curvirostra</i> )	Schedule 1, BoCC Green	Jay ( <i>Garrulus glandarius</i> )	BoCC Green	Stonechat ( <i>Saxicola torquatus</i> )	BoCC Green
Common gull ( <i>Larus canus</i> )	BoCC Amber	Kestrel ( <i>Falco tinnunculus</i> )	BoCC Amber	Swallow ( <i>Hirundo rustica</i> )	BoCC Amber
Common sandpiper ( <i>Actitis hypoleucos</i> )	BoCC Amber	Lesser redpoll ( <i>Acanthis cabaret</i> )	BoCC Red	Swift ( <i>Apus apus</i> )	BoCC Amber
Cormorant ( <i>Phalacrocorax carbo</i> )	BoCC Green	Linnet ( <i>Carduelis cannabina</i> )	BoCC Green	Tawny owl ( <i>Strix aluco</i> )	BoCC Amber
Cuckoo ( <i>Cuculus canorus</i> )	BoCC Red	Long-tailed tit ( <i>Aegithalos caudatus</i> )	BoCC Green	Teal ( <i>Anas crecca</i> )	BoCC Amber
Curlew ( <i>Numenius arquata</i> )	BoCC Red	Magpie ( <i>Pica pica</i> )	BoCC Green	Tree pipit ( <i>Anthus trivialis</i> )	BoCC Red
Dipper ( <i>Cinclus cinclus</i> )	BoCC Amber	Mallard ( <i>Anas platyrhynchos</i> )	BoCC Amber	Tree sparrow ( <i>Passer montanus</i> )	BoCC Red
Dunnock ( <i>Prunella modularis</i> )	BoCC Amber	Marsh tit ( <i>Poecile palustris</i> )	BoCC Red	Treecreeper ( <i>Certhia familiaris</i> )	BoCC Green
Fieldfare	Schedule 1, BoCC Red	Meadow pipit	BoCC Amber	Wheatear	BoCC Green

Species	Conservation status	Species	Conservation status	Species	Conservation status
( <i>Turdus pilaris</i> )		( <i>Anthus pratensis</i> )		( <i>Oenanthe oenanthe oenanthe</i> )	
Gannet ( <i>Morus bassanus</i> )	BoCC Amber	Merlin ( <i>Falco columbarius</i> )	Annex 1, Schedule 1, BoCC Red	Whinchat ( <i>Saxicola rubetra</i> )	BoCC Red
Garden warbler ( <i>Sylvia borin</i> )	BoCC Green	Mistle thrush ( <i>Turdus viscivorus</i> )	BoCC Red	Whitethroat ( <i>Sylvia communis</i> )	BoCC Green
Goldcrest ( <i>Regulus regulus</i> )	BoCC Green	Moorhen ( <i>Gallinula chloropus</i> )	BoCC Green	Wigeon ( <i>Anas penelope</i> )	BoCC Amber
Golden eagle ( <i>Aquila chrysaetos</i> )	Annex 1, Schedule 1, BoCC Green	Mute swan ( <i>Cygnus olor</i> )	BoCC Amber	Willow warbler ( <i>Phylloscopus trochilus</i> )	BoCC Amber
Golden plover ( <i>Pluvialis apricaria</i> )	Annex 1, BoCC Green	Osprey ( <i>Pandion haliaetus</i> )	Annex 1, Schedule 1, BoCC Amber	Woodcock ( <i>Scolopax rusticola</i> )	BoCC Red
Goldeneye ( <i>Bucephala clangula</i> )	Schedule 1, BoCC Amber	Pied wagtail ( <i>Motacilla alba yarrellii</i> )	BoCC Green	Woodpigeon ( <i>Columba palumbus</i> )	BoCC Green
Goldfinch ( <i>Carduelis carduelis</i> )	BoCC Green	Pink-footed goose ( <i>Anser brachyrhynchus</i> )	BoCC Amber	Wren ( <i>Troglodytes troglodytes indigenus</i> )	BoCC Green
Goosander ( <i>Mergus merganser</i> )	BoCC Green	Raven ( <i>Corvus corax</i> )	BoCC Green		

<sup>i</sup> Scottish Natural Heritage (2010) Survey methods for use in assessing the impacts of onshore windfarms on bird communities

<sup>ii</sup> Scottish Natural Heritage (2013) Recommended bird survey methods to inform impact assessment of onshore windfarms.

