

Appendix 2

APPLICATION FOR CONSENT UNDER S36 OF THE ELECTRICITY ACT 1989 AND DEEMED PLANNING PERMISSION UNDER S57 (2) OF THE TOWN AND COUNTRY PLANNING (SCOTLAND) ACT 1997 FOR THE CONSTRUCTION AND OPERATION OF THE LEWIS WIND POWERED ELECTRICITY GENERATING STATION AT BARVAS MOOR, ISLI OF LEWIS

Appropriate Assessments

Scottish Government Enterprise, Energy and Tourism Directorate

Lewis wind farm

Appraisal of the Implications of the Proposed Lewis Wind Farm on the Lewis Peatlands Special Protection Area (SPA)

The following appraisal has been prepared by the Competent Authority to inform the Appropriate Assessment of the above proposal. The frameworks are based on those provided in the European Commission's guidance document " Assessment of plans and projects significantly affecting Natura 2000 sites: Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC".

SPA and Project Description

1	Brief description of the SPA	<p>The Lewis Peatlands Special Protection Area (SPA) is designated under the EC Directive (79/409/EEC) on the Conservation of Wild Birds (the Birds Directive) as amended by EC Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora (the Habitats Directive) for:</p> <p><u>Article 4.1</u></p> <ul style="list-style-type: none">regularly supporting populations of European importance of the Annex 1 species: black-throated diver (<i>Gavia arctica</i>); red-throated diver (<i>Gavia stellata</i>); Golden eagle (<i>Aquila chrysaetos</i>); Golden Plover (<i>Pluvialis apricaria</i>); and Merlin (<i>Falco columbarius</i>) <p><u>Article 4.2</u></p> <ul style="list-style-type: none">regularly supporting populations of European and international importance of the migratory species during the breeding season: Dunlin (<i>Calidris alpina schinzii</i>) and Greenshank (<i>Tringa nebularia</i>). <p>The Lewis Peatlands SPA area is also designated as a Ramsar site, designated under the Convention on Wetlands of International Importance (Ramsar, 1971) to which the UK is a signatory. The Ramsar interests are fully covered by the appropriate assessment process for the Lewis Peatlands SPA.</p> <p>The Lewis Peatlands comprise an extensive area of deep blanket bog, interspersed with bog pool complexes and freshwater lochs, covering the main part of Lewis. Grazed, poor-quality grassland also occurs with heather (<i>Calluna vulgaris</i>) dominant on the coast. In the south, the continuous blanket bog becomes increasingly fragmented by rocky outcrops and larger lochs. Overall, the continuous and largely unfragmented extent of the peatland is a striking feature of the area, similar to the peatlands of Caithness and Sutherland that were extensively damaged by coniferous afforestation in the 1980s. The peatlands are of importance for a range of characteristic peatland breeding birds, especially waders, divers, and raptors.</p> <p>Unlike most SPAs the Lewis Peatlands SPA is not underpinned by a Site of Special Scientific Interest (SSSI) designation, pursuant to the Wildlife and Countryside Act 1981/Nature Conservation (Scotland) Act 2004.</p>
2	Brief description of the project	<p>The proposed scheme would be the largest onshore wind farm in Europe. The development would comprise 181 turbines, each having a rotor diameter of 107m on a 86.5m tower, giving a tip height of maximum 140m. There would be approximately 141km (88miles) of site roads with a typical running width of 5m. The electricity produced by the turbines would feed through 30km of underground cables and onto 30.6km of a high voltage transmission line supported on 27m lattice towers, via a series of eight substations.</p> <p>Construction of the wind farm would take approximately 4 years. Rock would be required for the construction of roads, hardstandings and foundations, concrete for construction would be mixed at four locations throughout the site in temporary batching plants. The proposal is based on a 20 year operational lifetime with decommissioning taking place</p>

thereafter.

3 Scale and Variation

Scale

The majority of the proposed wind farm (>80%) lies within the Lewis Peatlands SPA. This area comprises 58,984 ha of blanket bog, freshwater lochs and rocky outcrops. The table below shows the number of breeding pairs of qualifying species and their proportion in relation to the UK breeding population. The data are taken from the SPA citation presented when the site was classified in December 2000.

Species	Number of breeding pairs on designation	Proportion of UK breeding population
Red-throated diver	80	9%
Black-throated diver	13	8%
Golden eagle	5	1%
Merlin	20	2%
Golden Plover	1800	8%
Dunlin	3400	37%
Greenshank	140	8%

Variation

Species using the Lewis Peatlands are subject to natural fluctuations in numbers due to a range of factors including weather, predation, food supply etc. Details are presented in item 7.

1. *Appraisal of Impacts on Site Integrity*

4	Conservation Objectives of the SPA against which the impacts on site integrity will be judged	<p>To avoid deterioration of the habitats of qualifying species or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained.</p> <p>To ensure for the qualifying species that the following are maintained in the long term:</p> <ul style="list-style-type: none">• Population of the species as a viable component of the site• Distribution of the species within site• Distribution and extent of habitats supporting the qualifying species• Structure, function and supporting processes of habitats supporting the qualifying species• No significant disturbance of the qualifying species <p>The qualifying species are: Red-throated diver, Black-throated diver, Golden Eagle, Merlin, Golden Plover, Dunlin and Greenshank.</p>
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5	Describe the ways in which the proposed wind farm may impact upon the ornithological interest	<p>Habitat loss</p> <p>The construction of wind turbines, access routes and substations and the open quarrying of rock source will lead to habitat loss. Besides the direct habitat loss due to the individual turbines and their associated infrastructure, other loss can occur from changes in soil condition, hydrology and physical damage during excavation and construction. The loss or alteration of habitat could represent a reduction in the potential nesting or foraging habitat available to the qualifying bird species, including the potential loss of a number of entire territories for some of the species present.</p> <p>Displacement/disturbance</p> <p>Construction can lead to displacement and disturbance of species. Displacement can also occur through the presence of structures or increased levels of human activity which is most common during the construction and decommissioning stages. The long term consequences of increased access, especially in remote areas, and other activities related to wind farm operation will lead to additional disturbance that would otherwise not have happened. Assessing the likely long term impacts of disturbance is difficult. Some factors associated with these bird species, e.g. long life expectancy, high site fidelity, may mean that impacts are only seen after some considerable time. Short term effects on breeding success can also be confounded by other impacts such as changes in food supply or habitat loss.</p> <p>Barrier effects</p> <p>The Barrier effect is the prevention of birds using their usual migration or local commuting routes due to the presence of wind turbines in their flightpath. The effect is for birds to fly around the wind farm resulting in increased energy expenditure or avoidance of feeding/breeding/roosting areas that may be on the other side of the development. The LWP Addendum i claims that the minimum distance between turbines tip to tip is 450m which should reduce the barrier effect. Other published evidence (Desholm & Kahlert 2005) however suggests that with an even greater tip to tip distance (approx 480m) the barrier effect is still in place for waterfowl and seabirds.</p> <p>Collision risk</p> <p>Collision risk at wind farms is well documented (Hunt 2001, Barrios & Rodriguez 2004) and each individual site poses a different level of threat depending on a number of factors e.g species density, behaviour, topography, site layout etc. The risk is most significant where the development occurs on sites holding large numbers/concentrations of birds, overlays regular flight lines such as between roosting or feeding grounds, or where birds use the area for hunting. Among the species most likely to be subject to significant risks are raptors, geese, divers and some seabirds. Qualifying species require careful risk assessment on a site specific and species specific basis.</p>
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Comment on method for conducting assessment of “adverse impact on integrity”.

