Annex 1

RSPB Scotland comments on the Addendum to the Viking Energy Partnership wind farm application.

Introduction

1. The RSPB is a registered charity incorporated by Royal Charter and is Europe's largest voluntary conservation organisation, with a membership of more than 88,000 in Scotland. The principal objective of the RSPB is the conservation of wild birds and their habitats. RSPB Scotland is part of the RSPB and manages over 68,000 hectares of land in Scotland. We strongly support the provisions of international and domestic agreements and legislation for the conservation of the natural environment.

2. RSPB Scotland has been present in Shetland since 1904. We manage seven nature reserves totalling 2,257 ha. We have over 450 members and employ six staff. Shetland is internationally important for seabirds and for blanket bog habitat and nationally important for its upland birds and habitats.

3. RSPB Scotland has significant experience of wind farm proposals. For example, across the UK, we were involved in some 1,500 wind farm related cases over the period 2004-2010 and of these, we initially objected to just 10%. Where possible, we seek changes through design, construction methods or operation to reduce harmful impacts. This allowed us subsequently to withdraw many of these objections, resulting in an overall final objection rate of only 7%.

The importance of the site for birds

4. Breeding populations of several important birds are found on this site. Whooper swan, red-throated diver, merlin, golden plover, dunlin and Arctic tern are listed in Annex 1 of EU Directive 2009/147/EC on the Conservation of Wild Birds (the 'Birds' Directive). Whooper swan, red-throated diver, merlin and whimbrel are included in Schedule 1 of the Wildlife and Countryside Act 1981, which affords them special protection whilst breeding. Lapwing, dunlin, whimbrel, Arctic skua and skylark are of high conservation concern as their populations have undergone declines of at least 50% over the past 25 years and accordingly are included in the Red List of Birds of Conservation Concern (BOCC). Shetland holds over 40% of the world population of great skuas and this species is also on the Amber list of the BOCC. In addition, curlew, Arctic skua and skylark are UK Biodiversity Action Plan (BAP) species, recognised as requiring conservation action to ensure the survival of healthy populations.

5. For those species on Annex 1 and the regularly occurring migratory species, Article 4 of the 'Birds' Directive requires "*special conservation measures*" to be taken "*to ensure their survival and reproduction in their area of distribution.*" The Directive does not specify the nature of these measures but Scottish Planning policy stipulates

that the presence or potential presence of a legally protected species *"is an important consideration in decisions on planning applications"*. For all species, especially those of conservation concern, such decisions also contribute to the "*requisite measures*" taken by Member States to secure the objectives of Articles 2 and 3.

The importance of the site's habitats

6. Part of the application area is active blanket bog (*i.e.* still peat-forming), which is a priority habitat on Annex 1 of EU Directive 92/43/EC on the Conservation of Natural Habitats and of Wild Flora and Fauna (the 'Habitats' Directive) and therefore of international importance. Blanket bog is also a priority habitat in the UK BAP.

Ornithology (A11)

General comments

7. The reduction in turbine number to give the T127 array has involved some effort to reduce losses of birds through the removal of turbines. However, further turbine removal is needed to reduce the predicted adverse effects of the proposed development to an acceptable level. Whilst we welcome the Habitat Management Plan (HMP), its ability to increase bird numbers is too uncertain and hence it cannot be regarded as adequate mitigation or compensation for birds that would be killed or displaced by the T127 array. Removal of further turbines from locations with the highest densities of key species would be the only way to ensure that deaths or losses from collisions and displacement/disturbance could be reduced to a level that would not put the conservation status of several important species at risk. However we continue to believe, without prejudice to our consideration of any revised or future proposals that a suitably-designed wind farm on a more modest, although still very significant, scale could be acceptable at this site.

8. This chapter fails to acknowledge fully that the proposed development will impact upon a large number of birds through displacement, disturbance and deaths through collisions with turbines and there is a general reluctance to accept even the figures that are presented. Every opportunity appears to have been taken to downplay any adverse effects of the development and overstate possible gains arising from the HMP. This is disappointing and contrary to the precautionary principle.

9. This section (A11) of the written statement has been rewritten and is now more clearly laid out. We welcome the inclusion of population modelling and, whilst recognising its limitations, we acknowledge that it is a useful aid to interpreting the data presented. However, we disagree with many of the assumptions made and the Applicant's interpretation of the parameters used in the compilation of these models, which in almost every case have led to the potential adverse effects of the T127 array being significantly underestimated.

Development changes (A11.6)

Design change – bird considerations (A11.6.1)

10. The reduction in turbine number is the critical change that has been made to the proposed development since the original submission in 2009. However, the assumptions upon which impacts on bird populations are based (e.g. collision risk and operational displacement) have also changed, and so it is not possible to determine, from the data provided, what effect turbine removal alone has had on the predicted impact. It would have been informative to have been provided with an indication of whether the removal of these turbines has reduced the predicted impact by a small, moderate or large amount, and what additional gain might be achieved by the deletion of further turbines. Thus, at the top of page A11 - 34 the predicted reduction in effects on key bird species is indicated by the bullet points, but these are the reductions produced by the removal of turbines combined with *'more sophisticated analyses'*. It would have been helpful if sets of graphs showing the results of deterministic population modelling under different scenarios for both the original T150 turbine layout and this, revised, T127 layout had been provided. This would have clearly shown the predicted effects of removing the 23 turbines. Although it has not been made clear how reductions in collision risk have been achieved, for several species it appears that a considerable proportion (bullet points at the top of page A11 – 34) is due to changes in the way in which collision risk and operational displacement have been calculated, rather than through the removal of high risk turbines. The impact of turbine removal can be estimated by summing the red columns (risks posed by the 23 deleted turbines) in the turbine risk graphs. However, this produces a shortfall from the figures given in the text, suggesting that a significant proportion of the reduced risk comes from a change in the method of calculation. For example, for whimbrel the reduction in risk is given as 78%, but the sum of the red bars for turbines removed is approximately 54%, *i.e.* 24% of the reduced risk comes from the change in the calculation methods. A more extreme example is dunlin, where a figure of 92% reduction in risk is quoted, but according to the graph only c.7% appears to come from the removal of turbines. For Arctic skua, the graph suggests only a 38% risk reduction arises from turbine removal, compared with 82% given in the text.

11. We would have no concerns about refinements in assessment methodology to improve the accuracy of impact predictions. However, it is unclear from what has been presented whether these changes to methodology genuinely provide any improvement in accuracy or just whether they just artificially reduce predicted impact.

Geographical population estimates (pairs) for selected species occurring on the proposed development site (Table A11.8)

12. We have identified two errors in the Shetland populations quoted. The Shetland breeding population of whooper swans is 6-8 pairs (8 pairs in 2009 and 6 pairs in 2010). The Shetland population of Arctic skuas is known to have declined

considerably since the figure quoted. It was estimated to be 586 pairs in 2008, having declined by over 10% per annum since last fully surveyed in 2002. We note that a figure of c.600 pairs is used in the population modelling (Table 8 in Annex A11.4)

Wider area context (A11.2.3)

13. This section recognises the importance of Shetland for many bird species and acknowledges that the proposed development *"...covers a relatively high proportion of the relevant SNH Natural Heritage Zone (the Shetland NHZ). Inevitably then, for species that are widespread, on average a relatively large proportion of the NHZ population occur within or close to the proposed development site."* It goes on to state that *"....Shetland as a whole is what might be termed 'good' for birds'"*. In our opinion, Shetland is a difficult region in which to site a large wind farm, because of the wide distribution of important species. Therefore, particular care is needed in attempting to find a suitable site for this development. The importance of the Central Mainland for birds requires that a precautionary approach be taken to siting and designing the development in order to avoid significant proportions of key species being adversely affected. Whilst we appreciate that some of the revisions now made have reduced likely impacts on birds and habitats, we do not consider that the proposal is yet acceptable.

Limitations and data gaps (A11.3.2)

14. The absence of recent reliable information on the trends of many Shetland bird populations is inadequately acknowledged. These are major data gaps that severely limit the accuracy of the deterministic population models and ability to assess the conservation status of several important species.

EIA context and overview (A11.3.3)

15. Page A11–5, paragraph 4 quotes SPP (2010), paragraph 132: *"planning authorities should apply the precautionary principle where the impacts of a proposed development on nationally or internationally significant ...natural heritage resources are uncertain but there is sound evidence for believing that significant irreversible damage could occur."* However, it is stated on page A11–5, paragraph 3, that *"The current assessment approach based on 'likely' effects has replaced the previous 'worst case' approach."* Consequently, for whimbrel and Arctic skua, whose national populations may be irreversibly damaged by the T127 array, we suggest that the approach used in the Addendum is not precautionary and is contrary to the guidance in SPP (2010).

