APP/L2250/V/10/2131934 & APP/L2250/V/10/2131936

SECTION 77 TOWN AND COUNTRY PLANNING ACT 1990 – REFERENCE OF APPLICATIONS TO THE SECRETARY OF STATE FOR COMMUNITIES AND LOCAL GOVERNMENT

TOWN AND COUNTRY PLANNING (INQUIRIES PROCEDURE) (ENGLAND) RULES 2000

PROOF OF EVIDENCE OF DR. ROY ARMSTRONG B.Sc(hons) Ph.D

ORNITHOLOGY

In respect of:

Planning Application Reference:	Y06/1647/SH (New Terminal Building)
Planning Application Reference:	Y06/1648/SH (Runway Extension)

relating to land at London Ashford Airport, Lydd, Romney Marsh, Kent, TN29 9QL

LYDD London Ashford Airport

1. PROFESSIONAL QUALIFICATIONS AND EXPERIENCE

1.1 I am Roy Armstrong, a partner in Armstrong McCaul Biological Consultants (est. 1994) and a senior lecturer in Animal Conservation Science at the Centre for Wildlife Conservation, University of Cumbria.

1.2 I have a B.Sc. (hons) in Zoology (Liverpool University 1987) and a Ph.D in Zoology (Glasgow University 1992) in the field of bird biology.

1.3 I have prepared Bird Strike Hazard Assessments for several international airports and for developments within the 13km Safeguarding Zones of UK airports.

1.4 In my capacity as a consultant I have been involved in many projects of direct relevance to the discussion of ornithological issues pertinent to the proposed development of London Ashford Airport ("the Airport"). I have performed many contracts monitoring the distribution and movements of wild birds. I have appeared as an ornithological expert witness at Public and Planning Inquiries, including proposals for new commercial airports. I have relevant experience in the assessment of impacts on Special Protection Areas and have advised on ornithological impacts of developments such as the Solway Barrage Feasibility Study and am currently the Professional Peer Reviewer on the Mersey Barrage Study.

1.5 As part of my lecturing duties at the Centre for Wildlife Conservation (University of Cumbria), I currently lecture on the impacts of disturbance on wild bird populations and how recent developments in Behavioural Ecology can be used to predict such impacts.

1.6 I am a dedicated conservationist and have worked in both a paid and unpaid capacity on a range of species in several countries.

2. SCOPE OF EVIDENCE

2.1 In this proof I present evidence on the potential impact of the described development on bird conservation in the vicinity of the Airport.

2.2 Natural England and the RSPB have raised objections to the proposed development for several reasons. With regards to birds, these focus on the impact of aircraft on birds through disturbance and the impact of measures introduced for air safety reasons on local populations of birds. The latter issue is covered by the Proof of Evidence of Mr Nigel Deacon (LAA/6/A). My evidence considers the potential impacts of aircraft-generated disturbance on the neighbouring important bird populations. The information presented in this proof will assist the competent authority to conclude that the development proposals would not have a likely significant effect on the SPA, pSPA and pRamsar and, in any event, would not have an adverse impact on the integrity of the SPA, pSPA and pRamsar. In addition, this Proof will assist the competent authority to conclude that the development proposals, in respect of the impact of aircraft on birds through disturbance, would not have any significant adverse effects on the SSSI and the RSPB Reserve.

2.3 I have reviewed information presented in support of the Applications and in Nigel Deacon's Proof of Evidence.

2.4 I have reviewed the current scientific literature (with which I am already very familiar) to provide an informed expert assessment of the impact of aircraft on birds through disturbance. I note that disturbance studies have developed significantly in recent years with clear distinctions now being made between disturbance effects (i.e. responses), and disturbance impacts (i.e. the effect the disturbance has at site and population level).

2.5 Using the findings from recent advances in Behavioural Ecology, I have assessed all of the bird species considered to be of conservation significance in areas where there is any perceived potential for negative impacts arising as a result of the development proposals at the Airport.

