# Section 7
# ORNITHOLOGY

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## Glossary

| Term | Definition |
|---|---|
| Assemblage | A group of species found in the same location. |
| Avoidance | Prevention of impacts occurring, having regard to predictions about potentially negative environmental effects (e.g. project decisions about site location or design). |
| Baseline conditions | The conditions that would pertain in the absence of the proposed project at the time that the project would be constructed/operated/decommissioned. The definition of these baseline conditions should be informed by changes arising from other causes (e.g. other consented developments). |
| Biodiversity | The biological diversity of the Earth's living resources. The total variability among organisms and ecosystems. |
| Conservation status | The state of a species or habitat including for example, extent, abundance, distribution and their trends. |
| Cumulative effect | The combined effect of the assessed project in combination with the effects from a number of different projects, on the same single receptor/resource. |
| Designated site | An area afforded protection under an International Convention, European Directive or a piece of UK legislation due to its nature conservation or landscape value. |
| Ecological Receptor | Includes any living organisms other than humans, the habitat which supports such organisms, or natural resources which could be adversely affected by the development. |
| Effect | Term used to express the consequence of an impact. The significance of effect is determined by correlating the magnitude of the impact with the importance, or sensitivity of the receptor or resource in accordance with defined significance criteria. |
| Environmental Impact Assessment | A statutory process by which certain planned projects must be assessed before a formal decision to proceed can be made. Involves the collection and consideration of environmental information, which fulfils the assessment requirements of the EIA Directive, including the publication of an Environmental Statement. |
| Habitat | The place or type of site where an organism or population naturally occurs. Often used in the wider sense referring to major assemblages of plants and animals found together. |
| Impact | Change that is caused by an action; for example, land clearing (action) during construction which results in habitat loss (impact). |
| Magnitude | A combination of the extent, duration, frequency and reversibility of an impact. |
| Mitigation | Measures (which may include process or design) intended to avoid, reduce and where possible, remedy significant adverse impacts of a development. |
| Population | A collection of individuals (plants or animals), all of the same species and in a defined geographical area. |
| Remote Detector | Bat detectors left in situ over a number of days in strategic points to record bat activity. |
| Scoping | The determination of the extent of an assessment (for an EcIA or full EIA). |
| Sensitivity | The extent to which a study subject can accept a change of a particular type and scale without unacceptable adverse effects. |
| Significance | The significance of an effect combines the evaluation of the magnitude of an impact and the sensitivity of the receptor. |
| Site of Special Scientific Interest | Sites providing statutory protection for the best examples of the UK's flora, fauna, geological or physiographical features. These sites are also used to underpin other national and international nature conservation designations. |
| Special Area of Conservation | Protected sites designated under the EC Habitats Directive. Article 3 of the Habitats Directive requires the establishment of a European network of important high quality conservation sites that will make a significant contribution to conserving the 189 habitat types and 788 species identified in Annexes I and II of the Directive (as amended). |
| Special Protection Area | Sites providing statutory protection for a number of rare, threatened or vulnerable bird species and also for regularly occurring migratory species. |
| Zone(s) of Influence | The area(s) over which ecological features may be affected by the biophysical changes caused by the proposed project and associated act. |

## Abbreviations

| Abbreviation | Description |
|---|---|
| ASSI | Area of Special Scientific Interest |
| BCT | Bat Conservation Trust |
| BoCC | Birds of Conservation Concern |
| BTO | British Trust for Ornithology |
| CIEEM | Chartered Institute of Ecology and Environmental Management |
| CWL | Community Windpower Ltd |
| DGC | Dumfries and Galloway Council |
| EcIA | Ecological Impact Assessment |
| EIA | Environmental Impact Assessment |
| EIAR | Environmental Impact Assessment Report |
| FRZ | Flight Risk Zone |
| GWDTE | Groundwater Dependent Terrestrial Ecosystem |
| IEF | Important Ecological Feature |
| IUCN | International Union for the Conservation of Nature |
| LBAP | Local Biodiversity Action Plan |
| MSS | Marine Scotland Science |
| NDSFB | Nith District Salmon Fishery Board |
| NHZ | Natural Heritage Zone |
| NNR | National Nature Reserve |
| NVC | National Vegetation Classification |
| pSAC | Proposed Special Area for Conservation |
| pSPA | Proposed Special Protection Area |
| RSPB | Royal Society for the Protection of Birds |
| SPA | Special Protection Area |
| SEPA | Scottish Environmental Protection Agency |
| SNCO | Statutory Nature Conservation Organisation |
| NatureScot | NatureScot (Previously known as Scottish National Heritage – SNH) |
| SPA | Special Protection Area |
| SPP | Scottish Planning Policy |
| SSSI | Site of Special Scientific Interest |
| VP | Vantage point |
| WCA | Wildlife and Countryside act 1081 |
| ZOI | Zone of Influence |

# Section 7: Ornithology

## 7.1 Introduction

7.1.1 This section is the Ornithology chapter of the Ecological Impact Assessment (EcIA) of the proposed Scoop Hill Community Wind Farm development, as required by the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017.

7.1.2 Ornithological surveys were carried out at the proposed Scoop Hill Community Wind Farm to establish the ornithological baseline of the site, and to assess potential impacts from the proposed development on the bird interest of the area. Starling Learning was commissioned to undertake a series of bird surveys at the site dating from August 2017 to November 2019 with additional field work in 2020.

7.1.3 This section describes the Ecological Impact Assessment (EcIA) of the proposed wind farm development on the ornithological value of the site only. All other ecology has been covered separately in Section 8 of this EIAR. Any sensitive information relating to raptors is provided in a separate Confidential Annex.

7.1.4 This EcIA is based upon:

- Existing records of important species provided through consultation;
- Bird surveys carried out by Starling Learning from 2017 to 2020; and
- Collision risk assessment.

7.1.5 The aims of this EcIA are to:

- Establish a robust and accurate ornithological baseline for the site;
- Identify the risk of collision with turbines for key species;
- Identify any potential impacts arising from the development proposals (construction and operational stages);
- Establish the magnitude and significance of those identified impacts;
- Identify mitigation measures to address the significant impacts;
- Assess any residual impacts and the need for any compensation; and,
- Assess cumulative impacts from other surrounding developments.

7.1.6 The proposed Scoop Hill Community Wind Farm is situated within a commercial forest plantation to the southeast of the town of Moffat. As well as the conifer plantation, the survey area has a wide variety of habitats including heather and grass moorland, broad-leaved woodland and farmland.

## 7.2 Scoping

7.2.1 A scoping exercise was undertaken, and a Scoping Report was submitted to the Scottish Government (SG) and distributed to a number of other agencies including Dumfries and Galloway Council (DGC), NatureScot, Scottish Environment Protection Agency (SEPA) and the Royal Society for the Protection of Birds (RSPB) to indicate the subjects to be covered within the EIAR.

7.2.2 A scoping opinion relating to ornithology was received from the Scottish Government, RSPB and NatureScot.

### Scoping Response from the Scottish Government

7.2.3 The Scottish Government response was as follows:

*"The proposed site is in close proximity to River Tweed Special Area of Conservation (SAC) Dryfe Water Site of Special Scientific Interest (SSSI) and NatureScot would expect measures are taken to assure no impact or significant effect on either.*

*The mitigation measures suggested for any significant environmental impacts identified should be presented as a conclusion to each chapter. Applicants are also asked to provide a consolidated schedule of all mitigation measures proposed in the environmental assessment report, provided in tabular form, where that mitigation is relied upon in relation to reported conclusions of likelihood or significance of impacts".*

7.2.4 The Community Windpower (CWL) response was as follows:

*"Designated sites will be considered in the Environmental Impact Assessment with measures taken to ensure no significant impacts on them.*

*All ecological impacts will be identified, and their significance assessed, mitigation will be put in place and any residual impacts discussed".*

### Scoping Response from RSPB

7.2.5 The RSPB response was as follows:

*"This development falls within an area which is important for several species which we recommend should be targets for survey work and assessment. This includes black grouse, nightjar, red kite and sensitive raptor species. We would also advise that breeding waders are included as target species.*

*The survey methodology gives a list of target species which does not currently include red kite, which we recommend is included.*

*More detail on the survey work required.*

*We support details of proposed survey work for sensitive habitats which includes Phase 1 habitat mapping alongside NVC habitat assessment. The EIA should outline how impact to sensitive habitats including deep peat has been minimised through infrastructure layout design.*

*We would expect to see full detail of the two years of survey work in the EIA including methodology and results of survey work. This would include survey to identify status of breeding waders (adaptive Brown & Shepherd Upland bird survey) for four visits as advised by NatureScot guidance alongside black grouse lek surveys, nightjar survey and breeding/wintering raptor survey. All target species should be surveyed in line with NatureScot guidance1.*

*We would also expect full detail of vantage point (VP) survey work to include viewsheds and clear summary of any overlap in VPs alongside times of watches to ensure that survey work is conducted to enable a full record of bird activity and status at this site.*

*Cumulative impact should be assessed in line with NatureScot guidance2 which would include all consented or developments at application that have the potential to cause cumulative effects in combination with the project. This assessment should include a quantifiable assessment of impact based*

*on collision risk figures for all target species across all developments so that results are additive rather than based on significance as stand-alone projects".*

7.2.6 The CWL response was as follows:

"*All species mentioned by the RSPB have been surveyed for, including waders.*

*Red Kite has been recorded on site and considered within the survey including a 2km raptor survey.*

*Further details have been provided to the RSPB in a summary following the first year of survey outlining all ornithological survey methodologies and a summary of each target species recorded, including flight maps.*

*The habitat surveys have helped to guide the layout and Groundwater Dependant Terrestrial Ecosystems avoided*

*The methodology and results of two years survey work will be presented within the EIA including four visits for breeding waders, Black Grouse lek surveys, Nightjar and raptor surveys, all following NatureScot Guidance. We have also considered the migration of geese and Whooper Swans.*

*All details of VPs, viewsheds, overlaps will be included along with a collision risk analysis.*

*All other wind farms within the Natural Heritage Zones will be considered within the EIA to provide cumulative figures for collision risk, displacement and loss of habitat*".

**Scoping Response from NatureScot:**

7.2.7 The NatureScot response was as follows:

*"NatureScot has been in discussion with the consultants who are currently undertaking the ornithological survey work on behalf of Community Windpower Ltd. and are broadly satisfied with the scope and methodologies that have been adopted. The site is large and complex and NatureScot accept that there may be difficulties in obtaining ideal coverage. The assessment will need to take account of any limitations.*

*Our own appraisal of the literature suggests that turbine lighting could potentially have adverse effects on birds, but the evidence for lights increasing collision rates by attracting birds nocturnally at onshore wind farms is very limited. To date there have been no large scale fatality events at onshore wind farms relating to lighting that we are aware of, but this could be due to a lack of recording rather than a lack of fatalities. We advise that the applicant should also present an assessment of the effect of turbine lighting on birds. Given the uncertainties but potential for adverse effects, in our view it would be sensible to consider mitigation in respect of this.*

*We are happy with the scope of survey work with respect to other ecological receptors.*

*All surveys should follow recommended methodology".*

7.2.8 The CWL response was as follows.

"*The coverage of the site has been good despite difficulties. It will be ensured that the assessment takes account of any limitations.*

*Once the type of lighting has been decided, the potential impacts on birds will be assessed.*

*All surveys follow recent guidelines*".

## 7.3 Legislation

7.3.1 The following legislation has been taken into account when undertaking this assessment:

- Environmental Impact Assessment Directive 2014/52/EU;
- The Wildlife and Countryside Act (as amended) (WCA);
- The Conservation (Natural Habitats, &c) Regulations 1994 (as amended) ('The Habitats Regulations);
- The Nature Conservation (Scotland) Act 2004 (as amended);
- The Council Directive on the Conservation of Wild Birds 2009/147/EC (The EU 'Birds Directive'); and
- The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 ('the 2017 EIA Regulations').

## 7.4 Planning Policy

7.4.1 The Scottish Planning Policy (SPP) sets out details of national planning policy and includes the requirement for an appropriate assessment by the planning authority on any development plans or proposals which are likely to have a significant effect on natural sites, which include Special Protection Areas (SPAs), designated for their bird interest and Ramsar sites.

7.4.2 Dumfries and Galloway Planning Policy includes the following:

**NE5: Species of International Importance**

Development proposals that would be likely to have an adverse effect on a European Protected Species will not be permitted unless it can be shown that:

- There is no satisfactory alternative; and
- The development is required for preserving public health or public safety or for other imperative reasons of overriding public interest including those of a social or economic nature and beneficial consequences of primary importance for the environment; and
- The development would not be detrimental to the maintenance of the population of the species at a favourable conservation status in its natural range.

**NE6: Sites of National Importance for Biodiversity and Geodiversity**

Development that affects Sites of Special Scientific Interest, not designated as International Sites, and other national nature conservation designations will only be permitted where:

- It will not adversely affect the integrity of the area or the qualities for which it has been designated, or
- Any such adverse effects are clearly outweighed by social, environmental or economic benefits of national importance.

7.4.3 There is one site with a statutory designation within the Development, the Dryfe Water SSSI, however this is an upland mixed ash woodland with botanical interest with no cited ornithological interests.

## 7.5 Methodology

### Desk Study

7.5.1 A desktop study and consultation exercise was carried out in 2017, prior to any fieldwork, to collate existing background information on the ornithological interest of the site. This included a search for statutory and non-statutory sites designated for their nature conservation value, records of protected or notable species within the site or surrounding habitats, which could be impacted by the scheme and habitats or features of interest. The search area for protected species records was determined by the particular species and ranged between 500m and 2 km from the site boundary. The following data sources were consulted:

- RSPB;
- NatureScot – Sitelink web pages (online information about designated sites);
- Forestry Commission Scotland Upper Nithsdale Land Management Plan 2018 to 2028;
- National Biodiversity Atlas (NBN Atlas) (only for scoping, no records from this site are included);
- SEPA;
- South West Scotland Environmental Information Centre (SWSEIC);
- The Birds of Conservation Concern (BoCC) (Eaton *et al.,* 2015);
- International Union for the Conservation of Nature (IUCN) Red list of threatened species;
- Scottish Biodiversity List (Scottish Biodiversity Forum) (2013);
- Relevant Environmental Statements, associated documents and bird monitoring reports for developments included in the Cumulative Assessment (acquired from various sources); and
- Data on relevant scarce raptor species supplied by the local RSG.
- Aerial photography; and
- The UK Biodiversity Action Plan (BAP);

7.5.2 Results of the data search are shown in Appendix 7.1. The data from the Scottish Raptor Study Group is contained within the separate Confidential Annex.

7.5.3 Statutory designated sites up to 20 km from the site boundary were identified using the NatureScot *Sitelink* search facility.

7.5.4 The RSPB suggested investigation of the movements of Barnacle Geese as they are known to fly over the area on their return to the Svalbard in spring. Flights have been monitored by the Wildfowl and Wetlands Trust (WWT) and the results were investigated.

7.5.5 A scoping survey was conducted in 2017 by Starling Learning to make a preliminary assessment of the birds likely to be of ornithological interest for the site. The scoping survey aimed to identify the following:

- An assessment of the presence, numbers and distribution of target species and other species of conservation concern;
- An appraisal of the habitats within and adjacent to the wind farm, up to a distance of 500 metres (m);
- An assessment of how the bird population is likely to be affected by the proposed development, with particular reference to collision risk and potential displacement.

7.5.6 This reconnaissance survey involved walkovers of the entire site, with one-hour vantage point watches from various points. An assessment was made of the likely bird species present in each habitat. The walkover also included point counts of ten minutes duration for each one.

7.5.7 Taking into account the potential bird issues raised by the consultees and the generic guidance[1] on assessing effects on bird communities, the following field survey requirements were identified:

- Breeding bird surveys for species of conservation concern including black grouse (*Tetrao tetrix)*, nightjar (*Caprimulgus europaeus*) and waders;
- Surveys of scarce breeding raptors and owls: golden eagle (*Aquila chrysaetos),* goshawk (*Accipiter gentiles),* hen harrier (*Circus cyaneus)*, peregrine (*Falco peregrinus)*, merlin (*Falco columbarius)*, osprey (*Pandion haliaetus*), red kite (*Milvus milvus*) short-eared owl (*Asio flammeus)* and barn owl (*Tyto alba)*;
- Vantage point surveys during the breeding, non-breeding and migration seasons; and
- Migrating wildfowl.

7.5.8 The primary target species for survey work are those listed in the NatureScot Guidance for wind farm developments outside of designated areas:

- All Annex 1 species or Schedule 1 breeding species (other than passerines);
- Species with very localised UK breeding distributions; and
- Other large species potentially vulnerable to wind farm development.

### Fieldwork

7.5.9 The ornithological survey work was undertaken with the following objectives:

- To determine the breeding, wintering and migrating bird populations;
- To complete a survey of breeding birds, with special reference to raptors and waders;
- To locate any nests of breeding raptors within the site or on adjacent moorland and forest edge;
- To determine the level of flight activity by birds within the proposed development area with special reference to target species; and

[1] Scottish Natural Heritage (2017). Recommended bird survey methods to inform Impact Assessment of onshore windfarms.

Scottish Natural Heritage (2009). Monitoring the impact of onshore wind farms on birds.

Scottish Natural Heritage (2018). Assessing Significance of Impacts from Onshore Windfarms Out With Designated Areas

- To determine the impact of the proposals during construction and operation of the wind farm.

7.5.10 In order to do this, a number of different fieldwork techniques were used in this survey, paying particular attention to species of conservation concern that, by the nature of their behaviour, are particularly vulnerable to wind farm developments. Survey work was carried out by Starling Learning staff namely Liam Flynn, David Galbraith, Joseph Greenlees, Seumas Harris, Douglas Irving, Diane Lyons, James Manners, Ian Miller, Angus Murray, Liz Parsons, Hilary Redden, Chris Rollie and Alan Wood, all of whom are suitably qualified ornithologists. A summary of their experience and qualifications is provided in Appendix 7.2.

7.5.11 Surveys were all undertaken in accordance with standard methodologies with varying buffers around the Zone of Influence (ZOI) and included:

- Vantage point surveys during the breeding, non-breeding and migration seasons (500m buffer);
- Breeding bird surveys including Brown and Shepherd Wader Survey[2] for breeding upland waders (500m buffer);
- A bird habitat appraisal;
- Walkovers and point counts (500m);
- Nightjar survey (1 km);
- Black Grouse Survey (1.5km); and
- Raptor survey (2km) and golden eagle (6km).

Bird Habitat Assessment

7.5.12 An assessment of all habitats and their significance for birds was carried out. Details from the Phase 1 habitat survey were added to this.

Vantage Point Surveys

7.5.13 Vantage point (VP) watches were undertaken during the breeding, non-breeding and migration seasons and were carried out in accordance with NatureScot guidance (2017 to 2020) on survey methods for use in assessing the impacts of onshore wind farms on bird communities.

7.5.14 One observer undertook each VP watch in conditions of good visibility, while positioned as inconspicuously as possible hidden in a small camouflaged army tent. Surveyors were in contact using two-way radios and able to inform each other of the movements of target species. Care has been taken to avoid double counting of flights. The VP locations ensured no more than 2km from the area viewed and it was possible to see the airspace of the turbines. However, due to the height of the forestry it was impossible to find a perfect VP to see the airspace of T59 from within the recommended 2km. However, it was visible from VPs 5a, 7, 18 and 20, and birds were recorded within this airspace of T59 making assessment possible.

7.5.15 The majority of the VP surveys were carried out soon after dawn and before dusk. Each VP watch lasted two or three hours, with a break between watches.

7.5.16 In year one of the survey there were 21 VPs with a total of 90 hours watched from each one ensuring coverage during the breeding season, migration and winter. During the second year of survey the number of turbines was reduced and the position of some of the turbines altered too. VP locations were then altered accordingly, and the number of VPs reduced to 18. Some of the new VPs, 5a. 6a and 22 were started towards the end of year 1.There were additional *Migration Watch* Points at six of the VPs (two to the west, two central and two to the east positioned on high points) in April and early May 2018 at dusk and dawn). These *Migration Watch* Points also took place in late September and October 2018. Details of the vantage points are given in Appendix 7.3 and VPs and their viewsheds are illustrated on Figures 7.3a-f and 7.5a-e. All dates and times of vantage point surveys are shown in Appendix 7.4.

7.5.17 No other ornithological or ecological surveys were carried out at times when the VP watches were taking place.

7.5.18 Surveys collated data over a 500 m buffer of the proposed turbine locations, and for *Target A* species, recorded flight duration and the bird's flying elevation above the ground at 15 second intervals. For other species (*Target B*), flights were mapped, and elevation noted but not timed. Finally for species of lower conservation importance (*Target C*), a count of individuals present each 5 minute period was made.

7.5.19 Each flight was recorded on a 1:10,000 map in the field and flights of target species are shown on Figures 7.6 to 7.20. The recording forms used at vantage points are shown in Appendix 7.5.

7.5.20 The aim was to quantify the use of the proposed wind farm airspace by these birds and to collect information on the relative use of different parts of the survey area. Information on the proportion of time that target species spent flying at different elevations was also gathered. This data was then used to predict the amount of time target species would spend flying at turbine rotor blade height within the volume of the proposed wind farm. This was then used to carry out an assessment of collision risk for each target species.

7.5.21 The collision risk has been calculated separately for each of the two years of survey. These results are detailed in Appendix 7.14.

7.5.22 Details of the secondary species recorded from VPs including buzzard, kestrel, raven and gulls are given in Appendix 7.9.

7.5.23 The overall spatial coverage is considered to provide representative flight activity levels within the development area to enable robust collision monitoring to take place.

[2] A. F. Brown & K. B. Shepherd (1993) A method for censusing upland breeding waders, Bird Study, 40:3, 189-195, DOI: 10.1080/00063659309477182

Breeding Bird Survey

7.5.24 The breeding bird survey included a wader survey to identify breeding territories of the open ground on the moorland and farmland. This was based on the Brown and Shepherd methodology (1993) for surveying upland breeding waders.

7.5.25 Four visits were made for both years of survey between the months of April and June in 2018 and 2019 and fieldwork was conducted between 0830 and 1800 hours in suitable weather (i.e. wind speed not above 5 Beaufort, no persistent rain and good visibility). Dates and times are given in Appendix 7.6.

7.5.26 The survey area covered up to 500 m from the site boundary and all bird species visible at the time of the survey were recorded. The surveyors walked the site, scanning the area with binoculars and listening for calls at regular intervals (approx 100 m), noting nests and broods, but focussing on evidence of breeding. Suitable cover was used to observe the birds for the majority of the survey but raised vantage points were used for scanning for limited periods to help count vocal and highly mobile species such as curlew.

7.5.27 Supplementary records have been added to this survey from visits from the vantage points over the duration of the survey. All results are compiled in Appendix 7.10 and on Figures 7.21 to 7.24.

Walkover Surveys

7.5.28 As there were areas hidden from the viewsheds of several VPs, regular walkovers of the wind farm area took place concentrating on areas missed from the VPs and all species were recorded. These involved slow walkovers with short 10 minute VPs.

Black Grouse Survey

7.5.29 The RSPB monitoring method[3] for black grouse was followed. Three visits were made to each survey area commencing before sunrise in April and May in 2018 and 2019. Known lek sites, as provided by the RSPB, were checked and other suitable areas were visited. Results are provided in the Confidential Annex.

Raptor Survey

7.5.30 Three visits were made in spring 2018 and spring 2019 to assess the site for breeding raptors, all between March and July. This extended a minimum of two kilometres from the turbines.

7.5.31 As it was known that a golden eagle frequently forages over the site, the search area was extended to 6km to determine golden eagle foraging and possible nesting. The *South of Scotland Golden Eagle Project* have commenced a scheme to release a number of golden eagles into the Dumfries and Galloway and Scottish Borders area with three eagles released in the Moffat Hills area in 2019. This was taken into account.

7.5.32 Goshawk was known to nest in the area and surveys included visits in February and March 2018 and 2019 to survey for displaying birds with a second visit in June to look for the nests.

7.5.33 A short-eared owl survey was not carried out, and there was a plan to carry out further specific surveys should any be recorded, however no birds were seen for the entire duration of the surveys.

7.5.34 There was liaison with the RSPB and Raptor Study Group. Other raptors known to be present were taken into account; osprey, red kite, merlin, peregrine and hen harrier.

7.5.35 Methodology from the RSPB Bird Monitoring Methods manual[3] was used together with the Scottish Raptor Study Group Guidelines for Surveying Raptors[3]. Raptors were also surveyed on all other surveys and additional records gathered when walking to and from vantage points. Results from this are included in the Confidential Annex with non-sensitive data shown in Appendices 7.10 and 7.11.

Nocturnal Surveys

7.5.36 Nightjar surveys were carried out in suitable areas following RSPB methodology[4]. Two visits were made to each location from June to mid July in 2018 and 2019, at dusk and before dawn, avoiding winds greater than Beaufort 3. Additional survey was carried out with tape lures played during bat activity surveys.

7.5.37 There are a number of buildings within the 1km buffer that have been surveyed for barn owls: Braefield, Laverhay, Milne, Shankend, Macmaw, Waterhead, Sandyford, Kilburn, Finniegill, and Dryfehead. The first visit took place in winter 2017/18 to talk to landowners, check for roosts, evidence of roosts or nests with a second visit to check for nests in summer.

7.5.38 Long–eared owls were considered during the bat surveys.

7.5.39 All nocturnal surveys included a search for Woodcock.

**Wildfowl**

7.5.40 As it was known that there is goose and whooper swan movements through the Southern Uplands, extra VPs were carried out during migration periods.

7.5.41 Wildfowl counts were conducted on the Black Esk during the winter with occasional dawn and dusk visits to record any roosts.

## 7.6 Ecological Impact Assessment (EcIA)

**General**

7.6.1 This section explains how the significance of effects on the ornithological interests of the site was assessed.

[3] Hardey, J., Crick, H.Q.P., Wernham, C.V., Riley, H.T., Etheridge, B. and Thompson, D.B.A. (2013). Raptors: A Field Guide to Survey and Monitoring. The Stationery Office, Edinburgh

[4] Gilbert et al. 1998**:** *Bird Monitoring Methods*, RSPB

7.6.2 This EcIA is carried out in accordance with the guidance set out in the Institute of Ecology and Environmental Management (IEEM) Guidelines for Ecological Impact Assessment (2017)[5] and Guidelines for Ecological Impact Assessment 2nd Edition (2016)[6]. This section defines the methodology used to assess the significance of effects through the process of an evaluation of the sensitivity (a combination of Nature Conservation Value and Conservation Status) and the magnitude of effect.

7.6.3 In order to accurately assess the potential impacts likely to occur from the development of the wind farm, the baseline conditions of the site need to be established, which ecological features (habitats, species, ecosystems and their functions/processes) are likely to be affected by the proposal, both within and adjacent to the development area.

**Evaluating Ornithological Interests**

7.6.4 There are a wide range of criteria which will determine the sensitivity of each ecological feature. Examples include:

- Any site designations;
- Naturalness;
- Rarity of habitat, plant and animal species;
- Habitat diversity and connectivity;
- Habitats and species in decline; and
- Large populations or concentrations of species considered uncommon or declining in a larger context.

7.6.5 The Nature Conservation Value is defined on the basis of the geographic context given in Table 7.1 below (which follows the guidance detailed in CIEEM 2016[5]).

**Table 7.1 – Approach for Evaluating the Value or Sensitivity of Ecological Features in Scotland**

| Value of Receptor | Examples (Guidance to evaluation) |
|---|---|
| High<br>e.g. International or National | An internationally or nationally designated site or candidate site (SPA, SSSI, NNR, Ramsar site, Biogenetic Reserve).<br>Any regularly occurring population of an internationally or nationally important bird species, which is threatened or rare in the UK, e.g. Schedule 1.<br>A regularly occurring, nationally significant population/number of any internationally important species.<br>A site that provides critical habitat for any regularly occurring bird population of national importance which is rare in the UK. |
| Medium<br>e.g. Regional (Southwest Scotland) | Viable areas of key habitat identified in the Regional BAP or smaller areas of such habitat, which are essential to maintain the viability of a larger whole. |
| | Viable areas of key habitat identified as being of regional value in the appropriate Natural Area profile e.g. local nature reserve.<br>Any regularly occurring, locally significant population of a species listed on the current UK Red List.<br>A regularly occurring, locally significant number of a regionally important species.<br>An occasional occurrence of a nationally important species |
| Low<br>e.g. District and Local importance | Areas of habitat identified in a sub-county (District/Borough) BAP or in the relevant Natural Area profile.<br>A population of a species that is listed in a District/Borough BAP because of its rarity in the locality or in the relevant Natural Area profile because of its regional rarity or localisation.<br>A regularly occurring, locally significant number of a District/Borough important species during a critical phase of its life cycle.<br>A regularly occurring but low number of locally common protected species within or adjacent to the development area.<br>A population of bird species or assemblage of species which are not considered to qualify for non statutory designation but are considered locally important. |
| Very Low | Those habitats that have an effect of enriching and complimenting the local natural environment to a small degree.<br>A population of bird species or assemblage of species which are not considered to qualify for non statutory designation but are considered locally important in the context of the immediate surrounding area. |
| Negligible | A commonplace species of little or no conservation importance. Areas of habitats considered to be of very limited ecological value. Those habitats that do not enrich the site for ornithology. |

7.6.6 Those ecological features identified to be potentially affected by the development and deemed to be of local importance or above, are termed 'Important Ecological Features' (IEFs).

7.6.7 Designated sites can be readily assigned to an appropriate level. For example, a site with a designation assigned through European legislation, such as a Special Protected Area (SPA) or a Special Area of Conservation (SAC), would be considered of International significance, a SSSI designated by UK statute would be of national significance and a site designated by a local authority would be of district importance. Where a feature has value at more than one level, its overriding value is that of the highest level. However, some sites may be designated for different features at the European and national levels, so these features should be valued accordingly.

[5] CIEEM (2006) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal. Chartered Institute of Ecology and Environmental Management, Winchester

[6] CIEEM (2016) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal, 2nd edition. Chartered Institute of Ecology and Environmental Management, Winchester

7.6.8 Impacts may be defined as direct (e.g. direct habitat loss or destruction of a nest) or indirect (e.g. disturbance during construction or change in habitat suitability for birds).

The IEEM guidelines set out the process for assessment in the following stages:

- Description of the ecological baseline i.e. results of fieldwork and desktop study;
- Identification of IEFs, i.e. the species of ecological value within the zone of influence;
- Determination of the nature conservation value of the IEFs;
- Identification of the potential impacts due to construction, operation and decommissioning of the development on the IEFs;
- Determination of the magnitude of impact on the IEFs taking into account the sensitivity of the receptor and the duration and reversibility of the impact;
- Determination of the significance of the impact based on the interaction between the magnitude/duration, the nature conservation value and the likelihood of the impact occurring;
- Identification of mitigation measures to reduce or avoid negative impacts;
- Determination of the residual impact following mitigation; and
- Identification of any monitoring requirements.

### Magnitude of Effect

7.6.9 The magnitude of effect refers to the level of changes in the extent and integrity of the ecological feature.

7.6.10 Effects on IEFs can be judged in terms of magnitude in space and time. Magnitude refers to the scale of the impact. This may relate to the loss of a breeding population or the displacement of an individual bird. The effects can be adverse, neutral or beneficial.

7.6.11 Magnitude is assessed at five levels for spatial effects as shown in Table 7.2.

7.6.12 Magnitude is also assessed at five levels for temporal effects, as shown in Table 7.3. Duration is defined as the time for which the impact is expected to last before recovery.

**Table 7.2 – Definition of spatial effect magnitude on IEFs**

| Negative Effect Magnitude | Description |
|---|---|
| Very high | Total or almost complete loss of the receptor. Loss or very major alteration to key elements/features of the baseline conditions such that the post development character/composition/attributes will be fundamentally changed and may be lost from the site altogether. The conservation status of the receptor would be affected.<br>Guide: <20% of population remains |
| High | Result in large scale, permanent changes in the receptor and likely to change its ecological integrity. These effects are likely to result in overall changes in the conservation status of a receptor.<br>Guide: 20-80% of population lost |
| Medium | Include moderate scale, long-term changes in a receptor or larger scale temporary changes, but the integrity of the receptor is unlikely to be affected. This may mean that there are temporary changes in the conservation status of the receptor but these are reversible and unlikely to be permanent.<br>Guide: 5-20% of population lost |
| Low | Include effects that are small in magnitude, have small scale temporary changes, and where integrity is not affected. These effects are unlikely to result in overall changes to the conservation status of a receptor.<br>Guide: 1-5% of population lost |
| Negligible | No perceptible change in the ecological receptor.<br>Guide: 1% or less of population lost |

7.6.13 Effects and spatial magnitude are assessed within appropriate bio-geographic regions:

- Effects on breeding bird populations are assessed within a regional context;
- Effects on non breeding birds are assessed within a national context; and
- Any potential impacts on migrating geese of conservation value are assessed at a national level.

7.6.14 For breeding raptors, the local population is defined as all birds breeding within 2 km of the site (NatureScot 2005). For all other breeding species, the local population is defined as that being within the core survey area. For species on transit through the site, for example migrants or wintering birds, the local population is defined as the source population for the birds concerned, defined at the smallest geographical scale possible on the basis of the available evidence.

**Table 7.3 – Definition of Temporal Effect Magnitude on IEFs**

| Duration | Definition |
|---|---|
| Permanent | Effects continuing indefinitely beyond the span of one human generation (taken as above 26 years) except where there is likely to be substantial improvement after this period. |
| Long term | Between 15 and up to (and including) 25 years |
| Medium term | Between 5 and up to (but not including) 15 years |
| Short term | Up to (but not including) 5 years |
| Negligible | No effect |

### Determining Significance of Potential Effects

7.6.15 The significance of potential effects is determined by considering the value of the receptor and the magnitude of the effect and using professional judgement as to whether the integrity of the receptor will be affected.

7.6.16 Effects are more likely to be considered significant where they affect species of a high conservation value or where the magnitude of the effect is high. Effects considered not significant would apply to situations where the receptor is of a low conservation value, the integrity is not threatened, or the magnitude is low.

7.6.17 In accordance with the EIA Regulations, each likely effect is evaluated and classified as either significant or not significant. The significance levels of effect on bird populations are described in Table 7.4. Effects resulting in detectable changes in the conservation status of regional populations of Nature Conservation Importance are automatically considered to be significant effects for the purposes of the EIA Regulations

(i.e. no distinction is made between effects of "*major*" or "*moderate*" significance). Non-significant effects include all those which are likely to result in small to barely detectable (minor) or non-detectable (negligible) changes in conservation status of regional (and therefore national) populations.

**Table 7.4 Significance Levels of Effects on Birds**

| Significance Level of Effect | Description |
|---|---|
| Major | Detectable changes in regional populations of Nature Conservation Importance that would have a severe impact on conservation status. |
| Moderate | Detectable changes in regional populations of Nature Conservation Importance that would likely have an impact on their conservation status. |
| Minor | Small or barely discernible changes that would be unlikely to have an impact on the conservation status of regional populations of Nature Conservation Importance |
| Negligible | No or non-detectable changes in the conservation status of regional populations of Nature Conservation Importance. |

**Frequency and Timing**

7.6.18 The number of times an activity occurs will have an impact on ornithological features. The timing is also significant if the activity takes place during a critical period e.g. when birds are nesting.

**Reversibility**

7.6.19 An irreversible effect is one from which recovery is not possible within a reasonable timescale or if there is no possibility of action being taken to repair it. A reversible effect is one where recovery can take place or can be reversed by mitigation.

**Assessment of Cumulative Impacts and Effects**

7.6.20 NatureScot (2012) Cumulative Assessment is used to inform the cumulative assessment and the assessment of effects from surrounding developments will be taken into consideration.

**Assessment of residual impacts**

7.6.21 If a potential impact is determined to be significant, mitigation measures to avoid, reduce or prevent the impact are suggested wherever possible. Remaining residual impacts will then be discussed.

**Limitations to Assessment**

7.6.22 On many occasions vantage point surveys were cancelled due to bad weather conditions including thick snow and low cloud. However, it was possible to make up the hours at a later date.

7.6.23 The combined visible area of the VPs provides 73.5% coverage of the 500 m buffer of the proposed turbine locations. This relatively low overall coverage is due in part to the landscape characteristics of the study area with steep sided valleys and partly due to the forest cover, both of which restrict options for good VP locations. However, the majority of 'non-visible' ground is contained within the interior of low lying gullies and cleuchs; well below airspace of proposed wind turbines. Therefore, any undetected flights would be so low in relation to the proposed turbines located on the higher ridges that they would not be at risk of collision and not included in any Collision Risk Model (CRM). Consequently, the fact that a flight has gone undetected has no significant consequence on the outcome of an impact assessment.

7.6.24 Furthermore, when calculating bird occupancy within a Collision Risk Model (CRM), a weighted average of unit time per hectare per hour is derived, this is then extrapolated across the entire wind farm area plus 500 m buffer. Therefore, despite some areas being 'non-visible', a measure of bird occupancy has been applied to these areas by virtue of the time recorded by birds in the 'visible' areas. In addition, some flights within 'non-visible' areas were in fact detectable if they were above 20 m and these would have been recorded and mapped by observers. Despite these fieldwork realities, few flights were observed within, emerging from or departing to 'non-visible' areas over the two years of baseline surveys. Hence, it is considered improbable that high levels of flight activity at rotor height occurred here, compared to the relatively low levels recorded over the majority of the 'visible' areas.

7.6.25 The available information on bird populations at the NHZ level is limited and available information on the results of monitoring, mitigation and enhancement work at existing wind farm developments is sparse. Therefore, the best use is made of the available literature and professional judgement to inform the assessment.

## 7.7 Baseline Conditions/Results

7.7.1 This section summarises the baseline bird populations and flight activity within and surrounding the Proposed Development based on surveys undertaken in the period September 2017 to February 2020 by Starling Learning.

7.7.2 The Zone of Influence (ZOI) is identified as the area and resources that may be influenced by the development. It includes a radius around turbines, ancillary structures, borrow pits and access tracks of between 500m to 2km (see section 7.5.11 for buffers).

7.7.3 Details of the methods and full results are presented in Appendix 7.1 and 7.2, and in the Confidential Annex (for key sensitive species).

7.7.4 The Proposed Development site comprises a large area of commercial forestry with adjacent areas of upland moor and farmland.

**Desk Study**

Natural Heritage Zone

7.7.5 Natural Heritage Zones are a system devised by NatureScot. It comprises sub divisions of Scotland based on wildlife, natural features, landforms, geology, land use and human impact. The proposed Scoop Hill Wind Farm is within the Western Southern Uplands and adjacent to the Border Hills NHZ.

Designated Sites

7.7.6 There are a number of statutory designations within 15km of the site. The majority of them have no citations regarding birds and all statutory and non-statutory designated sites are described in Appendix 8.6 of the Ecology Chapter. There is only one statutory site relating to birds within 15km, namely Castle Loch, Lochmaben, the details of which are outlined in Appendix 7.7.

7.7.7 There are no non-statutory sites of significance to birds within or adjacent to the development.

7.7.8 Data from other sources is outlined in Appendix 7.1.

7.7.9 Data from the Scottish Raptor Study Group (SRSG) is provided in a separate Confidential Annex, which accompanies this EIAR. Data from the SRSG and from site survey identified the following breeding raptors and owls within 2km of the development:

- Peregrine regularly nesting at two locations;
- Goshawk nesting at two locations;
- Osprey nesting at one location; and
- A single golden eagle present on site for many years;
- Regular sightings of red kite in recent years; and
- Tawny owl nesting in nest boxes at three locations.

7.7.10 In 2018, three juvenile golden eagles were released in the Moffat Hills by the South of Scotland Golden Eagle Project (SoSGEP) in order to boost the small, isolated and vulnerable population of golden eagles in the Scottish Borders and Dumfries & Galloway region. A further series of translocations will take place over the following five years.

7.7.11 More information is contained in the separate Confidential Annex.

## Species (Site Survey)

Bird Habitats

7.7.12 A range of bird habitats exist within the development site. These are:

- Conifer woodland at various stages including clear fell;
- Broad-leaved woodland;
- Acid, neutral and marshy grassland;
- Dry and wet dwarf shrub heath;
- Blanket bog ;
- Wet and dry modified bog;
- Standing water ;
- Running water;
- Scrub;
- Cliffs and scree; and
- Amenity grassland and bare ground.

Vantage Point Surveys

7.7.13 During the surveys, the flight activity of all target species was recorded from the vantage points. The number and duration of flights by target species is shown in Appendix 7.8. Flights maps are shown on Figures 7.6 to 7.20.

7.7.14 The Flight Risk Zone (FRZ) is given by the lower and upper limits of the recorded flight height bands which encompass the heights swept by the rotating turbine blades (i.e. 10 m to 250 m). Hence the presented amount of time spent flying at collision risk height is greater than that actually spent at collision risk height (approximately 90% of flight time within the risk height flight bands is at risk of collision).

Flight Records for Target Species (in order of the 'British List')[7]

*Hen Harrier*

7.7.15 Hen harrier was only recorded outside the breeding season with birds recorded hunting in late summer, autumn and winter mainly on the moorland to the west of the site and with an occasional flight to the south of the site. A total of 12 flights were recorded, eight flights in year 1 and four in year 2. The total flight time in year 1 was 879 seconds with 30 seconds within the FRZ. In year 2, a total flight time of 166 seconds was recorded, again most of which were below turbine height, with 41 seconds within the FRZ.

*Peregrine*

Peregrine was recorded mainly to the east side of the site but with some other records through various parts of the site. A total of 29 flights were recorded, 19 flights recorded in year 1 and ten flights in year 2. Total flight time in year 1 was 1,612 seconds with 610 seconds in the FRZ. Total flight time in year 2 was 1,032 seconds with 570 seconds in the FRZ.

*Merlin*

7.7.16 The majority of the merlin records were to the western side of the site on moorland with two records to the northeast in the Pot Hill area. A total of 11 flights were recorded; seven in year 1 and four in year 2. Total flight time in year 1 was 195 seconds with 70 in the FRZ, and in year 2, a total of 224 seconds with 60 seconds in the FRZ.

*Goshawk*

7.7.17 A total of 73 flights were recorded in year 1 of the survey and 13 flights in year 2. In year 1, a total flight time of 20,247 seconds was recorded with 2,178 seconds in the FRZ. In year 2, the total flight time was 1,329 seconds with 798 seconds in the FRZ.

*Golden Eagle*

7.7.18 The majority of the flights recorded are from the northwest of the site. A total of 23 flights were recorded in year 1 of the survey and 19 flights in year 2. Total flight time recorded in year 1 was 10,137 seconds

[7] British Ornithologists' Union. 2017. The British List: A Checklist of Birds of Britain (9th edition). *Ibis* 160: 190-240.

with 2,318 seconds within the FRZ. In year 2, total flight time was 5,373 seconds with 1,315 seconds within the FRZ.

*Red Kite*

7.7.19 Red Kite was recorded mainly to the west and southwest area with a total of 23 flights, nine in year 1 and 14 in year 2. Total flight time was 2,043 seconds in year 1 with 912 seconds within the FRZ. In year 2, total flight time was 2,189 seconds with 871 in the FRZ.

*Osprey*

7.7.20 Osprey was recorded on both the western and eastern sides of the site. A total of seven flights were recorded, three in year 1 and four in year 2. Total flight time recorded in year 1 was 289 seconds with 90 seconds in the FRZ. In year 2, total flight time was 213 seconds with 131 seconds within the FRZ.

*Hobby*

7.7.21 A juvenile hobby was recorded hunting on site in September 2017 in the Black Esk area. It was recorded for a total of 16 seconds with no flights within the FRZ. As this species is not considered to be threatened and is likely to only be an occasional summer visitor, it is no longer considered within this EcIA.

*Golden Plover*

7.7.22 Winter flocks were recorded in the Milne Height area to the west of the site and to the far northwest. A total of 228 flights were recorded with flocks ranging from single birds to 38 birds; a total of 38 flights recorded in year 1 and 190 in year 2. Total flight time in year 1 was 605 seconds with 360 seconds within the FRZ. In year 2, the total flight time was 23,293 seconds with 19,996 seconds in the FRZ.

*Curlew*

7.7.23 Curlews were mainly recorded in the western areas of moorland and farmland with a total of 36 curlew flights recorded, with 25 in year 1 and 12 in year 2. The total flight time for year 1 was 2,015 seconds with 1,414 seconds within the FRZ. In year 2, total flight time was 1,162 seconds and 1,039 seconds within the FRZ.

*Oystercatcher*

7.7.24 A pair of breeding oystercatchers was recorded in flight in the area of the Black Esk in summer 2018. A total of six flights were recorded, with a flight time of 272 seconds, none of which were within the FRZ. It is unlikely that this species will be impacted in any way and is therefore no longer considered within this EcIA.

*Snipe*

7.7.25 Snipe were often recorded during walk in and outs to vantage points on moorland. From VPs, a total of 15 flights were recorded, nine in year 1 and six in year 2. Total flight time recorded in year 1 was 280 seconds, of which 204 seconds were within the FRZ. In year 2, the total flight time was 87 seconds with 38 seconds in the FRZ. It is unlikely that this species will be impacted in a significant way and is therefore no longer considered within this EcIA.

*Woodcock*

7.7.26 Two flights of woodcock were recorded with a total of eight seconds, none of which were within the FRZ. It is unlikely that this species will be impacted in any way and is therefore no longer considered within this EcIA.

*Whooper Swan*

7.7.27 Only one whooper swan was recorded flying over the site, for a total of 19 seconds, all within the FRZ. As only one flight was recorded and there is lack of suitable whooper swan habitat for feeding or roosting a detailed assessment of potential effects on this species arising from the Proposed Development is not required under the EIA Regulations. Hence, whooper swans despite their high Nature Conservation Importance are not considered further in this EcIA.

*Pink-footed Geese*

7.7.28 Three flocks of pink-footed geese were recorded flying over the site in winter 2017/18 flights, two flocks in winter 2018/19 and four flocks in autumn 2019. A total of 1,019 flights were recorded with 355 flights in year 1 and 664 in year 2. Total flight time for year 1 was 28,884 seconds with 1,270 seconds within the FRZ. Year 2 recorded a total of 22,434 seconds with 20,360 in the FRZ. Pink-footed goose is considered to be of low Nature Conservation Importance in relation to the Proposed Development due to the fact that there are no wintering areas in the vicinity and very little migratory traffic was recorded relative to the known volume of movements by this species. Therefore there is no requirement for a more detailed assessment and are not considered further in this EcIA.

*Unidentified Grey Geese*

7.7.29 There were four flocks of unidentified grey geese either flying too high to identify or it was too dark. It is likely that these were pink-footed geese or greylag geese. A total of 50 flights were recorded. A total flight time of 3,922 seconds was recorded with 3,307 seconds within the FRZ. As it was only four flocks this too is considered to be insignificant and not given further consideration within this EcIA.

*Barn Owl*

7.7.30 No flights were recorded of barn owl.

*Black grouse*

7.7.31 No black grouse flights were recorded.

Summary of target species

7.7.32 A summary of the observed flights of target species is given in Table 7.5 This details the total number of flights, and flights within the FRZ.

**Table 7.5 - Summary of Recorded Flight Activity of Target Species**

| Species | Total no. of flights | | Total number of flights within the FRZ | | Total flying time (secs) | | Total flying time in FRZ (secs) | |
|---|---|---|---|---|---|---|---|---|
| | Year 1 | Year 2 | Year 1 | Year 2 | Year 1 | Year 2 | Year 1 | Year 2 |
| Hen Harrier | 8 | 4 | 1 | 3 | 879 | 166 | 30 | 41 |
| Peregrine | 19 | 10 | 8 | 9 | 1612 | 1032 | 610 | 570 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Merlin | 7 | 4 | 2 | 1 | 195 | 224 | 70 | 60 |
| Goshawk | 73 | 13 | 35 | 10 | 20,247 | 1,329 | 2,178 | 798 |
| Golden Eagle | 23 | 19 | 19 | 15 | 10,137 | 5,373 | 2,318 | 1,315 |
| Red Kite | 9 | 14 | 6 | 10 | 2,043 | 2,189 | 912 | 871 |
| Osprey | 3 | 4 | 1 | 3 | 289 | 213 | 90 | 131 |
| Hobby | 2 | 0 | 0 | 0 | 16 | 0 | 0 | 0 |
| Golden Plover | 38 | 190 | 12 | 190 | 605 | 23,293 | 360 | 19,996 |
| Curlew | 25 | 12 | 9 | 18 | 2,015 | 1,162 | 1,414 | 1,039 |
| Oystercatcher | 6 | 0 | 0 | 0 | 272 | 0 | 0 | 0 |
| Snipe | 9 | 6 | 5 | 3 | 280 | 87 | 204 | 38 |
| Woodcock | 2 | 0 | 0 | 0 | 8 | 0 | 0 | 0 |
| Whooper Swan | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 19 |
| Pink-footed Geese | 355 | 664 | 132 | 304 | 28,884 | 22,434 | 1,270 | 20,360 |
| Unidentified Geese | 35 | 15 | 29 | 0 | 3,397 | 525 | 3,307 | 0 |

Secondary Species

7.7.33 Flights of 11 secondary species were recorded namely grey heron, buzzard, sparrowhawk, herring gull, lesser black-backed gull, great black-backed gull, kestrel, raven, cormorant, mallard and goosander. A summary of the observed flights on non target species is given in Appendix 7.9.

*Grey Heron*

7.7.34 Recorded in, flying to, and from, various watercourses. No flights were recorded within the FRZ.

*Sparrowhawk*

7.7.35 59 records of sparrowhawk were recorded, 39 flights of which were within the FRZ.

*Buzzard*

7.7.36 Recorded frequently from all vantage points with a total of 1,675 flights of which 1,407 were within the FRZ.

*Herring Gull*

7.7.37 Recorded flying over the site occasionally.

*Lesser Black-backed Gull*

7.7.38 Recorded occasionally over the site in small numbers.

*Great Black-backed Gull*

7.7.39 Occasional records of individuals flying over the site.

*Kestrel*

7.7.40 Recorded frequently from all areas of moorland and farmland with 433 flights, 411 of which were within the FRZ.

*Raven*

7.7.41 Recorded very frequently from most vantage points totalling 969 flights with 765 within the FRZ.

*Cormorant*

7.7.42 Three flights recorded near the Black Esk, none within the FRZ.

*Wildfowl*

7.7.43 Seven flights by mallard were recorded mainly near the Black Esk, none within the FRZ. Four flights of goosander were recorded, again near the black Esk, two of which were within the FRZ.

7.7.44 Thirty seven other species were recorded flying over the survey areas, seen or heard from the vantage points or during the point counts. This included regular flights by skylark and meadow pipit in the moorland areas. Regular species recorded in the forest areas include woodpigeon, mistle thrush and at forest edges crossbill, willow warbler jay and song thrush. Records are included in Appendix 7.4.

Flight records recorded from surveys other than vantage points

7.7.45 A number of flights of target species were recorded during breeding bird surveys and walkovers. These are shown on Figure 7.24 and Appendix 7.10.

## Breeding Bird Survey

7.7.46 This section includes the results from the wader survey, moorland breeding bird survey and the raptor survey. Results are given in Appendix 7.10.

Breeding Target Species Recorded and their Status

Within the 500 m buffer of the entire proposed site, a total of 59 species have been recorded breeding at Scoop Hill. However, a number of these species have not been included in the results in Appendix 7.10 as they are not species of conservation concern. Woodland species were not recorded as due to the density of the forest it was not possible to monitor populations. However, a comment has been made about several species although breeding figures are not provided.

Waders

7.7.47 Waders were present in breeding in quite low numbers on the moorland areas. Curlew were recorded on the moorland areas giving a total of 6 birds. Snipe too were present in low numbers giving a total of 14 breeding pairs. Two pairs of oystercatcher and one pair of lapwing were recorded in the lower lying agricultural land. The only other breeding wader was common sandpiper with one pair on the Dryfe Water.

Black Grouse Survey

7.7.48 Two leks were recorded on site and details are provided in the Confidential Annex.

Raptor Survey

7.7.49 Due to the sensitivity of many of these species, a summary is provided below with further details provided in the Confidential Annex. In conjunction with data from the SRSG the following raptors have been recorded.

7.7.50 Peregrine was recorded at nesting at two locations which are regular sites.

7.7.51 Merlin was regularly recorded during the breeding season indicating a possible territory, however no nest was confirmed.

7.7.52 Two goshawk nests were confirmed.

7.7.53 Two osprey nests were confirmed.

7.7.54 A number of golden eagle roost locations were identified.

7.7.55 Barn owl nests and roosts were found at a number of locations.

7.7.56 Several tawny owl territories were recorded in the conifer plantation.

Other species

7.7.57 No nightjars were recorded breeding during the two years of survey despite the habitat appearing to be suitable. Ravens were recorded very frequently and are obviously nesting in the area. Only one nest was confirmed near the Black Esk Reservoir. Meadow pipit was the commonest species on the moorland and skylarks were also present in high densities with 58 territories recorded. Red Grouse were localised and present in low numbers as were stonechat, whinchat and wheatear. Several cuckoo territories were recorded.

7.7.58 Crossbills were very common in areas with a good Sitka cone crop.

7.7.59 Many of the other woodland species of conservation concern were not recorded in any detail including lesser redpoll, song thrush and mistle thrush but are common in the forest. Tree pipit was present in low numbers. Other common woodland species include coal tit, siskin, chaffinch and jay.

**Wildfowl Surveys of Black Esk**

7.7.60 Wildfowl counts were generally low on the Black Esk. These are summarised in Table 7.6 below. There were no significant wildfowl or gull roosts recorded.

**Table 7.6 - Summary of Winter Wildfowl Counts, Black Esk 2017/18**

| Date | Species |
|---|---|
| 31 October 2017 | Three goldeneye *Bucephala clangula* ;<br>19 mallard *Anas platyrhynchos*;<br>1 little grebe *Tachybaptus ruficollis* |
| 17 November 2017 | 3 little grebe;<br>14 mallard;<br>2 goosander;<br>1 grey heron |
| 15 Dec 2017 | 3 goosander;<br>18 mallard;<br>4 goldeneye. |
| 21 February 2018 | 2 goosander;<br>1 grey heron;<br>14 mallard;<br>6 goldeneye. |

**Determining Ornithological Importance**

7.7.61 The assessment applies to species that have been identified as Important Ecological Features (IEFs). These are the species considered to be important and potentially affected by the development. Appendix 7.12 outlines birds of conservation importance relating to species rarity, to the extent to which they are threatened throughout their range, or to their rate of decline. The species identified as IEFs due to being of high or medium conservation importance are outlined below.

7.7.62 The following are considered to be of high conservation importance: hen harrier, peregrine, merlin, goshawk, golden eagle, red kite, osprey, barn owl, black grouse, golden plover, and curlew are considered to have a high nature conservation value at Scoop Hill.

7.7.63 Despite their high conservation status, whooper swan and pink-footed geese have been regarded as having medium nature conservation value at this site as they do not utilise the site and there were very few flight records of these species. Oystercatchers were present in low numbers and snipe were localised on the hills and woodcock localised on woodland edges. These two are considered to be of medium nature conservation value to the site. Due to their conservation status kestrel, red grouse, whinchat, reed bunting and cuckoo have also been classed as having medium value. As has crossbill, despite being Schedule 1 as populations are now stable and the mature stands of conifers hold good populations of this species. Mallard, goosander and goldeneye were recorded on the Black Esk and flying in that general area and are generally out of the wind farm area and therefore considered to be of low conservation value to this site.

7.7.64 There are a number of other species, mainly passerines and gulls considered to have low conservation value for the site.

7.7.65 Species of high, medium and low nature conservation value will be considered further within this ECIA.

## 7.8 Impact Assessment

7.8.1 Within this section, the ways in which birds may be affected by the wind farm development are discussed and a description is given of possible impacts of the scheme on the bird populations in the area and their significance.

7.8.2 The key issues relating to birds are as follows:

- Effect on hunting and foraging grounds, shelter and roost sites, breeding sites, corridors for migration and dispersal and stop over sites.
- Effect on population cycles, survival rates, reproduction rates, and seasonal behaviour.

7.8.3 These could be affected by:

1. The effects of direct habitat loss due to land-take from the access road, the turbine bases and the ancillary structures.
2. The effects of indirect habitat loss. Birds may be disturbed and displaced from the proximity of the wind turbines. Such disturbance may occur as a consequence of construction work, maintenance, and visitors or due to the presence of the wind farm close to nesting or feeding sites or on habitual flight routes.

3. The potential killing or injury of birds due to the effects of collision with rotating turbine blades, overhead wires, guy lines and fencing.

7.8.4 The effects of habitat loss, construction of the wind farm and the operational wind farm on individual birds or groups of birds are discussed. Decommissioning may result in disturbance to birds breeding and hunting in the area. This is difficult to judge at this particular time and will depend upon the levels of use of the site by birds at the time of decommissioning and will be dependent upon whether a decision is made to remove the track or not. However, it is unlikely to affect more than one breeding season and is likely to be less of a disturbance than construction of the wind farm.

### Direct Habitat Loss

7.8.5 The development would lead to a very minimal loss of habitat from the site. The construction of turbines, access tracks and ancillary structures would lead to losses of conifer and woodland, bog, heath and grassland habitats.

7.8.6 This would mean a small loss of nesting habitat for some species including goshawk, crossbill, black grouse, curlew, red grouse, skylark and meadow pipit, a loss of foraging habitat for raptors such as golden eagle, peregrine, hen harrier and kestrel and also for winter roosting golden plover. No Schedule 1 or Annex I bird species will lose any significant amount of habitat for foraging or for nesting. The loss of habitat is considered **long term** but of a **low magnitude** and **of minor significance.**

### Disturbance and Displacement during Construction

7.8.7 During the construction phase is the time when there is most potential for impacts on bird populations. The amount of disturbance is dependent on the time of year that construction takes place, with the breeding season having the biggest potential for loss of bird populations. It would be very difficult to avoid disturbing nesting birds if construction took place from mid-March until early August. Ground clearance would be especially disruptive. Nests in the tall moorland vegetation would be difficult to locate making avoidance problematical.

7.8.8 This disturbance and displacement is likely to occur over just one breeding season and is therefore **short term**, of **medium magnitude** and of **minor significance**.

7.8.9 The effects of disturbance and displacement on individual species are discussed later in Section 7.9, Receptor Assessment.

