



RSB WS/2 – Ecology, Habitats and Species

Town and Country Planning (Scotland) Act 1997

The Town and Country Planning (Notification of Applications) (Scotland) Direction 2007

Outline Planning Permission for Golf Course and Resort Development on land at Menie House, Balmedie, Aberdeen

PUBLIC LOCAL INQUIRY: Ref CIN/ABS/001

WRITTEN SUBMISSION RSB/WS2

of the

RSPB Scotland

Scottish Wildlife Trust

Botanical Society of the British Isles

ECOLOGY, HABITATS & SPECIES

1. Purpose and Scope of the Submission

- 1.1 The purpose of this written submission is to set out the RSPB / SWT / BSBI position in respect of habitats / ecology / species. Impacts on birds and the application of the Habitats Regulations are dealt with in separate submissions (RSB WS/3 & WS/4). Bearing in mind that SNH will call evidence to be heard at the Inquiry, it is considered that there would be a danger of duplicating some evidence if RSPB / SWT / BSBI were also to call a witness to address some of the aspects addressed by SNH in detail. It is considered that cross examination is unlikely to be necessary in order to fully inform the Reporters of the RSPB / SWT / BSBI's views in respect of matters contained in this submission. Our precognitions deal with matters where cross-examination, by those with a different point of view, and exploration / clarification by the Reporters may be helpful.
- 1.2 We focus on the key issues that stand between the applicants and the RSPB / SWT / BSBI, so the following resumé of the areas of disagreement should not be taken as a full submission of the organisations' objections. This submission should be read in conjunction with the previous consultation responses and representations of the RSPB / SWT / BSBI and does not substitute for them.

2. Important environmental information missing

- 2.1 This is an outline application without detailed information for major elements of the proposal, including the proposed second golf course. Therefore, the evaluation of environmental impacts is inevitably severely limited. By delaying consideration of both direct and indirect impacts until after decision-making, there is a risk that impacts may be of such a magnitude that, had they been appreciated earlier, a different decision would have been reached, or different conditions attached to a consented application.
- 2.2 Insufficient or no consideration has been given in the ES to long-term habitat change brought about by the processes of dune stabilisation, shaping of tees, greens, bunkers and fairways, watering and drainage, the use of fertilisers and herbicides, the eradication of rabbits, the spread of introduced organisms, trampling, passage of machinery, divot replacement etc. Such change will be additional to direct habitat

loss, which is relatively easy to predict from detailed plans of proposed development, and is likely to exacerbate harmful environmental effects (T50, p27)

- 2.3 Although a dedicated, expert bryophyte survey was requested at the Scoping Stage by Aberdeenshire Council, Natural Heritage Team, by the time of writing this had not been started and is unlikely to be submitted to the Inquiry. This is clearly unsatisfactory and it is very likely that some rare and Red-listed species will be found, with a chance that they may be of such importance that the course design will need to be changed. The identification of bryophyte species is much dependent on specialists who are expert in particular genera, and who may well take several weeks after the initial survey to provide accurate identification. This near-complete absence of data necessary to reach a properly informed judgement as to the effects of the development on an important issue throws doubt on the ability of Scottish Ministers to address all material considerations when reaching their decision on the outline planning application.
- 2.4 We believe information should have been obtained on the distribution of shepherd's cress (*Teesdalia nudicaulis*). This higher plant is red-listed as "Near Threatened" (RSB 3), and is reported from the development area (Environmental Statement, Appendix 7-1) from a field observation in 2006.

3. The failure of the ES adequately to address and portray the impact on the whole ecosystem and dynamics of vegetation

- 3.1 We accept that the ES and supporting documents enumerate fairly accurately the extent and distribution of habitats and, for the most part, of the flora and fauna found at this site, although we have reservations about the representativeness of surveys carried out on a limited number of days or confined to a single season. Our concerns about the way in which the ES portrays the potential impacts of the proposed development relate to the difficulties of accurately evaluating impacts for an outline application (with only indicative plans for one golf course) plus the way in which the ES fails to address the impact upon the whole ecosystem and dynamics of vegetation, rather than upon its constituent components, considered individually in the ES.