<sup>iii</sup> Scottish Natural Heritage (2014) Recommended bird survey methods to inform impact assessment of onshore windfarms.

<sup>iv</sup> Scottish Natural Heritage (2017) Recommended bird survey methods to inform impact assessment of onshore windfarms.

## ANNEX E COLLISION RISK ASSESSMENTS

Table E-1, Table E-2 and Table E-3 present the parameters which apply to each Collision Risk Model (CRM).

**Table E-1 Wind farm parameters**

Area of wind farm envelope	1571.74	hectares (ha)
Number of turbines	18	turbines
Rotor diameter	150	metres (m)
Hub height	125	m
Max. rotor depth	2.434	m (at 15° pitch angle)
Max. chord	4.238	m
Pitch	15	degrees (°)
Rotation period	4.76	seconds (secs)
Turbine operation time	85	percent (%)
Risk height: highest	200	m
Risk height: lowest	50	m
Flight risk volume	2357602688	m <sup>3</sup>

**Table E-2 CRM parameters per species**

Species	Length (m)	Wingspan (m)	Assumed flight speed, v (ms <sup>-1</sup> )	Avoidance rate	Probability of collision	Bird transit time (secs)
Goshawk	0.62	1.65	9.7	0.98	0.0884	0.3148
Greylag goose	0.825	1.635	17.1	0.998	0.0682	0.1906
Hen harrier	0.48	1.1	12	0.99	0.0672	0.2428
Osprey	0.58	1.7	11.4	0.98	0.0766	0.2644
Pink-footed goose	0.675	1.52	17.3	0.998	0.0626	0.1800

**Table E-3 Visible area within the CRAA per vantage point**

VP	Area (ha)						
1	408.94	4	162.43	7	534.17	10	0.00
2	158.46	5	201.69	8	159.82	11	300.20
3	167.49	6	278.13	9	157.73		

Birds are assumed to be active during all the daylight hours and this is estimated by calculating the number of hours per day between sunrise and sunset (adjusting for correct latitude) for the survey seasons as defined in Table E-4 below.

**Table E-4 Season definitions per species/species group**

Species	Breeding season		Non-breeding season			Hours presumed present
	Start date	End date	Start date	End date		
Geese and swans	15 <sup>th</sup> May	31 <sup>st</sup> August	1,789	1 <sup>st</sup> September	14 <sup>th</sup> May	2,708
Raptors	15 <sup>th</sup> March	31 <sup>st</sup> August	2,625	1 <sup>st</sup> September	14 <sup>th</sup> March	1,869

CRM was carried out using Scottish Natural Heritage 2000<sup>i</sup> guidance which follows the Band *et al.* 2007<sup>ii</sup> method quantifying potential bird collisions with onshore wind turbines. Outputs for the CRM for the following species are presented in the following order below:

- Goshawk;
- Greylag goose;
- Hen harrier;
- Osprey; and
- Pink-footed goose.

### E.1 Goshawk

#### Breeding Season 2018

**Table E-5 Goshawk flight activity**

VP	Seconds at risk height	Observation effort (HaHr)	Flying time at risk height (secsHahr <sup>-1</sup> )
6	24.32	10012.5738	0.0000007
9	57.24	5678.1128	0.0000028
11	32.43	10807.0658	0.0000008

**Table E-6 Goshawk mortality estimates**

Mean activity in wind farm at rotor height	0.0068	hr <sup>-1</sup>
Total Combined rotor swept volume	971435	m <sup>3</sup>
Bird occupancy	17.7777	hrs/season
Bird occupancy of rotor swept volume	26.3707	bird-sec
No. of transits through rotors	83.7576	per season
Estimated collisions	7.4044	per season
Estimated collisions after correction for operation	6.2938	per season
Estimated collisions after avoidance factor	0.1259	per season
Equivalent to 1 bird every	7.94	seasons

