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CLASHINDARROCH WIND FARM

ORNITHOLOGICAL APPRAISAL

SUPPLEMENTARY ECOLOGICAL REPORT
Report 3 of 3

AUGUST 2004

A Report to:
AMEC Wind Energy

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2 Summary

The following report presents the results of an independent study by Heritage Environmental Ltd. (HEL) to provide a Wintering and Breeding Bird Appraisal of the proposed Wind farm scheme at Clashindarroch Forest, Aberdeenshire. The study was commissioned following comments on the requirements for further ornithological survey presented within the Environmental Statement (ES).

Scope of Study
The scope of the ecological appraisal undertaken included:

- Breeding bird survey of forested and open areas (including a 500m buffer beyond the proposed development area);
- Grouse surveys;
- Species specific raptor survey; and
- Winter and summer Vantage Point (VP) surveys, including specific Geese and Common Gull watches.

Results of Appraisals
The following summarises the results of the ecological appraisal undertaken:

Breeding Birds
The breeding bird assemblage associated with the moorland habitat within the study site is assessed to be of *High Local Value* as they support a moderate assemblage of breeding birds. Breeding birds of this habitat type that are of conservation concern and recorded breeding within the study site include: Meadow Pipit, Red Grouse, Skylark, and Snipe.

The woodland within the study site supports a sensitive raptor species (see Confidential Annex) and viable breeding populations and critical elements of the habitat requirements of a number of Red and Amber List Species of Conservation Concern. Species of conservation concern that are associated with this habitat include, Black Grouse, Bullfinch, Dunnock, Goldcrest, Lesser Redpoll, Linnet, Spotted Flycatcher, Tree Pipit and Willow Warbler. Common Crossbill (Schedule 1 Wildlife and Countryside Act) are also present. However, it is considered that the woodland is likely to be of comparable value to other blocks of coniferous plantation within the area. Key direct habitat loss as a result of the proposed windfarm will be of woodland.

Grouse Surveys
Capercaillie were not confirmed as being present within the study site, and this study concurs with the conclusions reached within the ES, that this species may well be extinct within Clashindarroch Forest. Black grouse lek to the south of the study site and may breed at low levels within it.

Wintering Birds
Winter survey identified few Geese flights over the site, with 6 goose flights recorded, most above turbine height, or beyond the proposed development site to the west.

Common Gull Activity

A considerable amount of Common Gull activity was recorded from the VP watches. However, there were very few recorded flights over the main part of the site, and all/most over the main part of the site were from single birds or small flocks. Key activity is restricted to the northern end of the study site between Craigend Hill and north of the Brown Hill/Muckle Long Hill ridge. Data from the VP sites and from additional watches beyond the study site concluded that the locations and direction of the majority of these Gull flights are consistent with the birds coming to and from the Tips of Corsemaul and Tom Mor Special Protection Area (SPA). The value of the northern section of the study site for Gulls is assessed to be of *Regional/National Value.* The main part of the study site, with only low levels of Gull activity recorded is assessed to be of *Low Local Value*.

Tips of Corsemaul and Tom Mor SPA is in the vicinity of the proposed scheme, designated for its population of breeding Common Gulls. These two areas of hill top are located approximately 4km north west of the site and are designated for holding a breeding population of European importance of Common Gull. The site supports approximately 18,000 pairs, which represents at least 14% of the breeding population of West and Central Europe, or more than 1% of the world population. It is the largest known Common Gull colony in the world (JNCC 2004).

Mitigation Measures

Key mitigation recommendations to reduce impacts to an acceptable level include:

Environmental Management Procedure

A site Environmental Management Procedure should be in place during the construction and operational phase of the works. The procedure will include the following in relation to the ornithological resource:

- An emergency procedure for site workers to follow should active bird nest sites be encountered during the course of the works. The key to the procedure should be that all works be stopped in the area and specialist advice sort to determine suitable set-backs or buffer zones. The set-back requirements will vary from species to species, and SNH should be consulted.
- A procedure that ensures all site workers are inducted in relation to ecological requirements on the site including the above emergency procedure and any exclusion zones if present.

Ecological Watching Brief

An Ecological Watching Brief will be in place to ensure that due consideration is being given to ecological requirements throughout the construction phase and operational phase. The Ecological Watching Brief will be overseen by the project Ecologist.

Direct Habitat Loss Impacts on Black Grouse and other Species

Although the numbers of Black Grouse in the study site are low, birds roost and feed within the site. The ES states that it would be desirable to encourage Black Grouse to use areas outwith the turbine envelope following development, to minimise the risk of collisions. It would seem to be of greater benefit in the long term, as in accordance with Scottish Executive EAU recommendations, if planting of scrub and small tree species such as Birch *Betula spp.* were to take place within the study area to encourage Black Grouse to use this area as well, which it is considered would outweigh the potential negative impacts of collisions. The revised Habitat Management Plan for the site, should consider the following for key species, where there is potential for habitat enhancement should consider the following:

Black Grouse

- Any areas of planting within clear-fell areas should include berried shrubs and trees such as Birch, Willow and Rowan;
- Management should aim to created a diverse sward with Heather, Bilberry, Rushes and Grasses;

Grazing pressure should be reduced in sensitive areas to improve insect abundance and provide greater cover of vegetation for hens and chicks;

ement of in-bye fields should aim to enhance herb diversity and to provide food plants and such as Cotton Grass, Sedges, Rushes, Sorrel, Buttercups and Clover;

should be retained and additional flushes created.

uld leave feathered edges on remaining areas of plantation.

that are to remain within the development site and surrounding forestry should be retained tion to provide mature trees to produce high quality areas of feeding habitat, rich in cones, ould provide both high quality feeding and breeding sites.

will feed on a wide variety of seeds. The Redpoll is often associated with pioneer woodland small seeds such as Birch. There is therefore potential within the proposed Habitat nting, or natural regeneration of semi-natural woodland to provide alternative foraging and ecies within the short term, i.e. 5-10 years.

increase the availability of suitable habitat.

Disturbance Impacts on Breeding Birds

As stated in the ES, felling operations will, in accordance with the Wildlife and Countryside Act (1981), maintain a disturbance free zone around nesting forest species. It is recommended that no felling is undertaken between February and July inclusive, unless prior checks are undertaken by suitably qualified ecologists, to identify nest sites and disturbance free zones until breeding is completed. Provided that this approach is followed during all phases of the construction, disturbance should be kept to a minimum.

Disturbance Impacts on Crossbills

Mitigation should be in the form of a precautionary approach, i.e. avoiding felling during the nesting period of February to July. Alternatively an intensive ground survey would be undertaken to locate nests and set up

suitable disturbance free zones around them. The latter would, however, be very labour intensive, as Crossbill nests are difficult to locate from the ground.

Collision Mortality - Common Gulls
The only significant impact identified for collision mortality potential is Common Gulls flying over the site at the northern end. On examination of the flight lines it is clear that it is predominately the northern-most turbine that is on the route of the major flight path and therefore with the potential for collision impacts on this species. Flights away from this turbine are few in number and generally with very small flock sizes of one or to gulls. It is therefore recommended that the northern most turbine is removed from the proposed windfarm layout. Removal of this turbine from the proposed layout would significantly decrease the potential for collision mortality, reducing the impact significance from Moderate to Low Significance. Assuming this turbine is removed from the layout, it is considered that there will no significant effect on the nearby Tips of Corsemaul and Tom Mor SPA.

Black Grouse
Any fencing erected (e.g. around site compounds) should be 'grouse friendly'. Fencing should be suitably marked

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1 INTRODUCTION

4.1 Terms of Reference and Scope of Study

The following report presents the results of an independent study by Heritage Environmental Ltd. (HEL) to provide a Wintering and Breeding Bird Appraisal of the proposed Wind farm scheme at Clashindarroch Forest, Aberdeenshire. This work was commissioned by AMEC Wind Energy in January 2004, following comments on the requirements for further ornithological survey presented within the Environmental Statement (ES) as discussed below.

The Scottish Executive Ecological Advisers (EAU) have provided comments (Alan McAuley 17/9/03 and 26/03/04) on the Environmental Statement and application for the Clashindarroch Wind Farm, and have identified a number of key issues relating to ornithology:

- Requirement for additional breeding bird survey of 500m envelope beyond all turbines, infrastructure, etc. to ensure adequate appraisal of open ground habitats;
- Requirement for additional breeding bird survey for raptors and woodland grouse of 2000m envelope beyond all turbines, infrastructure, etc. to ensure adequate appraisal of open ground habitats;
- Requirement for additional breeding bird survey of 500m envelope of access route to ensure adequate appraisal of forest/open ground habitats;
- Requirement for additional breeding bird survey for raptors and woodland grouse of 2000m envelope of access route to ensure adequate appraisal of forest/open ground habitats;
- Breeding bird survey of forest, especially clear-fell areas;
- Incomplete woodland grouse surveys in ES; and
- Requirement for additional Vantage Point (VP) data collection in relation to Common Gulls *Larus canus*.

In addition to this, Scottish Natural Heritage (SNH) (Dr Ron MacDonald 10/2/04) requested additional survey work to ascertain whether Common Gulls were flying over the site to and from the nearby Tips of Corsemaul/Tom Mor Special Protection Area (SPA) and as to whether the proposed wind farm would be likely to have a significant effect on the Common Gull colony from the SPA.

The Royal Society for the Protection of Birds (RSPB) expressed concerns about the incompleteness of the ornithological survey work for the ES and recommended further location of raptor nests, more information on the adjacent moorland areas and winter observations for geese and nocturnal species.

In accordance with the Client brief in order to satisfy requirements of: EAU, SNH and RSPB, the scope of consultancy services required in the project was defined as follows:

- Provision of breeding and wintering bird survey;

- Provision of an impact assessment of the proposed development in relation to the above species; and
- Provision of ecological mitigation and compensation recommendations (where required) in order to reduce and/or eliminate any potential negative impacts on the wintering geese resource as a consequence of the proposed wind farm scheme.

4.2 Report Authors

This Assessment has been prepared by HEL, specialists in ecological impact assessment for development projects since 1997. The key to our approach is the provision of independent and objective reporting based upon sound scientific data collection and analysis. HEL have considerable experience of wind farm projects, and specifically have undertaken assessments for ornithology throughout Scotland.
Principal authors and technical reviewers for this report were as follows:

- Rebecca L. Osborn BA (Hons. Oxon), MSc, MIEEM – Senior Ecologist and Ornithological and Mammal Specialist;
- Mark A. Bates HND (Con Man.), AIEEM – Principal Ecologist and Ecological Impact Assessment Specialist.

4.3 Birds and Windfarms

The key potential issues relating to birds and wind farms can be summarised as follows:

- The effect of direct habitat loss due to land take by wind turbines bases, tracks and ancillary structures;
- The effects of disturbance resulting in indirect habitat loss, i.e. displacement of birds from the proximity of the wind turbines; and
- The effects of collision with rotating turbine blades, guy lines, fencing and overhead wires (if present), resulting in the killing or injury of birds.