- 3.2 An attribute of fundamental importance to the Development site – indeed, it may be judged the nub of its scientific and aesthetic value – is that it is not isolated from its surroundings. The coastal dune system at Menie Estate forms part of a continuous band of habitat of the highest nature conservation and geomorphological interest extending 20 km northwards from the mouth of the Don as far as the cliffs at Collieston.
- 3.3 It is axiomatic that larger expanses of habitat are more robust and richer in species – smaller areas are more susceptible to edge effects and to chance events such as species extinctions which large areas are buffered against. The loss of habitats occasioned by the proposed development would, therefore, mean more than just a numerical reduction of areas – what is left would be further impoverished as it would become less resilient to external and internal change. This aspect is not adequately addressed by the Applicant through the environmental impact assessment process.
- 3.4 The second important attribute of this site is its dynamic nature – sand moves in the wind, creating new landforms with bare surfaces open to plant colonisation whilst other areas of vegetation may be overwhelmed. Plant communities succeed one another as conditions suit different species and attendant animal communities similarly change. This dynamism is referred to in several places in the ES (core document (G)3: e.g. p82). However, it is then ignored by the golf course proposals and mitigation, which seek to fossilise landforms and communities, even though as we explain in paras 7.2-7.5 there is no convincing evidence to support the belief that stopping the clock in this way is possible.
- 3.5 A third, important feature of the coastal dune system at Menie is its relative lack of interference by Man's activities. Locally there is evidence of war-time structures, of agricultural improvement, of the passage of vehicles, of the release of gamebirds for shooting and pond construction (core document (G)3: ES Chapter 10) but, on the whole, the landforms and vegetation are evolving naturally (core document (G)3: ES Appendix 6.1; ES p.122). Should this development be consented, the very naturalness of the site will no longer exist. At one end of the scale, there will be massive habitat change with stabilisation of the sand dome and the dynamic nature of the site severely curtailed. At the other, artificial micro-management will mean the provision of otter holts to compensate for habitat damage elsewhere and the collection of seeds of *Carex maritima* to be sown on newly-created habitat thought suitable.

4. The Value of Menie – Designated sites

4.1 In addition to the need to look at the whole site, holistically, it is important to consider the value of the site, both as a whole and in terms of its constituent attributes, in a wider context.

4.2 “The northern third of the proposed golf course lies within Foveran Links Site of Special Scientific Interest on the area known as Menie Links” (core document (G)3: ES p80). The site is designated for both its biological and geological attributes. (SNH 1; SSSI citation) SSSIs are rigorously selected on the basis of their national (UK) importance and planning policy, both national and local, affords them a very high degree of protection from planning proposals which may be damaging.

4.3 It is accepted by the Applicant (core document (G)3: ES, Table 7.6) that “physical changes to approximately one third of the Foveran Links SSSI” will have a severe adverse level of impact with no mitigation or enhancement available. The Applicant also accepts that - even after the proposed mitigation which we do not believe will be effective (Sections 8 and 10 below) - the SSSI will suffer the “loss of potential dynamic succession in dune areas with adverse effects on flora and fauna”. Such damage to a nationally-designated site is wholly inconsistent with national policy and unacceptable when it is unnecessary and avoidable (see our joint submission on Planning Policy and Guidance RSB WS/5 and the precognitions of Dr Auld and Mr Hughes).

4.4 The whole Championship golf course development area lies within the Foveran Links Site of Interest to Natural Science (SINS), a regional nature conservation designation (RSB 9). This site is designated for its botanical interest. SINS are protected by local plan policy Env 3 (core document (A)2).

4.5 The SINS site comprises four overlapping SEESA (Study of Environmentally Sensitive Areas) sites, as follows:

Entomology 7 – Drumside Links – dune flora with associated fauna

Ornithology 14 – Ythan Estuary and Forvie and Foveran Links – breeding terns and eiders, wintering birds

Botany 36 – Foveran Links – Damp dune slacks with a particularly interesting flora

including unusual ferns and bryophytes

Entomology 24 – Foveran and Drums Links – important dune and lowland heath community. As interesting entomologically as Forvie except smaller size.