## E.2 Greylag Goose

Non-Breeding Season 2012/2013

**Table E-7 Greylag goose flight activity**

VP	Seconds at risk height	Observation effort (HaHr)	Flying time at risk height (secsHahr <sup>-1</sup> )
2	275.11	7249.5943	0.0000013

**Table E-8 Greylag goose mortality estimates**

Mean activity in wind farm at rotor height	0.0020	hr <sup>-1</sup>
Total Combined rotor swept volume	1036643	m <sup>3</sup>
Bird occupancy	5.4088	hrs/season
Bird occupancy of rotor swept volume	8.5618	bird-sec
No. of transits through rotors	44.9238	per season
Estimated collisions	3.0620	per season
Estimated collisions after correction for operation	2.6027	per season
Estimated collisions after avoidance factor	0.0052	per season
Equivalent to 1 bird every	192.11	seasons

Non-Breeding Season 2017/2018

**Table E-9 Greylag goose flight activity**

VP	Seconds at risk height	Observation effort (HaHr)	Flying time at risk height (secsHahr <sup>-1</sup> )
8	34.18	1917.8809	0.0000006

**Table E-10 Greylag goose mortality estimates**

Mean activity in wind farm at rotor height	0.0010	hr <sup>-1</sup>
Total Combined rotor swept volume	1036643	m <sup>3</sup>
Bird occupancy	2.7534	hrs/season
Bird occupancy of rotor swept volume	4.3584	bird-sec
No. of transits through rotors	22.8685	per season
Estimated collisions	1.5587	per season
Estimated collisions after correction for operation	1.3249	per season
Estimated collisions after avoidance factor	0.0026	per season
Equivalent to 1 bird every	377.39	seasons

## E.3 Hen Harrier

Breeding Season 2013

**Table E-11 Hen harrier flight activity**

VP	Seconds at risk height	Observation effort (HaHr)	Flying time at risk height (secsHahr <sup>-1</sup> )
1	39.70	14721.8875	0.0000002

**Table E-12 Hen harrier mortality estimates**

Mean activity in wind farm at rotor height	0.0003	hr <sup>-1</sup>
Total Combined rotor swept volume	926903	m <sup>3</sup>
Bird occupancy	0.8881	hrs/season
Bird occupancy of rotor swept volume	1.2569	bird-sec
No. of transits through rotors	5.1761	per season
Estimated collisions	0.3479	per season
Estimated collisions after correction for operation	0.2957	per season
Estimated collisions after avoidance factor	0.0030	per season
Equivalent to 1 bird every	338.16	seasons

Non-Breeding Season 2013/2014

**Table E-13 Hen harrier flight activity**

VP	Seconds at risk height	Observation effort (HaHr)	Flying time at risk height (secsHahr <sup>-1</sup> )
1	20.33	13904.0048	0.00000012
3	64.29	5694.5786	0.00000037
4	28.45	6010.0151	0.00000016

**Table E-14 Hen harrier mortality estimates**

Mean activity in wind farm at rotor height	0.0010	hr <sup>-1</sup>
Total Combined rotor swept volume	926903	m <sup>3</sup>
Bird occupancy	1.8932	hrs/season
Bird occupancy of rotor swept volume	2.6796	bird-sec
No. of transits through rotors	11.0348	per season
Estimated collisions	0.7417	per season
Estimated collisions after correction for operation	0.6304	per season
Estimated collisions after avoidance factor	0.0063	per season
Equivalent to 1 bird every	158.62	seasons

#### E.4 Osprey

Breeding Season 2018

**Table E-15 Osprey flight activity**

VP	Seconds at risk height	Observation effort (HaHr)	Flying time at risk height (secsHahr <sup>-1</sup> )
8	12.51	5753.6428	0.0000006