4.4 Policy and Guidance

The ornithological assessment has been undertaken with regard to advice/ requirements given in the following:

- Wildlife and Countryside Act (1981) as amended;
- EC Council Directive 79/409/EEC on the conservation of wild birds (The Birds Directive);
- The Conservation (Natural Habitats &C) Regulations 1994;
- Nature Conservation: Implementation in Scotland of the Habitats and Birds Directives: Scottish Executive Circular 6/1995 as amended June 2000;
- National Planning Policy Guidance (NPPG) 14: Natural Heritage;

- Methodology for assessing the effects of wind farms on ornithological interest (SNH 2000a);
- Survey methods to assess wind farm impacts on upland bird communities (SNH 2002);
- Windfarms and Birds: calculation of a theoretical collision risk assuming no avoiding action (SNH 2000b); and
- The UK Biodiversity Action Plan(UK BAP).

4.5 Summary of Development Proposals

Locations of the proposed wind turbines and access roads used in this report are taken from AMEC Clashindarroch – Figure 3 Site Layout (1:50,000) within the ES. Map 1 shows the study site and indicative layout of the proposed scheme.

The site involves construction of a proposed wind farm of 47 turbines, one permanent monitoring mast, access roads, site control buildings, local substation and temporary compound. Access to the site will be along the A96, A920 and the unclassified road at River Deveron Bridge.

4.6 Study Site and General Site description

The study site lies on exposed hilly terrain (220m to 525m asl) in Aberdeenshire between Huntly 6km to the north east and Rhynie, 6km to the east. A commercial forest was established by the Forestry Commission in the 1930s with most planting carried out between 1950 and 1970, resulting in a varied age sturcture. The forest is dominated by South Coastal Lodgepole Pine *Pinus contorta* and Sitka Spruce *Picea sitchensis*. In addition areas of Larch *Larix sp.*, Scots Pine *Pinus sylvestris*, Norway Spruce *Picea abies* and Douglas Fir *Pseudotsuga menziesii* are present. The total area of the forest is 5,607 hectares. The site is surrounded by open moorland and farmland.

5 APPRAISAL METHODOLOGY

5.1 Consultation

SNH were consulted regarding the scope of the winter and gull vantage point methods and RSPB regarding the winter and raptor vantage point methods. The Scottish Executive were consulted regarding the proposed Common Gull survey work, and found the proposed methods acceptable.

The following concerns were raised:

- 4 watches per vantage point per month (April – July) would be preferable for gulls with consideration given to night time vantage point watches (SNH);
- Dawn watches could extend beyond three hours on goose vantage points (RSPB);
- Survey work should continue into autumn and mid-winter for geese (RSPB); and
- 2 watches per month should be undertaken for Geese (RSPB).

Where any limitations are considered to be present with the survey work undertaken, this is addressed within section 2.4.4 Limitations.

5.2 Desk Study

The following were consulted for any historic records for wintering and breeding birds:

- Existing information within the Environmental Statement which included survey work from four VPs for raptors and a forest grouse survey using trained dogs.
- RSPB, Dr Ian Francis (including information in letter dated 22/12/03 regarding the ES)
- SNH, Dr Sue Lawrence
- Forestry Commission Scotland staff

Relevant records have been incorporated in section 3.2 Desk Study Records.

5.3 Breeding bird survey

A breeding bird survey was undertaken covering all open ground habitats and forest (especially clear-fell areas) to ensure adequate appraisal. The breeding bird *study site* included a 500m envelope around all turbines and wind farm infrastructure, called the *development site* within the report.

5.3.1 Open Ground Habitats

Field Methods

Ornithological surveys of open ground montane and upland areas have been carried out in Britain since the late1970s using various methods including fixed transect and walkabout surveying techniques. The contemporary method recommended by both SNH and RSPB is known as the Constant Search Method or Brown & Shepherd Breeding Bird Survey method (Brown & Shepherd 1993), and was used for this study.

The Brown & Shepherd Breeding Bird Survey method involves surveying open ground montane and upland areas on a 1km^2 basis, based upon the National Grid. In order to ensure survey effort is constant, each 1km^2 is divided into four 500 x 500m quadrats which are surveyed for 20-25 minutes (proportionately less in boundary part squares). Each quadrat is thoroughly walked so that all parts are approached to within at least 100m.

Two survey visits of the study site were carried out; the first between 20th -21st April and 12th – 14th May and the late season visit between 21st -24th June and 30th June – 2nd July. All species encountered were mapped on a 1:10,000 field map for each visit. The majority of the survey was undertaken in good weather conditions, and was abandoned if the weather deteriorated significantly (i.e. persistent rain, or winds above force 5). To take account of variation in species behaviour surveying was carried out between 0830 and 1900 period.

Recording methodology was that used in the standard common bird census (CBC), including field registration and behaviour codes.

Data Analysis
Analysis of the field maps was undertaken in order to produce final distribution maps of breeding birds throughout the study site. The following criteria were used to establish which birds were actually breeding:

a) For all birds
- nest, eggs and/or chicks
- alarm calling indicative of nest, young or territory
- displaying or song flighting
- distraction display
- birds aggressively defending territories

b) For all ducks
- birds showing secretive behaviour

c) For all raptors
- if a pair were apparently attached to a territory

d) For Red Grouse
- if a pair were recorded
- males in song flight
- males in territorial behaviour

e) For all passerines
- birds singing or alarm calling

Limitations
There were not assessed to be any limitations associated with the breeding bird survey work.

5.3.2 Forest Habitats

Field Methods

An adapted Breeding Bird Survey as outlined in *Bird Monitoring Methods* (Gilbert *et al*. 1998) was undertaken to take into account the difficulty of surveying woodland and variation in breeding season between species. An initial early survey visit in April was undertaken to confirm presence of Crossbill species and Capercaillie. The aim of the survey was to confirm the presence and location of breeding species and not absolute breeding densities and population sizes.

The Breeding Bird Survey method involved walking transects along forest rides and the forest edge, recording birds seen and heard whilst walking. Where necessary stops were made to aid recording.

Timing, recording and data analysis of survey was as described for the Open Ground Habitats in *Section 2.4.1*.

Limitations

There were not assessed to be any significant limitations associated with the survey. Areas of the forest are dense plantation and therefore access was not possible except along forest rides and tracks within these areas, and the methodology accounted for this difficulty by making frequent stops to record birds singing/calling during field work.

5.3.3 Raptor Survey

A raptor survey was undertaken of all open ground (including a 2km envelope around the development site) and forest habitats. The survey included all raptor species previously recorded within the study site which are afforded enhanced statutory protection under the Wildlife and Countryside Act, 1981 (as amended). Full details of species specific methods are provided within the Confidential Annex.

5.3.4 Woodland Grouse Survey

A woodland grouse survey was undertaken of all open ground and forest habitats. The scope of the survey included both Capercaillie and Black Grouse.

Black Grouse

Areas of high suitability for breeding Black Grouse (e.g. marginal upland between 200-550m with mosaics of moorland, rough grazing and in-bye) were surveyed by undertaking a walkover survey to confirm the presence of suitable lek habitat and/or birds during mid April – late May. Areas where leks had previously been recorded from desk study information were also visited.

Dawn lek counts were undertaken on 13 May to determine the presence and size of any leks at the following locations:

- Two known leks south of the site on rough pasture NJ427258 and NJ429251
- Area of open moorland surrounded on three sides by forest near Mount of Haddoch NJ420287.

Surveyors were in position before sunrise and counts were made of the maximum number of males and females present in the period between 1 hour before and 1 hour after dawn.

Capercaillie

The presence/absence of Capercaillie was determined during by undertaking a walkover survey to confirm the presence of leks or individual birds during mid April – late May. The Breeding Bird Survey involved walking transects at dawn along forest rides and the forest edge, recording birds seen and heard whilst walking. Where necessary stops were made to aid recording. In addition evidence of Capercaillie droppings was searched for along rides.

5.4 Flight Activity Surveys

5.4.1 Vantage Point Watches

A contemporary method has been prepared by Mike Madders (SNH 2002) and this methodology was adapted in order to quantify the duration of use of the study site by target and secondary species.

Target species for the site, were depending on the time of year of survey: Greylag Geese, Pink-footed Geese, Common Gulls and raptors with enhanced statutory protection. Secondary species were other waterfowl species, other resident and wintering raptor species and other species that receive enhanced statutory protection.

Information was collected during timed watches from 6 strategic vantage points (VPs) as shown on Map 1. The number of VPs was increased to 6 (as opposed to 4 in the ES) to provide good coverage of the whole windfarm with a 500m buffer around most turbines. The VPS were located at the following:

- VP1 Leids Hill NJ415268
- VP2 Cloiche Dubh west NJ423302
- VP3 Cloiche Dubh east NJ429303
- VP4 Grumack Hill NJ428335
- VP5 Near Muckle Black Hill NJ445351
- VP6 Smiddy Hillocks NJ445365

All counts were undertaken in conditions of good ground visibility (>3km), with the cloud base at least 500m higher than the most elevated ground observed. Each watch lasted 3 hours unless visibility deteriorated (e.g. lowering clouds or fading light).

During each watch the following methods were used to record data:

- Focal sampling: The area in view was scanned constantly until an individual/flock was detected in flight. Once detected, the birds were followed until they ceased flying or were lost to view. The time the birds were first detected and duration of the flight bout were recorded, as well as an estimate of the flight height at 15s intervals, within three height categories: <20m, 20-130m or >130m. These height bands equate to approximately to below rotor height, at rotor height and

above rotor height, allowing for some observer error. The route followed by the flock/bird was plotted onto 1:25,000 scale maps.
- Records were also made of use of the study site for feeding and roosting as well as incidental observations of other species of note recorded during the VP survey.

Data analysis
All flights paths were digitised and tables of survey data compiled. Flight paths have been analysed to assess sensitive areas with potential collision risk. In addition, summary tables have been prepared analysing activity at different flight heights as well as activity within 500m of proposed turbine locations.

5.4.2 Dates and Times of VPs

Table 2-4-2 (Appendix I) summarises the dates and times of VPs undertaken. In summary VPs were undertaken between February and August inclusive and included:

- February – April: 1 watch per VP per month (at least 50% at either dawn or dusk)
- May – July: 3 watches per VP per month (watches at dawn, dusk and during day)
- August: 2 watches per VP per month (watches at dawn and dusk)

All these watches combined give a total of 42 hours per vantage point or 252 hours watching for the whole study site (although it should be noted that the whole site cannot be seen from each VP).

5.4.3 Species Specific Watches

5.4.3.1 Geese specific watches

Target species of the February – April watches included Greylag and Pink-footed Geese. At least 50% of watches were undertaken at dawn and dusk (see Table 2.4.2). These months and times were chosen to cover both the daily movement between feeding and roosting areas and the spring migration period of the grey geese species.

5.4.3.2 Gull specific watches

Target species of the March – August watches included Common Gulls. Monthly watches were carried out at dawn and dusk (between 0415 and 2330) from each of the vantage points to cover the period of greatest activity as gulls moved between breeding, feeding and roosting sites. Raptor flights were also recorded.

5.4.3.3 Assessing Movement of Gulls from Study Site to SPA

In order to provide further evidence that the gulls recorded flying over the site were heading to or coming from the Tips of Corsemaul and Tom Mor SPA, additional vantage points were carried out, as shown on Map 1. On 23 June a vantage point was carried out from two positions on the road approximately 1.5km from the site in the direction of the SPA. In addition to this, on 22 July, two VPs were

carried out in the north of the site from positions where it was possible to see the SPA in the distance.