Baseline methods (A11.41)

(c) The *'do nothing'* scenario

16. The final conclusion of this section *"Therefore the likely 'do nothing scenario' for the main habitats in Viking study area (and therefore most of the bird populations) is a continuing decline into the future or, at least stabilising at the current degraded levels"* is unjustified as

the current population trends of many of the species in the Shetland are unknown and, for those species whose populations do appear to be changing, the reasons for these changes are not clear and may be unconnected with the condition of the habitat in Shetland.. In addition, this conclusion does not accord with the assertion made later in the document that all but three species are in favourable conservation status.

Construction disturbance (d)

17. We welcome reference to the Bird Protection Plan (BPP), which could significantly reduce the effects of disturbance to breeding birds during construction of the development. The BPP should include such measures as clearly marking works boundaries and using signs and briefings to prevent workers straying from the work area on foot or in vehicles. If consent is granted, details of the BPP should be agreed in writing with SNH prior to the commencement of works.

Operational disturbance (e)

18. The Addendum now assumes that displacement of nesting birds around turbines will occur only within a distance of 200m, contrary to the evidence presented in Pearce-Higgins *et al*. (2009). Several reasons are given in justification of this assumption and criticisms are made of Pearce-Higgins' work, suggesting that it is likely to have overestimated displacement effects. Three other, unpublished, studies have been cited to support this approach. The published and peer-reviewed Pearce-Higgins paper remains the most detailed study of wind farm impacts on upland birds currently available and therefore it should provide the basis for estimating displacement effects, at least until further, reliable work showing contrary findings is available. We are extremely doubtful that the three, unpublished, studies cited provide sufficient contrasting evidence. These papers are generally focussed on a small number of sites and, contrary to the implication made in the Addendum, do not always provide before and after comparisons, nor involve appropriate control sites. The studies of Douglas *et al* (unpublished) and Fielding and Haworth (2010) involved data collection commencing only <u>after</u> windfarm construction. If displacement <u>commences</u> during construction, these studies are potentially irrelevant to the current application. Two of the cited, unpublished studies examined displacement effects using a territory centre approach, and acknowledged that territory centres are only indicative and are subject to an undetermined positional error, contrasting with the more rigorous approach adopted in Pearce-Higgins *et al* (2009). Consequently, the statement in paragraph 4 on page A11 – 19 that *"...in short they found no convincing evidence of displacement occurring in these species"* cannot be supported.

19. Applying the displacement figures found in the Pearce-Higgins *et al* study, considerably greater numbers of birds of certain species would be affected. For curlew, for instance, 42.4% displacement was found to occur over a 500m distance band from turbines. Although 193 territory centres were reported within this band *"of the proposed turbines, tracks and other features of site infrastructure"* no disaggregated figure for turbines alone is given. The number of displaced territories will

undoubtedly be greatly in excess of the 31 pairs (during construction) or 19.5 pairs (during operation) predicted by the Applicant. Similarly, the predicted eight pairs of golden plovers affected will be a significant under-estimate.

Collision (A11.4.3)

20. An avoidance rate of 98% (recently accepted by SNH) has been used for most of the species considered in the Addendum. It has been repeatedly suggested that this rate is unrealistically conservative, and that actual numbers of turbine collisions would be lower than figures predicted on this basis. No firm evidence has been presented to support this claim, although it appears to be based at least in part on SNH's acceptance of a 99% avoidance rate for geese and golden eagles and the unsupported assumption that other species are at least as agile. The Addendum goes on to suggest that it makes no biological sense for the avoidance rate of geese to be greater than that of smaller, more agile species. However, although waders and skuas may be more agile in flight than geese, the Viking development would be on the breeding grounds of these species where the risks to displaying birds and inexperienced juvenile birds taking their first flights may be considerably higher than for migrating or wintering geese. Consequently, until evidence is provided to the contrary, the avoidance rate of 98% remains the most appropriate value.

21. Recently issued SNH guidance states that the adopted 98% avoidance rate also takes account of operational disturbance. However in the Addendum, for most species, 50% operational displacement within 200m of the turbines has been applied <u>before</u> the use of the 98% avoidance rate. This approach does not confirm to SNH guidance and cited numbers of collisions should be doubled to correct this mistake. For lapwing, with very little flight activity recorded in locations with proposed turbines, the likelihood of collision was considered negligible, no further assessment of collision risk was carried out at all and it was simply judged that collision effects would not be significant

Distance detection correction (Appendix A11.1 paragraphs 125-127)

22. Although not standard practice, RSPB Scotland welcomes, in principle, the adoption of a correction factor to the estimate of the number of bird flights to account for the varying detectability of different species at longer range from VPs. We recognise that direct comparison with outputs of collision risk modelling from other sites where distance detection correction has not been made would be inappropriate.

23. It is worth noting that the worked example given for whimbrel (Appendix A11.2, page 6) appears to use the incorrect value for '*effective area observed*'. A value of 50 ha is used, giving a flight activity value of 0.406 s hr^{-1} ha^{-1}. The value in Table 2, corrected for distance detection, is 41.3 ha, which would give a flight activity of 0.492 s hr^{-1} ha^{-1}. This is 21% higher than the value presented. Because further calculations are made to generate an estimate of annual flight activity, it is not clear which of these values was used to produce the overall figure of 560 s ha^{-1} $year^{-1}$.

Estimating spatial differences in flight activity (Appendix A11.2)

24. The correction used here depends on the assumption that birds do not move far from their breeding territory throughout the breeding season. This seems unrealistic, as skuas are likely to hunt over a much wider area and waders can move their broods a considerable distance (up to 1 km) from the nest site. Nor does it account for commuting flights to feeding grounds, the activity of non-breeding birds or post-breeding dispersal. This correction appears to have been used to assess the overall collision risk across the development area. The correction gives an overall reduced estimated flight activity (and therefore collision risk) for most species, by 18.2 - 45.5%, and only great skua shows a small increase (Appendix A11.2, Table 4). Given that the remaining 21 VPs from which data have been used (data from 19 have been excluded) were all within 1 km of the turbine layout, this overall correction is not necessary, especially for species such as skuas that are likely to fly over a wider area than just their territory, and those that have large median nearest neighbour distances (*e.g*. Arctic skua - 817m; great skua and whimbrel >500m). The use of moorland bird survey data, which provides only approximate territory centres has been combined with a number of unsafe assumptions (particularly that flight activity is zero away from breeding territories) to produce a pseudo-accurate 'correction factor'. The use of these data in this way cannot be justified as a means of reducing apparent collision risks.

Whimbrel landform correction factor (Appendix A11.2)

25. Whimbrel tend to nest on lower slopes, so most flight activity would be in these places. However, it would be wrong to then suggest that hilltop turbines pose little risk to whimbrel, as is hinted at for turbines K84 to K87. Similar calculations were also made for golden plover, which flew over hilltops more than expected. Collision risk estimates were likely to be too low by 1%, but no correction for this was made. No details are provided of the statistical tests employed, nor is a rationale offered for only applying them to these two species.

Species	Land take (prs)	Construction disturbance (prs)	Operational disturbance (prs)	Collisions/ year individuals	Total predicted collisions in 25 years
Red-throated diver (breeders)	0	0	2.2 (1.6 young)	1.3	32.5
Red-throated diver (non-breeders)				2.7	67.5
Merlin	0	1	1	<0.28	7
Golden plover	2	15	8	12	300
Lapwing	1.6	6	3.5	Not provided	?
Dunlin	2	8	4.5	1.1	27.5
Whimbrel	0.5	0	1.8	2.1	52.5
Curlew	4	31	19.5	17.6	440
Arctic skua	0.5	4	0.5	1.9	47.5
Great skua	2	8	5.5	24.9	622.5

Table 1. Predicted losses of selected species, as given in the written statement [1].

[1] These are considered by RSPB Scotland to be considerable underestimates.

Population modelling (A11.4.4)

26. The Addendum states in A11.3.5 that *"However it is recognised that in all cases the population parameters and processes that affect the species of interest in Shetland are incompletely understood and, generally are either poorly quantified or have never been quantified"*. In our opinion, unsafe and unjustifiably optimistic assumptions about the Shetland status of several species have been used in the deterministic population modelling. For example, in Appendix A11.4, Table 1, page 16, row 3 it is assumed that displaced whimbrels and Arctic skuas will successfully settle elsewhere in Shetland, when there is no evidence that this is likely. Whilst we do not fully understand the reasons for these species' decline, habitat change may be an issue for whimbrel and the presence of great skuas may be an issue for both species, making some areas unsuitable. No clear evidence for any spare capacity of the populations of most species has been provided in the Addendum. We provide further comment on other unsafe assumptions under individual species accounts. The underestimate by 100% of the numbers of turbine collisions (referred to in paragraph 21, above) will have to be corrected in revised population modelling: this is not a straightforward calculation.