### Displacement during Operation

7.8.10 Operational turbines have the potential to displace both nesting and foraging birds.

7.8.11 Various studies have shown that at some sites waders can be displaced from up to 500 m away and in some cases, 800 m (Pearce-Higgins *et al*., 2009).[8] However a study by Natural Research[9] has suggested that curlew are not displaced by turbines. However, studies are inconclusive. Up to four pairs of curlew and possibly three pairs of snipe could have the potential to be displaced at Scoop Hill. Small wintering flocks of golden plover roost within the site. These flocks have the potential to be displaced, however studies have shown that winter flocks of golden plover do continue to use wind farm sites (Pearce-Higgins *et al*., 2012)[10].

7.8.12 Raptors will lose foraging areas and can be displaced up to 200 to 300m from turbines (Whitfield & Madders, 2005[11]). Flight activity of buzzard and hen harrier have been shown to be reduced by 41% and 53% respectively within 500m of wind turbines[8] but it is likely that they will continue to hunt within the wind farm area.

7.8.13 The risk of birds colliding with the rotating turbine blades has been assessed using the model developed by Band et al. This estimates the number of bird collisions with the turbine rotors during the specified time period. It is calculated in two stages:

- Estimating the number of birds passing through the area or volume swept by the rotors;
- Estimating the probability that a bird will be struck by a rotor blade when passing through the area swept by the rotors.

7.8.14 The model is different for two different situations:

- Predictable flights by waterfowl;
- Less predictable and generally more local movements by birds such as foraging by raptors and waders.

7.8.15 Data for both scenarios were collected by observing and recording bird flight activity in and around the site during timed watches from the vantage points.

### Effects Scoped Out

7.8.16 On the basis of the field survey work undertaken, the professional judgement of the ornithology team, experience from other relevant projects and taking account of policy guidance and standards, the following topic areas have been scoped out of the current assessment:

- Effects on all bird species classified as of low Nature Conservation Importance.
- Effects on the following bird populations: whooper swan, pink-footed goose, hobby, snipe, oystercatcher, woodcock, mallard, red grouse, whinchat, reed bunting and cuckoo. Baseline field studies have recorded very infrequent use of the area within the proposed development by these species of high and moderate Nature Conservation Importance. Although these species were

[8] Pearce-Higgins, J.W., Stephen, L., Langston, R.W., Bainbridge, I.P. and Bullman, R. (2009) The distribution of breeding birds around upland wind farms. Journal of Applied ecology, 46: 1323-1331

[9] Whitfield, D.P., Green, M & Fielding, A.H. (2010). Are breeding Eurasian curlew *Numenius arquata* displaced by wind energy developments? Natural Research Projects Ltd, Banchory, Scotland.

[10] Pearce-Higgens, J. W. *et al*. (2008). Assessing the cumulative impacts of wind farms on peatland birds: a case study of golden plover Pluvialis apricaria in Scotland. RSPB. Mires and Peat, Volume 4 (2008–2010), Article 01, http://www.mires-and-peat.net/,

[11] Whitfield P., Madders M.

present, their reliance on habitats and airspace in the vicinity of the Proposed Development is so low that there is no potential for an adverse effect on regional or national populations as a result of the construction, operation or decommissioning activities (see Baseline Conditions).

**Effects Assessed**

7.8.17 Potential effects are evaluated in respect of species of high or moderate Nature Conservation Importance whose regional populations could be potentially affected by the Proposed Development. Emphasis is given to species identified as sensitive receptors. In considering the Nature Conservation Importance of potentially affected species, consideration has been given to the criteria in Table 7.2.

7.8.18 Potential Effects are assessed in respect of the following species of high Nature Conservation Importance, as follows:

- Hen harrier;
- Merlin
- Goshawk;
- Peregrine;
- Golden eagle;
- Red kite;
- Black grouse;
- Osprey;
- Barn owl,
- Golden Plover; and
- Curlew.

7.8.19 On the basis of consultations and survey work, collision risk modelling has been carried out to predict the wind farm's impact on the following species of conservation importance and considered to be at risk from the turbine rotors:

*Hen harrier, merlin, goshawk, peregrine, golden eagle, red kite, golden plover and curlew.*

7.8.20 However, no flights were recorded by barn owl or black grouse and very few flights by merlin and osprey were recorded within the FRZ, so no collision risk modelling has been carried out for these species.

7.8.21 The risk window for the area was calculated using the data shown in Appendix 7.13.

7.8.22 The total area surveyed was 3,942 ha and the total area visible (A) from all the vantage points is 2,741 ha.

7.8.23 All calculations for collision risk are shown in Appendix 7.14.

## 7.9 Receptor Assessment

7.9.1 For each species taken to be an IEF, an assessment is made of the impacts on the Scottish population and also the population of the NHZ. Population figures for Scotland are from The Birds of Scotland, Forrester et al, 2007. [12] Population figures for the NHZ are taken from Wilson M.W. et al, 2015.[13]

7.9.2 The assessment will identify whether the impact is likely to adversely affect the conservation status of each of the species, without any consideration of possible mitigation.

**Hen Harrier**

Baseline

7.9.3 Hen harrier is an Annex 1 and Schedule I species, red listed and an LBAP species in Dumfries and Galloway as it is a scarce species due to a serious decline owing to persecution. Numbers have recovered slightly however this species still suffers from persecution. A survey in 2004 recorded the population as 633 pairs in Scotland and only about 400 in the early 1980s. The NHZ population of breeding hen harriers in 2011 was approximately 18 pairs.

7.9.4 Twelve flights were recorded from vantage point surveys of foraging birds with one additional flight recorded during a walkover survey. There are no birds recorded nesting within the site.

7.9.5 Hen harrier is considered to be of high nature conservation value at this site.

Potential Construction Effects

7.9.6 There is potential for disturbance and displacement from foraging habitats during construction. Displacement distance is estimated to be 500 m from the construction of turbines (Ruddock and Whitfield, 2007)[14]. However this is temporary, and the current use of the site is by foraging and not breeding birds. The impact is considered to be of a **low magnitude, short term** and of **minor significance**.

Potential Operational Effects

7.9.7 Collision risk has been calculated and the risk is very low. Over the 40 year lifetime of the wind farm it is predicted that 0.135 birds will collide.

7.9.8 There is potential for some displacement from the operating wind farm. Madders and Whitfield concluded that the majority of upland raptors are displaced slightly from turbines whilst foraging. However hen harriers are known to continue to hunt at wind farms, so they are not likely to be displaced entirely.

7.9.9 Both the collision risk and displacement of hen harrier from the proposed Scoop Hill Community Wind Farm is considered to be of a **negligible magnitude**, considered to be of **no significance**.

[12] Forrester R. & Andrews I. et al. 2007. The Birds of Scotland. The Scottish Ornithologists Club.

[13] Wilson, M. W., Austin, G. E., Gillings S. and Wernham, C. V. (2015). Natural Heritage Zone Bird Population Estimates. SWBSG Commissioned report number SWBSG_1504.pp72. Available from:www.swbsg.org

[14] Ruddock M. & Whitfield P. (2007). A review of disturbance distances in selected bird species. A report from Natural Research (Projects) Ltd to Scottish Natural Heritage

### Peregrine

Baseline

7.9.10 There were 29 records of hunting birds recorded from VPs with an additional three flight records during other surveys. There are two nesting pairs within 2km of the development.

7.9.11 Peregrine is an Annex 1 and Schedule I species, amber listed and a Dumfries and Galloway LBAP species due to a serious decline in the 1950s and 1960s. Although numbers have recovered this species still suffers from persecution. The Scottish peregrine population is estimated to be around 600 pairs and 2,000 to 2,500 in winter. The NHZ population of peregrines is estimated to be 34 breeding pairs.

7.9.12 Peregrine is considered to be of high nature conservation importance at this site.

Potential Construction Effects

7.9.13 There is the slight possibility of disturbance or displacement at the nest sites during construction. One of the nest sites is approximately 1.5km from a turbine; the other nest site is approximately 1.7km from a turbine. However, one nest site is also approximately 700m from track construction. Studies of disturbance distances for nesting peregrines have shown a range varying from 70m to 400m and pairs in remote areas are more prone to disturbance than urban birds. Disturbance to foraging is temporary and the amount of foraging habitat lost is small. This is considered to be a negative impact of **low magnitude**, **short term** and of **minor significance**.

Potential Operational Effects

7.9.14 The collision risk has been calculated to be 1 bird every 6.66 years. Over the lifetime of the wind farm of 40 years, this would be approximately 6.01 birds at risk from collision. This equates to a loss of 8.84% of the regional population over 40 years. The impact is considered to be of a **medium magnitude, long term** and of **moderate significance.**

7.9.15 However, the large size of the wind farm of 75 turbines creates a very large FRZ. In reality, peregrines were mainly recorded on the eastern side of the site and only occasionally elsewhere on site. Adjusting the collision risk calculation to an area of just 30 turbines, this decreases the collision risk to 2.4 birds at risk, 3.53% of the regional population over 40 years. This is a more realistic scenario and this impact would be considered to be of **low magnitude**, **short term** and of **minor significance**.

7.9.16 There is potential for some displacement from the operating wind farm. However peregrines have been recorded colliding with turbines, which would suggest that they are not displaced entirely. Displacement is considered to be of **a low magnitude** and of **low significance**.

### Merlin

Baseline

7.9.17 Merlin was recorded 11 times hunting on site during the vantage point watches and on six other occasions. No nest was located.

7.9.18 Merlin is an Annex 1 and Schedule I species, amber listed and a Dumfries and Galloway LBAP species. The Scottish population is estimated to be 800 pairs with 3,000 birds present in winter. The NHZ population is estimated to be 12 breeding pairs.

7.9.19 Merlin is considered to be of high nature conservation importance for this site.

Potential Construction Effects

7.9.20 There is potential for disturbance and displacement from foraging habitats during construction. Displacement distance is estimated to be approximately 400 m from the construction (Ruddock and Whitfield, 2007)[15]. However, this is temporary, and the current use of the site is by foraging and not breeding birds. The impact is considered to be of a **low magnitude, short term** and of **minor significance**.

Potential Operational Effects

7.9.21 The collision risk has been calculated to be 1 bird every 82 years. Over the lifetime of the wind farm of 40 years, this would be approximately 0.48 birds at risk from collision. This equates to a loss of 2% of the regional population over 40 years. The adverse impact is considered to be of a **low magnitude, long term** and of **minor significance.**

7.9.22 There is some potential for foraging birds to be displaced, however this is considered to be of a **low magnitude** and of **low significance**.

### Goshawk

Baseline

7.9.23 A total of 86 flights were recorded from the vantage points with an additional six flights recorded during other surveys.

7.9.24 Goshawks were reintroduced to Britain in the 1960s following extinction in the 19th century. The Scottish breeding population is now at least 130 pairs with 350 to 450 birds in winter. Breeding birds in the NHZ is estimated at 31 pairs.

7.9.25 Goshawk is listed as a Schedule 1 species and is considered to be of high nature conservation importance for this site.

[15] Ruddock M. & Whitfield P. (2007). A review of disturbance distances in selected bird species. A report from Natural Research (Projects) Ltd to Scottish Natural Heritage

Potential Construction Effects

7.9.26 It is impossible to predict the effects of construction on goshawk. One of the nest sites has since been felled. It is likely that this species will nest again elsewhere within the forest. Therefore there is potential for disturbance and displacement from both a nest and foraging habitats during the construction phase. The impact is considered to be of **high magnitude, short term** and **of major significance**.

Potential Operational Effects

7.9.27 Collision risk was calculated at 14.1 birds colliding over the lifetime of the wind farm of 40 years. In relation to the regional population, this is considered to be approximately 22.74% of local birds. The impact of the development on risk of collision is considered to be of **high magnitude, long term** and of **major significance.** Displacement will be dependant on the nest locations at the time of construction.

7.9.28 As with peregrine, goshawks were recorded in specific areas and not over the entire wind farm. Reducing the collision risk analysis area to 30 turbines substantially reduces the collision risk to 5.66 birds which is 8.8% of the regional population. This adverse impact would be of a **medium magnitude, long term** and of **moderate significance.**

### Golden Eagle

Baseline

7.9.29 Golden eagle was recorded from vantage points on 42 occasions with an additional six flights during other surveys.

7.9.30 It is a Schedule 1 species. It is estimated that there are approximately 440 pairs breeding in Scotland. The NHZ population is estimated to be two breeding pairs.

7.9.31 Golden eagle is listed as a Schedule 1 species, and is considered to be of high nature conservation importance for this site.

Potential Construction Effects

7.9.32 There is potential for disturbance and displacement to the foraging eagle and to its roost locations during construction, this is considered to be of **medium magnitude, short term** and **moderate significance**.

Potential Operational Effects

7.9.33 The collision risk has been calculated to be 1 bird every 3.64 years. Over the lifetime of the wind farm (40 years) this could be approximately 11 birds theoretically at risk from collision. This has the potential to equate to the loss of the NHZ population. The impact has the potential to be of **very high magnitude, long term** and **of major significance**.

7.9.34 However, in reality, the FRZ for the eagles is a lot smaller as eagle flights were recorded mainly to the west of the site and there are no hunting grounds over the conifer plantation. The flights are not random across the wind farm and the collision risk assessment might be more accurate if the relative risk was associated with individual turbines where they were recorded flying. For instance, when the FRZ included only 30 turbines, the main flight area of the eagles, the collision risk is substantially reduced to 4.39 birds over the 40 years of the wind farm which is a more realistic scenario however it is still of a **high magnitude, long term** and of **major significance.**

7.9.35 Even this theoretical scenario is unlikely due to the following observations of golden eagle on site during the ornithology surveys:

- It appears that only one golden eagle has so far been recorded over the wind farm;
- It is not one of the birds from the NHZ breeding pairs;
- Research has shown that eagles are avoiding wind farms[16] and therefore other golden eagles may not be attracted into the area and therefore putting themselves at risk; and
- It is not a traditional nest site for golden eagle, so if the existing eagle was displaced and no eagles were able to take over this territory, it would not be the loss of a nest site for a new breeding pair as breeding has not occurred in this locality previously.

### Red Kite

Baseline

7.9.36 Red kite have not been recorded on site. A total of 23 flights were recorded from VPs.

7.9.37 Red kite is an Annex 1 and Schedule I species, amber listed and a Dumfries and Galloway LBAP species.

7.9.38 In 2018 the Scottish population was estimated to be at least 350 breeding pairs[17]. The NHZ population of red kites is estimated between 360 to 390 birds in 2013 and the number of breeding pairs in 2017 was estimated at over 105 pairs[18].

Potential Construction Effects

7.9.39 There is potential for disturbance and displacement from foraging habitats during construction. The impact is considered to be of a **low magnitude, short term** and of **negligible** s**ignificance.**

Potential Operational Effects

7.9.40 The collision risk has been calculated to be 1 bird approximately every 9.59 years, over the lifetime of the wind farm of 40 years this would be approximately 4.17 birds at risk from collision. This equates to a loss of 1.98% of the regional breeding population. The impact is considered to be of **low magnitude, long term** and **of minor significance**.

[16] Fielding A., Haworth, P. 2010 Golden Eagles and Wind Farms. SNH

[17] The history and future of red kite conservation. RSPB Posts. 2018. https://community.rspb.org.uk/ourwork/b/scotland/posts/red-kite-conservation

[18] RSPB, January 2017. http://www.gallowaykitetrail.com/

### Osprey

Baseline

7.9.41 Osprey flights were recorded on seven occasions from VPs. Two nests were recorded within 2km of the development.

7.9.42 The Scottish breeding population is approximately 200 pairs. The NHZ population in 2013 was estimated at six breeding pairs.

7.9.43 Osprey is listed on Schedule 1 of the Wildlife and Countryside Act (1981, as amended), Annex 1, amber listed, and a Dumfries and Galloway LBAP species and is considered to be of high nature conservation importance for this site.

Potential Construction Effects

7.9.44 One nest is located approximately 1.3km from a turbine; the other nest is located approximately 200m from track construction. Therefore there is potential for disturbance and displacement from one of the nests and foraging habitats during the construction phase. The potential impact is considered to be of **high magnitude, short term** and **of major significance**.

7.9.45 Potential Operational Effects

7.9.46 The collision risk was not calculated as the amount of time in the FRZ was so low. Over the lifetime of the wind farm it is predicted that no ospreys will be killed due to collision. The impact of the development on risk of collision and displacement is considered to be **negligible.**

### Other Raptors

7.9.47 For other raptors it is possible that several buzzards and kestrels may be displaced as a result of the construction. If felling takes place during the bird breeding season there is potential for disturbance and displacement and the impact would be considered to be of **medium magnitude, short term** and of **moderate significance**. However, as felling is planned for out with the breeding season, the impacts are considered to be of **low magnitude, short term** and **not significant**. Birds will continue to hunt through the site during operation of the wind farm, therefore there is some risk of collision, and the impact is considered to be of **low magnitude** and of **minor significance.**

### Golden Plover

Baseline

7.9.48 Flocks of golden plover use the site for winter roosting and feeding and a total of 228 flights were recorded from the vantage points.

7.9.49 There are an estimated 25,000 to 35,000 wintering golden plover in Scotland and 20,000 to 60,000 autumn passage birds. The breeding population is estimated at 15,000 pairs. The NHZ estimated population was estimated at 778 pairs in 2015.

7.9.50 Golden plover is listed in Annex 1 of the EU Birds Directive and is a Dumfries and Galloway LBAP species.

7.9.51 This species is considered to be of high nature conservation importance at this site.

Potential Construction Effects

7.9.52 As much of the ground clearance will take place during winter months, there is the risk of disturbance and displacement to this species. Birds may still be able to utilise the site for some of the time depending on patterns of night or daytime feeding. The disruption is temporary and therefore the impact is considered to be of **low magnitude**, **short term** and of **minor significance.**

Potential Operational Effects

7.9.53 The collision risk was calculated to be 1 bird every 0.78 years. This is an estimated 51 birds during the 40 year lifetime of the wind farm. In relation to the Scottish wintering population of 30,000 birds this is 0.17% of a loss of the wintering population. The risk of collision is considered to be **negligible.** In reality however, it is likely to be considerably less than this as the birds were very much confined to two areas and as such the FRZ is much reduced. Reducing the risk area to approximately 10 turbines reduces the collision risk to 6.79 birds during the 40 year lifetime of the wind farm.

7.9.54 No breeding was confirmed; it is unlikely that any breeding golden plover will be displaced.

7.9.55 Wintering golden plover have the possibility of being displaced. However, studies have shown that this species continues to use wind farms after construction (McLoughlin *et al.*, 2012).

7.9.56 Hötker *et al.* (2006) monitored 22 wind farm sites (predominantly in Germany); six sites showed a minimum disturbance distance for wintering golden plover of 50m, nine sites a minimum distance of 150 m, four sites a minimum distance of 250 m, two sites a minimum distance of 350 m. Post construction monitoring at CWL's operational Sanquhar Wind Farm has recorded a flock of wintering golden plover roosting directly adjacent to turbines.[19]

7.9.57 Nonetheless, whilst there is a risk of collision, there are no published records of golden plover colliding with operational turbines in the UK. Hötker *et al* evaluated 127 wind farms in ten European countries and only found two golden plover collisions in Germany, one in the Netherlands and one in Sweden.

7.9.58 The likelihood of displacement is considered to be **of low magnitude** and of **minor significance.**

### Curlew

Baseline

7.9.59 Vantage point surveys recorded 37 flights by curlew. Six breeding territories were recorded.

[19] Starling Learning. Post Construction Ornithological Surveys 2018, Sanquhar Wind Farm. Community Windpower Ltd.

7.9.60 The Scottish breeding population is estimated to be around 58,800 pairs. Approximately 4,284 of these are in the NHZ.

7.9.61 Curlew is red listed, a priority UK BAP species and a Dumfries and Galloway LBAP species.

7.9.62 Curlew is considered to be of high nature conservation importance at this site.

Potential Construction Effects

7.9.63 There is potential for disturbance and displacement to nesting birds during construction. As with other species the magnitude of the impact will be higher if ground clearance and construction takes place during the breeding season, however, would only affect the birds for one breeding season. If construction is during the breeding season, the impact is considered to be of a **medium magnitude, short term** and of **moderate significance.** If this work is undertaken out with the breeding season, the impact is considered to be of **low magnitude, short term and of negligible significance.**

Potential Operational Effects

7.9.64 Pearce Higgens *et al* (2009) suggested a 42.4% decline in breeding curlews within 500 m of turbines[8]. Some of the curlew territories are closer to turbines than 500 m. There is therefore a possibility that three pairs of breeding curlew could be displaced during construction.

7.9.65 There is a possibility that curlews will collide with turbines. Collision risk has calculated that 1 bird will collide every 6.72 years, a loss of 5.96 birds over 40 years. This equates to 0.139% of the regional population.

7.9.66 Curlews do have a tendency to continue to be displaced by operating wind farms. An estimated displacement of four breeding birds is 0.09% of the local population.

7.9.67 The adverse effects of the operating wind farm are considered to be **negligible**.

### Barn Owl

Baseline

7.9.68 Barn owl was recorded nesting or roosting at four locations within 2km of the development.

7.9.69 The Scottish breeding population was estimated to be between 545 and 1,000 pairs in 2004. The NHZ population in 2014 was estimated to be between 165 and 400 pairs.

7.9.70 Barn Owl is listed as an EC Annex 1 species, amber listed, and a Dumfries and Galloway LBAP species and on the Scottish Biodiversity list and is considered to be of high nature conservation importance for this site.

Potential Construction Effects

7.9.71 Distances of nests or roost locations from turbines are 1km, 1.1km and 1.2km, and 1.8km from the roost location. Nests are unlikely to be disturbed and as hunting generally takes place at night foraging is unlikely to be disturbed. The impact is considered to be **negligible**.

7.9.72 Potential Operational Effects

7.9.73 No flights of barn owl were recorded. The impact of the development on risk of collision and displacement is considered to be **negligible.**

### Black Grouse

Baseline

7.9.74 Two black grouse leks were located on site. One lek with one male displaying is just over 200m from a turbine; the other is over 2km from the nearest turbine.

7.9.75 The Scottish breeding population is estimated to be 3,500 to 5,750 lekking males and the wintering population is 7,500 to 19,000. The NHZ population of lekking males is 121.

7.9.76 Black grouse is a UK BAP priority species, red listed and a Dumfries and Galloway species.

7.9.77 This species is considered to be of medium nature conservation importance at this site.

Potential Construction Effects

7.9.78 There is potential for disturbance and displacement to this species during construction. The magnitude of the impact will be higher if construction takes place during the breeding season, however would only affect the lek for one breeding season. If construction is during the breeding season, the impact is considered to be of a **medium magnitude, short term** and of **moderate significance.** If out with the breeding season, the impact is considered to be o**f low magnitude, short term and of negligible significance.**

Potential Operational Effects

7.9.79 Black grouse have been known to collide with turbines (Zeiler & Grunschachner-Berger, 2009 and Council of Europe Publishing, 2004). However no birds were recorded in flight and the collision risk is deemed to be of **negligible magnitude** and **not significant**.

7.9.80 Black Grouse leks can be displaced by operating turbines. Some studies show abandonment of lek sites, others show tolerance. Recent studies have shown seasonality where winter birds are undeterred however breeding birds sometimes avoid wind farms[20]. There is the possibility of displacement of this lek of two birds; this is a loss of 1.65% of the lekking males in the region. This is considered to be of **low magnitude**, **long term** and **minor significance**.

[20] Zwart, M.C. & Mckenzie, Ailsa & Minderman, Jeroen & Whittingham, Mark. (2016). Conflicts Between Birds and On-Shore Wind Farms. 10.1007/978-3-319-22246-2_23.

### Moorland and Woodland species

7.9.81 There are a number of species of conservation concern on the moorland and within the forest that have the potential to be affected by the development. Notable breeding moorland species recorded breeding on site includes skylark, cuckoo, whinchat and red grouse, and in the forest, examples include crossbill, song thrush, mistle thrush, tree pipit and lesser redpoll.

7.9.82 All breeding birds are likely to lose a small amount of foraging and nesting habitat and there is a slight risk of collision, however this is likely to make little difference to the population of most of these species. The main impacts are during ground clearance for construction when nests have the potential to be destroyed. If construction is during the breeding season, the impact is considered to be of a **medium magnitude, short term** and of **moderate significance.** If out with the breeding season, the impact is considered to be of **low magnitude, short term and of negligible significance.**

## 7.10 Mitigation

7.10.1 A Habitat Management Plan (HMP) and a Species Protection Plan (SPP) have been written as part of a programme of mitigation measures proposed for the construction and operation of the wind farm. These plans have addressed the following issues:

- Ways to minimise disturbance and potential impact on key species;
- Ensure all work is carried out in compliance with all the requirements of relevant wildlife legislation;
- How the value of the area might be improved by changes in land management; and
- How to increase overall biodiversity through management targeted at specific species.

7.10.2 It is proposed that this HMP is a working document which will evolve following discussions between the developers, the landowners, the ECoW and organisations with responsibility for and an interest in key wildlife species such as Dumfries & Galloway Council, NatureScot (formerly SNH) and the RSPB to develop an effective and workable plan for the site. The priority will be to:

- Examine ways to minimise disturbance and possible problems for key species;
- Examine how the value might be improved by changes in land management; and
- Increase overall biodiversity through management targeted at specific species.

7.10.3 An Ecological Clerk of Works (ECoW) will be appointed to oversee all construction work and ensure that a Habitat Management Group (HMG) is constituted containing relevant parties such as NatureScot, RSPB, the developer, the landowners and the Local Authority (Dumfries & Galloway Council).

7.10.4 A brief outline of mitigation for each habitat and species is provided below but will be covered in further detail in the HMP, an Outline version of which accompanies the Scoop Hill Community Wind Farm S36 application as a standalone document.

### Pre-construction

7.10.5 Prior to construction a number of species will be monitored in order that nest locations are known including goshawk, osprey, merlin and peregrine. The current use of the site by golden eagle will also be checked and monitored. The lek sites of black grouse will also be surveyed.

### Construction Phase

7.10.6 Although the construction phase is considered to have the most potential for impacts on bird populations, the amount of disturbance is dependent on the time of year that construction takes place, with the breeding season having the highest potential for significant disturbance of bird populations. Due to the scale of the site and the habitats present, it would be very difficult to locate and thus avoid nests during construction works. Therefore, to minimise the potential for impacts on breeding birds during construction, all ground clearance including key-hole felling will be undertaken outside the bird breeding season, which is generally accepted to be from mid-March to August. Although woodpigeons can nest well into October.

7.10.7 Any ground clearance required during the breeding season will be kept to a minimum and will be checked by a competent ornithologist prior to works commencing with a maximum of five days to clear each stage after each nest check before checking is required again.

7.10.8 NatureScot have requested a Species Protection Plan for Common Crossbill. This species is a Schedule 1 species and nests very early in the season (can start as early as December). This is very much dependant on the cone crop, and this will be written nearer to the time of felling (post-consent) in order that suitable mature conifer stands can be identified and felled at the correct time (September to November).

7.10.9 The ECoW will ensure that measures are put in place should nests be discovered to ensure no further disturbance to nesting birds. For example, the area with the nest will be avoided till after birds have fledged, this will be monitored by the ECoW. Buffer zones will be set up around the nest, the size of which will be determined by the bird species.

7.10.10 A buffer zone will be set up around the black grouse lek on Broadfield Height. No work will take place within 750m during April and May before 9am to avoid disturbing lekking birds.

7.10.11 A buffer zone will be set up around the golden eagle roost locations.

7.10.12 Displacement to breeding birds will mainly be temporary and outside the breeding season. Improvements suggested within the HMP will ensure any permanent displacement is insignificant.

7.10.13 Flocks of golden plover have the potential to be displaced in winter during construction. These will be carefully monitored by the ECoW, their roost locations noted, and attempts made to minimise disturbance.

7.10.14 The turbines, access tracks and ancillary structures will avoid habitats of bird significance as far as possible. Any micro-siting will be agreed with the ECoW.

7.10.15 There will be liaison with the South of Scotland Golden Eagle Project (SoSGEP). Habitat enhancement for eagles will be agreed with them, and there will be assistance given to the SoSGEP project, to help their work with schools and communities promoting the release of the eagles in southern Scotland. Current participants in the SoSGEP are Scottish Government, NatureScot, RSPB Scotland, Forestry Commission, Buccleugh Estates and Scottish Land and Estates.

7.10.16 Currently across Scotland, there have been no reports of golden eagle collisions with wind turbines and research has shown that they tend to avoid wind farms[21]. The main threat to golden eagles is from illegal persecution, and through learned or selected behaviour due to persecution, eagles may avoid other human activities[22]. It is therefore felt that displacement is more likely than collision. The existing golden eagle on site is believed to be elderly, having been recorded on site many years ago by the RSPB. It is unlikely that the territory will be taken up by another eagle or pair of eagles in the future due to the wind farm. However, it is not a breeding site. By working with the SoSGEP it is hoped that the wind farm can contribute to the net gain of eagles and the protection of them in both the local and wider region.

7.10.17 There are a number of habitat enhancement measures proposed within the HMP to improve the site for many bird species.

### Operational Phase

7.10.18 Post-construction monitoring to determine the effectiveness of the mitigation measures implemented is a crucial element in assessing the true extent of impacts on birds from wind farm developments. Various bird species including golden eagle and goshawk will be monitored during construction, in the year following the completion of the works and again in years two and three. Monitoring of golden eagles will take place in conjunction with SoSGEP and other raptors in conjunction with the SRSG. A report will be made to the relevant bodies regarding their status post-construction. Further monitoring visits should then be undertaken on a five-year basis from year five to year 20. The status of important bird species will be discussed and, if monitoring results suggest a change in management methods is required; these will be agreed and implemented through a revised management plan. Reports will be produced after each year of monitoring and will be made available to all relevant parties.

7.10.19 The methods used for post-construction monitoring will be in accordance with those detailed in Guidance on Methods for Monitoring Bird Populations at Onshore Wind Farms (NatureScot 2017) for those species identified as potentially at risk from the wind farm development, including golden eagle. It will include monitoring of breeding birds and vantage point watches for comparison with pre-construction data. It will also include carcass searches to estimate the actual number of collisions. These data can then be used to inform future collision risk analysis and potential alterations to the HMP.

### Decommissioning Phase

7.10.20 As with the construction phase, the greatest potential for impacts on birds during the decommissioning phase is during the nesting season, assuming that birds are breeding on site at that time. It is therefore recommended that decommissioning of the site is also undertaken outside the bird breeding season.

### Implementation of Mitigation Measures

7.10.21 Various enhancements will take place on site to increase the value of the site to bird populations. These are described in detail in the HMP, and are summarised below:

- Woodland and scrub enhancement, mainly planting within the cleughs to benefit black grouse and passerines;
- Enhancements to provide better foraging for golden eagle;
- Bog enhancement measures will enhance the site for species such as curlew and snipe; and
- A variety of nest boxes will be erected at adjacent farms and maintained for the duration of the wind farm including next boxes specifically for kestrel and barn owl.

### Residual Effects

7.10.22 If the species protection and mitigation measures detailed above are implemented, this will contribute to reducing significant negative impacts to occur on the ornithological value of the site and surrounding area. Residual effects following mitigation are summarised in Appendix 7.17

7.10.23 Avoiding ground clearance during the breeding bird season reduces adverse impacts on all breeding bird species and reduces construction impacts to low magnitude, short term and of minor or negligible significance.

7.10.24 With good practice and mitigation and some positive impacts, the overall residual impact of the development of a wind farm will be reduced.

## 7.11 Cumulative Impacts

7.11.1 NatureScot has published guidance on assessing cumulative impacts on birds in relation to wind farm developments (NatureScot 2012)[23]. These impacts may result from collision with turbines; displacement of birds due to loss of suitable feeding and/or breeding/wintering habitat; disturbance within and around the turbine envelope or a barrier effect on dispersal, regular movements or migration.

7.11.2 There are a number of other developments in the area, which need to be considered in terms of cumulative impacts. These include operational, consented/under construction and wind farm applications currently going through the planning process, as well as other types of developments such as mining. A list of developments within the NHZ within approximately 30 km of the Scoop Hill Community Wind Farm site is given in Appendix 7.15. Although cumulative impacts may arise in a number of different ways, these are very difficult to predict, therefore only additional cumulative impacts, from different developments, are considered in this EIAR. A list of wind farms within 20km is

[21] Fielding A., Haworth P. (2010) Golden Eagles and Wind Farms. Haworth Conservation for SNH

[22] González, L.M., Arroyo, B.E., Margalida, A., Sanchez, R. & Oria, J. (2006). Effect of human activities on the behaviour of breeding Spanish imperial eagles(Aquila adalberti): management implications for the conservation of a threatened species. Animal Conservation, 9, 85-93. Whitfield, D.P., Fielding, A.H., McLeod, D.R.A. & Haworth, P.F. (2006b). Aconservation framework for the golden eagle, implications for the conservation and management of golden eagles in Scotland. Report to Scottish Natural Heritage.

[23] Scottish Natural Heritage (2012). Guidance. Assessing the Cumulative Impact of Onshore Wind Energy Developments

given in Appendix 7.16 which has the potential to contribute to a cumulative effect on the birds of the region.

7.11.3 For some wind farms there was no available data online.

**Cumulative Effect on IEFs**

7.11.4 The IEFs considered within this assessment are those whose impact was considered to be of a low, moderate or high magnitude and minor, moderate or high significance, (hen harrier, peregrine, merlin, goshawk, red kite, golden eagle, osprey, golden plover, curlew, and black grouse) occur at many of the wind farms in the area.

7.11.5 Several wind farms predicted no significant effect on birds from habitat loss, construction or operation including Minnygap and Ewe Hill.

7.11.6 Hen harrier has been recorded on seven of the wind farms within the NHZ and within 30km. The adverse effects of these wind farms on this species were all low or negligible. The effects of Scoop Hill Community Wind Farm are predicted to be low; therefore, it is likely that the cumulative effect will be **negligible.**

7.11.7 Peregrine has been recorded at five of the wind farms within the NHZ and within 30km. No significant negative impact has been predicted for peregrine at these wind farms. The impacts at Scoop Hill are predicted to be between low and moderate magnitude, and there will be some contribution to the cumulative effect, but it is predicted to be of **low magnitude**, and of **minor significance**.

7.11.8 Merlin was recorded on seven of the wind farms within the NHZ and within 30km. The cumulative effect of these is three pairs potentially being displaced. However, no breeding was proven at Scoop Hill although birds were recorded on site. At most, one more pair has the potential to be displaced. The cumulative impacts are therefore deemed to be of **low magnitude,** and of **minor significance**.

7.11.9 Goshawk was recorded at five of the wind farms within the NHZ and within 30km. Adverse impacts from construction and operation at most wind farms were all minor or negligible. Faw side collision risk was calculated to be 1 bird every three years. This adds to the cumulative total of approximately 18 birds over 40 years potentially leading to a loss of 29% of the regional population. As the impacts on this species at Scoop Hill range from moderate to high, the cumulative impact has the potential to be of **high magnitude,** long term and of **major significance**.

7.11.10 Golden eagle was only recorded on one of the other wind farms within the NHZ and within 30km, the cumulative effect is therefore considered to be **negligible.**

7.11.11 Red kite was only recorded at two of the wind farms within the NHZ and within 30km. As the residual adverse effects are predicted to be low at Scoop Hill, the cumulative effect is **negligible**.

7.11.12 Osprey was recorded on four of the wind farms within the NHZ and within 30km. As the residual adverse effects are predicted to be low at Scoop Hill, the cumulative effect is **negligible.**

7.11.13 Golden plover was recorded on seven of the wind farms within the NHZ and within 30km. Four pairs are predicted to be potentially displaced from the other wind farms, however as there are no breeding pairs at Scoop Hill, there will not be any addition to the cumulative total. There will be some addition to the cumulative impact from collisions, however this is considered to be of **low magnitude** and **minor significance**.

7.11.14 Curlew was recorded on ten of the wind farms within the NHZ and within 30km. As impacts are predicted to be low at Scoop Hill the cumulative impact is considered to be of a **low magnitude** and **minor significance**.

7.11.15 Black grouse were recorded on seven of the wind farms within the NHZ and within 30km. A total of five leks were predicted to potentially be disturbed or displaced. One lek at Scoop Hill has the potential to be displaced. The cumulative effect is considered to be of **low magnitude** and **minor significance.**

7.11.16 The effect on barn owl was not recorded at most of the wind farms or impact was **negligible.** Therefore, the cumulative effect is **negligible.**

## 7.12 Statement of Significance and Summary

7.11.17 The scope of the ornithological assessment was determined through a combination of desk study, fieldwork, consultation and analysis of data. Fieldwork included a breeding bird survey, vantage point watches, black grouse surveys and raptor survey.

7.11.18 It is considered that the development of the wind farm will not have an adverse effect on areas of conservation significance in the surrounding area.

7.11.19 If good practice is followed and species protection and mitigation put in place, most negative impacts have been reduced. Overall, it is assessed that the majority of the predicted impacts on birds, with the exception of golden eagle, are not significant in terms of the EIA Regulations.

## Appendix 7.1 – Desktop - Bird Records

Bird records within 5km of the proposed development from the Southwest Scotland Environmental Information Centre (SWSEIC), Scottish Ornithologists Club, and adjacent wind farm EIAs.

| **Species, *Latin Name*** | **Species** | **Details** |
|---|---|---|
| *Anas platyrhynchos* | Mallard | Sandyford, 2006 |
| *Lagopus lagopus* | Willow Ptarmigan | Craig Fell, 2012 |
| *Alectoris rufa* | Red-legged Partridge | Craig Fell, 2013 |
| *Gallinago gallinago* | Snipe | Howgill Fell, 2013 |
| *Cuculus canorus* | Cuckoo | Sandyford, 2006 |
| *Cuculus canorus* | Cuckoo | Sandyford, 2016 |
| *Phylloscopus trochilus* | Willow Warbler | Sandyford, 2006 |
| *Alauda arvensis* | Skylark | Sandyford, 2006 |
| *Hirundo rustica* | Swallow | Sandyford, 2006 |
| *Delichon urbicum* | House Martin | Sandyford, 2006 |
| *Anthus pratensis* | Meadow Pipit | Sandyford, 2006 |
| *Motacilla cinerea* | Grey Wagtail | Sandyford, 2006 |
| *Motacilla alba* | Pied Wagtail | Sandyford, 2006 |
| *Troglodytes troglodytes* | Wren | Sandyford, 2006 |
| *Cyanistes caeruleus* | Blue Tit | Sandyford, 2006 |
| *Corvus frugilegus* | Rook | Sandyford, 2006 |
| *Corvus corone* | Carrion Crow | Tangy Kintyre, 2013 |
| *Loxia curvirostra* | Common Crossbill | Sandyford, 2016 |
| *Numenius arquata* | Curlew 5 pairs, 2014 | Crossdykes Wind Farm (6km southeast) |
| *Gallinago gallinago* | Snipe 4 – 5 pairs, 2014 | Crossdykes Wind Farm |
| *Haematopus ostralegus* | Oystercatcher 1 pair, 2014 | Crossdykes Wind Farm |
| *Circus cyaneus* | Hen Harrier winter 2013/14 | Crossdykes Wind Farm |
| *Accipiter gentilis* | Goshawk 2014 | Crossdykes Wind Farm |
| *Anser brachyrhynchus* | Pink-footed Geese, winter 2013 | Crossdykes Wind Farm |
| *Numenius arquata* | Curlew 5 pairs, 2008 | Ewe Hill wind Farm (7km southeast) |
| *Tyto alba* | Barn Owl roost 2015 & 2016 | Hopsrig Wind Farm (9km southeast) |
| *Accipiter gentilis* | Goshawk 2016 | Hopsrig Wind Farm |
| *Circus cyaneus* | Hen Harrier winter 2016 | Hopsrig Wind Farm |
| *Falco peregrinus* | Peregrine 2016 | Hopsrig Wind Farm |
| *Falco columbarius* | Merlin 2016 | Hopsrig Wind Farm |
| *Milvus milvus* | Red Kite 2016 | Hopsrig Wind Farm |
| *Pandion haliaetus* | Osprey 2016 | Hopsrig Wind Farm |
| *Anser brachyrhychus* | Pink-footed Goose 2016 | Hopsrig Wind Farm |
| *Numenius arquata* | Curlew 2 pairs | Hopsrig Wind Farm |
| *Gallinago gallinago* | Snipe 2 pairs | Hopsrig Wind Farm |
| *Scolopax rusticola* | Woodcock | Hopsrig Wind Farm |
| *Haematopus ostralegus* | Oystercatcher | Hopsrig Wind Farm |
| *Pluvialis apricaria* | Golden Plover winter flocks | Hopsrig Wind Farm |

## Appendix 7.2 – Survey Staff Details

Starling Learning is an ecological consultancy, habitat management and environmental education agency. Established in June 1996 and has six full time and several contract staff.

Liz Parsons and Joe Greenlees have worked with the company since 1996, Alan Wood since 1998, Jamie Manners since 2000, Diane Lyons and Davy Galbraith since 2004. The other members of staff have worked with the company for at least five years.

Ornithological survey experience includes Common Bird Census, breeding bird surveys, vantage point watches for wind farms, Black Grouse survey, Brown and Shepherd survey, raptor surveys, wetland bird surveys and nest searches.

Our clients are wide ranging and include wind farm companies, local authorities, conservation organisations, golf courses and other consultancies. A few examples are shown below:

**Community Windpower:**

- Spango 2012, 2013, 2016
- Sanquhar and Sanquhar II, 2011, 2013, 2015, 2016, 2017 to 2020
- Scoop Hill 2017 to 2020
- Millour Hill, Dalry 2010 to 2011, 2015 to 2016
- Aikengall, Dunbar. Spring 2004 and 2011 and 2013, 2015, 2016
- Ecological Clerk of Works at Aikengall I, Aikengall II and IIA, Sanquhar, Dalry and Calder Water Wind Farms.

**SNH:**

- Breeding wader survey, Muirkirk and North Lowther Hills SPA, 2015
- Winter Bird Survey, Portencross 2005 and 2006
- Whooper Swan monitoring for SPA, Inchinnan, winters 2001/2002, 2002/2003 and 2003/2004

**RSPB:**

- Moorland bird survey, Airds Moss, annually 2008 until 2015
- Otter surveys, Aird Meadow and Barr Loch, 2009, 2010, 2012
- Breeding Wader Survey, Clydesdale, spring 1999
- Breeding birds of Barr Meadow 2015

**AAH Planning:**

- Ecological and archaeological surveys for a number of solar array developments

**AMEC:**

- Dalry by- pass 2011, breeding bird survey
- Greengairs Tip, 2012, breeding bird survey
- Various wind farm ornithological surveys, 2013

**East Dunbartonshire Council**

- Update of Local Nature Conservation Sites, 2018, on going

**North Ayrshire Council**

- Update of Local Nature Conservation Sites, 2016

| Name | Occupation | Relevant qualifications and main experience |
|---|---|---|
| Liz Parsons | Director of Starling Learning | Has co-ordinated and assisted with many wind farm surveys since 2004.<br>BSc (Hons) Geography/Geology 2.1, Strathclyde University |
| Alan Wood | Senior Ecologist and Ecological Clerk of Works | Very experienced ornithologist, fieldwork experience includes many surveys for the Scottish Ornithologists Club and British Trust for Ornithology as well as 16 years of experience with Starling Learning |
| Joe Greenlees | Senior Ecologist and Ecological Clerk of Works, Starling Learning | Has assisted with many wind farm surveys since 2004.<br>Main experience includes ecological survey work of birds, and protected species.<br>HNC Countryside Management, Barony College |
| Jamie Manners | Ecological Surveyor, Starling Learning | Main experience includes ornithological and bat survey work. |
| David Galbraith | Ecological Surveyor, Starling Learning | Has assisted with many of the bird survey projects listed above. Carries out all habitat surveys for Starling Learning. GIS technician |
| Diane Lyons | Ecological surveyor, lead field teacher | Has assisted with many of the survey projects listed above. Main experience includes ornithological and mammal survey.<br>BSc Countryside Management, Auchincruive. |
| Seumas Harris | Ecological Surveyor, Starling Learning | Ornithology and bat surveys since 2013 |
| Douglas Irving | Ecological Surveyor, Starling Learning | Ornithology and bat surveys since 2015 |
| Liam Flynn | Ecological Surveyor, Starling Learning | Ornithology and bat surveys since 2012 |
| Ian Miller | Ornithological surveyor<br>Contract staff | Experienced ornithologist at many wind farms. Member of the Scottish Raptor Study Group |
| Angus Murray | Ornithological surveyor<br>Contract staff | Experienced ornithologist at many wind farms. Runs *Birdline Scotland* |
| Chris Rollie | Ornithological surveyor<br>Contract staff | Former RSPB Area Manager Dumfries and Galloway, Secretary of the Scottish Raptor Study Group Dumfries branch |
| Dr Hilary Redden | Phycologist, ecological surveyor and researcher.<br>Contract Staff | Has assisted with ecological surveys with Starling Learning and other organisations including the James Hutton Institute.<br>PhD. Seaweed as a biofuel. Newcastle University<br>BSc. Biological Sciences Edinburgh University |
| Karen McCaul | Ecological surveyor, contract staff | Has assisted with ornithological surveys as contract staff, former staff member of Starling Learning and RSPB. |

## Appendix 7.3 – Vantage Point Descriptions

Year 1- 2017 to 2018

| VPs Year 1 | Location | Turbines visible |
|---|---|---|
| VP1 | NY 15890 93373 | (South side of 1, 2, 3, 4, 5, 6 ,7, 8 in a previous layout, turbines now removed, or positions altered)<br>**2020 layout**: 42, 43 and 51 (51 slightly outside 2km buffer). |
| VP2 | NY 18808 94592 | (16, 17, 18, 19, top of 21, 22 in a previous layout)<br>**2020 layout:** 51, 52 (52 is slightly outside 2km), 53, 54, 55, 56, 57 and 58. |
| VP3 | NY 18809 94592 | (20, 32, 34 in previous layout)<br>**2020 layout**: 56, 57, 61 and 62 |
| VP4 | NY 16615 95432 | (9, 10, 13, 14, 48, 49, 50, 51, 56 in a previous layout)<br>**2020 layout**: 36, 37, 38, 39, 40, 41, 42, 43, 45, 49 and 50. |
| VP5 | NY 16678 95507 | (14, 15, 16, 17 in previous layout)<br>**2020 layout**: 46, 47, 48, 50, 51, 52, 53, 54, 55, 58 and 63. |
| VP6 | NY 17000 96000 | (42, 51, 56, 57, some of 41, 43, 48, 49, 50 in previous layout)<br>**2020 layout**: 36, 39, 40, 41, 42, 43, 45, 46, 47, 49, 50 and 51 |
| VP7 | NY 16825 96564 | (23, 24 ,25 partly 26, 37, 38 in previous layout)<br>**2020 layout**: 46, 47, 48, 39, 52, 53, 55, 58, 63 and 64; also 59 (the one not directly covered by any VP), 65 and 66 though these are over 2km. |
| VP8 | NY 14437 96604 | (West side of 52, 53, 54, 55 in a previous layout)<br>**2020 layout**: 33, 34, 35, 36, 37, 38, 39, 40, 41, 42 and 45 |
| VP9 | NY 15391 96955 | (7, 8, 9, 10, 11, 12, 13, 49 in previous layout)<br>**2020 layout**: 36, 37, 38, 39, 40, 41, 42, 43, 49 and 50. |
| VP10 | NY 15383 97399 | (East side of 52, 53, 54, 55 in previous layout)<br>**2020 layout**: 35, 36, 40, 45 and 47. |
| VP11 | NY 15507 98352 | (West side of 42, 43, 44, 45, 50, 51, 56 in previous layout)<br>**2020 layout**: 33, 34, 35, 36, 40, 44, 45, 46 and 47. |
| VP12 | NY 13780 99217 | (57, 58, 59, 77 in previous layout)<br>**2020 layout**: 13, 14,25, 29, 30, 32 and 33; also 31, though just outside 2km. |
| VP13 | NY 11952 99230 | (West side of 81,82,83 in previous layout)<br>**2020 layout**: 1, 2, 4, 5 and 6. |
| VP14 | NY 15488 98930 | (73,74,75 also 59, 60 and 61 in previous layout)<br>**2020 layout**: 24, 25, 26, 27, 28, 29 and 31 (also 23 and 22 but both are just over 2km) |
| VP15 | NT 13653 00317 | (78, 79, 80, 84, 85, 86 in previous layout)<br>**2020 layout**: 1, 4, 5, 6, 8, 9, 10, 11, 12, 13 and 14 |
| VP16 | NT 14902 02748 | (87 88, 89, 90 in previous layout)<br>**2020 layout**: 11, 12, 15, 16, 17, 18, 19, 20 and 21; also 10 (very slightly outside 2km buffer). |
| VP17 | NT 17071 01200 | (61, 63, 64, 65, 66, 67 and 73 in previous layout)<br>**2020 layout**: 17, 18, 19, 20, 21, 22, 23, 24 and 26 |

| | | |
|---|---|---|
| VP18 | NY 17058 99162 | (39, 40, 68, 69, 70, 71, 72 and 76 in previous layout)<br>**2020 layout**: 22, 65, 66, 67, 68, 69, 70, 71 and 72 |
| VP19 | NY 19141 95076 | (20, 21, 25, 29, 30, 31 in previous layout)<br>**2020 layout**: 53, 54, 55, 56, 57, 58, and 60 (also 52, 63 and 59 but over 2km) |
| VP20 | NY 20830 96253 | (27, 28, 33, 35 and 36 in previous layout)<br>**2020 layout**: 56, 57, 60, 61 and 62; also visible is 59 (just over 2km.) |
| VP21 | NY 17010 98833 | (To see east side of 41, 46 and 47 in a previous layout)<br>**2020 layout**: 29, 31, 32, 33, 34, 44, 45, 46, 47 and 48. |

Year 2 – 2018 to 2020

| VPs | Location | Turbines visible |
|---|---|---|
| 1 | NY 15890 93373 | 42, 43 and 51 (51 slightly outside 2km buffer). |
| 2 | NY 18808 94592 | 53, 54, 55, 56, 57, 58 |
| 3 | NY 18809 94592 | 56, 57, 59, 60, 61, 62 |
| 4 | NY 16615 95432 | 36, 37, 38, 39, 41, 42, 43, 45, 49, 50 |
| 5A | NY 16810 96524 | 41, 42, 43, 49, 50, 51, 52, 53, 54, 55 and 58 |
| 6A | NY 16458 96480 | 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44 and 45. |
| 7 | NY 16825 96564 | 46, 47, 48, 39, 52, 53, 55, 58, 63 and 64; also 59, 65 and 66 though these are slightly over 2km. |
| 8 | NY 14437 96604 | 33, 34, 35, 36, 37, 38, 39, 40, 42, 42 and 45 |
| 12 | NY 13780 99217 | 13, 14, 25, 29, 30, 32 and 33; also 31, though just outside 2km. |
| 13a | NY 13222 97961 | 1, 2, 3, 4, 5, 6 and 7 |
| 14 | NY 15488 98930 | 24, 25, 26, 27, 28, 29 and 31 (also 23 and 22 but those two are just over 2km) |
| 15 | NT 13653 00317 | 1, 4, 5, 6, 8, 9, 10, 11, 12, 13 and 14 |
| 16 | NT 14902 02748 | 11, 15, 16, 17, 18, 19, 20, 23 |
| 17 | NT 17071 01200 | 17, 18, 29, 20, 21, 23, 24, 26, 27 |
| 18 | NY 17058 99162 | 22, 65, 66, 67, 68, 69, 70, 71 and 72 |
| 19 | NY 19141 95076 | 53, 54, 55, 56, 57, 58, and 60 (also 52, 63 and 59 but over 2km) |
| 22 | NT 16996 00775 | 22, 23, 24, 26, 27, 28, 67, 68, 69 and 71 |
| 23 | NT 16666 03623 | 19, 73, 74 and 75 |

## Appendix 7.4 – Vantage Point Data

Year 1

| Date | VP number | No. of hours | start time | Wind speed | Wind directn | Weather | Secondary species | Surveyor |
|---|---|---|---|---|---|---|---|---|
| 14-Aug-17 | 1 | 3 | 7.30 | 1 | SW | 8/8, Fair, rain | SG, WR, SL, WP, WW, GO | JM |
| 14-Aug-17 | 1 | 3 | 11.00 | 1 | SW | 8/8, Fair, rain | WR, SL, WP, C., GO, PH, SG | JM |
| 14-Aug-17 | 2 | 3 | 7.45 | 2 | SW | 8/8, Fair, rain | WP ,CR, CH, MP | DG |
| 14-Aug-17 | 2 | 3 | 11.15 | 2 | SW | 8/8, Fair, rain | MP, CH, SL, WP | DG |
| 14-Aug-17 | 3 | 3 | 7.40 | 2 | SW | 8/8, Fair, rain | WP ,CR, CH, MP, W., SL, C. | DI |
| 14-Aug-17 | 3 | 3 | 11.10 | 2 | SW | 8/8, Fair, rain | WP, Ch, C., MP | DI |
| 15-Aug-17 | 9 | 3 | 6.45 | 2 | SW | 8/8, Good, rain/dry | SL, HM, S., MP, C. | JM |
| 15-Aug-17 | 9 | 3 | 10.15 | 2 | SW | 7/8, Good, dry | MP | JM |
| 15-Aug-17 | 10 | 3 | 6.35 | 2 | SW | 7/8, Good, dry, heavy shower | SL, HM, CH,MP | DI |
| 15-Aug-17 | 10 | 3 | 10.05 | 3 | SW | 5/8, Good, dry | SL, WP | DI |
| 15-Aug-17 | 12 | 3 | 6.50 | 2 | S | 7/8, Good, dry, occasional light shower | MP, WP, SL, SN | DG |
| 15-Aug-17 | 12 | 3 | 10.20 | 3 | SW | 5/8, Good, dry, occasional showers | SL, WP, CR | DG |
| 21-Aug-17 | 4 | 3 | 10.00 | 1 | SE | 2/8, Good, dry | CT, C., MP, R., S., SL, WP, GS | LF |
| 21-Aug-17 | 4 | 3 | 13.30 | 1 | S | 6/8, Good, dry | CT, WP, MP | LF |
| 21-Aug-17 | 5 | 3 | 10.15 | 1 | SE | 2/8, Good, dry | SK, M. MP, WP, GS, CR | JM |
| 21-Aug-17 | 5 | 3 | 13.45 | 1 | S | 6/8, Good, dry | SK, WP, | JM |
| 21-Aug-17 | 6 | 3 | 10.00 | 1 | SE | 2/8, Good, dry | C., SL, MP, CR, WP, J., | DG |
| 21-Aug-17 | 6 | 3 | 13.30 | 1 | S | 8/8, Good, dry, some light rain | C., SL, MP, M., | DG |
| 21-Aug-17 | 7 | 3 | 9.30 | 1 | SE | 2/8, Good, dry | MP, WP, SL | DI |
| 21-Aug-17 | 7 | 3 | 13.00 | 1 | s | 6/8, Good, dry, some light rain | MP, SL, WR | DI |
| 22-Aug-17 | 8 | 3 | 7.15 | 1 | SE | 7/8, Good, dry | SL, MP, C., WP | LF |
| 22-Aug-17 | 8 | 3 | 10.45 | 2 | SE | 5/8, Very Good, dry | MP, WP, SL | LF |
| 22-Aug-17 | 13 | 3 | 7.25 | 1 | SE | 7/8, Good, dry | WR, MP, SL, WP,C. | DL |
| 22-Aug-17 | 13 | 3 | 10.55 | 2 | SE | 5/8, Very Good, dry | MP, WP, C., GO | DL |
| 22-Aug-17 | 15 | 3 | 7.15 | 1 | SE | 8/8, Fair, dry | 0 | JM |
| 22-Aug-17 | 15 | 2 | 10.45 | 2 | SE | 8/8, Fair, dry | 0 | JM |
| 22-Aug-17 | 16 | 3 | 7.30 | 1 | SE | 8/8, Fair, dry | MP, WP | DG |
| 22-Aug-17 | 16 | 1 | 11.00 | 1 | SE | 8/8, Good, dry, 25 $^{O}$C | MP, WR | DG |
| 24-Aug-17 | 14 | 3 | 7.45 | 3 | W | 8/8, Poor-Good, some drizzle then dry | CT, WR, SK, SL, BF, WP | JG |
| 24-Aug-17 | 14 | 3 | 11.15 | 4 | W | 6/8, Good, dry | WP, CT, CR, WR | JG |
| 24-Aug-17 | 17 | 3 | 8.10 | 3 | SW | 8/8, Fair, light rain then dry | MP, SL | DG |
| 24-Aug-17 | 17 | 3 | 11.40 | 4 | SW | 7/8, Good, dry | MP, SL | DG |
| 24-Aug-17 | 19 | 3 | 7.20 | 2-3 | SW | 7/8, Good, one light shower | J., WW, R., C., WP, LR, CH, BF, D., ST, WR, CT, | AM |
| 24-Aug-17 | 19 | 3 | 10.50 | 3 | SW | 6/8,Good, dry | GC, CT, LT, WR, ST, BF, CR, SL, MP, R., GT | AM |
| 24-Aug-17 | 18 | 3 | 8.00 | 3 | SW | 6/8, Very Good, rain shower | MP, J. , SL | DL |
| 24-Aug-17 | 18 | 3 | 11.30 | 3 | SW | 3/8, Very Good, dry | MP, SL, WR | DL |
| 25-Aug-17 | 11 | 3 | 11.00 | 2 | W | 8/8, Fair, drizzle | W., WR, CR, MP, SL | JG |
| 25-Aug-17 | 11 | 3 | 14.30 | 2 | W | 8/8, Fair, drizzle | WP, MP, C, SL | JG |