5.4.3.4 Raptor specific watches

Monthly raptor specific watches were carried out from around 9am to 12pm from each of the six vantage points during May to July inclusive. This time period was chosen as the period when raptors should be at their most active, especially when feeding young. Gull flights were also recorded.

5.4.3.5 Nocturnal watches

During August, nocturnal watches (during the period of 11pm to 3am) were carried out to determine if there was any gull movement over the site during the night and to record the presence of nocturnal species which may be under recorded during daytime survey. One watch was carried out from each of the six vantage points using second generation night vision equipment. It should be noted that for nocturnal species the dawn and dusk surveys also provided additional survey intensity for this group of birds.

5.4.4 Limitations

Due to the size and topography of the site, it was necessary to locate some of the VPs within the proposed turbine envelope. It is acknowledged that observer presence may have influenced the bird use of the site to a small extent. However, it is not considered that this is a significant limitation.

Due to inclement weather conditions including low cloud and mist, fieldwork was considerably interrupted, especially in June. This resulted in a number of watches being undertaken slightly outwith the originally proposed timescale. However, it is not considered to have affected significantly the description or assessment of the bird resource of the site.

No coverage of the site has been undertaken for the autumn period for Geese. However, due to the low levels of Geese activity recorded and the lack of nearby known significant roosting sites, it is considered that no survey in the autumn months for geese is necessary.

Although only 3 watches per month were undertaken in May – July and not four, as recommended by SNH (for Common Gulls). It is considered that sufficient data has been obtained to allow an accurate assessment of the use of the site by Common Gulls.

Although night survey was only undertaken in August and not earlier in the summer, it is considered that given the daytime movement over the site in these months, sufficient data has been obtained to allow an accurate assessment of the use of the site by Common Gulls.

6 DESCRIPTION OF BIRD RESOURCE

6.1 Designated Sites

Tips of Corsemaul and Tom Mor SPA is in the vicinity of the proposed scheme, designated for its population of breeding Common Gulls. These two areas of hill top are located approximately 4km north west of the site and are designated for holding a breeding population of European importance of Common Gull. The site supports approximately 18,000 pairs, which represents at least 14% of the breeding population of West and Central Europe.

Craigs of Succoth SSSI is located within the study site. This is designated solely for its botanical interest and is therefore not considered in this report.

6.2 Desk Study Records

No previous records for the site are held by SNH and the ES states that the North East Scotland Raptor Study Group were unable to add to information already known to the Forestry Commission Scotland staff. Information was obtained from the Forestry Commission Scotland (Buchan Forest District office) and RSPB (Ian Francis- letter dated 22/12/03 responding to ES). Relevant records have been included in section 3.3 or in the Confidential Annex.

6.3 Results of Bird Survey

Maps 2a and b shows the bird resource from the 2004 Breeding Bird surveys (yellow label indicates breeding, pink non-breeding) and the following description for each species provides an indication of whether birds are breeding within the study site or within the proposed development area (i.e. arbitrarily defined as within 50m from any turbines).

The following provides a summary description of all species recorded. Results for sensitive raptor species are contained within the Confidential Annex.

- **Blackbird *Turdus merula***. Occasional breeder throughout the woodland.
- **Blackcap *Sylvia atricapilla***. Probable breeder. Recorded on one occasion during the breeding bird survey in the north of the site near Craigend Hill.
- **Black Grouse *Tetrao tetrix*** recorded lekking to the south of the site and a single female within the site. No birds were recorded lekking in the study site, but a lek of up to 14 males was observed for over three hours at NJ429251, located approximately 2km to the south of the proposed development site. Birds were observed to fly between the lek and the moorland to the north on two occasions. Two males were present at the lek at NJ427258 near Blackmiddens during this time but were not lekking. In addition, a female bird was flushed on the way to the VP at Cloiche Dubh hill on 12th February (see Flight 7, Map 4a).

Black grouse have been recorded on eight occasions by FCS between September 1999 and October 2003.

- **Bullfinch *Pyrrhula pyrrhula*** recorded twice during the breeding bird survey, near Craigend Hill in young plantation and at the south of the site near the ski huts. Also occasionally from VPs and anecdotally.
- **Blue Tit *Parus caeruleus***. Breeding throughout the site in woodland and scrub.
- **Buzzard *Buteo buteo***. Four breeding pairs recorded: in woodland near the proposed access track; near Shank of Baditimmer; near Meikle Watchman; and at the south of the site about 400m from the road (A941). Recorded regularly from VPs.
- **Capercaillie**. These were not recorded during the breeding bird survey work, and current survey concurs with the conclusions reached within the ES, that Capercaillie may well be extinct within Clashindarroch Forest. Capercaillie have only been recorded on six occasions within Clashindarroch Forest between September 1999 and October 2003 (five of which were during autumn and winter) with an additional three records for Capercaillie/Black Grouse hybrids.
- **Carrion Crow *Corvus corone***. Breeding. One breeding record on Muckle Black Hill. It is likely that this species was under-recorded.
- **Chaffinch *Fringilla coelebs***. Abundant breeder throughout the site in woodland.
- **Coal Tit *Parus ater*.** Abundant breeder throughout the site in woodland
- **Common Crossbill *Loxia curvirostra*** Recorded occasionally during VPs, particularly during the winter. Thought to be breeding.
- **Common Gull *Larus canus***. Not breeding within site. Recorded frequently flying to the south of The Craigs of Succoth, where a well used flight line is used. Further details for this species are given in *Section 3.4.2*.
- **Curlew *Numenius arquata*** Not breeding within site. Recorded infrequently from VPs
- **Dunnock *Prunella modularis*** Breeding. Recorded occasionally during the breeding bird survey in the woodland areas
- **Golden Plover *Pluvialis apricaria*** Not breeding. Recorded on one occasion from VP5 (18/3/04), calling from the ground and not actually seen in flight. In addition to this record, a casual record of Golden Plover, heard in flight was noted on 14 May at 07:40 in the same vicinity (between Muckle Black Hill and Brown Hill). In addition to this record, a casual record of Golden Plover heard in flight was noted on 14 May at 07:40 in the same vicinity (between Muckle Black Hill and Brown Hill). Golden Plover are known (RSPB) to nest in the adjacent moorland possibly using Black Hill or Mount of Haddoch.
- **Grasshopper Warbler *Locustella naevia*** Probably breeding - One bird recorded during BBS in wet grassland area in clear-felled compartment of forest.
- **Goldcrest *Regulus regulus*** Breeding. Abundant within the plantation.
- **Great Spotted Woodpecker *Dendrocopos major***. Probable breeder. Recorded on one occasion during the breeding bird survey at the south of the site near Leids Hill

- **Greenfinch *Carduelis chloris***. Breeding. Recorded from two areas during the breeding bird survey, along the proposed access track and in the plantation to the west of Grumack Hill.
- **Herring Gull *Larus argentatus***. Non breeding. Recorded occasionally flying over the site during VPs.
- **Jackdaw *Corvus monedula*.** Non breeding. Recorded infrequently from VPs.
- **Jay *Garrulus garralus*** Breeding. Recorded twice during the breeding bird survey in plantation near Red Hill and to the south of the site near the road (A941).
- **Kestrel *Falco tinnunculus.*** Recorded as breeding during the breeding bird survey in plantation near The Shank and occasionally from VPs.
- **Lapwing *Vanellus vanellus.*** Not breeding within site. Recorded on one occasion during VP surveys.
- **Lesser Redpoll *Carduelis flammea*.** Breeding. Recorded near the forest edge from two locations during the breeding bird survey along the proposed access track and near Red Hill.
- **Lesser Black-Backed Gull *Larus fuscus*.** Non breeding. Recorded occasionally flying over the site during VPs.
- **Linnet *Carduelis cannabina*** Breeding - infrequent records near the forest edge during the breeding bird survey and anecdotal records
- **Long-Tailed Tit *Aegithalos caudatus*.** Recorded on one occasion during the breeding bird survey near the road at the south of the site.
- **Meadow Pipit *Anthus pratensis*** Breeding. Frequent in the moorland areas.
- **Mistle Thrush *Turdus viscivorus*** Breeding. Recorded from five locations during the breeding bird survey: two near Muckle Black Hill, two near Craigwater Hill and one near Green Knowe.
- **Pink-footed Goose *Anser brachyrhynchus*** Not breeding. Recorded occasionally flying over the site during winter. Table 3.4.1 provides details of goose flight activities.
- **Red Grouse *Lagopus lagopus scoticus*** Breeding at low densities in the moorland areas of the site.
- **Red-Legged Partridge *Alectoris rufa***. Breeding. Recorded during the breeding bird survey of proposed access track.
- **Raven *Corvus corax***. Not breeding. Recorded occasionally from VPs.
- **Robin *Erithacus rubecula***. Abundant breeder throughout the site in woodland areas.
- **Sedge Warbler *Acrocephalus schoenobaenus.*** Breeding in one location on moorland to west of site near Black Hill
- **Snipe *Gallinago gallinago*** Breeding. Two birds recorded during the breeding bird survey near Smiddy Hillocks. Recorded occasionally from VPs.
- **Song Thrush *Turdus philomelos*** Breeding - Recorded during the breeding bird survey throughout the woodland areas at low densities.
- **Sparrowhawk *Accipter nisus***. Possibly breeding. Recorded on three occasions from VPs.
- **Siskin *Carduelis spinus***. Breeding. Recorded regularly throughout the plantation.

- **Spotted Flycatcher *Muscipapa striata*** Breeding - One bird recorded during the breeding bird survey, near Oxter Burn.
- **Stonechat *Saxicola torquata*** Single record of breeding bird on moorland to west of site near Garnel Burn.
- **Swallow *Hirundo rustica*** Not breeding. Recorded on one occasion during the breeding bird survey.
- **Skylark *Alauda arvensis*** Breeding - recorded during the breeding bird survey, particularly on the moorland to the west of the site.
- **Tawny Owl *Strix aluco*.** Probable breeder. Heard on several occasions during VPs undertaken at dusk.
- **Treecreeper *Certhia familiaris*.** Recorded on one occasion during the breeding bird survey by a forest track near Craigs of Longley.
- **Tree Pipit *Anthus trivialis*** Probably breeding. Recorded once during the breeding bird survey in clear felled area near Corrydown
- **Willow Warbler *Phylloscopus trochilus*** Abundant breeders throughout the site in plantation and scrub.
- **Woodcock *Scolopax rusticola*.** Recorded on one occasion from VP6 during dusk surveys, and on a number of occasions near the proposed access track route during winter mammal survey work.
- **Woodpigeon *Columba palumbus*.** Breeding. Recorded regularly throughout the wooded areas.
- **Wren *Troglydytes troglydytes*.** Breeding. Recorded frequently throughout the woodland, particularly along burns.

6.4 Results of Target Species Flights

The results of the vantage point watches have been summarised in the following tables and are presented graphically in Maps 3a, 3b, 4a, 4b and 5.