Interpretation of bird data

Assumed conservation status

27. We are concerned about the absence of a precautionary approach in the interpretation of some species information. For a number of important species where insufficient information exists to confidently deduce current trends, it has been assumed that populations are in favourable conservation status, whereas a more cautious approach would be to acknowledge that the conservation status is uncertain. In our opinion, this lack of caution has led to some of the conclusions of non-significant effects of the development on particular species being unsafe. This is particularly the case for red-throated diver, merlin, golden plover and curlew.

28. For several species of wader that breed on in-bye habitats, such as lapwing and part of the curlew population, there is little or no information on population trends in Shetland since the late 1990s, when a series of surveys carried out by the RSPB Scotland indicated that both species were in decline. For species breeding on moorland, such as golden plover, dunlin and part of the curlew population, few data are available since the RSPB and SNH carried out extensive surveys in Shetland in the 1980s. As these surveys have not been repeated, the population trends for these species in Shetland as a whole are unknown.

29. The Shetland Breeding Bird Survey (SBBS) has involved a number of 1km squares, selected by the observers, not randomly. The SBBS does not use recognised methods for surveying waders in upland and other habitats. Therefore the results are not comparable with wader surveys carried out by SNH and RSPB Scotland in the 1980s and 1990s.

Table 2. Reported changes in Shetland wader populations (Pennington et al. 2004)

Species	Reported trends
Golden plover	No trend reported since late 1980s surveys
Lapwing	-23 to -39% between 1993 and 1998/1999
Dunlin	No trend reported since late 1980s surveys
Curlew	-36 to -53% between 1993 and 1998/1999

30. Despite the above, in A11.3.2 it is stated that *"No gaps were identified in the baseline Viking data that would prevent assessments being undertaken."* However, as we have shown the size and recent trends of the Shetland populations of most species of waders are unknown.

Design change - bird considerations (A11.6.1)

31. We are unconvinced by the statement in A11.6.1, paragraph 2, that *"theoretical points of diminishing return"* (of removing additional turbines) have been identified for a number of species. The histograms of turbine risk for certain species (such as

illustration A11.2) show that further turbines can be identified which are predicted to have a disproportionate risk for particular species. Unfortunately, the individual turbine codes have not been labelled on these histograms in the Addendum so we cannot identify whether the removal of any particular turbine to benefit one species would also benefit others to a significant extent.

32. We consider that in order to significantly reduce the adverse effects of this development on the Shetland, and in some cases UK, populations of the species breeding in the area, further turbines must be deleted. Unfortunately, based on the information made available, with rare exceptions, we cannot advise which turbines these are, or how many may need to be removed to reduce adverse impacts on birds to an acceptable level.

Comments on individual species

Red-throated diver (A11.8)

Assumed conservation status (A11.8.2)

33. We disagree that the red-throated diver is in favourable conservation status. There was a 3.8% decline between the censuses in 1994 and 2006 following an earlier decline of 36% between 1983 and 1994. In addition, although non-breeding birds continue to be present, breeding numbers and breeding success continue to fluctuate annually, possibly in response to food availability.

Red-throated diver influences on design change (A11.8.3)

34. Illustration A11.2 indicates that only the two most high risk turbines, together with several turbines of considerably lower risk, have been deleted in devising the T127 layout. The histogram shows that a considerable further reduction of risk would ensue from deleting further high risk turbines.

35. Further benefits would accrue to non-breeding red-throated divers from the deletion of additional high risk turbines.

Red-throated diver disturbance impacts (A11.8.6)

Construction disturbance

36. Borrow pit DBP03 in the North West quadrant is less than 1km south-west of a red-throated diver breeding loch. Further measures may be needed to reduce disturbance to any divers using this loch.

37. It is essential that the measures used to avoid disturbance to breeding divers during construction works are detailed in the Bird Protection Plan (BPP) and are agreed with SNH prior to commencement of any works.

Operational disturbance

38. In A11.8.6 (b) the situation at the Burgar Hill windfarm is cited incorrectly. It is stated that the public viewing station (hide) is 20m from the breeding loch, Lowrie's Water, whereas, in fact, it lies 50m from the water's edge, and 103m from the nearest known nest site (last used in 2000) and 181m from the nearest nest site used within the past five years.

39. In paragraph 5 on page A11 – 49 it is stated that *"...observations at Burgar Hill indicate that, whilst divers exhibit avoidance towards individual turbines, they continue to fly between turbines..."* It goes on to say *"...it seems reasonable to assume that the turbines would likely not materially impede diver movements."* The Burgar Hill turbines have been operational for 20 years and are much smaller than those proposed for this development. Consequently, avoidance of turbines may be much easier for divers nesting beside such a small development.

40. Later in this section, and again in 11.8.9 (paragraph 2), the Burgar Hill example is falsely cited as a case where turbines have had no noticeable effect on breeding divers. However, a decline in the number of breeding pairs has occurred here since turbines were constructed: three pairs used to nest regularly, of which two often bred successfully. However, there are now no more than two pairs and sometimes only one. Whether this is the result of the presence of the turbines is not clear, but it may be that the cumulative effect of having six turbines between the birds and their feeding areas has had an adverse effect. Therefore, results from Burgar Hill should only be applied with considerable caution.

41. The calculations of diver disturbance vulnerability index (DVI) would seem to be largely applicable to disturbance by people and vehicles when present on tracks and in the vicinity of other infrastructure. However at the end of paragraph 1 on page A11 – 48, the Addendum acknowledges that *"In view of the limited data available on tolerance and response by divers to disturbance, the assessment criteria are inevitably somewhat arbitrary and rely on expert judgement."* The DVI seems almost to discount any disturbance effects arising from the turbines themselves, which is unsupported by published data. Consequently, we consider that a precautionary approach should be adopted and no turbines should be located within 500m of any lochs used by breeding, or non-breeding, red-throated divers or in diver flight lines (this should also apply to anemometer masts) and tracks should not pass within 250m of these lochs. Consequently, the deletion of further turbines is necessary to reduce to an acceptable level the effects of operational disturbance on breeding red-throated divers.

Significance evaluation – combined effects on red-throated diver (A11.8.8)

42. In section 31 of part 2 of the Birds Technical Report it is stated that *"the survey data suggest that from 2004 to 2009 the VDSA supported a more–or-less stable breeding population"*. Section 32 goes on to report an apparent increase of 10% (5 pairs) in the

population in the Viking Diver Survey Area (VDSA) in 2010. Such a fluctuation in the number of breeding pairs may reflect changes in the proportion of adults attempting to breed rather than any shift in overall numbers. This may be a response to a fluctuation in the availability of suitable prey fish in the sea around the islands. Consequently, we consider that the current conservation status of red-throated diver is best considered uncertain.

43. In our opinion there is no clear evidence of any spare capacity in the Shetland red-throated diver population. Deterministic population modelling suggests that a c.7% decline could occur over 25 years which would represent a significant risk to the future conservation status arising from the 127-turbine array. We consider that the effects on the breeding population would be **significant** and that further turbines should be deleted in order to reduce the adverse effects of the development on the conservation status of the red-throated diver in Shetland.

Mitigation/Enhancement (A11.8.9)

44. The measures in the Habitat Management Plan (HMP) should be regarded as experimental and of unproven efficacy. The proposed measures should be approved by SNH in advance of any development commencing and trialled before more widespread application is considered.

Whooper swan (A11.9)

45. We remain concerned that the construction compound located at the south-east corner of Sand Water (HU422546) could cause disturbance to the pair of whooper swans that nested on the loch in both 2009 (contrary to the data in the Addendum) and 2010. Although it would be possible to reduce the disturbance to this species, which is a very rare breeder in the UK, by relocating the compound further to the south-east and out of sight of the loch, this would move it closer to two merlin breeding sites. Therefore, we suggest that alternative measures to reduce disturbance to both whooper swans and merlins from work at this compound should be included in the BPP.

Merlin (A11.11)

Assumed conservation status (A11.11.2)

46. There are insufficient recent data to assess population trends in Shetland as a whole and the relatively large number of breeding pairs recorded in the Central Mainland is likely to reflect, at least in part, differences in the intensity of census work between here and elsewhere in Shetland. However, there are clear indications of a decline in the North Mainland. Consequently, we consider that the conservation status of the merlin in Shetland should be considered uncertain.