There are no fundamental disagreements over the methods or quality of the field data collection on birds for this proposal in the Lewis Peatlands SPA although SNH and RSPB have commented on the limited nature of some of the data collected, (eg on black-throated diver flightlines, vantage point data during the main migration periods). However there are fundamental disagreements on interpretation of EU Habitats and Birds Directives and European Commission guidance on these directives.

SNH sets conservation objectives for all Natura 2000 sites in Scotland that are designed, in line with European Commission Article 6 guidance, to contribute to maintaining or restoring the favourable conservation status (fcs) of the features, as defined in Article 1 of the Habitats Directive and to ensure that deterioration or significant disturbance to qualifying interests is avoided. SNH’s approach to the setting of conservation objectives has been endorsed by the Scottish Government. Where populations of qualifying species have increased since initial classification, SNH’s approach is to assess effects on site integrity against the contemporary (increased) population while using the population at the time of classification as a reference point and to judge trends.

The developer contends that the population at the time of classification is the relevant point referring to European Commission Guidance on Article 6, section 3.5, which recommends that

“At a site level, the maintenance of favourable conservation status has to be evaluated against the initial conditions provided in Natura 2000 standard data forms when the site was proposed for selection or designation, according to the contribution of the site to the ecological coherence of the network” The concluding statement in section 4.5.3 relating to the formation of conservation objectives is also relevant. “The information provided according to the standard data form established by the Commission forms the basis for a Member State’s establishment of the site’s conservation objectives”

SNH acknowledges that the data forms are the basis for identifying the qualifying interests of the site for which the conservation objectives are set but considers section 3.5 is also relevant i.e “This notion should be interpreted in a dynamic way according to the evolution of the conservation status of the habitat or of the species”. Section 4.6.3 of the Article 6 guidance is also relevant. “As regards the connotation or meaning of ‘integrity’, this can be considered as a quality or condition of being whole or complete. In a dynamic ecological context, it can also be considered as having the sense of resilience and ability to evolve in ways that are favourable to conservation” SNH’s approach has been accepted by the Scottish Government.

The overarching objective for the SPA is “to avoid deterioration of the habitats of the qualifying species or significant disturbance to the qualifying species, thus ensuring the integrity of the site is maintained”. This is not addressed in any detail by the developer, but is critical to the consideration of the appropriate assessment. However, the underlying objectives are considered:

“To ensure for the qualifying species that the following are maintained in the long term:”

- i. “Populations of the species as a viable component of the site”: a simple interpretation is that this requires the maintenance of numbers and viable populations. The developer asserts that declines due to the windfarm, which are smaller than the natural annual population fluctuations of the key species recorded in the Highlands, would not affect these ‘viable’ populations. However, the developer uses a dataset which is recognised as having inadequate data for

		<p>effective assessment of all of these species in the Highlands, even though it is the best available, and does not acknowledge that declines from the windfarm would be in addition to the natural fluctuations. The developer also appears to assert that the maintenance of populations of species above the -accepted minimum threshold for consideration for selection as an SPA (ie. 1% of either the GB population for Annex I species or 1% of the biogeographic population for regularly occurring migratory species) would constitute compliance with this objective. However, for example, the dunlin population on this site is approximately 31% of the global population of this subspecies, and the loss of all but 1% of this population would not be seen as an acceptable impact on this site.</p> <p>ii. “Distribution of species within the site” – the developer suggests the site integrity will be maintained if the current distribution in terms of presence or absence at a 1km square level is maintained. This assessment however, would allow the loss of 11 pairs out of 12 in a 1km square but would still pass the developer’s proposed test. We do not consider this to be the intention of the Birds Directive objectives for sites such as this, and would expect the European Commission to require the assessment to take into account both the geographic distribution of birds and the numbers of birds within that distribution, ie. density.</p> <p>iii. “Distribution and extent of habitats supporting the qualifying species” and</p> <p>iv. “Structure function and supporting processes of habitats supporting the species” are both asserted by the developer to be satisfactorily discharged if the first two objectives are not considered compromised. However, the permanent loss of substantial areas of important supporting habitats from this site, and of the effects of roads and other infrastructure developments on the structure and function of remaining areas of supporting habitat need to be assessed separately from the numbers and distributions of birds on those habitats. The maintenance of the habitats of the site as a ‘most suitable territory’ for the qualifying species is fundamental to the concept of site integrity.</p> <p>v. “No significant disturbance of the species”: again the developer appears to contend that if objectives 1 and 2 are not considered to be compromised, then this objective must be met. However, many of the species concerned with this site are long-lived species, and it is quite possible that effects such as reduced productivity (resulting from increased disturbance, or additional predation from generalist predators such as crows and ravens associated with the development, or reduction in habitat quality during the breeding season) would not be easily detected in the short term. A reduction in productivity of a few percent is sufficient to cause long-term declines in bird species and these factors should be taken into account in any assessment.</p>
7	<p>For each species, describe predicted impacts against the conservation objectives, proposed mitigation measures and predicted results</p>	<p>Red Throated Diver</p> <p>There are 935-1500 breeding pairs of red throated diver in the UK. All 42 pairs detected during the ES survey work should be considered as part of the Lewis Peatlands SPA population.</p> <p>Red throated divers breed on small or very small inland lochs on Lewis, and are not particularly site faithful,. Over the 20 year lifespan of the wind farm it is likely that many different lochs would be used for breeding and breeding birds are likely to select lochs from which access to the coast for feeding would involve crossing turbines. There is no evidence in the survey work undertaken by LWP to determine which of the unoccupied lochs were most likely to become occupied. The ES survey concluded that between years 2002 and 2003, red throated diver site fidelity was 73%, but the potential for</p>

27% of the breeding lochs to change every year creates difficulties in estimating the long term impacts of the wind farm proposal.

The design of the wind farm was modified in the Nov 2006 layout to try and accommodate predicted red throated diver flight lines and reduce the barrier effect. However, the ES estimated that 20% of the pairs surveyed had a regular flight path which potentially takes them through the turbine array. In addition, no evaluation of collision with transmission cables is made. The ES has also not considered the risk proposed to summering red throated divers which can make up 40% of the summer population and which are potential future breeding birds once they reach maturity.

Conservation Objectives	Likely Impact	Met/Not met
The population of each qualifying species is capable of maintaining itself and a viable component of the site	Population is likely to decline as a result of collisions and disturbance	Not met
Distribution of each qualifying species is maintained	Disturbance from infrastructure could limit nesting distribution, and possible nest choice selection, if red throated divers avoid nesting near turbines and turbine infrastructure	Not met
Distribution and extent of habitats supporting the qualifying species are maintained	Most water bodies are unlikely to be affected, but impacts dependent on future nest choice selection by divers	Not met (uncertain outcome)
Structure, function and supporting processes of habitats supporting the qualifying species are maintained	Potential barrier effects may limit nest choice selection, possible limiting population	Not met (uncertain outcome)
No significant disturbance of the qualifying species will occur	Limited site fidelity may mean the species will suffer disturbance, which could lead to longer term population decline if this is sufficient to limit breeding success or to enhance adult mortality. Increased access may also lead to increased disturbance	Not met (uncertain outcome)

The ES proposes a number of measures which are termed mitigation. These include restrictions on development near breeding lochs, measures to limit collisions with the overhead wires and the use of rafts to increase breeding success; no mitigation is proposed to avoid collisions with turbines. The mitigation measures are outlined below.