6.4.1 Goose flight Activity.

Small numbers of Pink-footed Geese and Grey Geese (either Pink-footed Geese or Greylag Geese) were recorded flying over or adjacent to the study site. As can be seen from Table 3.4.1 (a and b) and Map 4a, there were few recorded flights of geese over the study site. In addition, most of the recorded flights were at heights above that of the proposed turbines.

Table 3.4.1.a *Vantage point activity summaries for geese*

Vantage Point (VP)	Flight No	Date	Time	Species Observed (BTO code)	No. of Birds per flight.	Time Birds spent flying in Height Bands (seconds).		
						0-20m	20-130m	130m +
3	*18	17/3/2004	11:54	Goose sp	12			180
5	19	18/3/2004	7:29	PG	32			60
6	24	18/3/2004	7:23	PG	36			180

6	25	18/3/2004	8:06	PG	2		180	
6	*30	18/3/2004	8:55	Goose sp.	60			240

Key: PG = Pink Footed Goose, Goose sp. = Pink Footed or Greylag Goose. Flight numbers marked * are more than 500m from the nearest proposed turbine.

Table 3.4.1.b *Summary of all Goose flight activity*

Species observed	Total site observation time (seconds) (32,400s from each VP)	Total time observed x number of birds (seconds)	Total time observed within 500m of turbines (seconds)	Time at rotor height (seconds)
Goose sp.	194,400	16560	0	0
Pink-footed Goose (PG)	194,400	8760	8760	360
All Geese	**194,400**	**25320**	**8760**	**360**

6.4.2 Common Gull Flight Activity

A considerable amount of Common Gull activity was recorded from the vantage point watches as shown on Map 3 (a and b). However, there were very few recorded flights over the main part of the site, and records of flights over the main part of the site were from single birds or small flocks. The vast majority of flights were recorded from VP6, and many are within 500m of the currently proposed most northerly turbine. Key activity is restricted to the northern end of the study site between Craigend Hill and north of the Brown Hill/Muckle Long Hill ridge as shown on Map 3 (a and b). There is a distinct east/west direction to the vast majority of the flights. Low numbers of other gulls, including Lesser Blacked Backed Gull and Black-headed Gull, were also recorded.

Data from the VP sites and from additional watches beyond the study site concluded that the locations and direction of the majority of these gull flights are consistent with the birds coming to and from the Tips of Corsemaul/Tom Mor SPA.

The highest levels of activity were recorded between March to June inclusive, with activity tailing off on the study site in July and August.

Data collected in the ES (Figures 21-23) recorded some Common Gull activity around Muckle Long Hill and Crown Hill during the April and June surveys. Only four flights from single birds appear to have been recorded over the main part of the site, which concurs with data collected in this assessment.

SNH is aware of two other Common Gull colonies in the area. Correen Hills SSSI is located c. 10km to the south-west of the study site. However, recent counts (SNH) indicated that it may only support c. 20 pairs of

Common Gull. In addition, Kelman Hill (NJ 384328) located c. 4 km to the west of the study site, and situated south of Tips of Coresmaul and West of Clashindarroch. An SNH survey in 1998 recorded 1,000 breeding pairs at this site.

Table 3.4.2.b *Summary of all Gull flight activity*

Species observed	Total site observation time (seconds)	Total time observed (seconds)	Total time observed within 500m of turbines (seconds)	Time at rotor height (seconds)
Common Gull	1,048,800	363,581	220,946	187,419

6.4.3 Other Key Species Flight Activity

Results of secondary species flights are shown on Maps 4 (a and b) and details are given in Table 3-4-3 in Appendix I.

7 EVALUATION OF BIRD RESOURCE

7.1 Levels of Value

In this section each bird resource is assigned a value based on its status within the study site. Table 4.1.1 has been used as a guide using adapted guidelines for assessing nature conservation value (IEEM 2002 and SNH 2000a). A summary of findings is presented in Table 4.6.1 and 4.6.2.

Table 4.1.7.1.1 Levels of Value of Ornithological Resource

Level of Value	Examples
International	Internationally designated or qualifying sites holding species or assemblages of international importance e.g. Ramsar Site qualifying assemblage, Special Protection Area qualifying species or assemblage. Sites supporting populations of internationally important species in internationally important numbers i.e. Annex 1 of Birds Directive, migratory species on migration routes, or in breeding, moulting, wintering or staging areas.
National	SSSI or NNR designated or qualifying sites holding species or assemblage of national importance. Sites supporting viable breeding populations of Wildlife and Countryside Act Schedule 1 Species and supplying critical elements of their habitat requirements. Sites supporting nationally important numbers of a single species (>1% UK population). Species contributing to the integrity of an SPA or SSSI but which are not cites as species for which the site is designated.
Regional	Sites not meeting SSSI criteria but comfortably exceeding SINC criteria. Species subject to special conservation measures in UK BAP or sites holding viable breeding populations or supplying critical elements of their habitat requirements. Sites containing regionally important numbers of a single species (>1% regional population). Sites supporting viable populations of species on Annex 1 of the EC Birds Directive.
High Local	Sites meeting the criteria for a county area designation (SINC), Designated Local Nature Reserves holding viable populations of any key species identified in the Local BAP. Sites supporting viable breeding populations of substantial number of species known to be Red or Amber List Species of Conservation Concern and supplying critical elements of their habitat requirements.
Moderate Local	Undesignated sites, or features considered to appreciably enrich the habitat resource within approximately 10 km radius from the site. Sites supporting viable breeding populations of a small number of species listed as Red list or Amber list Species of Conservation Concern or supplying critical elements of their habitat requirements.
Low Local	Undesignated sites, species or areas considered to enrich the species richness within the immediate environs of the site.
Negligible	Areas with a poor species richness and none of the above. Any other species.

7.2 Legislative Overview

Britain has an international obligation to protect certain species of birds and their habitats under a number of international designations. The importance of habitats for birds is recognised by the EC Birds Directive (79/409/EEC) which lays certain obligations on governments of member states to protect populations and habitats of all migratory and some other vulnerable birds (listed in Annex 1 of the Directive and generally known as Annex 1 species). This protection is achieved through a variety of means, including the designation of Special Protection Areas (SPAs) covering the most important areas throughout Britain for each Annex 1 species, and significant populations of migratory bird species (which are not necessarily Annex 1 listed).

The Scottish Executive Revised Circular 6/1995 sets out the obligations of the EC Directive 92/43/EC on the Habitats Directive and EC Birds Directive (79/409/EEC). The regulations require that where an authority concludes that a development proposal unconnected with the nature conservation management of a Natura 2000 sites is likely to have a significant effect on that site, it must undertake an appropriate assessment of the implications of for the conservation interests for which the area has been designated. Paragraph 13 of the Circular states that the need for appropriate assessment extends to plans or projects outwith the boundary of the site in order to determine their implications for the interest protect within the site.

Sites of National Importance for birds are designated as Sites of Special Scientific Interest (SSSI) under the Wildlife and Countryside Act, 1981 (as amended). The Wildlife and Countryside Act, 1981 (as amended) provides general protection to any wild bird and their nest and eggs. In addition, this Act provides enhanced statutory protection to rare breeding birds (listed under Schedule 1 of the Act and generally known as Schedule 1 species). It is an offence to disturb a Schedule 1 species while it is building a nest or is in, on or near a nest containing eggs or young.

7.3 Birds of Conservation Concern

A number of bird species have been highlighted as priorities for bird conservation in the United Kingdom. This includes those listed in RSPB (2002) *The Population Status of Birds in the UK: Birds of Conservation Concern: 2002-2007.* A total of 247 species have been assessed and each has been placed into one of three lists:

- Red List – High Conservation Concern;
- Amber List – Medium Conservation Concern; or
- Green List – Other species.

There are forty Red listed species, 121 are Amber listed and 86 are Green listed. The category each species falls into depends on seven quantitative criteria:

- Global conservation status;
- Recent decline;
- Historical decline;

- European conservation status;
- Rare breeders;
- Localised species; and
- International importance.

In addition, a number of species of conservation concern are listed on the UK Biodiversity Action Plan (UK BAP) and /or the North East Scotland Biodiversity Partnership.

7.4 Species with enhanced Statutory Protection recorded during the VP and breeding bird surveys

The following species with enhanced statutory protection were recorded during the bird surveys:

- Common Crossbill (Schedule 1)
- Golden Plover (Annex 1)

Note the Confidential Annex reviews the presence of sensitive raptors with enhanced statutory protection, and should be read in conjunction with this section.

7.5 Other Species of conservation concern recorded during the VP and breeding bird surveys

The following species of conservation concern were recorded during the bird surveys:

- Black Grouse *Tetrao tetrix* (UKBAP, North East Scotland BAP and Red List)
- Bullfinch *Pyrrhula pyrrhula* (UKBAP, North East Scotland BAP and Red List)
- Linnet *Carduelis cannabina* (UKBAP, North east Scotland BAP and Red List)
- Skylark *Alauda arvensis* (UKBAP, North East Scotland BAP and Red List)
- Song Thrush *Turdus philomelos* (UKBAP, North East Scotland BAP and Red List)
- Spotted Flycatcher *Muscipapa striata* (UKBAP, North East Scotland BAP and Amber List)
- Grasshopper Warbler *Locustella naevia (*Red List)
- Common Gull *Larus canus* (Amber List)
- Curlew *Numenius arquata* (Amber List)
- Dunnock *Prunella modularis* (Amber List)
- Goldcrest *Regulus regulus* (Amber List)
- Kestrel *Falco tinnunculus* (Amber List)
- Lapwing *Vanellus vanellus* (Amber List)
- Lesser Redpoll *Carduelis flammea* (Amber List)
- Meadow Pipit *Anthus pratensis* (Amber List)
- Mistle Thrush *Turdus viscivorus* (Amber List)
- Pink-footed Goose *Anser brachyrhynchus* (Amber List)
- Red Grouse *Lagopus lagopus scoticus* (Amber List)
- Snipe *Gallinago gallinago* (Amber List)

- Swallow *Hirundo rustica* (Amber List)
- Tree Pipit *Anthus trivialis* (Amber List)
- Willow Warbler *Phylloscopus trochilus* (Amber List).
- Woodcock (Amber List)

7.6 Ornithological Resource Evaluation

The ornithological resource is evaluated by key habitat type and then in more detail for key species, i.e. species that receive enhanced statutory protection (Schedule 1 species), species listed on Annex 1 of the Birds Directive and species of particular conservation concern.

7.6.1 Key Habitat Evaluation

Upland moorland
This habitat is present within the areas of open ground within and adjacent to the plantation. In areas around Leids Hill, Mount of Haddoch, Black Hill, Cloiche Dubh Hill, Grumack Hill extending along the ridge to the north east, and Brown Hill it is composed predominantly of rank Heather and other dwarf shrub heath species.

Breeding birds of this habitat type that are of conservation concern and recorded breeding within the study site include Meadow Pipit, Red Grouse, Skylark, and Snipe. Black grouse lek to the south of the study site and may breed at low levels within it.

The bird assemblage associated with the moorland habitat within the study site is assessed to be of *High Local Value* for breeding birds as they support a moderately rich assemblage of breeding birds.

Woodland
This is the main habitat within the study site. It is comprised of commercial coniferous plantation dominated by Lodgepole pine and Sitka Spruce, with small areas of Scot's Pine, Larch, Norway Spruce and Douglas fir. The plantation is of mixed age, including areas of mature plantation with open grassy rides and areas of clear fell.