**Table E-16 Osprey mortality estimates**

Mean activity in wind farm at rotor height	0.0009	hr <sup>-1</sup>
Total Combined rotor swept volume	958712	m <sup>3</sup>
Bird occupancy	2.4914	hrs/season
Bird occupancy of rotor swept volume	3.6473	bird-sec
No. of transits through rotors	13.7953	per season
Estimated collisions	1.0563	per season
Estimated collisions after correction for operation	0.8979	per season
Estimated collisions after avoidance factor	0.0180	per season
Equivalent to 1 bird every	55.69	seasons

<sup>i</sup> Scottish Natural Heritage (SNH) (2000) Windfarms and Birds - Calculating a theoretical collision risk assuming no avoiding action. SNH Guidance Note. Available at <http://www.snh.gov.uk/docs/C205425.pdf>

<sup>ii</sup> Band, W., Madders, M. and Whitfield, D.P. (2007). Developing field and analytical methods to assess avian collision risk at Windfarms. In: de Lucas, M., Janss, G.F.E. and Ferrer, M. (eds.) Birds and Windfarms: Risk Assessment and Mitigation. Pp. 259-275. Quercus, Madrid. Band *et al.* (2007) describe a method of quantifying potential bird collisions

#### E.5 Pink-Footed Goose

Non-Breeding Season 2017/2018

**Table E-17 Pink-footed goose flight activity**

VP	Seconds at risk height	Observation effort (HaHr)	Flying time at risk height (secsHahr <sup>-1</sup> )
7	16575.15	3205.0039	0.00031

**Table E-18 Pink-footed goose mortality estimates**

Mean activity in wind farm at rotor height	0.4930	hr <sup>-1</sup>
Total Combined rotor swept volume	988930	m <sup>3</sup>
Bird occupancy	1335.1389	hrs/season
Bird occupancy of rotor swept volume	2016.1552	bird-sec
No. of transits through rotors	11218.8756	per season
Estimated collisions	702.0276	per season
Estimated collisions after correction for operation	596.7235	per season
Estimated collisions after avoidance factor	1.1934	per season
Equivalent to 1 bird every	0.84	seasons

## ANNEX F REVIEW OF THE EFFECTS OF ARTIFICIAL LIGHT ON BIRDS IN RELATION TO DEPLOYMENT OF OBSTRUCTION LIGHTING ON WIND TURBINES

### F.1 Introduction

With the increase in height of wind turbines, it is now a requirement for obstruction lighting to be added to tall turbines to make the structures more visible to pilots of aircraft. This review summarises the impacts of artificial light on birds and considers whether any of the known impacts might arise in birds as a consequence of deployment of obstruction lighting on wind turbines. This review was undertaken by Professor Bob Furness in September 2017.

### F.2 Methods

A literature search was carried out, using tools such as Web of Knowledge and Google scholar, to identify relevant published work. Identified publications were obtained and read, in order to prepare this review paper.

### F.3 Results Obtained from Literature Search

There is a large literature identifying a wide range of impacts of artificial lights on birds. The identified impacts all relate to effects occurring at night. These include:

- Disruption of photoperiod physiology of birds due to artificial light;
- Extension of daytime activity (earlier start at dawn, later end at dusk);
- Phototaxis of seabirds (birds attracted to light sources and grounded on land);
- Phototaxis of nocturnal migrants (birds attracted to light sources and grounded or killed);
- Ability of some birds to use nocturnal feeding assisted by artificial light;
- Increased predation risk for nocturnal birds resulting from artificial lighting;
- Birds better able to avoid collision when structures are illuminated; and
- Displacement of birds due to avoidance of lights.

These impacts are considered in turn below.