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|---|---|---|---|---|---|---|---|---|
| 25-Aug-17 | 9 | 3 | 10.50 | 3 | W | 8/8, Fair, showers | WP CT, H., GC, R. | DL |
| 25-Aug-17 | 9 | 3 | 14.20 | 2 | W | 8/8, Fair, rain then dry | WP, WR, ST, SL | DL |
| 25-Aug-17 | 20 | 3 | 11.05 | 2 | SW | 7/8, Good, dry, occasional light shower | H., C., J., SL, HM, WP. MP, GO, WW, BF, LR, CR | AM |
| 25-Aug-17 | 20 | 3 | 14.35 | 2-3 | SW | 7-8/8. visibility Good, light showers | CC, BC, D., WR, R., GC, GT, CT, BT | AM |
| 25-Aug-17 | 16 | 3 | 11.40 | 2 | SW | 8/8, Poor/Fair, intermittent light rain | RG, M., MP | DG |
| 28-Aug-17 | 8 | 3 | 9.40 | 3 | SW | 8/8, Poor/Fair, intermittent light rain | SL, MP, C. | DG |
| 28-Aug-17 | 9 | 3 | 9.15 | 3 | SW | 8/8.Very poor/Good, dry, mist | SL | ADW |
| 28-Aug-17 | 10 | 3 | 9.10 | 3 | SW | 8/8, Very poor, shower then dry, mist | SL | JM |
| 29-Aug-17 | 12 | 3 | 8.10 | 1 | S | 8/8, Good, dry | WP, CH, C., SL | JM |
| 29-Aug-17 | 12 | 3 | 11.40 | 0 | S | 8/8, Good, dry | WP, J., GO | JM |
| 29-Aug-17 | 15 | 3 | 8.15 | 2 | W | 8/8, Good, dry | SL, MP | DG |
| 29-Aug-17 | 15 | 3 | 11.45 | 2 | W | 8/8, Good, dry, light shower | SL, MP, C., RG | DG |
| 29-Aug-17 | 16 | 3 | 8.00 | 2 | W | 8/8. Good, dry | MP, SL, CR | ADW |
| 29-Aug-17 | 16 | 3 | 11.30 | 2 | W | 8/8, Good, dry, light shower | MP, SL, RG | ADW |
| 7-Sep-17 | 4 | 3 | 12.40 | 2 | SW | 8/8, visibility poor then good, some rain | CH, WP, CT | JG |
| 7-Sep-17 | 4 | 2 | 16.10 | 3 | S | 8/8, visibility poor then good, some rain | CH, WP, C. | JG |
| 7-Sep-17 | 5 | 3 | 12.30 | 1 | S | 8/8, visibility poor then good, some rain | WR, CH | DL |
| 7-Sep-17 | 5 | 2 | 16.00 | 3 | S | 8/8, visibility poor then good, some rain | C., WP | DL |
| 7-Sep-17 | 6 | 3 | 12.40 | 1 | S | 8/8, visibility poor, then clear, intermittent rain | CH, CT, WP, D., RN calling | DG |
| 7-Sep-17 | 6 | 2 | 16.10 | 3 | S | 8/8, visibility poor then good, some rain | CH, CT, R. | DG |
| 7-Sep-17 | 7 | 3 | 12.45 | 1 | SW | 8/8, visibility poor then good, some rain | MP, C., WP | AM |
| 7-Sep-17 | 7 | 2 | 16.15 | 3 | S | 8/8, visibility poor, then clear, intermittent rain | C., MP. SL, D., R., WP | AM |
| 8-Sep-17 | 2 | 3 | 7.50 | 2 | W | 8/8, visibility very Good, occasional showers | WP, MP, SL, M., J., SG | DL |
| 8-Sep-17 | 2 | 3 | 11.20 | 2 | W | 8/8, visibility Good, continual showers | WP, MP, SL, M. | DL |
| 8-Sep-17 | 3 | 3 | 7.50 | 2 | W | 8/8, visibility very Good, occasional showers | MP, SL, WP, CH, gull sp, SL, J., , C. | JG |
| 8-Sep-17 | 3 | 3 | 11.20 | 2 | W | 8/8, visibility Good, continual showers | WP. CH, C., MP, SL, J. | JG |
| 8-Sep-17 | 4 | 3 | 8.10 | 3 | SW | 7/8, Good, light showers | MP, SL, WP, C., ST, PW, R., D., WR and CT (BZ) | AM |
| 8-Sep-17 | 5 | 3 | 11.40 | 3 | WSW | 7/8, Good, light to heavy showers | MP, CT, GC, R. and C. (BZ) | AM |
| 8-Sep-17 | 6 | 3 | 8.20 | 2 | S-SW | 8/8, visibility Fair, low cloud, occ rain | J., R., BZ calling from south of VP | DG |
| 8-Sep-17 | 7 | 3 | 11.50 | 3 | SW | 8/8, visibility Fair, occ low cloud and light rain | MP, C., SL, RN perched on site not seen to fly | DG |
| 18-Sep-17 | 14 | 3 | 9.45 | 0 | NW | 8/8. Good, dry | J., CH, WP, CT, GC, GT, SL, R. | DG |
| 18-Sep-17 | 14 | 3 | 13.15 | 1 | NW | 8/8. Good, dry | CH, WP, CT, GC, GT, R., RN heard behind VP | DG |
| 18-Sep-17 | 1 | 3 | 10.50 | 1 | NW | 8/8. Good, dry | MP, WP, SL | DI |
| 18-Sep-17 | 21 | 3 | 9.30 | 0 | NW | 8/8. Good, dry | WR, D., M., CT, LR, CH | JM |
| 18-Sep-17 | 21 | 3 | 13.00 | 1 | NW | 8/8. Good, dry | WR, D., CT, LR, CH | JM |
| 19-Sep-17 | 17 | 3 | 8.35 | 2-3 | SW | 3/8 Good to Fair, dry | C., MP | DG |
| 19-Sep-17 | 17 | 3 | 12.05 | 3 | SW | 7/8 Good, dry | C., MP | DG |
| 19-Sep-17 | 2 | 3 | 8.25 | | SW | 5/8 Fair, dry | MP, WP, C, LR | HR |
| 19-Sep-17 | 2 | 1 | 11.55 | | SW | 8/8 Fair, dry | C., WR | HR |
| 19-Sep-17 | 18 | 3 | 8.40 | 1 | S | 5/8 Fair, dry | MP, J., WR, SL, LR, C., CR | JM |
| 19-Sep-17 | 18 | 3 | 12.10 | 1 | S | 8/8 Fair, dry | MP, J., WR, SL, LR, C., CR | JM |
| 25-Sep-17 | 20 | 3 | 14.10 | 0-1 | 0 | 7/8 Fair, dry | R., GO, CR, J., WR, D., H., C., WP | DG |
| 25-Sep-17 | 20 | 3 | 17.40 | 0-1 | 0 | 7/8 Good, dry | C., R., CT, LT, WP, H., WR, CR, GS | DG |
| 25-Sep-17 | 19 | 3 | 13.50 | 0 | 0 | 6/8 Good, dry | R., WP, CT, GC, CH, | JM |

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| 25-Sep-17 | 19 | 3 | 17.20 | 0 | 0 | 8/8 Good, dry | R., WR, LT, GT | JM |
| 25-Sep-17 | 1 | 3 | 13.55 | 1 | SSE | 6/8 Good, dry | WR, C., SK, GO, RB, R., D., PW ,MP, SG | ADW |
| 25-Sep-17 | 1 | 3 | 17.25 | 1 | SSE | 7/8 Good, dry | C., LI, M., LR, SK, MP, R., SN, TO | ADW |
| 26-Sep-17 | 13 | 3 | 10.15 | 2 | SE | 8/8 Fair, dry | C., MP | JM |
| 26-Sep-17 | 13 | 3 | 13.45 | 1 | SE | 7/8 Good, dry | C., MP | JM |
| 26-Sep-17 | 11 | 3 | 11.00 | 2 | SE | 8/8, Fair, dry | MP, S., CR, J., M. | DG |
| 26-Sep-17 | 11 | 3 | 14.30 | 2 | SE | 7/8 Good, dry | MP, CR, CH | DG |
| 26-Sep-17 | 10 | 3 | 11.00 | 2 | ESE | 8/8, Fair, dry | MP, SG, C., CH, SH (male behind VP) | ADW |
| 26-Sep-17 | 9 | 3 | 14.30 | 2 | SE | 8/8 Fair, dry | C., MP, RN (calling), WP | ADW |
| 9-Oct-17 | 4 | 3 | 11.05 | 1 | SW | 8/8, Fair-poor, drizzle and fog later | M., C., MP, WR and LR | JM |
| 9-Oct-17 | 4 | 2 | 14.35 | 2 | SW | 8/8, Poor-Good, some drizzle then fog later | WR, C. | JM |
| 9-Oct-17 | 7 | 3 | 11.10 | 1 | SW | 8/8, Poor-Good, some drizzle then fog later | SG, WR, WP, R., LR and 3SN flushed near VP | ADW |
| 9-Oct-17 | 7 | 2 | 14.40 | 2 | SW | 8/8, Poor-Good, some drizzle then fog later | WP, R., C. | ADW |
| 9-Oct-17 | 6 | 2 | 11.30 | 1 | SW | 8/8, Poor-Good, some drizzle then fog later | J., GC, CH, SK | DG |
| 9-Oct-17 | 6 | 3 | 15.00 | 1 | SW | 8/8, Fair to poor, drizzle, fog later | J., R., GC, CH, B. | DG |
| 10-Oct-17 | 17 | 3 | 7.00 | 3-4 | W | 8/8, Good to Fair, occasional light rain | MP, C. | DG |
| 10-Oct-17 | 17 | 3 | 10.30 | 3-4 | W | 8/8, Good to Fair, occasional light rain | C., J., RE and RG | DG |
| 10-Oct-17 | 18 | 3 | 6.50 | 2 | WSW | 7-8/8, Good, dry | R.,WR,BF,C.,CH, MP,CR,GS, RE, J., B., S., M., LR, WP | ADW |
| 10-Oct-17 | 18 | 3 | 10.20 | 1-2 | W | 8/8, Good, dry | R., WR, BF, CR, LR, GO, RE, C., WP, GC, CH, J., GS | ADW |
| 10-Oct-17 | 21 | 3 | 6.45 | 1-2 | NW | 8/8, Good, dry | R., B., WR, GS, CH, BF and C. | JM |
| 10-Oct-17 | 21 | 3 | 10.15 | 1-2 | NW | 8/8, Good, dry | R., B., WR, CH, BF and C. | JM |
| 19-Oct-17 | 14 | 3 | 14.15 | 1 | W | 8/8, Fair to poor, light rain | CR, BF (RN calling in conifers) | JG |
| 19-Oct-17 | 14 | 2 | 17.45 | 1 | W | 8/8, poor, rain, low cloud | CR, CT | JG |
| 19-Oct-17 | 2 | 3 | 13.45 | 1 | NE | 5/8, Good, dry | CR, R., WP, C. and FF | DL |
| 19-Oct-17 | 2 | 2 | 17.15 | 1-3 | NE | 5-8/8, Good to Fair, rain | CR, R., WP, C. | DL |
| 19-Oct-17 | 10 | 3 | 13.45 | 1 | NE | 5/8, Good, dry | JD flock, MP | LF |
| 19-Oct-17 | 10 | 2 | 17.15 | 1-3 | NE | 5-8/8, Good to Fair, rain | C. flock, MP, goose flock far to west off site | LF |
| 19-Oct-17 | 5 | 3 | 14.00 | 2 | E | 8/8, Fair, variable showers | FF, RE, CR, GS, MP, BF, WR, R. | AM |
| 19-Oct-17 | 5 | 2 | 17.30 | 1 | ENE | 8/8, Fair, variable showers, mist later | B., CT, GC, CH, LR, SK, R., WR | AM |
| 19-Oct-17 | 7 | 2 | 14.25 | 1-3 | ESE | 8/8, Good to Fair, occasional light rain | FF, RE, GO (BF, B. on way to VP from car) | DG |
| 19-Oct-17 | 4 | 2 | 16.55 | 1-2 | ESE | 8/8, Fair to poor, light to heavy rain | No birds seen or heard (Gi call heard back at car) | DG |
| 20-Oct-17 | 12 | 3 | 10.00 | 1 | NW | 5/8, Good visibility, dry | J, C, BF, CH, MP, R., CT, GC, WR | AM |
| 20-Oct-17 | 12 | 2 | 13.30 | 1 | SE | 5-7/8, Good visibility, dry | CT, LT, R., CH, GC, PW, GS, WR, GO | AM |
| 20-Oct-17 | 10 | 3 | 10.15 | 3-4 | W | 4-6/8, visibility Fair, intermittent low cloud, dry | MP, SN (flushed from ground), C. | JG |
| 20-Oct-17 | 10 | 2 | 13.45 | 2 | W | 5-8/8, Fair, some rain, fog towards end | MP, C. | JG |
| 20-Oct-17 | 16 | 3 | 10.40 | 1-3 | W | 7-8/8, Fair to poor visibility, dry, low cloud | Fox, roe deer (GI perched, not seen to fly) | DG |
| 20-Oct-17 | 16 | 1 | 14.10 | 1-2 | S | 8/8, Good to Fair until end with fog, dry | GO | DG |
| 20-Oct-17 | 9 | 3 | 10.30 | 3-4 | W | 3/8, Fair to very Good, heat haze, dry | MP | LF |
| 20-Oct-17 | 9 | 2 | 14.00 | 2 | W | 4-7/8, Good, low cloud towards end | MP | LF |
| 20-Oct-17 | 15 | 3 | 10.30 | 0 | SW | 3/8, visibility excellent, dry | MP, CT, CH, R., GO, WP, C. | DL |
| 20-Oct-17 | 15 | 2 | 14.00 | 1 | SW | 2-5/8, visibility excellent, dry | MP, CT, CH, R., C. | DL |
| 29-Oct-17 | 19 | 3 | 8.50 | 3 | SW | 6/8 visibility fair, dry, | CH, SK, R, M. | LF |
| 29-Oct-17 | 19 | 3 | 12.20 | 3 | SW | 6/8 visibility fair, dry, drizzle at end | CH, WR, B., M. | LF |
| 30-Oct-17 | 12 | 3 | 11.00 | 0-1 | SW | 8/8, visibility Good, dry | WP, RO, JD, CH, C., MG, RL, rabbit, roe deer | DG |
| 30-Oct-17 | 12 | 2 | 14.30 | 1 | SW | 8/8, Fair, dry, cloud base low towards end | WP, RO, JD, FF (badger sett to N of VP (E. Braid)) | DG |

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| 30-Oct-17 | 11 | 3 | 11.00 | 0-1 | SW | 8/8, visibility Good, dry | MP (Merlin hunting over clearfell near VP) | LF |
| 30-Oct-17 | 11 | 2 | 14.30 | 1-2 | SW | 8/8, visibility Good, dry, low cloud at very end | MP | LF |
| 30-Oct-17 | 8 | 3 | 10.15 | 0-1 | W | 7/8, visibility Good, dry, cold | C., FF, MP | JM |
| 30-Oct-17 | 8 | 2 | 14.00 | 0-1 | W | 7/8, visibility Good, dry, one light shower, cold | MP | JM |
| 30-Oct-17 | 13 | 3 | 9.45 | 0-1 | SW/WNW | MP, C., FF flock c100 | MP | ADW |
| 30-Oct-17 | 13 | 2 | 13.15 | 1-2 | W/WNW | MP, C., SG | WP | ADW |
| 2-Nov-17 | 6 | 3 | 10.00 | 0 | NE | 3-5/8, excellent, dry | CR, CT, Gi calling not seen, C., J. | JG |
| 2-Nov-17 | 6 | 2 | 13.30 | 0 | NE | 3/8, excellent, dry | CR, CT, C. | JG |
| 2-Nov-17 | 21 | 3 | 10.30 | 0 | NE | 1-3/8, excellent, dry | FF, CR, WR, WP, CT, CH, LT, C. | DL |
| 2-Nov-17 | 21 | 2 | 14.00 | 0 | SW | 2-3/8, excellent, dry | FF, WR, CT, CH, C. | DL |
| 2-Nov-17 | 17 | 3 | 10.20 | 1 | NE | 1-6/8, Good, dry | FF, MP, C. | DG |
| 2-Nov-17 | 17 | 3 | 13.50 | 0-1 | NE | 6/8, Good visibility, dry | FF, MP | DG |
| 2-Nov-17 | 18 | 3 | 10.10 | 1 | N/NE | 3-5/8, visibility Good, dry | CR, C., LR, SK, CH, GO, R., WR, RB, D., GC, B., S., BF, BZ | AM |
| 2-Nov-17 | 18 | 2 | 13.40 | 1 | SE/SW | 5/8, visibility Good, dry | CR, C., LR, SK, CH, GO, R., WR, D., GC, B., BZ | AM |
| 3-Nov-17 | 2 | 3 | 10.00 | 0-3 | WSW | 8/8 Good/Fair, dry | CR, CH | JG |
| 3-Nov-17 | 2 | 2 | 13.30 | 1-3 | WSW | 8/8 Good/Fair, dry | CR, CH | JG |
| 3-Nov-17 | 3 | 3 | 10.00 | 0-3 | WSW | 8/8 Good/Fair, dry | FF, CB, ST, C., CH, J., M., MP | DL |
| 3-Nov-17 | 3 | 2 | 13.30 | 1-3 | WSW | 8/8 Good/Fair, dry | FF, C., CH, MP | DL |
| 3-Nov-17 | 1 | 3 | 9.15 | 1 | SW | 8/8, Good visibility, dry | RL, PH, C., RO, MG, FF, SG, M., MP, CR, GO, CH, LR, SK, CT, R., WR, GL, PW | AM |
| 3-Nov-17 | 1 | 2 | 12.45 | 1 | SW | 7/8, Good visibility, dry | RL, PH, C., RO, MG, FF, SG, MP, CR, GO, CH, CT, R., WR, PW | AM |
| 3-Nov-17 | 19 | 3 | 9.36 | 0-2 | SW | 8/8, Fair, dry | R., J., C., LR, CH, CR, GC | DG |
| 3-Nov-17 | 19 | 2 | 13.06 | 1-2 | SW | 8/8 Good/Fair, dry | R., C., LT, GC, CR, ST | DG |
| 13-Nov-17 | 16 | 3 | 8.40 | 3 | SW | 8/8, Fair, occasional light rain | MP, C. | HR |
| 13-Nov-17 | 16 | 3 | 12.10 | 2 | SW | 8/8, Fair, occasional light rain | - | HR |
| 13-Nov-17 | 20 | 3 | 8.35 | 2 | SW | 8/8, Fair, occasional light rain | SK, CR, CH, M. | DI |
| 13-Nov-17 | 20 | 3 | 12.05 | 2 | SW | 8/8, Fair, occasional light rain | CH, M., WR | DI |
| 13-Nov-17 | 21 | 3 | 8.30 | 3 | SW | 8/8, Fair, occasional light rain | B., WR, CT, CH | AM |
| 13-Nov-17 | 21 | 3 | 12.00 | 3 | S | 8/8, Fair, occasional light rain | CH, C., J. | AM |
| 13-Nov-17 | 15 | 3 | 8.55 | 3 | SW | 8/8, Fair, occasional light rain | MP, C. | DL |
| 13-Nov-17 | 15 | 2 | 12.25 | 3 | SW | 8/8, Fair, occasional light rain | - | DL |
| 14-Nov-17 | 5 | 3 | 8.50 | 3 | WNW | 6/8 visibility fair, dry, cold | SK, C. | HR |
| 14-Nov-17 | 5 | 3 | 12.20 | 3 | NW | 6/8 visibility fair, dry, cold | WR, CT, M. | HR |
| 14-Nov-17 | 12 | 3 | 9.10 | 3 | NW | 6/8 visibility fair, dry, cold | - | DI |
| 14-Nov-17 | 12 | 3 | 12.40 | 3 | NW | 6/8 visibility fair, dry, cold | MP | DI |
| 14-Nov-17 | 13 | 3 | 8.50 | 3 | WNW | 6/8 visibility good, dry | MP | AM |
| 14-Nov-17 | 13 | 3 | 12.20 | 4 | NW | 7/8 visibility fair, dry | C. | AM |
| 14-Nov-17 | 4 | 3 | 8.45 | 3 | WNW | 6/8 visibility good, dry | CR, WR, B, M., CH | DL |
| 14-Nov-17 | 4 | 3 | 12.15 | 3 | NW | 6/8 visibility good, dry | WR, B. | DL |
| 16-Nov-17 | 15 | 3 | 11.10 | 3-4 | WNW | 3/8 Good, dry | - | LF |
| 16-Nov-17 | 15 | 1 | 14.40 | 3 | WNW | 3/8, Good, dry | - | LF |
| 16-Nov-17 | 11 | 3 | 11.00 | 3-4 | WNW | 3/8, Good, dry | FF, C., | DL |
| 16-Nov-17 | 11 | 1 | 14.30 | 3--4 | WNW | 3/8 Good, dry | - | DL |
| 16-Nov-17 | 8 | 3 | 10.00 | 3 | WNW | 3/8, Good, dry | C., FF | JG |
| 16-Nov-17 | 8 | 2 | 13.30 | 3 | WNW | 3/8, Good, dry | SG | JG |

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| 16-Nov-17 | 16 | 3 | 11.15 | 4 | NW | 5/8 Fair, dry, 3.5 $^{O}$C | RG | DG |
| 16-Nov-17 | 16 | 2 | 14.45 | 5 | NW | 4/8 Fair, dry, 3 $^{O}$C | - | DG |
| 17-Nov-17 | 19 | 3 | 10.00 | 1-2 | W | 8/8, Fair, | RE, R., J. | DL |
| 17-Nov-17 | 19 | 3 | 13.30 | 1-2 | W | 8/8, Fair, | CH, LT | DL |
| 17-Nov-17 | 3 | 3 | 9.40 | 1 | W | 8/8, Fair, | MP | JG |
| 17-Nov-17 | 3 | 3 | 13.10 | 2 | W | 8/8, Fair, | C. | JG |
| 17-Nov-17 | 20 | 3 | 10.00 | 1-2 | WNW | 8/8, Fair, occasional light rain | C., B., CH, LR | DG |
| 17-Nov-17 | 20 | 3 | 13.30 | 2 | W | 8/8, Fair, occasional light rain | J., WP, C., JD, WR | DG |
| 17-Nov-17 | 1 | 3 | 9.30 | 1-2 | N | 8/8, Good, dry | - | LF |
| 17-Nov-17 | 1 | 3 | 13:00 | 1-2 | NW | 8/8, Good, dry | - | LF |
| 21-Nov-17 | 8 | 3 | 11.05 | 3 | NW | 7/8 good visibility, dry | MP | LF |
| 21-Nov-17 | 8 | 3 | 14.35 | 3 | NW | 8/8 good poor towards end, dry | - | LF |
| 21-Nov-17 | 9 | 3 | 10.50 | 3 | NW | 7/8 good visibility, dry | C. | HR |
| 21-Nov-17 | 9 | 3 | 14.20 | 3 | NW | 8/8 good poor towards end, dry | WP | HR |
| 21-Nov-17 | 10 | 3 | 10.45 | 3 | NW | 7/8 good visibility, dry | M. | AM |
| 21-Nov-17 | 10 | 3 | 14.15 | 4 | NW | 8/8 good poor towards end, dry | - | AM |
| 21-Nov-17 | 11 | 3 | 10.50 | 3 | NW | 7/8 good visibility, dry, cold | CH, M., WR | DI |
| 21-Nov-17 | 11 | 3 | 14.20 | 4 | NW | 8/8 good poor towards end, dry | - | DI |
| 22-Nov-17 | 12 | 3 | 8.45 | 3 | NW | 0/8, Good, dry | MP, WR | DI |
| 22-Nov-17 | 12 | 3 | 12.15 | 4 | NW | 0/8, Good, dry | C. | DI |
| 22-Nov-17 | 13 | 3 | 8.40 | 3 | NW | 0/8, Good, dry | M., K., | AM |
| 22-Nov-17 | 13 | 3 | 12.10 | 4 | WNW | 0/8, Good, dry | C., M. | AM |
| 22-Nov-17 | 14 | 3 | 9.10 | 3 | NW | 0/8, Good, dry | CR, SK, CT, B., ST | LF |
| 22-Nov-17 | 14 | 3 | 12.40 | 4 | NW | 0/8, Good, dry | ST, B, CH, SK | LF |
| 22-Nov-17 | 15 | 3 | 9.00 | 4 | WNW | 0/8, Good, dry, cold | - | HR |
| 22-Nov-17 | 15 | 3 | 12.30 | 4 | WNW | 0/8, Good, dry, cold | - | HR |
| 28-Nov-17 | 7 | 3 | 10.15 | 3-4 | NW | 1/8, Good, dry, 3 $^{O}$C | CR, K., GO | DG |
| 28-Nov-17 | 7 | 2 | 13.45 | 3-2 | NW | 3/8, Good, dry, 3 $^{O}$C | K., MP | DG |
| 28-Nov-17 | 4 | 3 | 10.20 | 3 | NW | 1/8, Good, dry, 2 $^{O}$C | C., CH, GO, SK | ADW |
| 28-Nov-17 | 4 | 2 | 13.50 | 3-2 | NW | 2/8, Good, dry, 2 $^{O}$C | GC | ADW |
| 28-Nov-17 | 5 | 3 | 10.00 | 3-4 | NW | 1/8, Good, dry | MP, CR | LF |
| 28-Nov-17 | 5 | 2 | 13.30 | 3-2 | NW | 2/8, Good, dry | MP, CR | LF |
| 29-Nov-17 | 6 | 3 | 9.30 | 3-4 | NW | 0/8, Good, dry | MP, CR | LF |
| 29-Nov-17 | 6 | 2 | 13:00 | 4 | N | 0/8, Good, dry | MP, CR, SK | LF |
| 29-Nov-17 | 21 | 3 | 9.50 | 2 | NW | 0/8, Good, dry, 2 $^{O}$C | CR, RE, RN | DG |
| 29-Nov-17 | 21 | 2 | 13.20 | 2 | NW | 0/8, Good, dry, 3 $^{O}$C | RE | DG |
| 29-Nov-17 | 14 | 3 | 10.05 | 3 | N | 1/8, Good, dry, 0.9 $^{O}$C | CR, CT, LR | ADW |
| 29-Nov-17 | 14 | 3 | 13.35 | 3 | N | 1/8, Good, dry | CR, | ADW |
| 3-Dec-17 | 1 | 3 | 10.20 | 2 | SW | 8/8 visibility good, dry | M., K. | HR |
| 3-Dec-17 | 1 | 3 | 13.50 | 2 | SW | 8/8 visibility good, then poor, some drizzle | MP | HR |
| 3-Dec-17 | 3 | 3 | 10.10 | 3 | SW | 8/8 visibility good, dry | MP | AM |
| 3-Dec-17 | 3 | 3 | 13.40 | 2 | SW | 8/8 visibility good, then poor, some drizzle | - | AM |
| 3-Dec-17 | 5 | 3 | 10.20 | 2 | SW | 8/8 visibility good, dry | - | DL |
| 3-Dec-17 | 5 | 3 | 13.50 | 2 | SW | 8/8 visibility good, then poor, some drizzle | - | DL |

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|---|---|---|---|---|---|---|---|---|
| 4-Dec-17 | 7 | 3 | 8.30 | 4 | SW | 6/8 visibility good, dry | CH, CR, J. | HR |
| 4-Dec-17 | 7 | 2 | 12.00 | 2 | SW | 6/8 visibility good, dry | CH, ST | HR |
| 4-Dec-17 | 8 | 3 | 8.35 | 4 | SW | 6/8 visibility good, dry | MP | AM |
| 4-Dec-17 | 8 | 2 | 12.05 | 2 | SW | 6/8 visibility good, dry | - | AM |
| 4-Dec-17 | 11 | 3 | 8.50 | 4 | SW | 6/8 visibility good, dry | - | DL |
| 4-Dec-17 | 11 | 2 | 12.20 | 3 | SW | 6/8 visibility good, dry | - | DL |
| 5-Dec-17 | 14 | 3 | 9.10 | 2 | WSW | 7/8 visibility fair, dry, short period of drizzle | ST, CR, R. | HR |
| 5-Dec-17 | 14 | 3 | 12.40 | 1 | SW | 7/8 visibility fair, dry, short period of drizzle | B, WR | HR |
| 5-Dec-17 | 16 | 3 | 9.20 | 2 | SW | 7/8 visibility fair, dry, short period of drizzle | WP | AM |
| 5-Dec-17 | 16 | 2 | 12.50 | 1 | SW | 7/8 visibility fair, dry, short period of drizzle | - | AM |
| 5-Dec-17 | 20 | 3 | 9.05 | 2 | WSW | 7/8 visibility fair, dry, short period of drizzle | MA | DL |
| 5-Dec-17 | 20 | 2 | 12.35 | 2 | SW | 7/8 visibility fair, dry, short period of drizzle | - | DL |
| 15-Dec-17 | 19 | 3 | 10.00 | 1-2 | NE | 1/8, Good, dry | SK | LF |
| 15-Dec-17 | 19 | 2 | 13.30 | 2 | NE | 1/8, Good, dry | SK | LF |
| 15-Dec-17 | 20 | 3 | 10.23 | 1-2 | N | 1/8, Good, dry, 3 $^{O}$C | CR, B., BF, WR | DG |
| 15-Dec-17 | 20 | 2 | 13.53 | 2 | N | 0/8, Good, dry, 3 $^{O}$C | B., WR, CT, R., WP, JD | DG |
| 15-Dec-17 | 3 | 3 | 10.00 | 2 | N | 1/8, Good, dry | CR | JG |
| 15-Dec-17 | 3 | 2 | 13.30 | 2 | N | 0/8, Good, dry | ST | JG |
| 15-Dec-17 | 2 | 3 | 10.00 | 1.2 | NW | 2/8, Good, dry | R. | DL |
| 15-Dec-17 | 2 | 2 | 13.30 | 1-2 | NW | 1/8, Good, dry | MP, ST | DL |
| 16-Dec-17 | 6 | 3 | 8.50 | 1 | | 8/8 Visibility good, dry | ST, CR, J. | DG |
| 16-Dec-17 | 6 | 1 | 12.20 | 2 | | 8/8 visibility good, then poor, low cloud | WR, J. | DG |
| 16-Dec-17 | 16 | 3 | 8.30 | 1 | | 8/8 Visibility good, dry | MP | JG |
| 16-Dec-17 | 21 | 3 | 12.00 | 2 | | 8/8 visibility good, then poor, low cloud | CH, CT | JG |
| 16-Dec-17 | 21 | 1 | 8.35 | 1 | | 8/8 Visibility good, dry | WR, B., ST, M. | DL |
| 16-Dec-17 | 17 | 3 | 12.05 | 2 | | 8/8 visibility good, then poor, low cloud | MP | DL |
| 16-Dec-17 | 13 | 2 | 10.05 | 1 | | 8/8 Good then thick cloud | MP | LF |
| 18-Jan-18 | 19 | 3 | 8.45 | 3 | NE | 4/8. Very good, dry | CH, WR, B., M. | HR |
| 18-Jan-18 | 19 | 3 | 12.15 | 4 | N | 4/8. Very good, dry | CH, ST | HR |
| 18-Jan-18 | 20 | 3 | 8.50 | 3 | N | 4/8 visibility good, cold, dry | MA, WR, ST | LF |
| 18-Jan-18 | 20 | 3 | 12.20 | 3 | NE | 4/8. Very good, dry | M. | LF |
| 18-Jan-18 | 21 | 3 | 9.10 | 3 | N | 4/8. Very good, dry | J., ST, WR, R. | AM |
| 18-Jan-18 | 21 | 3 | 12.40 | 4 | N | 4/8 good, dry | R., B., SK, CT | AM |
| 18-Jan-18 | 18 | 3 | 8.30 | 3 | NE | 4/8. Very good, dry | R., SK, CT | DL |
| 18-Jan-18 | 18 | 2 | 12.00 | 4 | N | 4/8. Very good, dry | CT, WR, BF | DL |
| 19-Jan-18 | 8 | 3 | 10.15 | 3 | NE | 6/8, good, short showers | MP, C. | DL |
| 19-Jan-18 | 8 | 3 | 13.45 | 3 | NE | 6/8, good, short showers | MP, M. | DL |
| 19-Jan-18 | 9 | 3 | 10.25 | 2 | N | 6/8, good, short showers | MP, K. | AM |
| 19-Jan-18 | 9 | 3 | 13.55 | 3 | E-SW | 6/8, good, short showers | - | AM |
| 19-Jan-18 | 10 | 3 | 10.00 | 3 | N | 6/8, good, short showers | - | HR |
| 19-Jan-18 | 10 | 3 | 13.30 | 3 | N | 6/8, good, short showers | - | HR |
| 19-Jan-18 | 11 | 3 | 9.50 | 3 | N | 6/8, good, short showers | - | LF |
| 19-Jan-18 | 11 | 3 | 13.20 | 2 | NE | 6/8, good, short showers | - | LF |
| 25-Jan-18 | 15 | 3 | 10.15 | 1-3 | W | 6/8, fair, light shower | CR, C. | JG |

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|---|---|---|---|---|---|---|---|---|
| 25-Jan-18 | 15 | 2 | 13.45 | 1-3 | W | 8/8, Poor, rain | C. | JG |
| 25-Jan-18 | 20 | 3 | 10.40 | 1-3 | W | 8/8, fair, dry-Showers | C., LR, CR, R. FF | DG |
| 25-Jan-18 | 20 | 1 | 14.10 | 1-2 | W | 8/8 fair-poor, Showers | C. | DG |
| 25-Jan-18 | 7 | 3 | 10.20 | 2 | W | 8/8, fair, dry-Showers | ST | HR |
| 25-Jan-18 | 7 | 1 | 13.50 | 4 | W | 8/8 fair-poor, Showers | WR, ST, R. | HR |
| 25-Jan-18 | 12 | 3 | 10.00 | 2-5 | SSW | 5/8, good, dry-showers | CR, WP, C. | LF |
| 25-Jan-18 | 12 | 2 | 13.30 | 2-4 | W | 8/8, Poor-very poor, Light showers | CR, WP, C. | LF |
| 26-Jan-18 | 9 | 3 | 10.30 | 1 | SSE | 4/8, Very good, dry | C. FF | JG |
| 26-Jan-18 | 9 | 3 | 14.00 | 2 | S | 4/8, Very good, dry | C. | JG |
| 26-Jan-18 | 10 | 3 | 10.00 | 2 | E-SW | 2/8, Very good, dry | MP, (3 SN flushed on way to VP) | LF |
| 26-Jan-18 | 10 | 2 | 14.00 | 3 | SW | 4/8. Very good, dry | FF | LF |
| 26-Jan-18 | 2 | 3 | 10.15 | 2 | SW | 2/8, Very good, dry | CH, M., WR | HR |
| 26-Jan-18 | 2 | 3 | 13.45 | 2 | SW | 4/8. Very good, dry | CH, M. | HR |
| 26-Jan-18 | 11 | 3 | 10.26 | 1 | E-SW | 4/8, good, dry | MP | DG |
| 26-Jan-18 | 11 | 2 | 13.56 | 2 | SW | 3-4/8, good, dry | C., MP | DG |
| 29-Jan-18 | 14 | 3 | 11.00 | 2-4 | W | 4/8,Very good, poor in rain, shower | - | LF |
| 29-Jan-18 | 14 | 2 | 14.30 | 4-5 | NW | 4/8, Very good, dry | - | LF |
| 29-Jan-18 | 17 | 3 | 11.00 | 4 | NW | 4/8, good, light shower | - | ADW |
| 29-Jan-18 | 17 | 2 | 14.30 | 4-6 | WNW | 5/8, good, dry | - | ADW |
| 29-Jan-18 | 18 | 3 | 10.38 | 2 | NW | 6/8, good, showers | - | DG |
| 29-Jan-18 | 18 | 2 | 14.08 | 2 | NW | 6/8, good, dry | - | DG |
| 30-Jan-18 | 5 | 3 | 11.20 | 2-4 | W | 8/8, good, Light drizzle-dry | BF, CR, FF | ADW |
| 30-Jan-18 | 5 | 2 | 14.50 | 3-4 | W | 8/8, good, dry-light drizzle | CR | ADW |
| 30-Jan-18 | 7 | 3 | 11.30 | 3-5 | SW | 8/8, fair, dry, drizzle | MP | LF |
| 30-Jan-18 | 7 | 2 | 15.00 | 5 | SW | 8/8, fair, drizzle | M. | LF |
| 30-Jan-18 | 21 | 3 | 11.35 | 2-4 | SW | 8/8, fair, occasional light rain | - | DG |
| 30-Jan-18 | 21 | 2 | 15.05 | 4 | SW | 8/8, fair, occasional light rain | - | DG |
| 5-Feb-18 | 8 | 3 | 10.30 | 1 | S | 8/8, good, dry, temp 6.3 | C. MP, S., RB, SG, M. | ADW |
| 5-Feb-18 | 8 | 2 | 14.00 | 1 | S | 8/8, good, dry, temp 3.2 | C., CR, SG | ADW |
| 5-Feb-18 | 9 | 3 | 10.15 | 1 | S | 7/8 good, dry, temp 2 | M. | HR |
| 5-Feb-18 | 9 | 3 | 13.45 | 1 | S | 7/8 good, dry, temp 2 | - | HR |
| 5-Feb-18 | 16 | 3 | 10.50 | 2 | SW | 7/8 good, dry, temp -1 | - | DG |
| 5-Feb-18 | 16 | 2 | 14.20 | 2 | SW | 8/8, good, dry temp -1.5 | CR,WK, RG | DG |
| 5-Feb-18 | 13 | 3 | 10.15 | 1 | S | 7/8, good, dry, temp -1 | CR, M., C., | AM |
| 5-Feb-18 | 13 | 2 | 13.45 | 1 | S | 7/8 good, dry, temp 2 | WR, WK | AM |
| 6-Feb-18 | 1 | 3 | 10.25 | 2 | NW | 6/8, good, dry, 2 $^{O}$C fresh Snow cover | CR, CH, MP, WR | AM |
| 6-Feb-18 | 1 | 3 | 13.55 | 2 | NW | 6/8, good, dry, temp 2 | WR, RL, PH, M., GC | AM |
| 6-Feb-18 | 2 | 3 | 10.15 | 2 | NW | 7/8, good, dry | - | HR |
| 6-Feb-18 | 2 | 3 | 13.45 | 2 | NW | 7/8, good, dry | M. | HR |
| 6-Feb-18 | 10 | 3 | 10.40 | 2 | NW | 7/8, good, dry | MP | ADW |
| 6-Feb-18 | 10 | 3 | 14.10 | 2 | NW | 7/8, good, dry | MG | ADW |
| 6-Feb-18 | 18 | 3 | 11.23 | 2 | NW | 7/8, good, dry, temp 1 | CR | DG |
| 6-Feb-18 | 18 | 2 | 14.53 | 2 | NW | 4/8, good, dry, temp 1 | CR | DG |
| 9-Feb-18 | 14 | 3 | 9.45 | 2 | NW | 1/8, good, dry | CR, CH. CT | DL |

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|---|---|---|---|---|---|---|---|---|
| 9-Feb-18 | 14 | 2 | 13.15 | 2 | NW | 0/8, good, dry | C., CH, CT | DL |
| 9-Feb-18 | 21 | 3 | 9.44 | 2 | NW | 1/8, good, dry | CR | JG |
| 9-Feb-18 | 21 | 2 | 13.15 | 2 | NW | 0/8, good, dry | - | JG |
| 9-Feb-18 | 18 | 3 | 10.15 | 2 | NW | 1/8, good, dry | - | DG |
| 9-Feb-18 | 18 | 2 | 13.45 | 2 | NW | 1/8, good, dry | - | DG |
| 10-Feb-18 | 12 | 3 | 8.25 | 3 | N | 1/8 visibility good | MP | DL |
| 10-Feb-18 | 12 | 1 | 11.55 | 2 | N | 1/8 visibility fair | M., MP | DL |
| 10-Feb-18 | 16 | 3 | 8.20 | 3 | N | 1/8 visibility good | MP | JG |
| 10-Feb-18 | 16 | 3 | 11.50 | 2 | N | 1/8 visibility fair | MP | JG |
| 10-Feb-18 | 1 | 3 | 8.15 | 3 | N | 1/8 visibility good | MP | DG |
| 10-Feb-18 | 1 | 3 | 11.45 | 2 | N | 1/8 visibility good then poor at end | K., MP | DG |
| 20-Feb-18 | 5 | 3 | 9.45 | 2-3 | NW | 2/8, good, dry | S., CH, CR, MP | LF |
| 20-Feb-18 | 5 | 2 | 13.15 | 3-4 | N | 2/8, good, dry | CR | LF |
| 20-Feb-18 | 6 | 3 | 9.30 | 1-2 | NW | 1/8, good, dry | CR, S., C. | ADW |
| 20-Feb-18 | 6 | 2 | 13.00 | 2 | N | 2/8, good, dry | CR, BF, CH | ADW |
| 20-Feb-18 | 7 | 3 | 9.35 | 2 | NW | 2/8, good, dry | CH, FF | JM |
| 20-Feb-18 | 7 | 2 | 13.05 | 2-3 | NW | 5/8, good, dry | CH | JM |
| 20-Feb-18 | 4 | 3 | 9.50 | 2-3 | NW | 2/8, good, dry, temp 5 | CH, R., CR, FF, HG | DG |
| 20-Feb-18 | 4 | 2 | 13.20 | 2 | NNW | 2/8, good, dry, temp 7 | C., GS, CR, CH | DG |
| 21-Feb-18 | 3 | 3 | 9.30 | 2-3 | SE | 2/8, good, dry | GS, C., CR, M., CH, B., PH | LF |
| 21-Feb-18 | 3 | 3 | 13.00 | 2-3 | SE | 4/8, good, dry | C., CH, PH | LF |
| 21-Feb-18 | 20 | 3 | 9.30 | 0-1 | SSW | 2/8, good, dry | M.,R., GT, D., CT, PW, CR, WR, C., WP | ADW |
| 21-Feb-18 | 20 | 3 | 13.00 | 0-1 | SSW | 5/8, good, dry | R., CR, CT, SK, C., FF | ADW |
| 21-Feb-18 | 2 | 3 | 9.15 | 0-1 | SE | 3/8, good, dry | M., CH, SK, GS | JM |
| 21-Feb-18 | 2 | 3 | 12.45 | 0-1 | SE | 6/8, good, dry | M., CH, ST, D., LR | JM |
| 21-Feb-18 | 19 | 3 | 9.35 | 0-1 | NNW | 4/8, good, dry, temp 6 | R., CH, GT, M., JD, LR, ST, CR, PH, J., D. | DG |
| 21-Feb-18 | 19 | 3 | 13.05 | 1 | S | 5/8, good, dry, temp 7-10 | R., CH, ST, CR, PH | DG |
| 22-Feb-18 | 15 | 3 | 12.15 | 1 | SE | 7/8, good, dry | C., RG, CR | LF |
| 22-Feb-18 | 15 | 3 | 15.45 | 2 | SE | 8/8, good, dry | RG | LF |
| 22-Feb-18 | 13 | 3 | 11.00 | 1 | S | 6/8, good, dry | C., S. | JG |
| 22-Feb-18 | 13 | 3 | 14.30 | 2 | SE | 8/8, good, dry | S, MP | JG |
| 22-Feb-18 | 16 | 3 | 12.20 | 1-2 | SE | 6/8, good, dry | CT | DL |
| 22-Feb-18 | 16 | 2 | 15.50 | 2 | S | 6/8, good, dry | CT | DL |
| 22-Feb-18 | 12 | 3 | 12.00 | 2 | SE | 8/8, fair , dry | M., DI, C. | DG |
| 22-Feb-18 | 12 | 3 | 15.30 | 2 | SE | 8/8, fair, dry | C, M. | DG |
| 23-Feb-18 | 13 | 3 | 11.00 | 1 | SE | 7/8, good, dry | S., C. | JG |
| 23-Feb-18 | 13 | 3 | 14.30 | 2 | SE | 7/8, good, dry | S. | JG |
| 23-Feb-18 | 10 | 3 | 10.30 | 1-2 | SE | 3/8, good, dry | S., WP. C. | DL |
| 23-Feb-18 | 10 | 3 | 14.00 | 1-2 | SE | 3/8, good, dry | C. | DL |
| 23-Feb-18 | 11 | 3 | 10.10 | 3 | S | 6/8 | MP, WK | DG |
| 23-Feb-18 | 11 | 3 | 13.40 | 3 | S | 6/8 | MP | DG |
| 23-Feb-18 | 14 | 3 | 10.25 | 1 | SE | 7/8, good, dry | CH, SK, M. | LF |
| 23-Feb-18 | 14 | 3 | 13.55 | 2 | S | 7/8, good, dry | SK, CR, CH, CT | LF |
| 5-Mar-18 | 19 | 3 | 13.05 | 4 | SE | 2/8 good visibility, mainly dry | CT, M., ST, J | DI |

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|---|---|---|---|---|---|---|---|---|
| 5-Mar-18 | 19 | 1 | 16.35 | 2 | SE | 2/8 good, dry | WR, CT, M. | DI |
| 5-Mar-18 | 21 | 3 | 13.45 | 4 | SSE | 2/8 good, dry | M., ST, CH, SK | AM |
| 5-Mar-18 | 17 | 3 | 14.00 | 4 | SE | 2/8 good, dry | M., ST, J., CR, B. | HR |
| 6-Mar-18 | 3 | 3 | 7.45 | 4 | SE | 2/8 good, dry | R., M. | AM |
| 6-Mar-18 | 3 | 1 | 11.15 | 3 | S | 2/8 good, dry | S., MP ,R. | AM |
| 6-Mar-18 | 10 | 2 | 8.20 | 4 | S | 2/8 good, dry | S., MP | HR |
| 6-Mar-18 | 17 | 2 | 8.35 | 4 | SE | 2/8 good, dry | S. | DI |
| 12-Mar-18 | 10 | 3 | 12.05 | 1 | NNE | 8/8, Moderate, dry | R., MP, GS, ST, C., CR | ADW |
| 12-Mar-18 | 10 | 3 | 15.45 | 0-1 | NNE | 8/8, Moderate, dry | CR, R., ST | ADW |
| 12-Mar-18 | 4 | 3 | 12.00 | 2 | NE | 8/8, fair, dry | MP, CR, BF, M., CH, C. B., | LF |
| 12-Mar-18 | 4 | 3 | 15.30 | 2 | NNE | 8/8, good, dry | M., SN | LF |
| 12-Mar-18 | 7 | 3 | 12.05 | 1 | NE | 8/8. fair, dry, 4.5 $^{O}$C | M., MP, CR | DG |
| 12-Mar-18 | 7 | 3 | 15.35 | 1 | NE | 8/8, fair, dry, 7 $^{O}$C | M. | DG |
| 12-Mar-18 | 6 | 3 | 12.00 | 0-1 | N | 8/8, fair, dry | CR, M., C., ST, B., FF, SK | JM |
| 12-Mar-18 | 6 | 3 | 15.30 | 0-1 | N | 8/8, fair, dry | M., ST, B., R., CR | JM |
| 13-Mar-18 | 2 | 3 | 9.50 | 1 | WSW | 7/8, good, dry/showers | CH, ST, R., BF, CR, FF, S., MP, C. | ADW |
| 13-Mar-18 | 2 | 3 | 13.20 | 1-2 | WSW | 7/8, good, dry | ST, CH, NH | ADW |
| 13-Mar-18 | 19 | 3 | 10.00 | 0-1 | NW | 8/8, good, dry (light shower) | ST, CH, CT, R., D., M., GT, B., CR, | JM |
| 13-Mar-18 | 19 | 3 | 13.30 | 1 | W | 8/8, good, dry | CH, R., S. | JM |
| 13-Mar-18 | 3 | 3 | 9.45 | 2 | SW | 5/8, good, dry (shower) | M., C., JD, GS, BF, CH, B., CR, M. | LF |
| 13-Mar-18 | 3 | 2 | 13.15 | 2 | SW | 7/8 good, dry | GC, ST | LF |
| 13-Mar-18 | 20 | 3 | 10.03 | 1 | NW | 7/8, good, dry(showers) temp 7 | C., SG, WP, M., CH, CR, CT,R. | DG |
| 13-Mar-18 | 20 | 2 | 13.33 | 2 | SW | 7/8, good, dry (showers) temp7 | C., CH, R. | DG |
| 19-Mar-18 | 17 | 3 | 9.30 | 4 | NE | 4/8, good, dry, temp 1.5 | MP, J.,GB | DG |
| 19-Mar-18 | 17 | 2 | 13.03 | 4 | NE | 3/8, good, dry, temp 1.5 | LB | DG |
| 19-Mar-18 | 18 | 3 | 9.40 | 3 | NE | 4/8, good, dry | - | JM |
| 19-Mar-18 | 18 | 2 | 13.10 | 3 | E | 3/8, good. dry | - | JM |
| 19-Mar-18 | 21 | 3 | 9.50 | 1-2 | NE | 5/8, good, dry | CH, SK, CR | ADW |
| 19-Mar-18 | 21 | 2 | 13.20 | 1 | NE | 3/8, good, dry | GB, LB | ADW |
| 20-Mar-18 | 8 | 3 | 6.55 | 1-2 | SW | 4/8, good, dry | S., MP, C., SG | JM |
| 20-Mar-18 | 8 | 3 | 10.25 | 1-2 | SW | 3/8, good, dry | S., C. | JM |
| 20-Mar-18 | 13 | 3 | 6.45 | 1 | SSW | 2/8, good, dry | S., C., SC, MP, RN | ADW |
| 20-Mar-18 | 13 | 3 | 10.15 | 1-2 | SSW | 3/8, good, dry | C., MP | ADW |
| 20-Mar-18 | 1 | 3 | 7.10 | 1 | SW | 3/8, good, dry, temp 7 | GB, PW, SG,S.,MP | DG |
| 20-Mar-18 | 1 | 3 | 10.40 | 1 | SSW | 3/8, good, dry, temp 9 | MG, FF | DG |
| 22-Mar-18 | 2 | 3 | 9.00 | 1 | SW | 8/8, good, dry | MP, ST, CH, R., JD | DL |
| 22-Mar-18 | 2 | 3 | 12.30 | 1-2 | SW | 8/8, good, dry | WP, SG | DL |
| 22-Mar-18 | 3 | 3 | 9.00 | 3-4 | S | 8/8, good, dry | MP, CH, ST, M., JD, B., CR | LF |
| 22-Mar-18 | 3 | 3 | 12.30 | 4-5 | S | 8/8, good, dry | B., CR, LB | LF |
| 22-Mar-18 | 19 | 3 | 9.10 | 2 | SW | 8/8, good, dry | CH, CT, ST, R., SK, CR | JG |
| 22-Mar-18 | 19 | 3 | 12.40 | 2 | SW | 8/8, good, dry | CR, CH, R. | JG |
| 22-Mar-18 | 20 | 3 | 9.10 | 2 | SW | 8/8, fair, dry, temp 5.3 | CR, CH, M., C. | DG |
| 22-Mar-18 | 20 | 3 | 12.40 | 3 | SW | 8/8, fair, dry, temp 6 | CR, LR, CH | DG |
| 23-Mar-18 | 7 | 3 | 6.50 | 2 | W | 8/8, moderate, light rain then dry | CH, BF, ST, FF | DL |

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|---|---|---|---|---|---|---|---|---|
| 23-Mar-18 | 7 | 3 | 10.20 | 2 | W | 8/8, good, dry then light rain | FF, S., LB | DL |
| 23-Mar-18 | 6 | 3 | 6.55 | 2 | WSW | 8/8, fair, dry then showers, temp 5 | ST, B., CT, FF, CH, CR, M. | DG |
| 23-Mar-18 | 6 | 2 | 10.25 | 2 | WSW | 8/8, poor, changing to good, showers | CH, M., WR, ST | DG |
| 23-Mar-18 | 5 | 3 | 6.45 | 2 | W | 8/8, poor changing to good, showers | CR, FF, R., D. | JG |
| 23-Mar-18 | 5 | 3 | 10.15 | 2 | W | 8/8, good, occasional light rain | CR, R. | JG |
| 23-Mar-18 | 4 | 3 | 7.05 | 2-3 | W | 8/8, poor, changing to good, showers | MP, CR, C., M., FF flock, goose flock off site | LF |
| 23-Mar-18 | 4 | 3 | 10.35 | 2-3 | W | 8/8, good, occasional squalls | MP, CR, C. | LF |
| 26-Mar-18 | 12 | 3 | 9.30 | 1 | W | 1/8-7/8, good, dry | MP, WR, R., ST, S., CH, C., WP | ADW |
| 26-Mar-18 | 12 | 3 | 13.00 | 1-2 | W | 7/8-8/8, good, dry | R., GT, MP | ADW |
| 26-Mar-18 | 16 | 3 | 9.48 | 1 | WSW | 3/8-7/8, good, dry, temp 3.5 $^{O}$C | MP, CR, C., CH, | DG |
| 26-Mar-18 | 16 | 3 | 13.28 | 1 | SW | 8/8, good, dry/hail showers, temp 5 $^{O}$C | MP, CH, C. | DG |
| 26-Mar-18 | 15 | 3 | 10.00 | 1-2 | SE | 5/8, good, dry | CH, R., C. | JM |
| 26-Mar-18 | 15 | 2 | 13.30 | 1-2 | SE | 8/8, good, dry | CH, R., C. | JM |
| 5-Apr-18 | 10 | 3 | 13.45 | 0-1 | S | 4/8, good, dry | S., C., MP | DL |
| 5-Apr-18 | 10 | 3 | 17.15 | 0-1 | S | 5/8, good, dry | S., C., MP | DL |
| 5-Apr-18 | 9 | 3 | 13.15 | 2 | SW | 4/8, good/fair, dry, Snow Lying | C., S., MP, FF FLOCK 140 | DG |
| 5-Apr-18 | 9 | 2 | 16.45 | 2 | W | 6/8, good/fair, dry, thawing | S., MP, FF SMALLER GROUPS | DG |
| 5-Apr-18 | 13 | 3 | 13.50 | 2 | SW | 3/8, good, dry, Snow Lying | S., LB | JG |
| 5-Apr-18 | 13 | 3 | 17.20 | 2 | SW | 5/8, good, dry, Snow Lying | S. | JG |
| 6-Apr-18 | 12 | 3 | 6.00 | 1-2 | SW | 8/8, good, dry | MP, C., CH, R. | DL |
| 6-Apr-18 | 12 | 3 | 9.30 | 1-2 | SW | 8/8, good, dry | MP, C., CH | DL |
| 6-Apr-18 | 16 | 3 | 6.05 | 3 | SE | 8/8, good, dry, TEMP 4.5 $^{O}$C | ST, MP, CH, CR | DG |
| 6-Apr-18 | 16 | 3 | 9.35 | 3 | SE | 7-8, good/fair, haze developing | MP, LB | DG |
| 6-Apr-18 | 15 | 3 | 6.15 | 2 | SE | 7/8, good, dry | CR, MP | JG |
| 6-Apr-18 | 15 | 3 | 9.45 | 2 | SE | 8/8. good, dry | CR, MP | JG |
| 9-Apr-18 | 4 | 3 | 14.00 | 1 | S | 3/8, good, dry | CR, CT, CH, MP, WR; distant S., CU, C. and B. | ADW |
| 9-Apr-18 | 4 | 2 | 17.30 | 1 | S | 4/8, good, dry | CR, CH, M., ST, D., CU | ADW |
| 9-Apr-18 | 5 | 3 | 14.00 | 0-1 | SE | 4/8, good, dry | R., C., CH, GS, WR, D., WP, CR | JM |
| 9-Apr-18 | 5 | 2 | 17.30 | 0 | S | 4/8, good, dry | R., CR, ST, D., LR | JM |
| 9-Apr-18 | 7 | 3 | 14.05 | 1 | S-SE | 5/8, good, dry | CH, MP, PW | DG |
| 9-Apr-18 | 7 | 2 | 17.35 | 1 | S | 4/8, good, dry | CH, MP | DG |
| 10-Apr-18 | 14 | 3 | 15.10 | 4 | NE | 8/8, good, dry | - | ADW |
| 10-Apr-18 | 14 | 1 | 18.40 | 2 | NE | 8/8, poor visibility, low cloud | CH, ST, BR, WR, B. | ADW |
| 10-Apr-18 | 21 | 3 | 15.05 | 2-3 | E | 8/8, good, dry | ST, MP | JM |
| 10-Apr-18 | 21 | 1 | 18.35 | 2 | NE | 8/8, poor visibility, low cloud | ST, M., CH, SK, CR | JM |
| 10-Apr-18 | 18 | 3 | 15.30 | 4 | NE | 8/8, good, dry | S., MP | DG |
| 10-Apr-18 | 18 | 2 | 19.00 | 2 | NE | 8/8, poor visibility, low cloud | S. | DG |
| 11-Apr-18 | 8 | 3 | 6.10 | 3 | ENE | 1/8 good visibility, dry | MP, S., K. | ADW |
| 11-Apr-18 | 8 | 3 | 9.40 | 2 | ENE | 2/8 good visibility dry | MP, S. | ADW |
| 11-Apr-18 | 9 | 3 | 6.00 | 3 | NE | 1/8 good visibility, dry | MP, S. | JM |
| 11-Apr-18 | 9 | 3 | 9.30 | 3 | NE | 2/8 good visibility dry | MP, S. | JM |
| 11-Apr-18 | 10 | 3 | 6.35 | 3 | NE | 1/8 good visibility, dry | S., MP | DG |
| 11-Apr-18 | 10 | 3 | 10.05 | 4 | NE | 2/8 good visibility dry | MP, S. | DG |
| 16-Apr-18 | 1 | 3 | 10.00 | 2 | SW | 8/8, visibility poor, drizzle, improving | GF, CH, C., SD, MP, RB, GC, LB, PW, PH, SL | JM |