The study site supports a sensitive raptor species (see Confidential Annex) and viable breeding populations and critical elements of the habitat requirements of a number of Red and Amber List Species of Conservation Concern. Species of conservation concern that are associated with this habitat include: Black Grouse, Bullfinch, Dunnock, Goldcrest, Lesser Redpoll, Linnet, Spotted Flycatcher, Tree Pipit and Willow Warbler. Common Crossbill (Schedule 1, Wildlife and Countryside Act 1981) are also present and may breed. However, it is considered that the woodland is likely to be of comparable value to other blocks of coniferous plantation within the area.

The woodland habitat within the study site is assessed to be of *High Local Value* for breeding birds.

7.6.2 Key species evaluation

Black Grouse

The distribution of Black Grouse has declined dramatically this century (Gibbons *et al*. 1993). In 1993 it was estimated that the British breeding population was in the order of 10,000 – 15,000 breeding females (Gibbons *et al*. 1993), although opinion is that population levels are likely to have declined since then.

Numbers of Black Grouse are often known to increase temporarily when ground is planted for forestry. This is perhaps due to increased vegetation height and diversity and reduction in grazing pressure, all providing improved cover for nests and chicks, and an increase in availability of invertebrate food. However, when the canopy closes, Black Grouse populations will decline or be displaced (Gibbons *et al*. 1993).

Numbers of Black Grouse appear to be very low within the study site. Within the study site, the lek sites are all located outwith the proposed turbine envelope area and only one flight was recorded within the study site during vantage point watch surveys.

The study site is assessed to be of *High Local Value* for this species.

Capercaillie
No evidence of Capercaillie was found, which is consistent with the findings reported in the ES. It is possible that Capercaillie are no longer present within the study site.

The study site is assessed to be of *Negligible Value* for this species.

Common Crossbill
Common Crossbill are widespread throughout Scotland and north-western England. The population levels of Crossbill in Scotland fluctuate wildly depending on immigration of birds from the continent and in relation to annual coning variations (Gibbons *et al*. 1993).

Singles and groups of birds were seen throughout the forestry area (especially during winter vantage points), and it is suspected that they are breeding within the plantation. Much of the plantation is mature trees and should potentially provide good cone crops. The populations will be mobile, dependant on availability of conifer seed from year to year (Gibbons *et al*. 1993).

The study site is assessed to be of *High Local Value* for this species.

Common Gull
Common Gulls return to their breeding colonies in March and April. Common Gulls only breed in northern regions in Europe. They lay their eggs in the second half of May and the first half of June. Incubation lasts around 25 days, with young hatching at the end of June. Both birds incubate on 2-3 hour shifts. Young fledge after 35 days and are flying by the end of July with the gulls leaving the area by mid-August (Cramp *et al* 1983).

Tips of Corsemaul/Tom Mor SPA, located approximately 4km north-west of the study site holds approximately 18,000 pairs which represents at least

14% of the breeding population of west and central Europe (124,000 pairs), or more than 1% of the world population. It is the largest known Common Gull colony in the world (JNCC 2004).

Although the gulls are not actually using the study site for breeding or foraging, there is clearly a well defined flight path over the north section of the study site which appears to be from birds breeding on the SPA. Flocks numbering several hundred gulls were recorded and up to a 1000 gulls were recorded on individual VPs in May and June. The majority of the records are from March to June inclusive, during which time the gulls arrive at their breeding colonies. They will be at their most active during this period. Many birds were recorded flying over the northern end of the site with most birds appearing to be flying to and from the breeding colony on Tips of Corsemaul/Tom Mor SPA to feeding/roosting grounds on farmland to the north east of the site, especially during the early part of the breeding season. Although it is possible that some of the Gulls observed may be breeding on the Kelman Hill colony, the direction of movement of Gulls observed, indicate that they are likely to be from the SPA. Many Gulls also feed to the west of the study site along the River Deveron valley (Osborn, personal observation).

No regular flight path was recorded over the study site towards Mains of Lesmoir to the south-east of the study site. Two flights of single gulls were recorded flying over the site near Cloichedubh hill in this direction. It is considered that any birds feeding to the south-east of the study site around Mains of Lesmoir are not flying over the proposed development site. It is possible that birds feeding at Mains of Lesmoir could fly up the valley of the Water of Bogie and then along the well used identified flight path near The Craigs of Succoth.

The value of the northern section of the study site for Gulls is assessed to be of *Regional/National Value.* However, the main part of the study site, with only low levels of Gull activity recorded is assessed to be of Negligible/*Low Local Value*.

Golden Plover
Golden Plover have shown marked range reductions in Grampian region (as well as Tayside, SE Highland and some southern areas of Scotland). Of the European population, about 3% breed in Britain and Ireland (Gibbons *et al* 1993).

There is no evidence of breeding of this species in the study site, although the two records of a calling individual in the same vicinity, to the north of Muckle Black Hill suggests that a bird may have been attempting to attract a mate to breed in the area. The hilltop where the bird was recorded on the ground is suitable breeding habitat being level ground with relatively short heath vegetation.

The study site is assessed to be of *High Local Value* for this species.

Table 4.6.7.6.1 Evaluation summary of Study Site's Key Ornithological Resource

Species	Value of Study Site for species	Key Habitat	Notes
Black Grouse	High Local	Forest rides, moorland and grassland areas to south of site.	Population probably declining.
Common Crossbill	High Local	Mature plantation throughout the site.	Most of the plantation supports mature trees with a good potential cone crop. Few areas of Scots pine.
Golden Plover	High Local	Flat moorland hilltops, with short vegetation.	Not breeding on site. Some suitable habitat.
Common Gull	Regional/ National- Northern part Negligible/Low Local – main part	N/A as birds only flighting.	Flight path to and from nearby SPA passes over northern end of site.

Table 4.6.7.6.2 Summary of Habitat Assemblage Evaluation

Habitat Assemblage	Value of Study Site	Key Areas	Example Species
Upland Moorland and Grassland	High Local	Mostly within the 500m envelope to the west and north of the site, but also around the tops of Cloiche Dubh hill.	Raptors, Black Grouse, Red Grouse, Meadow Pipit, Skylark.
Woodland	High Local	The majority of the site supports this habitat. Mostly mature plantation with areas of clear-fell.	Raptors, Crossbill, Bullfinch, Lesser Redpoll, Spotted Flycatcher, Song Thrush.

8 IMPACT PREDICTION

8.1 Scope of Impacts

The potential impacts consist of those that could take place during the construction phase and those that could take place during the operation of the site.

The following activities will occur during the construction phase that may give rise to an impact on the ornithological interest on the site:

- Construction of new access roads and upgrades to existing roads;
- Clear-fell of areas of forestry plantation;
- Excavation of Borrow Pits;
- Construction of wind turbine foundations and associated hard standings;
- Excavation of cable trenches;
- Construction of sub-stations and other permanent buildings;
- Construction temporary lay down area;
- Construction of temporary site office.

The following may give rise to an impact on the ornithological interest during the operational phase:

- Potential collision risk with turbine blades;
- Increased human activity and vehicular access to the site due to regular wind farm maintenance operations;
- Increased background noise on the site due to the operation of the turbines and the presence of man-made objects;
- Habitat restoration and management work following the construction phase;
- Increased human access on the site through ongoing monitoring.

Following guidelines being developed by the Institute of Ecology and Environmental Management, and guidance in SNH (2000a) a set of criteria has been produced to determine the significance of each effect. The significance of an impact on a particular ecological resource can be divided into two parts: the magnitude of the impact and the value of the resource. The value of the resource has been assessed above in Section 4.

To determine the magnitude of an impact, the following factors should be considered:

- Duration;
- Timing and frequency;
- Extent;
- Reversibility;
- Cumulative impacts;
- Sensitivity.

The criteria that have been used to assess the magnitude of impacts are summarised in Table 5.1.1. Each impact is given a magnitude. The magnitude of the impact is then assessed in conjunction with the value of the resource to provide an indication of impact significance (Table 5.1.2 and 5.2.3). In this assessment, impacts of moderate or major significance are considered to be a *significant impact*. For the sake of clarity a statement is also provided in this section on whether or not mitigation is possible for all significant impacts. This states mitigation as possible or not. Where impact prediction is difficult due to uncertainties or where particularly sensitive species are being considered a precautionary approach relative to mitigation has often been suggested. This approach represents best practice.

Table 5.1.8.1.1 *Guideline Criteria for Assessing Magnitude of Impacts (adapted from SNH 200a)*

Impact	Guideline Criteria
High	Total loss of, or major alteration to key elements/features of the baseline (pre development) conditions such that post development character/composition/attributes will be fundamentally changed.
Medium	Loss of, or alteration to one or more key elements/features of the baseline conditions such that post development character/composition/attributes of baseline will be partially changed
Low	Minor shift away from baseline conditions. Change arising from the loss/alteration will be discernible but underlying character/composition/attributes of baseline condition will be similar to pre-development circumstances/patterns.
Negligible	Very slight change from baseline conditions. Change barely distinguishable, approximating to the 'no change' situation.
Positive	Positive change from baseline conditions.

Table 5.1.8.1.2 *Guideline Graded Significance of Impacts in Relation to Magnitude of Impact and Value of Ornithological Resource*

Value	Magnitude			
	High	**Medium**	**Low**	**Negligible**
International	Major	Major	Moderate	Low
National	Major	Major	Moderate	Low
Regional	Major	Moderate	Low	Low
High Local	Moderate	Moderate	Low	Low
Moderate Local	Moderate	Low	Low	Low
Low Local	Low	Low	Low	Low
Negligible	Low	Low	Low	Low

Table 5.1.8.1.3 *Guideline Criteria for Assessing Significance of Impacts*

Impact Significance	Guideline Criteria
Major	Substantial loss of conservation value on a regional, national scale or international scale. Loss of conservation value on a national scale or international scale.
Moderate	Substantial loss of conservation value on a high local and moderate local scale, some loss of value on a regional scale and low impact on international or national scale.
Low	Negligible impact on any scale. Low impact on community or species, of regional value or below and medium impact community or species of moderate local impact or below. Substantial loss of conservation value on a very local scale (i.e. immediate environs of study area).

8.2 Construction Impacts

These impacts are considered for species within each of the main habitat types. Potential impacts are considered in more detail on species with enhanced statutory protection or species of key conservation concern where it is considered there could be a potentially significant impact.

8.2.1 Direct Habitat Loss

Upland Moorland and Grassland
The area of this habitat that would be directly lost, as a result of the construction of turbine foundations, crane hard standings and access tracks, is considered to be minimal. It is considered that the loss of foraging and breeding habitat to all bird species would be negligible.

Changes in the hydrological regime of wetland habitats (i.e. flushes and damp grasslands) arising from construction of tracks, turbine bases, etc., could alter the foraging habitat available to upland wader species present on the site. This includes the following species: Snipe and Curlew. However, Snipe was only recorded once on the site, and Curlew were not breeding. Any negative impacts are therefore not considered to be significant. The habitat management plan in the ES sates that management would attempt to recreate moorland, grassland and wetland communities which may benefit these species.