#### Disruption of photoperiod physiology of birds due to artificial light

In theory, low levels of artificial light have the potential to affect the physiological photoperiod experienced by birds, and thereby to affect the timing of their onset of activity in the morning and end of activity in the evening, as well as potentially affecting the seasonal triggers for activities such as deposition or shedding of fat stores, moult, breeding and migration (Titulaer *et al.* 2012, Gaston *et al.* 2013, 2015, De Jong *et al.* 2017, Da Silva *et al.* 2017). However, there are no published studies or observations reporting clear examples of any seasonal activities of birds being affected by exposure to artificial light. There are a few anecdotal examples of urban birds starting to nest in winter, and this could possibly be interpreted as birds coming into breeding condition early because their photoperiod had been affected by artificial light. However, such early breeding is generally seen only in a few bird species that are often able to breed successfully in winter if weather conditions permit. That suggests that such cases represent opportunistic breeding in urban environments rather than disruption of natural photoperiod responses. De Jong *et al.* (2017) experimented with birds in captivity, exposing them to different colours of light at night. Birds advanced their onset of activity in the morning when exposed to light at night, and advanced timing

more in response to red and white light than to green light. Birds advanced timing more in response to higher intensity of artificial light. However, there have not been similar experiments with free-living wild birds, so it is uncertain if such effects occur in wild birds. Since such effects have not been reported, it seems more likely that there is very little, if any, effect of artificial light on photoperiod responses of wild birds.

#### Extension of daytime activity

Da Silva *et al.* (2017) used an experimental approach with wild birds, exposing the area around an automated feeding station in a forest to artificial light at night. They found a small response in some bird species, with blue tit and great tit starting to forage earlier during experimentally lighted mornings. However, no response was shown by willow/marsh tit, nuthatch, jay or blackbird, and the response of great tits was weak. The authors concluded that 'our results suggest that artificial light during winter has only small effects on timing of foraging'. Da Silva *et al.* (2017) used an experimental approach to test whether birds start singing earlier in the morning when their forest habitat was illuminated with artificial light. They found no effect of artificial light (testing a variety of different light colours) on the timing of the dawn chorus. These results suggest that artificial light has very little, if any, impact on the available daylength for day-active birds, possibly because the natural variation in light levels is so large that artificial light makes very little difference to the natural diurnal cycle of light levels.

#### Phototaxis of seabirds

Most burrow-nesting shearwaters and petrels are nocturnally active. Adults rear a single chick, and 'desert' the fully-grown chick to leave it to fledge independently. Chicks fledge at night, usually just after dark, and show strong positive phototaxis; they are attracted to light. This allows them to navigate from the dark burrows at the colony to the sea, as light intensity is naturally higher over the sea than onshore. This phototoxic response is therefore important to allow fledglings to find the sea when they first leave their burrow (especially important for those petrel species that breed at colonies some distance inland from the sea). This phototaxis behavioural response is also seen, for example, in hatchling sea turtles and has the same function. Puffins also show this same response as petrels. There are numerous examples of shearwater, petrel, and puffin chicks being attracted to artificial lights at fledging, and being grounded (Wilhelm *et al.* 2013, Rodriguez *et al.* 2014, Gineste *et al.* 2017). This is well known, for example, at colonies in the Hawaii, Balearic Islands, Canary Islands and Azores where fledglings will collide with street lights and car headlights (Fontaine *et al.* 2011, Troy *et al.* 2011, 2013, Rodriguez *et al.* 2012a, b, c, 2015a, b). It also occurs in Scotland, for example at the islands of Rum and St Kilda (Miles *et al.* 2010) where Manx shearwaters, European storm-petrels, Leach's storm-petrels and Atlantic puffin fledglings are grounded at street lights and illuminated windows. In virtually all of these examples, only fledglings are attracted and grounded, during the short period in late summer when chicks are departing from nesting burrows. Adults appear to be unaffected by artificial lights. Although for most colonies the numbers of fledglings distracted by artificial lights is trivial, the impact on survival of fledglings can be significant in a few cases where large colonies are close to extensive artificial lighting. In Reunion Island, 13,200 tropical shearwater fledglings were found grounded due to artificial lights, with numbers increasing from 1996 to 2015 (Gineste *et al.* 2017). At Phillip Island, Australia, 8,871 short-tailed shearwater fledglings were found grounded by lights along the roadsides, with at least 40% of these dead or dying (Rodriguez *et al.* 2014). Turning off the street lights mitigated this mortality (Rodriguez *et al.* 2014). In Kauai, Hawaii, more than 30,000 grounded fledglings of the federally threatened Newell's shearwater have been collected under lights, an impact that may be contributing to the decline of this population (Troy *et al.* 2011).