2.6 Bird populations are continually changing so I have reviewed the conservation "value" of populations of species of conservation significance around the Airport. I have projected what the likely changes in these populations might be to allow an analysis of the potential future importance of these populations.

2.7 Finally, I have reviewed the likely impacts on each species from their known Behavioural Ecology, or through extrapolation from similar species in conjunction with our current understanding of Behavioural Ecology.

2.8 If there are any detailed or additional comments raised by Rule 6 Parties, these will be dealt with in rebuttal evidence as required.

2.9 All quoted references in this Proof can be found in CD12.27.

3. INDIVIDUAL ISSUES

3.1 The Impact of Aviation on the conservation of birds

3.2 There are many examples of airports next to thriving bird populations in important bird areas. In the UK these include SPAs, SSSIs and Ramsar sites designated for their waterfowl interests (for example, Liverpool, Glasgow, Belfast City and City of Derry airports). Several of these sites support populations of species listed as important around the Airport. Similar species assemblages are also found close to airports in other countries, including reserves adjoining some of the busiest airports in the world. In the UK, expansion of aircraft activities have not resulted in decreases in bird populations in neighbouring SPAs (please refer to the Proof of Evidence of Nigel Deacon (LAA/6/A).

3.3 The proposed development at the Airport includes three changes that are likely to have a significantly positive impact on neighbouring bird populations when compared with the no development/fallback position including, increased predictability of movements, the introduction of a cap on the numbers of helicopter flights and a limit on night-flying between the hours of 2300 and 0700.

3.4 The disturbance impact caused by individual developments can be difficult to assess where studies of similar stimuli and/or activities, are not available. Further, individual species may respond very differently to stimuli in different parts of their range (Gill 2007). Historically, a great deal of simplistic research has been undertaken in which the behaviour of a range of species has been recorded in response to different stimuli. However extrapolating these observations to local population levels is fraught with difficulties. Most studies of disturbance concentrate on observations of birds' responses ("disturbance effect") to disturbance sources such as dog-walkers, aircraft etc. While this type of study can demonstrate a response to a stimulus, it tells us nothing about the effect of the disturbance on bird populations ("disturbance impact" Nisbet 2000).

3.5 Recent developments in Behavioural Ecology have focussed on disturbance impact and placed this in context to impacts on populations. This has revolutionised our understanding of disturbance with reference to conservation. Nisbet (2000) states that this new approach "challenges the mind-set that the effects of disturbance are always adverse, and the resulting management principle that disturbance should be minimised". In his review of the species he knows best, he considered "There is little scientifically acceptable evidence that human disturbance causes substantial harm to terns (*Sterna spp*.), gulls (*Larus spp*.) or herons (*Ardeidae*)" and continues "Most colonial waterbirds can become extremely tolerant of repeated human disturbance" (Nisbet 2000).

3.6 It is generally accepted in avian ecology that population regulation is "density-dependent" and that an area supporting a population has a finite food supply that limits the population to the area's "carrying capacity". Density dependent mortality (or a reduction in subsequent breeding success) in temperate areas usually acts through food depletion combined with reduced day length and low temperatures. At a site such as the Dungeness to Pett Levels SPA, population regulation of most waders and wildfowl is likely to take place in mid/late winter (although migration time may be important to some species). Away from this winter "bottleneck" in the capacity of the habitat, resources are not limiting and the populations of birds have some flexibility in their energy budgets. At this time, birds should be able to withstand periods of lost foraging as extra time remains available for foraging. Mortality prior to the winter bottleneck will have no effect on the overall population as this will be limited to the carrying capacity of the area by density-dependent factors. Likewise, disturbance prior to the winter bottleneck may well result in some minor relocations. However it would not affect the carrying capacity of the wider area.

3.7 In a study of the Black-tailed Godwit *Limosa limosa*, Gill *et al.* (2001a) demonstrated that even heavily disturbed areas may be exploited fully if sufficient undisturbed feeding time is available. The carrying capacity of the site is therefore not reduced by the disturbance effect and the disturbance impact is negligible (apart perhaps from some small energetic costs from increased vigilance and movements).