Merlin influences on design change (A11.11.3)

47. We welcome the deletion of turbines in the north-west quadrant that has significantly reduced the risk to merlin. Turbine K86 is close to territory C and is likely to affect breeding performance and foraging efficiency at this site. Deletion of this turbine would considerably reduce the level of operational disturbance and collision risk at this territory, which has a relatively high rate of occupancy and high productivity. This would significantly reduce the predicted impact of the development on the conservation status of the merlin in Shetland. In addition, the deletion of this turbine would also reduce the collision risk to whimbrel.

48. We suggest that turbine K86 should be deleted as it poses a significant threat to a particularly productive breeding pair of merlins.

Merlin disturbance impacts (A11.11.6

Operational disturbance

49. There is no evidence for the speculation in paragraph 4 on page A11-78 that *"...it is likely that if the birds were upset by the near proximity of the wind farm infrastructure they would continue to occupy the site, but choose to nest further away from the turbine as nesting habitat at the site is not considered limiting"*. The depth of heather used by this pair is limited in the surrounding area and they have never been found to nest away from this one small area.

Significance evaluation – combined effects on merlin (A11.11.8)

50. A number of unsafe assumptions have been used in this model. In Appendix A11.4: Population Modelling, Table 3, Merlin parameter values and other information used in population model, Page 19, row 10, Shetland Status, the statement is made that the merlin's Shetland status is *"recent recovery, stable or slowly increasing."* However, Pennington *et al*. (2004) state that *"Since 1987, the number of pairs has declined and the breeding population is now considered to be below 20 pairs"*. Increased search effort in recent years has detected more pairs in the Central Mainland but a decline in areas such as the North Mainland. In our opinion, there is no clear evidence that there is any spare capacity in the Shetland merlin population. The results of the deterministic population modelling, shown in Illustration A11.4 indicate an effect equivalent to a c.8.5% decline over 25 years. We consider that the proposed wind farm still proposes a **significant** threat to the conservation status of this species.

Mitigation/Enhancement (A11.11.9)

51. As stated earlier, we consider that the measures in the Habitat Management Plan (HMP) should be regarded as experimental and of unproven efficacy. The proposed measures should be approved in advance by SNH and trialled before more widespread application is considered.

Hen harrier (A11.12)

52. See our comments on whooper swan. Although it would be possible to reduce the disturbance to the roost at Sand Water by relocating the construction compound further to the south-east, this would move it closer to two merlin breeding sites. Therefore, we suggest that alternative measures to reduce disturbance from work at this compound should be included in the BPP.

Golden plover (A11.13)

Assumed conservation status (A11.13.2)

53. Insufficient information is available on recent population trends from elsewhere in Shetland to justify the conclusion that the population has Favourable Conservation Status. A precautionary approach would be to consider the conservation status of this species in Shetland to be uncertain.

Golden plover influences on design change (A11.13.3)

54. Illustration A11.5, Turbine risk histogram for golden plover, indicates that only one of the most high risk turbines for this species - and a number of less high risk turbines - were deleted to reach the T127 array. We consider that by deleting further turbines, the adverse effects of the proposed development could be significantly reduced.

Significance evaluation – combined effects on golden plover (A11.13.8)

55. Unsafe assumptions have been used in the population modelling. There is no evidence for the statement, in Appendix A11.4: Population Modelling, Table 4. Golden plover parameter values used in model, Page 21, row 10, Shetland status, that the Shetland population of golden plover is "*Apparently stable*". The BTO BBS surveys 2002 – 2008 cover very few sites and the SBBS 2008 does not use standard methods comparable to other upland and wader surveys. In our opinion there is no clear evidence of spare capacity in the Shetland golden plover population.

56. The results of deterministic population modelling shown in illustration A11.6 suggest that a c. 10% decline in the regional population of golden plover could occur over the 25-year life of the proposed development which, in its current form, could put the future conservation status of this species at risk. Consequently we disagree with the conclusion of this chapter and consider that the effects of the development would be **significant**. Further turbines should be deleted in order to substantially reduce the effects of the development on this species.

Mitigation/Enhancement (A11.13.9)

57. As this species is associated particularly with short vegetation, there is a risk that a reduction in grazing might lead to population decline. Therefore the HMP must be approved by SNH in advance of any commencement of the development.

Lapwing (A11.14)

Assumed conservation status (A11.14.2)

58. Again, the methods involved in the Shetland BBS surveys mean the results are not strictly comparable to surveys carried out by SNH and RSPB Scotland. Consequently, with insufficient information available on recent population trends from elsewhere in Shetland and a population decline detected in the 1990s, a precautionary approach would be to consider the conservation status of this species in Shetland to be uncertain.

59. The removal of further turbines should be considered in order to reduce the impact of the development on this species.

Dunlin (A11.15)

Assumed conservation status (A11.15.2)

60. We are not aware of any data from widespread localities in Shetland that would reliably permit any conclusion on recent population trends in this species. As the subspecies *C.a. schinzii* that breeds in Shetland is included in Annex 1 of the Birds Directive a precautionary approach should be adopted and the conservation status of this species in Shetland should be regarded as uncertain.

Dunlin influences on design change (A11.15.3)

61. Illustration A11.7, Turbine risk histogram for dunlin, shows that none of the seven most high risk turbines have been deleted in arriving at the T127 array. This makes it rather surprising that this array has apparently given rise to a 92% reduction in predicted collisions, when the stated primary reasons *"are the deletion of 23 turbines from areas used by dunlin".* Therefore, we consider that by deleting further high risk turbines, the adverse effects of the development can be significantly reduced.

Significance evaluation – combined effects on dunlin (A11.15.8)

62. Unsafe assumptions have been used in the population modelling. In Appendix A11.4: Population Modelling, Table 5, Dunlin parameter values used in model, Page 23, row 11, Shetland population status is given as *"Apparently stable"* although there is no good evidence of this. The BTO BBS surveys 2002 – 2008 cover a very small number of sites and the SBBS 2008 does not use standard methods comparable to

other upland and wader surveys. In our opinion there is no clear evidence that there is any spare capacity in the Shetland dunlin population.

63. The results of deterministic population modelling presented in illustration A11.8 indicate an effect equivalent to a c.1% decline over 25 years. However, because of the uncertainty in the calculation of collision risk for this species and the rather surprising apparent reduction in predicted collisions, we are not confident of the reliability of this modelling. Consequently, we consider that the removal of further high risk turbines is needed to ensure that this development does not adversely affect the conservation status of this species and we consider that the adverse effects of the T127 array will be **significant**.

Whimbrel (A11.17)

Assumed conservation status (A11.17.2)

64. We agree that the Shetland population of this species is not in favourable conservation status.

Whimbrel influences on design change (A11.17.3)

65. Illustration A11.9, Turbine risk histogram for whimbrel, shows that two of the more high risk turbines (K86 & K88) remain in the T127 array. Although in earlier discussions we did agree that the particular locations of these turbines made it likely that they posed less of a threat to breeding whimbrel than illustration A11.9 would indicate, subsequent advice from our specialist staff (previously communicated to Viking Energy) suggests that these two turbines could be a significant threat to breeding whimbrel in the area. Whimbrel often make display flights high above their territory, especially soon after arriving back in spring, and use a much larger volume of airspace than the area of their territory on the ground might suggest. Therefore, hilltop turbines close to whimbrel hotspots could still pose a risk, even though nest sites, and most flight activity once birds are nesting, are primarily on lower ground. Consequently, we consider that by deleting further turbines including K86 and K88 the risk to breeding whimbrel would be reduced significantly.

Whimbrel collision impacts (A11.17.7)

66. The claim that, on average, 108 adult whimbrel from the Shetland population die each year is incorrect because it is based upon an annual survival rate of 82%. A survival rate of 88% should have been used (see table 6 in Appendix A11.4), and the calculated number of deaths per year would then be 72. This means that predicted collision deaths would represent a higher proportion of all adult whimbrel deaths than is portrayed in the Addendum.

67. The use of 82% annual survival rate has been used on the assumption that survival has declined since the 1980s when survival was 88%. This may be the case, but at the

same time it has been implied that the decline in the population of whimbrel is due to reduced breeding success, and the HMP is focussed entirely on increasing breeding productivity. This is a contradictory use of the data to predict that there would be a lower proportion of overall whimbrel deaths resulting from collisions than should be the case.

Significance evaluation – combined effects on whimbrel (A11.17.8)

68. The recent survey was the most comprehensive ever undertaken for whimbrel in Shetland. The current population estimate is provisional and the data have not been fully analysed. Comprehensive random tetrad coverage of low density areas was never used for previous estimates, and therefore it is likely that the true extent of the decline is greater than that suggested here, because numbers may have been underestimated by previous survey work.