- 4.6 We contest the Applicant's view of the extent of the SINS site. The area in several figures in Document T50 labelled "Foveran Botanical SINS", with area stated on p.2 of that document, is actually Foveran Links SESA, as explained in the above paragraph. The SINS is actually far more extensive. We question the Applicant's downplaying of the SINS extent but notice that nowhere in these very recent documents do TIGLS deny that the great bulk of ground that is to be developed for the golf course is of high conservation interest. We would point out that Figure 5 of Document T50 indicates that virtually all of the coastal part of the development site is delineated as of high nature conservation interest, based on NVC/ Phase 1 data.
- 4.7 It is important to stress that the value of this site is not confined to the Foveran Links SSSI. Indeed, the whole stretch of sand dune and related habitats running the entire length of the site is of high nature conservation value. As noted in the ES (core document (G)3: para 7.3.10) the ground outwith the SSSI (i.e. the SINS and area to the south at Balmedie) *'should have been selected as a combined geomorphological and ecological SSSI system according to national guidelines (JNCC 1998). Those guidelines give general principles and list 7 selection types of dune habitat, all of which are present'* (core document (G)3: ES 7.3;p 101). In particular, it is clear that habitats of high nature conservation interest are found all along the coastal belt of the site, according to Figure 5 of Document T50.
- 4.8 It is a matter of fact that the area notified as SSSI is – or should be – protected from damaging development by strong policies at national and development plan level but that does not downgrade the interest and importance of the rest of the area.

5. The Value of Menie – habitats, and some projected impacts

- 5.1 The EU Habitats Directive (92/43/EEC) (core document (F)2) lists Annex 1 habitats, which are rare and in need of protection, of which the most important are Priority Annex 1 Habitats. The ES (core document (G)3 Vol 2: Appendix 7.1, Table A7-1.1) makes it clear that five Annex 1 habitats, of which three (shown by an asterisk in the list below) are Priority Habitats, are found here in substantial quantity, as follows:

- 2120 White Dunes (mobile dunes)
- *2130 Grey Dunes.
- *2140 Decalcified Fixed Dunes (dune heath).
- *2150 (Atlantic) Decalcified Fixed Dunes (dune heath)
- 2190 Humid Dune Slacks

As these habitats are listed on Annex 1 of the Directive they are by definition of European Community-wide conservation importance and are not, as stated in the ES Table 7.9, merely of national conservation interest.

5.2 Coastal sand dunes is listed as a Priority habitat in the UK Biodiversity Action Plan (BAP) (RSB 47; Core Document (F) 5). The UK BAP is the Government's response to the Convention on Biological Diversity, signed in 1992. It describes the UK's biological resources and commits a detailed plan for the protection of these resources, through a series of Species Action Plans, Habitat Action Plans and Local BAPs. Priority habitats are of national (UK) importance.

5.3 There are a number of objectives and proposed actions of the UK HAP for coastal sand dunes which are particularly apposite to the Menie site. Objectives include:

'Protect the existing sand dune resource of about 54,500 ha from further losses to anthropogenic factors, whether caused directly or indirectly ..'

'Encourage natural movement and development of dune systems...'

Maintain dune grassland, heath and lichen communities on the majority of dune systems'

Proposed actions include:

'Develop and promote planning policies and procedures which will aim to prevent further losses of sand dune habitat to development and exploitation and minimise them where they are unavoidable'

'Notify by 2004 any remaining areas of sand dune habitat which meet national criteria as SSSI and ASSI and ensure appropriate management of designated sites'

'Encourage golf course management policies and practices which are sympathetic to the flora and fauna of sand dune systems'

'Discourage unnecessary stabilisation of all dunes, and where appropriate promote

managed destabilisation measures on over-stabilised dunes'

We contend that these objectives cannot be met if this application is consented.