3.8 Using field data from a long-term study, West *et al.* (2002) developed a predictive model of the impacts of different levels of disturbance on Oystercatchers *Haematopus ostralegus* on the Exe estuary. They concluded that current levels of human disturbance (e.g. bait-diggers and walkers) on the relatively disturbed Exe estuary were "most unlikely to increase mortality rate above the level it would otherwise be".

3.9 A significant outcome from their model is the relative importance of frequent small-scale disturbance compared with less frequent more intense disturbance. West et al. concluded that "for the same overall area disturbed, numerous small disturbances would be more damaging than fewer, larger disturbances." This demonstrates that even relatively intense disturbance may have no effect on the carrying capacity of a site.

3.10 It is clear from these studies that even where clear responses to disturbance occur, the impacts of the disturbance, even at levels historically thought to be damaging, are not considered likely to have any impact at population level. Indeed, this development in our understanding of disturbance effects is of great value to conservation organisations where encouraging the public to visit wildlife reserves is considered desirable. This is stressed by Gill (2007) who considers that "Remarkably few studies take such a balanced view of the disturbance issues and acknowledge that the conservation benefits of public access can potentially over-ride demographic costs to individuals".

3.11 The impact of disturbance on a site's carrying capacity (and therefore population size) will depend on the intensity of density-dependent factors as "any declines in survival or fecundity will result from density-dependence and not directly through disturbance. Efforts to manage disturbance in order to maintain populations must therefore be based on an understanding of the density-dependent consequences of avoidance of disturbed areas". (Gill 2007). Gill goes on to state "populations with weak density dependence can experience extensive redistributions with minimal impacts on population size".

3.12 West *et al.* (2002) in their simulations acknowledge that disturbance is more important to Oystercatchers after December 1st "When declining temperatures and food quality combine to make survival more difficult". However, for species that are able to forage at night (some actually feed mostly at night e.g. Teal) the potential impacts of disturbance are further reduced as extra feeding time is available.

3.13 West *et al.* (2002) demonstrate this in "restricting disturbance to daylight produced a substantial reduction in its effects because Oystercatchers can feed at night, allowing them to compensate for daytime disturbance." Even in circumstances where disturbance is sufficiently extreme to cause almost total abandonment of a site during daylight hours, undisturbed night-time feeding may be extensive and result in an area being fully exploited e.g. with Redshank *Tringa totanus* around a busy Helipad (Burton and Armitage 2005).

3.14 The importance of undisturbed night-time conditions is demonstrated in wildfowl where areas with no night-time hunting support populations ten times more numerous than areas with night-time hunting (Tamisier and Saint Gerand 1981, cited in Tamisier 2004). Examination of the standard reference work Birds of the Western Palaearctic and other published sources reveals that most of the waterfowl species that occur on the Dungeness peninsula feed at night. The examples above demonstrate that the two key groups of waterfowl present on the SPA (waders and wildfowl) are likely to benefit from no night-flying as a result of the development proposals at the Airport. This would represent an improvement on the present position and the position in the event that the development proposals are not consented given there would be no such restriction on night-flying.

3.15 A recent development in the understanding of behaviour in response to disturbance is the interpretation that responses are, in effect, responses to predation risk (e.g. Frid and Dill 2002). This has important implications as anti-predator behaviour has been extensively researched and is relatively well understood (in comparison to say, responses to aircraft). Using the “risk-disturbance hypothesis” and the extensive supporting literature, predictions of how species may respond to disturbance can be made. This is especially useful for species groups where studies of disturbance impacts are not available. It also allows previous studies to be assessed for site-specific factors and predictions to be made about how species may respond in different scenarios. For example, individuals may display shorter flight initiation distances (the distance at which birds flee a stimulus) where suitable refuge areas are available close by. The plasticity of flight initiation distance is based on the same economic principle – optimisation of trade-offs – that drives antipredator behaviour in general (e.g. Lima 1998).