Impact Magnitude: **Low**
Impact Significance: **Low**
Mitigation Possible: **Yes, Potential Positive Enhancement**

Woodland
The main habitat to be affected by the proposed wind farm would be the woodland, comprising predominantly mature Lodgepole Pine and Sitka Spruce plantation. Extensive areas (up to 689 hectares) of this plantation woodland are proposed for felling within the Development Site. At the southern end of the site approximately 50ha will be topped instead of clear felled to avoid conflict with users of the Nordic ski trails which require tree cover to prolong snow retention.

Approximately 70% of the plantation woodland within the study site will be lost, with a subsequent negative effect on species that use this habitat for breeding and foraging. However, beyond the study site extensive stands of plantation are present within Clashindarroch Forest to the east that will remain.

Although within the surrounding local area there is extensive coniferous plantation and it is recognised that the plantation would be felled normally as part of forestry operations, the area of loss within the study site is considered to be of high impact magnitude. This is due to both the extent of plantation being felled and the relatively short duration. As a result there will be a loss of associated breeding and foraging woodland birds. There may be some displacement of populations to surrounding areas, but in general population levels of these woodland species will be reduced in the short-term. There is potential within the proposed Habitat Management Plan for planting of some areas of native woodland and scrub, which in the longer term could reduce the impact of loss of the plantation woodland on the bird resource.

Breeding birds found within the woodland habitat of conservation concern include sensitive raptors (see Confidential Annex), Bullfinch, Common Crossbill, Goldcrest, Lesser Redpoll, Spotted Flycatcher, Song Thrush, Tree Pipit and Willow Warbler. Black Grouse are also likely to use the woodland areas.

Impact Magnitude: High
Impact Significance: Moderate
Mitigation possible: Yes, Partial longer term.

8.2.2 Direct Habitat Loss Impacts on Ornithological Resource

Geese

There will be no direct habitat loss for geese as they are flying over the study site and not using it directly.

Impact: Negligible
Significance: Low
Mitigation possible: Not required

Black Grouse

No leks are located within the study site. The bird surveys undertaken for this assessment indicate that little use is currently made of the study site by Black Grouse for feeding and/or roosting, and that identified activity is largely confined to areas that will be unaffected by the proposed clear-felling. The extent of direct loss of moorland areas is not significant. It is therefore considered that the impact of direct habitat loss for Black Grouse will be low.

Impact: Low
Significance Low
Mitigation possible: Not required

Common Crossbill

The plantation woodland is comprised predominantly of coniferous trees, which provide potential breeding and foraging habitat for Common Crossbill. The loss of this resource will inevitably reduce the number of cone bearing trees available to this species which lives only in conifer woodland and is dependent on conifer seeds. Crossbill generally feed on spruce but also on Pine and Larch (Cramp *et al.* 1994). Crossbills are thought to be nesting at low densities throughout the mature plantation.

Impact: **Medium**
Significance: **Moderate**
Mitigation possible: **Yes, Partial in longer term**

Golden Plover
The direct habitat loss to the areas of potentially suitable Golden Plover habitat will be as a result of seven turbines and associated infrastructure. However, this species is not currently breeding within the study site. The clear felling will have no negative impact on this habitat and may make it more attractive to this species by reducing the extent of surrounding forestry. Golden Plover prefer wide open spaces for nesting and may be discouraged by the proximity of plantations (Stroud 1986).

Impact: **Low**
Significance: **Low**
Mitigation possible: **Not required**

Common Gull
Since Common Gulls are only using part of the study site as a flight path there should be no impact of habitat loss on their use of the site.

Impact: **Negligible**
Significance: **Low**
Mitigation possible: **No**

8.2.3 Disturbance Impacts

The ES states that the felling operations will, in accordance with the Wildlife and Countryside Act (1981), maintain a disturbance free zone around nesting forest species. Provided that this approach is followed during other phases of the construction, disturbance should be kept to a minimum. The potential disturbance impacts are therefore considered only for potentially sensitive species and not for each habitat assemblage.

Black Grouse
Black Grouse can be sensitive to disturbance at their lek site, particularly during the breeding season (April to July inclusive). Nesting female Black Grouse can also be sensitive to disturbance during the breeding season. It should be noted that lekking activity peaks around dawn and dusk and it is likely that Black Grouse would have begun dispersing from their leks prior to the start of the daily construction activities.

Currie (1997) recommends provisional safe distances for working practices for forestry operations during the breeding season from Black Grouse nests or leks are from 300m (nestling stage) to 1,000m (nest building stage). The closest lek to the study site, at NJ429251 is approximately

2km from the boundary of the study site. In addition, no breeding was confirmed within the study site. Therefore it is considered that disturbance impacts will be minimal, assuming that the recommended Site Environmental Management Procedure is followed in relation to nesting birds (see Section 6.1.1).

Impact Magnitude: Low
Impact Significance Low
Mitigation possible: No

Common Crossbill
There would be a disturbance issue if Common Crossbill nest sites were within 50m (at nestling stage) to 150m (at nest building stage) of works if undertaken during the breeding season, defined as February to May inclusive (Currie 1997). However, confirmation of nest sites within extensive areas of plantation woodland is not practical, and therefore a precautionary approach is recommended (see Section 6.1.1). Disturbance impacts relative to foraging are not considered to be significant, with birds often feeding in close proximity to human activities.

Impact Magnitude: Medium
Impact Significance: Moderate
Mitigation possible: Yes

Golden Plover
Golden Plover are sensitive to disturbance during the breeding season. They were not nesting this season but the area of open moorland along the ridge of Grumack Hill is potential habitat and should be monitored for nesting Golden Plover in the year prior to construction. Impacts should be low assuming that the recommended Site Environmental Management Procedure is followed in relation to nesting birds (see Section 6.1.1).

Impact Magnitude: Low
Impact Significance: Low
Mitigation possible: Yes

Common Gull
Since this species presence on the site is restricted to over flights, disturbance impacts are negligible.

Impact Magnitude: Negligible
Impact Significance: Low
Mitigation possible: Not required

8.3 Operational Phase Impacts

8.3.1 Long-term Indirect Habitat Loss

Indirect habitat loss could occur as a result of long-term disturbance from the operation of the wind farm (e.g. maintenance operations, increased public access on foot/bike, noise of turbines, etc.) and displacement of bird activity from a radius (depending on the species) around each turbine area or group of turbines.

There have been few studies to date where monitoring has been undertaken to fully assess any long-term indirect habitat loss, although available published evidence suggests that the effect can be minimal (e.g. Percival 1998). Disturbance effects for most species are likely to be temporary as the birds become habituated to the presence and noise of the turbines and any associated maintenance. Some species may be affected to a greater extent, in terms of displacement and habituation.

Breeding birds have not been found to be affected by long-term disturbance at distances greater than 300m from a turbine (Gill *et al*. 1996, Percival 1998). In addition, breeding passerines such as Skylarks and Meadow Pipits have been observed with no significant disturbance effects within operational wind farms (Thomas 1999). It is therefore considered that there will not be any significant long-term disturbance effects on passerines as a result of the proposed wind farm. In addition very little effect has been seen on breeding waders such as Curlew and Lapwing (Meek *et al.* 1993).

Displacement of bird activity from a radius around the turbines, could also for example, prevent territorial display flights of the upland waders such as: Curlew, Snipe and Lapwing. These display flights can occur at rotor level, which could reduce the airspace available. However, densities of breeding waders within the turbine envelope area are very low and therefore it is not considered there will be a significant impact.

Impact Magnitude: Low
Impact Significance: Low
Mitigation possible: Not required

Key Species:
It is not considered that there will be any significant indirect habitat loss for key species. Further discussion in relation to sensitive raptor species is provided within the Confidential Annex.

Impact Magnitude: Low
Impact Significance: Low
Mitigation possible: Not required

8.3.2 Collision Mortality

The majority of studies have so far shown that there is a very low collision mortality rate attributable to wind farms throughout Britain (Langston and Pullan 2002). However, this does not mean that collision mortality is always insignificant. There have been large numbers of bird kills at large, poorly sited wind farms, in continental Europe and in the United States of America, in areas of high concentrations of birds, especially migrants, large raptors or other large soaring species. However, current published evidence (e.g. Winklemann 1992) suggests that collisions at wind farms sites are usually rare events and predominately occur at these poorly sited wind farms with high concentrations of birds.

Geese

Due to low numbers of geese flying over the site and the fact that most were above rotor height, or outwith the proposed development area to the west of the study site, it is considered that the collision risk is minimal for geese.

Impact Magnitude: Low
Impact Significance: Low
Mitigation possible: Not required

Black Grouse
Black Grouse could be at risk of collision, if flying to and from breeding and feeding areas and if flying at rotor height. However, Black Grouse often fly relatively low to the ground and therefore most flights would be likely to occur at below blade height. Although Black Grouse have been observed flying at heights above 20m on occasions (Osborn personal observation), given the low levels of Black Grouse activity on the proposed development site, the risk of collision is considered to be low. Black Grouse have been recorded lekking during 2004 to the south of the site at NJ429251, over 1km outwith the area proposed for turbines.

The main collision risks would be from individuals roosting within the forest, within the proposed turbine areas and then flying down to lekking / feeding areas on the open ground. However, only one bird was flushed from within the woodland during the surveys and numbers in the forest are thought to be very low.

There is also potential for collision with any fencing erected on the site. Best practice recommendations are made in section 6. Mitigation Measures.

Impact Magnitude: Low
Impact Significance: Low
Mitigation possible: Not required (Best practice recommendations for fencing)

Golden Plover
This species could be at risk of collision, especially during display flights at the start of the breeding season. However, the low numbers and lack of evidence of breeding recorded on site reduce the potential for impact on this species.

Impact Magnitude: Low
Impact Significance: Low
Mitigation possible: Not required

Common Gulls
A large number of flights were recorded for this species, confined to the northern end of the study site. Of a potential 1,048,800 seconds of observation, Common Gulls were recorded within 500m of the nearest proposed turbine and within turbine rotor blade height for 187,419 seconds, or 17.9% of the total observation time. It is considered that the majority of these flights came from gulls breeding on the nearby SPA.

When flying over the site under normal weather conditions, it is considered likely that the Gulls will increase their flight height, or alter course to avoid the rotor blades. The greatest potential risk of collision will be in poor weather conditions or at night when the birds may not see the turbines in time to take avoidance action. It is therefore considered that if no mitigation is put in place that there could be a significant effect on the SPA. Therefore mitigation recommendations are made in section 6 to reduce the residual impact to not having a significant effect on the SPA.

Impact Magnitude: Medium
Impact Significance: Moderate
Mitigation possible: Yes

8.4 Decommissioning of the Wind Farm

Decommissioning of the wind farm has the potential to negatively impact on the bird resource of the study site, as a consequence of direct and indirect impacts. The scale and therefore significance of these impacts will depend on the methods, timescale and timing of decommissioning.