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|---|---|---|---|---|---|---|---|---|
| 16-Apr-18 | 1 | 3 | 13.30 | 2-3 | SW | 5/8, visibility good, dry | CH, C., SD, MP, PH, PW | JM |
| 16-Apr-18 | 10 | 3 | 10.20 | 3 | SW | 8/8, visibility poor, drizzle, improving | S., MP, C. | HR |
| 16-Apr-18 | 10 | 3 | 13.50 | 3 | SW | 5/8, visibility good, dry | S., MP | HR |
| 17-Apr-18 | 2 | 0 | 7.10 | 1 | SW | 8/8 visibility very poor, abandoned | - | JM |
| 17-Apr-18 | 3 | 0 | 7.10 | 1 | SW | 8/8 visibility very poor, abandoned | - | HR |
| 19-Apr-18 | 9 | 3 | 5.45 | 2 | S | 7/8, good, dry, hazy later | S., MP | LF |
| 19-Apr-18 | 9 | 2 | 9.15 | 2 | SW | 8/8, fair, dry | S., MP | LF |
| 19-Apr-18 | 11 | 3 | 5.55 | 2 | S | 8/8, fair, dry, drizzle later | S., LB | JG |
| 19-Apr-18 | 11 | 2 | 9.25 | 2 | SW | 8/8, fair, dry | LB, S, MP | JG |
| 19-Apr-18 | 12 | 3 | 5.45 | 1-2 | SW | 8/8, fair, dry | S., MP, C. | JM |
| 19-Apr-18 | 12 | 2 | 9.15 | 2 | S | 8/8, fair, dry | S, MP | JM |
| 19-Apr-18 | 15 | 3 | 14.40 | 2 | SW | 8/8,fair, dry, occasional low cloud | MP, roe deer | DG |
| 19-Apr-18 | 15 | 2 | 18.10 | 2 | SW | 8/8,fair, dry, occasional low cloud | MP, S | DG |
| 19-Apr-18 | 16 | 3 | 14.50 | 2 | S | 8/8,fair, dry, occasional low cloud | S. | DL |
| 19-Apr-18 | 16 | 2 | 18.20 | 0-1 | SW | 8/8,fair, dry, occasional low cloud | - | DL |
| 30-Apr-18 | 5 | 3 | 9.20 | 2-3 | NE | 6/8, good visibility, dry, very cold wind | MP, R., WW, WR, SL, WP, PW, LR | ADW |
| 30-Apr-18 | 5 | 3 | 12.50 | 1-2 | NE | 2/8, good visibility, dry, becoming warmer | LR, M., CH | ADW |
| 30-Apr-18 | 4 | 3 | 9.26 | 2 | NE | 6/8, visibility good, dry, haze developing | WP, CR, SK, C. | DG |
| 30-Apr-18 | 4 | 3 | 12.56 | 1-2 | NE | 1/8, visibility good/fair, some haze present | CH, MP | DG |
| 30-Apr-18 | 6 | 3 | 9.00 | 2-3 | N | 7/8, visibility good, dry, cold wind | CR, SL, CH, LB | JM |
| 30-Apr-18 | 6 | 3 | 12.30 | 2-3 | N | 3/8, visibility good, dry, cold wind | CR, SL, CH | JM |
| 1-May-18 | 17 | 3 | 5.40 | 1-3 | S | 7/8, visibility variable, dry, occ low cloud | CH | JM |
| 1-May-18 | 17 | 3 | 9.10 | 3 | S | 7/8, visibility variable, dry, occ low cloud | CH, SK, R. | JM |
| 1-May-18 | 19 | 3 | 5.40 | 1 | S | 7/8, visibility variable, dry, occ low cloud | CH, ST, BR, WR, B. | ADW |
| 1-May-18 | 19 | 3 | 9.10 | 3 | S | 7/8, visibility variable, dry, occ low cloud | WR, M., C., R. | ADW |
| 1-May-18 | 18 | 3 | 6.20 | 1 | SW | 7/8, visibility variable, dry, occ low cloud | CT, ST, B., R., LR, BT | DG |
| 1-May-18 | 18 | 3 | 9.50 | 1-2 | SW | 7/8, fair, dry, slightly misty | CH, WW, C., M. | DG |
| 3-May-18 | 10 | 3 | 9.47 | 2-3 | SW | 8/8, fair, a little light rain and low cloud | S., MP, C., WP, fox | DG |
| 3-May-18 | 10 | 3 | 13.17 | 2-3 | SW | 8/8, fair, a little light rain and low cloud | S., MP, C. | DG |
| 3-May-18 | 11 | 3 | 10.00 | 2-3 | SW | 8/8, visibility fair to poor, light rain, misty | MP, WP, S. | LF |
| 3-May-18 | 11 | 3 | 13.30 | 3-4 | SW/W | 8/8, visibility fair poor, light rain, misty | MP, WP, S. | LF |
| 3-May-18 | 8 | 3 | 9.00 | 0-1 | SSW | 8/8, visibility good, light showers | S., MP, C., WP, PW | DL |
| 3-May-18 | 8 | 3 | 12.30 | 1-2 | SSW | 8/8, visibility good/fair, light rain, low cloud | S., MP, C. | DL |
| 3-May-18 | 9 | 3 | 10.00 | 2-3 | SW | 8/8, visibility fair to poor, light rain, misty | S., C., CU calling, RN calling, WP | JG |
| 3-May-18 | 9 | 3 | 13.30 | 3-4 | SW/W | 8/8, visibility fair/poor, light rain, misty | S., C., MP | JG |
| 4-May-18 | 12 | 3 | 7.00 | 2 | S | 8/8, visibility poor/fair, dry, low cloud early | S., WP, MP, B., SL, WW, BT, GT, WR | LF |
| 4-May-18 | 12 | 2 | 10.30 | 1 | SW | 8/8, good/poor, dry, occ low cloud | S., WW, WR, ST, M. | LF |
| 4-May-18 | 13 | 3 | 7.30 | 0-1 | SW | 8/8, good/poor, dry, occ low cloud | S., C. | JG |
| 4-May-18 | 13 | 3 | 11.00 | 1 | SW | 8/8, good/poor, dry, occ low cloud | S, MP | JG |
| 4-May-18 | 15 | 3 | 7.00 | 1 | SW | 8/8, good/poor, dry, occ low cloud | MP, SC | DL |
| 4-May-18 | 15 | 2 | 10.30 | 0-1 | SW | 8/8, visibility poor, dry, low cloud over site | - | DL |
| 7-May-18 | 14 | 3 | 10.30 | 1-2 | S | 5/8, visibility good, dry. | R, CT, MP, CH, WW, WR, MT, CR, SI, WP, SL, C | ADW |
| 7-May-18 | 14 | 3 | 14.00 | 2 | S | 5/8, visibility good, dry. | CR, MP, WR, SI, WP, BF | ADW |
| 7-May-18 | 8 | 3 | 9.45 | 1-3 | SE | 6/8, visibility good, dry | S., MP, C. WP, CH | JM |

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|---|---|---|---|---|---|---|---|---|
| 7-May-18 | 8 | 3 | 13.15 | 2-3 | SE | 5/8. visibility good, dry | S. MP, C. | JM |
| 7-May-18 | 9 | 3 | 9.45 | 1-2 | SW | 4/8, visibility good/fair, dry, some haze | S., MP, C. | DG |
| 7-May-18 | 9 | 3 | 13.15 | 2-3 | SW | 5/8, visibility good/fair, dry, some haze | S., MP, C., CH | DG |
| 7-May-18 | 20 | 3 | 10.20 | 2 | S | 5/8, visibility good, dry. | MA, MP | HR |
| 7-May-18 | 20 | 3 | 13.50 | 2 | S | 5/8, visibility good, dry. | BT, CR, MA | HR |
| 7-May-18 | 11 | 3 | 10.00 | 2-3 | S/SW | 3/8, visibility good, dry | S., MP, SN chipping, SL, WP | LF |
| 7-May-18 | 11 | 3 | 13.30 | 4 | SW | 3/8, visibility good, dry | S., MP, SL | LF |
| 8-May-18 | 6 | 2 | 6.33 | 1-2 | SW | 8/8, visibility fair/poor/low cloud then fog | C., CH, M., LR, R., WP, CT, WW, CK, ST, RN , MP | DG |
| 8-May-18 | 1 | 2 | 6.05 | 1-2 | SW | 8/8, visibility fair/poor/low cloud then fog | MP | JM |
| 8-May-18 | 19 | 2 | 6.05 | 1-2 | SW | 8/8, visibility fair/poor/low cloud then fog | M., CT, WW, ST | HR |
| 8-May-18 | 18 | 3 | 6.20 | 1-2 | SW | 8/8, visibility fair/poor/low cloud then fog | GC, R., D., WW | ADW |
| 8-May-18 | 17 | 2 | 6.10 | 1-2 | SW | 8/8, visibility fair/poor/low cloud then fog | MP | LF |
| 14-May-18 | 3 | 3 | 13.00 | 1-2 | SSW | 1/8, visibility good, dry, warm | CH, SL, WP, MP, PH, R., CC, CR, C., SM, SI, HM | ADW |
| 14-May-18 | 3 | 3 | 16.30 | 2 | SSW | 1/8, visibility good, dry, warm | CC, CR, SL, HM, CH, LR | ADW |
| 14-May-18 | 8 | 3 | 13.20 | 1 | SSW | 1/8, visibility good, dry, warm | MP, S. | DG |
| 14-May-18 | 8 | 3 | 16.50 | 2 | SSW | 1/8, visibility good, dry, warm | MP, S. | DG |
| 14-May-18 | 2 | 3 | 13.00 | 1 | SSW | 1/8, visibility good, dry, warm | WW, CH, SK, WR, BT | DI |
| 14-May-18 | 2 | 3 | 16.30 | 1-2 | SSW | 1/8, visibility good, dry, warm | CH, SL, WP, MP | DI |
| 15-May-18 | 21 | 3 | 6.30 | 2-3 | WSW | 6/8, visibility good, dry | CH, CR, CK, | DI |
| 15-May-18 | 21 | 3 | 10.00 | 3 | WSW | 6/8, visibility good, dry | CH, WW | DI |
| 15-May-18 | 17 | 3 | 6.20 | 2-4 | WSW | 7/8, visibility good, dry, some haze developing | MP, CK, C., J. | DG |
| 15-May-18 | 17 | 3 | 9.50 | 4 | WSW | 6/8, visibility good, dry | J., CK, ST | DG |
| 15-May-18 | 18 | 3 | 6.45 | 2 | SSW | 6/8, visibility good, dry | M., B., CK, LR, D., CR, GT, SL | ADW |
| 15-May-18 | 18 | 3 | 10.15 | 1-2 | SSW | 7/8, visibility good, dry, warm | ST, CH, WW, M., WR, B., TP, D., MP, CK, LR, GS, SI, CR, SL | ADW |
| 15-May-18 | 14 | 3 | 6.10 | 2 | SW | 6/8, visibility good, dry | WW, ST, SK, B., R. | JM |
| 15-May-18 | 14 | 3 | 9.40 | 1-2 | SW | 7/8, visibility good, dry | M., CH, CT, WR, R., SK, ST, WW, B. | JM |
| 16-May-18 | 5 | 3 | 13.10 | 1-2 | NE | 3/8, visibility good, dry | LR, CH, WW, WR, R., WP, SL | JM |
| 16-May-18 | 5 | 3 | 16.40 | | | 2/8, visibility good, dry | CH, WR, R., WP, SL, SI, GC | JM |
| 16-May-18 | 6 | 3 | 13.50 | 1-2 | N | 2/8, visibility good, dry | CH, R. WW, SI, CK, CR, LR | ADW |
| 16-May-18 | 6 | 3 | 17.20 | | | 2/8, visibility good, dry | R., CH, WW, SL | ADW |
| 16-May-18 | 4 | 3 | 13.15 | 2 | NE | 2/8, visibility good/fair, dry, warm, slight haze | MP, C., CH, ST, CR | DG |
| 16-May-18 | 4 | 3 | 16.45 | | | 2/8, visibility good, dry | S., MP, CR | DG |
| 16-May-18 | 7 | 3 | 13.30 | | | 2/8, visibility good, dry | CK, MP, S. | DI |
| 16-May-18 | 7 | 3 | 17.00 | 3 | NE | 1/8, visibility good, dry, cold wind at start | MP, CH, CK | DI |
| 17-May-18 | 20 | 3 | 5.40 | 0-1 | NE | 7/8, vis good, dry | ST, M, CH, SL, TD, WW, PW, J, WR, H, B, LR, C, | LP |
| 17-May-18 | 20 | 2 | 9.10 | 1 | NE | 7/8, vis good, dry | CH, WR, R., WP, SL, SI, GC | LP |
| 17-May-18 | 2 | 3 | 5.10 | 0-1 | ENE | 6/8, visibility good, dry | MP, ST, LR, CH, SL, HM, S. | JM |
| 17-May-18 | 2 | 2 | 8.40 | 1 | NE | 7/8, vis good, dry | CH, ST, R., WR, GS, GT, LR | JM |
| 17-May-18 | 3 | 3 | 5.10 | 1-2 | NE | 5/8, visibility good, dry | S., SL, HM, R., WR, ST, M., GC, WW, MP, B., GT, BT, CH, BF, C., JD | LF |
| 17-May-18 | 3 | 2 | 8.40 | 0 | ENE | 6/8, visibility good, dry | S., SI, HM, WW, MP, C. | LF |
| 17-May-18 | 1 | 3 | 5.35 | 1 | NE | 6/8, visibility good, dry | S, SI, SL, C., WW | DL |
| 17-May-18 | 1 | 2 | 9.05 | 1 | NE | 5/8 visibility good, dry | WW, S, CK, WR, RO, SM, CH, RB, WP | DL |
| 18-May-18 | 19 | 3 | 11.30 | 1 | S | 2/8, good visibility, dry | R., CH, GC, GO, B., WW, LR, WP, SL, CK | LF |
| 18-May-18 | 19 | 3 | 15.00 | 1 | S | 2/8, good visibility, dry | WW, LR, CK, GO, CH | LF |

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| 18-May-18 | 18 | 3 | 11.35 | 1 | S | 2/8, good visibility, dry | CK, CH, M., D., C., WP | LP |
| 18-May-18 | 18 | 3 | 15.05 | 1 | S | 1/8, visibility excellent, dry | CK, CH, R, C, WP, M, D, | LP |
| 18-May-18 | 16 | 3 | 11.45 | 1 | S | 2/8, good visibility, dry | MP | DL |
| 18-May-18 | 16 | 3 | 15.15 | 1 | S | 2/8, good visibility, dry | MP, S., SC | DL |
| 18-May-18 | 20 | 3 | 11.55 | 1 | S | 2/8, good visibility, dry | GD, MA | JM |
| 18-May-18 | 20 | 3 | 15.25 | 1 | S | 2/8, good visibility, dry | MP | JM |
| 20-May-18 | 20 | 3 | 6.10 | 2 | SW | 1/8 good visibility, dry | MA, MP | JM |
| 20-May-18 | 20 | 3 | 9.40 | 3 | SW | 2/8 good visibility dry | MA | JM |
| 20-May-18 | 21 | 3 | 6.05 | 2 | SW | 1/8 good visibility, dry | CH, SK, CT, GC, R, GT, CR | ADW |
| 20-May-18 | 21 | 3 | 9.35 | 3 | SW | 2/8 good visibility dry | ST, CR, CT, GC, GS, GT, D, M. | ADW |
| 20-May-18 | 17 | 3 | 6.20 | 2 | SW | 1/8 good visibility, dry | LB, S, MP | DG |
| 20-May-18 | 17 | 3 | 9.50 | 3 | SW | 2/8 good visibility dry | S., MP | DG |
| 20-May-18 | 14 | 3 | 6.20 | 2 | SW | 1/8 good visibility, dry | CR, R, BT, MG, J. | HR |
| 20-May-18 | 14 | 3 | 9.50 | 3 | SW | 2/8 good visibility dry | WW, CH, CR, MG | HR |
| 21-May-18 | 18 | 3 | 9.45 | 1-2 | S | 7/8, good visibility, dry | WW, D., GS, WP, CH, M., R., WR | JM |
| 21-May-18 | 18 | 3 | 13.15 | 1-2 | S | 8/8, good visibility, dry | WW, D., WP, CH, M., R., WR | JM |
| 21-May-18 | 19 | 3 | 9.10 | 1 | S | 7/8, good visibility, dry | D., ST, CR, GC | HR |
| 21-May-18 | 19 | 3 | 12.40 | 2 | S | 8/8, good visibility, dry | ST, M., J, WP, SK, LR | HR |
| 21-May-18 | 14 | 3 | 9.55 | 1 | SSW | 6/8, good visibility, dry | M., WW, CH, R., GC, CK, WP, CR, SK, BF, LR, S. | ADW |
| 21-May-18 | 14 | 3 | 13.25 | 1 | SSW | 8/8, visibility good, dry | S., CH, GC WW, CK, M., CT, SK, LR | ADW |
| 21-May-18 | 17 | 3 | 10.30 | 2 | S | 8/8, visibility good, dry | CK, MP, S. | DG |
| 21-May-18 | 17 | 2 | 14.00 | 3 | SW | 8/8, good visibility, dry | CK, MP, J. and brown hare | DG |
| 22-May-18 | 3 | 3 | 6.05 | 3-4 | NE | 7/8, visibility good, dry | MP, LR, CH, J, WP, SL, SM | JM |
| 22-May-18 | 3 | 3 | 9.35 | 3-4 | NE | 7/8, visibility good, dry | MP, S., CH, J. | JM |
| 22-May-18 | 2 | 3 | 5.55 | 3 | NE | 7/8, visibility good, dry | MP, S. | HR |
| 22-May-18 | 2 | 3 | 8.25 | 3 | NE | 7/8, visibility good, dry | J, MP, WP, M | HR |
| 22-May-18 | 13 | 3 | 6.10 | 4 | NE | 7/8, visibility good, dry | MP, S. | DG |
| 22-May-18 | 13 | 3 | 9.40 | 3 | NE | 7/8, visibility good, dry | MP, S. | DG |
| 22-May-18 | 19 | 3 | 5.50 | 3 | NE | 7/8, visibility good, dry | R., CH, ST, M., WW, SL, CR, GC | ADW |
| 22-May-18 | 19 | 3 | 9.20 | 3-4 | NE | 7/8, visibility good, dry | CH, R, SK, WW, ST, GC, WR, WP, SL, CR, LR, LT | ADW |
| 29-May-18 | 4 | 3 | 10.15 | 4 | NE | 5/8,visibility good, dry | MP, PW, CK | JM |
| 29-May-18 | 4 | 3 | 13.45 | 4 | NE | 4/8, visibility good, dry | MP, S. | JM |
| 29-May-18 | 17 | 3 | 10.40 | 4 | NE | 4/8, visibility good, dry | MP, CH, WW, CK | DG |
| 29-May-18 | 17 | 2 | 14.10 | 4 | NE | 5/8,visibility good, dry | CH, WW, CK | DG |
| 29-May-18 | 5 | 3 | 10.00 | 2-3 | NE | 4/8, visibility good, dry | CK, S, MP, WW, CH, SK, CR, B, ST, WR, C, SL | LF |
| 29-May-18 | 5 | 3 | 13.30 | 3 | NE | 4/8, visibility good, dry | WW, CH, SK, ST, WR, C. | LF |
| 29-May-18 | 1 | 3 | 9.50 | 3 | NE | 5/8,visibility good, dry | WW, S., CK, SL, MP, LI | ADW |
| 29-May-18 | 1 | 3 | 13.20 | 3 | NE | 4/8, visibility good, dry | WP, RO, SD, C, MP, SL, LI, R, WW, S, CK | ADW |
| 30-May-18 | 11 | 3 | 14.45 | 4-5 | NE | 5/8, visibility good, dry | S, MP, WP, C | JM |
| 30-May-18 | 11 | 3 | 18.15 | 4 | NE | 5/8, visibility good, dry | MP, S. | JM |
| 30-May-18 | 13 | 3 | 14.50 | 4 | NE | 5/8, visibility good, dry | S, MP, LB, CK, M | DG |
| 30-May-18 | 13 | 2 | 18.20 | 4 | NE | 5/8, visibility good, dry | CK, M., MP, S. | DG |
| 30-May-18 | 9 | 3 | 15.05 | 4 | NE | 5/8, visibility good, dry | MP, S. | LF |
| 30-May-18 | 9 | 3 | 18.35 | 4 | NE | 3/8, visibility good, dry | S, MP, SL | LF |

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| 31-May-18 | 15 | 3 | 7.10 | 1 | SE | 8/8 visibility good, dry | CR, CH, CK, SL | LF |
| 31-May-18 | 15 | 3 | 10.40 | 1 | SE | 8/8 visibility good, dry | CH, SL | LF |
| 31-May-18 | 12 | 3 | 7.00 | 1 | SE | 8/8 visibility good, dry | MP, S. | DL |
| 31-May-18 | 12 | 3 | 10.30 | 1 | SE | 8/8 visibility good, dry | CK, MP, S | DL |
| 31-May-18 | 11 | 3 | 7.25 | 1 | SE | 8/8 visibility good, dry | M., MP, S., RG | JM |
| 31-May-18 | 11 | 3 | 10.55 | 1 | SE | 8/8 visibility good, dry | RG, S., MP | JM |
| 4-Jun-18 | 8 | 3 | 13.30 | 2-3 | NE | 7/8, visibility fair, dry | S, MP, WP, C, LB | JM |
| 4-Jun-18 | 18 | 3 | 14.00 | 2-3 | NE | 7/8, visibility fair, dry | LR, ST, WW, MP, S, C | ADW |
| 4-Jun-18 | 13 | 3 | 13.57 | 2-3 | NE | 7/8, visibility fair, dry | S, MP, RG, LB, CK, C, | DG |
| 4-Jun-18 | 9 | 3 | 13.45 | 2-3 | NE | 7/8, visibility fair, dry | SL, MP, CK | DI |
| 5-Jun-18 | 2 | 3 | 12.15 | 1-2 | NE | 2/8, visibility excellent, dry | MP, CH, R, M, GF, ST, CR, WP, LR | JM |
| 5-Jun-18 | 2 | 3 | 15.45 | 2 | NE | 2/8, visibility excellent, dry | MP, LR, M., CH | JM |
| 5-Jun-18 | 3 | 3 | 12.15 | 2 | NE | 2/8, visibility excellent, dry | HM, CH, WR | DI |
| 5-Jun-18 | 3 | 3 | 15.45 | 1-2 | NE | 2/8, visibility excellent, dry | M, ST, HM, SI, WP, CH | DI |
| 5-Jun-18 | 20 | 3 | 11.40 | 1 | NE | 2/8, visibility excellent, dry | WW, CT, R., CT, MP, D. | ADW |
| 5-Jun-18 | 20 | 2 | 15.10 | 1-2 | NE | 2/8, visibility excellent, dry | WW, GW, CH, WR, D, GC, CT, R, MP | ADW |
| 6-Jun-18 | 5 | 3 | 6.20 | 2 | ENE | 1/8 visibility very good, dry | CH, WW, R., BT, J. | JM |
| 6-Jun-18 | 5 | 3 | 9.50 | 2 | NE | 1/8 good visibility, dry, warm | JD, WW, CH, GC | JM |
| 6-Jun-18 | 6 | 3 | 6.00 | 1 | NE | 1/8 visibility very good, dry | WW, CC, CH, GC | DI |
| 6-Jun-18 | 6 | 3 | 9.30 | 2 | NE | 1/8 good visibility, dry, warm | WW, ST, M., CH | DI |
| 6-Jun-18 | 11 | 3 | 6.10 | 2 | ENE | 1/8 visibility very good, dry | MP, S. | DG |
| 6-Jun-18 | 11 | 3 | 9.40 | 2 | ENE | 1/8 good visibility, dry, warm | MP, S. | DG |
| 12-Jun-18 | 5 | 3 | 13.20 | 1 | S | 8/8, visibility good, dry | M, GS, CH, WW, CK, MP, D, R, WR, LR | JM |
| 12-Jun-18 | 7 | 3 | 13.15 | 1 | WSW | 8/8, visibility good, dry | MP,LR, S, CK, B, WW, CH, H, C | ADW |
| 12-Jun-18 | 6 | 3 | 13.00 | 1 | WSW | 8/8, visibility good, dry | CK, ST,BZ | LF |
| 12-Jun-18 | 9 | 3 | 14.30 | 1 | WSW | 8/8, visibility good, dry | C, CH, WC, PH, HM, SG, SI, ST, LB, SL, CK, WP, | DG |
| 13-Jun-18 | 17 | 3 | 8.30 | 2-3 | SW | 8/8 visibility, moderate, dry | MP, LR, WW | ADW |
| 13-Jun-18 | 17 | 3 | 12.00 | 3 | SW | 8/8 visibility, moderate, dry | WW, S. MP | ADW |
| 13-Jun-18 | 1 | 3 | 8.05 | 2-3 | SW | 8/8 visibility, moderate, dry | S, SG, WP | LF |
| 13-Jun-18 | 1 | 3 | 11.35 | 3 | SW | 8/8 visibility, moderate, dry | S., MP | LF |
| 13-Jun-18 | 6 | 3 | 8.20 | 3 | SW | 8/8 visibility, moderate, dry | CH,R | DG |
| 13-Jun-18 | 6 | 3 | 11.50 | 3 | SW | 8/8 visibility, moderate, dry | CH, R., C. | DG |
| 13-Jun-18 | 21 | 3 | 8.25 | 3 | SW | 8/8 visibility, moderate, dry | CH, WW, B. | JM |
| 13-Jun-18 | 21 | 3 | 11.55 | 3 | SW | 8/8 visibility, moderate, dry | LR, CH, BC, WW, D, B, CK | JM |
| 18-Jun-18 | 11 | 3 | 11.00 | 4 | W | 8/8 visibility, moderate, dry | S, MP, C | ADW |
| 18-Jun-18 | 11 | 3 | 14.30 | 4 | W | 8/8 visibility, moderate, dry | S., MP | ADW |
| 18-Jun-18 | 8 | 3 | 10.30 | 4 | W | 8/8, visibility good, dry | S, MP | LF |
| 18-Jun-18 | 8 | 3 | 14.00 | 4 | W | 8/8 visibility, moderate, dry | S. MP | LF |
| 18-Jun-18 | 1 | 3 | 12.00 | 4 | W | 8/8, visibility good, dry | SL, CH, SG, C, WP, SI, PH, GB, MP, H, B | DG |
| 18-Jun-18 | 1 | 3 | 15.30 | 4 | W | 8/8 visibility, moderate, dry | PH, MP, S., B., WP, SG | DG |
| 18-Jun-18 | 9 | 3 | 11.15 | 4 | W | 8/8 visibility, moderate, dry | S, MP | JM |
| 18-Jun-18 | 9 | 3 | 14.45 | 4 | W | 8/8, visibility good, dry | S, MP | JM |
| 19-Jun-18 | 16 | 3 | 7.00 | 3 | SW | 8/8 visibility excellent, dry | S, MP, CH, CR, GC | LF |
| 19-Jun-18 | 16 | 3 | 10.30 | 3 | W | 8/8 visibility excellent, dry | MP, S., CH | LF |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 19-Jun-18 | 15 | 3 | 6.45 | 3 | SW | 8/8, visibility, excellent, dry | CK, MP, C, CH | DG |
| 19-Jun-18 | 15 | 3 | 10.15 | 3 | SW | 8/8 visibility excellent, dry | CJ, M., ST | DG |
| 19-Jun-18 | 12 | 3 | 6.50 | 3 | SW | 8/8 visibility excellent, dry | MP, SC, S, B, M., ST, CH, WP | JM |
| 19-Jun-18 | 12 | 3 | 10.20 | 3 | SW | 8/8, visibility, excellent, dry | SC, MP, WP, C, CH, PH, B, ST, S | JM |
| 25-Jun-18 | 8 | 3 | 13.00 | 1 | SW | 2/8, visibility excellent, dry | SG, S, MP, WP, C, SL | DG |
| 25-Jun-18 | 10 | 3 | 13.23 | 1 | SW | 2/8, visibility excellent, dry | MP, CH, C, PH, WP, WW, ST, B, | HR |
| 25-Jun-18 | 15 | 3 | 13.15 | 1 | SW | 2/8, visibility excellent, dry | CR, GC, WW, M, S, MP, SI, SL | LF |
| 25-Jun-18 | 16 | 3 | 13.30 | 1 | SW | 2/8, visibility excellent, dry | MP, CH | ADW |
| 26-Jun-18 | 15 | 3 | 16.05 | 1 | SW | 2/8, visibility, good, dry | CH, WW, WP,MP, C | HR |
| 26-Jun-18 | 15 | 3 | 19.35 | 1 | SW | 1/8 visibility very good, dry | WW, WP, R., LT | HR |
| 26-Jun-18 | 13 | 3 | 16.00 | 1 | SW | 2/8, visibility, good, dry | C, WP, SL, RO, PH, CH, HM | ADW |
| 26-Jun-18 | 13 | 3 | 19.30 | 1 | SW | 1/8 visibility very good, dry | WP, CH | ADW |
| 26-Jun-18 | 10 | 3 | 16.40 | 1 | SW | 2/8, visibility, good, dry | S, MP, CH, B, ST, C, WP, LB | LF |
| 26-Jun-18 | 10 | 3 | 20.10 | 1 | SW | 1/8 visibility very good, dry | S., MP, M., ST, B. | LF |
| 26-Jun-18 | 16 | 3 | 16.15 | 1 | SW | 1/8 visibility very good, dry | MP | DG |
| 26-Jun-18 | 16 | 3 | 19.45 | 1 | SW | 2/8, visibility, good, dry | MP, CH | DG |
| 27-Jun-18 | 6 | 3 | 11.15 | 1-2 | SW | 1/8 visibility, excellent, dry | CH, R, WW, SK | JM |
| 27-Jun-18 | 6 | 3 | 14.45 | 1 | SW | 1/8 visibility, excellent, dry | WW, R. | JM |
| 27-Jun-18 | 7 | 3 | 11.15 | 2 | SW | 1/8 visibility, excellent, dry | CH, WW, R, WR, ST | LF |
| 27-Jun-18 | 7 | 3 | 14.45 | 2 | SW | 1/8 visibility, excellent, dry | WW, R., CH | LF |
| 27-Jun-18 | 4 | 3 | 11.35 | 1 | SW | 1/8 visibility, excellent, dry | MP, WW, SK, CH, SL, S, CT | ADW |
| 27-Jun-18 | 4 | 3 | 15.05 | 1 | SW | 1/8 visibility, excellent, dry | S., MP, WW | ADW |
| 27-Jun-18 | 5 | 3 | 11.30 | 1 | SW | 1/8 visibility, excellent, dry | MP, WP, M., R., WW | DG |
| 27-Jun-18 | 5 | 3 | 15.00 | 1 | SW | 1/8 visibility, excellent, dry | WP, C, CH, MP, H, M, WR, R, SL. WW, ST | DG |
| 29-Jun-18 | 23 | 3 | 8.00 | 1 | S | 0/8 visibility, excellent, dry | WW, CH, SK, WP, SL, MP, M | DL |
| 29-Jun-18 | 23 | 3 | 11.30 | 1 | S | 1/8 visibility, excellent, dry | SK, CH, WW, MP M. | DL |
| 29-Jun-18 | 20 | 3 | 7.55 | 1 | S | 1/8 visibility, excellent, dry | C. , MA, MP | HR |
| 29-Jun-18 | 20 | 3 | 11.25 | 1 | S | 1/8 visibility, excellent, dry | MP, WW | HR |
| 29-Jun-18 | 21 | 3 | 8.10 | 1 | S | 1/8 visibility, excellent, dry | WW, M., ST, B. | DI |
| 29-Jun-18 | 21 | 3 | 11.40 | 1 | S | 1/8 visibility, excellent, dry | CH, WW, ST | DI |
| 29-Jun-18 | 22 | 3 | 8.00 | 1 | S | 0/8 visibility, excellent, dry | D., SK, WR, M., CH, WW | LP |
| 29-Jun-18 | 22 | 3 | 11.30 | 1 | S | 0/8 visibility, excellent, dry | WW, D, LR, SK, ST, WR, CH | LP |
| 3-Jul-18 | 21 | 3 | 9.45 | 1 | SW | 0/8 visibility, excellent, dry | CH, GC, ST, WW, SK, WR, R, B, S, MP, LR, CR, | LF |
| 3-Jul-18 | 21 | 3 | 13.15 | 1 | SW | 0/8 visibility, excellent, dry | WW, CH, SK, WR, S., MP, LR, CR | LF |
| 3-Jul-18 | 17 | 3 | 10.00 | 1 | SW | 0/8 visibility, excellent, dry | CH, MP, | DG |
| 3-Jul-18 | 17 | 3 | 13.30 | 1 | SW | 0/8 visibility, excellent, dry | CH, MP | DG |
| 3-Jul-18 | 15 | 3 | 10.05 | 1 | S | 0/8 visibility, excellent, dry | MP, LB, SC | HR |
| 3-Jul-18 | 15 | 3 | 13.35 | 1 | S | 0/8 visibility, excellent, dry | MP, LB | HR |
| 3-Jul-18 | 18 | 3 | 10.00 | 1 | SW | 0/8 visibility, excellent, dry | HG, LB, WW, CH, SK, CT | JM |
| 3-Jul-18 | 18 | 3 | 13.30 | 1 | SW | 0/8 visibility, excellent, dry | LR, WR, WW, GS, BC, CH, WP | JM |
| 4-Jul-18 | 6 | 3 | 6.00 | 1 | SSE | 0/8 visibility, excellent, dry | GT, CH, GC, R, WR, ST, LR, CC, CR, SK, BF, WP, | LF |
| 4-Jul-18 | 6 | 3 | 9.30 | 1 | SE | 0/8 visibility, excellent, dry | CH, GC, ST, WW, SK, WR, R, B, S, MP, LR, CR, | LF |
| 4-Jul-18 | 4 | 3 | 6.15 | 1 | SE | 0/8 visibility, excellent, dry | MP, CH, WR, PW, LR, M, WP, C, WW, GT, GS | DG |
| 4-Jul-18 | 4 | 3 | 9.45 | 1 | SE | 0/8 visibility, excellent, dry | GS, CH, WR, PW, M., WP | DG |

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|---|---|---|---|---|---|---|---|---|
| 4-Jul-18 | 14 | 2 | 7.20 | 1 | SE | 0/8 visibility, excellent, dry | CC, CR, SL, HM, CH, LR | HR |
| 4-Jul-18 | 7 | 3 | 6.00 | 1 | SE | 0/8 visibility, excellent, dry | LR, D., WW, CC, SL | JM |
| 4-Jul-18 | 7 | 3 | 9.30 | 1 | SE | 0/8 visibility, excellent, dry | MP, ST, WW, CH, SK, WP, LR | JM |
| 16-Jul-18 | 5a | 3 | 5.00 | 1 | SW | 7/8 visibility good, dry | WR, LR, CH, SL, WP, M, SK | JM |
| 16-Jul-18 | 5a | 3 | 8.30 | 0 | SW | 7/8 visibility good, dry | LR, CH, SK, WP, M., ST | JM |
| 16-Jul-18 | 4 | 3 | 5.10 | 0 | SW | 7/8 visibility good, dry | MP, S. | HR |
| 16-Jul-18 | 4 | 3 | 8.40 | 0 | SW | 7/8 visibility good, dry | MP, S. | HR |
| 16-Jul-18 | 9 | 3 | 5.10 | 0 | SW | 7/8 visibility good, dry | MP, S. | ADW |
| 16-Jul-18 | 3 | 3 | 10.15 | 0 | SW | 7/8 visibility good, dry | MP.,S., WW, CH | ADW |
| 16-Jul-18 | 10 | 3 | 5.20 | 0 | SW | 8/8 visibility moderate, dry | S, MP, LB | AM |
| 16-Jul-18 | 10 | 1 | 8.50 | 0 | SW | 8/8 visibility moderate, dry | S, MP, LB, HG | AM |
| 17-Jul-18 | 2 | 3 | 6.30 | 0 | SW | 8/8 visibility moderate, dry | SL, CH, LR, WP, MP, WH, CR, GT, SM, SK, B, CC | JM |
| 17-Jul-18 | 2 | 3 | 10.00 | 0 | SW | 8/8 visibility moderate, dry | CH, LR, CR, GT, SK, ST | JM |
| 17-Jul-18 | 3 | 3 | 6.30 | 0 | SW | 8/8 visibility moderate, dry | LR, PH, MP, J, WP, SL, CC, CT, C, WR, BC, NH | HR |
| 17-Jul-18 | 3 | 3 | 10.00 | 0 | SW | 8/8 visibility moderate, dry | J., WP, CT, GC, WR, BC | HR |
| 17-Jul-18 | 6a | 3 | 7.30 | 0 | SW | 8/8 visibility moderate, dry | MP, CH, WP, M. | DG |
| 17-Jul-18 | 6a | 1 | 11.00 | 0 | SW | 8/8 visibility moderate, dry | MP, CH, M, WP, LR, C, MP, WP | DG |
| 24-Jul-18 | 6a | 3 | 13.00 | 2 | S | 7/8 visibility good, dry | WP, MP, SL | JM |
| 24-Jul-18 | 6a | 1 | 16.30 | 2 | S | 7/8 visibility good, dry | MP, SL | JM |
| 24-Jul-18 | 19 | 2 | 12.20 | 2 | S | 7/8 visibility good, dry | CH, SK, GC | HR |
| 24-Jul-18 | 20 | 2 | 15.50 | 2 | S | 7/8 visibility good, dry | SK, WW, CH | HR |
| 24-Jul-18 | 7 | 3 | 13.00 | 2 | S | 7/8 visibility good, dry | MP, SL | LF |
| 24-Jul-18 | 7 | 3 | 16.30 | 2 | S | 7/8 visibility good, dry | MP, CR, WP, CH, SL | LF |
| 25-Jul-18 | 1 | 3 | 7.10 | 2 | SW | 6/8 visibility good, dry | RO, WP, SL, LR | JM |
| 25-Jul-18 | 1 | 3 | 10.40 | 3 | SW | 3/8 visibility good, dry | LB, S, MP | JM |
| 25-Jul-18 | 12 | 3 | 7.00 | 3 | SW | 6/8 visibility good, dry | WP, MP, S. | HR |
| 25-Jul-18 | 12 | 3 | 10.30 | 3 | SW | 3/8 visibility good, dry | MP, S. | HR |
| 25-Jul-18 | 13 | 3 | 7.35 | 3 | SW | 6/8 visibility good, dry | S., MP, WP | DG |
| 25-Jul-18 | 13 | 3 | 11.05 | 3 | S | 3/8 visibility good, dry | SL, S, MP | DG |
| 25-Jul-18 | 8 | 3 | 7.15 | 2-3 | S | 3/8 visibility good, dry | MP, S., SL, WP | LF |
| 25-Jul-18 | 8 | 3 | 10.45 | 3 | S | 3/8 visibility good, dry | S., MP | LF |
| 31-Jul-18 | 17 | 3 | 10.14 | 4 | SW | 8/8, visibility fair, dry | SL, H., C. | DG |
| 31-Jul-18 | 17 | 3 | 13.44 | 4 | SW | 8/8 visibility fair -poor, intermittent light rain | - | DG |
| 31-Jul-18 | 18 | 3 | 10.30 | 3 | SE | 8/8, visibility good, dry | CH, LR, SK, WP, MP | LF |
| 31-Jul-18 | 18 | 3 | 14.00 | 3 | SE | 8/8, visibility good-fair, some light rain | WP, MP | LF |
| 31-Jul-18 | 22 | 3 | 10.00 | 2-3 | W | 8/8, visibility good, dry | C. | JM |
| 31-Jul-18 | 22 | 3 | 13.30 | 3-4 | W | 8/8, visibility good-fair, intermittent rain | C. | JM |
| | **Total** | **1930** | | | | | | |

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Year 2

| Date | VP number | No. of hours | Start time | Wind speed | Wind direction | Weather | Secondary species | Surveyor |
|---|---|---|---|---|---|---|---|---|
| 1-Aug-18 | 1 | 3 | 6.15 | 2 | SE | 6/8, visibility good, dry | M., CH, MP, GO, RO, SL, C. | LF |
| 1-Aug-18 | 1 | 3 | 9.45 | 2 | S | 7/8, visibility good, dry | M., CH, MP, RO, SL, C. | LF |
| 1-Aug-18 | 8 | 3 | 6.30 | 2 | S | 8/8, visibility good - fair, dry | MP, WR, S., WP, SL, C. (BZ off Site) | JM |
| 1-Aug-18 | 8 | 3 | 10.00 | 3 | S | 8/8, visibility good, dry | MP, WR, S., WP, SL, C. | JM |
| 1-Aug-18 | 22 | 3 | 7.32 | 2 | SW | 7/8, visibility fair, dry | SL, WP, MP, WW, M., LR | DG |
| 1-Aug-18 | 22 | 3 | 11.02 | 1 | SW | 8/8, visibility fair, dry | SL, WP, MP, WW, M., LR | DG |
| 9-Aug-18 | 12 | 3 | 13.00 | 1-2 | S | 5/8, visibility good, dry | SL, WP. SI, C., MP, CH, M. (RN heard not seen) | LF |
| 9-Aug-18 | 12 | 3 | 16.30 | 2 | S | 5/8, visibility good, dry | WP, CH, MP, WR | LF |
| 9-Aug-18 | 15 | 3 | 13.15 | 2-3 | S | 6/8, visibility good, dry | BZ, RN, K. | JM |
| 9-Aug-18 | 15 | 2 | 16.45 | 2 | S | 5/8, visibility good, dry | RN | JM |
| 9-Aug-18 | 16 | 3 | 13.00 | 2-3 | SSW | 7/8, good - fair, occasional light rain | SL, J. | DG |
| 9-Aug-18 | 8 | 3 | 13.45 | 2-3 | S | 7/8, good - fair, occasional light rain | CH, C, M., ST, BZ, K | DL |
| 9-Aug-18 | 8 | 1 | 17.15 | 2 | SW | 5/8, visibility good, dry | CH, M., ST, LR, B. | DL |
| 10-Aug-18 | 14 | 3 | 6.45 | 1 | SSE | 7/8, fair, showers | SH, B, CR, SK, CH, WP, LR | LF |
| 10-Aug-18 | 14 | 3 | 10.15 | 1 | SSE | 8/8, visibility fair - poor, showers | B., CR, CH | LF |
| 10-Aug-18 | 18 | 3 | 6.45 | 1 | SSE | 7/8, good, fair, heavy showers | CH, WR, M., | DL |
| 10-Aug-18 | 18 | 3 | 10.15 | 1 | SSE | 8/8, visibility fair - poor, showers | WR, R, WP, RN, HG | DL |
| 10-Aug-18 | 23 | 3 | 7.15 | 1 | SSE | 7/8, good, fair, heavy showers | WW, WR, R, WP, C, CH, BZ, SH | JM |
| 10-Aug-18 | 22 | 3 | 10.45 | 1 | SE | 8/8, visibility fair - poor, showers | MP, SL, C., LR (GI and SH famIly on way to VP) | DG |
| 23-Aug-18 | 7 | 2 | 13.45 | 1 | SW | 8/8, good, heavy showers | SL, CH | HR |
| 23-Aug-18 | 16 | 2 | 11.00 | 1 | SW | 8/8, visibility poor, light rain | MP, S. | DG |
| 23-Aug-18 | 18 | 3 | 13.30 | 3 | SW | 8/8 visibility fair -poor, intermittent light rain | MP, SL, K | DG |
| 23-Aug-18 | 12 | 3 | 9.35 | 3 | SW | 8/8 visibility good, heavy showers | SL, WP, C, | AM |
| 23-Aug-18 | 12 | 3 | 13.05 | 2 | SW | 8/8 visibility good, heavy showers | WP, CH, SL | AM |
| 23-Aug-18 | 5a | 3 | 13.36 | 3 | SW | 8/8 visibility good, then heavy showers | CH, WP, WR | JG |
| 24-Aug-18 | 1 | 3 | 7.05 | 3 | SW | 8/8 visibility good, heavy showers | SL, SG, RN, GF, BZ, MP, K, | KM |
| 24-Aug-18 | 1 | 3 | 10.35 | 2 | SW | 8/8 visibility good, heavy showers | SG, JD, MP, S., SL, HM, SI | KM |
| 24-Aug-18 | 22 | 3 | 10.09 | 2 | WNW | 7/8 visibility good, showers | WP, CH, SL, HM, MP, B, WR, C, SK, GT, WW, BZ | DG |
| 24-Aug-18 | 8 | 5 | 9.40 | 2 | WNW | 7/8 visibility good, showers | C, PW, WP, LI, MP, RN, BZ, K, | JG |
| 24-Aug-18 | 13a | 3 | 7.25 | 2 | SW | 8/8 visibility good, heavy showers | MP, S., CR, CH, C. | AM |
| 24-Aug-18 | 13a | 3 | 10.55 | 2 | SW | 8/8 visibility good, heavy showers | MP, S. CH | AM |
| 27-Aug-18 | 19 | 1 | 14.00 | 2 | S | 8/8 visibility fair/poor showers then clear | CH, SL, WP, BT | DG |
| 27-Aug-18 | 6a | 3 | 12.30 | 2 | SW | 8/8 visibility fair/poor showers then clear | MP, K, RN, BZ | KM |
| 27-Aug-18 | 6a | 3 | 16.00 | 2 | SW | 8/8 visibility fair/poor showers then clear | MP, BZ, SH | KM |
| 27-Aug-18 | 5a | 3 | 12.30 | 2 | W | 8/8 visibility fair/poor showers then clear | CH, WP, C, RN | JM |
| 27-Aug-18 | 5a | 3 | 16.00 | 2 | SW | 8/8 visibility fair/poor showers then clear | CH, WR, WP, C. | JM |
| 27-Aug-18 | 4 | 3 | 12.45 | 2 | SW | 8/8 visibility fair/poor showers then clear | MP, WP, D, CR, BZ, RN | JG |
| 27-Aug-18 | 4 | 3 | 16.15 | 2 | SW | 8/8 visibility fair/poor showers then clear | MP, D., CR, CH, WP, RN | JG |
| 28-Aug-18 | 22 | 3 | 11.00 | 2 | WSW | 8/8 visibility good, dry | WR, K | JM |

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|---|---|---|---|---|---|---|---|---|
| 28-Aug-18 | 14 | 2 | 10.30 | 2 | WSW | 8/8 visibility good, dry | BZ, RN, MP | KM |
| 28-Aug-18 | 14 | 3 | 13.00 | 2 | WSW | 8/8 visibility good, dry | SL, MP, WR, CT, R, WP, BF | KM |
| 28-Aug-18 | 17 | 3 | 11.00 | 2 | WSW | 8/8 visibility good, dry | BZ, K, RN, SL | DG |
| 10-Sep-18 | 19 | 3 | 6.55 | 3 | SW | 8/8 visibility good, dry | BZ, C., MP | HR |
| 10-Sep-18 | 19 | 3 | 10.25 | 2 | SW | 8/8 visibility good, dry | BZ | HR |
| 10-Sep-18 | 2 | 3 | 6.45 | 3 | SW | 8/8 fair, dry | MP, S., CH, WR, B. | KM |
| 10-Sep-18 | 2 | 3 | 10.15 | 2 | SW | 8/8 visibility good, dry | B., MP, CR, WR | KM |
| 10-Sep-18 | 3 | 3 | 6.45 | 3 | SW | 8/8 visibility good, dry | MP, S. | DI |
| 10-Sep-18 | 3 | 3 | 10.15 | 2 | SW | 8/8 visibility good, dry | ST, M., MP | DI |
| 10-Sep-18 | 8 | 3 | 7.15 | 2 | SW | 8/8 visibility good, dry | RN, BZ | AM |
| 10-Sep-18 | 8 | 3 | 10.45 | 2 | SW | 8/8 visibility good, dry | MP, S., C. | AM |
| 10-Sep-18 | 13a | 3 | 7.20 | 3 | SW | 8/8 visibility good, dry | MP, S. | JM |
| 10-Sep-18 | 13a | 3 | 10.50 | 2 | SW | 8/8 visibility good, dry | C., MP, S. | JM |
| 3-Oct-18 | 18 | 2 | 8.15 | 2 | W | 8/8 visibility good, dry, then low cloud | SK, BF, GC, CT, LR, R, CH, BZ | LF |
| 3-Oct-18 | 17 | 1 | 8.35 | 2 | W | 8/8 visibility good, dry, then low cloud | MP, RN | ADW |
| 3-Oct-18 | 22 | 3 | 8.30 | 2 | W | 8/8 fair, dry, then low cloud | RN | JM |
| 15-Oct-18 | 2 | 3 | 7.50 | 0 | E | 1/8 visibility excellent dry | CH, R, WP, CR, MP | JM |
| 15-Oct-18 | 2 | 3 | 11.20 | 1 | E | 1/8 visibility excellent dry | R., CH, WR, WP, B. | JM |
| 15-Oct-18 | 3 | 3 | 7.34 | 0-1 | E | 1/8 visibility excellent dry | CR, PH, S, C, M, CH, WP, MA, MP, GO, B | ADW |
| 15-Oct-18 | 3 | 3 | 11.04 | 1 | E | 1/8 visibility excellent dry | MP, CH | ADW |
| 15-Oct-18 | 23 | 2 | 9.07 | 0-1 | NE | 1/8, visibility fair, dry | MP | DG |
| 17-Oct-18 | 15 | 3 | 10.00 | 0 | E | 4/8 visibility excellent dry | S, MP, CR, GC, LR, SK, WP, CH, CT, C, RN, K | LF |
| 17-Oct-18 | 15 | 2 | 13.30 | 1 | E | 3/8 visibility excellent dry | CR, MP, GC, CH, WR, CT, C., RN | LF |
| 18-Oct-18 | 13a | 3 | 9.25 | 1 | SW | 3/8 visibility excellent dry | C, J, CR, FF, RE, MP, S, BF, BZ, RN | LF |
| 18-Oct-18 | 13a | 2 | 13.05 | 1 | SW | 3/8 visibility excellent dry | CR, MP, BF | LF |
| 18-Oct-18 | 12 | 3 | 9.15 | 0-1 | SW | 5/8 visibility excellent dry | S, C, SH, WP, MP | JM |
| 18-Oct-18 | 12 | 2 | 12.45 | 1 | SW | 3/8 visibility excellent dry | WP | JM |
| 18-Oct-18 | 16 | 3 | 10.05 | 0-1 | SW | 5/8, visibility fair, dry | RG, MP, WP, M., RN, RE | DG |
| 18-Oct-18 | 16 | 3 | 13.35 | 1 | SW | 3/8 visibility excellent dry | RG, M., MP | DG |
| 5-Nov-18 | 23 | 3 | 8.40 | 1 | SE | 8/8 visibility fair dry | C, CH, RE, RG, RN | ADW |
| 5-Nov-18 | 23 | 2 | 12.10 | 1 | SE | 8/8 visibility fair dry | RG, RE, C., M., BZ | ADW |
| 5-Nov-18 | 18 | 3 | 8.30 | 1-2 | SE | 8/8 visibility fair dry | D., WR | JM |
| 5-Nov-18 | 18 | 2 | 12.00 | 1 | SSE | 8/8 visibility fair dry | WP, B. | JM |
| 6-Nov-18 | 17 | 3 | 8.15 | 3 | SSE | 8/8 visibility fair dry | C. | ADW |
| 6-Nov-18 | 17 | 2 | 11.45 | 2 | SE | 8/8 visibility fair dry | C. | ADW |
| 6-Nov-18 | 22 | 3 | 8.25 | 2 | SE | 8/8 visibility fair dry | RN | JM |
| 6-Nov-18 | 22 | 1 | 12.05 | 2 | SE | 8/8 visibility fair dry | RN | JM |
| 19-Nov-18 | 16 | 3 | 10.00 | 3-4 | E | 8/8 visibility good, dry | MP, BZ, SH | ADW |
| 19-Nov-18 | 16 | 3 | 13.30 | 3 | E | 8/8 visibility good, dry | MP | ADW |
| 19-Nov-18 | 15 | 3 | 10.05 | 1 | NE | 8/8 visibility poor dry | WP, BZ, RN, C, MP, | DG |
| 19-Nov-18 | 15 | 2 | 13.35 | 1 | E | 8/8 visibility good, dry | WP, RN, MP, BZ | DG |
| 19-Nov-18 | 14 | 3 | 9.30 | 2-3 | NE | 8/8 visibility good, dry | RN, C, FF | JM |
| 19-Nov-18 | 14 | 2 | 13.00 | 2 | NE | 8/8 visibility good, dry | C. | JM |
| 19-Nov-18 | 12 | 3 | 9.30 | 2-3 | NE | 8/8 visibility good, dry | MP, RN, BZ, C | LF |

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| 19-Nov-18 | 12 | 2 | 13.00 | 3 | E | 8/8 visibility good, dry | MP, C., M. | LF |
| 20-Nov-18 | 19 | 3 | 8.50 | 2-3 | NE | 8/8 visibility good, dry | D. | ADW |
| 20-Nov-18 | 19 | 3 | 12.20 | 3 | E | 8/8 visibility good, dry | CH, D. | ADW |
| 20-Nov-18 | 2 | 3 | 8.40 | 2 | NE | 8/8 visibility good, dry | RN, CH, MP, B, RE, ST, PH | DG |
| 20-Nov-18 | 2 | 2 | 12.10 | 2 | E | 8/8 visibility good, dry | ST, M., MP | DG |
| 20-Nov-18 | 3 | 3 | 8.40 | 2 | NE | 8/8 visibility good, dry | RN, C | JM |
| 20-Nov-18 | 3 | 2 | 12.10 | 2 | NE | 8/8 visibility good, dry | RN | JM |
| 20-Nov-18 | 8 | 3 | 8.30 | 4-5 | NE | 6/8 visibility good dry | RN, BZ | LF |
| 20-Nov-18 | 8 | 2 | 12.00 | | | 8/8 visibility good, dry | BZ | LF |
| 26-Nov-18 | 16 | 3 | 9.50 | 2-3 | NE | 8/8 visibility good, dry | BZ, RN | ADW |
| 26-Nov-18 | 16 | 2 | 13.30 | 2 | NE | 8/8 visibility good, dry | BZ | ADW |
| 26-Nov-18 | 8 | 3 | 9.55 | 2-3 | NE | 4/8 visibility fair dry | FF, BZ, C | JM |
| 26-Nov-18 | 8 | 2 | 13.25 | 2 | NE | 4/8 visibility fair dry | FF, C. | JM |
| 26-Nov-18 | 15 | 3 | 9.45 | 1-2 | NE | 5/8 visibility excellent dry | MP, K, RG, CR, SK, GC, RN | LF |
| 26-Nov-18 | 15 | 2 | 13.15 | 2 | NE | 4/8 visibility fair dry | RG, M., MP | LF |
| 27-Nov-18 | 17 | 3 | 10.30 | 4-5 | ESE | 8/8 visibility good, dry | RN, K, | ADW |
| 27-Nov-18 | 17 | 3 | 14.00 | 4 | ESE | 8/8 visibility good, dry | RN | ADW |
| 27-Nov-18 | 23 | 3 | 9.10 | 3-4 | E | 8/8 visibility good, dry | RN, K, RG | JM |
| 27-Nov-18 | 23 | 3 | 12.40 | 3-4 | ESE | 8/8 visibility good, dry | RG, M., K. | JM |
| 27-Nov-18 | 22 | 3 | 9.45 | 3-4 | SE | 8/8 visibility good, dry | RN, BZ | LF |
| 27-Nov-18 | 22 | 2 | 13.15 | 3 | ESE | 8/8 visibility good, dry | RN | LF |
| 3-Dec-18 | 6a | 3 | 9.40 | 0-1 | NW | 2/8 visibility good dry | RN, CH, K, | ADW |
| 3-Dec-18 | 6a | 2 | 13.10 | 1 | NW | 8/8 visibility good, dry | CH | ADW |
| 3-Dec-18 | 1 | 3 | 9.15 | 1-2 | NW | 2/8 visibility good dry | BZ,RN, SG, FF, GO, K, C, | JM |
| 3-Dec-18 | 1 | 3 | 12.45 | 1 | NW | 8/8 visibility good, dry | FF, BZ, C, SG, M., K., RO, CR | JM |
| 3-Dec-18 | 7 | 3 | 9.45 | 2-3 | NW | 2/8 visibility good dry | MP, K, RN, BZ | LF |
| 3-Dec-18 | 7 | 3 | 13.15 | 2 | NW | 2/8 visibility good dry | RN, MP | LF |
| 3-Dec-18 | 5a | 3 | 9.45 | 2-3 | NW-NNW | 4/8-2/8 visibility good dry | K. RN, BZ, CR, SG, MP, WR, GS, CH | AM |
| 3-Dec-18 | 5a | 2 | 13.15 | 2 | NW | 2/8 visibility good dry | MP, WR, GS, CH, BZ, RN | AM |
| 4-Dec-18 | 22 | 3 | 10.15 | 2 | SW | 8/8, very poor, then good, dry | MP | AM |
| 4-Dec-18 | 22 | 2 | 13.45 | 2 | SW | 8/8, very poor, then good, dry | MP | AM |
| 4-Dec-18 | 18 | 3 | 10.00 | 0-1 | SW | 8/8, very poor, then good, dry | GO, RN | JM |
| 4-Dec-18 | 18 | 2 | 13.30 | 1 | SW | 8/8, very poor, then good, dry | RN | JM |
| 4-Dec-18 | 4 | 3 | 10.25 | 1 | SW | 8/8, very poor, then good, dry | CH | LF |
| 4-Dec-18 | 4 | 2 | 13.55 | 1 | SW | 8/8, very poor, then good, dry | M. | LF |
| 4-Dec-18 | 8 | 3 | 10.05 | 1 | SW | 8/8, very poor, then good, dry | C. | ADW |
| 4-Dec-18 | 8 | 3 | 13.35 | 1 | SW | 8/8, very poor, then good, dry | - | ADW |
| 13-Dec-18 | 12 | 3 | 8.45 | 4-5 | NE | 7/8 visibility good dry | RN, BZ | JM |
| 13-Dec-18 | 12 | 2 | 12.15 | 4 | NE | 7/8 visibility good dry | BZ | JM |
| 13-Dec-18 | 16 | 3 | 10.00 | 5-6 | NE | 6/8 visibility good dry | RG, RN, CH | DL |
| 13-Dec-18 | 16 | 1 | 13.30 | 5-6 | NE | 7/8 visibility good dry | - | DL |
| 13-Dec-18 | 15 | 3 | 8.55 | 5-6 | NR | 6/8 visibility good dry | S, RN, CT | JG |
| 13-Dec-18 | 15 | 2 | 12.25 | 5-6 | NE | 7/8 visibility good dry | MP | JG |
| 13-Dec-18 | 13a | 3 | 8.30 | 5-6 | NE | 6/8 visibility good dry | RN, K, CR | LF |