Lights on wind farm turbines in Scotland are unlikely to affect fledgling puffins, shearwaters or petrels from Scottish colonies, as most of those colonies are on offshore islands immediately overlooking the sea. Fledglings are likely to disperse over the sea without seeing lights on wind turbines. Exceptions to this might be puffins from Isle of May fledging past offshore wind farms in the Forth and Tay area, Manx shearwaters and European storm petrels fledging from Sanda Islands, Kintyre, past terrestrial wind farms on the Kintyre peninsula, puffins fledging from the Shiant Islands passing terrestrial wind farms in the Western Isles, Manx shearwaters fledging from the small isles (especially Rum) and the Treshnish Isles passing terrestrial wind farms on Skye or Mull. However, the lights involved on wind turbines would be likely to represent a trivial amount of lighting relative to the street lights and house lights of local towns, villages, lighthouses, ships and fishing vessels. These fledglings are also thought to tend

to fly low rather than at high altitudes, and so would not be likely to be particularly close to lights at the tops of turbines. Phototaxis of fledging seabirds in Scotland is, therefore, very unlikely to be a problem in relation to obstruction lighting on wind turbines.

### Phototaxis of nocturnal migrants

It has been recognised for a very long time that nocturnal migrant birds are attracted to artificial light while migrating (Harvie Brown *et al.* 1881, Horring 1926, Mehlum 1977, Jones and Francis 2003). This topic has recently received considerable attention specifically in relation to lighting at communication towers (Longcore *et al.* 2008, Gehring *et al.* 2009), wind farms (Kerlinger *et al.* 2010, Hüppop and Hilgerloh 2012), oil and gas production platforms (Day *et al.* 2015, Ronconi *et al.* 2015), cruise ships (Bocetti 2011), and in general in relation to bird ecology (Zhao *et al.* 2014, Watson *et al.* 2016).

The strongest and most dramatic examples of phototaxis in nocturnal migration birds are the ‘falls’ of migrants that can occur at lighthouses and lightships, especially during foggy weather in autumn. These were studied in detail in the 1880s to 1920s. For example, Harvie Brown and Alfred Newton established a committee of the British Association for the Advancement of Science in the 1870s and sent questionnaires to lighthouse keepers throughout the British Isles to obtain data on nocturnal bird migration and the numbers of birds killed by collision with lights. As long ago as 1881, they reported that *‘the brightest, whitest, fixed lights attract the most birds’*, that most collisions occurred during autumn migration rather than during spring migration, and that most collisions occurred when the weather was foggy and windy (as also concluded over 100 years later by Mehlum 1977). These same factors were identified as affecting collision rates in a study by Zhao *et al.* (2014). The British association annual reports show the large numbers of birds that can be killed; for example, 600 thrushes killed by collision with Skerryvore lighthouse in October 1877. A high proportion of the birds killed were juveniles, which probably at least in part explains why numbers killed tended to be much higher in autumn than in spring. Similar surveys were conducted around the same period in many different European countries. For example, the 41<sup>st</sup> annual report on birds at Danish lighthouses, for the year 1923, was published in 1926 (Horring 1926). That report mentions that at least 4,600 birds, mostly thrushes and starlings, were killed by collision at Danish lighthouses and lightships in 1923. Study of birds at lighthouses fell out of favour around the 1930s, and there is very little literature on this topic after that period, although it was recognised that large numbers of migrating birds were still being killed by collision at lighthouses (e.g. Mehlum 1977, Jones and Francis 2003). Jones and Francis (2003) reported that from 1960-1989 there were kills of up to 2,000 birds in a single night in autumn at Long Point lighthouse (Ontario, Canada). However, this light was fitted with a new beam in 1989, which was narrower and less powerful, and this resulted in a huge decrease in numbers of migrant birds killed. From 1990 to 2002 the mean numbers known to be killed were reduced to only about 30 birds per year. The authors point out that this highlights the *‘effectiveness of simple changes in light signatures in reducing avian light attraction and mortality during migration’*.