Impact Magnitude: Unknown.
Impact Significance: Unknown
Mitigation possible: Yes

9 MITIGATION MEASURES

9.1 Key General Recommendations

9.1.1 Site Environmental Management Procedure

A site Environmental Management Procedure should be in place during the construction and operational phase of the works. The procedure will include the following in relation to the ornithological resource:

- An emergency procedure for site workers to follow should active bird nest sites be encountered during the course of the works. The key to the procedure should be that all works be stopped in the area and specialist advice sort to determine suitable set-backs or buffer zones. The set-back requirements will vary from species to species, and SNH should be consulted.
- A procedure that ensures all site workers are inducted in relation to ecological requirements on the site including the above emergency procedure and any exclusion zones if present.

9.1.2 Ecological Watching Brief

An Ecological Watching Brief will be in place to ensure that due consideration is being given to ecological requirements throughout the construction phase and operational phase. The Ecological Watching Brief will be overseen by the project Ecologist.

9.2 Construction Phase

9.2.1 Direct Habitat Loss Impacts on Black Grouse and other Species

Although the numbers of Black Grouse within the study site are low, birds roost and feed in the site. The ES states that it would be desirable to encourage Black Grouse to use areas outwith the turbine envelope following development, to minimise the risk of collisions. However, it would seem to be of greater benefit in the long term, as in accordance with Scottish Executive EAU recommendations, if planting of scrub and small tree species such as Birch *Betula spp.* were to take place within the study area to encourage Black Grouse to use this area as well, which it is considered would outweigh the potential negative impacts of collisions. The revised Habitat Management Plan for the site, should consider the following for key species, where there is potential for habitat enhancement. Assuming the following recommendations are followed, the long-term residual impact significance for woodland species including Crossbill should be low:

Black Grouse

- Any areas of planting within clear-fell areas should include berried shrubs and trees such as Birch, Willow and Rowan;
- Management should aim to created a diverse sward with Heather, Bilberry, Rushes and Grasses;
- Grazing pressure should be reduced in sensitive areas to improve insect abundance and provide greater cover of vegetation for hens and chicks;

- Management of in-bye fields should aim to enhance herb diversity and to provide food plants and cover such as Cotton Grass, Sedges, Rushes, Sorrel, Buttercups and Clover;
- Wet flushes should be retained and additional flushes created.
- Clear-fell areas should leave feathered edges on remaining areas of plantation.

Crossbill

- Some areas of plantation that are to remain within the development site and surrounding forestry should be retained beyond the economic rotation to provide mature trees to produce high quality areas of feeding habitat, rich in cones, in the longer term.

Other woodland bird species

- Lesser Redpoll and Bullfinch will feed on a wide variety of seeds. The Redpoll is often associated with pioneer woodland favouring tree species with small seeds such as Birch. There is therefore potential within the proposed Habitat Management Plan, by the planting, or natural regeneration of semi-natural woodland to provide alternative foraging and breeding habitat for these species within the short term, i.e. 5-10 years.

Upland Waders

- Wet flushes could be created to increase the availability of suitable habitat.

9.2.2 Disturbance Impacts on Breeding Birds

As stated in the ES, felling operations will, in accordance with the Wildlife and Countryside Act (1981), maintain a disturbance free zone around nesting forest species. It is recommended that no felling is undertaken between February and July inclusive, unless prior checks are undertaken by suitably qualified ecologists, to identify nest sites. Provided that this approach is followed during all phases of the construction, disturbance should be kept to a minimum and the residual impact significance should be low.

9.2.3 Disturbance Impacts on Crossbills

Mitigation should be in the form of a precautionary approach, i.e. avoiding felling during the nesting period of February to July. Alternatively an intensive ground survey would be undertaken to locate nests and set up suitable disturbance free zones around them. The latter would, however, be very labour intensive, as Crossbill nests are difficult to locate from the ground. Provided that this approach is followed during all phases of the construction, disturbance should be kept to a minimum and the residual impact significance should be low.

9.3 Operational Phase

9.3.1 Collision Mortality

Common Gulls

The only significant impact identified for collision mortality potential is Common Gulls flying over the site at the northern end. On examination of the flight lines (Map 3 (a and b), it is clear that it is the northern-most turbine that is on the route of the major flight path and therefore with the potential for collision impacts on these species. Flights away from this turbine are few in number and generally with very small flock sizes of one or two gulls. It is therefore recommended that the northern most turbine is removed from the proposed wind farm layout. Removal of this turbine from the proposed layout would significantly decrease the potential for collision mortality, reducing the impact significance from Moderate to Low.

Assuming this turbine is removed from the layout, it is considered that there will no significant effect on the nearby Tips of Corsemaul/Tom Mor SPA.

BIack Grouse
Any fencing erected (e.g. around site compounds) should be 'grouse friendly'. Fencing should be suitably marked.

9.3.2 Post Construction Monitoring

Consideration should be given to monitoring of the ornithological resource during the operation of the windfarm Any monitoring methods and timings should be agreed with SNH.

10 REFERENCES

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11 APPENDICES

Table 2-4-2. Dates, times and weather conditions of vantage point watches

VP	Date	Time	Precipitation	Cloud cover (%)	Wind speed (Beaufort)	Wind direction	Temperature (°C)
1	12/2/04	0900-1200	0	50	1-3	W	2
2	12/2/04	1315-1615	0	30	1	NW	8-10
3	12/2/04	0900-1200	0	50	1-3	W	2
4	12/2/04	1315-1615	0	50	0-2	W	10
5	11/2/04	1300-1600	0	50	3-4	W	13
6	11/2/04	1300-1600	0	50	3-4	W	13
1	17/3/04	1430-1730	0	25	4-6	W	5
2	17/3/04	1000-1300	0	20	3-5	W	7
3	17/3/04	1000-1300	0	20-40	3-5	SW	8
4	17/3/04	1415-1715	0	20-40	4-6	S/SW	5
5	18/3/04	700-1000	0	60	1	SW	5
6	18/3/04	0700-1000	0	50-70	3-5	S/SW	4
1	21/04/04	1445-1745	0	100	2	NW	5
2	2104/04	1500-1800	0	100	2	N	5
3	21/04/04	1530-1830	0	95	2	N	5
4	20/4/04	1800-2100	0	10-40	2-3	SE	4-10
5	20/4/04	1810-2110	0	50	3-5	SE	6
6	20/4/04	1812-2100	0	30-60	2-3	SE	6
1	12/5/04	0850-1150	0	100	1	NW	15
1	13/5/04	0415-0715	0	100-40-70	2-3	W	5-10
1	26/5/04	1900-2200	0	5	0	W	10
2	12/5/04	0930-1230	0	90-40	1	NW	13-17
2	13/5/04	0430-0730	0	80	2	WNW	5
2	26/5/04	1930-2230	0	5	0-1	W	10

3	12/5/04	0930-1230	0	95	1	W	13-17
3	14/5/04	0500-0800	0	65	1	W	5-10
3	26/5/04	1930-2230	0	5	0-1	W	10
4	12/5/04	0930-1230	0	100-75	2	N	13-17
4	14/5/04	0500-0800	0	70	2	W	4
4	26/5/04	1950-2250	0	5	2	E	10
5	13/5/04	0925-1225	Shower	100	2	W	10-15
5	14/5/04	0430-0730	0	60	2	W	5-10
5	11/05/04	2000-2300	0	60	1	V	10-15
6	13/5/04	0930-1230	Shower	90	2	W	10-15
6	13/5/04	0430-0730	0	60	2	W	5
6	11/05/04	2030-2330	Light rain	60	1	V	10-15
1	22/6/04	0430-0730	0	30	1	V	5-10
1	22/06/04	0900-1200	Drizzle	80-100	1-2	NW	5
1	23/06/04	0600-0900	Drizzle	80	1-2	NW	5
2	22/6/04	0445-0745	0	30	0-1	E	10
2	30/6/04	2000-2300	0	50	3	W	10
2	2/7/04	1000-1300	0	30	2	W	5
3	22/6/04	0445-0745	0	30	1	V	10
3	30/6/04	2000-2300	0	50	3	W	10
3	2/7/04	1000-1300	0	30	2	W	5
4	21/6/04	2030-2330	0	50	0	-	15
4	1/7/04	0900-1200		50	2	W	10
4	2/7/04	0430-0730	0	20	1	V	5
5	1/7/04	0900-1300	0	50	2	W	10
5	2/7/04	0425-0725	0	20-30	1-2	W	10
5	21/06/04	2000-2300	0	0	2	NNW	1
6	21/06/04	2000-2300	0	5	1	N	8
6	23/06/04	0600-0900	Occasional light rain	100	1	N	4

6	22/06/04	0900-1200	Occasional light rain	100	1	N	8
G1	23/6/04	1700-1800	Light Rain	100	3	SE	10
G2	22/07/04	1900-2200	0	60	3	E	16
G3	22/07/04	1900-2200	0	100	3	SE	16
1	23/07/04	0900-1200	0	40	2	SW	16
1	23/07/04	1830-2130	0	50	2	SE	16
1	22/07/04	0530-0830	Light rain	100	2	SE	15
2	21/7/04	0900-1200	0	70-80	2-3	SW	15
2	23/7/04	0500-0800	0	10	2	NW	14
2	9/8/04	1840-2020	Drizzle	100	3	SW	15
3	21/7/04	0900-1200	0	85	4	SSW	15
3	23/7/04	0500-0800	0	20	3	N	14
3	9/8/04	1840-2020	Drizzle	100	3	SW	15
4	23/7/04	0900-1200	0	80	3	SW	15
4	22/07/04	0530-0830	0	100	2	SE	10
4	23/07/04	1830-2130	0	100	2	SE	10
5	21/7/04	0430-0730	0	50	2	W	10
5	22/7/04	0900-1200	0	70	3	W	17
5	23/07/04	1830-2130	0	70-100	1	SE	10
6	21/7/04	0500-0800	0	60	4	SE	10
6	22/7/04	0900-1200	0	100	2	S	17
6	22/07/04	1830-2130	Light rain	100	2	SE	10
1	19/8/04	1830-2130	Rain	100	2	SE	14
1	19/8/04	0530-0830	Rain	100	4	SE	15
2	18/8/04	1830-2130	0	100	2	SE	10
2	18/8/04	2300-0200	Rain at end	100	2	SE	8
3	19/8/04	0530-0830	Rain	100	1	SE	15
3	18/8/04	0630-0930	Light rain	100	1	SE	10
4	18/8/04	2300-0200	Rain at end	100	2	SE	8

4	20/8/04	0530-0830	Light rain	100	4	NE	10
5	18/8/04	0530-0830	Light rain	100	1-2	SE	10
5	19/8/04	1830-2130	Rain	100	4	SE	14
5	19/8/04	0530-0830	Rain	100	2	SE	15
6	18/8/04	2300-0200	Rain at end	100	3-4	SE	14
6	20/8/04	0530-0830	Light rain	100	3	NE	15