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|---|---|---|---|---|---|---|---|---|
| 13-Dec-18 | 13a | 2 | 12.00 | 5 | NE | 7/8 visibility good dry | CR, CH, RN | LF |
| 14-Dec-18 | 17 | 3 | 9.30 | 0-1 | NE | 2/8 visibility excellent dry | RN, CH | DL |
| 14-Dec-18 | 17 | 2 | 13.00 | 1 | NE | 2/8 visibility excellent dry | CH, WP | DL |
| 14-Dec-18 | 22 | 3 | 10.45 | 1 | NE | 2/8 visibility excellent dry | - | JG |
| 14-Dec-18 | 22 | 1 | 14.15 | 0 | NE | 2/8 visibility excellent dry | - | JG |
| 14-Dec-18 | 14 | 3 | 10.30 | 0-1 | E | 2/8 visibility excellent dry | WR, R, WP, RN, HG | JM |
| 14-Dec-18 | 14 | 2 | 14.00 | 1 | NE | 2/8 visibility excellent dry | WP, WR, HG | JM |
| 14-Dec-18 | 23 | 3 | 10.45 | 1-2 | NE | 2/8 visibility excellent dry | - | LF |
| 14-Dec-18 | 23 | 1 | 14.15 | 1-2 | NE | 2/8 visibility excellent dry | RN, MP | LF |
| 8-Jan-19 | 19 | 3 | 8.45 | 1-2 | NW | 5/8 visibility excellent dry | GT, RN, GO, CR | JM |
| 8-Jan-19 | 19 | 2 | 12.15 | 1-2 | NW | 5/8 visibility excellent dry | CR, GO, ST | JM |
| 8-Jan-19 | 14 | 3 | 9.10 | 1-2 | NW | 4/8 visibility excellent dry | RN, BZ | LF |
| 8-Jan-19 | 14 | 2 | 12.40 | 1 | NW | 5/8 visibility excellent dry | - | LF |
| 8-Jan-19 | 23 | 3 | 9.50 | 1-2 | NW | 4/8 visibility excellent dry | RG, RN, | ADW |
| 8-Jan-19 | 23 | 2 | 13.30 | 2 | NW | 5/8 visibility excellent dry | MP | ADW |
| 9-Jan-19 | 5a | 3 | 10.10 | 1-2 | N | 2/8 visibility excellent dry | MP, CR, BF, RN, BZ | LF |
| 9-Jan-19 | 5a | 2 | 13.40 | 1 | N | 2/8 visibility excellent dry | MP, M., RN, BZ | LF |
| 9-Jan-19 | 7 | 3 | 10.15 | 1-2 | N | 2/8 visibility excellent dry | CR, RN | ADW |
| 9-Jan-19 | 7 | 2 | 13.45 | 2 | N | 2/8 visibility excellent dry | - | ADW |
| 9-Jan-19 | 4 | 3 | 10.10 | 1-2 | N | 2/8 visibility excellent dry | RN, RB | JM |
| 9-Jan-19 | 4 | 2 | 13.40 | 2 | N | 2/8 visibility excellent dry | WP | JM |
| 11-Jan-19 | 2 | 3 | 11.20 | 2 | NE | 3/8 visibility fair, some rain showers | JD | AM |
| 11-Jan-19 | 2 | 1 | 14.50 | 2 | ENE | 3/8 visibility fair, some rain showers | C., M., CH | AM |
| 11-Jan-19 | 3 | 3 | 11.20 | 2 | NE | 3/8 visibility fair, some rain showers | CH, JD | HR |
| 11-Jan-19 | 3 | 1 | 14.50 | 2 | NE | 3/8 visibility fair, some rain showers | SH, WR | HR |
| 11-Jan-19 | 18 | 3 | 11.45 | 2 | NE | 3/8 visibility fair, some rain showers | - | KM |
| 11-Jan-19 | 18 | 1 | 15.15 | 2 | ENE | 3/8 visibility fair, some rain showers | - | KM |
| 23-Jan-19 | 16 | 3 | 9.50 | 2-3 | WSW | 1/8-4/8, good, dry | RN | DG |
| 23-Jan-19 | 16 | 2 | 13.20 | 2 | WSW | 1/8-4/8, good, dry | - | DG |
| 23-Jan-19 | 12 | 3 | 9.00 | 1 | W-SW | 0/8-1/8, good, dry | MP, C., RN, BZ | LF |
| 23-Jan-19 | 12 | 2 | 12.30 | 0 | WSW | 1/8-4/8, good, dry | | LF |
| 23-Jan-19 | 13a | 3 | 8.55 | 0-1 | SW | 1/8-2/8, good, dry | GO,GY, C., MG, PH, J., WP, MP, K., Geese IN DISTANCE | ADW |
| 23-Jan-19 | 13a | 2 | 12.30 | 0 | SW | 1/8-4/8, good, dry | - | ADW |
| 23-Jan-19 | 15 | 3 | 10.00 | 0-1 | SW | 1/8,good, dry | K | JM |
| 23-Jan-19 | 15 | 2 | 13.30 | 0 | SW | 1/8-4/8, good, dry | BZ, C., MP | JM |
| 11-Feb-19 | 14 | 3 | 10.50 | 0-1 | SW | 1/8-2/8, good, dry | SK, BF, GC, CR, BZ, RN | LF |
| 11-Feb-19 | 14 | 2 | 13.20 | 1 | SW | 1/8-2/8, good, dry | GC, WR, CR, B. | LF |
| 11-Feb-19 | 22 | 3 | 9.40 | 1-2 | SW | 2/8, good, dry | GS, BZ, RN | ADW |
| 11-Feb-19 | 22 | 2 | 13.10 | 2 | SW | 2/8, good, dry | RN, BZ, M. | ADW |
| 11-Feb-19 | 17 | 3 | 9.45 | 1-2 | SW | 1/8, good, dry | BZ, K, RN | HR |
| 11-Feb-19 | 17 | 2 | 13.15 | 1 | SW | 2/8, good, dry | PW, K., BZ | HR |
| 11-Feb-19 | 23 | 3 | 11.00 | 1-2 | SW | 1/8-2/8, fair-good | BZ, SC, RN, K. | DG |
| 11-Feb-19 | 23 | 2 | 14.30 | 1 | SW | 2/8, good, dry | BZ | LF |
| 12-Feb-19 | 2 | 0 | 8.55 | 1 | S | 8/8 rained off | - | DG |

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|---|---|---|---|---|---|---|---|---|
| 12-Feb-19 | 3 | 0 | 8.55 | 2 | S | 8/8 rained off | - | ADW |
| 12-Feb-19 | 7 | 0 | 9.20 | 1 | S | 8/8 rained off | - | HR |
| 12-Feb-19 | 8 | 0 | 9.25 | 1 | S | 8/8 rained off | - | AM |
| 25-Feb-19 | 15 | 3 | 11.15 | 0-1 | S | 5/8, hazy, dry | CR,S | JM |
| 25-Feb-19 | 15 | 2 | 14.45 | 0 | S | 5/8 visibility good, mostly dry | S., MP, CH, WW, R., B., W., WR, WP, C. | JM |
| 25-Feb-19 | 8 | 3 | 10.40 | 1-2 | SE | 6/8, good, dry | S, MP, C, R, | LF |
| 25-Feb-19 | 8 | 2 | 14.10 | 1 | SE | 6/8, good, dry | S., MP | LF |
| 25-Feb-19 | 12 | 3 | 11.06 | 1 | SE | 6/8, fair, dry | C, M, PH, WP | DG |
| 25-Feb-19 | 12 | 2 | 14.36 | 1 | SE | 5/8 visibility good, mostly dry | WP, WR, LB | DG |
| 25-Feb-19 | 16 | 3 | 11.15 | 1 | SSE | 4/8, fair, dry | MP, R, ST, RN | ADW |
| 25-Feb-19 | 16 | 2 | 14.45 | 1 | SE | 5/8 visibility good, mostly dry | MP | ADW |
| 26-Feb-19 | 5a | 3 | 8.20 | 0-1 | WSW-S | 0/8, fair/good, dry, some haze | CH, ST, M., LR, CR, GS, GY, S., SK, RB | ADW |
| 26-Feb-19 | 5a | 2 | 11.50 | 1 | SW | 0/8, fair/good, dry, some haze | M., CR, LR, B., RB | ADW |
| 26-Feb-19 | 6a | 3 | 8.50 | 1 | SW | 3/8, good, dry | PW, M, RN, BZ, | DG |
| 26-Feb-19 | 6a | 2 | 12.20 | 1 | SW | 3/8, good, dry | PW, M. | DG |
| 26-Feb-19 | 4 | 3 | 9.15 | 1-2 | SW | 0/8, dry, clear | CR, GT, R, M, BF, CH, C, D, CT, SK, BZ | LF |
| 26-Feb-19 | 4 | 2 | 12.45 | 2 | SW | 0/8, dry, clear | SK, CT, M., ST, GT, D., C. | LF |
| 26-Feb-19 | 7 | 3 | 8.30 | 1-2 | SW | 0/8, good, dry | ST, CH, CR, WR, LR, GS, RB, R, BZ, RN | JM |
| 26-Feb-19 | 7 | 2 | 12.00 | 2 | SW | 0/8, good, dry | ST, CH, CR, WR, LR, GS, RB, R, BZ, RN | JM |
| 7-Mar-19 | 3 | 3 | 7.45 | 2-3 | NW | 8/8, good, dry | PH, CH | JG |
| 7-Mar-19 | 3 | 3 | 11.15 | 2 | NW | 8/8, good, dry | CH, WR, WP, C. | JG |
| 7-Mar-19 | 2 | 3 | 7.45 | 2-3 | NW | 8/8, good, dry | CH, ST, M, R, GT | DG |
| 7-Mar-19 | 2 | 3 | 11.15 | 2 | NW | 8/8, good, dry | R., CH, WR, WP, B. | DG |
| 7-Mar-19 | 1 | 3 | 8.05 | 2-3 | NW | 8/8,good, dry | MP, M, ST, R, CH, GC, CR, B, GT, CT, BZ | LF |
| 7-Mar-18 | 1 | 3 | 11.35 | 2 | NW | 8/8, good, dry | CT, BZ, R., CH, GC | LF |
| 8-Mar-19 | 5a | 3 | 9.00 | 0-1 | S | 8/8, good, dry | ST | LF |
| 8-Mar-19 | 5a | 3 | 12.30 | 1 | S | 8/8 fair, light rain | ST, WP | LF |
| 8-Mar-19 | 6a | 3 | 9.00 | 2 | SW | 8/8 fair, light rain | CH,M, C | DG |
| 8-Mar-19 | 6a | 3 | 12.30 | 1 | S | 8/8 fair, light rain | M., CH | DG |
| 8-Mar-19 | 7 | 3 | 9.10 | 2 | SW | 8/8, fair, light rain | ST, R, CH, WR | JG |
| 8-Mar-19 | 7 | 2 | 12.40 | 1 | S | 8/8 fair, light rain | ST, M, R, WR, MP, S, GC, CH, WP | JG |
| 9-Mar-19 | 13a | 3 | 9.30 | 1 | SW | 7/8 visibility good, some drizzle | R., WR, S. | JG |
| 9-Mar-19 | 13a | 3 | 13.00 | 1 | SW | 7/8 visibility good, some drizzle | S., MP | JG |
| 9-Mar-19 | 23 | 3 | 9.45 | 2 | SW | 7/8 visibility good, some drizzle | MP | DG |
| 9-Mar-19 | 23 | 3 | 13.15 | 1 | SW | 7/8 visibility good, some drizzle | MP | DG |
| 18-Mar-19 | 17 | 3 | 7.35 | 3 | SW | 8/8, fair, light rain | CH, C, MP, BZ,RN | DG |
| 18-Mar-19 | 17 | 2 | 11.05 | 2 | S | 8/8, fair, light rain | MP, BZ, SH | DG |
| 18-Mar-19 | 14 | 3 | 7.40 | 3 | SW | 8/8, fair, light rain | ST, M, R, WR, MP, S, GC, CH, WP | ADW |
| 18-Mar-19 | 14 | 2 | 11.10 | 2 | SW | 8/8, fair, light rain | WP, CH, MP, M., ST | ADW |
| 18-Mar-19 | 18 | 3 | 7.55 | 3 | SW | 8/8, fair, light rain | R, CH, D, ST, M, WR, WP, GC, CT, GT | LF |
| 18-Mar-19 | 18 | 3 | 11.25 | 2 | SW | 8/8, fair, light rain | R, CH, D, ST, M, WR, WP, GC, CT | LF |
| 19-Mar-19 | 1 | 3 | 11.45 | 2-3 | SW | 8/8, good, light rain | SG, C, MG, R, B, CH, GT, BT, WR, LT, WP | LF |
| 19-Mar-18 | 1 | 3 | 15.15 | 2 | SW | 8/8, fair, light rain | WR. R., B., CH, GT, BF | LF |
| 19-Mar-19 | 3 | 3 | 11.35 | 2-3 | SW | 8/8, good, light rain | ST, R, MP, S, WP, CH, FF, RN, C | ADW |

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| 19-Mar-19 | 3 | 3 | 15.25 | 3 | SW | 8/8, fair, light rain | MP, S. | ADW |
| 19-Mar-19 | 2 | 3 | 11.35 | 2-3 | SW | 8/8, good, light rain | MP, ST, CH, PH, R, C, | DG |
| 19-Mar-19 | 2 | 3 | 15.25 | 3 | SW | 8/8, fair, light rain | PH, CH | DG |
| 1-Apr-19 | 12 | 3 | 9.30 | 2 | SE | 8/8, good, fair | WP, MP, CH, B, ST, GT, R, C, JD | LF |
| 1-Apr-19 | 12 | 2 | 13.00 | 2 | SE | 8/8, fair, light rain | ST, M., B., JD | LF |
| 1-Apr-19 | 15 | 3 | 10.00 | 2 | SE | 8/8, good, fair | CH, RN | JM |
| 1-Apr-19 | 15 | 3 | 13.30 | 2 | SE | 8/8, fair, light rain | CH, RN, PH | JM |
| 1-Apr-19 | 16 | 3 | 9.45 | 2 | ESE | 8/8, good, fair | C, MP, RG | ADW |
| 1-Apr-19 | 16 | 3 | 13.15 | 2 | ESE | 8/8, fair, light rain | RG, LI, S., MP, C. | ADW |
| 1-Apr-19 | 13a | 3 | 9.55 | 2 | ESE | 8/8, fair, light rain | MP, S. | AM |
| 1-Apr-19 | 13a | 3 | 13.25 | 2 | SE | 8/8, fair, light rain | S., MP | AM |
| 2-Apr-19 | 7 | 3 | 7.10 | 2 | SW | 8/8, good , fair, hail showers | LR, CH, MP, CR | JM |
| 2-Apr-19 | 7 | 3 | 10.40 | 2 | SW | 8/8, fair, light rain | MP, CR, WP, WR, CH | JM |
| 2-Apr-19 | 5a | 3 | 7.00 | 2 | SW | 8/8, good, fair, hail showers | MP, ST, M, CH, B, R, CR, LR, WP, BF | LF |
| 2-Apr-19 | 5a | 3 | 10.30 | 2 | SW | 8/8, fair, light rain | LR, CH, MP, CR | LF |
| 2-Apr-19 | 6a | 3 | 7.25 | 2 | SW | 8/8, good, fair, hail showers | MP, CH, C, PW, LR, MP, WR, R, | ADW |
| 2-Apr-19 | 6a | 3 | 10.55 | 2 | SW | 8/8, fair, light rain | WR, PW, MP | ADW |
| 8-Apr-19 | 4 | 3 | 7.10 | 1-3 | ENE | 7/8, visibility good/fair, dry | CH, MP, M. | DG |
| 8-Apr-19 | 4 | 3 | 10.40 | 3-4 | ENE | 5/8, good/fair, dry | CH, MP | DG |
| 8-Apr-19 | 19 | 3 | 7.55 | 2-3 | ENE | 8/8, visibility good, dry | D., CH, GC, M., R., GT, GY, MP, BF, CT | ADW |
| 8-Apr-19 | 19 | 3 | 11.25 | 2-3 | ENE | 3/8, visibility good, dry | R., MP, GL, CH, BF, CT | ADW |
| 8-Apr-19 | 1 | 3 | 6.55 | 4-5 | NE | 5/8-4/8, good, dry | MP, C. | JM |
| 8-Apr-19 | 1 | 3 | 10.25 | 4 | NE | 3/8-2/8, good, dry | PW, MP | JM |
| 9-Apr-19 | 17 | 3 | 12.00 | 3-5 | ENE | 4/8, visibility good, dry | MP, WP | DG |
| 9-Apr-19 | 17 | 3 | 15.30 | 3 | ENE | 4/8, visibility good, dry | MP, S. | DG |
| 9-Apr-19 | 18 | 3 | 12.10 | 3 | NE | 4/8, visibility good, dry | CH, WR, B., R. | ADW |
| 9-Apr-19 | 18 | 3 | 15.40 | 4 | NE | 4/8, visibility good, dry | R., BF, GO | ADW |
| 29-Apr-19 | 2 | 3 | 9.20 | 1-2 | SE | 4/8, visibility good, dry | M., MP, LR, WP, WW, CH, B., R. | JM |
| 29-Apr-19 | 2 | 3 | 12.50 | 1-2 | SE | 4/8, visibility good, dry | R., M., MP, LR | JM |
| 29-Apr-19 | 1 | 3 | 9.00 | 1-2 | SE | 5/8, visibility good, dry | MP, S., CH, GT, D., SL, SG, C., RO, TP | LF |
| 29-Apr-19 | 1 | 3 | 12.30 | 1-2 | ESE | 4/8, visibility good, dry | MP, S., CH, GT, D., SL, SG, C., RO, TP | LF |
| 29-Apr-19 | 3 | 3 | 9.20 | 1-2 | SE | 4/8, visibility good, dry | ST, PH, M. B., MP. CH, GO, SL, LR, WP, C. | DG |
| 29-Apr-19 | 3 | 3 | 12.50 | 1-3 | SE | 4/8, visibility good, dry | ST, PH, M., B., MP, CH, WP, C. | DG |
| 30-Apr-19 | 15 | 3 | 8.30 | 0-2 | S | 7/8, visibility good/fair, dry | R., MP, CH | JM |
| 30-Apr-19 | 15 | 3 | 12.00 | 1-2 | S | 7/8, visibility good/fair, dry | R., MP, CH | JM |
| 30-Apr-19 | 16 | 3 | 8.45 | 1-3 | SE | 7/8, visibility fair, dry | MP, WP, CH, M., C., SL, emperor moths | DG |
| 30-Apr-19 | 16 | 3 | 12.15 | 2-3 | SE | 8/8, visibility good, dry | MP, WP, CH, M., C. | DG |
| 30-Apr-19 | 12 | 3 | 8.15 | 1-2 | ESE | 7/8, visibility good/fair, dry | S., MP, CH, WW, R., B., W., WR, WP, C. | LF |
| 30-Apr-19 | 12 | 3 | 11.45 | 1-2 | SE | 4/8, visibility good, dry | S., MP, CH, WW, R., B., W., WR, WP, C. | LF |
| 1-May-19 | 6a | 3 | 6.15 | 1-2 | S | 8/8, fair, showers | WW, CH, SN, ST, LR, SL, C., CK | JM |
| 1-May-19 | 6a | 3 | 9.45 | 1-2 | S | 8/8, fair, showers | WW, CH, ST, LR, SL, C., CK | JM |
| 1-May-19 | 7 | 3 | 6.15 | 0-1 | SW | 8/8, fair, showers, light rain | ST, MP, LR, C., CK, M., WW, WP | DG |
| 1-May-19 | 7 | 3 | 9.45 | 1-2 | SW | 8/8, fair, showers, light rain | ST, MP, LR, C., CK, M., WW, WP | DG |
| 1-May-19 | 19 | 3 | 6.00 | 1-2 | S | 8/8, poor/fair, then good, showers | CH, B., GT, BT, WW, CT, WR, LR, GC, D., R., BF, SK, CR, SL, J., WP, PW | LF |

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| 1-May-19 | 19 | 3 | 9.30 | 1-2 | S | 8/8, good, some light showers | CH, B., GT, BT, WW, CT, WR, LR, GC, D., R., BF, SK, CR, ST, SL, J., WP, PW | LF |
| 2-May-19 | 14 | 3 | 14.20 | 1-2 | NW | 6/8, good, dry | WW, CH, GC, WR, S., GT, SK, ST, CK | LF |
| 2-May-19 | 14 | 3 | 17.50 | 1-2 | NW | 6/8, good, dry | WW, CH, GC, WR, S., GT, SK | LF |
| 2-May-19 | 18 | 3 | 14.45 | 0-1 | W | 2-4/8, good, dry | WW, SC, ST, R., WP, WR, MP | DL |
| 2-May-19 | 18 | 3 | 18.15 | 0-1 | W | 2/8, good, dry | WW, SC, WP, CT, MP | DL |
| 3-May-19 | 6a | 3 | 15.20 | 2-3 | NNE | 6/8, good, dry | MP, WW, CH, WR, CK | LF |
| 3-May-19 | 6a | 3 | 18.50 | 2-3 | N | 8/8, good, dry | MP, WW, CH, WR, CK | LF |
| 3-May-19 | 7 | 3 | 15.15 | 1 | N | 7/8, good, dry | WP, MP, CH, TP | DL |
| 3-May-19 | 7 | 1 | 18.45 | 1-2 | N | 7/8, good, dry | M., GS | DL |
| 6-May-19 | 8 | 3 | 6.15 | 0-3 | N | 8/8, good, some light showers | WP, C., S., MP | JM |
| 6-May-19 | 8 | 3 | 9.45 | 3 | N | 8/8, good, some light showers | WP, C., S., MP | JM |
| 6-May-19 | 16 | 3 | 6.10 | 2 | ENE | 8/8, good/fair, intermittent light rain | BT, CT, MP, WP | DI |
| 6-May-19 | 16 | 3 | 9.40 | 2 | NE | 8/8, good/fair, intermittent light rain | MP, WP | DI |
| 6-May-19 | 15 | 3 | 6.00 | 0-1 | NE | 8/8, good/fair, intermittent light rain | CH, RG, C., CK, MP, roe deer | DG |
| 6-May-19 | 15 | 3 | 9.40 | 0-1 | NE | 8/8, good/fair, intermittent light rain | CH, RG, C., CK, MP | DG |
| 7-May-19 | 22 | 3 | 8.45 | 0-2 | E | 8/8, visibility good, dry | CH, GS, CH, MP, WR, D., R., RG, ST, CK, WW, SL, C. | DI |
| 7-May-19 | 22 | 3 | 12.15 | 0-2 | SE | 8/8, visibility good, dry then rain at end | CH, GS, CH, MP, WR, D., R., RG, ST, CK, WW, SL, C. | DI |
| 7-May-19 | 23 | 3 | 9.05 | 0-1 | NE | 8/8, visibility good, dry, brief Snow flurries | PW, MP, CH, WR, WP, M., CK, S., RG, mountain hare (Pot Hill) | DG |
| 7-May-19 | 23 | 3 | 12.35 | 0-1 | E | 8/8, visibility good, dry, intermittent light rain | S., MP, RG | DG |
| 7-May-19 | 17 | 3 | 9.00 | 1-2 | E | 8/8, good/fair, dry with brief hail/rain | MP, S., C. | JM |
| 7-May-19 | 17 | 3 | 12.30 | 1-2 | E | 8/8, fair, dry with intermittent rain | MP, S., C. | JM |
| 8-May-19 | 12 | 3 | 15.40 | 2 | E | 6/8, visibility good, occasional shower | MP, S. | HR |
| 8-May-19 | 12 | 3 | 19.10 | 1 | E | 6/8, visibility good, occasional shower | MP, S. | HR |
| 8-May-19 | 13a | 3 | 15.30 | 2 | E | 6/8, visibility good, occasional shower | MP, S. | KM |
| 8-May-19 | 13a | 3 | 19.00 | 1 | E | 6/8, visibility good, occasional shower | MP, S. | KM |
| 8-May-19 | 6a | 3 | 15.55 | 2 | E | 6/8, visibility good, occasional shower | WW, CH, WR, B., LR, ST | DL |
| 8-May-19 | 6a | 3 | 20.25 | 1 | E | 6/8, visibility good, occasional shower | WW, CH, WR, ST, M. | DL |
| 14-May-19 | 19 | 3 | 9.45 | 0-2 | SW | 4/8, good, dry | WW, WP, SL, LR, ST, CT, B. CH, LT, GC, M., BT, PH, PW, WR | DG |
| 14-May-19 | 19 | 3 | 13.15 | 1-2 | SW/var | 4/8, good, dry | WW, WP, SL, LR, CT, B., CH, LT, BT, PH, R., GT, orange tips | DG |
| 14-May-19 | 1 | 3 | 9.30 | 1-2 | SE | 0/8, good, dry | CH, WW, MP, GT, B., S., SL, CT, SG, ST, W.,WP, C., HM | LF |
| 14-May-19 | 1 | 3 | 13.00 | 1-2 | SE | 0/8, good, dry | CH, WW, MP, GT, B., S., SL, CT, SG, ST, W.,WP, C., WR, CK | LF |
| 14-May-19 | 2 | 3 | 9.30 | 0-1 | SW | 2/8, good, dry | BZ, WP, CH, B., LR, WW, LR, K., M., SL, 2BZ, 2BZ | JM |
| 14-May-19 | 2 | 3 | 13.00 | 0-1 | SW | 2/8, good, dry | WP, CH, B., LR, WW, M., SL | JM |
| 14-May-19 | 3 | 3 | 9.30 | 0-1 | SW | 2/8, good, dry | WP, MP, LR, BZ, K., 5BZ, SL, BZ, S., HM, 2BZ, PH, 3BZ | SH |
| 14-May-19 | 3 | 3 | 13.00 | 0-1 | SW | 2/8, good, dry | WP, MP, LR, BZ, K., 5BZ, SL, BZ, S., HM, 2BZ, PH, 3BZ | SH |
| 15-May-19 | 4 | 3 | 5.40 | 1 | W | 4/8, good, dry | WP, CH, R., ST., WW, C., WR, CK, MP, CR, SL | DG |
| 15-May-19 | 4 | 3 | 9.10 | 1-2 | W-SW | 5/8, good, dry | WW, CH, C., LR, CK, SL, WR | DG |
| 15-May-19 | 7 | 3 | 5.30 | 0-1 | SW | 1/8, good, dry | CK, M., CK, MP, S., BZ, WR, WW, B., LR, 2B, SK, C. | SH |
| 15-May-19 | 7 | 3 | 9.00 | 0-1 | SW | 1/8, good, dry | CK, M., CK, MP, S., BZ, WR, WW, B., LR, 2B, SK, C. | SH |
| 15-May-19 | 6a | 3 | 5.30 | 0-1 | S | 2/8, good, dry | CK, WR, WW, LR | JM |
| 15-May-19 | 6a | 3 | 9.00 | 0-1 | S | 2/8, good, dry | CK, LR, BZ, C., CH, M., S., 2 roe deer | JM |
| 15-May-19 | 5a | 3 | 5.30 | 1-2 | SSW | 3/8, good, dry | CK, MP, CH, GC, ST, B., GT, WW, WR, LR, CR | LF |
| 15-May-19 | 5a | 3 | 9.00 | 1-2 | SW-S | 4/8, good, dry | CK, MP, CH, GC, ST, B., GT, WW, WR, LR, CR, J., GS, SL | LF |
| 16-May-19 | 3 | 3 | 10.50 | 3 | E | 0/8, good, dry | RG, LI, S., MP, C. | LP |

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| 16-May-19 | 17 | 2 | 14.20 | 1-3 | E | 1/8, good, dry | RG, LI, S., MP, C. | LP |
| 16-May-19 | 22 | 3 | 11.00 | 0-1 | S | 0/8, good, dry | WW, CH, MP, CU | DL |
| 16-May-19 | 22 | 2 | 14.30 | 0-1 | S | 1/8, good, dry | WW, CH, MP | DL |
| 16-May-19 | 18 | 3 | 10.30 | 2-3 | ESE | 0/8, good, dry | CH, WW, WR, B., R., SK, GC, CT, ST, BF, BT, MP | LF |
| 16-May-19 | 18 | 3 | 14.00 | 2-3 | E | 1/8, good, dry | CH, WW, WR, B., R., SK, GC, CT, ST, BF, BT, GS, MP | LF |
| 17-May-19 | 7 | 3 | 10.30 | 3 | NNE | 3/8, good, dry | CH, WW, CK, CR, MP, M., WP, SK | LP |
| 17-May-19 | 7 | 3 | 14.00 | 3 | ENE | 3/8, good, dry | WW, CK, MP, M., SK, WP, J. | LP |
| 17-May-19 | 4 | 3 | 9.00 | 2-3 | ENE | 2/8, good, dry | CK, CH, WW, J., WR, GC, SK, MP, H. | LF |
| 17-May-19 | 4 | 3 | 12.30 | 1-2 | ENE | 3/8, good, dry | CK, CH, WW, J., WR, GC, SK, BF, MP | LF |
| 17-May-19 | 6a | 3 | 11.30 | 2-3 | NE | 0-4/8, good, dry | FP, MP, LB | DL |
| 3-Jun-19 | 6a | 3 | 13.00 | 2-4 | SW | 8/8, good, dry | MP, WP, WR, S. | LF |
| 3-Jun-19 | 6a | 2 | 16.30 | 3-4 | SW | 8/8, good, dry | MP, WP, WR | LF |
| 3-Jun-19 | 7 | 3 | 12.45 | 2-3 | SW | 8/8, good, showers first hour then dry | MP, LR, CH | JM |
| 3-Jun-19 | 7 | 3 | 16.15 | 2-3 | SW | 8/8, good, dry | MP, LR, CH | JM |
| 3-Jun-19 | 5a | 3 | 13.00 | 3 | SW | 8/8, good, dry | MP, CK, ST, WW, CH, LR | ADW |
| 3-Jun-19 | 5a | 3 | 16.30 | 3 | SW | 8/8, good, dry | MP, CK, ST, WW, CH, LR | ADW |
| 3-Jun-19 | 4 | 3 | 13.05 | 3 | WSW | 8/8, fair, dry | MP, C., CH, ST, WP, WW, SI | DG |
| 3-Jun-19 | 4 | 3 | 16.35 | 3 | WSW | 8/8, good, dry | SI, WW, MP, WP, ST | DG |
| 3-Jun-19 | 3 | 3 | 13.20 | 3 | SW | 8/8, good, dry | MP, JD, WW | HR |
| 3-Jun-19 | 3 | 2 | 16.50 | 3 | SW | 8/8, good, dry | WW, WR, JD, C., M. | HR |
| 4-Jun-19 | 23 | 3 | 8.55 | 0-1 | SW | 8/8, good, dry with occ light rain | MP, C., RG, CK, S., CH, | DG |
| 4-Jun-19 | 23 | 2 | 12.25 | 0-2 | SW | 8/8, fair/good, dry with occ light rain | MP, RG, CK, S., C. | DG |
| 4-Jun-19 | 18 | 3 | 8.15 | 1 | SW | 7/8, good, dry with one light shower | ST, R., WW, D., WR, CH, WP, CT, MP, BC, CR, SK, C. | ADW |
| 4-Jun-19 | 18 | 3 | 11.45 | 0-1 | SW | 8/8, good, dry | ST, R., WW, D., WR, CH, WP, CT, MP, BC, CR, SK, C. | ADW |
| 4-Jun-19 | 17 | 3 | 8.30 | 1-2 | SW | 8/8, good, dry | CH, MP, WW, CK, WR, SL, CR, SK, R., S. | LF |
| 4-Jun-19 | 17 | 3 | 12.00 | 1-2 | SW | 8/8, good, dry | CH, MP, WW, WR, SL, CR, SK, R., S. | LF |
| 4-Jun-19 | 14 | 3 | 8.30 | 1-2 | S-SE | 8/8, good, dry with occ light showers | WR, WW, CH, SL, CK, WP, M. | JM |
| 4-Jun-19 | 14 | 3 | 12.00 | 1-2 | SE | 8/8, good, dry with occ light showers | WR, WW, CH, SL, CK, WP, M. | JM |
| 4-Jun-19 | 19 | 3 | 9.05 | 2 | SE | 8/8, good, dry with occ light showers | MP, WW, WR, ST | HR |
| 4-Jun-19 | 19 | 3 | 12.35 | 2 | SE | 8/8, good, dry with occ light showers | WW, MP, WR, B., R., LR, PH | HR |
| 10-Jun-19 | 8 | 3 | 6.15 | 1-2 | SW | 4/8, good, dry | CK, S., MP, WR, PK (off Site), CU (heard calling), C., WP, S., RO, JD | LF |
| 10-Jun-19 | 8 | 3 | 9.45 | 1-2 | SW-NW | 6/8, good, dry with light rain near end | CK, S., MP, WR, CU (heard calling), C., WP, S., RO, JD | LF |
| 10-Jun-19 | 12 | 3 | 6.40 | 0-2 | SW-NW | 5/8, good, dry with brief light rain | S., JD, R., MP, CK | JM |
| 10-Jun-19 | 12 | 3 | 10.10 | 2 | NNE | 6/8, good, dry with intermittent rain | S., JD, R., MP, CK | JM |
| 10-Jun-19 | 13a | 3 | 6.35 | 0-1 | SW-NE | 5/8, good, dry with brief light rain | RO, JD, WP, C., R., B., PH, SL, Li, CH, S., W., ST | DG |
| 10-Jun-19 | 13a | 3 | 10.05 | 0-1 | NNE | 6/8, good, dry with intermittent rain | RO, JD, WP, C., B., PH, M., S, MP, CH, W. | DG |
| 11-Jun-19 | 14 | 3 | 14.45 | 2-3 | E | 8/8, fair/good, dry with occ light rain | WW, CH, J., CK, WR | JM |
| 11-Jun-19 | 14 | 3 | 18.15 | 2-3 | E | 8/8, fair, dry | WW, CH, J., CK, WR | JM |
| 11-Jun-19 | 18 | 3 | 14.15 | 2-3 | NW | 8/8, good, dry | GC, SL, WW, GL, WR, WR, CH, B., BC, ST, R., PW, LR, BF, SK | LF |
| 11-Jun-19 | 18 | 3 | 17.45 | 2-3 | NW | 8/8, good, dry | GC, SL, WW, GL, WR, WR, CH, B., BC, ST, SK, GT, CR, J., WP | LF |
| 11-Jun-19 | 17 | 3 | 14.40 | 2-3 | NE | 8/8, good, dry with occ light rain | ST, WP, MP, LR, M. | DG |
| 11-Jun-19 | 17 | 3 | 18.10 | 2-3 | NE | 8/8, good, dry with occ light rain | ST, WP, WW, CH, MP, LR, M., ST | DG |
| 14-Jun-19 | 7 | 3 | 16.05 | 3 | NE | 5/8, good, dry with brief light rain | C., CK, MP, CH, ST, BZ, BZ, GS, LR | JG |
| 14-Jun-19 | 7 | 3 | 19.35 | 2 | NE | 4/8, good, dry | C., CK, MP, CH, ST, BZ, BZ, GS, LR | JG |

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| 27-Jun-19 | 1 | 3 | 11.40 | 1-2 | NE-SE | 1/8, good, dry | S., MP, CH, WW, B., SL, C., R., MG, PW, W., SM | LF |
| 27-Jun-19 | 1 | 3 | 15.10 | 1-2 | SE | 1/8, good, dry | S., MP, CH, WW, B., SL, C., R., MG, PW, W., SM | LF |
| 27-Jun-19 | 18 | 3 | 13.50 | 1-2 | NE-SE | 2/8, good, dry | WW, CS, RN, BZ, CH | JG |
| 27-Jun-19 | 18 | 2 | 15.20 | 1-2 | NE | 1/8, good, dry | WW, CH, CS | JG |
| 28-Jun-19 | 1 | 3 | 9.30 | 2-3 | NE | 0/8, good, dry | RN, C., CH, SL, MP | JG |
| 28-Jun-19 | 1 | 3 | 13.00 | 2-3 | NE | 0/8, good, dry | RN, C., CH, SL, MP | JG |
| 28-Jun-19 | 2 | 3 | 9.50 | 2-3 | NE | 0/8, good, dry | MP, CH, WW, WR, ST, R., J., WP, CC, CR | LF |
| 28-Jun-19 | 2 | 3 | 13.20 | 2-3 | NE | 0/8, good, dry | MP, CH, WW, WR, ST, R., J., WP, CC, CR | LF |
| 28-Jun-19 | 3 | 3 | 9.50 | 2 | NE | 0/8, good, dry | MP, C., SL, WP, CH, PH, HM, LR | DG |
| 28-Jun-19 | 3 | 3 | 13.20 | 2 | SE | 0/8, good, dry | MP, C., SL, WP, CH, PH, HM | DG |
| 1-Jul-19 | 15 | 3 | 6.00 | 4-5 | WNW | 8/8, fair/good, dry | S., MP, WP, CR, GC, SL, CH, C. | LF |
| 1-Jul-19 | 15 | 3 | 9.30 | 4-5 | WNW | 8/8, good, dry | S., MP, WP, CR, GC, SL, CH, C., SK | LF |
| 1-Jul-19 | 8 | 3 | 6.30 | 2 | W | 7/8, good, dry | S., MP, BZ, C. | JM |
| 1-Jul-19 | 8 | 3 | 10.00 | 2 | W | 8/8, good, dry | S., MP, BZ, C. | JM |
| 1-Jul-19 | 16 | 3 | 6.40 | 3-4 | WNW | 8/8, fair/poor then good, light rain then dry | MP, WP, fox | DG |
| 1-Jul-19 | 16 | 3 | 10.10 | 4 | WNW | 8/8, good, dry | MP, WP, northern eggar moths | DG |
| 2-Jul-19 | 6a | 3 | 8.15 | 1-3 | NW-W | 5/8, good, dry, clouding over | MP, S., CH, WR, WP, C. | LF |
| 2-Jul-19 | 6a | 3 | 11.45 | 2-3 | W | 8/8, good, dry | MP, S., CH, WR, WP, C., GS | LF |
| 2-Jul-19 | 4 | 3 | 8.15 | 1-3 | W | 8/8, good, dry | CH, WR, BF, SK, SL | JM |
| 2-Jul-19 | 4 | 3 | 11.45 | 2-3 | W | 8/8, good, dry | CH, WR | JM |
| 2-Jul-19 | 23 | 3 | 9.50 | 2-3 | WNW | 8/8, good, dry | MP, SC, GL, WR, S., painted lady, gv white and small heath butterflies | DG |
| 2-Jul-19 | 23 | 1 | 13.20 | 2-3 | WNW | 8/8, good, dry | SC, MP, WR, S. | DG |
| 15-Jul-19 | 12 | 3 | 9.30 | 1-3 | SW | 4/8, good, dry | MP, S., C., LB, HG, SL, WW, CH, B., WP | LF |
| 15-Jul-19 | 12 | 3 | 13.00 | 1-3 | SW | 4/8, good, dry | MP, S., C., LB, HG, SL, WW, CH, B., WP | LF |
| 15-Jul-19 | 13a | 3 | 9.30 | 1-2 | SW | 5/8, good, dry | S., CR, MP, WP, WR | JM |
| 15-Jul-19 | 13a | 3 | 13.00 | 1-2 | SW | 5/8, good, dry | S., MP, WP, WR | JM |
| 15-Jul-19 | 15 | 3 | 9.55 | 0-2 | SSW/var | 5/8, good, dry, a little haze later | WP, C., MP, CH, SL, HM, ringlet, small heath, footman | DG |
| 15-Jul-19 | 15 | 3 | 13.25 | | SW-S | 5/8, good, dry, a little haze later | CH, MP, C., SL, HM | DG |
| 15-Jul-19 | 16 | 3 | 9.55 | 1-2 | SSW | 4/8, good, dry | MP, CH, CT, SK, CR | ADW |
| 15-Jul-19 | 16 | 3 | 13.25 | 2-3 | SSW | 4/8, good, dry | MP, CR, SK, HG | ADW |
| 16-Jul-19 | 5a | 3 | 14.30 | 1-3 | SW | 7/8, good/fair, dry then showery later | MP, ST, CH, CR, WR, GS, LR, J., SL, SM, SI | LF |
| 16-Jul-19 | 5a | 3 | 18.00 | 2-3 | SW | 8/8, good but poor in showers | MP, ST, CH, CR, WR, LR, SL, SM, SI | LF |
| 16-Jul-19 | 8 | 3 | 14.30 | 1-2 | W | 7/8, poor then good, dry | LR, MP, C., WP | JM |
| 16-Jul-19 | 8 | 3 | 18.00 | 1-2 | W | 7/8, good, poor in showers | LR, MP, C., WP, SL, GS, SI | JM |
| 16-Jul-19 | 22 | 3 | 17.26 | 2-3 | SW-W | 8/8, fair/good, dry with occ showers | WW, MP, WP, C., B. | DG |
| 16-Jul-19 | 4 | 3 | 14.20 | 1-2 | SW | 7/8, fair then good, dry | CH, MP, CR, SK, WR, WP, HM, SL, SM, SI, GS, M., D., BF, LR | ADW |
| 16-Jul-19 | 4 | 3 | 17.50 | 1-2 | SW | 8/8, good, dry with small showers later | MP, CR, GS, CH, M., D., BF, LR, SI, SL | ADW |
| 25-Jul-19 | 14 | 3 | 7.50 | 2-3 | S | 2/8, good, dry | CR, WR, MP, SL, WP | JG |
| 25-Jul-19 | 14 | 3 | 11.20 | 2-3 | S | 2/8, good, dry | WR, MP, SL, WP | JG |
| 25-Jul-19 | 22 | 3 | 7.45 | 2-3 | S | 0/8, good, dry | WP, SL, CR, WW, BF, ST, R., WR | LF |
| 25-Jul-19 | 22 | 3 | 11.15 | 2-3 | S | 2/8, good, dry | WP, SL, WW, R., WR | LF |
| 25-Jul-19 | 23 | 3 | 7.05 | 2-3 | SSE | 3/8, good, dry | MP, C. | DG |
| 25-Jul-19 | 23 | 2 | 10.35 | 3 | SSE | 3/8, good, dry, a little heat haze | MP, WP, W., J. (nr VP18), brown hare (Pot Hill, 3 Mullach), fox cubs | DG |
| 26-Jul-19 | 6a | 3 | 8.45 | 1-2 | SSW | 8/8, good, dry, some heat haze | MP, WR, LR, M. WP | LF |

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| 26-Jul-19 | 6a | 3 | 12.15 | 1-2 | SSW | 8/8, good, dry | MP, WP | LF |
| 26-Jul-19 | 5a | 3 | 8.50 | 1-2 | SW | 7/8, good, dry | MP, WP, SF, WR, SL, wood wasp, ladybirds | DG |
| 26-Jul-19 | 5a | 3 | 12.20 | 1-2 | SW | 7/8, good, dry, a little heat haze along valley | WW, MP, WP, SL, SI | DG |
| 26-Jul-19 | 19 | 3 | 8.00 | 1-2 | SSW | 8/8, good, dry | SL, R., WR, WW, RN (calling behind VP, not seen) | JG |
| 26-Jul-19 | 19 | 3 | 11.30 | 1-2 | SSW | 6/8, good, dry | SL, R., WR, WW | JG |
| 5-Aug-19 | 14 | 3 | 10.00 | 1-2 | S | 6/8, Poor first hour then good, drizzle then dry | WP, WR, CH, LR, B., R., MP, SK | LF |
| 5-Aug-19 | 14 | 3 | 13.30 | 1-2 | SW | 6/8, good, dry | WP, WR, CH, B., R., MP | LF |
| 5-Aug-19 | 22 | 3 | 10.00 | 1-2 | W | 8/8, poor 1st hour then good, dry with showers | LR, WP, MP, M. | JM |
| 5-Aug-19 | 22 | 1 | 13.30 | 2-3 | W | 8/8, good, dry | WP, MP, M. | JM |
| 5-Aug-19 | 23 | 3 | 10.15 | 1-2 | SW | 8/8, poor 1st hour then good, drizzle then dry | MP, C., RO (c40) | ADW |
| 5-Aug-19 | 23 | 2 | 13.45 | 2 | SW | 7/8, good, dry | MP, C., RO (c60), M. | ADW |
| 6-Aug-19 | 2 | 3 | 7.15 | 1-2 | WSW | 8/8, poor to fair in low cloud, rain occ dry | WP, SL, HM, CH, MP, J. | LF |
| 6-Aug-19 | 2 | 3 | 10.45 | 1-2 | WSW | 8/8 , fair, dry with variable rain and showers | WP, SL, HM, CH, MP, J. | LF |
| 6-Aug-19 | 3 | 3 | 7.15 | 1 | SW | 8/8, poor to fair in low cloud, rain occ dry | SL, WP | JM |
| 6-Aug-19 | 3 | 3 | 10.45 | 2 | SW | 8/8 , fair, dry with variable rain and showers | SL, WP | JM |
| 6-Aug-19 | 19 | 3 | 7.10 | 1 | S | 8/8, poor to fair in low cloud, rain occ dry | CH, D., WW, CR, J., WP, SL, B., GC | ADW |
| 6-Aug-19 | 19 | 3 | 10.40 | 1 | SSW | 8/8 , fair, dry with variable rain and showers | CH, GC, BT, SK, WW, CR, WP, SL, D. | ADW |
| 12-Aug-19 | 1 | 3 | 9.00 | 1 | W | 6/8, good, dry | SL, J., BZ, W, GL, MP, PW, WR, LI, MG, C., GO, WP, SL, HM, SG | ADW |
| 12-Aug-19 | 1 | 3 | 12.30 | 1-2 | W | 7/8, good, dry then some drizzle at end | SL, Li, BZ fam, WW, MP, PW, C., GO, WP, SL, HM, badger | ADW |
| 12-Aug-19 | 14 | 3 | 9.30 | 1-2 | NW | 5/8, good, dry | WP, MP, LR, CH, R., WR, WW, CT, GT, SL, HM | LF |
| 12-Aug-19 | 14 | 3 | 13.00 | 1-2 | NW | 6/8, good, dry | WP, MP, CH, R., WR, WW, SL, HM | LF |
| 12-Aug-19 | 18 | 3 | 9.30 | 0-1 | NW/var | 7/8, good, dry | WW, WP, SL, J. (on the way in at gate), CH, brown hare (Three Mullach) | DG |
| 12-Aug-19 | 18 | 3 | 13.00 | 0-2 | NW/var | 7/8, good, dry with occasional spots of rain | WW, WP, BF, CH, Scotch Argus butterflies on the wing | DG |
| 13-Aug-19 | 13a | 3 | 8.10 | 1-2 | S | 5/8, good, dry | MP, W. (juvs present), MP, SL, HM, C., JD | LF |
| 13-Aug-19 | 13a | 3 | 11.40 | 2-3 | W/var | 6/8, good, dry | MP, SL, HM, C., JD (EA after ADW radio) | LF |
| 13-Aug-19 | 15 | 3 | 8.55 | 1-2 | W | 5/8, good, dry with shower | MP, C., CR, WP, TP, CT, HM, WW | ADW |
| 13-Aug-19 | 15 | 1 | 12.25 | 1-2 | W | 6/8, good, dry with shower | M., HM, CT, MP, GC | ADW |
| 13-Aug-19 | 16 | 3 | 9.00 | 2 | NW | 7/8, good/fair, dry with prolonged shower | R., MP, C., CR, SL, WP, roe on way up, heather fly abundant in sun all over Scaw'd Fell | DG |
| 13-Aug-19 | 16 | 3 | 12.30 | 2 | SW-W | 7/8, good/fair, dry with prolonged shower | MP, SL, corvid flock foraging on Wintergill Head | DG |
| 15-Aug-19 | 12 | 3 | 15.10 | 2 | SW | 4/8 visibility fair to good, dry | MP, S., RO | HR |
| 15-Aug-19 | 12 | 3 | 18.40 | 2 | SW | 4/8 visibility fair to good, dry | MP, S. SC | HR |
| 15-Aug-19 | 13a | 3 | 15.00 | 2 | SW | 4/8 visibility fair to good, dry | MP, S. | AM |
| 15-Aug-19 | 13a | 3 | 18.30 | 2 | SW | 4/8 visibility fair to good, dry | MP, S. | AM |
| 19-Sep-19 | 23 | 3 | 10.34 | 1-2 | W-SW | 7/8-6/8, fair, dry | MP, M., WP | DG |
| 19-Sep-19 | 23 | 2 | 14.04 | 1-2 | SW | 6/8, fair, dry | MP, C. | DG |
| 19-Sep-19 | 22 | 3 | 10.00 | 0-1 | W | 2/8-3/8, good, dry | MP, CH, WR, WP | DL |
| 19-Sep-19 | 22 | 1 | 13.30 | 0-1 | W | 4/8, good, dry | MP, WR, GS | DL |
| 19-Sep-19 | 17 | 3 | 10.00 | 1-2 | S | 8/8-7/8, good, dry | MP, C., WP | JM |
| 19-Sep-19 | 17 | 3 | 13.30 | 1-2 | S | 7/8, good, dry | MP, C. | JM |
| 20-Sep-19 | 2 | 3 | 9.35 | 0-2 | SSE-SSW | 1/8-2/8, good, dry | WP,SL, MP, PH, CH, LR | DG |
| 20-Sep-19 | 2 | 3 | 13.05 | 2-1 | SSW | 2/8-4/8, good, dry | SL, PH, CH, C., WP | DG |
| 20-Sep-19 | 3 | 3 | 9.30 | 0-1 | S | 0/8-1/8, good, dry | WP, LR, R., CH | JM |
| 20-Sep-19 | 3 | 3 | 13.00 | 0-1 | S | 0/8-1/8, good, dry | R., CH, PH, CR | JM |
| 20-Sep-19 | 1 | 3 | 8.30 | 0-1 | S | 0/8-1/8, good, dry | CH, GO, RB, C., JD, MA, PW, RO, BZ | DL |

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| 20-Sep-19 | 1 | 3 | 12.00 | 0-1 | S | 0/8-1/8, good, dry | CH, GO, C., RO, R., LR, MP, FP, WP | DL |
| 7-Oct-19 | 8 | 3 | 7.45 | 2 | SW | 2/8 visibility good, dry | FF, RO, CH | HR |
| 7-Oct-19 | 8 | 3 | 11.15 | 3 | SW | 2/8 visibility good, dry | MP, CH, FF | HR |
| 7-Oct-19 | 4 | 3 | 8.05 | 2 | SW | 2/8 visibility good, dry | CH, CC, R. | KM |
| 7-Oct-19 | 4 | 3 | 11.35 | 3 | SW | 2/8 visibility good, dry | CH, R. | KM |
| 7-Oct-19 | 7 | 3 | 7.40 | 2 | SW | 2/8 visibility good, dry | R., M., ST, WP | JM |
| 7-Oct-19 | 7 | 3 | 11.10 | 3 | SW | 2/8 visibility good, dry | CH, M., WP | JM |
| 8-Oct-19 | 17 | 3 | 15.30 | 2 | SW | 2/8 visibility good, dry | MP, C. | JM |
| 8-Oct-19 | 15 | 3 | 15.40 | 2 | SW | 2/8 visibility good, dry | C., K. | KM |
| 8-Oct-19 | 13a | 3 | 15.15 | 2 | SW | 2/8 visibility good, dry | MP | HR |
| 17-Oct-19 | 19 | 3 | 8.10 | 4 | NE | 0/8, good, dry | M., ST, B. | KM |
| 17-Oct-19 | 19 | 3 | 11.40 | 4 | NE | 0/8, good, dry | WP, M., ST | KM |
| 17-Oct-19 | 23 | 3 | 8.25 | 4 | NE | 0/8, good, dry | MP | DI |
| 17-Oct-19 | 23 | 3 | 11.55 | 4 | NE | 0/8, good, dry | MP | DI |
| 17-Oct-19 | 2 | 3 | 10.20 | 4 | NE | 0/8, good, dry | CH, ST, WP, CR, R., WR | LF |
| 18-Oct-19 | 17 | 3 | 13.40 | 4 | ENE | 7/8 visibility fair, occ light shower | K. | KM |
| 18-Oct-19 | 17 | 1 | 17.10 | 4 | ENE | 7/8 visibility fair, occ light shower | MP | KM |
| 18-Oct-19 | 4 | 3 | 13.30 | 4 | ENE | 7/8 visibility fair, occ light shower | WP, CH, SK | DI |
| 18-Oct-19 | 4 | 1 | 17.10 | 4 | NE | 7/8 visibility fair, occ light shower | SK, M., ST, CH | DI |
| 18-Oct-19 | 5a | 3 | 13.35 | 4 | NE | 7/8 visibility fair, occ light shower | SK, GC, CH, WR | LF |
| 18 0ct 19 | 5a | 1 | 17.15 | 4 | NE | 7/8 visibility fair, occ light shower | WR, CH | LF |
| 14-Nov-19 | 19 | 3 | 11.30 | 3 | N | 1/8, good, dry | CH, WP, RE | DG |
| 14-Nov-19 | 19 | 2 | 15.00 | 4 | N | 1/8, good, dry | RE, WP | DG |
| 14-Nov-19 | 3 | 3 | 11.10 | 4 | NE | 0/8, good, dry | CR, CH | JG |
| 14-Nov-19 | 3 | 2 | 15.40 | 4 | N | 1/8, good, dry | CH, CR | JG |
| 14-Nov-19 | 4 | 3 | 11.20 | 4 | N | 1/8, good, dry | CH | HR |
| 14-Nov-19 | 4 | 2 | 15.50 | 3 | N | 1/8, good, dry | B. | HR |
| 15-Nov-19 | 19 | 3 | 8.50 | 2-3 | NE | 8/8-6/8, good, dry, then showers | CH, ST, CT, BT, R., GT, CR, WR | LF |
| 15-Nov-19 | 19 | 2 | 12.20 | 2-3 | NE | 2/8-8/8, good, showers | CH, R. SK, LR, WP, GC, J. | LF |
| 15-Nov-19 | 22 | 3 | 9.30 | 2-3 | NE | 8/8-7/8, good, light showers | WP, MP | DG |
| 15-Nov-19 | 2 | 3 | 9.00 | 2 | NE | 6/8-7/8, good, dry then showers | CR, WR, R., RN | JG |
| 15-Nov-19 | 2 | 2 | 12.30 | 2 | NE | 7/8, good, showers | R., RE, FF | JG |
| 23-Jan-20 | 7 | 3 | 13.40 | 3 | WSW | 7/8, poor, fog, light drizzle and showers | CR, LR, BF, FF | AM |
| 23-Jan-20 | 6a | 2 | 13.45 | 3 | SW | 8/8,poor-fair,misty, light showers | C., CH | DG |
| 23-Jan-20 | 5a | 2 | 13.40 | 1-3 | SSW | 8/8, poor, showers | CR, WR, MP | LF |
| 24-Jan-20 | 19 | 2 | 13.00 | 2 | SSW | 8/8, Poor, fog | SK, CR, R., WP and RN and SH | ADW |
| 24-Jan-20 | 3 | 1 | 13.15 | 2 | SW | 8/8, visibility fair-poor, dry, visibility reducing | B., CR, WP, SD, PH | DG |
| 24-Jan-20 | 2 | 1 | 13.15 | 2 | SW | 8/8, visibility fair-poor, dry, visibility reducing | C, WP | LF |
| | **Total** | **1294** | | | | | | |

## Appendix 7.5 – Vantage Point Recording Form

**Target A Species**: Raptors, wildfowl, waders, BK Target B (secondary species) BZ, K., SH, MA, CA, all gulls

Vantage point …….. Date …….. Start time …….. End time…….. Surveyor ……..……..