5.4 North East Scotland Local Biodiversity Action Plan (Core document F8) is the framework for local action by a range of partners to protect and enhance biodiversity in Aberdeenshire, the City of Aberdeen and Moray. Species (SAP) and Habitat (HAP) Action Plans outline objectives and targets for action. A Coastal Cliffs and Heaths HAP is in preparation whilst a Coastal Sand Dunes and Shingle HAP (core documents (F)8) has been finalised.

5.5 The principal objective of the Coastal Sand Dunes and Shingle HAP is:

'Protect the existing sand dune resource of approximately 7000 ha, and the existing vegetated shingle resource of 673 ha, and associated species, from further losses and degradation, due to human activities and developments, whether caused directly or indirectly' with a target:

'No net loss of the existing sand dune resource and the existing vegetated shingle due to human activity by 2012'

5.6 Objectives include:

'Minimise further damage to existing sand dunes and vegetated shingle sites through human activities' with target 'no further damage to sand dune and vegetated shingle sites'

'Maintain dune and shingle habitats and associated flora and fauna' with target 'no reduction in quality of habitat'

'Encourage natural movement and development [accretion] of sand dune systems, and control natural succession to scrub and woodland where necessary' with target 'losses due to natural causes offset by encouraging new dunes to accrete and, where possible, by allowing mobile dune systems to move inland'

We contend that these objectives cannot be met if this application is consented.

- 5.7 Details of losses of habitat, listed by Phase 1/NVC categories, to various elements of the development are given in ES Table A7-1.2 for the original, Fazio-designed golf course – but do not include losses from the second, planned golf course (or other elements of the outline proposal). As this design has been superseded, this table should be disregarded.
- 5.8 A revised golf course layout designed by Hawtree was then submitted as an indicative layout of the proposed golf course representing the Applicant's preferred method of mitigation. Details of direct habitat loss to development are presented by Phase 1/NVC categories in Document T4 (submitted 12 May 2008) and summarised – by key dune habitats / habitats of moderate interest / habitats of low interest - in Table 4 of Document T50 (also submitted on 12 May 2008). Again, these do not include losses from the second, planned golf course (or the rest of the outline proposal) and take no account of longer-term and secondary losses.
- 5.9 The Applicant estimates that these direct habitat losses would total 35.08 ha of key dune habitats, 1.49 ha of moderate interest habitats and 5.13 ha of low interest habitats. Within Foveran Links SSSI, direct losses would be 19.35 ha, 0.02 ha and 2.36 ha respectively
- 5.10 Close scrutiny of Table 4 suggests that nearly all of the key dune habitats to be lost are Habitats Directive Annex 1 habitats with 16.53 ha of that loss to Priority Habitats (13.18 ha 2130 Grey dunes and 3.35 ha 2140/2150 decalcified fixed dunes)

Such losses of internationally, nationally and regionally important habitat would be a flagrant contradiction of the biodiversity planning purpose and process, at international, national and regional levels and are unacceptable where they are unnecessary and avoidable.

6. **The Value of Menie – species, and some projected impacts**

- 6.1 A number of species found at this site are of recognised international, national or regional importance. It is highly likely that further study would reveal additional species of importance.

6.2 Species listed on Annex IV of the Habitats Directive are of European Community interest and in need of strict protection. Otter, common pipistrelle and soprano pipistrelle occur at this site. In addition, badger, a UK protected species, occurs at Menie.

6.3. **Otters, bats and badgers**

Native British animals listed on Annex IV(a) of the Habitats Directive are protected by Regulation 39 of the Habitats Regulations (core document (F)3). This regulation transposes Article 12(d) of the Directive into law in Scotland. Annex IV(a) includes otter and all species of bat. Both are present at Menie. The conclusions relating to the potential impacts of the development as proposed on bats in the TIGLS Environmental Statement are cursory to say the least, as the survey for foraging bats took place on two consecutive nights only and did not cover the whole site (core document (G03: ES Appendix 7.8). RSPB / SWT / BSBI contend that more in depth surveys at various times of year are required before impacts on these European Protected Species can be fully understood. Planning consent given without a fuller understanding of the distribution and impacts on both bats and otters may mean that outline planning permission would be granted without full consideration of all material issues

6.4 It is acknowledged (core document (G)3: ES, p110) that otters will be impacted by disturbance, damage to feeding habitats and damage and loss of potential resting areas during construction. During operation of golf courses there will be disturbance by golfers, especially early and late in the day. In addition, disturbance from ongoing management will occur throughout the site – greens have to be kept clear of dew and this will take place regularly in early morning.