Diverters on power lines	Diverters only reduce collisions by 50%-85%. Flying in poor visibility (as divers do) will increase collision risk. Bird diverters may not remain in place if the site is subject to high winds	Unlikely to eliminate collision risk with overhead power lines sufficiently to avoid adverse impact
Diver rafts	Rafts are only appropriate when causes of breeding failure result from nest predation by terrestrial predators or when water levels fluctuate, neither of these are a problem on Lewis, and rafts have not been found to be beneficial to most red-throated divers which nest on very small lochs. Divers have a large number of alternative nest sites and may move nest in response to experience of predation	Highly unlikely to succeed, partly because principal determinant of breeding success is probably food supply, not nest predation from terrestrial predators or water level fluctuations.

Black throated divers

The UK population of black-throated diver is considered to be 150-189 pairs. The population at classification in 2000 was 13 pairs. LWP claim that the Lewis Peatlands SPA holds 11 breeding pairs making up 6.9% of the UK breeding population.

The ES recognises the possibility of disturbance at breeding lochs and feeding lochs but no information is presented on the whereabouts of known feeding lochs. The size of the non-breeding population and the risks posed to them should have been evaluated. Black-throated diver watches appear not to have been undertaken at breeding lochs despite the fact that on Lewis black-throated divers make frequent flights to feed on neighbouring lochs or occasionally to the sea. Furthermore, there are no vantage point records in early morning or evening when flight activity by divers would be at its highest.

Like red-throated divers, black-throated divers on Lewis are less site faithful than elsewhere in Scotland. Again, this may be due to a wide range of suitable lochs upon which to breed. Therefore the same problem arises whereby the revised turbine layout is based on loch use during 2003-2004 and 2006 takes no account of the limited level of site fidelity and future changes of loch use for breeding. It is possible that some turbines will prevent lochs that may have been used in the past from being used again in the future.

Conservation Objective	Likely Impact	Met/Not Met
The population of each qualifying species is capable of maintaining itself and a viable component of the site	Population is likely to decline as a result of collisions and disturbance	Not met
Distribution of each qualifying	Disturbance from infrastructure could limit nesting distribution,	Not met

species is maintained	and possible nest choice selection, if black-throated divers avoid nesting near turbines and turbine infrastructure	
Distribution and extent of habitats supporting the qualifying species are maintained	Water bodies on which breeding and feeding occur are unlikely to be affected (e.g. by draining or pollution with sediment) but impacts dependent on future nest choice selection by divers	Not met (uncertain outcome)
Structure, function and supporting processes of habitats supporting the qualifying species are maintained	Potential barrier effects may limit nest choice selection, limiting population, for those pairs that forage for all or part of the time on the sea	Not met (uncertain outcome)
No significant disturbance of the qualifying species will occur	Limited site fidelity may mean that the species could suffer disturbance, which could lead to longer term population decline, if this is sufficient to limit breeding success or to enhance adult mortality. Increased access may also lead to increased disturbance	Not met (uncertain outcome)

The proposed mitigation comprises alleviation of disturbance through revised wind farm layout and scheduling of construction work, reduction of collision risk by the use of bird diverters and the provision of nesting rafts.

Mitigation proposed	Comment	Likely Success
No development within 1000m	Turbines have been sited to avoid lochs identified in the 2002-2003 surveys. Limited site fidelity means that birds may move closer to turbines as inter-annual breeding site changes occur	Cannot guarantee success, unless divers actively avoid turbines and associated infrastructure
Disturbance free zone of 2000m	Will require annual breeding bird surveys of divers while construction is happening	Likely to succeed, but only for lochs identified during pre-construction surveys
Diverters on power lines	Diverters only reduce collisions by 50-85%. Flying in poor visibility (as divers do) will increase collision risk	Unlikely to eliminate collision risk with overhead power lines sufficiently to avoid adverse impact
Diver rafts	Rafts are only appropriate when causes of breeding failure result from nest predation by terrestrial predators, or when water levels fluctuate. Divers have a large number of alternative nest sites and may move nest site in response to experience of predation from airborne predators	Unlikely to succeed, partly because the principal determinant of breeding success on Lewis is probably food supply, not nest predation from terrestrial predators or water level fluctuation, as is the case elsewhere, where rafts have been demonstrated to be beneficial for this species

Golden eagle

The UK golden eagle population is estimated to number 443 breeding pairs. The Western Isles has long been considered a stronghold of this species and supports approximately 81 pairs, the ES identifies seven pairs as part of the SPA population.

Although direct habitat loss through land take might appear to be negligible at the scale of all breeding territories combined, additional factors such as breeding success, food supply, presence of neighbouring territories confound an assessment based on simple habitat loss prediction.

SNH advise that in all proposals involving occupied ranges of golden eagles, the use of the PAT (Predicting Aquila Territory) model is recommended as an element of assessment. According to the predictive PAT model used in the ES, four of the seven pairs of eagles will suffer some range loss due to the wind farm. The ES assumes that the relevant conservation objectives will only be compromised for golden eagles if displacement results in range abandonment and/or reduced breeding success, and it claims that none of the four pairs will experience either range abandonment or reduction in breeding success. However, the distribution of four pairs could be affected through interference with the habitat with at least one territory being abandoned and breeding success reduced in two or three other pairs.

The collision risk in the ES uses the standard SNH Collision Risk Model, although it is not clear if, or how, flight height estimates have been corrected to include those flights above 100m up to the true risk height of 140m. Using an avoidance rate of 98%, a combined collision rate of 46 golden eagles over the lifetime of the development is estimated. It is more difficult to estimate the number of subadult collision fatalities because of the uncertainty of the subadult population within the SPA, and therefore collision fatalities could reduce survival over the subadult period from about 40% to 16%. Increased mortality of adults would also reduce breeding success by increasing recruitment into breeding territories of inexperienced young birds which typically have poorer breeding performance for a number of years

In summary, it is likely that given the collision estimates in the ES that direct impacts on the population within the Lewis Peatlands SPA will be significant and will lead to an adverse impact on the SPA's integrity.

Conservation Objective	Likely Impact	Met/Not met
The population of each qualifying species is capable of maintaining	The abandonment of at least one breeding territory and adverse	Not met
Distribution of each qualifying species is maintained	Loss of habitat use from disturbance to adult, breeding golden eagles and	Not met
Distribution and extent of habitats supporting the qualifying species are	Indirect effects of wind farm and turbine infrastructure on habitats	Not met (uncertain outcome)

maintained	within the SPA may affect breeding and non breeding golden eagles	
Structure, function and supporting processes of habitats supporting the qualifying species are maintained	The turbine array and infrastructure may fragment the continuous landscape used by golden eagles; affect prey populations (especially breeding waders and potentially red grouse) and reduce the viability of at least some (up to four) territories	Not met
No significant disturbance of the qualifying species will occur	Displacement of breeding and non breeding golden eagles will amount to significant disturbance	Not met

The proposed mitigation measures include alteration to wind farm design, forestry removal, possible alterations to landfill operations, the use of bird diverters on lines and consideration of supplementary feeding.