Site ……Scoop Hill ……

| Bird number on map | Species | first recorded at (hrs) | Height when first seen | 15 secs | 30 secs | 45 secs | 60 secs | 75 secs | 90 secs | 105 secs | 120 secs | 135 secs | Total no. of seconds recorded | No. of secs over windfarm at turbine height |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
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## Vantage Point Recording Form (Continued)

| Hour | Wind direction | Wind speed | Cloud cover /8 | Visibility | Precipitation | Other |
|---|---|---|---|---|---|---|
| Hour 1 | | | | | | |
| Hour 2 | | | | | | |
| Hour 3 | | | | | | |
| | | | | | | |
| Hour 4 | | | | | | |
| Hour 5 | | | | | | |
| Hour 6 | | | | | | |

| Record at five minute intervals | | | | | |
|---|---|---|---|---|---|
| Target C Species & number | Description | Species & number | Description | Species & number | Description |
| | | | | | |
| | | | | | |
| | | | | |

## Appendix 7.6 – Dates of various bird surveys

| Survey type | Survey type | Surveyor |
|---|---|---|
| **Black Grouse** | 3 visits during April and May 2018 & 2019 before sunrise | |
| | 20/04/2018 | DG, JM, DL, JG, LF |
| | 02/05/2018 | ADW, DG, |
| | 04/05/2018 | JG, DL, LF |
| | 07/05/2018 | DG, ADW, JM, HR |
| | 09/04/2019 | ADW, JM, DG, HR |
| | 03/05/2019 | DI, LP, HR, JM |
| | 13/05/2019 | JM, JG, DI, LF |
| **Raptor** | 3 visits across site from February to June 2018 & 2019 | |
| Golden Eagle | 23/02/2018 | ADW |
| Golden Eagle | 09/04/2018 | ADW, JM |
| Golden Eagle | 01/05/2018 | JG, AM |
| Golden Eagle | 11/03/2019 | ADW, JG |
| Golden Eagle | 16/04/2019 | ADW, JG |
| Goshawk | 18/03/2018 Territorial display | ADW |
| Goshawk | 25/03/2018 Territorial display | JG, JM |
| Goshawk | 25/03/2018 Territorial display | DG, ADW |
| Goshawk | 30/05/2018 | ADW |
| Goshawk | 14/06/2018 | ADW, HR, JM |
| General raptor | 28/04/2018 | DI, JG, LF |
| General raptor | 14/05/2018 | JG, JM, AM |
| General raptor | 28/06/2018 | DL, LP, DI |
| General raptor | 09/04/2019 | DL, LF, DI |
| General raptor | 03/05/2019 | JG, JM, DI |
| General raptor | 13/05/2019 | JG, DL |
| Goshawk | 23/03/2019 Territorial display | ADW, JG |
| Goshawk | 24/03/2019 Territorial display | ADW, JG |
| Goshawk | 01/05/2019 | CR |
| Goshawk | 03/05/2019 | CR |
| Goshawk | 04/05/2019 | CR |
| Goshawk | 19/06/2019 | CR |
| **Moorland Birds** | 4 visits during from April to June 2018 & 2019 | |
| | 16/04/2018 | ADW |
| | 18/04/2018 | LP, DL |
| | 20/04/2018 | DG, DL, JG, LF, JM |
| | 01/05/2018 | JG |
| | 31/05/2018 | LP, HR |
| | 01/06/2018 | LP, LF, DL, JG |
| | 20/04/2019 | HR, DG, JG |
| | 17/05/2019 | JG, JM, DG |
| | 05/06/2019 | DG, LF, ADW, JM |
| | 13/06/2019 | JG, JM, DG |
| **Nightjar** | Visits in June and early July 2018 & 2019 | |
| | 20/06/2018 | DG, LF, JM, HR |
| | 25/06/2018 | DG, ADW, HR, LF |
| | 13/06/2019 | ADW, DG, HR, DI |
| | 27/06/2019 | JG, LF, DG, HR |
| **Migration VPs** | | |
| West VP 1 | 05/04/2018 dawn | DL |
| West VP 10 | 05/04/2018 dawn | DG |
| Central VP 18 | 05/04/2018 dawn | JG |
| Central VP 19 | 09/04/2018 dawn | DG |
| East VP 17 | 09/04/2018 dawn | JM |
| East VP20 | 09/04/2018 dawn | ADW |
| West VP 1 | 01/05/2018 dusk | DG |
| West VP 10 | 01/05/2018 dusk | JM |
| Central VP 18 | 01/05/2018 dusk | ADW |
| Central VP 19 | 03/05/2018 dusk | DG |
| East VP 17 | 03/05/2018 dusk | JM |
| East VP20 | 03/05/2018 dusk | LF |
| West VP 1 | 29/09/2018 dawn | HR |
| West VP 10 | 29/09/2018 dawn | DI |
| Central VP 18 | 29/09/2018 dawn | AM |
| Central VP 19 | 29/09/2018 dusk | HR |
| East VP 17 | 29/09/2018 dusk | DI |
| East VP20 | 29/09/2018 dusk | AM |
| West VP 1 | 04/10/2018 dawn | ADW |
| West VP 10 | 04/10/2018 dawn | LF |
| Central VP 18 | 04/10/2018 dawn | JM |
| Central VP 19 | 04/10/2018 dusk | ADW |
| East VP 17 | 04/10/2018 dusk | LF |
| East VP20 | 04/10/2018 dusk | JM |
| **Walkover** | Occasional winter walkovers | |
| | 17/11/2017 | LP |
| | 28/11/2017 | JG |
| | 05/02/2018 | JG |
| | 06/02/2018 | JG |
| | 12/03/2018 | JG |
| | 03/12/2018 | AM |
| | 04/12/2018 | JG |
| | 12/02/2019 | AM, HR, KM |
| | 18/03/2019 | JG, HR |
| | 19/03/2019 | JG, HR |
| **Barn Owl** | Winter 2017/2018 2nd visit in summer | |
| | 09/10/2017 | ADW,DG,JM |
| | 31/10/2017 | ADW,DG,JM,LF |
| | Spring 2018 (Laverhay buildings) | ADW,DG,JM,LF |
| | 24/07/2018 VP to watch Waterhead | LF |
| | 24/07/2018 VP to watch east of Waterhead | JM |
| **Long-eared and Tawny Owl** | 12/03/2018 | ADW,LF |
| | 12/03/2018 | JM,DG |
| **Black Esk wildfowl** | Winter, dawn and dusk 2017/18 | |
| | 31 October 2017 | DG, ADW, JM, LF |
| | 17 November 2017 | ADW |
| | 15 Dec 2017 | ADW |
| | 21 February 2018 | AM |

## Appendix 7.7 – Designated Sites with Ornithological Significance within 20 km of Scoop Hill

| Site Name and Designation | Distance from Site | Reasons for Designation | Potential for Impacts |
|---|---|---|---|
| **European Designated Sites** | | | |
| Langhom-Newcastleton Hills SPA | 15.4km to the east | Supports a breeding population of European importance of Annex 1 species Hen Harrier *Circus cyaneus*. | No direct habitat connections. No potential for impacts. |
| **National Designated Sites** | | | |
| Castle Loch SSSI | 13.7km | Biological: Goosander Mergus *merganser*, Greylag Goose *Anser anser*, Pink-footed Goose *Anser brachyrhynchus*. | No direct habitat connections. No potential for impacts. |
| Tweedsmuir Hills SSSI | 15.6km to the north | Biological: Upland habitats, Upland assemblage, Vascular plants, Vascular plant assemblage, Bryophyte assemblage, Non-vascular plants, Birds, Breeding bird assemblage. | No direct habitat connections. No potential for impacts. |

## Appendix 7.8 – Flights by Target A Species

| Target Species | No. on map | Date | VP | Total time recorded (secs) | Within FRZ |
|---|---|---|---|---|---|
| **Hen Harrier** | | | | | |
| 1 female | 1 | 22-Aug-17 | 8 | 90 | 0 |
| 1 female | 2 | 22-Aug-17 | 8 | 420 | 0 |
| 1 female | 3 | 22-Aug-17 | 8 | 180 | 0 |
| 1 female | 4 | 22-Aug-17 | 15 | 32 | 0 |
| 1 female | 5 | 26-Sep-17 | 9 | 17 | 0 |
| 1 ringtail | 6 | 19-Oct-17 | 3 | 30 | 30 |
| 1 female | 7 | 26-Jan-18 | 7 | 15 | 0 |
| 1 male | 8 | 05-Feb-18 | 13 | 95 | 0 |
| | | | **Total Year 1** | **879** | **30** |
| 1 ringtail | 9 | 09-Aug-18 | 15 | 24 | 20 |
| 1 ringtail | 10 | 20-Sep-19 | 3 | 14 | 0 |
| 1 ringtail | 11 | 20-Sep-19 | 2 | 96 | 16 |
| 1 male | 12 | 07-Oct-19 | 8 | 32 | 5 |
| | | | **Total Year 2** | **166** | **41** |
| | | | | | |
| **Peregrine** | | | | | |
| 1 female | 1 | 8-Sep-17 | 2 | 108 | 54 |
| 1 female | 2 | 8-Sep-17 | 2 | 8 | 8 |
| 1 female | 3 | 8-Sep-17 | 2 | 40 | 40 |
| 1 female | 4 | 8-Sep-17 | 3 | 110 | 54 |
| 1 female | 5 | 8-Sep-17 | 3 | 8 | 8 |
| 1 female | 6 | 26-Sep-17 | 11 | 808 | 255 |
| 1 male | 7 | 17-Nov-17 | 20 | 46 | 0 |
| 1 male | 8 | 17-Nov-17 | 20 | 71 | 0 |
| 1 female | 9 | 15-Dec-17 | 2 | 15 | 0 |
| 1 | 10 | 29-Jan-18 | 18 | 216 | 171 |
| 1 female | 11 | 9-Feb-18 | 21 | 49 | 20 |
| 1 female | 12 | 21-Feb-18 | 20 | 2 | 0 |
| 2 (pair at Black Esk) | 13 | 13-Mar-18 | 20 | 33 | 0 |
| 2 (pair at Black Esk) | 14 | 13-Mar-18 | 20 | 23 | 0 |
| 2 (pair at Black Esk) | 15 | 22-Mar-18 | 20 | 54 | 0 |
| 1 male | 16 | 22-Mar-18 | 20 | 21 | 0 |
| | | | **Total Year 1** | **1612** | **610** |
| 1 female | 17 | 10-Aug-18 | 22 | 39 | 35 |
| 1 | 18 | 24-Aug-18 | 8 | 350 | 100 |
| 1 female | 19 | 27-Aug-18 | 4 | 90 | 30 |
| 1 | 20 | 17-Oct-18 | 15 | 57 | 55 |
| 1 | 21 | 17-Oct-18 | 15 | 58 | 50 |
| 1 | 22 | 25-Feb-19 | 5a | 10 | 0 |
| 1 | 23 | 26-Feb-19 | 7 | 48 | 35 |

| | | | | | |
|---|---|---|---|---|---|
| 1 female | 24 | 18-Mar-19 | 14 | 140 | 140 |
| 1 | 25 | 19-Mar-19 | 1 | 124 | 75 |
| 1 | 26 | 29-Apr-19 | 1 | 116 | 50 |
| | | | **Total Year 2** | **1032** | **570** |
| | | | | | |
| **Merlin** | | | | | |
| 1 | 1 | 28-Aug-17 | 8 | 72 | 10 |
| 1 | 2 | 8-Sep-17 | 2 | 5 | 0 |
| 1 | 3 | 25-Sep-17 | 13 | 16 | 0 |
| 1 | 4 | 20-Oct-17 | 15 | 22 | 0 |
| 1 | 5 | 2-Nov-17 | 6 | 60 | 60 |
| 1 | 6 | 16-Nov-17 | 11 | 8 | 0 |
| 1 | 7 | 16-Nov-17 | 11 | 12 | 0 |
| | | | **Total Year 1** | **195** | **70** |
| 1 | 8 | 14-Dec-18 | 22 | 45 | 0 |
| 1 | 9 | 18-Mar-19 | 17 | 135 | 60 |
| 1 | 10 | 16-May-19 | 15 | 28 | 0 |
| 1 | 11 | 8-Oct-19 | 15 | 16 | 0 |
| | | | **Total Year 2** | **224** | **60** |
| | | | | | |
| **Goshawk** | | | | | |
| 1 | 1 | 26-Sep-17 | 11 | 48 | 0 |
| 1 | 2 | 10-Oct-17 | 18 | 255 | 95 |
| 1 | 3 | 19-Oct-17 | 16 | 2100 | 0 |
| 2 | 4 | 2-Nov-17 | 6 | 660 | 15 |
| 1 | 5 | 2-Nov-17 | 6 | 45 | 45 |
| 1 | 6 | 2-Nov-17 | 6 | 1560 | 0 |
| 1 | 7 | 3-Nov-17 | 3 | 30 | 30 |
| 1 | 8 | 3-Nov-17 | 3 | 60 | 60 |
| 1 | 9 | 3-Nov-17 | 3 | 18 | 18 |
| 1 | 10 | 3-Nov-17 | 2 | 30 | 30 |
| 1 | 11 | 3-Nov-17 | 2 | 60 | 60 |
| 1 | 12 | 3-Nov-17 | 2 | 30 | 0 |
| 1 | 13 | 3-Nov-17 | 19 | 9 | 0 |
| 1 | 14 | 17-Nov-17 | 1 | 30 | 0 |
| 1 | 15 | 17-Nov-17 | 1 | 45 | 0 |
| 1 | 16 | 17-Nov-17 | 1 | 30 | 0 |
| 1 | 17 | 17-Nov-17 | 1 | 30 | 0 |
| 1 | 18 | 28-Nov-17 | 7 | 106 | 106 |
| 1 | 19 | 28-Nov-17 | 7 | 126 | 109 |
| 1 | 20 | 28-Nov-17 | 7 | 202 | 90 |
| 1 | 21 | 28-Nov-17 | 5 | 30 | 0 |
| 1 | 22 | 28-Nov-17 | 5 | 30 | 0 |
| 1 | 23 | 28-Nov-17 | 5 | 45 | 15 |
| 1 | 24 | 28-Nov-17 | 5 | 25 | 0 |
| 1 | 25 | 28-Nov-17 | 5 | 40 | 0 |

| | | | | | |
|---|---|---|---|---|---|
| 1 | 26 | 29-Nov-17 | 6 | 30 | 0 |
| 1 | 27 | 15-Dec-17 | 20 | 28 | 0 |
| 1 | 28 | 15-Dec-17 | 20 | 278 | 40 |
| 1 | 29 | 15-Dec-17 | 20 | 140 | 10 |
| 1 | 30 | 15-Dec-17 | 20 | 147 | 0 |
| 1 male | 31 | 29-Jan-18 | 18 | 200 | 180 |
| 1 male | 32 | 29-Jan-18 | 18 | 348 | 60 |
| 1 female | 33 | 29-Jan-18 | 17 | 200 | 45 |
| 1 | 34 | 29-Jan-18 | 17 | 2 | 0 |
| 1 female | 35 | 9-Feb-18 | 14 | 5 | 0 |
| 1 female | 36 | 9-Feb-18 | 14 | 210 | 0 |
| 1 | 37 | 9-Feb-18 | 18 | 145 | 75 |
| 1 | 38 | 9-Feb-18 | 18 | 72 | 60 |
| 1 | 39 | 9-Feb-18 | 18 | 298 | 260 |
| 1 | 40 | 9-Feb-18 | 18 | 185 | 75 |
| 1 female | 41 | 9-Feb-18 | 21 | 40 | 0 |
| 1 female | 42 | 9-Feb-18 | 5 | 30 | 30 |
| 1 female | 43 | 9-Feb-18 | 5 | 15 | 15 |
| 1 | 44 | 9-Feb-18 | 5 | 15 | 0 |
| 1 female | 45 | 20-Feb-18 | 6 | 5 | 0 |
| 1 | 46 | 20-Feb-18 | 7 | 16 | 0 |
| 1 | 47 | 20-Feb-18 | 4 | 316 | 256 |
| 1 | 48 | 23-Feb-18 | 11 | 237 | 0 |
| 1 | 49 | 19-Mar-18 | 21 | 18 | 10 |
| 1, female | 50 | 20-Mar-18 | 8 | 209 | 10 |
| 1 male | 51 | 20-Mar-18 | 1 | 393 | 79 |
| 1 male | 52 | 22-Mar-18 | 19 | 60 | 0 |
| 1 female | 53 | 22-Mar-18 | 19 | 10200 | 60 |
| 1 | 54 | 22-Mar-18 | 3 | 12 | 12 |
| 1 | 55 | 22-Mar-18 | 3 | 25 | 0 |
| 1 male | 56 | 23-Mar-18 | 7 | 3 | 0 |
| 1 male | 57 | 24-Mar-18 | 6 | 231 | 75 |
| 1 female | 58 | 26-Mar-18 | 12 | 35 | 0 |
| 1 male | 59 | 6-Apr-18 | 16 | 2 | 0 |
| 1 male | 60 | 9-Apr-18 | 7 | 42 | 34 |
| 1 male | 61 | 7-May-18 | 11 | 96 | 0 |
| 1 male | 62 | 7-May-18 | 11 | 51 | 51 |
| 1 female | 63 | 8-May-18 | 6 | 34 | 0 |
| 1 female | 64 | 8-May-18 | 6 | 15 | 0 |
| 1 female | 65 | 8-May-18 | 6 | 7 | 0 |
| 1 female (& male briefly) | 66 | 16-May-18 | 4 | 78 | 30 |
| 1 female | 67 | 18-May-18 | 19 | 46 | 0 |
| 1 male | 68 | 18-May-18 | 19 | 28 | 28 |
| 1 | 69 | 3-Jul-18 | 21 | 24 | 10 |

| | | | | | |
|---|---|---|---|---|---|
| 1 | 70 | 3-Jul-18 | 18 | 7 | 0 |
| 1 female | 71 | 31-Jul-18 | 17 | 25 | 0 |
| | | | **Total Year 1** | **20247** | **2178** |
| 1 male | 72 | 18-Oct-18 | 13 | 15 | 15 |
| 1 male | 73 | 18-Oct-18 | 13 | 540 | 540 |
| 1 male | 74 | 27-Nov-18 | 17 | 9 | 9 |
| 1 male | 75 | 27-Nov-18 | 17 | 160 | 30 |
| 1 | 76 | 3-Dec-18 | 5a | 10 | 0 |
| 1 female | 77 | 25-Feb-19 | 5a | 35 | 0 |
| 1 male | 78 | 25-Feb-19 | 5a | 266 | 45 |
| 1 female | 79 | 19-Mar-19 | 3 | 120 | 120 |
| 1 female | 80 | 19-Mar-19 | 2 | 45 | 10 |
| 1 | 81 | 2-Apr-19 | 5a | 24 | 0 |
| 1 female | 82 | 8-Apr-19 | 4 | 76 | 15 |
| 1 | 83 | 15-May-19 | 5a | 10 | 10 |
| 1 female | 84 | 15-May-19 | 5a | 6 | 0 |
| 1 male | 85 | 6-Aug-19 | 3 | 13 | 4 |
| | | | **Total Year 2** | **1329** | **798** |
| | | | | | |
| **Golden Eagle** | | | | | |
| 1 | 1 | 29-Aug-17 | 12 | 174 | 65 |
| 1 | 2 | 30-Oct-17 | 21 | 70 | 0 |
| 1 female | 3 | 22-Feb-18 | 13 | 6180 | 2595 |
| 1 female | 4 | 22-Feb-18 | 13 | 30 | 30 |
| 1 female | 5 | 20-Mar-18 | 8 | 68 | 5 |
| 1 | 6 | 9-Apr-18 | 4 | 318 | 318 |
| 1 | 7 | 9-Apr-18 | 4 | 140 | 140 |
| 1 | 8 | 7-May-18 | 14 | 57 | 57 |
| 1 | 9 | 7-May-18 | 14 | 110 | 55 |
| 1 | 10 | 7-May-18 | 14 | 76 | 0 |
| 1 | 11 | 7-May-18 | 11 | 39 | 29 |
| 1 | 12 | 15-May-18 | 14 | 5 | 5 |
| 1 | 13 | 21-May-18 | 14 | 65 | 30 |
| 1 | 14 | 19-Jun-18 | 12 | 386 | 340 |
| 1 | 15 | 19-Jun-18 | 15 | 16 | 4 |
| 1 | 16 | 19-Jun-18 | 15 | 4 | 0 |
| 1 | 17 | 25-Jun-18 | 12 | 276 | 195 |
| 1 | 18 | 25-Jun-18 | 15 | 248 | 248 |
| 1 | 19 | 26-Jun-18 | 15 | 420 | 250 |
| 1 | 20 | 26-Jun-18 | 16 | 391 | 280 |
| 1 | 21 | 26-Jun-18 | 16 | 536 | 325 |
| 1 | 22 | 3-Jul-18 | 17 | 88 | 62 |
| 1 | 23 | 24-Jul-18 | 7 | 440 | 340 |
| | | | **Total Year 1** | **10137** | **5373** |
| 1 | 24 | 26-Nov-18 | 16 | 340 | 135 |

| | | | | | |
|---|---|---|---|---|---|
| 1 | 25 | 26-Nov-18 | 15 | 440 | 440 |
| 1 | 26 | 13-Dec-18 | 12 | 66 | 10 |
| 1 | 27 | 13-Dec-18 | 13 | 98 | 98 |
| 1 | 28 | 29-Apr-19 | 1 | 125 | 120 |
| 1 | 29 | 2-May-19 | 14 | 210 | 160 |
| 1 female | 30 | 16-May-19 | 17 | 75 | 0 |
| 1 female | 31 | 16-May-19 | 17 | 135 | 0 |
| 1 female | 32 | 16-May-19 | 17 | 30 | 0 |
| 1 female | 33 | 16-May-19 | 17 | 30 | 0 |
| 1 | 34 | 17-May-19 | 4 | 281 | 60 |
| 1 | 35 | 15-Jul-19 | 15 | 86 | 46 |
| 1 female | 36 | 13-Aug-19 | 16 | 122 | 122 |
| 1 female | 37 | 13-Aug-19 | 16 | 83 | 43 |
| 1 | 38 | 19-Sep-19 | 17 | 25 | 7 |
| 1 | 39 | 8-Oct-19 | 15 | 42 | 13 |
| 1 | 40 | 8-Oct-19 | 17 | 85 | 45 |
| 1 | 41 | 16-Oct-19 | 16 | 39 | 10 |
| 1 | 42 | 17-Oct-19 | 17 | 6 | 6 |
| | | | **Total Year 2** | **2318** | **1315** |
| | | | | | |
| **Red Kite** | | | | | |
| 1 | 1 | 24-Aug-17 | 14 | 90 | 0 |
| 1 | 2 | 25-Sep-17 | 1 | 125 | 25 |
| 1 | 3 | 03-Nov-17 | 1 | 955 | 450 |
| 1 | 4 | 31-May-18 | 12 | 65 | 23 |
| 1 | 5 | 12-Jun-18 | 1 | 401 | 296 |
| 1 | 6 | 13-Jun-18 | 17 | 82 | 0 |
| 1 | 7 | 4-Jul-18 | 4 | 267 | 102 |
| 1 | 8 | 4-Jul-18 | 4 | 32 | 0 |
| 1 | 9 | 25-Jul-18 | 1 | 26 | 16 |
| | | | **Total Year 1** | **2043** | **912** |
| 2 | 10 | 19-Mar-19 | 1 | 190 | 180 |
| 2 | 11 | 19-Mar-19 | 1 | 404 | 404 |
| 2 | 12 | 01-Apr-19 | 12 | 232 | 180 |
| 2 | 13 | 01-Apr-19 | 12 | 224 | 30 |
| 1 | 14 | 08-Apr-19 | 1 | 135 | 0 |
| 1 | 15 | 03-May-19 | 6 | 69 | 69 |
| | 16 | 15-Jul-19 | 12 | 42 | 8 |
| 1 | 17 | 20-Sep-19 | 1 | 113 | 0 |
| 1 | 18 | 15-Nov-19 | 2 | 400 | 0 |
| 1 | 19 | 15-Nov-19 | 2 | 380 | 0 |
| | | | **Total Year 2** | **2189** | **871** |
| | | | | | |
| **Osprey** | | | | | |
| 1 | 1 | 24-Aug-17 | 19 | 209 | 90 |
| 1 | 2 | 25-Aug-17 | 20 | 42 | 0 |

| | | | | | |
|---|---|---|---|---|---|
| 1 | 3 | 16-Apr-18 | 1 | 38 | 0 |
| | | | **Total Year 1** | **289** | **90** |
| 1 | 4 | 1-Apr-19 | 16 | 105 | 35 |
| 1 | 5 | 3-Jun-19 | 7 | 12 | 0 |
| 1 | 6 | 3-Jun-19 | 5a | 71 | 71 |
| 1 | 7 | 15-Jul-19 | 16 | 25 | 25 |
| | | | **Total Year 2** | **213** | **131** |
| | | | | | |
| **Hobby** | | | | | |
| 1 juvenile | 1 | 25-Sep-17 | 20 | 9 | 0 |
| 1 juvenile | 2 | 25-Sep-17 | 20 | 7 | 0 |
| | | | **Total Year 1** | **16** | **0** |
| | | | | | |
| **Golden Plover** | | | | | |
| 5 | 1 | 20-Oct-17 | 9 | 150 | 150 |
| 7 | 2 | 20-Oct-17 | 9 | 210 | 210 |
| 1 | 3 | 30-Oct-17 | 11 | 15 | 0 |
| 15 | 4 | 26-Jan-18 | 10 | 225 | 0 |
| 10 | 5 | 22-Feb-18 | 16 | 5 | 0 |
| | | | **Total Year 1** | **605** | **360** |
| 29 | 6 | 19-Nov-18 | 6a | 435 | 319 |
| 29 | 7 | 19-Nov-18 | 6a | 1015 | 638 |
| 33 | 8 | 3-Dec-18 | 6a | 825 | 333 |
| 34 | 9 | 3-Dec-18 | 6a | 306 | 170 |
| 14 | 10 | 16-Dec-18 | 16 | 322 | 140 |
| 13 | 11 | 16-Dec-18 | 16 | 364 | 156 |
| 38 | 12 | 2-Apr-19 | 6a | 20026 | 18240 |
| | | | **Total Year 2** | **23293** | **19996** |
| | | | | | |
| **Curlew** | | | | | |
| Year 1 | | | | | |
| 2 | | 24-Aug-17 | 19 | 100 | 100 |
| 3 | | 16-Apr-18 | 1 | 336 | 180 |
| 1 | | 19-Apr-18 | 9 | 21 | 21 |
| 1 | | 19-Apr-18 | 9 | 40 | 40 |
| 1 | | 3-May-18 | 10 | 94 | 5 |
| 1 | | 3-May-18 | 10 | 32 | 0 |
| 1 | | 3-May-18 | 10 | 15 | 2 |
| 1 | | 3-May-18 | 10 | 900 | 780 |
| 1 | | 3-May-18 | 10 | 77 | 10 |
| 1 | | 3-May-18 | 8 | 12 | 0 |
| 1 | | 3-May-18 | 8 | 8 | 0 |
| 1 | | 7-May-18 | 8 | 12 | 0 |
| 1 | | 7-May-18 | 9 | 134 | 115 |
| 1 | | 7-May-18 | 11 | 20 | 20 |
| 2 | | 7-May-18 | 11 | 44 | 44 |

| | | | | | |
|---|---|---|---|---|---|
| 1 | | 7-May-18 | 11 | 27 | 27 |
| 1 | | 30-May-18 | 1 | 25 | 25 |
| 1 | | 30-May-18 | 9 | 25 | 25 |
| 1 | | 4-Jun-18 | 8 | 5 | 0 |
| 1 | | 13-Jun-18 | 1 | 56 | 0 |
| 1 | | 18-Jun-18 | 8 | 32 | 20 |
| **Year 1 totals** | | | | **2015** | **1414** |
| | | | | | |
| Year 2 | | | | | |
| 8 | | 27-Aug-18 | 6 | 1056 | 968 |
| 1 | | 19-Mar-19 | 1 | 57 | 40 |
| 1 | | 29-Apr-19 | 1 | 20 | 20 |
| 1 | | 30-Apr-19 | 15 | 11 | 11 |
| 1 | | 6-May-19 | 8 | 18 | 0 |
| **Year 2 totals** | | | | **1162** | **1039** |
| | | | | | |
| **Oystercatcher** | | | | | |
| 2 (pair at Black Esk) | 1 | 13-Mar-18 | 20 | Perched on wall | 0 |
| 2 (pair at Black Esk) | 2 | 13-Mar-18 | 20 | 25 | 0 |
| 2 (pair at Black Esk) | 3 | 22-Mar-18 | 20 | 31 | 0 |
| 2 | 4 | 1-Aug-18 | 20 | 216 | 0 |
| | | | **Total Year 1** | **272** | **0** |
| | | | | | |
| | | | | | |
| **Snipe** | | | | | |
| 1 | 1 | 26-Sep-17 | 13 | 8 | 0 |
| 1 | 2 | 20-Oct-17 | 15 | 8 | 0 |
| 1 | 3 | 23-Feb-18 | 10 | 6 | 0 |
| 1 | 4 | 23-Feb-18 | 10 | 5 | 0 |
| 1 | 5 | 3-May-18 | 11 | 110 | 75 |
| 1 | 6 | 3-May-18 | 11 | 58 | 58 |
| 1 | 7 | 3-May-18 | 11 | 69 | 60 |
| 1 | 8 | 18-Jun-18 | 9 | 6 | 3 |
| 1 | 9 | 18-Jun-18 | 9 | 10 | 8 |
| | | | **Total Year 1** | **280** | **204** |
| 1 | 10 | 9-Nov-18 | 15 | 11 | 0 |
| 1 | 11 | 3-Dec-18 | 6a | 12 | 5 |
| 1 | 12 | 3-Dec-18 | 6a | 6 | 0 |
| 1 | 13 | 13-Dec-18 | 15 | 22 | 17 |
| 1 | 14 | 13-Dec-18 | 15 | 8 | 0 |
| 1 | 15 | 13-Dec-18 | 13 | 28 | 16 |
| | | | **Total Year 2** | **87** | **38** |
| | | | | | |
| **Woodcock** | | | | | |
| 1 | | 9-Feb-18 | 14 | 5 | 0 |
| 1 | | 22-Feb-18 | 16 | 3 | 0 |

| | | | | | |
|---|---|---|---|---|---|
| | | | **Total year 1** | **8** | **0** |
| | | | | | |
| **Whooper swan** | | 20-Nov-18 | 3 | 19 | 19 |
| | | | **Total Year 2** | **19** | **19** |
| | | | | | |
| **Pink Footed Goose** | | | | | |
| 85 | | 15-Dec-17 | 15 | 80 | 850 |
| 176 | | 25-Jan-18 | 15 | 13200 | 0 |
| 47 | | 09-Feb-18 | 18 | 1974 | 420 |
| 47 | | 09-Feb-18 | 21 | 13630 | 0 |
| **Year 1 totals** | | | | **28884** | **1270** |
| | | | | | |
| Year 2 | | | | | |
| 90 | | 03-Dec-18 | 3 | 240 | 0 |
| 134 | | 19-Mar-19 | 1 | 124 | 10050 |
| 65 | | 20-Sep-19 | 2 | 7410 | 7410 |
| 65 | | 20-Sep-19 | 3 | 2860 | 2860 |
| 270 | | 20-Sep-19 | 1 | 10800 | 0 |
| 40 | | 20-Sep-19 | 1 | 1000 | 40 |
| **Year 2 totals** | | | | **22434** | **20360** |
| | | | | | |
| **Goose (unidentified)** | | | | | |
| 6 | | 26-Jan-18 | 9 | 90 | 0 |
| 20 | | 23-Feb-18 | 11 | 2920 | 2920 |
| 9 | | 12-Jun-18 | 1 | 387 | 387 |
| **Year 1 totals** | | | | **3397** | **3307** |
| | | | | | |
| Year 2 | | | | | |
| 15 | | 19-Mar-19 | 3 | 525 | 0 |
| **Year 2 totals** | | | | **525** | **0** |
| | | | | | |
| **Goosander** | | | | | |
| 1 | | 8-Sep-17 | 6 | 14 | 14 |
| 1 female | | 25-Sep-17 | 20 | 35 | 0 |
| 1 | | 17-Nov-17 | 20 | 44 | 30 |
| 1 female | | 29-Jan-18 | 18 | 44 | 0 |
| **Year 1 totals** | | | | **137** | **44** |
| | | | | | |
| | | | | | |
| **Mallard** | | | | | |
| Year 1 | | | | | |
| 4 (on reservoir) | | 25-Jan-18 | 20 | 0 | 0 |
| 1 | | 15-Oct-18 | 3 | 15 | 5 |
| **Year 1 totals** | | | | **15** | **5** |
| | | | | | |
| Year 2 | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| 3 | | 20-Sep-19 | 1 | 23 | 10 |
| **Year 2 totals** | | | | **23** | **10** |

## Appendix 7.9 – Flights by Target B (secondary) Species

| Species | Total no. of flights | Total number of flights within the FRZ |
|---|---|---|
| Buzzard | 1,675 | 1,407 |
| Sparrowhawk | 59 | 39 |
| Kestrel | 433 | 411 |
| Herring Gull | 5 | 3 |
| Lesser Black-backed Gull | 37 | 26 |
| Great Black-backed Gull | 8 | 6 |
| Raven | 969 | 765 |
| Grey Heron | 6 | 2 |
| Mallard | 7 | 0 |
| Goosander | 4 | 2 |

## Appendix 7.10 – Flights of Target A species other than from VPs

| Species | Date | No. on map |
|---|---|---|
| EA | 18-Oct-17 | 1 |
| EA | 15-Nov-17 | 2 |
| EA | 23-Feb-18 | 3 |
| EA | 23-May-18 | 4 |
| EA | 22-Aug-18 | 5 |
| EA | 03-May-19 | 6 |
| GI | 03-Jun-18 | 7 |
| GI | 30-May-18 | 8 |
| GI | 01-May-19 | 9 |
| GI | 28/06/2018 | 10 |
| GI | 17/11/2017 | 11 |
| GI | 17/11/2017 | 12 |
| PE | 28/06/2018 | 13 |
| PE | 19/04/2020 | 14 |
| PE | 01-May-19 | 15 |
| OP | 03-May-19 | 16 |
| OP | 16/04/2018 | 17 |
| ML | 19/04/2020 | 18 |
| ML | 19/04/2019 | 19 |
| ML | 04-May-19 | 20 |
| ML | 04-May-19 | 21 |
| ML | 01-Jun-18 | 22 |
| ML | 31-May-18 | 23 |

| | | |
|---|---|---|
| HH | 12-Aug-19 | 24 |
| BK | 04-May-19 | 25 |
| BK | 09/04/2019 | 26 |
| CU | 16-Apr-18 | 27 |
| CU | 10-Jun-19 | 28 |
| CU | 16-Apr-18 | 29 |
| CU | 19-Apr-18 | 30 |
| CU | 19-Apr-18 | 31 |
| CU | 19-Apr-19 | 32 |
| CU | 01-Jun-18 | 33 |
| CU | 01-Jun-18 | 34 |
| CU | 01-Jun-18 | 35 |
| CU | 04-May-19 | 36 |
| CU | 06-May-20 | 37 |
| SN | 01-Jun-18 | 38 |
| SN | 01-Jun-18 | 39 |
| SN | 04-May-19 | 40 |
| SN | 19-Apr-18 | 41 |
| SN | 04-May-19 | 42 |
| SN | 01-Jun-18 | 43 |
| SN | 16-Apr-18 | 44 |
| L. | 01-Jun-18 | 45 |
| RK | 28-Jun-18 | 46 |
| GP | 19-Apr-18 | 47 |
| GP | 19-Apr-18 | 48 |
| GP | 19/04/2020 | 49 |
| GP | 08/02/2020 | 50 |

## Appendix 7.11 – Breeding Bird Survey (in order of the British List)[24]

The following list is not an accurate representation of the breeding birds present at Scoop Hill but gives an indication of some of the moorland and forest species present.

| Species | Breeding pairs | Description |
|---|---|---|
| Black Grouse *Tetrao tetrix* | 4 | Four lekking males in area. |
| Red Grouse *Lagopus lagopus* | 11 | Very localised, on moorland to north of the site. |
| Cuckoo *Cuculus canorus* | 5 | Five singing males on moorland. |
| Oystercatcher *Haematopus ostralegus* | 2 | Two breeding territories recorded to the northwest of the site. |
| Lapwing *Vanellus vanellus* | 1 | One breeding territory to the very south of the site on agricultural land. |
| Curlew *Numenius arquata* | 6 | Six breeding pairs over the moorland areas. |
| Snipe *Gallinago gallinago* | 14 | Fourteen territories on moorland. |
| Common Sandpiper *Actitis hypoleucos* | 1 | Only one territory on the Dryfe Water, probably under-recorded. |
| Buzzard *Buteo buteo* | 13 | Estimated 13 territories. |
| Osprey *Pandion haliatus* | 2 | Two nests. |
| Sparrowhawk *Accipiter nisus* | 1 | One territory but definitely under-recorded. |
| Goshawk *Accipiter gentilis* | 2 | Two nests located. |
| Barn Owl *Tyto alba* | 2-3 | 2 to 3 territories. |
| Tawny Owl *Strix aluco* | 7 | Not recorded in detail. |
| Kestrel *Falco tinnunculus* | 5 | Four territories. |
| Merlin *Falco columbarius* | ? | Possibly one breeding territory, no nest located. |
| Raven *Corvus corax* | 1 | One nest located. |
| Skylark *Alauda arvensis* | 58 | Common on the moorland on grassy tops of hills. |
| Sand Martin *Riparia riparia* | 6 | Colony of six nests in the banks of the River Annan. |

[24] British Ornithologists' Union. 2017. The British List: A Checklist of Birds of Britain (9th edition). *Ibis* 160: 190-240.

| | | |
|---|---|---|
| Whinchat<br>*Saxicola rubetra* | 6 | High concentration of territories in the Glengap area. |
| Stonechat<br>*Saxicola rubicola* | 1 | Surprisingly, only one territory recorded. |
| Grey Wagtail<br>*Motacilla cinerea* | 3 | Three breeding territories adjacent to watercourses. |
| Linnet<br>*Linaria cannabina* | 2 | Two territories in scrub to the southwest of the site. |
| Reed Bunting<br>*Emberiza schoeniclus* | 5 | Five territories all in marshy ground to the northwest of the site. |

## Appendix 7.12 – Important Ecological Features

The nature conservation value of the bird species has been determined using the values in Table 7.1 and the value relates to their significance at Scoop Hill.

| Nature Conservation Value at Scoop | Species | Status |
|---|---|---|
| High | Hen Harrier | Schedule 1<br>EC Annex 1<br>Scottish Biodiversity List<br>Red listed<br>D & G LBAP |
| High | Peregrine | Schedule 1<br>EC Annex 1<br>Scottish Biodiversity List<br>Amber listed<br>D & G LBAP |
| High | Merlin | Schedule 1<br>EC Annex 1<br>Amber listed<br>Scottish Biodiversity List<br>D & G LBAP |
| High | Goshawk | Schedule 1 |
| High | Golden Eagle | Schedule 1<br>D & G LBAP |
| High | Red Kite | Schedule 1<br>EC Annex 1<br>Scottish Biodiversity List<br>Amber listed<br>D & G LBAP |
| High | Osprey | Schedule 1<br>EC Annex 1<br>Amber listed<br>Scottish Biodiversity List<br>D & G LBAP |
| High | Barn Owl | EC Annex I<br>Scottish Biodiversity List<br>Amber listed<br>D & G LBAP |
| High | Black Grouse | Priority species, UK BAP<br>Red listed<br>Scottish Biodiversity List<br>D & G LBAP |
| High | Golden Plover | EC Annex 1<br>Scottish Biodiversity List<br>D & G LBAP |
| High | Curlew | Priority species, UK BAP<br>Red listed<br>D & G LBAP |
| High | Crossbill | Schedule 1 |
| Medium | Snipe | Amber listed |
| Medium | Woodcock | Red listed<br>D & G LBAP |
| Medium | Skylark | Priority species, UK BAP<br>Scottish Biodiversity List<br>Red-listed<br>D & G LBAP |
| Medium | Song Thrush | Priority species, UK BAP<br>Red listed |
| Medium | Mistle Thrush | Red listed |
| Medium | Lesser Redpoll | Priority species, UK BAP<br>Red listed |
| Low | Oystercatcher | Amber listed |
| Low | Lapwing | Priority species, UK BAP<br>Red listed |
| Low | Common Sandpiper | Amber listed |
| Low | Kestrel | Amber listed<br>Scottish Biodiversity List<br>D & G LBAP |
| Low | Pink-footed Goose | Amber listed |
| Low | Whooper Swan | Schedule 1<br>Amber listed |
| Low | Cuckoo | Priority species, UK BAP<br>Red listed |
| Low | Red Grouse | Priority species, UK BAP<br>Amber listed |
| Low | Lesser Black-backed Gull | Amber listed |
| Low | Herring Gull | Priority species, UK BAP<br>Scottish Biodiversity List<br>Red listed<br>D & G LBAP |
| Low | Meadow Pipit | Amber listed |
| Low | Stonechat | Amber listed |
| Low | Whinchat | Red listed |
| Low | Wheatear | Amber listed |
| Low | Swallow | Amber listed |
| Low | Willow Warbler | Amber listed |
| Low | Dunnock | Priority species, UK BAP<br>Amber listed |
| Low | Grey Wagtail | Red listed |
| Low | Bullfinch | Priority species, UK BAP<br>Amber listed |
| Low | Tree Pipit | Priority species, UK BAP<br>Red listed |
| Low | Linnet | Priority species, UK BAP<br>Red listed |
| Low | Siskin | Scottish Biodiversity List |
| Low | Reed Bunting | Amber listed |
| Low | Mallard | Amber listed |
| Very low | Goldeneye | Amber listed |

## Appendix 7.13 – Collision Risk Analysis – Turbine Variables

Four sizes of candidate turbine are proposed. For the collision risk analysis, the following wind turbine dimensions have been used.

- 4 wind turbines will have a maximum tip height of 180m;
- 47 wind turbines will have a maximum tip height of 200m;
- 2 wind turbines will have a maximum turbine height of 225m; and
- 22 wind turbines will have a maximum tip height of 250m.

| Turbine Variables | Turbine data |
|---|---|
| Maximum Hub heights | 180 to 250 m |
| Depth of blade | 3 |
| No. of blades | 3 |
| Maximum chord | 3.8 m |
| Pitch (average) | 11.5° |
| Rotor diameter of candidate turbine | Estimated to be 150 m |
| Rotation period average | 6.87 s |
| Number of turbines | 75 |

## Appendix 7.14 – Collision Risk Analysis

**Table 1 - The total area surveyed:**

| Total area surveyed (ha) | Total area visible from vantage points (ha) A |
|---|---|
| 4,198 | 3,911 |

Table 2 below summarises the flight activity over the site for species at risk from collision.

**Table 2 – Summary of Flight Activity by Target Species at Risk of Collision**

| Species | Total flying time in FRZ (secs) | | Total flight time in FRZ |
|---|---|---|---|
| | Year 1 | Year 2 | |
| Hen Harrier | 30 | 41 | 71 |
| Peregrine | 610 | 570 | 1,180 |
| Merlin | 70 | 60 | 130 |
| Goshawk | 2,178 | 798 | 2,976 |
| Golden Eagle | 2,318 | 1,315 | 3,633 |
| Red Kite | 912 | 871 | 1,783 |
| Golden Plover | 360 | 19,996 | 20,356 |
| Curlew | 1,414 | 1,039 | 2,453 |

The following tables describe the calculations for collision risk.

Total observation time was 90 hrs (324,000 seconds) in year 1 and 72 hours (259,200 seconds) in year 2, a total of 583,200 seconds.

The proportion of observation time (t) that birds were observed flying at turbine m height was calculated.

The table below shows t= total recorded time/total observation time for each species at each site.

**Table 3 – Calculation of t**

| Species | t |
|---|---|
| Hen Harrier | 1.22E-04 |
| Peregrine | 2.02E-03 |
| Merlin | 2.23E-04 |
| Goshawk | 5.10E-03 |
| Golden Eagle | 6.23E-03 |
| Red Kite | 3.06E-03 |
| Golden Plover | 3.49E-02 |
| Curlew | 4.21E-03 |

Flight activity per hectare of visible area, (*F*) is calculated by *t* divided by A

**Table 3 – Calculation of F**

| Species | F |
|---|---|
| Hen Harrier | 3.11E-08 |
| Peregrine | 5.17E-07 |
| Merlin | 5.70E-08 |
| Goshawk | 1.30E-06 |
| Golden Eagle | 1.59E-06 |
| Red Kite | 7.82E-07 |
| Golden Plover | 8.92E-06 |
| Curlew | 1.08E-06 |

The flight risk zone (FRZ) was calculated. This was taken as the envelope bounded by the outermost turbines with a buffer applied around the turbine envelope, the total area surveyed, see Table 1. This is the proportion of time that the birds were predicted to spend at turbine height within the wind farm area. Flight activity per hectare of visible area multiplied by the turbine envelope:

**Table 4 – Flight Risk Area**

| Species | FRZ |
|---|---|
| Hen Harrier | 1.31E-04 |
| Peregrine | 2.17E-03 |
| Merlin | 2.39E-04 |
| Goshawk | 5.48E-03 |
| Golden Eagle | 6.69E-03 |
| Red Kite | 3.28E-03 |
| Golden Plover | 3.75E-02 |
| Curlew | 4.51E-03 |

There are four turbine heights with different blade diameters and hub heights. The largest turbine size values have been used with the largest bandwidth. Target species were recorded at this bandwidth.

The size of the flight risk volume (Vw) was calculated by multiplying the area of the wind farm plus buffer zones, shown in Table 5, by the diameter of the blades (estimated to be 150m).

**Table 5 – Calculation of Vw**

| Area of wind farm (ha) | Area of wind farm $m^2$ | Vw |
|---|---|---|
| 4198 | 41,980,000 | 6,297,000,000.00 |

The combined volume swept out by the wind farm rotors (*Vr*) was determined by multiplying the number of turbines by $\pi R^2$ x (*d + l*) where *d* is the maximum depth of blade from back to front (3 m) and R is the rotor radius of the turbine (estimated to be 75 m) and *l* is the bird length.
The large number of turbines (75) creates a high FRZ. Several species only used a small area of the wind farm. Therefore an adjustment has been made for these species:

Peregrine – 30 turbines (4, 8, 9, 23, 25, 31, 32, 33, 34, 35, 36, 37, 38, 44, 46, 48, 50, 51, 52, 63, 68, 68, 70, 71, 72, 75)
Goshawk – 30 turbines (27, 28, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 59, 61, 62, 63, 67, 68, 69, 70, 71, 72, 36, 37, 38, 39)
Golden eagle - 30 turbines (2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 23, 24, 25, 29, 32, 33, 34, 37, 44, 45, 46, 47, 73)
Golden Plover – 10 turbines (32, 33, 34, 35, 36, 37, 39, 38, 40, 41)

**Table 6 – Calculation of Vr**

| Species | Vr | VR Adjusted |
|---|---|---|
| Hen Harrier | 4583418.75 | - |

| | | |
|---|---|---|
| Peregrine | 4609912.50 | 1843965.00 |
| Merlin | 4344975.00 | - |
| Goshawk | 4742381.25 | 1896952.50 |
| Golden Eagle | 6623437.50 | 2649375.00 |
| Red Kite | 4808615.63 | - |
| Golden Plover | 4344975.00 | 579330.00 |
| Curlew | 4702640.63 | - |

The occupancy within the flight risk volume *n w*as estimated.

Hen harrier, peregrine, merlin, goshawk, red kite and golden eagle have the possibility of being present at any time of year. During this period they were active for between 7 and 12 hours per day. Occupancy of the wind farm area over one year was therefore estimated to be 3,642 hours (13,111,200 seconds), over two years 7,284 hours (26,222,400 seconds).

Golden plover is a winter visitor to the site and has the possibility of being present from mid September to early May (234 days). During this period they are considered active for 12 hours over the day and night. Golden plover occupancy of the wind farm area over one year is estimated to be 2,808 hours (10,108,800 seconds), over two years 5,616 hours (20,217,600 seconds).

Curlew is a summer visitor to nest at Scoop Hill II. It has the possibility of being present from mid March until the end of August (168 days). During this period they are estimated to be active 12 hours per day. Curlew occupation of the wind farm in one year was therefore estimated to be 2,016 hours (7,257,600 seconds), for two years 4,032 hours (14,515,200 seconds).

Bird occupancy of the flight risk area is n, occupancy x flight risk area

**Table 7 – Calculation of n.**

| Species | n |
|---|---|
| Hen Harrier | 3426.635 |
| Peregrine | 56949.714 |
| Merlin | 6274.121 |
| Goshawk | 143629.109 |
| Golden Eagle | 175337.552 |
| Red Kite | 86051.983 |
| Golden Plover | 757459.026 |
| Curlew | 65532.642 |

The bird occupancy of the volume swept by the rotors (*b*) is then n x (*Vr/Vw*)

**Table 8 – Calculation of *b*.**

| Species | b | b adjusted |
|---|---|---|
| Hen Harrier | 2.49E+00 | - |
| Peregrine | 4.17E+01 | 1.67E+01 |
| Merlin | 4.33E+00 | - |
| Goshawk | 1.08E+02 | 4.33E+01 |
| Golden Eagle | 1.84E+02 | 7.38E+01 |
| Red Kite | 6.57E+01 | - |
| Golden Plover | 5.23E+02 | 6.97E+01 |
| Curlew | 4.89E+01 | - |

The time taken for a bird to make transit through the rotor and completely clear the rotors (t) is (d + l)/v, where d is the depth of the blades, l is the length of the bird and v ms-1 is the speed of the bird through the rotor. Average speeds have been sourced from a variety of sources (Madders and Whitfield, 2006).

**Table 9 – Calculation of *t***

| Species | t |
|---|---|
| Hen Harrier | 0.27 |
| Peregrine | 0.18 |
| Merlin | 0.22 |
| Goshawk | 0.24 |
| Golden Eagle | 0.31 |
| Red Kite | 0.23 |
| Golden Plover | 0.25 |
| Curlew | 0.24 |

The number of bird transits through the rotors is therefore b/t

**Table 10 – Bird Transits**

| Species | b/t | b/t adjusted |
|---|---|---|
| Hen Harrier | 9.37E+00 | - |
| Peregrine | 2.28E+02 | 9.11E+01 |
| Merlin | 1.98E+01 | - |
| Goshawk | 4.53E+02 | 1.81E+02 |
| Golden Eagle | 5.90E+02 | 2.36E+02 |
| Red Kite | 2.90E+02 | - |
| Golden Plover | 2.07E+03 | - |
| Curlew | 2.07E+02 | |

The likelihood of birds flying through the disc swept by the rotor blades and being hit by one of the blades was estimated using the Band Collision Model.

Collision likelihood was calculated for both upwind and downwind situations and the mean of these two values taken. Flapping and not gliding flight was assumed.

Assuming no avoidance by birds, the model predicts the average percentage of birds that will collide each year with the turbines as shown in Table 10.

**Table 11 – Percentage of birds estimated to collide with turbines**

| Species | % collision |
|---|---|
| Hen Harrier | 4.80% |
| Peregrine | 4.40% |
| Merlin | 4.10% |
| Goshawk | 5.20% |
| Golden Eagle | 6.20% |
| Red Kite | 4.80% |
| Golden Plover | 4.10% |
| Curlew | 4.80% |

The number of collisions per year is calculated by the probability of a collision multiplied by the number of bird transits through the rotors each year.

The table below shows the number of transits through the rotors each year by each species.

The turbine blades do not turn in very low winds and are shut down in very strong winds. It is predicted that turbines will not turn for approximately 25% of the time. Therefore the number of flights at risk from collision is reduced.

**Table 12 – Bird Transits**

| Species | No. of transits | At 75% operation | No. of transits adjusted | At 75% operation adjusted |
|---|---|---|---|---|
| Hen Harrier | 4.50E-01 | 3.37E-01 | - | - |
| Peregrine | 1.00E+01 | 7.51E+00 | 4.01E+00 | 3.00E+00 |
| Merlin | 8.12E-01 | 6.09E-01 | - | - |
| Goshawk | 2.36E+01 | 1.77E+01 | 9.43E+00 | 7.07E+00 |
| Golden Eagle | 3.66E+01 | 2.74E+01 | 1.46E+01 | 1.10E+01 |
| Red Kite | 1.39E+01 | 1.04E+01 | - | - |
| Golden Plover | 8.49E+01 | 6.37E+01 | 1.13E+01 | 8.49E+00 |
| Curlew | 9.93E+00 | 7.44E+00 | - | - |

The estimated collision rate does not take account of an avoidance factor by birds, but in practise the proportion of birds taking likely action to avoid collision with blades is very high. Raptors and waders are manoeuvrable and agile in flight and the likelihood of any of them flying into a turbine is considered to be fairly low.

The SNH precautionary avoidance rates are 99% for hen harrier, red kite and golden eagle, therefore 1% of birds are predicted to take no avoiding action. The recommended default avoidance rate for other species is 98% with 2% taking no avoiding action[25]. The collision risk analysis is summarised in the table below.

**Table 13 – Birds per year**

| Species | Avoidance % | Collision rate | Collision rate 1 bird every (years) | Collision rate | Collision rate 1 bird every (years) |
|---|---|---|---|---|---|
| Hen Harrier | 99.00 | 3.37E-03 | 0.00 | - | - |
| Peregrine | 98.00 | 1.50E-01 | 6.66 | 6.01E-02 | 16.64 |
| Merlin | 98.00 | 1.22E-02 | 82.13 | - | - |
| Goshawk | 98.00 | 3.54E-01 | 2.83 | 1.41E-01 | 7.07 |
| Golden Eagle | 99.00 | 2.74E-01 | 3.64 | 1.10E-01 | 9.11 |
| Red Kite | 99.00 | 1.04E-01 | 9.59 | - | - |
| Golden Plover | 98.00 | 1.27E+00 | 0.78 | 1.70E-01 | 5.89 |
| Curlew | 98.00 | 1.49E-01 | 6.72 | - | - |

[25] Scottish Natural Heritage. Avoidance Rates for the onshore SNH Wind Farm Collision Risk Model

Over the duration of the wind farm, 40 years, there is potential for the following collision rates shown below.