6.5 Bats are likely to be affected by construction activity at their roosts – notwithstanding the necessity to obtain a licence for such work – and the loss of feeding habitat through golf course development.

6.6 It is acknowledged by the Applicant (core document (G)3: ES, p 111) that badgers will be affected by disturbance, habitat fragmentation and loss of foraging areas to infrastructure. The proposed housing development is particularly liable to cause loss of feeding areas.

6.7 The conservation status of birds found at Menie is dealt with in separate Written Statements (RSB WS/3 and 4) and is not repeated here.

6.8 Butterflies and moths

Although there has been limited amount of survey carried out, during one of the wettest summers for some time, it is clear that there is considerable invertebrate interest at this site with a number of notable species. That interest has been understated by the Applicant (core document (G)3: ES, para 7.3.8 & Table 7.9).

The following butterfly species recorded at Menie (Core Document G (5)) is listed as a Priority species in the UK BAP on account of a very severe population decline:

grayling (*Hipparchia semele*)

A number of moths recorded at Menie have recently been listed as UK BAP species on account of very severe population declines (RSB 77, Conrad *et al.*):

Ear moth (*Amphipoea oculea*)

Garden tiger (*Arctia caja*),

Dusky brocade (*Apamea remissa*)

The Crescent (*Celaena leucostigma*)

Small square-spot (*Diarsia rubi*)

Small phoenix (*Ecliptopera silaceata*)

Autumnal rustic (*Eugnorisma glareosa*)

White-line dart (*Euxoa tritici*)

Double dart (*Graphiphora augur*)

Ghost moth (*Hepialis humuli*)

Rosy minor (*Mesoligia literosa*)

Shoulder-striped wainscot (*Mythimna comma*)

White ermine (*Spilosoma lubricipeda*)

The anomalous (*Stilbia anomala*)

Heath rustic (*Xestia agathina*)

The population decline over 35 years was particularly severe in The Anomalous (93%) but all declines were at least 70% over that period.

Two additional moths of significant conservation concern were recorded: Coast Dart

(*Euxoa cursoria*), which nationally was found in between 30 and 100 10 km squares and Straw Underwing (*Thalophila matura*), a scarce/rare species locally, which is declining at a significant rate..

It seems likely that survey for micro-moths was unreliable, as *Agriphila streaminella* and *Celypha lacunana*, both extremely widespread and abundant species, were not recorded. The survey period excludes the possibility of finding Sword-grass *Xylena exsoleta*, which flies in autumn and early spring and has been recorded at nearby Forvie. This is a UK priority moth species.

- 6.9 Surveys carried out indicate a substantial continuity in the invertebrate communities, with component species being widespread from Foveran Links down to Balmedie dunes. Within this general area there is a mosaic of habitats and their associated invertebrates, ranging from open dunes, through dry stabilising dunes and dune slacks, damp dune slacks, wet grassland and pools. Evidence from many studies, including a local mark/release/recapture of Six-spot burnet moths (*Zygaena filipendulae*) on Sands of Forvie makes it certain that there will be a constant interchange of species and individuals along the series of linked habitats.
- 6.10 A small number of species are regarded as national and/or regional priorities. The most notable and highly regarded of these is the Grayling butterfly (*Hipparchia semele*), which has been shown to have declined significantly across the UK by Butterfly Conservation, the organisation that specialises in this field. This was found in two distinct areas, within the SSSI and towards the southern edge of the proposed development area. It requires open grassland, with significant areas of bare sand, on which it basks. This habitat is provided in a successional way as recently mobile dunes begin to be stabilised by invading grasses (but not Marram grass). Subsequently, it is eventually excluded from areas as they become fully grassed over and it needs mobile dunes to provide its habitat continuity. This butterfly is a strong flier and the colonies will undoubtedly show an interchange of individuals, in a metapopulation¹ structure. It follows that the loss or separation of colonies, and/or the demobilisation of the dunes, will be detrimental to its survival in the general dune area.