69. The recent survey, which demonstrated the scale and geographic variation of the whimbrel decline in Shetland, showed that the Central Mainland is apparently the only part of Shetland not to have suffered major declines (Table 60, Birds Technical Report) and is now one of the few areas where sizeable numbers remain. It follows, therefore, that this may be the sole area where conditions remain suitable for whimbrel and so the construction of a large wind farm here could have a disproportionate effect on the remaining population.

70. Unsafe assumptions have been used in the population modelling. In Appendix A11.4: Population Modelling, Table 6, Whimbrel parameter values and other information used in population model, Page 25, row 3, mean productivity, the value of 0.62 is almost certainly too high as the population is declining, as the authors acknowledge. Clearly, there is no spare capacity in the Shetland whimbrel population.

71. The results of deterministic population modelling presented in illustration A11.10 indicate an effect equivalent to a c.6% decline over 25 years. Therefore, we consider that the T127 turbine array is a significant threat to the future conservation status of this species in the UK. Consequently we agree that this development would have **significant** adverse effects on the Shetland and UK population of whimbrel. We consider that further turbines need to be removed to reduce the effects of the development on this species.

Whimbrel Mitigation/Enhancement (A11.17.9)

72. We continue to regard the efficacy of proposals in the HMP as unproven and, although worthy of further investigation, insufficient in themselves to reduce adequately the threat to the conservation status of this species.

Quantifying the benefits of HMP to whimbrel (page A11 – 130)

73. On page A11 – 13, paragraph 1 it is suggested that predation by hooded crows may be responsible for whimbrel breeding failure. No conclusive evidence has been provided that crows are particularly important predators of whimbrel nests or chicks, both of which may be taken by a range of species in Shetland. Consequently, it would be prudent to investigate whether crow control is likely to be worthwhile, before resources are spent on this measure which could be both ineffective and cause disturbance to other species of breeding birds. There is even a risk that crow traps used in the areas proposed could accidentally catch other protected species, such as ravens or skuas.

74. There has been no experimental work or evidence presented to suggest that the suggested habitat improvements would have the desired effects on this species.

75. *Page A11 – 131, paragraph 2.* As current breeding success levels of whimbrel are unknown, it cannot be said that *"... potentially it takes relatively little additional production to stem the decline and move towards recovery."*

76. Page A11 – 131, paragraph 4. The cause of the recent decline in whimbrel numbers is unknown and no evidence has been presented to show that a change in breeding success is responsible. It is conceivable that the decline may be due to decreased adult survival (*e.g.* resulting from increased predation by great skuas or adverse conditions on the wintering grounds). However, if a reduction in breeding success was indeed the cause, (using the survival and breeding success data from the studies conducted on Fetlar and Unst during 1986-88) it would have had to have fallen from 0.86 fledglings per pair in the 1980s to an average of 0.24 fledglings per pair over the past 20 years. Therefore, a more than threefold increase in productivity would be required to reverse the decline, rather than the 15% quoted in the Addendum, even allowing that the decline on Fetlar may be greater than across Shetland as a whole). This suggests that the expectations of what can be achieved by the mitigation work outlined in the Addendum are overly optimistic. The figures presented in Table A11.45, Possible magnitude of benefits to whimbrel resulting from HMP, are no more than speculative.

Residual effects on whimbrel (A11.17.10)

77. The conclusion that the residual effects of the development are not significant is unjustified because of the very large number of unknowns involved in the proposed mitigation. As outlined above, the causes of whimbrel declines in Shetland are unknown and there is no certainty that breeding success is in any way limiting, and therefore that improved breeding success would necessarily lead to a population increase. Furthermore, there appears to be very little evidence to suggest that the proposed mitigation would necessarily result in increased breeding success. No evidence is presented to suggest that habitat condition limits chick survival. Previous studies did not indicate strong selection for wetter habitats that may hold

higher invertebrate abundances. There appears to be very little basis for assuming that crows are a particularly important nest predator of whimbrel. Consequently we cannot agree that the residual effects would not be significant.

78. We consider the measures of the HMP to be experimental and of unproven efficacy although we welcome the overall concept. Should the development be granted consent, any management actions should be approved in advance by SNH and trialled before more widespread application is considered.

Curlew (A11.18)

Assumed conservation status (A11.18.2)

79. With insufficient information available on recent population trends from elsewhere in Shetland and indications of a decline in the breeding population in the 1990s, a precautionary approach would be to consider the conservation status of this species in Shetland to be uncertain.

Curlew influences on design (A11.18.3)

80. Because of the rather even distribution of this species across the area of the proposed development it is important that further turbines are deleted in order to significantly reduce the predicted impact of the development on this species.

Significance evaluation – combined effects on curlew (A11.18.8)

81. Unsafe assumptions have been used in the population modelling. In Appendix A11.4: Population Modelling, Table 7, Curlew parameter values used in model, Page 27, row 3, the mean productivity value of *0.706* may be too high. The population was known to be declining in the 1990s and there has been no information on more recent trends. In our opinion there is no clear evidence that there is any spare capacity in the Shetland curlew population.

82. Page 28, row 4, Shetland status. There is no evidence that the Shetland population of curlew is "*Apparently stable*". Surveys in the 1990s suggested the species was declining and there have been no recent, comparable surveys. The BTO BBS surveys 2002 – 2008 cover a very small number of sites and the SBBS 2008 does not use standard methods comparable to earlier upland and wader surveys.

83. The results of deterministic population modelling shown in illustration A11.11 indicate an effect equivalent to a c.7% decline over 25 years. The development in its current form could put the future conservation status of this species at risk. Consequently, we do not concur with the conclusion of the Addendum, but consider that the effects of this development on the Shetland curlew population will be **significant**. Further turbines should be deleted, to significantly reduce the impact of this development on this species.

Arctic skua (A11.19)

Assumed conservation status (A11.19.2)

84. We agree that the Shetland population of this species is not in favourable conservation status.

Arctic skua influences on design change (A11.19.3)

85. Illustration A11.12, turbine risk histogram for Arctic skua, shows that high risk turbines remain in the T127 array. We consider that a significant reduction in the predicted effects of the development can be obtained by further deletion.

Significance evaluation – combined effects on Arctic skuas (A11.19.8)

86. An unsafe assumption has been used in the population modelling. In *Appendix A11.4: Population Modelling, Table 8. Arctic skua parameter values used in model, page 29, row 3, mean productivity,* the value of *1.14* is almost certainly too high: the population is declining due, at least in part, to food shortages causing breeding failure. Clearly the Shetland Arctic skua population has no spare capacity.

87. The results of deterministic population modelling presented in illustration A11.10 indicate an effect equivalent to a c.2% decline over 25 years. However, this species is anecdotally considered to be very vulnerable to collision with fences and overhead wires and may be especially vulnerable to collision with turbine blades. The Shetland and UK breeding population of this species is already declining and we believe, therefore that, without the removal of further high risk turbines, the development remains a **significant** threat. Further turbines should be deleted, to significantly reduce the impact of this development on this declining species.

Mitigation/Enhancement (A11.19.9)

88. It seems likely that the population decline in Arctic skuas is due, in part, to a reduction in the availability of sandeels in the marine environment together with predation by great skuas. It is not credible therefore, to claim that measures of the HMP are likely to *"offset the adverse but not significant effects caused by the windfarm".*

Great skua (A11.20)

Assumed conservation status (A11.20.2)

89. This species has suffered poor breeding success in a number of years since 1984, probably due to a reduction in the availability of sandeels in Shetland waters. In recent years in Orkney and Shetland, there have been complex changes in the population of great skuas, with the breeding population at some sites declining and

at others increasing. Consequently we consider that the conservation status of this species is uncertain.

Great skua influences on design change (A11.20.3)

90. There remains a considerable risk to great skuas from the T127 array. Consequently we consider that further high risk turbines should be deleted in order to reduce the detrimental effects of this development on this species.

Significance evaluation – combined effects on great skua (A11.20.8)

91. The results of deterministic population modelling presented in illustration A11.14 indicate an effect equivalent to a c.3% decline over 25 years. However, because of uncertainties in current trends in the population of this species we consider that the results of this modelling are insufficiently conclusive. Further reductions in the effects of this development could be achieved by deleting more turbines.

Arctic tern (A11.21)

Assumed conservation status (A11.21.2)

92. With insufficient information available on recent population trends from elsewhere in Shetland and continuing poor breeding success due to reduced local availability of sandeels, a precautionary approach would be to consider the conservation status of this species in Shetland to be uncertain, at best.

Arctic tern influences on design change (A11.21.3)

93. We do not suggest any further changes to the infrastructure of the development to conserve this species.

Significance evaluation – combined effects on Arctic tern (A11.21.8)

94. We do not consider that this development is likely to have a **significant** effect on the Arctic tern population of Shetland.