Mitigation proposed	Comment	Likely success
No development within 2000m	Likely to reduce impacts on golden eagle breeding birds but will not eliminate them. Disturbance arising from possible increased access is not accounted for	Likely to limit direct disturbance to breeding birds, but indirect effects may persist for at least four breeding territories
Disturbance free zone of 3000m for Pair C in breeding season	Likely to reduce impacts on this pair	Likely to succeed
Diverter on power lines	Diverter only reduce collisions by 50%-85%	Unlikely to eliminate collision risk with overhead power lines sufficiently to avoid adverse impact
Removal of forested areas	This will take place outwith the SPA and is compensation rather than mitigation. There is no certainty about how long the habitat will take to become suitable, indeed there is no guarantee that the created habitat will be suitable for the potential prey species that are suitable for golden eagle	Unlikely to succeed as the area proposed will not compensate for the potential area lost to breeding and non-breeding golden eagles
Control of scavenging birds	The birds in question (corvids and gulls) are all potential prey for golden eagle, so control of these birds is questionable as a mitigation measure, and may even prove to be counterproductive	Unlikely to succeed
Supplementary feeding	Supplementary feeding is suggested as a measure during construction only to divert eagles away from the wind turbine area. It is not clear as to why this is necessary given the establishment of disturbance free zones	Unlikely to be effective during construction, and not relevant to the post construction operational period. This appears to be an inappropriate proposal

round turbine workings during the construction period. Likely disturbance impacts (direct and indirect) are likely to persist for longer than the construction period

Merlin

The ES concludes there are 29 Merlin territories within the core survey area (this includes a pair nesting outside the SPA boundary but close enough to utilise parts of the SPA for foraging and could potentially nest within the boundary in the future).

On the basis of the information in the ES, it is unlikely that the turbines and turbine infrastructure will lead to a significant loss of habitat for breeding Merlin, given the distance most Merlin territories are situated from the wind farm.

There is little evidence to suggest that Merlin are displaced by wind farms, therefore a 1km buffer zone during construction as stated in the ES would minimise disturbance.

With regards to collision, Merlins do collide with turbines and overhead power lines. If Merlin are not displaced by the wind farm, then it is likely that the possibility of collisions could be exacerbated, especially given that data shows that both display and mobbing flights do occur within the range of turbines and overhead power lines for a number of breeding pairs. The ES claims that the Merlin is a 'fast, low-flying manoeuvrable species that is not considered to be at great risk from collision' and although this is generally true, the turbines would undoubtedly increase collision risk.

Conservation Objective	Likely Impact	Met/Not met
The population of each qualifying species is capable of maintaining itself as a viable component of the site	The potential for some pairs to be lost has not been discounted with the appropriate level of certainty. At least seven pairs (25%) may be affected by wind farm infrastructure in their territory, and the potential for collision related mortality cannot be discounted	Not met
Distribution of each qualifying species is maintained	Evidence suggests that merlin will not be displaced and will continue to use existing territories	Met
Distribution and extent of habitats supporting the qualifying species are maintained	No evidence that this will be adversely affected by the wind farm	Met
Structure, function and supporting processes of habitats supporting the qualifying species are maintained	No evidence that this will be adversely affected by the wind farm	Met
No significant disturbance of the qualifying species will occur	Disturbance is possible, either from wind form operations, or by incidental disturbance from recreation or other	Not met

	activities	
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The proposed mitigation measures in the ES include a 600 metre development free zone around known nest sites, the use of bird diverters and a 1km disturbance free zone around active nest sites during construction.

Mitigation proposed	Comment	Likely Success
No development within 600m of nest sites	Likely to reduce impacts on breeding birds but may not eliminate them. Disturbance arising from possible increased access is not accounted for	Likely to limit direct disturbance to breeding birds, but indirect effects may persist for seven breeding territories
Disturbance free zone of 1000m during construction	Likely to reduce impacts	Likely to succeed
Diverters on power lines	Diverters only reduce collisions by 50%-85%	Unlikely to eliminate collision risk with overhead power lines sufficiently to avoid adverse impact

Golden Plover

The Lewis Peatlands SPA has high densities of golden plover, holding more breeding pairs than any other site in the UK. Average breeding density over the whole site is almost three times higher than for any other UK SPA. The Lewis population is one of the few golden plover populations which appears to be increasing making the maintenance of this population in terms of the Natura 2000 network particularly important.

The only habitat loss the ES considers is the running surface of the roads and other infrastructure (including turbine bases, quarries, hard standings and access roads). When habitat loss due to the side of roads from construction activity, cable trenches (for underground lines) as well as habitat change either side of the road is counted, the total area lost is likely to be nearer 633ha rather than the 169ha the ES suggests. This increased habitat loss represents a loss of about 44 territories, which on the basis of population at the site designation, represents approximately 2.5% of the SPA population.

- The collision risk estimates in the ES have been underestimated and collision risk could be much greater:-
1. Duration of breeding season is too short as golden plover can arrive back on territory in mid to late March
 2. Flight activity is may be underestimated due to detectability problems with flying golden plover at distances beyond a km or so, as well as the absence of nocturnal flight in collision risk models.
 3. Absence of power line impacts.
 4. Errors in the calculation (use of 18 rather than 181 turbines).

Conservation Objective	Likely Impact	Met/Not met
The population of each qualifying species is capable of maintaining itself as a viable component of the site	Loss of habitat and potential changes arising from changes in demographic parameters mean that there is a likelihood of population decline. Collisions with power lines and turbines are likely and possible impacts on breeding productivity is	Not met

	possible	
Distribution of each qualifying species is maintained	Disturbance and displacement as well as infilling of peat workings within the SPA is likely to lead to distribution changing and areas either abandoned or densities lowered.	Not met
Distribution and extent of habitats supporting the qualifying species are maintained	Habitat will be lost to golden plover	Not met
Structure, function and supporting processes of habitats supporting the qualifying species are maintained	Loss of habitat, construction activity, disturbance will all compromise viability and potential habitat changes (eg hydrology) could have an adverse impact on golden plover	Not met
No significant disturbance of the qualifying species will occur	Construction and operational phases of the wind farm likely to cause disturbance to breeding golden plover	Not met

Proposed mitigation measures comprise alleviation of disturbance through ground surface preparation in advance of construction work, habitat creation through the restoration of approximately 88ha of abandoned peat cuttings and enhancement by felling 680ha of forestry, diverters on power lines and predator control around buildings and turbines.