¹ Definition of 'metapopulation': 'a group of spatially separated populations of the same species which react at some level'

6.11 Other notable species of Lepidoptera have also been trapped at various sites within the area, indicating a well-established and diverse community of coastal species, with a wide range of habitat requirements, benefiting from the varied and extensive nature of the dune systems and rear-dune grasslands. They share the need for the maintenance of habitat diversity, with successional change. Similar communities of invertebrates are also present at Balmedie and Foveran dunes, but the linear extent of the habitat helps ensure that populations of each species are sufficient for long-term survival. The species noted in the consultant's report use the full range of habitats from damp grassland to dry newly stabilised dunes

6.12 **Other invertebrates**

The invertebrate interest of the pools is best exemplified by the water beetles and, to a lesser extent, the bugs. The consultant's report (TIGLS Response, Appendix 8 by Professor Garth Foster) indicates clearly that those pools used extensively by ducks are of reduced value, and that important ponds are present both within the SSSI and also grouped near the southern edge of the development area, amongst the damp rear-dune grassland. Here there is an extensive guild of beetles, with Pond 15 being the richest, set amongst a small series of other ponds. Two particularly significant water beetle species are *Enochrus ochropterus* and *Rhantus suturalis*. Both of these were found in Pond 15 and carry a high grade in the conservation grading system developed by Professor Foster in (core document (G)10: Appendix 8). Although the overall grading of even Pond 15 may be relatively low by the standards of NE Scotland's national nature reserves, those have been subject to extensive and repeated survey, whereas Menie Dunes have received only one visit, at a time of year that is not regarded as optimal.

6.13 The time of year of survey was unsuitable for recording shieldbugs, which are adults in autumn, winter and spring. There are 45 species of *Hemiptera* associated with sand dunes, including 11 Red Data Book species and it is likely that some of these may occur here.

6.14 Seven species of *Odonata* (dragonflies and damselflies) were recorded, which is a very good range indeed of species in NE Scotland. An additional species, Common darter (*Sympetrum striolatum*) whose peak flight period can be into September was not recorded but is almost certain to be present.

6.15. **Impact of development on invertebrates**

The proposed golf course, the development of which would include both the direct loss of some dune habitats and also, very significantly, the stabilisation of some of the mobile dunes, would have a clear adverse effect on the integrity of the overall community of invertebrate animals present. It would threaten the open grassland continuity of habitat for the Grayling butterfly and would generally act to reduce the extent and connectivity of other dune habitats. The loss of some areas then devalues others nearby, by reducing the functioning of the metapopulation structure.

6.16 **Higher plants and ferns**

A number of species of higher plant and fern found at Menie are of very high conservation importance, as detailed in Cheffings et al (RSB 3). These are:

Curved sedge (<i>Carex maritima</i>)	Endangered
Early marsh orchid (<i>Dactylorhiza incarnata</i>)	Scarce (but Data Deficient and hence possibly in a higher category if belonging to <i>D. incarnata</i> ssp <i>cruenta</i> or ssp <i>ochroleuca</i>)
Rush-leaved fescue (<i>Festuca arenaria</i>)	Scarce
Heath cudweed (<i>Gnaphalium sylvaticum</i>)	Endangered
Intermediate wintergreen (<i>Pyrola media</i>)	Vulnerable
Allseed (<i>Radiola linoides</i>)	
Shepherd's cress (<i>Teesdalia nudicaulis</i>)	Near Threatened
Heath Dog-violet (<i>Viola canina</i>)	
Field pansy (<i>Viola tricolor</i>)	
Small adder's-tongue (<i>Ophioglossum azoricum</i>)	Scarce

SNH has published a Species Action Framework for *Pyrola media*. (core document (F)7: pp52-53) These five-year action plans, endorsed by the Scottish Government, have been prepared for a limited number of species whose status and importance are deemed sufficiently great to make them priorities for conservation action.