Further mitigation

95. There is a clear need for additional mitigation of the adverse effects of the proposed windfarm on the Shetland and UK populations of key species. Because the most serious impacts arise from operational disturbance and collision with wind turbine blades, removal of proposed turbines from particularly sensitive locations is most likely to be effective. This would also result in reductions in the area of blanket bog being damaged and in the volume of excavated peat to be dealt with.

Monitoring (A11.22)

96. We welcome the basic proposals in this section. However it is essential that a comprehensive monitoring programme is agreed in advance with SNH and other interested parties and is adequately funded.

97. As noted previously, there is little or no recent information on the trends of the Shetland populations of several important species. It would be important not only to monitor birds breeding in the vicinity of the wind farm but also to periodically assess population trends in Shetland as a whole in order to provide context.

98. Details of all monitoring should be agreed in writing with SNH prior to the commencement of any works.

Damage to blanket bog habitat

99. Much of the application area is blanket bog, a proportion of which is regarded as active, *i.e.* with a significant area of peat-forming vegetation present. This is a Priority Habitat on Annex 1 of the EU Habitats Directive. Blanket bog is also a Priority Habitat in the UK BAP. We welcome the deletion of infrastructure from the Delting quadrant, thereby avoiding some of the most extensive areas of intact blanket bog.

100. The construction of turbine bases, hard standings and tracks, and proposals to store and dispose of excavated peat, would cause serious damage to blanket bog. We consider that the area of the development that could potentially be damaged by drainage effects has been considerably underestimated.

101. The 2009 ES uses a catchment-based system to describe the hydrology of the Viking area. The alternative, hydromorphological system provides a functional framework of classification for peatland systems appropriate to blanket bog. This system, employed since the early 1980s in many parts of the world, now forms the basis of official guidance from JNCC to the UK conservation agencies and features in Ramsar Convention guidance for peatlands (Lindsay and Freeman 2008). The use of a catchment-based system is likely to have underestimated the extent of habitat potentially affected by the development. We commented on this matter in our previous response but the Addendum has not readdressed the issue.

102. The zone of influence on either side of cut tracks is likely to be highly variable as the nature of the peat varies. In the 2009 ES, it is acknowledged that *"Studies have shown that drainage can be affected by as much as 200m from the ditch."* We consider that damage to the living acrotelm of the blanket bog habitat has been underestimated and that such damage could adversely impact upon several key bird species.

Floating tracks

103. As we stated in our response to the 2009 ES, so-called "floating tracks" compress the catotelm and often result in slumping of the peat. They cut across the natural surface

flow of the bog, causing problems for both the bog and the road. Experience has shown that floating tracks do not continue to float but subsidence, both short- and long-term, is almost inevitable and occurs to different degrees and at different rates along a road (Lindsay and Freeman 2008). This, variable, subsidence has significant operational and environmental consequences as parts of the road become saturated. In some cases, this can lead to ponding of surface water on the upslope side of a track. Ponding of surface water can make the upslope side of the track unstable, and so may require remedial cross drainage, which would in turn damage the blanket bog, by drying out the upslope peat and causing erosion on the downslope side. Consequently, the damage to the blanket bog from "floating tracks" can be considerable. It is likely that some stretches of 'floating' tracks will require side-drainage, which will further damage the blanket bog.

Appendix A10.9 Viking Wind Farm Habitat Management Plan (HMP)

104. We welcome the proposal to carry out habitat improvements to enhance the populations of several species of birds and upland habitats. However, we consider the efficacy of the actions and methods presented in the HMP to be unproven and trials should be carried out before wider application. It cannot be guaranteed that the HMP will reduce any of the detrimental effects of the development. Consequently, the proposed actions cannot be considered either mitigation or compensation, but only potentially-offsetting measures.

105. There are many references in the Addendum to agreements and liaison with landowners but it is unclear on what measures firm undertakings have been made. It is essential that guarantees be in place before the development is consented (should Ministers be minded to do so) or, certainly, before any development can commence, in order to ensure that the HMP can be delivered.

106. There are a number of statements made concerning the geographical area over which the HMP measures will be applied, but these are rather confused. It is essential that a clear commitment is made to trial methods and then apply those which are successful on a suitably large scale elsewhere in Shetland.

107. There has been no clear commitment of financial resources for the HMP and, without this, it is impossible to judge whether it is likely to be effective. A clear indication of the financial commitment to the HMP must be made before any consent is considered. This must be secured through a suitable financial bond as is normal practice before issuing project consent for other large projects, including windfarms and open cast coal mines.

Aims and objectives (1.2)

108. It is important that the HMP does not cause further damage to sensitive areas and we welcome the fact that this is now acknowledged. On page 1 it is stated that *"In some cases the presence of sensitive species may mean that part or all of a proposed candidate site must be excluded from the HMP"*. Where breeding birds are concerned, we suggest that

this would mean that works should take place outside the breeding season in order to prevent disturbance, rather than that a site be excluded completely.

109. We welcome the recognition on page 3 that priority action should be directed to red-throated diver, merlin, whimbrel and blanket bog. However, opportunities to carry out beneficial management for other important species should not be precluded, and particular care must be taken not to cause adverse effects on other species such as golden plover.

Red-throated diver (4.3.2)

Important factors

110. Contrary to the statement in paragraph 3, page 4, it is likely that red-throated divers, along with many other Shetland seabirds that feed at least partially on sandeels, have been affected by fluctuations in food supply in the seas around Shetland since the mid 1980s. It is likely that this has influenced to some degree both breeding success and the proportion of adults that breed annually.

Planned red-throated diver HMP actions

111. Bullet point 2. The provision of nesting rafts is likely to be severely affected by strong winds in exposed sites.

112. Bullet point 3. Earth bank screening using peat may impair hydrology and is likely to slump.

Planned whimbrel HMP actions

113. In paragraph 5, on page 22, it is stated that *"the HMP will primarily attempt to increase densities at existing occupied sites".* This would preclude work during the breeding season, when disturbance would cause additional problems.

114. The Addendum fails to provide evidence to suggest that whimbrel breeding success is limited by the absence of suitable habitat. Therefore, habitat management may not necessarily confer benefits to breeding whimbrel. Research into the reasons for whimbrel decline is urgently required and results should be used to inform the HMP actions. Should any consent be issued, it is vital that provision is made for this research. The measures proposed are likely to be beneficial to breeding waders in general (and therefore may be considered as desirable off-setting measures in a general sense), although it is possible that they could actually have detrimental effects on golden plover.

115. The methods to be used in the HMP should be based upon an understanding of whimbrel habitat preferences on Mainland Shetland. Whilst studies investigating habitat preferences appear to have been undertaken, details are lacking (such as the number and range of sites from which data have been collected, types of data

collected), and no presentation or analyses of these data are provided. Therefore, without such analyses, recommendations on appropriate habitat managements are premature, and the current subjective assessments of habitat preferences as described in the HMP are inadequate. Contrary to the assertion in paragraph 2, they cannot be viewed as having a high likelihood of offsetting any deleterious effects of the development.

Predator control

116. In paragraph 4 of page 23 it is stated that nest predation by hooded crow was observed in only one instance, and that on this occasion Arctic skua was also involved. In paragraph 5 of page 23, it is stated that the Shetland BBS shows record numbers of hooded crows breeding. However, as stated earlier this survey has limitations and it is unsafe to draw such sweeping conclusions. As stated earlier, no evidence has been presented to suggest that hooded crows are a significant predator of whimbrel nests, or that their control would be effective.

Priority habitat management: blanket bog (4.4)

117. We commend the much-reduced use of excavated peat proposed in this version. However, the use of peat dams is mentioned in the bullet points at the bottom of page 28 and extensively on page 29. As we mentioned in our response to the original 2009 Environmental Statement, peat should not be used as it is difficult to guarantee that it will remain in place and not be washed out and pollute watercourses. There should be no cutting of turfs for this purpose, despite it being proposed on page 31.

Pilot Blanket Bog Management Area (6)

118. We welcome the selection of an extensive pilot area for this purpose. However, it is likely that some techniques, such as the reestablishment of vegetation on eroded areas of bare peat, will have to be trialled at a much smaller scale in order to determine which methods are likely to be most effective.

119. The geographical extent of proposed management works in the HMP and other parts of the Addendum is unclear. Whilst the proposed pilot area for peatland management has been clearly defined, measures aimed at birds have referred to a number of different, undefined areas including the West and Central Mainland. The methods proposed in the HMP should be trialled at a smaller scale for efficacy and to ensure that they do not have harmful effects on biodiversity. Successful measures must then be applied elsewhere in Shetland, away from the windfarm and at a suitably large scale. Adequate funding must be made available to ensure that the HMP is carried out. The HMP should not constrain where habitat measures of proven efficacy should be implemented within Shetland.