Mitigation proposed	Comment	Likely Success
Ground preparations in advance of the breeding season where works will impact on golden plover	As the wind farm construction cannot avoid works during the breeding season, ground preparation is considered as the alternative to discourage golden plover from nesting near construction	Unproven, and contrary to conservation objectives as this is likely to deliberately make ground unsuitable for golden plover
Habitat creation	Infilling of peat cuttings within the SPA and habitat creation outside the SPA (which is compensation, not mitigation). Peat workings already host breeding golden plover, so 'restoration' will actually reduce habitat available. There is no guarantee that recovered densities will attain or exceed original densities. Similarly, there is no good reason to suppose that restored forestry areas will provide suitable golden plover habitat.	Unlikely to succeed, and contrary to the site's objectives. The potential 'additional' territories created do not compensate for those lost to habitat loss, disturbance and displacement
Diverters on power lines	Diverters only reduce collisions by 50%-85%	Unlikely to eliminate collision risk with overhead power lines sufficiently to avoid adverse impact
Predator control around buildings and	The evidence as to whether	Uncertain outcome, but may be

turbines	increased perching opportunities provide conditions for increased predation is equivocal – some studies show an effect, others do not	useful, if predator numbers on the Lewis Peatlands (especially corvids and gulls) increase as a result of construction of the wind farm
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Dunlin

The Dunlin population of the Lewis Peatlands is one of the most important concentrations of this species within the EU. Approximately 31% of the global population of the *schinzii* race breed within the Lewis Peatlands, concentrated mainly in areas of active blanket bog, with extant pool systems. The ES fails to convey the relative rarity of the *schinzii* race.

The figures in the ES are possibly underestimated given that the predicted losses fail to take into account that many turbines are to be sited on the edge of the site, and so their 300m buffer zone will extend beyond the survey area and into the SAC which was not surveyed for Dunlin.

The figure for direct habitat loss is approximately 633ha and assuming 6 pairs/km² there will be a loss of around 38 territories. Disturbance and displacement effects will add to the losses from habitat destruction, so the 38 territories represents a minimum figure. The loss of dunlin territories (which excludes disturbance and displacement along roads and alongside power lines) is estimated at 231. This loss (about 6.3%) is significant and will have an effect on the integrity of the SPA.

No collision risk assessment was undertaken for dunlin and an assumption was made in the ES that approximately 2 dunlin per year would collide with the turbines. The Entec collision risk study 'focused in a small area' and does not appear to have made any assessment of detectability of dunlin flights in relation to distance from a VP and so there is no indication of what proportion of flights were missed. Furthermore, the survey period is insufficient to record all display and mobbing flights that occur at risk height, and activity duration (12 hrs is too short at times of the year when day length is much longer and dunlin activity likely take place across the duration of the day). Dunlin are also active and fly at night.

Conservation objective	Likely impact	Met/not met
The population of each qualifying species is capable of maintaining itself as a viable component of the site	Loss of habitat and potential changes arising from changes in demographic parameters for dunlin mean that there is a likelihood of population decline. Collisions with power lines and turbines are likely and possible impacts on breeding productivity is possible	Not met
Distribution of each qualifying species is maintained	Disturbance and displacement as well as infilling of peat workings within the SPA will lead to distribution changing and areas either abandoned or	Not met

	densities lowered	
Distribution and extent of habitats supporting the qualifying species are maintained	Habitat for dunlin will be lost	Not met
Structure, function and supporting processes of habitats supporting the qualifying species are maintained	Loss of habitat, construction activity, disturbance will all compromise viability and potential habitat changes (e.g. hydrology of active blanket bog) will have an adverse impact on dunlin	Not met
No significant disturbance of the qualifying species will occur	Construction and operational phases of the wind farm likely to cause disturbance to breeding dunlin	Not met

The proposed mitigation comprises of alleviation of disturbance through ground surface preparation in advance of construction works, habitat creation through the restoration of approximately 88ha of abandoned peat cuttings, bird diverters on power lines, and predator control.

Mitigation proposed	Comment	Likely success
Ground preparations in advance of the breeding season where works will impact on dunlin	As the wind farm construction cannot avoid works during the breeding season, ground preparation is considered as the alternative to discourage dunlin from nesting near construction	Unproven, and contrary to the site's conservation objectives, as this requires habitat to be made unsuitable for breeding dunlin
Habitat creation	Infilling of peat cuttings within the SPA and habitat creation outside the SPA (which is compensation). There is no guarantee that dunlin will use this habitat at densities that will attain or exceed original densities. Similarly, there is no good reason to suppose that restored forestry areas will provide suitable dunlin habitat	Unlikely to succeed, and contrary to the site's conservation objectives. The potential 'additional' territories created do not compensate for those lost to habitat loss, disturbance and displacement
Diverters on power lines	Diverters only reduce collisions by 50%-85%	Unlikely to eliminate collision risk with overhead power lines sufficiently to avoid adverse impact
Predator control around buildings and turbines	The evidence as to whether increased perching opportunities provide conditions for increased predation is somewhat unequivocal – some studies show an effect, others do not	Uncertain outcome, but may be useful, if predator numbers on the Lewis peatlands (especially corvids and gulls) increase as a result of construction of the wind farm

Greenshank

The SPA includes 152 breeding pairs of greenshank. The UK population was recently estimated at 1,440 pairs. The Lewis Peatlands SPA therefore supports approximately 10% of UK breeding population. The 2006 ES estimates that 60 pairs are within the SPA with 2% of the population subject to displacement or disturbance during operation and up to 20 pairs (10% of SPA population) during construction.

Very few flight data were recorded for greenshank, and no collision risk was evaluated in the ES. Of the 16 flights collected in 2005 and 2006, 8 were at collision risk height. LWP assume that the collision rate of greenshank would be comparable to that of golden plover and therefore approximately 2 greenshank would be lost per year due to collision with the turbines.

Conservation objective	Likely Impact	Met/not met
The population of each qualifying species is capable of maintaining itself as a viable component of the site	Loss of habitat and potential changes arising from changes in demographic parameters mean that there is a possibility of population decline. Collisions with power lines and turbines are possible and impacts on breeding productivity may occur if functional use peatland habitat is compromised.	Not met (uncertain outcome)
Distribution of each qualifying species is maintained	Disturbance and displacement as well as infilling of peat workings within the SPA will lead to distribution changing and areas either abandoned or densities lowered	Not met (uncertain outcome)

		Habitat creation	Infilling of peat cuttings within the SPA and habitat creation outside the SPA (mitigation). Peat workings already host breeding greenshank, so 'restoration' will actually reduce habitat available. There is no guarantee that the habitats will be used by breeding greenshank, given that greenshank habitat requirements are not well understood. Similarly, there is no good reason to suppose that restored forestry areas will provide suitable greenshank habitat	Unlikely to succeed, and contrary to the sites conservation objectives. The potential 'additional' territories created do not compensate those lost to habitat loss, disturbance and displacement
		Diverters on power lines	Diverters only reduce collisions by 50%-85%	Unlikely to eliminate collision risk with overhead power lines sufficiently to avoid adverse impact
		Predator control around buildings and turbines	The evidence as to whether increased perching opportunities provide conditions for increased predation is equivocal – some studies show an effect, others do not	Uncertain outcome, but may be useful, if predator numbers on the Lewis Peatlands (especially corvids and gulls) increase as a result of construction of the wind farm
8.	Effect on site integrity	This proposal would have a serious, detrimental effect on many of the qualifying bird species of the Lewis Peatlands SPA , Most of the conservation objectives for most of the qualifying species could not be met and therefore the proposal would adversely affect the integrity of the site.		