**Table 14 – Collision risk for the duration of the wind farm**

| Species | Collision risk over 40 years (number of birds) | Collision risk over 40 years (number of birds) adjusted |
|---|---|---|
| Hen Harrier | 0.135 | - |
| Peregrine | 6.01 | 2.4 |
| Merlin | 0.48 | - |
| Goshawk | 14.1 | 5.66 |
| Golden Eagle | 11 | 4.39 |
| Red Kite | 4.17 | - |
| Golden Plover | 51 | 6.79 |
| Curlew | 5.96 | - |

## Appendix 7.15 – Developments within 30km in the Natural Heritage Zone

| Wind Farm | Number of turbines | Distance from Scoop Hill (km) |
|---|---|---|
| Operational/under construction | | |
| Hopsrig | 12 | 8 |
| Minnygap | 10 | 9 |
| Ewehill and Extension | 22 | 9.5 |
| Harestanes and Extension | 68 | 10 |
| Minsca | 16 | 12.5 |
| Craig | 4 | 14 |
| Clyde | 152 | 17 |
| Dalswinton | 15 | 20 |
| Clyde Extension | 57 | 20 |
| Consented | | |
| Crossdykes | 15 | 7.5 |
| Lion Hill | 4 | 15.9 |
| Solwaybank | 15 | 16.2 |
| Crookedstane Farm | 4 | 18.8 |
| Planning | | |
| Loganhead | 8 | 8 |
| Earlshaugh | 24 | 13 |
| Faw Side | 45 | 15 |
| Whitelaw Brae | 14 | 16 |

## Appendix 7.16 – Cumulative Impacts

| **Hen Harrier** | | | |
|---|---|---|---|
| **Site** | **Collision mortality** | **Displacement effects** | **Habitat Loss** |
| Hopsrig | 0.0001 | - | - |
| Clyde | No CRM undertaken | 2 pairs potentially affected | Negligible |
| Clyde Extension | No significant impact | 1 pair displaced during construction | Negligible |
| Crossdykes | Negligible | Negligible | Negligible |
| Solwaybank | 1 every 158 years | Minor | Minor |
| Crookedstane Farm | No CRM undertaken | Negligible | Negligible |
| Faw Side | 1 bird every 59 years | Negligible | Negligible |

| **Peregrine** | | | |
|---|---|---|---|
| **Site** | **Collision mortality** | **Displacement effects** | **Habitat Loss** |
| Harestanes Extension | 1 bird every 56 years | Negligible | Negligible |
| Clyde | No CRM undertaken | 1 pair potentially displaced | Negligible |
| Crookedstane Farm | No CRM undertaken | Negligible | Negligible |
| Whitelaw Brae | No CRM undertaken | Negligible | Negligible |
| Faw Side | No CRM undertaken | Negligible | Negligible |

| **Merlin** | | | |
|---|---|---|---|
| **Site** | **Collision mortality** | **Displacement effects** | **Habitat Loss** |
| Harestanes Extension | Negligible | Negligible | Negligible |
| Clyde | No CRM undertaken | 1 pair potentially displaced | Negligible |
| Clyde Extension | No significant impact | 1 pair displaced during construction | Negligible |
| Lion Hill | No CRM undertaken | | Negligible |
| Solwaybank | Negligible | Minor | Minor |
| Earlshaugh | Negligible | 1 pair potentially displaced | |
| Faw Side | No CRM undertaken | Negligible | Negligible |

| **Goshawk** | | | |
|---|---|---|---|
| **Site** | **Collision mortality** | **Displacement effects** | **Habitat Loss** |
| Hopsrig | 0.0054 to 0.0641 | - | - |
| Crossdykes | Negligible | Negligible | Negligible |
| Solwaybank | 1 every 71 years<br>0.024 per year | Minor | Minor |
| Loganhead | 1 every 3.3 years | Negligible | Negligible |
| Faw Side | 0.313 per year<br>1 every 3 years | Negligible | Negligible |

| **Red Kite** | | | |
|---|---|---|---|
| **Site** | **Collision mortality** | **Displacement effects** | **Habitat Loss** |
| Hopsrig | Nil | Negligible | Negligible |
| Faw Side | No CRM undertaken | Negligible | Negligible |

| **Osprey** | | | |
|---|---|---|---|
| **Site** | **Collision mortality** | **Displacement effects** | **Habitat Loss** |
| Clyde Extension | No significant impact | Negligible | Negligible |
| Solwaybank | None | Minor | Minor |
| Whitelaw Brae | No CRM undertaken | Negligible | Negligible |
| Faw Side | No CRM undertaken | Negligible | Negligible |

| **Golden Plover** | | | |
|---|---|---|---|
| **Site** | **Collision mortality** | **Displacement effects** | **Habitat Loss** |
| Hopsrig | 0.1052 | - | Negligible |
| Harestanes extension | Negligible | Negligible | Negligible |
| Clyde | No CRM undertaken | 4 pairs potentially displaced | Negligible |
| Clyde Extension | No significant impact | Negligible | Negligible |
| Solwaybank | 1 every 0.42 years | Minor | Minor |
| Loganhead | No CRM undertaken | Negligible | Negligible |
| Faw Side | No CRM undertaken | Negligible | Negligible |

| **Curlew** | | | |
|---|---|---|---|
| **Site** | **Collision mortality** | **Displacement effects** | **Habitat Loss** |
| Hopsrig | 0.0004 | - | Negligible |
| Harestanes Extension | Negligible | Negligible | Negligible |
| Clyde | No CRM undertaken | 106 pairs recorded, many have potential to be displaced | Negligible |
| Clyde Extension | No significant impact | Negligible | Negligible |
| Crossdykes | Not significant | Potential significant effect | Negligible |
| Lion Hill | 0.15 per year | 10 pairs, many of which have potential to be displaced | Negligible |
| Solwaybank | Negligible | Minor | Minor |
| Loganhead | No CRM undertaken | Negligible | Negligible |
| Whitelaw Brae | No CRM undertaken | Negligible | Negligible |
| Faw Side | No CRM undertaken | Negligible | Negligible |

| **Black Grouse** |
|---|

| Site | Collision mortality | Displacement effects | Habitat Loss |
|---|---|---|---|
| Harestanes extension | Negligible | Negligible | Negligible |
| Clyde | Negligible | 1 lek, unlikely to be displaced | Negligible |
| Clyde Extension | No significant impact | 1 pair has potential to be displaced during construction | Negligible |
| Crookedstane Farm | No CRM undertaken | Negligible | Negligible |
| Lion Hill | Negligible | 1 lek, unlikely to be displaced | Negligible |
| Whitelaw Brae | No CRM undertaken | Two leks have potential to be displaced | Potential habitat loss |
| Faw Side | No CRM undertaken | Negligible | Negligible |

## Appendix 7.17 – Residual Effects

| Species | Significance of negative impact without mitigation | Residual significance of impact following mitigation |
|---|---|---|
| Designated Sites | No impacts | No impacts |
| Hen Harrier | Construction **low magnitude, short term** and of **minor significance**.<br><br>Operation **negligible.** | Construction **low magnitude, short term** and of **minor significance**.<br><br>Operation **negligible.**<br><br>Cumulative **negligible.** |
| Peregrine | Construction **low magnitude, short term** and of **minor significance**.<br><br>Operation **medium magnitude, long term** and of **moderate significance** but more likely to be low magnitude, **short term** and of **minor significance**. | Construction **low magnitude, short term** and of **minor significance**.<br><br>Operation **medium magnitude, long term** and of **moderate significance** but more likely to be low magnitude, **short term** and of **minor significance.**<br><br>Cumulative **low magnitude, long term** and **minor significance.** |
| Merlin | Construction **low magnitude, short term** and of **minor significance**.<br><br>Operation **low magnitude, long term** and of **minor significance**. | Construction **low magnitude, short term** and of **minor significance**.<br><br>Operation **low magnitude, long term** and of **minor significance**.<br><br>Cumulative **low magnitude, long term** and **minor significance.** |
| Goshawk | Construction **high magnitude, short term** and **of major significance**.<br><br>Operation **high magnitude, short term** and **of major significance**. | Construction **low magnitude, short term** and of **minor significance**.<br><br>Operation **medium magnitude, long term** and of **moderate significance.**<br><br>Cumulative **high magnitude, long term** and **of major significance**. |
| Golden Eagle | Construction **medium magnitude, short term** and **moderate significance**.<br><br>Operation **very high magnitude, long term** and **of major significance**. | Construction **low magnitude, short term** and of **minor significance**.<br><br>Operation **medium magnitude, long term** and of **moderate significance.**<br><br>Cumulative **negligible.** |
| Red Kite | Construction **low magnitude, short term** and of **negligible** s**ignificance.**<br><br>Operation **low magnitude, long term** and **of minor significance**. | Construction **low magnitude, short term** and of **negligible** s**ignificance.**<br><br>Operation **low magnitude, long term** and **of minor significance**.<br><br>Cumulative **negligible.** |
| Osprey | Construction of **high magnitude, short term** and **of major significance.**<br><br>Operation **negligible.** | Construction **low magnitude, short term** and of **negligible** s**ignificance.**<br><br>Operation **negligible.**<br><br>Cumulative **negligible.** |
| Kestrel and other raptors | Construction **medium magnitude, short term** and of **moderate significance**.<br><br>Operation **low magnitude** and of **minor significance.** | Construction **low magnitude, short term** and of **negligible** s**ignificance.**<br><br>Operation **low magnitude** and of **minor significance.**<br><br>Cumulative **negligible.** |

| | | |
|---|---|---|
| Golden Plover | Construction **low magnitude, short term** and of **minor significance**.<br><br>Operation **low magnitude, long term** and of **minor significance**. | Construction **low magnitude, short term** and of **minor significance**.<br><br>Operation **low magnitude, long term** and of **minor significance**.<br><br>Cumulative **low magnitude, long term** and **minor significance.** |
| Curlew | Construction **medium magnitude, short term** and of **moderate significance**.<br><br>Operation **negligible** | Construction **low magnitude, short term** and of **minor significance**.<br><br>Operation **negligible.**<br><br>Cumulative **low magnitude, long term** and **minor significance**. |
| Barn Owl | Construction negligible<br><br>Operation **low magnitude, long term** and of **minor significance**. | Construction negligible.<br><br>Operation **low magnitude, long term** and of **minor significance**.<br><br>Cumulative **negligible.** |
| Black Grouse | Construction **medium magnitude, short term** and of **moderate significance**.<br><br>Operation Construction **low magnitude, short term** and of **minor significance**. | Construction **low magnitude, short term** and of **minor significance**.<br><br>Operation **low magnitude, long term** and of **minor significance**.<br><br>Cumulative **negligible.** |
| Woodland species | Construction of **high magnitude, short term** and **of major significance.**<br><br>Operation **negligible.** | Construction **low magnitude, short term** and of **negligible significance.**<br><br>Operation **negligible.**<br><br>Cumulative **negligible.** |
| Skylark and other moorland species | Construction of **high magnitude, short term** and **of major significance.**<br><br>Operation **negligible.** | Construction **low magnitude, short term** and of **negligible significance.**<br><br>Operation **negligible.**<br><br>Cumulative **negligible.** |

# 374 Scoop Hill

## Legend

- Site Boundary
- Wind Turbine (180m to tip)
- Wind Turbine (200m to tip)
- Wind Turbine (225m to tip)
- Wind Turbine (250m to tip)
- Permanent Met Masts
- Site Entrance
- Access Tracks
- Existing Access Tracks to be Upgraded
- Substation & Control
- Substation & Control Room Construction Compound
- Temporary Construction Compound
- Borrow Pit
- Existing Quarries or Borrow Pit
- Borrow Pit Area of Search
- Habitat Surveys

Notes: N/A
Revisions: N/A
Turbine Layout: 374-191212-9018

0 500 1,000 2,000 m

Scale: 1:55,000 @ A3

N

Figure 7.1a Survey Area with Buffer

Date: 13/07/2020 Ref: 374-200713-7347-A
Produced: DW Reviewed: DR Approved: GC


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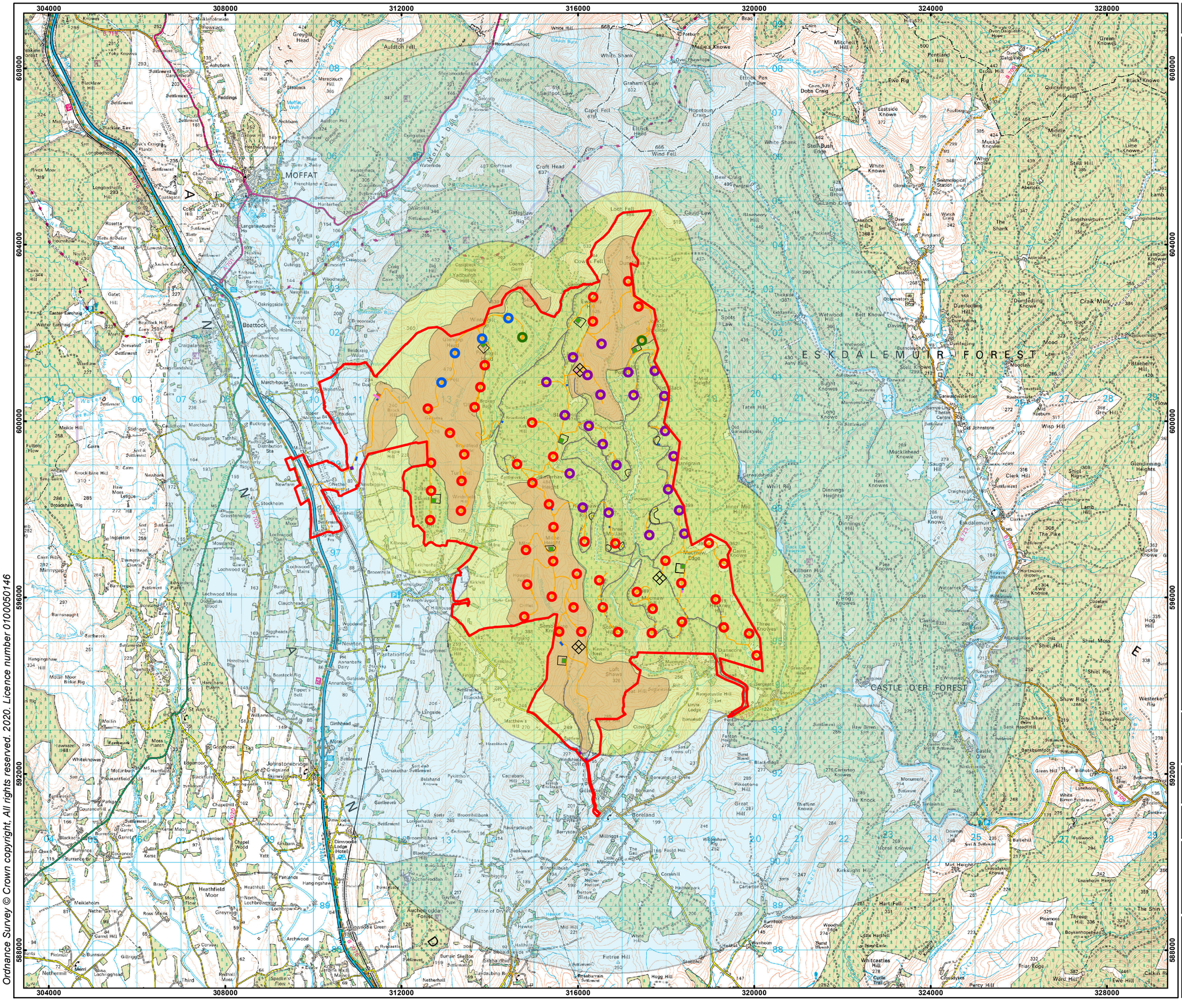


# 374 Scoop Hill

## Legend

- Site Boundary
- Wind Turbine (180m to tip)
- Wind Turbine (200m to tip)
- Wind Turbine (225m to tip)
- Wind Turbine (250m to tip)
- Permanent Met Masts
- Site Entrance
- Access Tracks
- Existing Access Tracks to be Upgraded
- Substation & Control Room
- Substation & Control Room Construction Compound
- Temporary Construction Compound
- Borrow Pit
- Existing Quarries or Borrow Pit
- Borrow Pit Area of Search
- Brown and Shepherd Moorland Bird Breeding Wader Areas
- Black Grouse
- Golden Eagle

Notes: N/A
Revisions: N/A
Turbine Layout: 374-191212-9018

0 1,000 2,000 4,000 m

Scale: 1:80,000 @ A3

N

Figure 7.1b Survey Area with Buffer

| | | |
|---|---|---|
| Date: 29/07/2020 | Ref: 374-200729-7367-A | |
| Produced: DW | Reviewed: DR | Approved: GC |


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374 Scoop Hill

## Legend

- Site Boundary
- Wind Turbine (180m to tip)
- Wind Turbine (200m to tip)
- Wind Turbine (225m to tip)
- Wind Turbine (250m to tip)
- Permanent Met Masts
- Site Entrance
- Access Tracks
- Existing Access Tracks to be Upgraded
- Substation & Control Room
- Substation & Control Room Construction Compound
- Temporary Construction Compound
- Borrow Pit
- Existing Quarries or Borrow Pit
- Borrow Pit Area of Search
- (5) Vantage Point

Notes: N/A
Revisions: N/A
Turbine Layout: 374-191212-9018

0 500 1,000 2,000 m
Scale: 1:55,000 @ A3

N

Figure 7.2 Vantage Points for Year 1 of Survey

| | | |
|---|---|---|
| Date: 13/07/2020 | Ref: 374-200713-7345-A | |
| Produced: DW | Reviewed: DR | Approved: GC |


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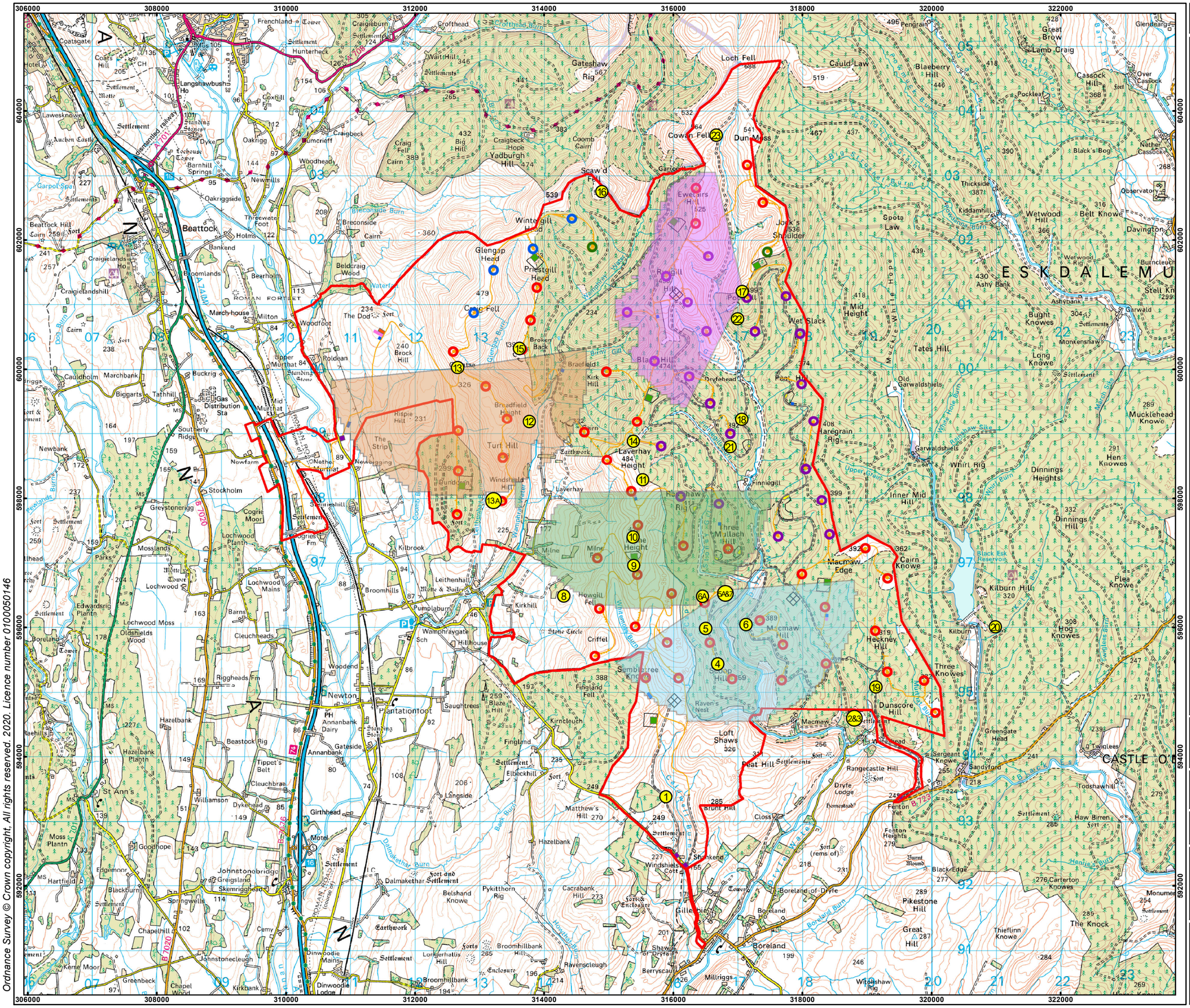

# 374 Scoop Hill

## Legend

- ▭ Site Boundary
- ○ Wind Turbine (180m to tip)
- ○ Wind Turbine (200m to tip)
- ○ Wind Turbine (225m to tip)
- ○ Wind Turbine (250m to tip)
- ◈ Permanent Met Masts
- 🟪 Site Entrance
- 🟧 Access Tracks
- ■ Existing Access Tracks to be Upgraded
- ■ Substation & Control Room
- 🟧 Substation & Control Room Construction Compound
- 🟦 Temporary Construction Compound
- 🟩 Borrow Pit
- 🟨 Existing Quarries or Borrow Pit
- □ Borrow Pit Area of Search
- ⑤ Vantage Point
- 🟦 VP5a Viewshed
- 🟩 VP11 Viewshed
- 🟧 VP13 Viewshed
- 🟪 VP17 Viewshed

Notes: N/A
Revisions: N/A
Layout:374-191212-9018

0 500 1,000 2,000 m
Scale: 1:55,000 @ A3
N

## Figure 7.3a Viewsheds for Year 1 of Survey (1)

Date: 16/07/2020 Ref: 374-200716-7351-A
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# 374 Scoop Hill

## Legend

- Site Boundary
- Wind Turbine (180m to tip)
- Wind Turbine (200m to tip)
- Wind Turbine (225m to tip)
- Wind Turbine (250m to tip)
- Permanent Met Masts
- Site Entrance
- Access Tracks
- Existing Access Tracks to be Upgraded
- Substation & Control Room
- Substation & Control Room Construction Compound
- Temporary Construction Compound
- Borrow Pit
- Existing Quarries or Borrow Pit
- Borrow Pit Area of Search
- (5) Vantage Point
- VP1 Viewshed
- VP7 Viewshed
- VP8 Viewshed
- VP18 Viewshed
- VP20 Viewshed

Notes: N/A
Revisions: N/A
Layout:374-191212-9018

0 500 1,000 2,000 m
Scale: 1:55,000 @ A3
N

Figure 7.3b Viewsheds for Year 1 of Survey (2)

Date: 16/07/2020 Ref: 374-200716-7353-A
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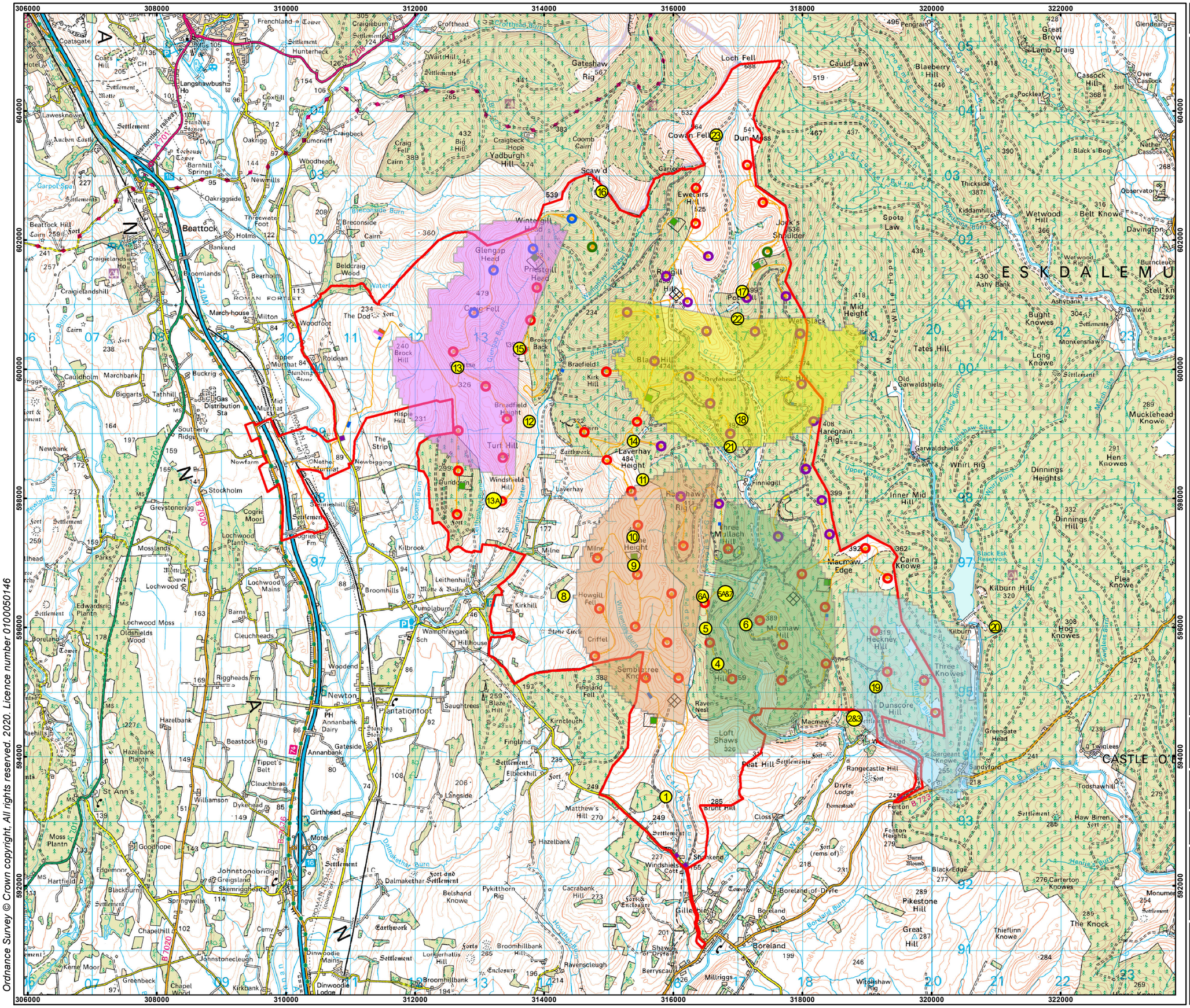


# 374 Scoop Hill

## Legend

- Site Boundary
- Wind Turbine (180m to tip)
- Wind Turbine (200m to tip)
- Wind Turbine (225m to tip)
- Wind Turbine (250m to tip)
- Permanent Met Masts
- Site Entrance
- Access Tracks
- Existing Access Tracks to be Upgraded
- Substation & Control Room
- Substation & Control Room Construction Compound
- Temporary Construction Compound
- Borrow Pit
- Existing Quarries or Borrow Pit
- Borrow Pit Area of Search
- (5) Vantage Point
- VP3 Viewshed
- VP5 Viewshed
- VP6a Viewshed
- VP15 Viewshed
- VP22 Viewshed

Notes: N/A
Revisions: N/A
Layout:374-191212-9018

0 500 1,000 2,000 m
Scale: 1:55,000 @ A3
N

Figure 7.3c Viewsheds for Year 1 of Survey (3)

| | | |
|---|---|---|
| Date: 21/07/2020 | Ref: 374-200721-7354-A | |
| Produced: DW | Reviewed: DR | Approved: GC |


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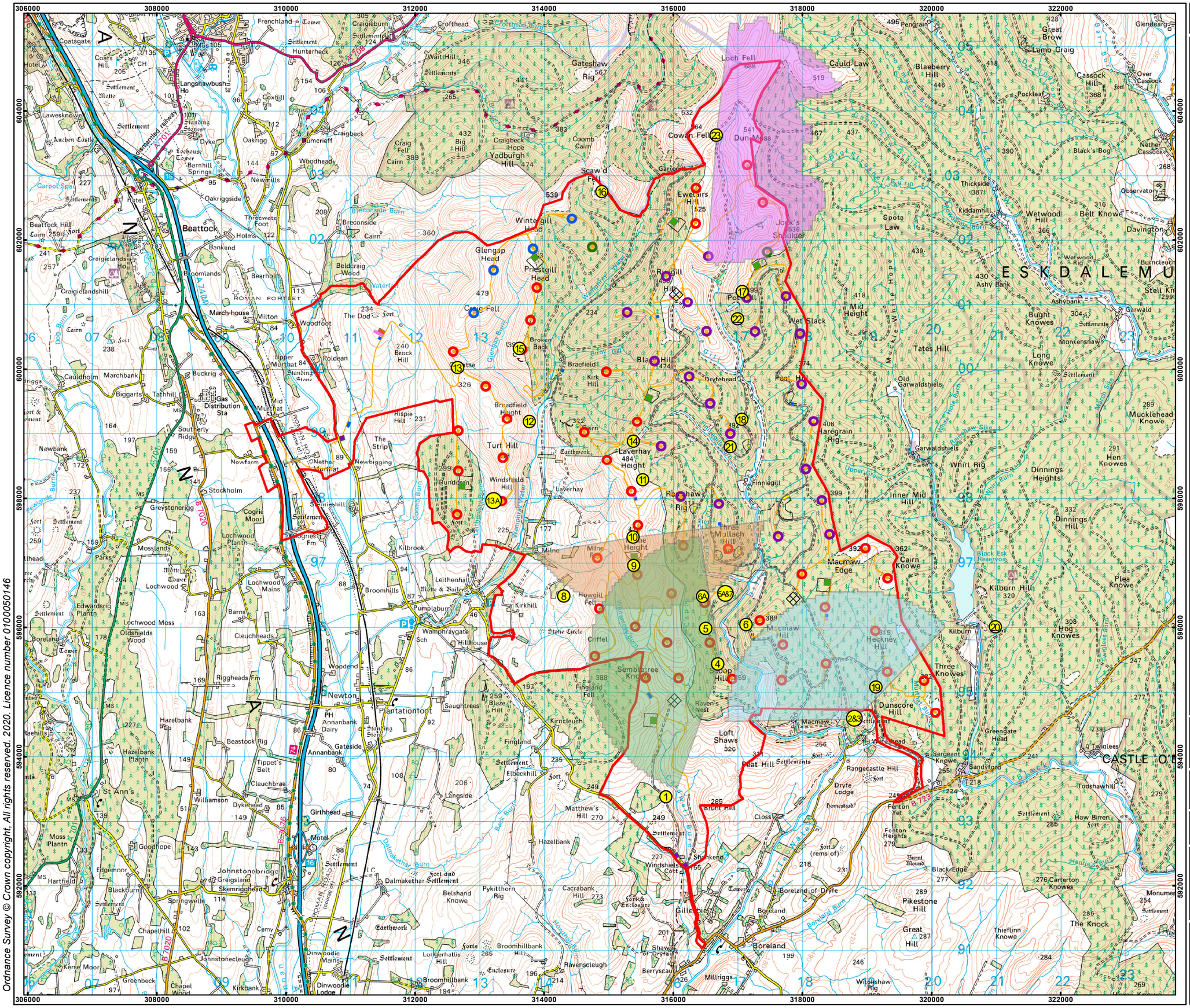


# 374 Scoop Hill

## Legend

- Site Boundary
- Wind Turbine (180m to tip)
- Wind Turbine (200m to tip)
- Wind Turbine (225m to tip)
- Wind Turbine (250m to tip)
- Permanent Met Masts
- Site Entrance
- Access Tracks
- Existing Access Tracks to be Upgraded
- Substation & Control Room
- Substation & Control Room Construction Compound
- Temporary Construction Compound
- Borrow Pit
- Existing Quarries or Borrow Pit
- Borrow Pit Area of Search
- Vantage Point
- VP2 Viewshed
- VP4 Viewshed
- VP10 Viewshed
- VP23 Viewshed

Notes: N/A
Revisions: N/A
Layout:374-191212-9018

0 500 1,000 2,000 m

Scale: 1:55,000 @ A3

N

## Figure 7.3d Viewsheds for Year 1 of Survey (4)

| | | |
|---|---|---|
| Date: 21/07/2020 | Ref: 374-200721-7355-A | |
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# 374 Scoop Hill

## Legend

- Site Boundary
- Wind Turbine (180m to tip)
- Wind Turbine (200m to tip)
- Wind Turbine (225m to tip)
- Wind Turbine (250m to tip)
- Permanent Met Masts
- Site Entrance
- Access Tracks
- Existing Access Tracks to be Upgraded
- Substation & Control Room
- Substation & Control Room Construction Compound
- Temporary Construction Compound
- Borrow Pit
- Existing Quarries or Borrow Pit
- Borrow Pit Area of Search
- Vantage Point
- VP9 Viewshed
- VP12 Viewshed
- VP13a Viewshed
- VP21 Viewshed

Notes: N/A
Revisions: N/A
Layout:374-191212-9018

0 500 1,000 2,000 m
Scale: 1:55,000 @ A3

N

Figure 7.3e Viewsheds for Year 1 of Survey (5)

| | | |
|---|---|---|
| Date: 24/07/2020 | Ref: 374-200724-7360-A | |
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# 374 Scoop Hill

## Legend

- Site Boundary
- Wind Turbine (180m to tip)
- Wind Turbine (200m to tip)
- Wind Turbine (225m to tip)
- Wind Turbine (250m to tip)
- Permanent Met Masts
- Site Entrance
- Access Tracks
- Existing Access Tracks to be Upgraded
- Substation & Control Room
- Substation & Control Room Construction Compound
- Temporary Construction Compound
- Borrow Pit
- Existing Quarries or Borrow Pit
- Borrow Pit Area of Search
- Vantage Point
- VP6 Viewshed
- VP14 Viewshed
- VP16 Viewshed
- VP19 Viewshed

Notes: N/A
Revisions: N/A
Layout:374-191212-9018

0 500 1,000 2,000 m
Scale: 1:55,000 @ A3

N

## Figure 7.3f Viewsheds for Year 1 of Survey (6)

| | | |
|---|---|---|
| Date: 24/07/2020 | Ref: 374-200724-7361-A | |
| Produced: DW | Reviewed: DR | Approved: GC |


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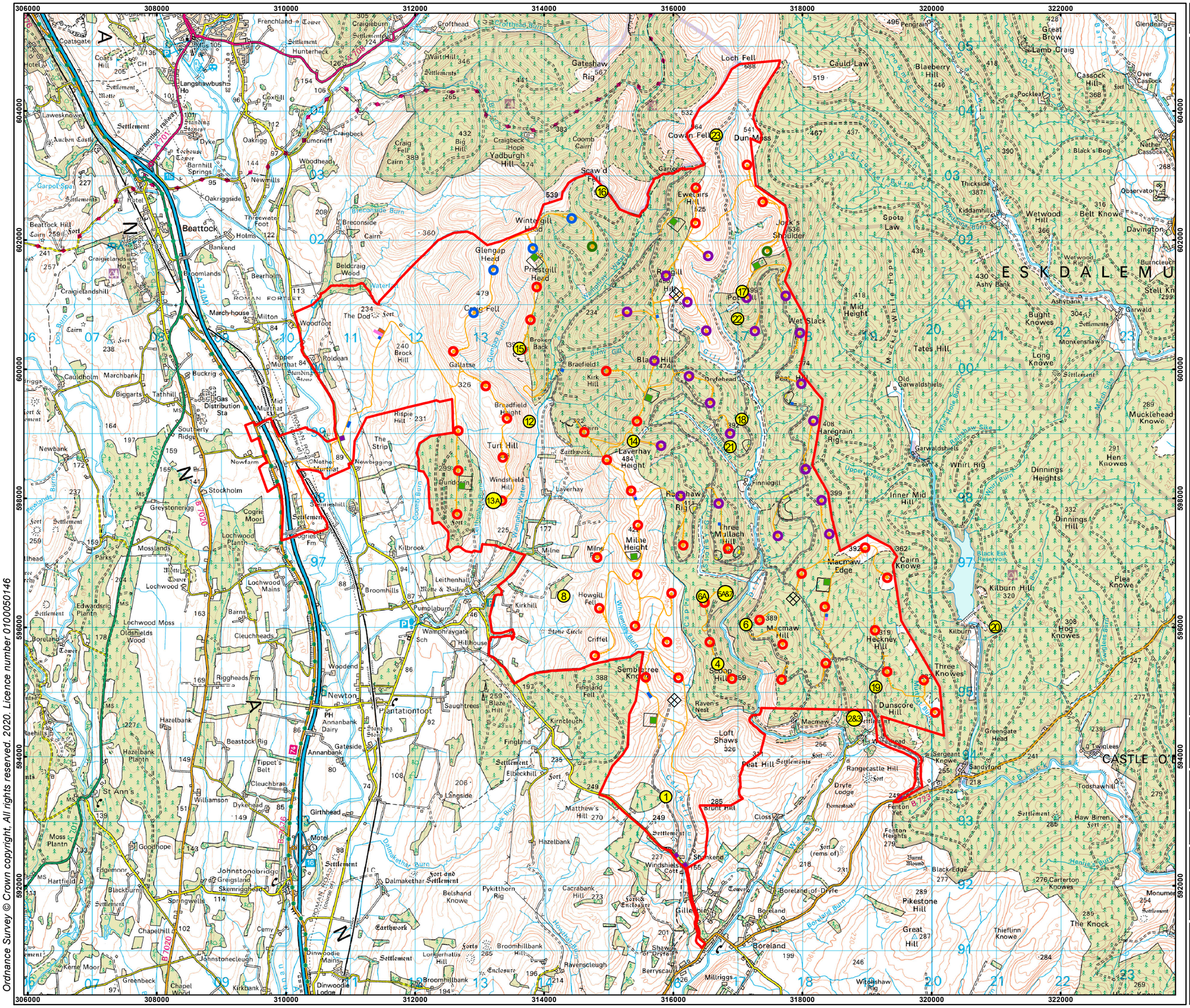

# 374 Scoop Hill

## Legend

- ▭ Site Boundary
- ○ Wind Turbine (180m to tip)
- ○ Wind Turbine (200m to tip)
- ○ Wind Turbine (225m to tip)
- ○ Wind Turbine (250m to tip)
- ◇ Permanent Met Masts
- 🟪 Site Entrance
- 🟧 Access Tracks
- ■ Existing Access Tracks to be Upgraded
- ■ Substation & Control Room
- 🟧 Substation & Control Room Construction Compound
- 🟦 Temporary Construction Compound
- 🟩 Borrow Pit
- 🟨 Existing Quarries or Borrow Pit
- □ Borrow Pit Area of Search
- ⑤ Vantage Point

Notes: N/A
Revisions: N/A
Turbine Layout: 374-191212-9018

0 500 1,000 2,000 m
Scale: 1:55,000 @ A3
N

Figure 7.4 Vantage Points for Year 2 of Survey

| Date: 13/07/2020 | Ref: 374-200713-7346-A | |
|---|---|---|
| Produced: DW | Reviewed: DR | Approved: GC |

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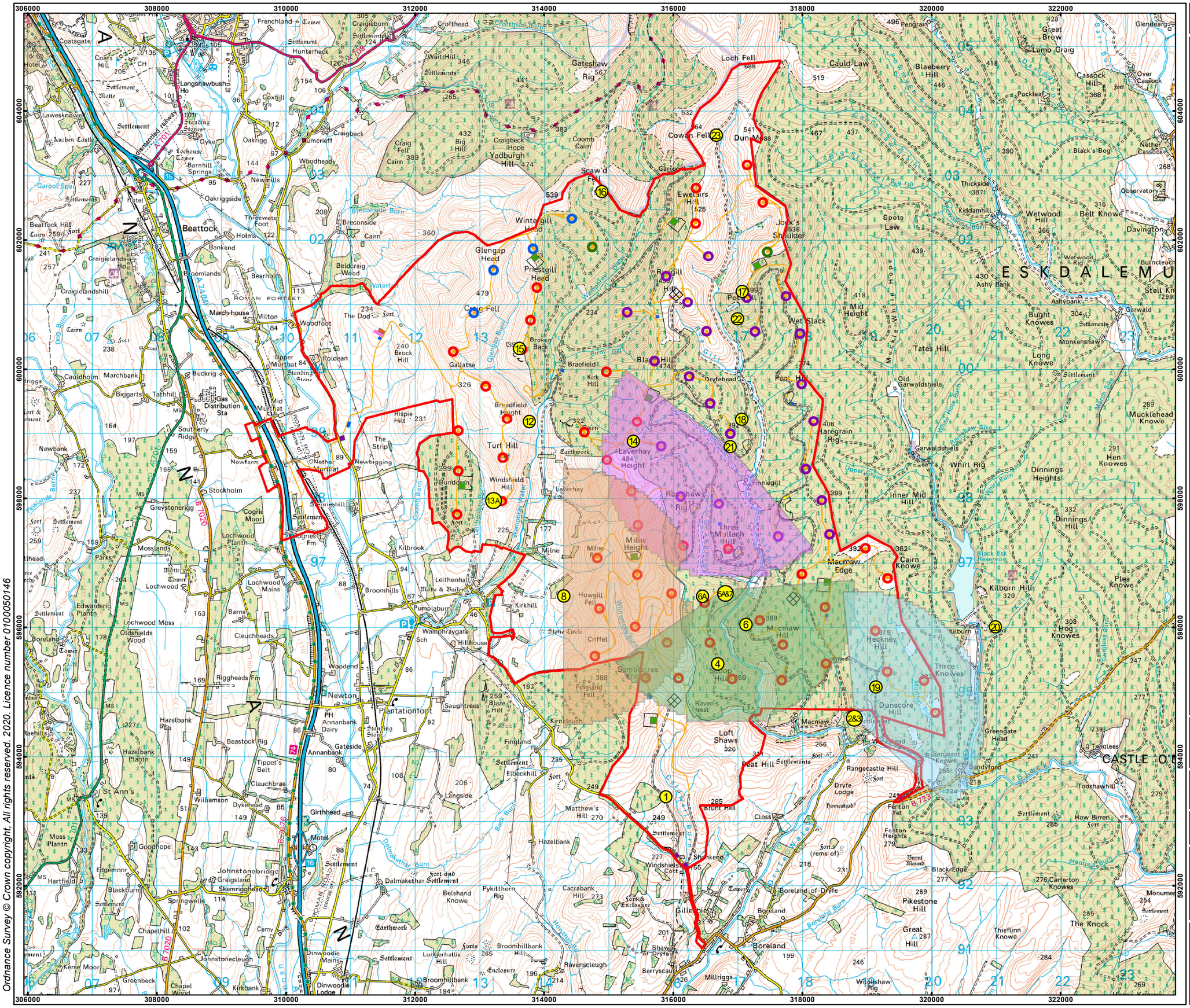


# 374 Scoop Hill

## Legend

- Site Boundary
- Wind Turbine (180m to tip)
- Wind Turbine (200m to tip)
- Wind Turbine (225m to tip)
- Wind Turbine (250m to tip)
- Permanent Met Masts
- Site Entrance
- Access Tracks
- Existing Access Tracks to be Upgraded
- Substation & Control Room
- Substation & Control Room Construction Compound
- Temporary Construction Compound
- Borrow Pit
- Existing Quarries or Borrow Pit
- Borrow Pit Area of Search
- (5) Vantage Point
- VP3 Viewshed
- VP5a Viewshed
- VP8 Viewshed
- VP21 Viewshed

Notes: N/A
Revisions: N/A
Turbine Layout: 374-191212-9018

0 500 1,000 2,000 m
Scale: 1:55,000 @ A3

N

## Figure 7.5a Viewsheds for Year 2 of Survey (1)

| | | |
|---|---|---|
| Date: 23/07/2020 | Ref: 374-200723-7359-A | |
| Produced: DW | Reviewed: DR | Approved: GC |


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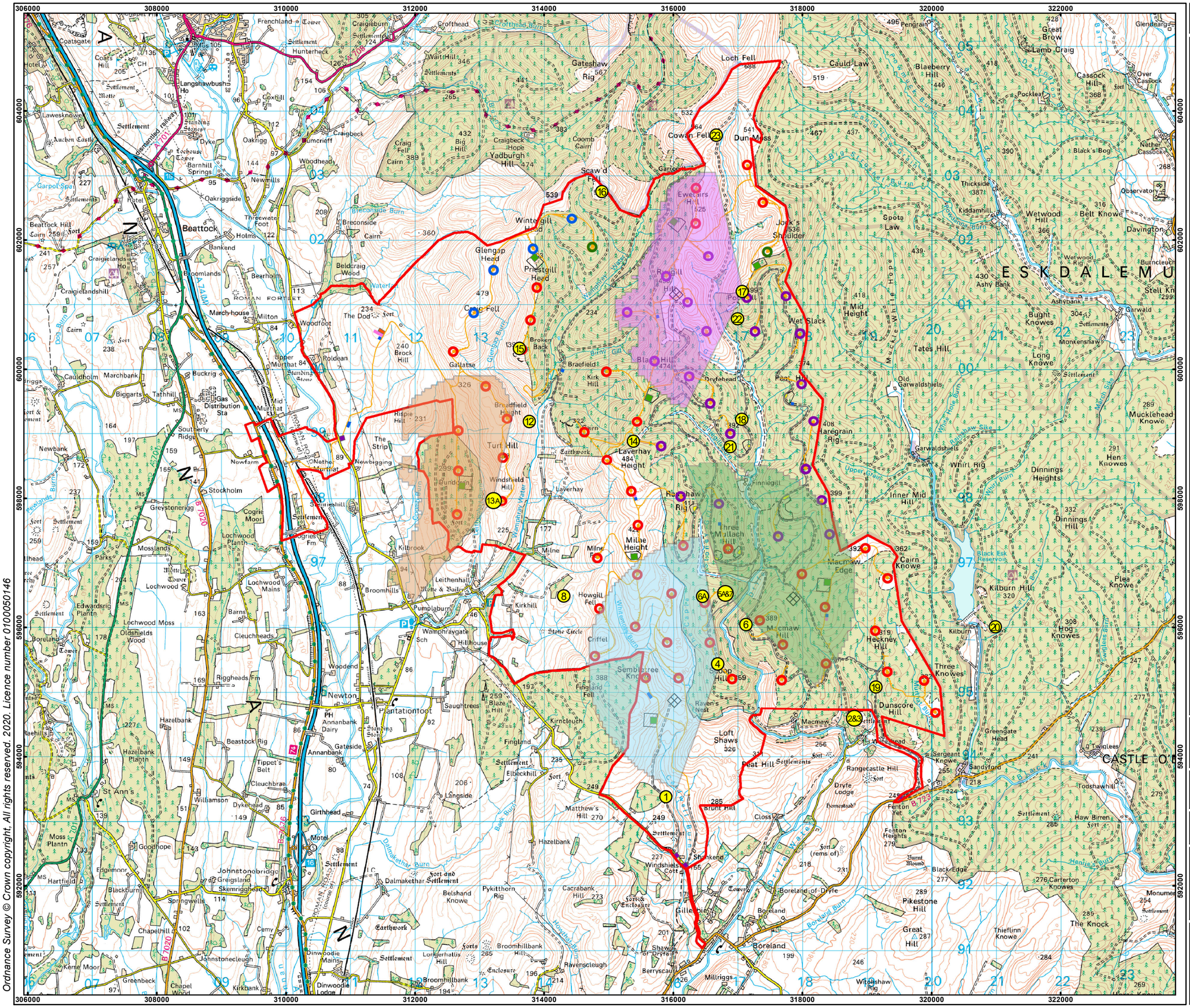

# 374 Scoop Hill

## Legend

- ▭ Site Boundary
- ○ Wind Turbine (180m to tip)
- ○ Wind Turbine (200m to tip)
- ○ Wind Turbine (225m to tip)
- ○ Wind Turbine (250m to tip)
- ◈ Permanent Met Masts
- 🟪 Site Entrance
- 🟧 Access Tracks
- ▩ Existing Access Tracks to be Upgraded
- 🟪 Substation & Control Room
- 🟥 Substation & Control Room Construction Compound
- 🟦 Temporary Construction Compound
- 🟩 Borrow Pit
- 🟨 Existing Quarries or Borrow Pit
- ☐ Borrow Pit Area of Search
- 5 Vantage Point
- 🟦 VP4 Viewshed
- 🟩 VP7 Viewshed
- 🟧 VP13a Viewshed
- 🟪 VP17 Viewshed

Notes: N/A
Revisions: N/A
Turbine Layout: 374-191212-9018

0 500 1,000 2,000 m
Scale: 1:55,000 @ A3
N

## Figure 7.5b Viewsheds for Year 2 of Survey (2)

Date: 23/07/2020 Ref: 374-200723-7358-A
Produced: DW Reviewed: DR Approved: GC

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# 374 Scoop Hill

## Legend

- Site Boundary
- Wind Turbine (180m to tip)
- Wind Turbine (200m to tip)
- Wind Turbine (225m to tip)
- Wind Turbine (250m to tip)
- Permanent Met Masts
- Site Entrance
- Access Tracks
- Existing Access Tracks to be Upgraded
- Substation & Control
- Substation & Control Room Construction Compound
- Temporary Construction Compound
- Borrow Pit
- Existing Quarries or Borrow Pit
- Borrow Pit Area of Search
- Vantage Point
- VP2 Viewshed
- VP6 Viewshed
- VP14 Viewshed
- VP15 Viewshed
- VP23 Viewshed

Notes: N/A
Revisions: N/A
Turbine Layout: 374-191212-9018

0 500 1,000 2,000 m
Scale: 1:55,000 @ A3

N

## Figure 7.5c Viewsheds for Year 2 of Survey (3)

Date: 16/07/2020 Ref: 374-200716-7352-A
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# 374 Scoop Hill

## Legend

- Site Boundary
- Wind Turbine (180m to tip)
- Wind Turbine (200m to tip)
- Wind Turbine (225m to tip)
- Wind Turbine (250m to tip)
- Permanent Met Masts
- Site Entrance
- Access Tracks
- Existing Access Tracks to be Upgraded
- Substation & Control Room
- Substation & Control Room Construction Compound
- Temporary Construction Compound
- Borrow Pit
- Existing Quarries or Borrow Pit
- Borrow Pit Area of Search
- (5) Vantage Point
- VP1 Viewshed Area
- VP16 Viewshed Area
- VP18 Viewshed Area
- VP19 Viewshed Area

Notes: N/A
Revisions: N/A
Turbine Layout: 374-191212-9018

0 500 1,000 2,000 m
Scale: 1:55,000 @ A3

N

## Figure 7.5d Viewsheds for Year 2 of Survey (4)

| | | |
|---|---|---|
| Date: 28/07/2020 | Ref: 374-200728-7366-A | |
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# 374 Scoop Hill

## Legend

- Site Boundary
- Wind Turbine (180m to tip)
- Wind Turbine (200m to tip)
- Wind Turbine (225m to tip)
- Wind Turbine (250m to tip)
- Permanent Met Masts
- Site Entrance
- Access Tracks
- Existing Access Tracks to be Upgraded
- Substation & Control Room
- Substation & Control Room Construction Compound
- Temporary Construction Compound
- Borrow Pit
- Existing Quarries or Borrow Pit
- Borrow Pit Area of Search
- Vantage Point
- VP6a Viewshed Area
- VP12 Viewshed Area
- VP20 Viewshed Area
- VP22 Viewshed Area

Notes: N/A
Revisions: N/A
Turbine Layout: 374-191212-9018

0 500 1,000 2,000 m
Scale: 1:55,000 @ A3
N

Figure 7.5e Viewsheds for Year 2 of Survey (5)

Date: 28/07/2020 Ref: 374-200728-7365-A
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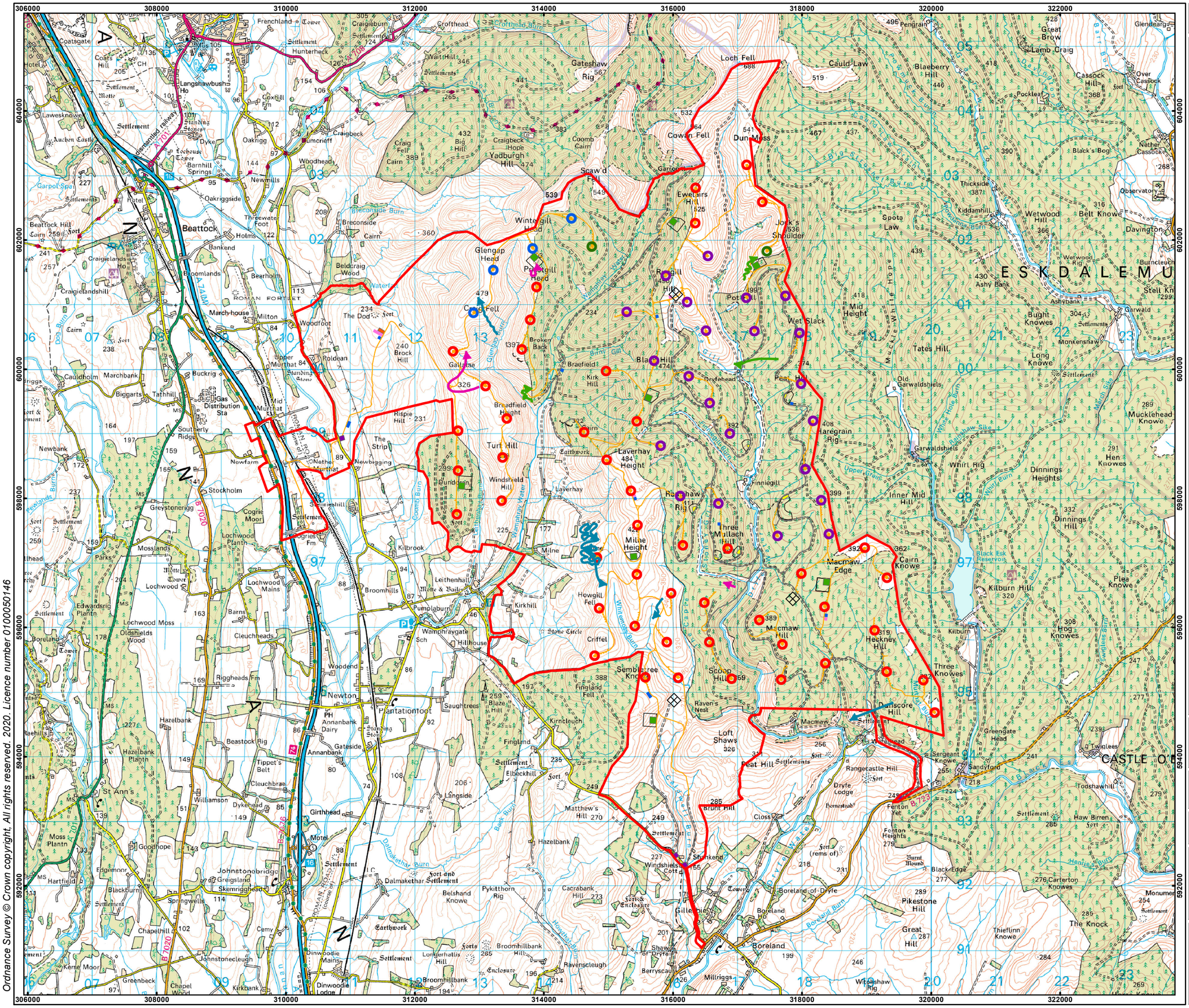

# 374 Scoop Hill

## Legend

- ▭ Site Boundary
- ○ Wind Turbine (180m to tip)
- ○ Wind Turbine (200m to tip)
- ○ Wind Turbine (225m to tip)
- ○ Wind Turbine (250m to tip)
- ◇ Permanent Met Masts
- 🟪 Site Entrance
- 🟧 Access Tracks
- ▨ Existing Access Tracks to be Upgraded
- 🟪 Substation & Control Room
- 🟧 Substation & Control Room Construction Compound
- 🟦 Temporary Construction Compound
- 🟩 Borrow Pit
- 🟨 Existing Quarries or Borrow Pit
- ☐ Borrow Pit Area of Search

Flight Lines

- → 2017
- → 2018
- → 2019

Notes: N/A
Revisions: N/A
Turbine Layout: 374-191212-9018

0 500 1,000 2,000 m
Scale: 1:55,000 @ A3
N

Figure 7.6 Hen Harrier Flights

Date: 21/02/2020 Ref: 374-200221-7241-B
Produced: DW Reviewed: DR Approved: GC

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# 374 Scoop Hill

## Legend

- Site Boundary
- Wind Turbine (180m to tip)
- Wind Turbine (200m to tip)
- Wind Turbine (225m to tip)
- Wind Turbine (250m to tip)
- Permanent Met Masts
- Site Entrance
- Access Tracks
- Existing Access Tracks to be Upgraded
- Substation & Control Room
- Substation & Control Room Construction Compound
- Temporary Construction Compound
- Borrow Pit
- Existing Quarries or Borrow Pit
- Borrow Pit Area of Search

Flight Lines

- 2017
- 2018
- 2019

Notes: N/A
Revisions: N/A
Turbine Layout: 374-191212-9018

0 500 1,000 2,000 m

Scale: 1:55,000 @ A3

N

## Figure 7.7 Peregrine Flights

| | | |
|---|---|---|
| Date: 21/02/2020 | Ref: 374-200221-7247-B | |
| Produced: DW | Reviewed: DR | Approved: GC |


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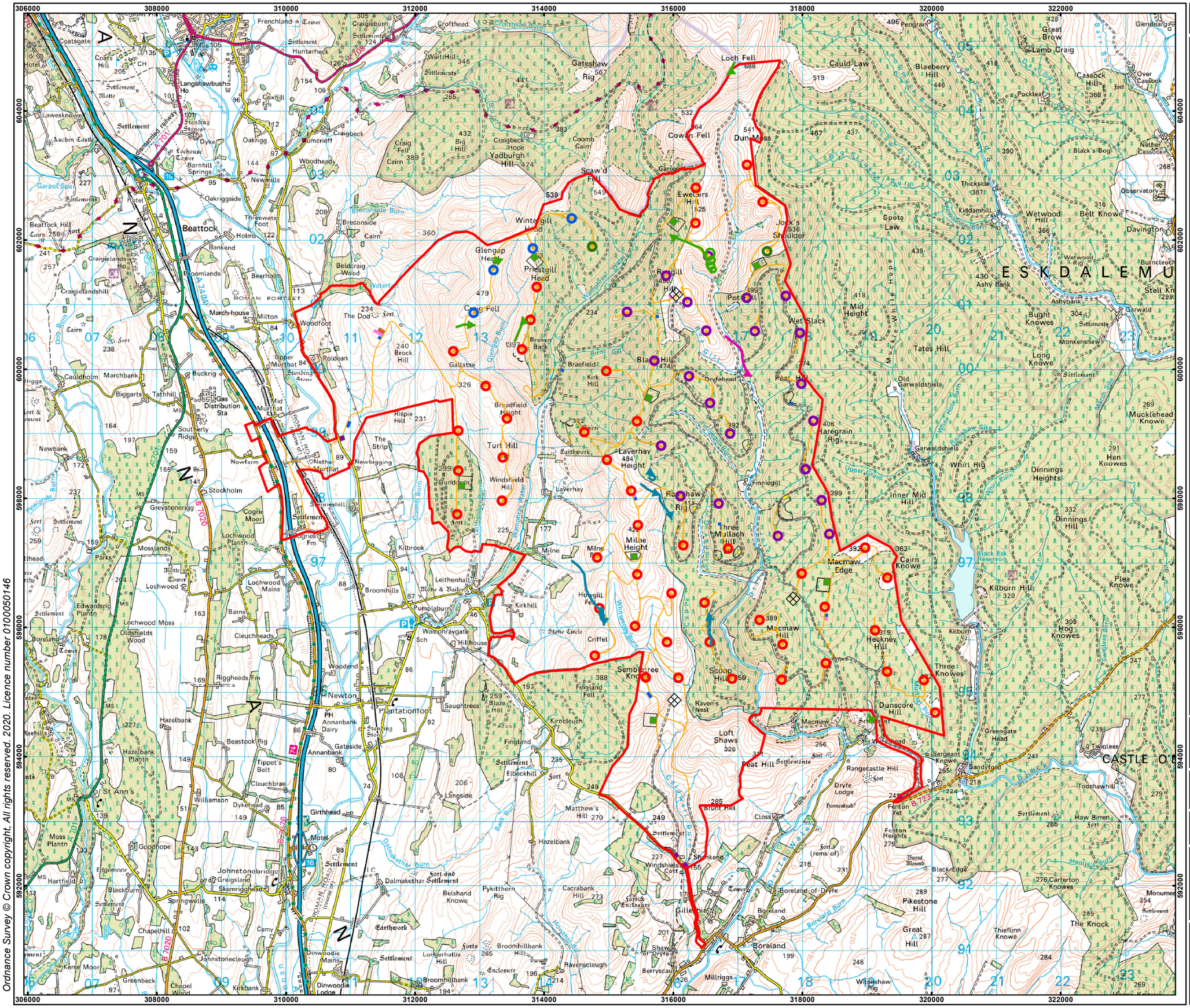


# 374 Scoop Hill

## Legend

- Site Boundary
- Wind Turbine (180m to tip)
- Wind Turbine (200m to tip)
- Wind Turbine (225m to tip)
- Wind Turbine (250m to tip)
- Permanent Met Masts
- Site Entrance
- Access Tracks
- Existing Access Tracks to be Upgraded
- Substation & Control Room
- Substation & Control Room Construction Compound
- Temporary Construction Compound
- Borrow Pit
- Existing Quarries or Borrow Pit
- Borrow Pit Area of Search

Flight Lines

- 2017
- 2018
- 2019

Notes: N/A
Revisions: N/A
Turbine Layout: 374-191212-9018

0 500 1,000 2,000 m

Scale: 1:55,000 @ A3

N

## Figure 7.8 Merlin Flights

| | | |
|---|---|---|
| Date: 21/02/2020 | Ref: 374-200221-7244-B | |
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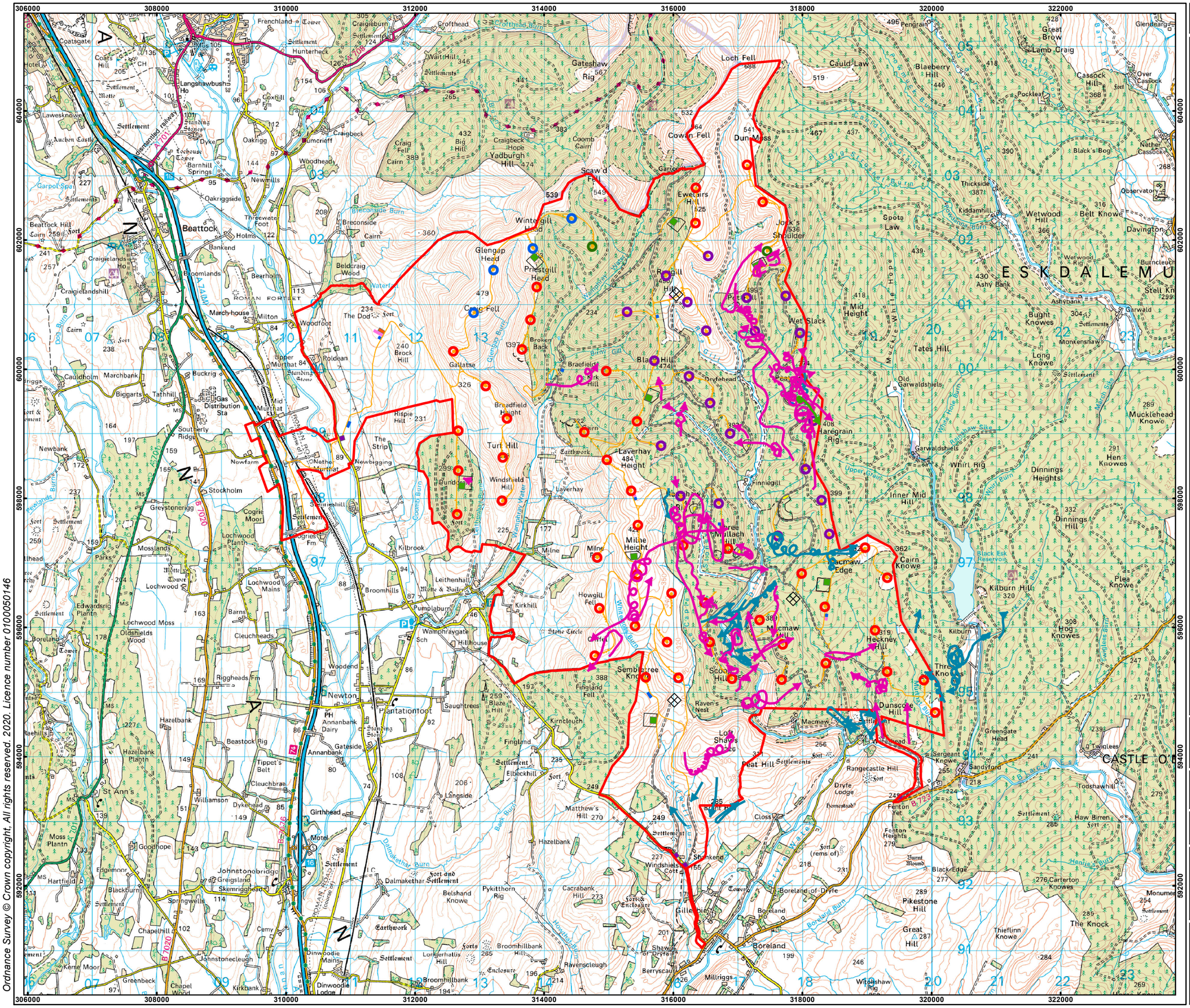