- 6.17 That there will be large losses of rare plants is conceded by the Applicant: “*There will be losses to at least 50% of the Carex maritima and probably 90% of the Ophioglossum population*”. (ES Chapter 7, p116)

6.18 **Lichens and lichenicolous fungi**

The ES (core document (G)3: Appendix 7.6 Menie Lichen Survey, Table 2) lists notable species which include one Near Threatened species (*Leptogium palmatum*), 7 Nationally Scarce species, 2 species for which Britain has international responsibility and one species which may be endemic to Britain (*Arthonia anombrophila*).

6.19 **Bryophytes**

Information on bryophytes is limited, pending completion of the survey referred to in Paragraph 2.1 (above).

6.20 **Fungi**

The fungi are under-researched in biology as well as distribution and a particular difficulty is posed by the propensity of many species to fruit either poorly, or not at all, in some years. As identification is based almost entirely on fruiting bodies, only survey over many years can provide a reliable listing of all species present on a site. Dedicated survey here was, perforce, confined to 2006 (Menie Dunes) and 2007 (Blairton Links). The conclusion from the 2007 report is clearly states that: “*the relatively untouched mosaic of coastal dunes, dune heaths and slacks represent some of the few habitats in the UK where the ecosystem has developed over hundreds of years virtually untouched by human management. As such, they should be valued and maintained.*” The Menie community of fungi and mosaic of habitats are clearly of considerable interest given that it is currently supporting three species from the 2007 UK Red List of Fungi (*Coprinus ammophilae*, *Omphalina galericolor* and *Volvariella reidii*), three other species not yet recorded elsewhere in Scotland (*Coprinus tigrinellus*, *Hebeloma vaccinum* and *Lepiota pseudolilacea*) and 10 other species that have been found in only 1-9 other sites in Scotland (Fungal Survey – part 2, provided by TIGLS 9 May 2008 and now assumed to form part of core document (G)3).

6.21 It is apparent from the preceding paragraphs that this site is of extremely high nature conservation importance, in terms of its designated interests, habitats and species. It is highly likely that further, intensive survey would add to that known interest. Most of the conservation importance of the site resides in the coastal dune habitats, which the proposed development will severely damage, as acknowledged by the Applicant. The continued existence of the sand domes is essential to the long-term viability of

the habitats and species which make this site so special, as explained later (paragraphs 7.2 – 7.5).

7. Further impacts on species

7.1 The Applicant has attempted to show that environmental benefits will accrue if the proposed development is consented. For instance (RSB 66: TIGLS Response, paragraph 1.1):

'The development provides a unique opportunity to conserve and enhance the environment. The proposed stabilisation of the dome will be a project of great scientific interest in itself'

7.2 This Orwellian statement is breathtaking in its denial of the conservation truth. We, and others, lead evidence here and elsewhere to show that it is the very lack of stabilisation of the dome which is a feature, perhaps the most important feature, of this site. Stabilisation might be of interest from an engineering viewpoint – in a similar way to infilling the Grand Canyon, perhaps – but would be utterly at odds with its conservation interest.

7.3 TIGLS Response, paragraph 6.1 (RSB 66) refers to other ways in which the proposed development may enhance the environment. A Badger Protection Plan will aim to create new foraging habitat and it is suggested that local habitat improvements at Menie may enhance the local status of otters. There are no grounds for supposing that, even if these actions were to be carried out, they would lead to any meaningful increase in the use of this area by these species once the habitat has been profoundly modified and with the major increase in the level of human activity on site.

7.4 It is alleged (TIGLS Response) that “*water vole numbers can benefit from higher levels of public activity through disturbance to potential predators*” and that the species could be re-introduced to Menie after some improvements to the watercourse habitats. We are aware of no evidence to support this.

7.5 Bringing stock-feeding areas/partridge rearing areas into better management is suggested as an environmental benefit which will accrue from the proposed

development (Document T50). We agree that these actions would be beneficial to the dune area but it is wrong to imply that they can only happen if consent is granted. In particular, poor management of the SSSI can, and should, be addressed through other mechanisms and SNH should strive to ensure that this happens.