3.16 A prediction of the risk-disturbance hypothesis is that “prey” should make optimal fleeing decisions. Fleeing probability should increase when the predator approaches more directly, as a direct approach may convey detection and intent to capture. Although the angle of approach is two-dimensional in some systems, in others it has vertical and horizontal components e.g. aerial predators. This approach is therefore appropriate to this study as “the same principle applies to aircraft disturbance” (Frid and Dill 2002). Their review of published studies supports this prediction in a range of species ranging from seals and grazing mammals to waterfowl when responding to helicopters or fixed-wing aircraft. The angle of approach of aircraft to individual sites should clearly be considered when trying to assess potential future disturbance impacts.

3.17 The presence of “refuges” is likely to reduce disturbance impacts, as many species appear to be more “comfortable” when refuge areas are available close by. This is reflected in decreased flight initiation distances in response to potential predators. The presence of the RSPB’s Dungeness Reserve close to the Airport is therefore likely to reduce any potential disturbance impacts associated with activities at LAA, even if any were to occur, as it clearly presents an excellent refuge.

3.18 Wildfowl Refuges (areas of wetland where no shooting is allowed) are very effective in supporting populations of wildfowl being hunted for sport throughout a much larger area. Much research has been undertaken in this area as managers/conservationists have sought to maximise yields, or the conservation value, of wetland areas. Wildfowl refuges need not be large to support local populations, even in areas of intensive wildfowling. As Fox and Madsen (1997) recommend “as a minimum [refuges] should have a diameter of three times the escape flight distance of the most sensitive species present”. It should be noted that these refuges are effective in a scenario where the disturbance stimulus is probably far more significant than disturbance caused by aircraft, as the stimulus (shooting) is large, frequent and reinforced with often lethal consequences. It is common practice to increase the efficacy of scaring through the use of non-lethal firearms with the occasional use of lethal firearms as this reduces the occurrence of habituation i.e. learning that a stimulus is not harmful.

3.19 A standard method employed in conservation for mitigation against disturbance is the maintenance of “Buffer Zones” i.e. areas with no disturbance, between the target and the stimulus. Alternatively, disturbance may be “zoned” with reduced disturbance close to the target and works by restricting disturbance to regular predictable stimuli to which habituation is more likely.

3.20 Several studies into the effectiveness of buffer zones have been undertaken, especially with potentially sensitive nesting species or important bird aggregations (e.g. Rodgers and Schwikert 2003, taken from online abstract). In the latter study, an airboat was employed to directly approach a range of species to assess flight initiation distance. The 13 species studied included Pelecaniforme*s*, Ciconiiforms and Falconifomes i.e. those species considered most likely to be affected. This is supported by studies of the factors that determine how "flighty" i.e. responsive to disturbance birds are, with "flightiness" related to body size, age at first breeding and increased diet (omnivorous/carnivorous species being more flighty), with other species likely to be more tolerant of disturbance (Blumstein 2006).

3.21 Flush distances ranged for all species from 49m for Snail Kite *Rostrhamus sociabilis* to 172m for Bald Eagle *Haliaetus leucocephalus.* Herons ranged from 65m for Tricolored Heron *Egretta tricolor* to 113m for Great Egret *Ardea alba*. Using these distances, the authors arrived at recommended Buffer Zone distances of 130m (Snail Kite) to 365m (Bald Eagle) for raptors and 165m (Tricolored Heron) to 255m (Great Egret) for "wading birds". The RSPB's Dungeness Reserve covers almost 1000ha. It is clear that this site has large areas that would be far beyond the buffer zones suggested for mitigation against even an extreme stimulus.

Likely Changes to Bird Populations on the Dungeness Peninsula

3.22 The development of large-scale chains of refuges aimed at supporting waterfowl communities is a highly effective conservation tool. In some cases, it has the potential to alter the ranges of species as "Management actions in one part of a flyway may affect the ability of areas elsewhere to meet obligations to biodiversity conservation and maintenance of range under international law" Fox and Madsen (1997).