Summary conclusion of assessment	Advice received from the developer, Scottish Natural Heritage and others on the Lewis wind farm application and subsequent addenda was carefully considered. The information provided was used to assess the implications for impacts on all Natura interests on the site and whether site integrity would be maintained. Stakeholders comments were measured against each of the conservation objectives for the site, for each qualifying species, and conclusions drawn as to whether each objective was met or not met. From the assessment it was concluded the construction of a wind farm in North Lewis will have an adverse effect on the integrity of the Lewis Peatlands SPA.
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Scottish Government Enterprise, Energy and Tourism Directorate

Lewis wind farm

Appraisal of the Implications of the Proposed Lewis Wind Farm on the North Harris Mountains Special Protection Area (SPA)

The following appraisal has been prepared by the Competent Authority to inform the Appropriate Assessment of the above proposal. The frameworks are based on those provided in the European Commission's guidance document " Assessment of plans and projects significantly affecting Natura 2000 sites: Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC".

SPA and Project Description		
1	Brief description of the SPA	<p>The North Harris Mountains Special Protection Area (SPA) is designated under the EC Directive (79/409/EEC) on the Conservation of Wild Birds (the Birds Directive) for:</p> <p><u>Article 4.1</u></p> <p>supporting populations of European importance of the Annex 1 species: golden eagle (<i>Aquila chrysaetos</i>).</p> <p>The North Harris Mountains SPA is located on the island of Harris in the Outer Hebrides off the north west coast of Scotland, it comprises part of a range of steep rocky hills on the west coast of Harris. The hills are composed of Lewisian gneiss and granite and rise from sea level to a height of 729 m. They have a strongly oceanic character with extensive wet heath and an abundance of Atlantic bryophytes. Numerous streams, oligotrophic lochs and dystrophic lochans occur. The site is of importance for a range of upland bird species, in particular a high density and highly productive population of Golden Eagle <i>Aquila chrysaetos</i>. These birds nest, roost, display and hunt throughout the site from the coastal margins to the hilltops, and may also hunt outside the SPA on adjacent agricultural areas.</p>
2	Brief description of the project	<p>The proposed scheme would be the largest onshore wind farm in Europe. The development would comprise 181 turbines, each having a rotor diameter of 107m on a 86.5m tower, giving a tip height of maximum 140m. There would be approximately 141km (88miles) of site roads with a typical running width of 5m. The electricity produced by the turbines would feed through 30km of underground cables and onto 30.6km of a high voltage transmission line supported on 27m lattice towers, via a series of eight substations.</p> <p>Construction of the wind farm would take approximately 4 years. Rock would be required for the construction of roads, hardstandings and foundations, concrete for construction would be mixed at four locations throughout the site in temporary batching plants. The proposal is based on a 20 year operational lifetime with decommissioning taking place thereafter.</p>
3	Scale and Variation	<p>Scale</p> <p>The North Harris Mountains SPA supports at least 6-7 pairs of breeding golden eagles representing 1.8% of the UK breeding population.</p>

		<p>Variation</p> <p>The population has a high breeding productivity for the west coast of Scotland and is one of the highest density populations of golden eagles in Britain.</p>
<p>2. Appraisal of Impacts on Site Integrity</p>		
4	<p>Conservation Objectives of the SPA site against which the impacts on site integrity will be judged</p>	<p>To avoid deterioration of the habitats of qualifying species or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained.</p> <p>To ensure for the qualifying species that the following are maintained in the long term:</p> <ul style="list-style-type: none"> • Population of the species as a viable component of the site • Distribution of the species within site • Distribution and extent of habitats supporting the qualifying species • Structure, function and supporting processes of habitats supporting the qualifying species • No significant disturbance of the qualifying species <p>The qualifying species is: <u>Golden eagle</u></p>
5	<p>Describe the ways in which the proposed wind farm may impact upon ornithological interest</p>	<p>The qualifying species for the North Harris Mountains SPA is golden eagle. Whilst the proposal does not affect land within, or adjacent to the boundary of the SPA, there could still be an adverse effect of the integrity of the site. Changes in the demography of the overall Lewis & Harris golden eagle population could be caused as a result of the wind farm. Juvenile and sub-adult eagles are known to range widely during their 3-4 year immature period, and birds produced by the pairs in the North Harris SPA, which would be expected to recruit into the population there, would probably be among those affected by the wind farm. The wind farm's potential impact on the population of sub-adult birds across Lewis and Harris as a whole suggests there will be insufficient recruits into the Lewis & Harris population to compensate for the cumulative mortality of adult birds. This could cause a wider depression in the whole Lewis & Harris breeding population, including those pairs supported by and present in the North Harris Mountains SPA.</p>

6	<p>Comment on method for conducting assessment of “adverse impact on integrity”.</p>	<p>There are no field data collection issues related to the population of golden eagles in the North Harris Mountains SPA. The assessment of impact is based upon data collected in the proposed windfarm, and SNH appears to accept the methods used. Although the ES states that the impacts on the breeding population of the North Harris Mountains SPA were considered, there are limited comments specifically regarding this SPA in the ES.</p>																		
7	<p>For each species, describe predicted impacts against the conservation objectives, proposed mitigation measures and predicted results</p>	<p>Golden eagle</p> <p>The North Harris Mountains SPA supports 6-7 breeding pairs.</p> <p>Direct impacts on the current breeding population can be discounted as likely ranging behaviour of these pairs will not extend to the wind farm area. However there may be long-term indirect impacts due to a risk that the additional cumulative mortality of adult and immature golden eagles across Lewis and Harris may result in insufficient recruits into the Lewis and Harris golden eagle population to maintain the population size in the North Harris Mountains SPA</p> <table border="1" data-bbox="725 798 2022 1224"> <thead> <tr> <th>Conservation Objectives</th> <th>Likely Impact</th> <th>Met/Not met</th> </tr> </thead> <tbody> <tr> <td>The population of each qualifying species is capable of maintaining itself and a viable component of the site</td> <td>Loss of sub-adults and increased cumulative adult mortality across Lewis & Harris could adversely affect the North Harris Mountains SPA through inadequate recruitment to maintain the population.</td> <td>Not met</td> </tr> <tr> <td>Distribution of each qualifying species is maintained</td> <td>No direct effect likely</td> <td>Met</td> </tr> <tr> <td>Distribution and extent of habitats supporting the qualifying species are maintained</td> <td>No effect</td> <td>Met</td> </tr> <tr> <td>Structure, function and supporting processes of habitats supporting the qualifying species are maintained</td> <td>No effect</td> <td>Met</td> </tr> <tr> <td>No significant disturbance of the qualifying species will occur</td> <td>No effect likely</td> <td>Met</td> </tr> </tbody> </table> <p>Proposed mitigation is as for the Lewis Peatlands SPA. No specific measures for the North Harris Mountains SPA are proposed. The Lewis Peatlands mitigation measures for golden eagles are as follows:</p>	Conservation Objectives	Likely Impact	Met/Not met	The population of each qualifying species is capable of maintaining itself and a viable component of the site	Loss of sub-adults and increased cumulative adult mortality across Lewis & Harris could adversely affect the North Harris Mountains SPA through inadequate recruitment to maintain the population.	Not met	Distribution of each qualifying species is maintained	No direct effect likely	Met	Distribution and extent of habitats supporting the qualifying species are maintained	No effect	Met	Structure, function and supporting processes of habitats supporting the qualifying species are maintained	No effect	Met	No significant disturbance of the qualifying species will occur	No effect likely	Met
Conservation Objectives	Likely Impact	Met/Not met																		
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No significant disturbance of the qualifying species will occur	No effect likely	Met																		