Table 3-4-2 *Vantage Point Activity Summaries for Gulls.*

Vantage Point (VP)	Flight No	Date	Time	Species Observed (BTO code)	No. of Birds per flight.	Time Birds spent flying in Height Bands (seconds).		
						0-20m	20-130m	130m+
5	1	18/03/04	0700	CM & BH	Constant stream of birds throughout VP			
5	2	18/03/04	0816	CM	22		360	
5	3	18/03/04	0942	CM	10	45	75	
6	4	18/03/04	0705	CM	3		120	
6	4	18/03/04	0707	CM	7		120	
6	4	18/03/04	0729	CM	15		120	
6	4	18/03/04	0738	CM	14		120	
6	4	18/03/04	0749	CM	2		120	
6	5	18/03/04	0711	CM	36		120	
6	5	18/03/04	0723	CM	2		120	
6	5	18/03/04	0727	CM	4		120	
6	5	18/03/04	0731	CM	10		120	
6	5	18/03/04	0736	CM	10		120	
6	5	18/03/04	0737	CM	16		120	
6	5	18/03/04	0740	CM	9		120	
6	5	18/03/04	0741	CM	20		120	
6	5	18/03/04	0744	CM	2		120	
6	5	18/03/04	0834	CM	3		120	
6	5	18/03/04	0839	CM	2		120	
6	5	18/03/04	0906	CM	5		120	
6	5	18/03/04	0908	CM	2		120	
6	6	18/03/04	0714	CM	5		120	
6	6	18/03/04	0737	CM	2		120	
6	7	18/03/04	0708	CM	2		120	
6	7	18/03/04	0747	CM	4		120	
6	7	18/03/04	0841	CM	1		120	
6	7	18/03/04	0848	CM	1		120	
6	8	18/03/04	0829	CM	21		120	
6	9	18/03/04	0837	CM	5		120	
6	10	18/03/04	0713	CM	2		120	
6	10	18/03/04	0716	CM	2		120	
6	10	18/03/04	0718	CM	3		120	
6	10	18/03/04	0720	CM	7		120	
6	10	18/03/04	0721	CM	8		120	
6	10	18/03/04	0735	CM	2		120	
6	10	18/03/04	0741	CM	2		120	
6	10	18/03/04	0745	CM	2		120	
6	10	18/03/04	0751	CM	8		120	
6	10	18/03/04	0753	CM	5		120	
6	10	18/03/04	0803	CM	2		120	
6	10	18/03/04	0805	CM	3		120	
6	10	18/03/04	0808	CM	10		120	
6	10	18/03/04	0812	CM	3		120	
6	10	18/03/04	0817	CM	3		120	
6	10	18/03/04	0825	CM	10		120	
6	10	18/03/04	0829	CM	5		120	
6	10	18/03/04	0851	CM	8		120	
6	10	18/03/04	0851	CM	2		120	

6	10	18/03/04	0853	CM	9		120	
6	10	18/03/04	0854	CM	1		120	
6	10	18/03/04	0903	CM	8		120	
6	10	18/03/04	0915	CM	2		120	
6	10	18/03/04	0929	CM	8		120	
6	11	18/03/04	0745	CM	2		120	
6	12	18/03/04	0813	CM	2		60	
6	12	18/03/04	0816	CM	4		60	
6	13	18/03/04	0831	CM	2		90	
4	14	20/04/04	1845	CM	1	30		
6	15	20/04/04	2005	CM	8		70	
6	16	20/04/04	1920	CM	6		75	
6	16	20/04/04	2009	CM	11		75	
6	17	20/04/04	1812	CM	4		90	
6	18	20/04/04	1820	CM	2		90	
6	18	20/04/04	1851	CM	2		90	
6	18	20/04/04	1916	CM	14		90	
6	19	20/04/04	1845	CM	7		75	
6	19	20/04/04	1944	CM	16		75	
6	19	20/04/04	1949	CM	22		75	
6	19	20/04/04	2028	CM	4		75	
6	20	20/04/04	1912	CM	6		75	
6	20	20/04/04	1922	CM	4		75	
6	20	20/04/04	1946	CM	2		75	
6	20	20/04/04	1959	CM	6		75	
6	21	20/04/04	1842	CM	11		75	
6	21	20/04/04	1955	CM	4		75	
6	22	13/05/04	0950	CM	4	180		
6	22	13/05/04	1020	CM	2	15	15	
6	23	13/05/04	1000	CM	5	45	30	
6	23	13/05/04	1049	CM	2		210	
6	23	13/05/04	1055	CM	2		60	
6	24*	13/05/04	0945	CM	1	120		
6	25*	13/05/04	1158	CM	3		30	
6	26	13/05/04	1215	CM	1		30	
6	27	13/05/04	1202	CM	1		45	
6	28	13/05/04	1105	CM	1		30	
6	29	13/05/04	1142	CM	2			60
6	30	13/05/04	1135	CM	1		20	
5	31	13/05/04	1158	CM	1		24	
5	32	13/05/04	1212	CM	1		40	
5	33	13/05/04	1138	CM	1	40		
5	34	13/05/04	1004	CM	1		10	
2	35	13/05/04	0714	CM	1		120	
1	36*	26/05/04	0920	CM	1		15	
6	37*	21/06/04	2030-2300	CM	370	120		
6	37*	21/06/04	2030-2300	CM	476		120	
6	37*	21/06/04	2030-2300	CM	212			120
6	38*	21/06/04	2030-2300	CM	34	120		
6	38*	21/06/04	2030-2300	CM	44		120	

6	38*	21/06/04	2030-2300	CM	19			120
5	39	2/07/04	0613	CM	1		120	
5	40	21/06/04	2110	CM	1		120	
4	41	21/6/04	2110	CM	1		15	30
4	42	02/07/04	0520	CM	2	60		
6	43	13/05/04	0400-0700	CM	150		120	
6	44	13/05/04	0400-0700	CM	390		120	
1	45	13/05/04	0543	CM	1	22		
6	46	11/05/04	2137	CM	2		40	
6	47	11/05/04	2145	CM	1		30	15
6	48	23/06/04	0610	CM	2		50	
6	48	23/06/04	0636	CM	3		45	
6	48	23/06/04	0656	CM	8		50	
6	48	23/06/04	0731	CM	2		45	
6	49	23/06/04	1024	CM	45		45	
OBS off site-Dumeath	50	23/06/04	1700	CM	10	30		
5	51	21/07/04	0615	CM	1		120	
6	52	21/07/04	0525	CM	1		45	
6	53	21/07/04	0535	CM	3		160	
6	53	21/07/04	0555	CM	6		180	
6	53	21/07/04	0630	CM	1		160	
6	53	21/07/04	0700	CM	1		160	
6	54	21/07/04	0735	CM	1		140	
6	55*	22/07/04	1024	CM	2		140	
6	56	22/07/04	1024	CM	135		240	240
Craigs of Succoth	57	22/7/04	2030	CM	4		15	

Flight Nos marked * are more than 500m from nearest proposed turbine.

Key: CM Common Gull,

Table 3-4-3 *Vantage Point Activity Summaries for Non-sensitive species.*

Vantage Point (VP)	Flight No	Date	Time	Species Observed (BTO code)	No. of Birds per flight.	Time Birds spent flying in Height Bands (seconds).		
						0-20m	20-130m	130m+
3	1	12/02/04	9.45	CR	27		60	
3	2	12/02/04	1039	RN	1		120	
3	3	12/02/04	1104	CR	2	30		
3	4	12/02/04	1104	CR	3	30		
3	5	12/02/04	1111	BF	3	15		
3	6	12/02/04	1118	CR	8	25		
2	7	12/02/04	1310	BK	1	15		
2	8	12/02/04	1305	BF	1	60		
2	9	12/02/04	1426	CR	5	30		
2	11	12/02/04	1445	BZ	1	5		
2	12	12/02/04	1452	BZ	1	15		
2	13	12/02/04	1443	BZ	1			15
2	14	12/02/04	1513	CR	16		60	
4	15	12/02/04	1459	BZ	1	30		
4	16	12/02/04	1516	M	3	15	45	
3	17	17/03/04	10.22	RN	2		60	
3	18	17/03/04	1154	Goose sp.	12			180
5	19	18/03/04	0729	PG	32			60
5	20	18/03/04	0751	JD	6		45	15
5	21	18/03/04	8.15	L	1		45	
5	22	18/03/04	0901	GP	1			
5	23	18/03/04	0940	BZ	2		60	
6	24	18/03/04	0723	PG	36			180
6	25	18/03/04	0806	PG	2		180	
6	26	18/03/04	0912	BZ	1		300	120
6	27	18/03/04	0922	BZ	2		600	
6	29	18/03/04	0942	BZ	2		120	
6	30	18/03/04	0947	PG	60			240
6	31	18/03/04	0949	BZ	1		120	
4	32	20/04/04	1806	LB	2		120	
4	33	20/04/04	1822	BZ	1	15	15	
4	34	20/04/04	1920	LB	3		30	
6	35	20/04/04	1830	LB	2		50	
6	36	20/04/04	2011	WK	1		42	
2	37	21/04/04	1718	RN	2		33	
2	38	21/04/04	1754	BZ	1		180	180
1	39	21/04/04	1450	BZ	1			21
1	40	21/04/04	1615	SH	1	20		
1	41	21/04/04	1730	CU	1	10		
2	42	12/05/04	1056	CU	2		240	
2	43	12/05/04	1215	BZ	1		30	90
3	44	12/05/04	0954	BZ	1		15	
3	45	12/05/04	1053	BZ	1		120	90
3	46	12/05/04	1129	SH	1		20	
3	47	12/05/04	1204	BZ	1		30	210
4	48	12/05/04	1000	RG	1	9		
4	49	12/05/04	1005	RN	1	15	21	
1	50	12/05/04	0939	BZ	1		60	30
1	51	12/05/04	1022	BZ	1	15	45	
1	52	12/05/04	1030	CU	1	30	15	
1	53	13/05/04	0455	CU	1	15	15	
6	54	13/05/04	1100	CU	1	30		

6	55	13/05/04	1113	BH	1		30	
5	56	13/05/04	0935	RG	1	6		
2	57	13/05/04	0618	SH	1		30	
2	58	13/05/04	0642	BZ	1		30	
2	59	13/05/04	0642	BZ	1		15	
3	60	14/05/04	0616	BZ	1		45	
3	61	14/05/04	0758	CU	1		120	
4	62	14/05/04	0513	RN	1		90	
4	63	14/05/04	0646	K	1		10	
4	64	14/05/04	0717	CU	1	10		
5	65	14/05/04	0549	LB	1		30	90
5	66	14/05/04	0552	LB	2	30		
1	67	26/05/04	2003	BZ	2	45	45	150
3	68	26/05/04	2125	RN	1			300
5	69	21/06/04	2100	LB	1	0	180	0
6	70	21/06/04	2045	SN	2	1680	420	0
5	71	01/07/04	1150	BZ	1	30	0	0
5	72	01/07/04	1255	BZ	1	30	270	0
4	73	01/07/04	1015	K	1	0	120	0
3	74	30/06/04	0915	K	1	30	0	0
3	75	22/06/04	0538	CR	1	20	0	0
2	76	22/06/04	0550	K	1	0	120	0
2	77	21/07/04	0910	BZ	1	0	120	0
3	78	23/07/04	0622	K	1	0	60	0

Key: BF – Bullfinch, BK – Black Grouse BZ – Buzzard, CR – Crossbill, CU – Curlew, GP – Golden Plover, HG – Herring Gull, JD – Jackdaw, K – Kestrel, L – Lapwing, LB – Lesser Black-backed Gull, M – Mistle Thrush, PG – Pink Footed goose, RG – Red Grouse, RN – Raven, SH – Sparrowhawk, SN – Snipe, WK - Woodcock