# 374 Scoop Hill

## Legend

- 🟥 Site Boundary
- ○ Wind Turbine (180m to tip)
- ○ Wind Turbine (200m to tip)
- ○ Wind Turbine (225m to tip)
- ○ Wind Turbine (250m to tip)
- ◇ Permanent Met Masts
- ■ Site Entrance
- ■ Access Tracks
- ■ Existing Access Tracks to be Upgraded
- ■ Substation & Control Room
- ■ Substation & Control Room Construction Compound
- ■ Temporary Construction Compound
- 🟩 Borrow Pit
- ■ Existing Quarries or Borrow Pit
- ☐ Borrow Pit Area of Search

Flight Lines

- → 2017
- → 2018
- → 2019

Notes: N/A
Revisions: N/A
Turbine Layout: 374-191212-9018

0 500 1,000 2,000 m
Scale: 1:55,000 @ A3
N

# Figure 7.9 Goshawk Flights

Date: 21/02/2020 Ref: 374-200221-7238-B
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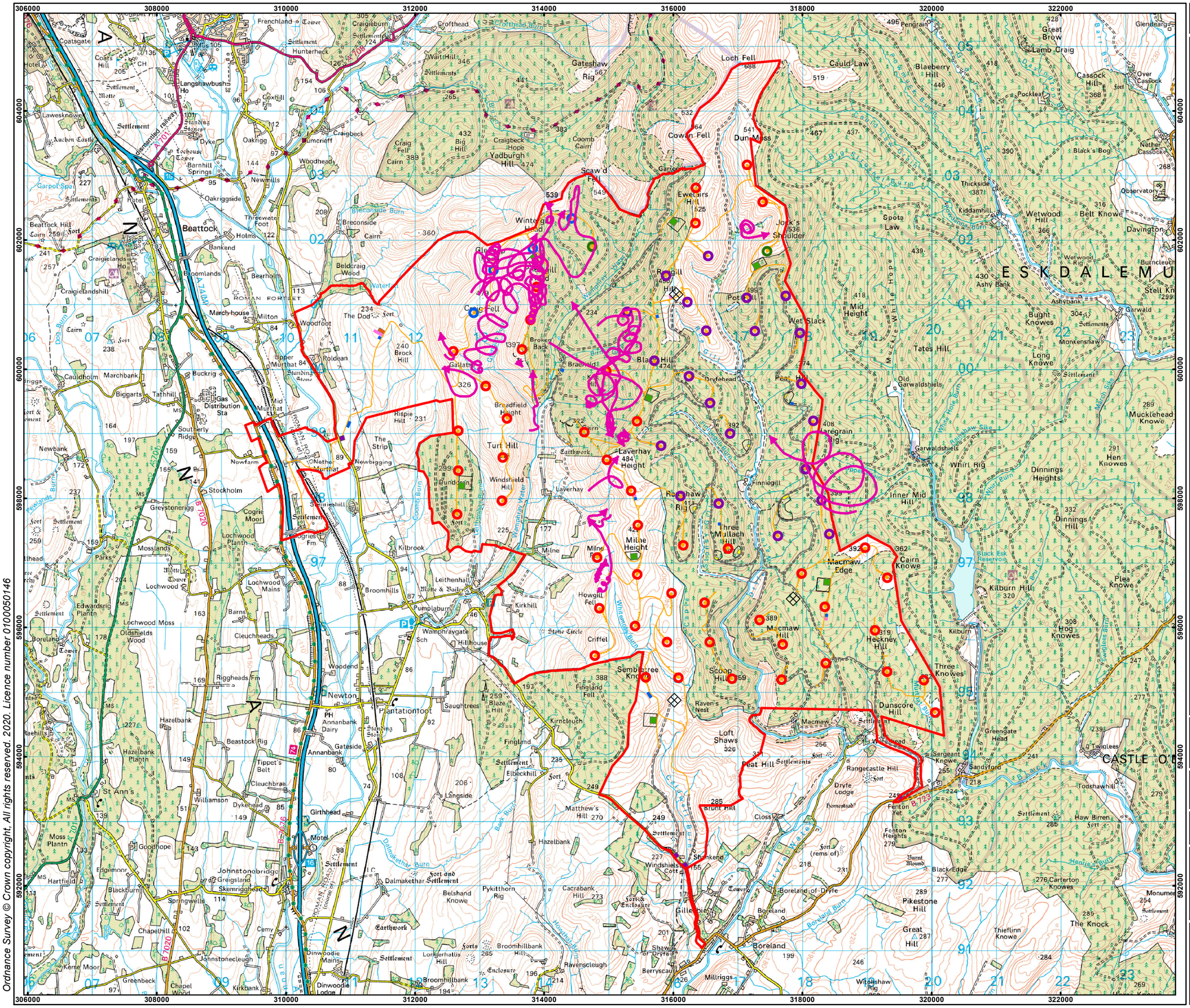
# 374 Scoop Hill



## Legend

- 🟥 Site Boundary
- ○ Wind Turbine (180m to tip)
- ○ Wind Turbine (200m to tip)
- ○ Wind Turbine (225m to tip)
- ○ Wind Turbine (250m to tip)
- ◈ Permanent Met Masts
- 🟪 Site Entrance
- 🟧 Access Tracks
- ▨ Existing Access Tracks to be Upgraded
- 🟪 Substation & Control Room
- 🟧 Substation & Control Room Construction Compound
- 🟦 Temporary Construction Compound
- 🟩 Borrow Pit
- 🟨 Existing Quarries or Borrow Pit
- ☐ Borrow Pit Area of Search

Flight Lines

- → 2018

<u>Notes:</u> N/A
<u>Revisions:</u> N/A
<u>Turbine Layout:</u> 374-191212-9018

0 500 1,000 2,000 m
Scale: 1:55,000 @ A3
N

Figure 7.10a Golden Eagle Flights

Date: 21/02/2020 Ref: 374-200221-7236-C
Produced: DW Reviewed: DR Approved: GC

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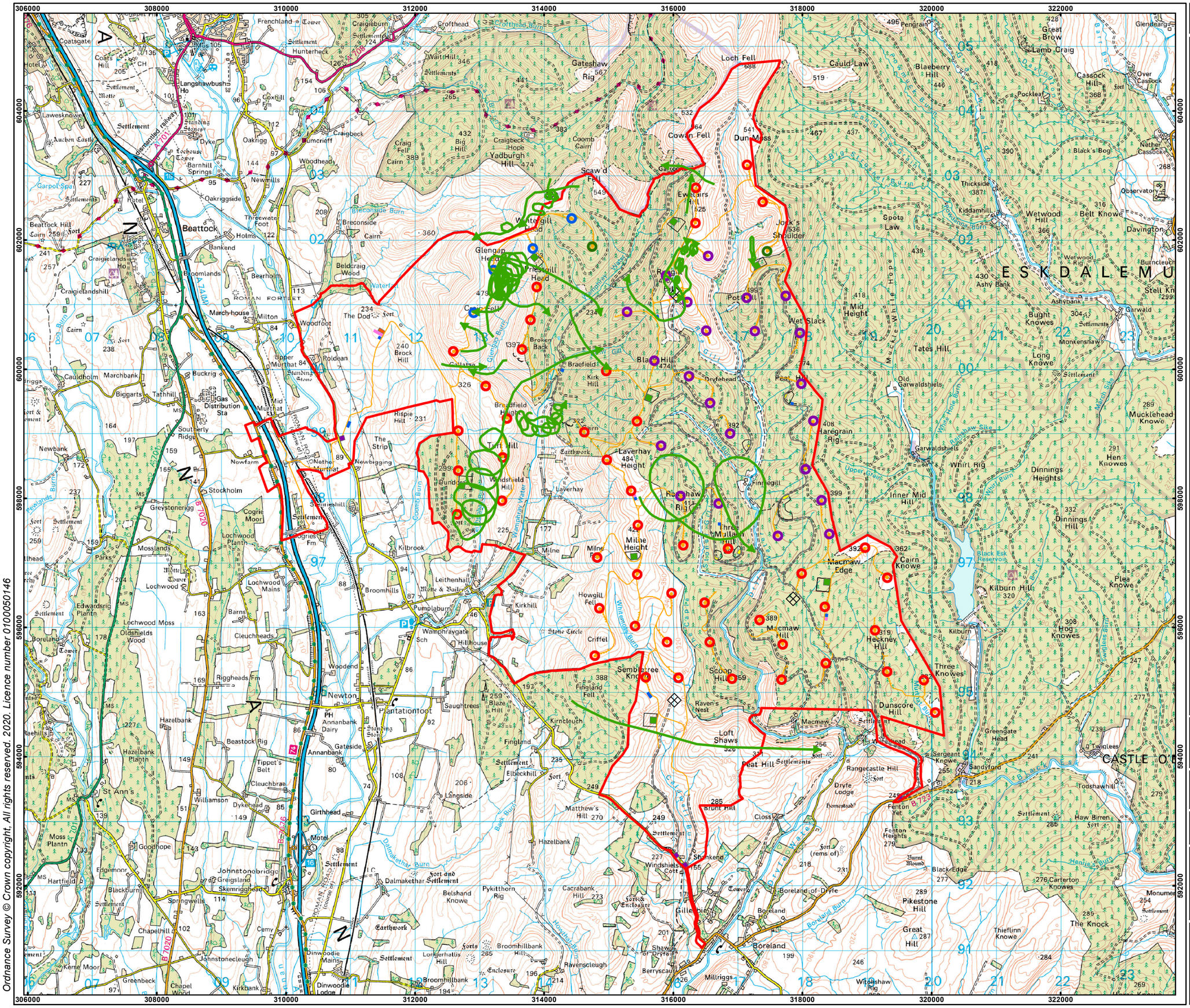

374 Scoop Hill

## Legend

- 🟥 Site Boundary
- ○ Wind Turbine (180m to tip)
- ○ Wind Turbine (200m to tip)
- ○ Wind Turbine (225m to tip)
- ○ Wind Turbine (250m to tip)
- ◈ Permanent Met Masts
- ■ Site Entrance
- ■ Access Tracks
- ■ Existing Access Tracks to be Upgraded
- ■ Substation & Control Room
- ■ Substation & Control Room Construction Compound
- ■ Temporary Construction Compound
- 🟩 Borrow Pit
- ■ Existing Quarries or Borrow Pit
- ☐ Borrow Pit Area of Search

Flight Lines

- → 2019

Notes: N/A
Revisions: N/A
Turbine Layout: 374-191212-9018

0 500 1,000 2,000 m
Scale: 1:55,000 @ A3
N

Figure 7.10b Golden Eagle Flights

Date: 28/07/2020 Ref: 374-200728-7363-A
Produced: DW Reviewed: DR Approved: GC

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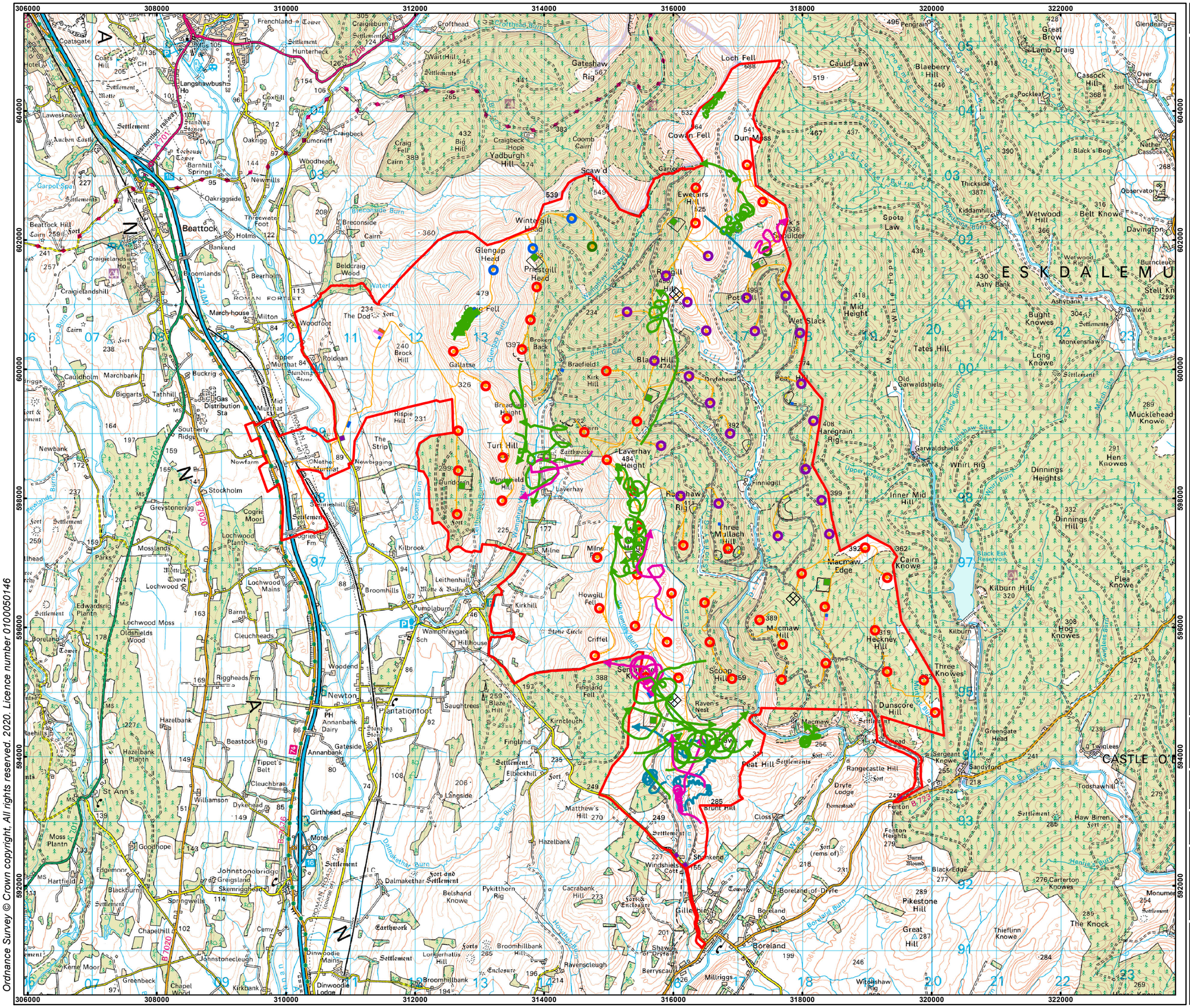


# 374 Scoop Hill

## Legend

- Site Boundary
- Wind Turbine (180m to tip)
- Wind Turbine (200m to tip)
- Wind Turbine (225m to tip)
- Wind Turbine (250m to tip)
- Permanent Met Masts
- Site Entrance
- Access Tracks
- Existing Access Tracks to be Upgraded
- Substation & Control Room
- Substation & Control Room Construction Compound
- Temporary Construction Compound
- Borrow Pit
- Existing Quarries or Borrow Pit
- Borrow Pit Area of Search

Flight Lines

- 2017
- 2018
- 2019

Notes: N/A
Revisions: N/A
Turbine Layout: 374-191212-9018

0 500 1,000 2,000 m

Scale: 1:55,000 @ A3

N

## Figure 7.11 Red Kite Flights

| | | |
|---|---|---|
| Date: 21/02/2020 | Ref: 374-200221-7243-B | |
| Produced: DW | Reviewed:DR | Approved: GC |


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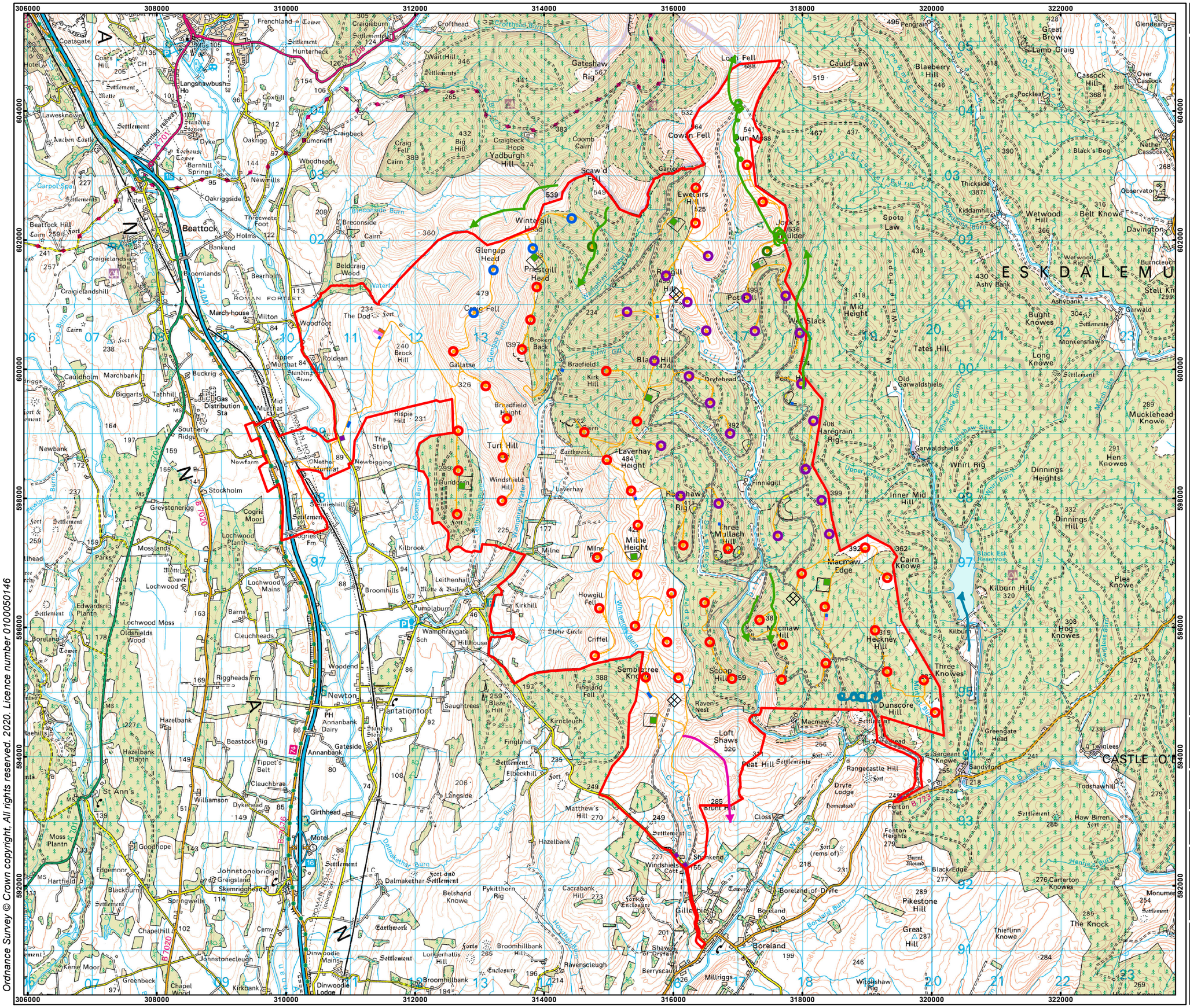

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# 374 Scoop Hill

## Legend

- ▭ Site Boundary
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- ○ Wind Turbine (200m to tip)
- ○ Wind Turbine (225m to tip)
- ○ Wind Turbine (250m to tip)
- ◇ Permanent Met Masts
- 🟪 Site Entrance
- 🟧 Access Tracks
- ▨ Existing Access Tracks to be Upgraded
- 🟪 Substation & Control Room
- 🟧 Substation & Control Room Construction Compound
- 🟦 Temporary Construction Compound
- 🟩 Borrow Pit
- 🟨 Existing Quarries or Borrow Pit
- ☐ Borrow Pit Area of Search

Flight Lines

- → 2017
- → 2018
- → 2019

Notes: N/A
Revisions: N/A
Turbine Layout: 374-191212-9018

0 500 1,000 2,000 m
Scale: 1:55,000 @ A3
N

## Figure 7.12 Osprey Flights

Date: 23/06/2020 Ref: 374-200623-7341-B
Produced: DW Reviewed: DR Approved: GC

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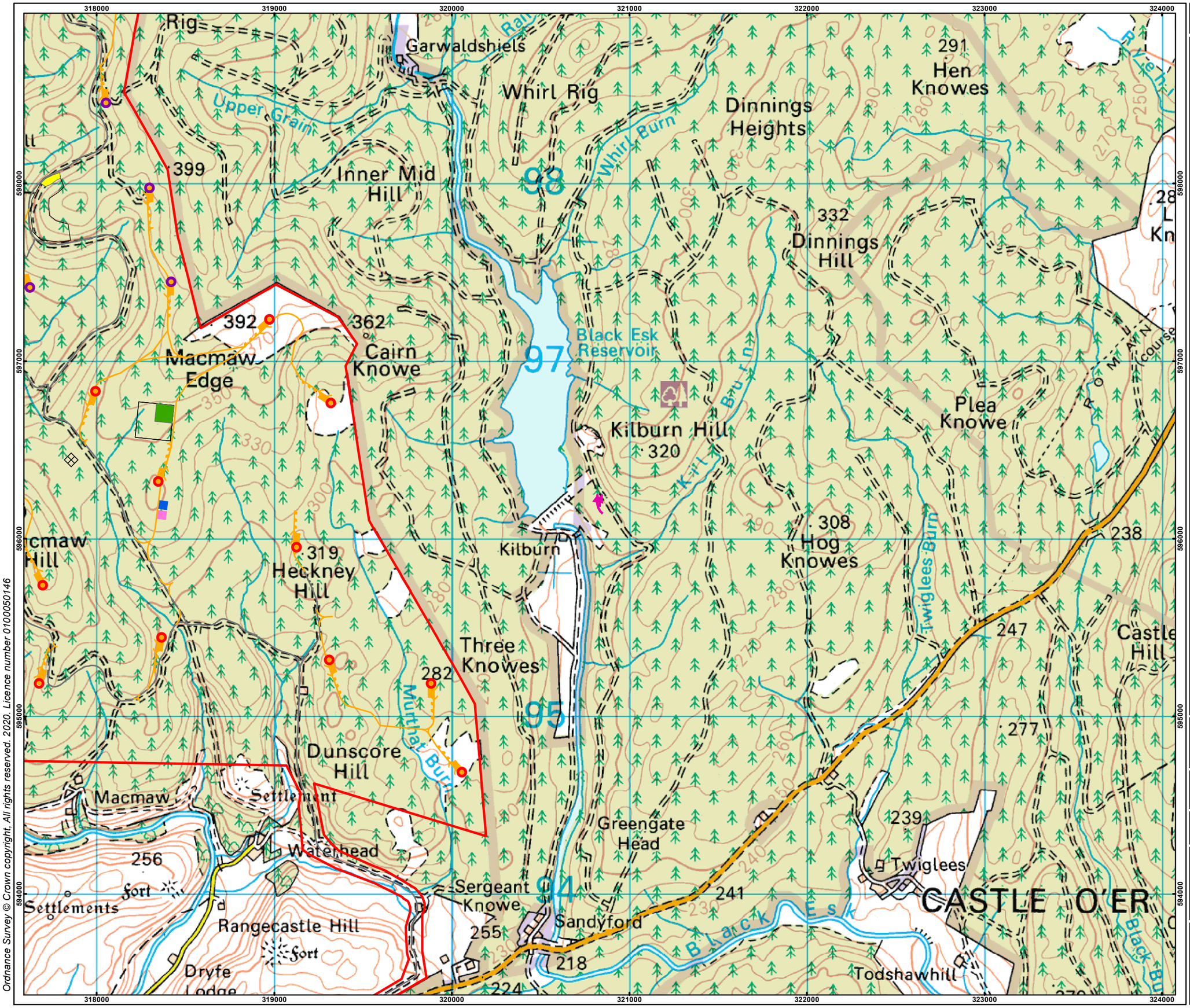


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## 374 Scoop Hill

### Legend

- Site Boundary
- Wind Turbine (180m to tip)
- Wind Turbine (200m to tip)
- Wind Turbine (225m to tip)
- Wind Turbine (250m to tip)
- Permanent Met Masts
- Site Entrance
- Access Tracks
- Existing Access Tracks to be Upgraded
- Substation & Control Room
- Substation & Control Room Construction Compound
- Temporary Construction Compound
- Borrow Pit
- Existing Quarries or Borrow Pit
- Borrow Pit Area of Search

Flight Lines

- 2017

Notes: N/A
Revisions: N/A
Turbine Layout: 374-191212-9018

0 250 500 1,000 m

Scale: 1:20,000 @ A3

N

Figure 7.13 Hobby Flights

| | | |
|---|---|---|
| Date: 21/02/2020 | Ref: 374-200221-7242-C | |
| Produced: DW | Reviewed: DR | Approved: GC |


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# 374 Scoop Hill

## Legend

- Site Boundary
- Wind Turbine (180m to tip)
- Wind Turbine (200m to tip)
- Wind Turbine (225m to tip)
- Wind Turbine (250m to tip)
- Permanent Met Masts
- Site Entrance
- Access Tracks
- Existing Access Tracks to be Upgraded
- Substation & Control Room
- Substation & Control Room Construction Compound
- Temporary Construction Compound
- Borrow Pit
- Existing Quarries or Borrow Pit
- Borrow Pit Area of Search

### Flights Lines

- 2017
- 2018
- 2019

Notes: N/A
Revisions: N/A
Turbine Layout: 374-191212-9018

0 500 1,000 2,000 m

Scale: 1:55,000 @ A3

N

## Figure 7.14 Golden Plover Flights

| | | |
|---|---|---|
| Date: 21/02/2020 | Ref: 374-200221-7240-B | |
| Produced: DW | Reviewed: DR | Approved: GC |


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# 374 Scoop Hill

## Legend

- Site Boundary
- Wind Turbine (180m to tip)
- Wind Turbine (200m to tip)
- Wind Turbine (225m to tip)
- Wind Turbine (250m to tip)
- Permanent Met Masts
- Site Entrance
- Access Tracks
- Existing Access Tracks to be Upgraded
- Substation & Control Room
- Substation & Control Room Construction Compound
- Temporary Construction Compound
- Borrow Pit
- Existing Quarries or Borrow Pit
- Borrow Pit Area of Search

Flight Lines

- 2017
- 2018
- 2019

Notes: N/A
Revisions: N/A
Turbine Layout: 374-191212-9018

0 500 1,000 2,000 m

Scale: 1:55,000 @ A3

N

## Figure 7.15 Curlew Flights

| | | |
|---|---|---|
| Date: 21/02/2020 | Ref: 374-200221-7235-B | |
| Produced: DW | Reviewed: DR | Approved: GC |


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# 374 Scoop Hill

## Legend

- Site Boundary
- Wind Turbine (180m to tip)
- Wind Turbine (200m to tip)
- Wind Turbine (225m to tip)
- Wind Turbine (250m to tip)
- Permanent Met Masts
- Site Entrance
- Access Tracks
- Existing Access Tracks to be Upgraded
- Substation & Control Room
- Substation & Control Room Construction Compound
- Temporary Construction Compound
- Borrow Pit
- Existing Quarries or Borrow Pit
- Borrow Pit Area of Search

Flight Lines

- 2018

Notes: N/A
Revisions: N/A
Turbine Layout: 374-191212-9018

0 500 1,000 2,000 m

Scale: 1:55,000 @ A3

N

## Figure 7.16 Oystercatcher Flights

| | | |
|---|---|---|
| Date: 21/02/2020 | Ref: 374-200221-7246-B | |
| Produced: DW | Reviewed: DR | Approved: GC |


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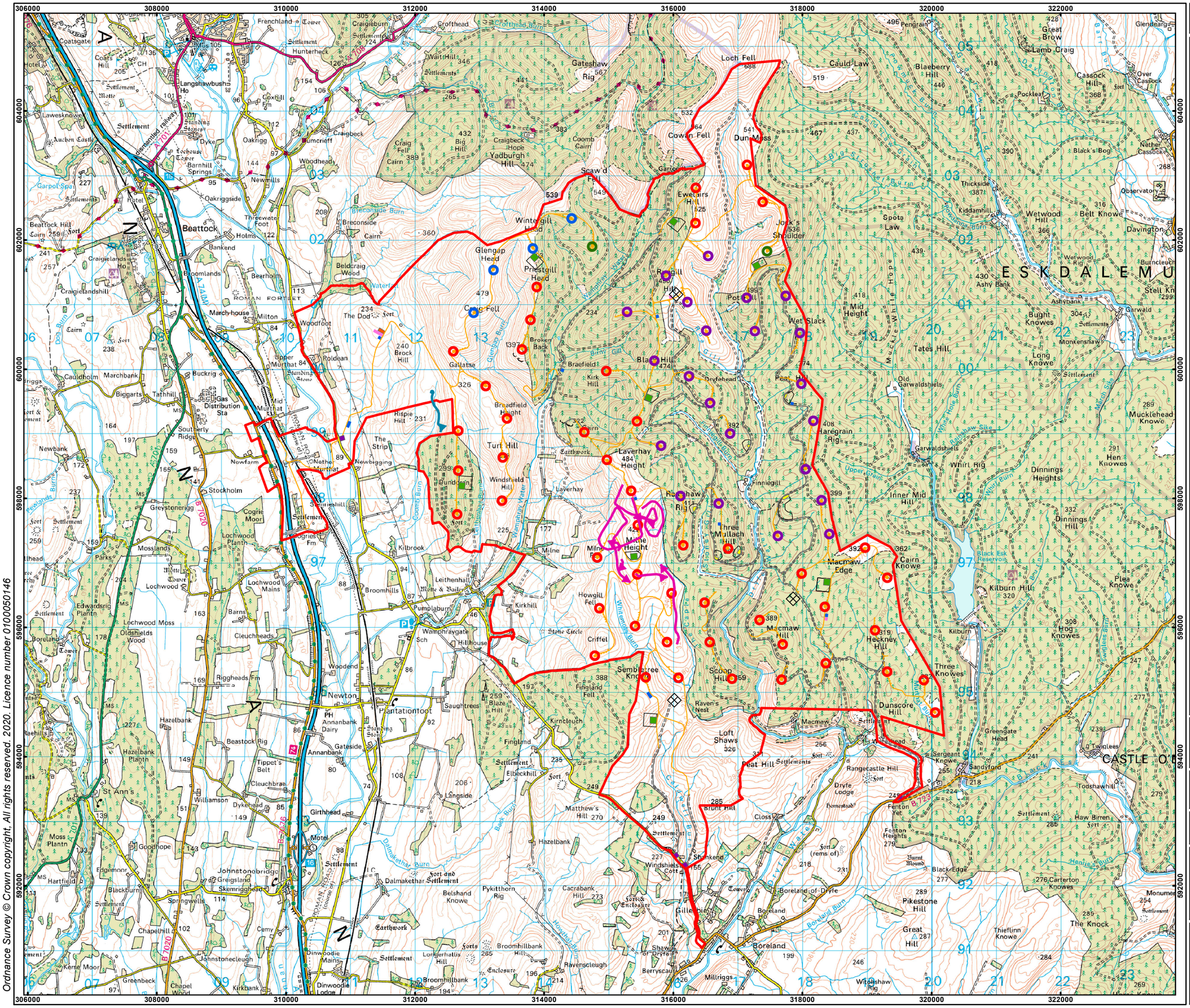


# 374 Scoop Hill

## Legend

- Site Boundary
- Wind Turbine (180m to tip)
- Wind Turbine (200m to tip)
- Wind Turbine (225m to tip)
- Wind Turbine (250m to tip)
- Permanent Met Masts
- Site Entrance
- Access Tracks
- Existing Access Tracks to be Upgraded
- Substation & Control Room
- Substation & Control Room Construction Compound
- Temporary Construction Compound
- Borrow Pit
- Existing Quarries or Borrow Pit
- Borrow Pit Area of Search

### Flight Lines

- 2017
- 2018

Notes: N/A
Revisions: N/A
Turbine Layout: 374-191212-9018

0 500 1,000 2,000 m

Scale: 1:55,000 @ A3

N

## Figure 7.17 Snipe Flights

| | | |
|---|---|---|
| Date: 24/02/2020 | Ref: 374-200221-7249-B | |
| Produced: DW | Reviewed: DR | Approved: GC |


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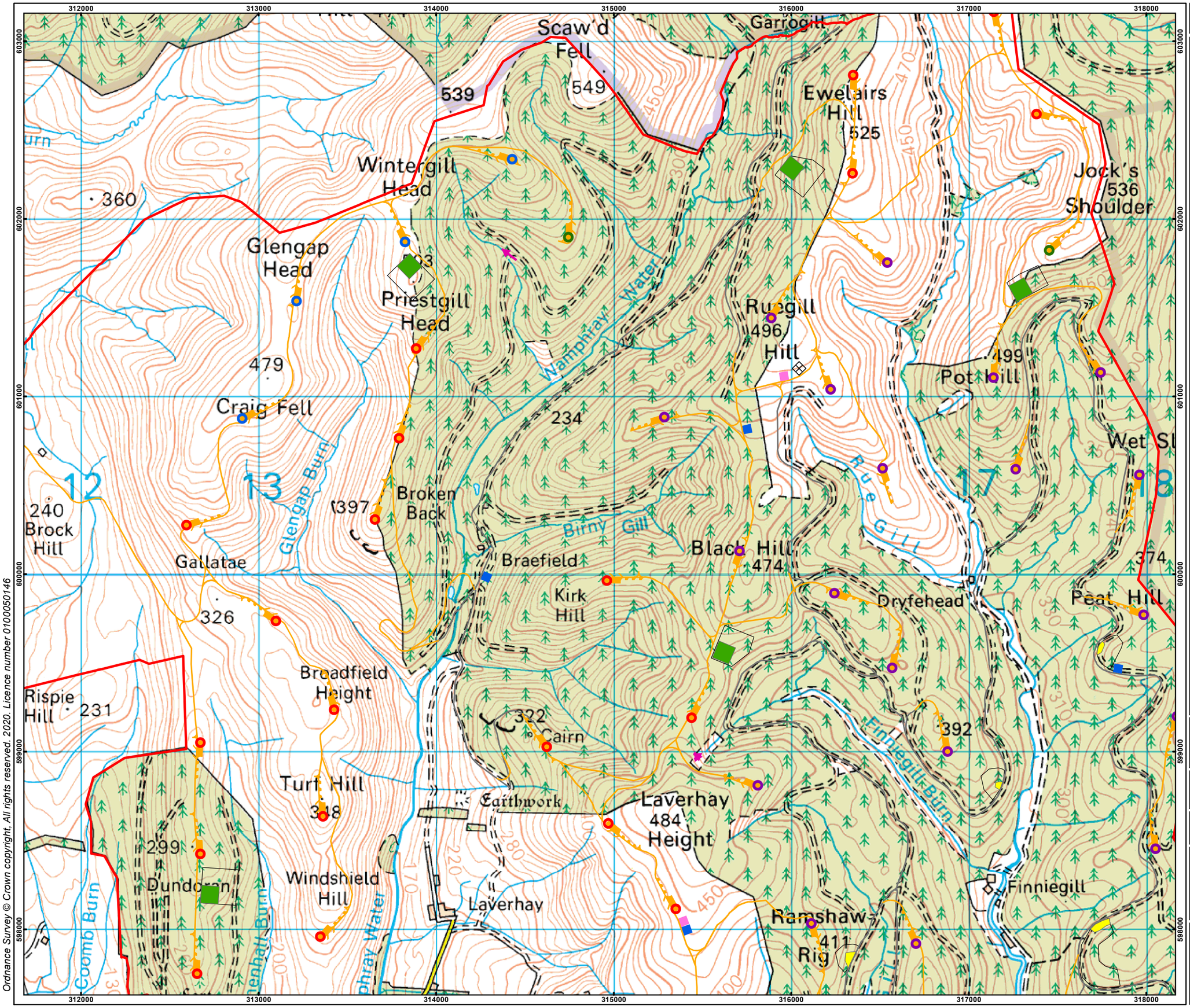




374 Scoop Hill

## Legend

- Site Boundary
- Wind Turbine (180m to tip)
- Wind Turbine (200m to tip)
- Wind Turbine (225m to tip)
- Wind Turbine (250m to tip)
- Permanent Met Masts
- Site Entrance
- Access Tracks
- Existing Access Tracks to be Upgraded
- Substation & Control Room
- Substation & Control Room Construction Compound
- Temporary Construction Compound
- Borrow Pit
- Existing Quarries or Borrow Pit
- Borrow Pit Area of Search

Flight Lines

- 2018

Notes: N/A
Revisions: N/A
Turbine Layout: 374-191212-9018

0 250 500 1,000 m

Scale: 1:20,000 @ A3

N

Figure 7.18 Woodcock Flights

| | | |
|---|---|---|
| Date: 24/02/2020 | Ref: 374-200224-7250-C | |
| Produced: DW | Reviewed: DR | Approved: GC |

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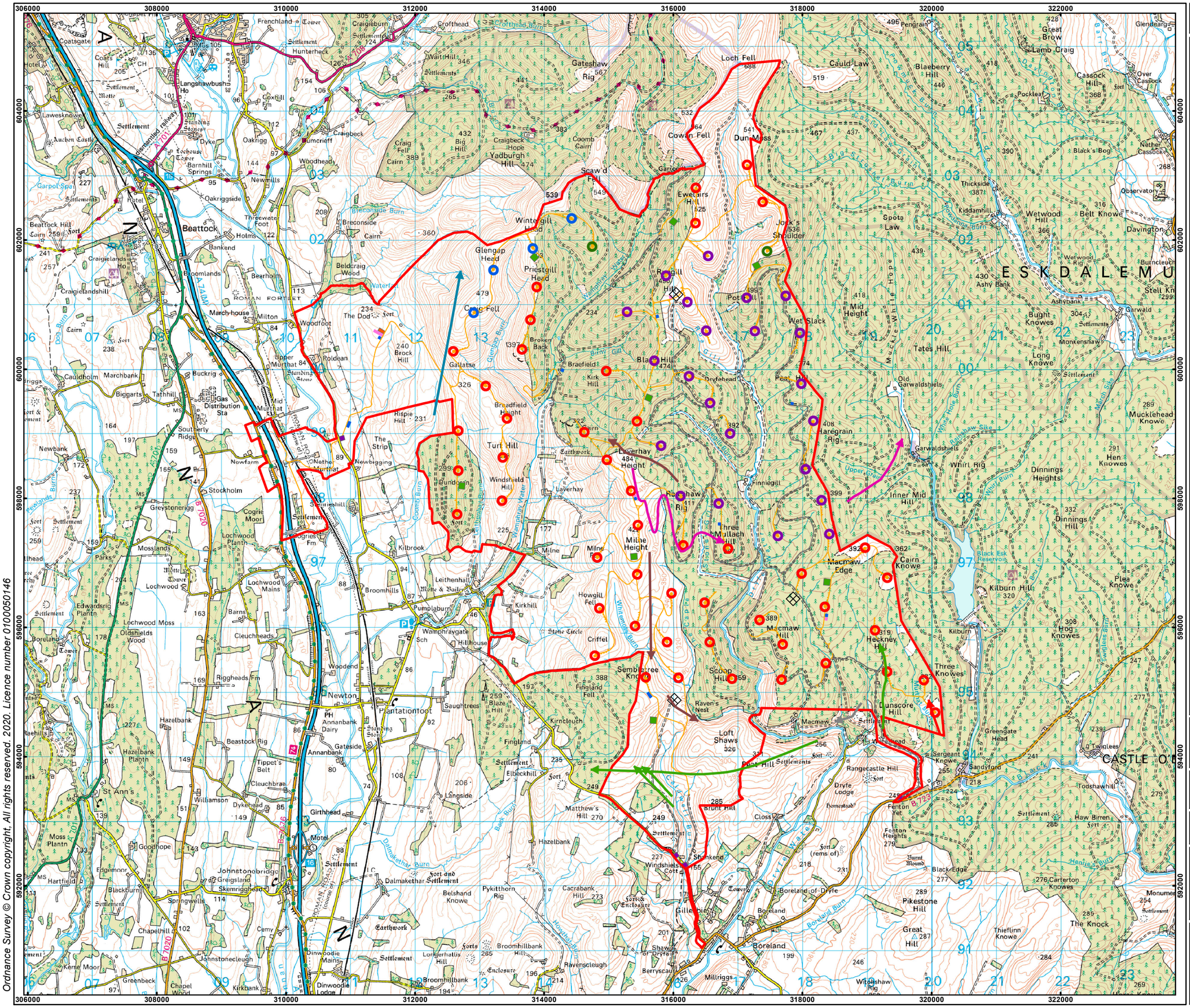

# 374 Scoop Hill

## Legend

🟥 Site Boundary
○ Wind Turbine (180m to tip)
○ Wind Turbine (200m to tip)
○ Wind Turbine (225m to tip)
○ Wind Turbine (250m to tip)
◈ Permanent Met Masts
🟪 Site Entrance
🟧 Access Tracks
⬛ Existing Access Tracks to be Upgraded
🟪 Substation & Control Room
🟧 Substation & Control Room Construction Compound
🟦 Temporary Construction Compound
🟩 Borrow Pit

Unidentified Geese Flights
→ 2018
→ 2019

Pink - Footed Goose Flights
→ 2017
→ 2018
→ 2019

Whooper Swan Flights
→ 2018

Notes: N/A
Revisions: N/A
Turbine Layout: 374-191212-9018

0 500 1,000 2,000 m
Scale: 1:55,000 @ A3
N

Figure 7.19 Whooper Swan and Geese Flights

Date: 21/02/2020 Ref: 374-200608-7316-B
Produced: DW Reviewed: DR Approved: GC

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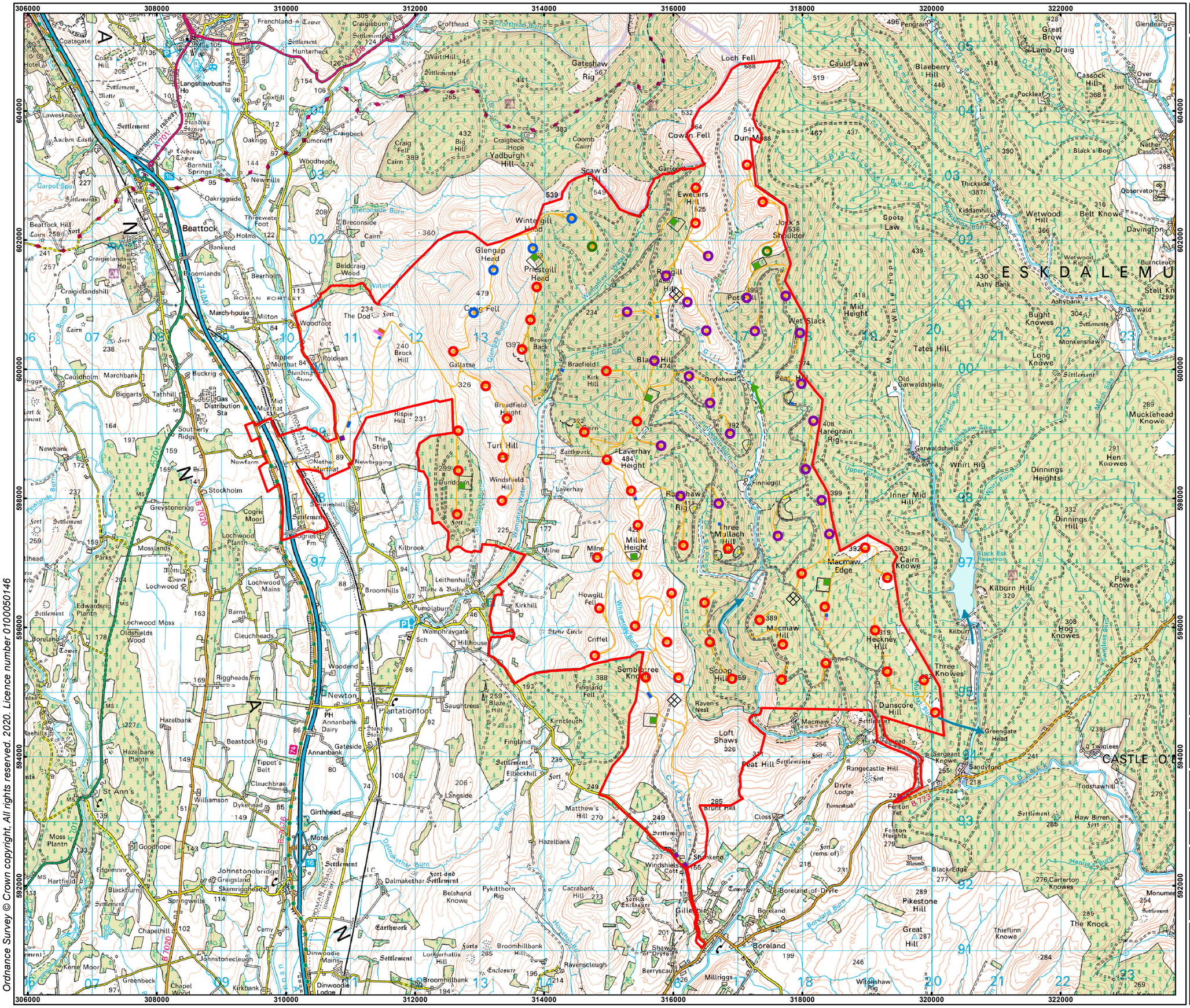
# 374 Scoop Hill



## Legend

| | |
|---|---|
| □ | Site Boundary |
| ○ | Wind Turbine (180m to tip) |
| ○ | Wind Turbine (200m to tip) |
| ○ | Wind Turbine (225m to tip) |
| ○ | Wind Turbine (250m to tip) |
| ◈ | Permanent Met Masts |
| 🟪 | Site Entrance |
| 🟧 | Access Tracks |
| ▨ | Existing Access Tracks to be Upgraded |
| 🟪 | Substation & Control Room |
| 🟧 | Substation & Control Room Construction Compound |
| 🟦 | Temporary Construction Compound |
| 🟩 | Borrow Pit |
| 🟨 | Existing Quarries or Borrow Pit |
| □ | Borrow Pit Area of Search |

Flight Lines

| | |
|---|---|
| → | 2017 |
| → | 2018 |

Notes: N/A
Revisions: N/A
Turbine Layout: 374-191212-9018

0 500 1,000 2,000 m
Scale: 1:55,000 @ A3
N

## Figure 7.20 Goosander Flights

Date: 21/02/2020 Ref: 374-200221-7237-B
Produced: DW Reviewed: DR Approved: GC

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# 374 Scoop Hill

## Legend

- Site Boundary
- Wind Turbine (180m to tip)
- Wind Turbine (200m to tip)
- Wind Turbine (225m to tip)
- Wind Turbine (250m to tip)
- Permanent Met Masts
- Site Entrance
- Access Tracks
- Existing Access Tracks to be Upgraded
- Substation & Control Room
- Substation & Control Room Construction Compound
- Temporary Construction Compound
- Borrow Pit
- Existing Quarries or Borrow Pit
- Borrow Pit Area of Search
- CK — Cuckoo
- CU — Curlew
- SM X6 — Sand martin
- SH — Sparrowhawk

Notes: N/A
Revisions: N/A
Turbine Layout: 374-191212-9018

0 500 1,000 2,000 m
Scale: 1:55,000 @ A3

N

## Figure 7.21 - Breeding Birds (1)

Date: 10/06/2020 Ref: 374-200212-7232-C
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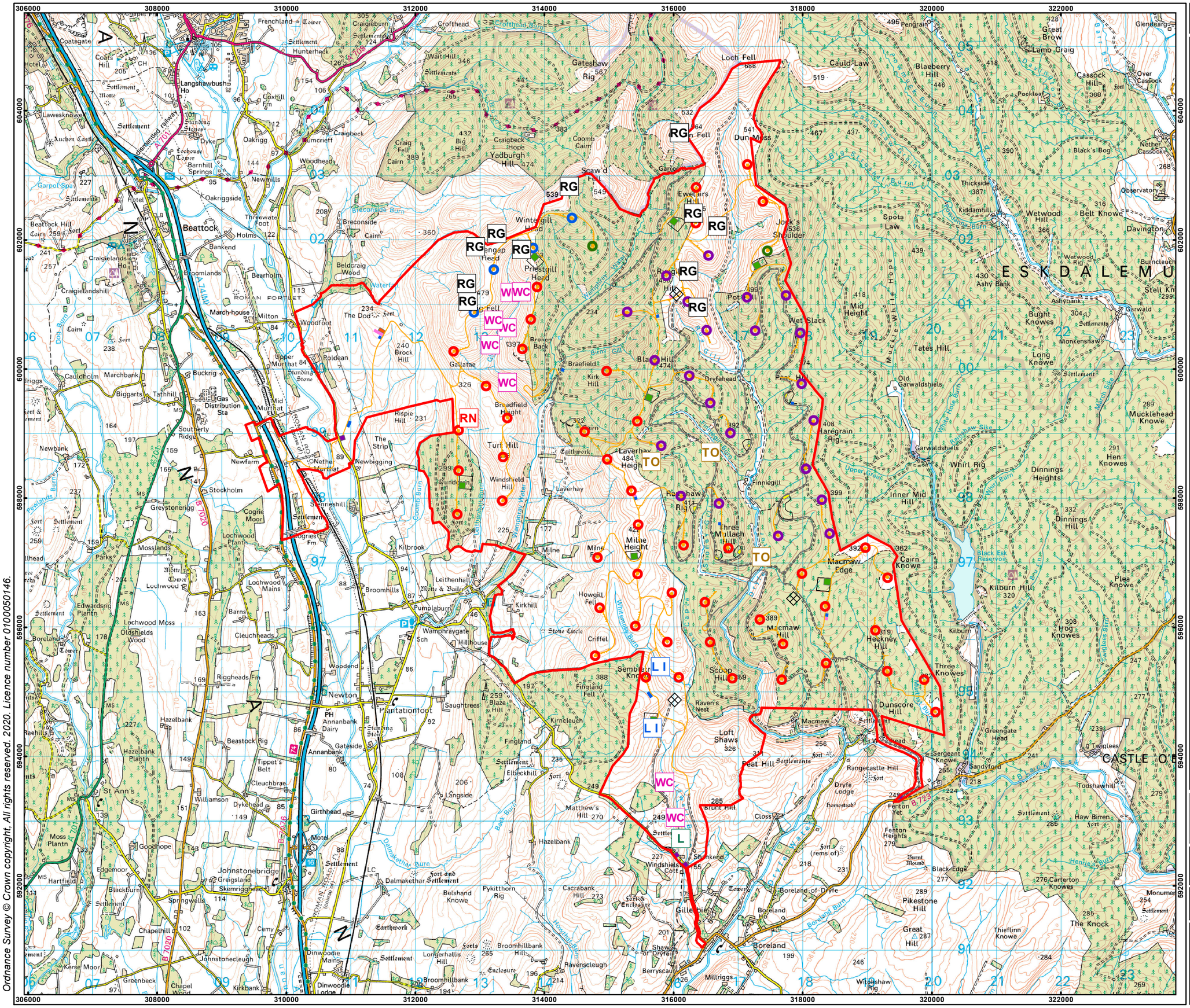


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# 374 Scoop Hill

## Legend

- Site Boundary
- Wind Turbine (180m to tip)
- Wind Turbine (200m to tip)
- Wind Turbine (225m to tip)
- Wind Turbine (250m to tip)
- Permanent Met Masts
- Site Entrance
- Access Tracks
- Existing Access Tracks to be Upgraded
- Substation & Control Room
- Substation & Control Room Construction Compound
- Temporary Construction Compound
- Borrow Pit
- Existing Quarries or Borrow Pit
- Borrow Pit Area of Search
- L Lapwing
- LI Linnet
- RN Raven
- RG Red Grouse
- TO Tawny Owl
- WC Whinchat

Notes: N/A
Revisions: N/A
Turbine Layout: 374-191212-9018

0 500 1,000 2,000 m
Scale: 1:55,000 @ A3

N

## Figure 7.22 - Breeding Birds (2)

| | | |
|---|---|---|
| Date: 10/06/2020 | Ref: 374-200610-7320-B | |
| Produced: DW | Reviewed: DR | Approved: GC |

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# 374 Scoop Hill

## Legend

- Site Boundary
- Wind Turbine (180m to tip)
- Wind Turbine (200m to tip)
- Wind Turbine (225m to tip)
- Wind Turbine (250m to tip)
- Permanent Met Masts
- Site Entrance
- Access Tracks
- Existing Access Tracks to be Upgraded
- Substation & Control Room
- Substation & Control Room Construction Compound
- Temporary Construction Compound
- Borrow Pit
- Existing Quarries or Borrow Pit
- Borrow Pit Area of Search
- GL Grey Wagtail
- OC Oystercatcher
- S Skylark

Notes: N/A
Revisions: N/A
Turbine Layout: 374-191212-9018

0 500 1,000 2,000 m
Scale: 1:55,000 @ A3
N

Figure 7.23 - Breeding Birds (3)

Date: 10/06/2020 Ref: 374-200610-7321-B
Produced: DW Reviewed: DR Approved: GC

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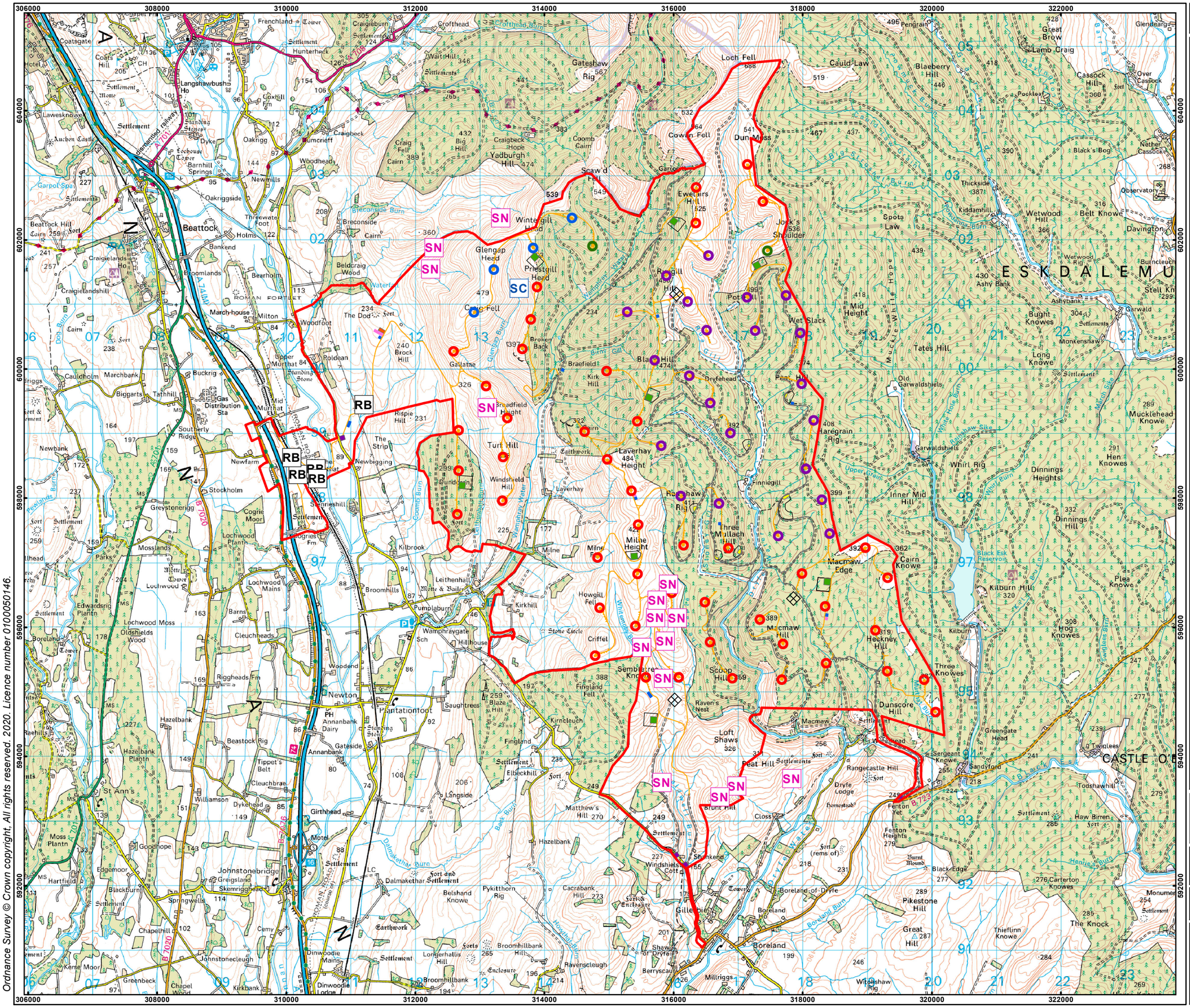




# 374 Scoop Hill

## Legend

- Site Boundary
- Wind Turbine (180m to tip)
- Wind Turbine (200m to tip)
- Wind Turbine (225m to tip)
- Wind Turbine (250m to tip)
- Permanent Met Masts
- Site Entrance
- Access Tracks
- Existing Access Tracks to be Upgraded
- Substation & Control Room
- Substation & Control Room Construction Compound
- Temporary Construction Compound
- Borrow Pit
- Existing Quarries or Borrow Pit
- Borrow Pit Area of Search
- RB — Reed Bunting
- SN — Snipe
- SC — Stonechat

Notes: N/A
Revisions: N/A
Turbine Layout: 374-191212-9018

0 500 1,000 2,000 m
Scale: 1:55,000 @ A3
N

Figure 7.24 - Breeding Birds (4)

Date: 18/06/2020 Ref: 374-200618-7332-C
Produced: DW Reviewed: DR Approved: GC

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