		Mitigation proposed	Comment	Likely success
		No development within 2000m of nest sites	Likely to reduce impacts on breeding birds but will not eliminate them. Disturbance arising from possible increased access is not accounted for. Action not relevant in reducing effect on North Harris SPA	Likely to limit direct disturbance to breeding birds, but indirect effects may persist for at least four breeding territories
		Disturbance free zone of 3000m for Pair C in breeding season	Likely to reduce impacts on this pair Action not relevant in reducing effect on North Harris SPA	Likely to succeed
		Diverters on power lines	Diverters only reduce collisions by 50%-85%	Unlikely to eliminate collision risk with overhead power lines sufficiently to avoid adverse impact
		Removal of forested areas	This will take place outwith the SPA and is therefore compensation rather than mitigation. There is no certainty about how long the habitat will take to become suitable, indeed there is no guarantee that the created habitat will be suitable for the potential prey species that are suitable for golden eagle	Unlikely to succeed as the area proposed will not compensate for the potential hunting area lost to breeding and non-breeding golden eagles
		Control of scavenging birds	The birds in question (corvids and gulls) are all potential prey for golden eagle, so control of these birds is questionable as a mitigation measure	This may be a counterproductive measure by reducing food availability
		Supplementary feeding	Supplementary feeding is suggested as a measure during construction only to divert eagles away from the wind turbine area. It is not clear as why this is necessary given the establishment of disturbance free zones round turbine workings during the construction period. Likely disturbance impacts (direct and indirect) are likely to persist for longer than the construction period	Unlikely to be effective during construction, and not relevant to the post construction operational period. Action not relevant in reducing effect on North Harris SPA
	Effect on site integrity	This proposal will not have a direct effect on the North Harris Mountains SPA, and according to the tests, most of the conservation objectives for golden eagles in the North Harris Mountains SPA could be met if the proposed development		

	were to proceed. However, the likely number of deaths through collisions of golden eagles on the windfarm site, (noting that immatures range widely across Lewis and Harris), means that there could be an adverse effect on the site's integrity due to changes in demography in the overall Lewis & Harris population, through a long-term population decline.
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<i>Summary Conclusion of assessment</i>	Advice received from stakeholders on the Lewis wind farm application and subsequent addenda was carefully considered. The information provided was used to assess the implications for impacts on all Natura interests on the site and whether site integrity would be maintained. Stakeholders comments were measured against each of the conservation objectives for the site, for each qualifying species, and whether each objective was met or not met. From the assessment it was concluded the construction of a wind farm in North Lewis will not have a direct impact on the North Harris Mountains SPA, but could have an indirect long term adverse effect on the site's integrity.
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Scottish Government Enterprise, Energy and Tourism Directorate

Lewis wind farm

Appraisal of the Implications of the Proposed Lewis Wind Farm on the Ness & Barvas Special Protection Area (SPA)

The following appraisal has been prepared by the Competent Authority to inform the Appropriate Assessment of the above proposal. The frameworks are based on those provided in the European Commission's guidance document " Assessment of plans and projects significantly affecting Natura 2000 sites: Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC".

SPA and Project Description		
1	Brief description of the SPA.	<p>The Ness & Barvas Special Protection Area (SPA) is designated under the EC Directive (79/409/EEC) on the Conservation of Wild Birds (the Birds Directive) for:</p> <p><u>Article 4.1</u></p> <ul style="list-style-type: none">regularly supporting a nationally important breeding population of the Annex 1 species: corncrake (<i>Crex crex</i>). <p>The Ness and Barvas SPA is composed of two separate areas in the extreme north (Ness) and west (Barvas) of the island of Lewis. Both areas consist of traditionally managed semi-intensified grassland and marshy areas within crofting land. The Ness part of the site also includes an area of machair common grazing , as well as Loch Stiapavat , a freshwater loch with marshy and botanically rich margins. The site is of European importance as a breeding area for the Annex 1 species corncrake <i>Crex crex</i>.</p>
2	Brief description of the project	<p>The proposed scheme would be the largest onshore wind farm in Europe. The development would comprise 181 turbines, each having a rotor diameter of 107m on a 86.5m tower, giving a tip height of maximum 140m. There would be approximately 141km (88miles) of site roads with a typical running width of 5m. The electricity produced by the turbines would feed through 30km of underground cables and onto 30.6km of a high voltage transmission line supported on 27m lattice towers, via a series of eight substations.</p> <p>Construction of the wind farm would take approximately 4 years. Rock would be required for the construction of roads, hardstandings and foundations, concrete for construction would be mixed at four locations throughout the site in temporary batching plants. The proposal is based on a 20 year operational lifetime with decommissioning taking place thereafter.</p>
3	Scale and Variation	<p>Scale</p> <p>The Ness & Barvas SPA lies at its closest point approximately 2.2km west from the nearest turbine position of the proposed Lewis wind farm. The SPA is designated for a population of 18 individual breeding corncrakes which at the time of designation represented 3.8% of the UK breeding population.</p> <p>Variation</p>

		<p>Corncrakes migrating between trans-Saharan Africa and Ness & Barvas SPA are highly likely to cross through the proposed turbines and grid connections. This is likely to include the entire cohort of young birds produced each year. Populations of this internationally rare species are very sensitive to small increases in mortality rates, especially of young birds.</p>
<p>3. <i>Appraisal of Impacts on Site Integrity</i></p>		
<p>4</p>	<p>Conservation Objectives of the SPA site against which the impacts on site integrity will be judged</p>	<p>To avoid deterioration of the habitats of qualifying species or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained.</p> <p>To ensure for the qualifying species that the following are maintained in the long term:</p> <ul style="list-style-type: none"> • Population of the species as a viable component of the site • Distribution of the species within site • Distribution and extent of habitats supporting the qualifying species • Structure, function and supporting processes of habitats supporting the qualifying species • No significant disturbance of the qualifying species <p>The qualifying species is: <u>Corncrake</u></p>