120. The measures proposed in the HMP to enhance blanket bog are unproven in Shetland and their success on a large scale should not be prejudged. In fact, in Appendix A16.7, Erosion of blanket bog within the site proposed for the Viking

Windfarm: Field Visit Report, section 10 it is stated that *"Whilst such micro-site management would be impractical over extensive areas, it could be possible around the turbine sites and along the tracks...".*

121. Our concerns about some of the measures in the HMP can be addressed by the HMP and BPP being agreed with SNH and SEPA before any development can commence.

Air and climate (A16)

122. The calculations of carbon payback periods presented in the Addendum have a series of flaws and unsafe assumptions, which make it uncertain that this development contributes as significantly towards a reduction in carbon emissions as is claimed. There is a tendency to make assumptions which favour the proposed development by understating adverse impacts and over-estimating compensatory benefits. For instance, in calculating carbon savings the 'fossil-fuel' mix emission factor is used in Table A16.2 although a more reasonable option would be to use the 'grid mix', which would substantially reduce the final figure. In table A16.4 a backup power generating requirement figure of 5% of rated capacity is used, in line with the cited Nayak *et al* (2008) work: the UKERC report (2006) states that balancing backup needs to be somewhere between 5% and 10% so a more pessimistic view of potential savings should be considered. There appears to have been an error made in the computation of the overall emission associated with the requirement for backup power generation (0.036Mt CO_2) given in Table A.16.4: we believe this figure is a seriously underestimate and wish to see the detailed calculations.

123. The placing of tracks or turbine foundations within peat can affect drainage at a distance. Paragraph 1, page A16 – 3, states *"Whilst it has been claimed that drainage distances can be up to 200m, evaluation of peat in Scotland indicates that distances of between 0 and 21.3m would be expected."* The Addendum goes on to say *"In light of this evaluation the calculation has been re-run for three drainage distance scenarios: 10m, 20m, and 50m. The 50m drainage scenario has been selected as the worst case based on the available evidence, rather than the 100m distance in the 2009 ES."* Although the data in a series of references have been alluded to in 16.4.2, other, more recent, studies suggest that the 100m figure is more appropriate, if not unduly conservative: Holden (2005) demonstrated that drainage effects can be caused over distances of 400m or more. It has not been made clear how the drainage distances used in the calculation were arrived at and why a more precautionary approach was not used. Consequently, there is a risk that the effects of drainage have been seriously underestimated.

124. On page A16 – 12, paragraph 2, it is stated that *"Peat extracted from the turbine bases will be stored on site for reinstatement following the decommissioning of the wind farm"*and, in paragraph 3, *"the removed peat from the turbine bases has not been included in the calculation for peat loss."* In Appendix A14.4, Appendix B, B4 it is estimated that the total volume of peat required to restore turbine bases is 36,880.8$m^{3,}$ whilst B5 goes on to state that the total volume of peat required for restoration of permanent hardstandings is 114,300m^3, giving a total of 151,181m^3, or 1,190m^3 of excavated peat

proposed to be stored adjacent to each turbine. There is no proof that this stored peat will not deteriorate, release part of its stored carbon, be washed into water courses if left exposed and cause further damage to the blanket bog. Consequently, the carbon balance calculations are deeply flawed.

125. One critical assumption of the carbon budgeting model is that site hydrology would be restored at the end of the 25-year life of the development. However, it is intended that all tracks and buried infrastructure should remain in place. Therefore, contrary to the assertion in the final paragraph on page A16 – 13, it cannot be assumed that local hydrology will return to a stable state, so this important assumption has not been met. This would certainly lead to an underestimation of the effects of the disruption of hydrology. Nevertheless, we acknowledge that leaving tracks and buried infrastructure in place may be preferable to the damage which would be caused by theirs removal.

126. Page A16–15, paragraph 1, suggests that additional carbon fixing, up to the equivalent of the total annual dry matter production of an area of blanket mire can be achieved by reducing grazing pressure. This is unrealistic as, firstly, not all of the production is removed by grazing animals and, secondly, some of the removal will be by lagomorphs which might be expected to increase as competition for sheep is reduced. Perhaps more importantly, only part of the annual dry matter production is permanently fixed as peat anyway. This part is estimated at 10-15% in Appendix A10, p. 8.

127. We welcome the attempt to map (and quantify in Table A16.6 *et seq.)* the areas of natural, bare and eroding peat within the ambit of the infrastructure in order to identify which parts of the system might be more directly or seriously impacted by the development. However, it is assumed that damaged bog or bare peat will be less damaged by the development *i.e.* it is inexorably committed to losing all its carbon and this situation cannot be worsened. In fact damaged bog and bare peat may retain some of their carbon store by remaining wet through receiving upslope seepage. Drainage associated with the development may remove or lessen this seepage, hastening oxidative loss, exacerbating an already bad situation. In addition, if water is channelled beneath roads erosion gullies may lead to erosive water movement.

128. It is reported in Appendix A16.6, Carbon payback calculations, 1.1.7 Carbon savings due to habitat management plans, that 10-40mm of peat is eroding per annum. The savings arising from reduction of this erosion are then applied to the entire HMP pilot area rather than to its bare peat only. In addition, biomass figures appear to have been conflated with those of carbon content and a reduction of around 50% is required. These errors lead to a substantial overestimate of the amount of carbon loss that could be saved by implementing the HMP.

129. An unduly pessimistic picture is painted of the condition of the blanket mire habitat of the development area, with the corollary that only through positive habitat management provided by Viking Energy can this be remedied. In fact, many of the photographs shown in section 3 of the (original) ES, Appendix 14.1, show evidence of

re-vegetation within the lower-lying parts of many erosion complexes. Carbon credits for re-vegetation within the Viking development scheme claimed to follow the Habitat Management Plan are, therefore, exaggerated.

Table A16.9: Calculated Overall Carbon Payback Period

130. This table should not include row 3 (Habitat Management Plan improvements) as these improvements are not guaranteed and any likely benefits have been overestimated.

Appendix A14.4 the Estimated Peat Extraction and Reuse Volumes

131. We welcome the statement in 1.2.4 Offset that *"The HMP will not limit itself to the wind farm area and one of the aims of the Addendum HMP is to increase its reach and therefore effectiveness".*

Restoration Requirements and Peat Reuse Considerations (2.3)

132. We welcome the commitment in paragraph 2 of page 7 that all excavated peat will be *"required in reinstatement and restoration*". However, some of the proposed methods of reuse would cause further damage to blanket bog and water courses and result in carbon release.

133. The statement in paragraph 6 of page 7 that *"Reinstatement of peat on roadside verges is also considered to be beneficial from both an ecological (improved habitat and reduced run off issues compared to having the side of slopes bare) and visual impact perspective".* The use of excavated peat alongside tracks (especially floating tracks) is likely to impede hydrology and damage vegetation so should not occur.

134. In Appendix A14.4, Appendix A, sections A3, A6 and A9 it is estimated that the total volume of peat required for verge restoration and landscaping along the raised hardcore edges of floated tracks would be, respectively, 113,893m^3; 93,305m^3 or 63,451m^3, depending on the length of track that is floated. However, as noted above, spreading excavated peat along the edges of floated tracks in this way will impede the movement of water through the hardcore of the floating track and so adversely affect the hydrology of the peatland around it.

135. No excavated peat should be used along the verges of tracks (especially floating tracks}.

Other design assumptions (3.3)

136. In xi) it is assumed that peat, to be used during decommissioning to restore areas of turbine bases and nearby hardstanding, be stored close by. The likelihood of the undesirable consequences of large volumes of peat deteriorating, releasing stored

carbon and being washed into water courses if left exposed have been referred to previously.

137. In Appendix A14.4, Appendix A, A3, A6 and A9 it is estimated that the total volume of peat required for restoration of double tracks to form single tracks is 73,026m^3. It is very unlikely that anything approaching typical peatland vegetation can be recreated on this peat; it will be very well drained and is likely to deteriorate, releasing part of its stored carbon, be washed into water courses and cause further damage to blanket bog.

138. It is proposed that between 287,658m^3 and 338,100m^3 of peat be reused or stored in ways that could be further damaging to the peatland, representing 66- 78% of the 434,000m^3 of the excavated peat identified for reuse in Table A16.3: Peat extraction and re-use volumes in A16 Air and Climate.

139. RSPB Scotland considers it essential that no excavated peat should be stored in the long term adjacent to turbine bases and hard standings, nor should it be used on verges or the sides of cut or floating tracks or to convert double track floating tracks to single track.