3.23 This appears to have happened recently with the extension of reserve networks in Denmark "with the potential of holding back substantial parts of some populations at a more northerly position on their flyways than before" (Madsen et al 1998). For areas to the South-Western edge of the range for wintering birds such as the UK, the provision of ideal wintering habitats is likely to have a reduced impact as suitable wintering sites to the North and East of the UK are developed to provide additional suitable wintering areas. This is further exacerbated by the impacts of climate change.

3.24 The UK with its comparatively mild, maritime climate, has traditionally supported large populations of migrant birds species seeking to avoid colder conditions. Wildfowl and waders (collectively termed “waterfowl”) from Greenland, Iceland, Svalbard, arctic Russia and Europe, use the UK’s coasts and waterbodies as relatively mild wintering grounds. The importance of the UK for these species is reflected in the large number of SPAs, Ramsar sites and SSSIs designated for the large numbers of these species that have historically occurred.

3.25 As climatic conditions in these areas change, the importance of the UK’s waterbodies and coasts is changing. With recent ameliorations of winter conditions, many species are wintering further North and East than hitherto, except of course during exceptionally cold periods. Current predictions suggest that this trend will continue with increased amelioration of winter conditions and consequent reductions in many wintering bird populations in the UK. For example, Smew, a species occurring at Dungeness and Pett levels in nationally significant numbers, are now wintering in reduced numbers in the UK as witnessed in the latest available WeBS summaries (for 2008/9); “At Dungeness and Rye Bay for example, the peak of 11 in February represents the lowest there since 1989/90 and the third lowest in thirty years" (Calbrade *et al*.).

3.26 Lower numbers during the recent run of relatively mild winters are associated with a shift in distribution toward the North-east of the wintering range. For example, in Sweden wintering numbers increased from 400 in 1971 to 3,800 in 2004 and an increasing trend has also been noted in the Czech Republic (Calbrade *et al.*).

3.27 The importance of the UK's waterbodies and coastal areas, in spite of recent cold spells, appears likely to reduce as species shift their wintering ranges North and East in response to climate change (Rehfisch *et al.* 2004). This appears to already be happening, with significant declines in wintering wader numbers at some sites. This trend looks likely to continue and the numbers of many of the qualifying species for the Dungeness to Pett Levels SPA look likely to reduce in the near future.

4.0 Conclusions

4.1 Any species currently present is tolerant of existing levels of disturbance (which under current permissions could be increased without regulation in terms of night time flying). Changes in the patterns of flights from the Airport will change in ways that are likely to reduce disturbance impacts, including flights becoming more regular and predictable, the cessation of night-flying and the introduction of a cap on the number of helicopter flights permitted. This will be an improvement against the fall back scenario should the development proposals not be consented.

4.2 Other, potentially more significant sources of disturbance already exist in the vicinity of the Airport and on important local sites e.g. game shooting, bird watching.

4.3 In view of the distance from the Airport to local sites and the angle of approach from aircraft, any additional disturbance is unlikely to significantly affect the behaviour of key species.

4.4 Should any increased disturbance occur, the presence of very large refuge areas nearby and the opportunity to feed when disturbance levels are negligible would result in no significant disturbance impact.

4.5 Having examined the Applications and the Proof of Evidence of Nigel Deacon, I do not believe that the development proposals, through the impact of aircraft on birds through disturbance, would have:-

4.5.1 a likely significant effect on the SPA, pSPA and the pRamsar and in any event would not have an adverse affect on the integrity of those sites; and

4.5.2 any significant adverse effects on the SSSI and the RSPB Reserve.

4.6 Furthermore, it should be noted that irrespective of my conclusion at paragraph 4.5, for most of the species present in significant numbers, population sizes for most species can be reasonably expected to reduce, in many cases to the point of species no longer being present in the area, in the near future.

GLOSSARY

NE	Natural England
pRamsar	the Dungeness, Romney Marsh and Rye Bay proposed Ramsar
Ramsar site	Designated under the Ramsar convention
RSPB	The Royal Society for the Protection of Birds
pSPA	the proposed extension to and change of name of the Dungeness to Pett Level Special Protection Area
SPA	Special Protection Area
SSSI	Site of Special Scientific Interest.

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