<p>5</p>	<p>Describe the ways in which the proposed wind farm may impact upon ornithological interest</p>	<p>Habitat loss</p> <p>The Lewis wind farm will not lead to any habitat loss for corncrakes in this SPA</p> <p>Displacement/disturbance</p> <p>There should be no direct effects of displacement/disturbance for corncrakes. In this SPA. However, construction can lead to displacement and disturbance of species. Displacement can also occur through the presence of structures or increased levels of human activity, increased activity is most common during the construction and decommissioning stages. The long term consequences of increased access, especially in remote areas, and other activities related to wind farm operation will lead to additional disturbance that would otherwise not have happened. Assessing the likely impacts of disturbance can be a difficult process when looking at the long term impacts on populations.. Short term effects on breeding success can also be confounded by other impacts such as changes in food supply or habitat loss.</p> <p>Barrier effects</p> <p>The barrier effect is the prevention of birds using their usual migration or local commuting routes due to the presence of wind turbines in their flight path. The effect is for birds to fly around the wind farm resulting in increased energy expenditure or avoidance of feeding/breeding/roosting areas that may be on the other side of the development. In the LWP Addendum it is claimed that the minimum distance between turbines tip to tip is 450m which should reduce the barrier effect. Other published evidence however suggests that with an even greater tip to tip distance (approx 480m) the barrier effect is still in place for waterfowl and sea birds. The barrier effect may be an issue for corncrakes but an adequate assessment has not been undertaken, so there is no clear evidence for or against this.</p> <p>Collision risk</p> <p>Collision risk at wind farms is well documented and each individual site poses a different level of threat dependent on a number of factors e.g species density, topography, site layout etc. The risk is most significant where the development overlays regular flight lines, birds flying between roosting or feeding grounds, or where birds use the area for hunting. Species most likely to be subject to significant risks are raptors, geese, divers and some sea birds. Rare species and those protected under national and international legislation require careful risk assessment on a site specific and species specific basis. The main risk to corncrakes would be at times of migration, however as outlined above, there has been no adequate assessment of this and there is no clear evidence of the nature or scale of the effect</p>
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6	<p>Comment on method for conducting assessment of “adverse impact on integrity”.</p>	<p>There were no species specific surveys undertaken in the ES for corncrake as it was claimed all current survey methods focus on the breeding areas where there would be no impact of the wind farm. The developer states that efforts to formulate a monitoring protocol to collect information on corncrake migratory movements were made although no technically feasible solutions were determined.</p> <p>The ES states it is possible that some, or all, of the birds may have to cross the wind turbine array at some point. Yet despite this, an adequate assessment has not been undertaken on the grounds that the effect on corncrake due to the barrier effect and collision risk is unknown and therefore difficult to quantitatively assess the potential effects.</p>																		
7	<p>For each species, describe predicted impacts against the conservation objectives, proposed mitigation measures and predicted results</p>	<p>Corncrake</p> <p>The Ness & Narvas SPA supported an average of 18 calling males from 1993 to 1997. Data for 1997-2001 for the SPA shows a population of 13 calling males, and from 2002 to 2006, data show an average of 15 calling males.</p> <p>Corncrake do not breed within the wind farm envelope, but the closeness of the wind farm to the SPA raises a risk to the integrity of the SPA. Corncrake fly overland at night limiting visibility, rain, fog, or mist would limit visibility still further.</p> <table border="1" data-bbox="725 632 2022 1082"> <thead> <tr> <th data-bbox="725 632 1200 660">Conservation Objectives</th> <th data-bbox="1200 632 1843 660">Likely Impact</th> <th data-bbox="1843 632 2022 660">Met/Not met</th> </tr> </thead> <tbody> <tr> <td data-bbox="725 660 1200 772">The population of each qualifying species is capable of maintaining itself and a viable component of the site</td> <td data-bbox="1200 660 1843 772">Loss of breeding birds especially during spring migration) and during breeding season may adversely impact on the breeding population. Effect is uncertain, and will depend on level of additional mortality</td> <td data-bbox="1843 660 2022 772">Not met (uncertain outcome)</td> </tr> <tr> <td data-bbox="725 772 1200 829">Distribution of each qualifying species is maintained</td> <td data-bbox="1200 772 1843 829">Unlikely to be affected as the SPA will not hold any turbines or infrastructure</td> <td data-bbox="1843 772 2022 829">Met</td> </tr> <tr> <td data-bbox="725 829 1200 912">Distribution and extent of habitats supporting the qualifying species are maintained</td> <td data-bbox="1200 829 1843 912">As above</td> <td data-bbox="1843 829 2022 912">Met</td> </tr> <tr> <td data-bbox="725 912 1200 995">Structure, function and supporting processes of habitats supporting the qualifying species are maintained</td> <td data-bbox="1200 912 1843 995">As above</td> <td data-bbox="1843 912 2022 995">Met</td> </tr> <tr> <td data-bbox="725 995 1200 1082">No significant disturbance of the qualifying species will occur</td> <td data-bbox="1200 995 1843 1082">The operational phases of the wind farm may cause disturbance to corncrake, especially those dispersing during or after the breeding season</td> <td data-bbox="1843 995 2022 1082">Not met (uncertain outcome)</td> </tr> </tbody> </table> <p>The ES does not propose any mitigation for this species, as it is claimed the scarcity of information available on corncrake behaviour does not allow effective measures to be designed. However the ES does propose enhancement measures including habitat management in breeding areas, and an imitation of SNH’s corncrake management scheme, with the same budget, but covering the strip of crofts lying between the two component parts of the Ness & Barvas SPA, along the east coast from Stornoway to Tolsta and the Eye Peninsula.</p>	Conservation Objectives	Likely Impact	Met/Not met	The population of each qualifying species is capable of maintaining itself and a viable component of the site	Loss of breeding birds especially during spring migration) and during breeding season may adversely impact on the breeding population. Effect is uncertain, and will depend on level of additional mortality	Not met (uncertain outcome)	Distribution of each qualifying species is maintained	Unlikely to be affected as the SPA will not hold any turbines or infrastructure	Met	Distribution and extent of habitats supporting the qualifying species are maintained	As above	Met	Structure, function and supporting processes of habitats supporting the qualifying species are maintained	As above	Met	No significant disturbance of the qualifying species will occur	The operational phases of the wind farm may cause disturbance to corncrake, especially those dispersing during or after the breeding season	Not met (uncertain outcome)
Conservation Objectives	Likely Impact	Met/Not met																		
The population of each qualifying species is capable of maintaining itself and a viable component of the site	Loss of breeding birds especially during spring migration) and during breeding season may adversely impact on the breeding population. Effect is uncertain, and will depend on level of additional mortality	Not met (uncertain outcome)																		
Distribution of each qualifying species is maintained	Unlikely to be affected as the SPA will not hold any turbines or infrastructure	Met																		
Distribution and extent of habitats supporting the qualifying species are maintained	As above	Met																		
Structure, function and supporting processes of habitats supporting the qualifying species are maintained	As above	Met																		
No significant disturbance of the qualifying species will occur	The operational phases of the wind farm may cause disturbance to corncrake, especially those dispersing during or after the breeding season	Not met (uncertain outcome)																		

	Mitigation proposed	Comment	Likely success
	Habitat management in non SPA areas	Dependent on uptake. However, such measures are not mitigation but compensation for possible losses to the SPA (and other) populations of breeding corncrake	As such a scheme is voluntary, take-up will determine the level to which actual habitat improvement measures take place on the ground
	Diverters on power lines	Diverters only reduce collisions by 50%-85%	Unlikely to eliminate collision risk with overhead power lines sufficiently to avoid adverse impact
Effect on site integrity	The ES acknowledges that it has not been possible to assess quantitatively the impacts of the Lewis wind farm on corncrake but nevertheless concludes there would be no adverse effect on the integrity of the Ness & Barvas SPA. It is considered that some of the conservation objectives for corncrake may not be met as a result of the proposal and the success of the compensatory measures is unknown. On this basis, it is considered that it has not been ascertained that the Lewis wind farm will not have an adverse effect on the integrity of the Ness & Barvas SPA		

Summary conclusion of assessment	Advice received from stakeholders on the Lewis wind farm application and subsequent addenda was carefully considered. The information provided was used to assess the implications for impacts on the Natura interest on the site and whether site integrity would be maintained. Stakeholders comments were measured against each of the conservation objectives for the site, for the qualifying species, and whether each objective was met or not met. From the assessment it was concluded the construction of a wind farm in North Lewis may have an adverse impact on the integrity of the Lewis Ness and Barvas SPA.
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