140. Our concerns about some of the measures in Appendix A14.4 the Estimated Peat Extraction and Reuse Volumes can be addressed by means of a planning condition requiring the Site Environmental Management Plan (SEMP) to be agreed with SNH and SEPA before any development can commence.

Reduction in the damage to blanket bog habitat

141. We welcome the measures that have already been taken to reduce the magnitude of damage to this important habitat, including the removal of all infrastructure from the Collafirth quadrant and the reduction in the length of tracks needed.

142. We suggest that damage to peatland habitats be further reduced by deleting the track in the north-west quadrant that runs from close to the Houb of Scatsta to deleted turbine D4, as all the turbines along this stretch of track have now been deleted.

National Planning context

143. The Scottish Government's planning policy on renewable energy developments was restated in Scottish Planning Policy (2010) (SPP), in paragraphs 182-195. This document lays a greater emphasis than before on sustainable development and climate change (paragraphs 34-44) which are of particular relevance to the consideration of renewable energy developments. Whilst these are generally to be encouraged, paragraph 187, on wind farms, places limits on their acceptability, as follows:

"Planning authorities should support the development of wind farms in locations where the technology can operate efficiently and environmental and cumulative impacts can be satisfactorily addressed."

144. The criteria by which the development of wind farms will be considered include "*effects on the natural heritage and historic environment*". Clearly, then, environmental and cumulative impacts, which include effects on the natural heritage, must be satisfactorily addressed and RSPB Scotland maintains that this has not been done in the case of these proposals as the Environmental Statement fails to portray accurately the true impacts of the development.

145. Paragraphs 125-148 of the SPP cover Landscape and Natural Heritage. It is made clear in paragraph 126 that planning authorities should "*take a broader approach to landscape and natural heritage than just conserving designated sites and species, taking into account the ecosystems and natural processes in their area.*" The duty placed on all public bodies to further the conservation of biodiversity under the Nature Conservation (Scotland) Act 2004 "*should be reflected in ...development management decisions*" (paragraph 129). Paragraph 132 states "*Planning authorities should apply the precautionary principle where the impacts of a proposed development on nationally or internationally significant landscape or natural heritage resources are uncertain but there is sound evidence for believing that significant irreversible damage could occur.*"

146. It is clear, therefore, that in deciding this application the Scottish Government must consider the very high level of natural heritage interest of the site and that the precautionary principle is to be adopted in decision-making unless it is certain there will be no adverse impacts on that interest.

147. Paragraph 133 states "*The disturbance of some soils, particularly peat, may lead to the release of stored carbon, contributing to greenhouse gas emissions. Where peat and other carbon rich soils are present, applicants should assess the likely effects associated with any development work*".

148. The Scottish Government must decide whether it considers an adequate assessment of peatland issues has been provided and whether it agrees with the Applicant's conclusions and the acceptability of the development in those terms. RSPB Scotland does not agree that assessment is yet adequate or that likely impacts would be acceptable.

149. Paragraphs 142-145 address Protected Species and it is made clear that the presence of legally protected species is an important consideration in decisions on planning applications. As all wild birds are protected – and many of the species on this site are specially protected – this clearly applies to this application, even though it is made primarily under the Electricity Act (1989) rather than a planning act. Paragraph 144 states:

"Planning permission must not be granted for development that would be likely to have an adverse effect on a species protected under the Wildlife and Countryside Act 1981 unless the development is required for preserving public health or public safety. For development affecting a species of bird protected under the 1981 Act there must also be no other satisfactory solution."

As all wild birds are protected under this Act, this test applies and would appear to provide a considerable obstacle to granting planning permission.

150. As we have made clear throughout this response, the proposed development would adversely affect species and habitats, including those protected under the Birds and Habitats Directives, the Wildlife and Countryside Act (1981) and identified as priorities in the UK Biodiversity Action Plan.

Development Plan context

151. The relevant development plan consists of the Shetland Structure Plan 2000 (approved 2001) and the Shetland Local Plan (adopted 2004). Development proposals conflict with Structure Plan policy GDS4: 165

"New development will conserve and, where possible, improve the quality of life and the environment by:
a) controlling the location, scale and design of new development to respect, protect and conserve the natural and built environment;
b) *minimising water, air and land pollution and waste generation……"*

152. In addition, damage would occur to important habitats and species listed under all five categories of Policy NE7:
"In considering development proposals, the Council will give full consideration to the legislation, policies and conservation objectives, that may apply to the following:
• Habitats & Species listed under Annex I, II & IV of the Habitats Directive;
• Species listed under Annex l of the Birds Directive;
• Species listed on Schedules 1, 5 and 8 of the Wildlife and Countryside Act 1981; and
• Habitats and Species listed in the UK Biodiversity Action Plan.
& Species which are widely regarded as locally important"

153. This application conflicts with Local Plan Policy NE10, which requires that applications should *"not have an unacceptably significant adverse effect on the natural or built environment"* and considerations to be taken into account include *"likely impacts, including cumulative impacts, on amenity and the environment as a whole".*

Shetland Draft Interim Planning Policy on Wind Farm Development

154. This represents the most recent exposition of local policy on wind farm development, albeit that it has not yet been adopted by Shetland Islands Council. It sets out *"a*

Spatial Framework against which all proposals for wind energy development of or exceeding 20 megawatts in generating capacity will be initially assessed."

Suggested measures that could substantially reduce the environmental impact of this development

155. We remain of the view that the proposal as revised remains unacceptable. However, should they be minded to approve this application, despite RSPB Scotland's objection to the proposed development in its current form, we request that Ministers:

- Delete Turbine K86, which poses a significant threat to a particularly productive breeding pair of merlins and to breeding whimbrels
- Delete Turbine K88 to reduce the risk to breeding whimbrels
- Delete further selected turbines to significantly reduce the adverse effects of this development on the Shetland, and in some cases UK, populations of the important species breeding in the area.
- Remove the track in the North West quadrant that runs from close to the Houb of Scatsta to (now deleted) turbine D4 as no associated turbines remain.

156. In addition, the following conditions should be attached to any consent:

- The Bird Protection Plan (BPP) must be agreed with SNH prior to commencement of any works
- All measures to be used to avoid disturbance to breeding divers during construction works are to be detailed in the BPP
- Measures to reduce disturbance to divers arising from Borrow pit DBP03, which is less than 1km from a breeding loch, must be included in the BPP
- Measures to reduce disturbance to both whooper swans and merlins from work at the Sand Water compound must be included in the BPP.
- Details of all monitoring must be agreed in writing with SNH prior to the commencement of any works.
- The Habitat Management Plan (HMP) must be agreed with SNH prior to commencement of any works
- The life of the Habitat Management Plan (HMP) should be equal to, or greater than, that of the consented development, including commissioning and decommissioning works.

- The methods proposed in the HMP should initially be trialled at a smaller scale for efficacy and to ensure that they do not have harmful effects on biodiversity. Successful measures should then be applied in any area of Shetland that they might benefit, and a suitable level of funding should be made available to ensure this can be delivered. The HMP should not constrain where habitat measures of proven efficacy are implemented within Shetland.

- The Site Environmental Management Plan (SEMP) is to be agreed with SNH and SEPA before the commencement of any development. This will address some of our concerns about the measures in Appendix A14.4 the Estimated Peat Extraction and Reuse Volumes.

- No excavated peat is to be stored adjacent to turbine bases and hard standings, or to be reused along the verges /sides of tracks (especially floating tracks) or to be used to convert double track floating tracks to single track.

References

Holden, J. (2005) *Peatland hydrology and carbon cycling: why small-scale process matters.* Philosophical Transactions of the Royal Society, series A, 363, 2891-2913.

Lindsay, R.A. and Freeman, J. (2008). *Lewis Wind Power (LWP) Environmental Impact Statement (EIS) 2004 and 2006 – A Critical Review*. Internal Report to RSPB Scotland.

Nayak, D. R., Miller, D., Nolan, p., Smith, P. And Smith, J., (2008) *Calculating carbon savings from wind farms on Scottish peat lands – a new approach.* http://www.scotland.gov.uk/Resource/Doc/229725/0062213.pdf accessed 18 Nov 2010 @12.11

Pennington, M., Osborn, K., Harvey, P., Riddington, R., Okill, D., Ellis, P. and Heubeck, M., (2004). *The Birds of Shetland*. Christopher Helm, London.

UKERC (2006) *The Costs and Impacts of Intermittency: An assessment of the evidence on the costs and impacts of intermittent generation on the British electricity network* http://www.ukerc.ac.uk/support/Intermittency accessed 17 Nov 2010 @ 14.00

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