Ronconi *et al.* (2015) and Day *et al.* (2015) both report that poor weather (e.g. fog, rain, low cloud cover) exacerbate nocturnal attraction of bird migrants to lights at oil and gas production platforms, with on occasions thousands of birds being killed in a night, especially where gas is being flared. Kerlinger *et al.* (2010) report that bright artificial lighting may have caused *‘multi-bird fatality events’* at wind farms in North America, but that obstruction lighting at turbines as recommended by the Federal Aviation Administration (FAA) (flashing red lights) had no influence on bird collisions compared with turbines at the same wind farm, where there was no obstruction lighting (see also this same conclusion in Manville 2009). Gehring *et al.* (2009) reported that communication towers equipped with non-flashing/steady-burning lights in addition to red or white flashing obstruction lights were responsible for much higher numbers of bird collisions; towers with fixed lights and flashing lights were responsible for 13 bird fatalities per season, whereas towers with only flashing obstruction lights were responsible for 3.7 bird fatalities per season. They concluded that having only flashing obstruction lights reduced bird collisions significantly, a conclusion supported by Patterson (2012). Longcore *et al.* (2008) reported that steady-burning lights increased the numbers of birds colliding with communication towers.

Watson *et al.* (2016) report that more nocturnal flight calls can be detected over artificially lit areas than over dark areas. They conclude that artificial lighting changes behaviour of nocturnal migrant birds, either by changing their flight paths to pass over lit areas, by flying at lower altitudes over lit areas, by increasing their call rates over lit areas, or by remaining longer over lit areas. Hüppop and Hilgerloh (2012) suggest that nocturnal migrants are more vocal when conditions are adverse, so that vocalisations do not indicate bird numbers but rather the stress levels of the birds. Bocetti (2011) identified that cruise ships, which often have bright external lighting during the night, also represent a collision hazard for nocturnal migrant birds, although it seems likely that the numbers of birds killed at cruise ships are rather small compared to numbers killed at lighthouses.

The evidence indicates that lights on wind turbines are likely to increase numbers of nocturnal migrant birds that collide. However, that increase is mainly seen if lights are steady-burning, whereas there is very little increase in collisions when lights are flashing. Obstruction lighting on wind turbines appears to be several orders of magnitude less effective than the light from lighthouses and lightships in attracting nocturnal migrant birds. Survival rates of small birds are low, and it is recognised that many birds die during migration, especially juvenile birds during autumn migration (Newton 2008). Birds that are attracted by artificial light are likely to be birds that are already at high risk of mortality because they are facing adverse weather conditions and are lost or exhausted (Newton 2008). Furthermore, Welcker *et al.* (2017) reported that, despite the apparent attraction of nocturnal migrating birds to lights, nocturnal migrants represented only 8.6% of all fatalities at a sample of German wind farms. They concluded that *‘nocturnal migrants do not have a higher risk of collision with wind energy facilities than do diurnally active species, but rather appear to circumvent collision more effectively’*.

### Phototaxis of other birds

Attraction of fledgling shearwaters, petrels and puffins, and attraction of nocturnal migrating birds to lights is well established and has been studied in detail. In contrast, there is no clear evidence from research studies or observations to suggest that other kinds of birds show attraction to lights. There seems to be little or no phototaxis shown by adult shearwaters, petrels or puffins around the British Isles, despite the strong response seen in fledglings. There is some evidence of adult petrels being attracted to bright artificial lights at night at colonies in the sub-Antarctic (e.g. Furness, pers. obvs.), but that may simply be a disorientation and grounding of birds that fly into strong beams of light such that they are unable to see where they are going. There is little evidence to suggest that those birds are attracted towards artificial light. There is little or no evidence to suggest that birds that are not undertaking migration are attracted to artificial light. While nocturnal migrants are found as collision casualties at lighthouses during the migration seasons, resident birds in summer or winter, wintering birds in winter or breeding birds in summer are not found as collision casualties in summer or winter. Seabirds breeding close to lighthouses are not found as collision casualties at lighthouses. The evidence strongly indicates that resident, breeding and wintering birds do not show phototaxis. Therefore, there is no risk due to phototaxis for resident birds, breeding or wintering birds in the vicinity of wind farms as a direct consequence of deployment of obstruction lighting on wind turbines.

### Ability of some birds to use nocturnal feeding assisted by artificial light

Birds that are visual feeders and feed only during the day may benefit from artificial light that allows them to feed visually at night. This has been reported, for example, in intertidal waders. Santos *et al.* (2010) found that visual feeding shorebirds fed at night in areas of the Tagus Estuary (Portugal) where artificial light allowed them to see prey. Tactile-feeding waders did not show any change in distribution attributable to the distribution of artificial light. Similarly, Da Silva *et al.* (2017) found that blue tits and great tits started foraging earlier in the morning when artificial light was available. The availability of artificial light did not alter feeding times of willow/marsh tits, nuthatches, jays or blackbirds, and the effect on great tits was weak and only evident during nights when weather was poor. There are anecdotal observations of birds such as robins feeding under street lights during winter darkness in urban environments.

In the context of obstruction lighting on wind turbines, it is highly unlikely that the amount of light provided would allow birds to feed at times when natural light levels were low, so this effect is very unlikely to be seen at wind farms.

### Increased predation risk for nocturnal birds resulting from artificial lighting

Canario *et al.* (2012) observed short-eared owls and long-eared owls catching migrating songbirds that had been attracted to artificial lights. Oro *et al.* (2005) found significantly lower survival rates of breeding adult European storm-petrels at a colony in Benidorm Island (Spain) that was illuminated by artificial lighting shining across the sea from Benidorm city compared to a control colony on the dark side of Benidorm Island. The low survival of the population exposed to artificial light was due to yellow-legged gull predation on the storm petrels which was facilitated by the artificial light allowing gulls to see, and catch, storm petrels attending the colony at night.

Amounts of light produced by obstruction lighting at the top of wind turbines will be far less than produced by the lights in the studies reported above. It is, therefore, extremely unlikely that the lighting on wind turbines would affect predation risk for nocturnal birds in the vicinity of wind farms.

### Birds better able to avoid collision when structures are illuminated

Blackwell *et al.* (2012) showed that artificial lights on aircraft reduced the risk of bird strike because lights made the aircraft more detectable to birds so allowed earlier avoidance behaviour. A study of bat collisions at wind farms in Texas found that bat fatalities were more frequent at turbines without aviation lights compared with turbines with synchronised red flashing aviation lights. The lower mortality at turbines with lights applied for only one species of bat, the other species showing no difference in mortality between turbines with or without aviation lights. However, the study suggests that at least one of the bat species avoided turbines more successfully when the turbine was equipped with obstruction lighting.

### Displacement of birds due to avoidance of lights

Day *et al.* (2017) reported that migrating eiders showed higher avoidance at night of an oil-production facility in Alaska when it was illuminated with a hazing light system. However, this seems to be a rare example of birds being displaced by artificial lights, and there seem to be more examples of birds using artificial lights to their benefit, such as the use by shorebirds of artificial lights to allow them to feed visually at night.

### Cumulative assessment

Loss *et al.* (2015) assessed the scale of anthropogenic mortality of birds in the United States and concluded that cause-specific annual mortality was billions due to predation by domestic cats, hundreds of millions due to collisions with buildings (mainly windows) and vehicles, tens of millions due to collisions with power lines, millions due to collisions with communication towers and electrocution at power lines, and hundreds of thousands due to collisions with wind turbines. These relative impacts are likely to be in a similar ranking in Scotland, and indeed throughout most of Europe.

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