- 7.6 It is proposed that rabbits will be removed to prevent damage to golf course assets. This will have a profound effect on vegetation as their grazing prevents the spread of coarser grasses and encourages other plants which are less able to tolerate competition. Rabbit removal will also lead to the build up in total biomass, with usually a more substantial litter layer. As a result, there will be an increased risk of damaging fires. Cutting management is proposed as a form of mitigation but this will have very different effects: species such as heaths and willows, which have a woody framework, will be damaged by cutting and cuttings which are left will have a smothering effect on remaining vegetation.

8. **Dune stabilisation**

- 8.1 Although the applicant is wary of fully conceding the point, it is clear that full stabilisation of the dome will be attempted. In addition to the 15 to 25% of the area of the dome which -

“will be constructed, stabilised, vegetated and maintained in the same way as all other holes in the course. The remaining 85 to 75% which is presently bare and mobile cannot be left in its present condition as it would threaten to destroy the constructed features of holes 11, 12, 13 and 17 by sand drifting and, frequently, make play difficult due to wind blown sand.” (RSB 66: TIGLS, Response p15)

This is well illustrated in Figure 5.1 but note, however, that the long-term existence of the remaining clumps of Marram in the “after stabilisation” illustration is unlikely, in the absence of accumulating sand.

- 8.2 The stabilisation of the sand dome will have a detrimental effect not just on the area’s geomorphological interest, but will also harm its ecology. Dune vegetation – along with its attendant animal communities - is a successional system, dependant on dynamic processes.

- 8.3 The succession of habitats from bare sand and mobile dunes, through dune slacks and fixed dunes to dune heath is particularly well represented at Menie and Foveran. One of the priority habitats at the proposed golf course site is humid dune slacks, which are areas behind the dunes where sand has been blown away to reveal the underlying soils and water table. Through ecological succession a variety of plant communities develop which in turn provide habitats for different species.
- 8.4 What is of particular scientific – and aesthetic – interest at Menie is that the dune slacks here show a particularly complete range of succession and are probably unique in Scotland (core document (G)3: ES, p82). Young dune slacks are especially well represented in the SSSI area and these are the largest areas of young dune slack in Scotland and probably in the whole UK (core document (G)3: ES, p82)
- 8.5 Stabilisation of the dunes will result in no further areas of young dune slack developing and, as the existing areas become mature through ecological succession, the area of this habitat will diminish

9. Indirect effects arising from the operational management of the golf course

- 9.1 It is difficult to predict the extent to which indirect effects will impact upon the dune environment, such are the complexity of the system and the multi-faceted aspects of the proposed development (and the current absence of details relating to the layout of the proposal). Whilst some factors, which are partially understood, can be quantified approximately, others are more difficult to predict and may prove immensely damaging.
- 9.2 The Applicant has acknowledged some of the indirect effects which will arise from the operational management of the golf course, e.g. disturbance to badgers and otters (core document (G)3: ES, p110-111). However, there has been an underplaying of indirect damage to habitats and associated species as follows.
- 9.3 Run-off from fertiliser treatments will be inevitable and might be expected to have a big impact due to the generally nutrient-poor conditions in which these habitats have developed. Initially, these impacts will occur adjacent to fertilized areas, but their extent would be expected to increase with time as the excess nutrient spreads.

- 9.4 Changes in hydrology will be expected to occur due to reshaping of the ground surface and insertion of drainage. Given the extent of engineering works and drainage associated with both playing surfaces and access routes, it is difficult to envisage hydrological conditions remaining unaltered within any of the dune slack areas. The importance of even small differences in water levels can be seen from the variation within individual dune slacks. More dramatically, seasonal flooding is an important factor influencing habitat development and species composition: without it, the value and diversity of the slacks will diminish.
- 9.5 Stabilisation of the dunes and, in particular, the sand dome will destroy the dynamic topology underlying the entire ecosystem. The effects of such stabilisation may take decades to show, but the cumulative effect of such stabilisation is likely to be substantial in the long term.
- 9.6 Loss of rabbits will have a profound effect on vegetation, as detailed in paragraph 7.6 (above).
- 9.7 Introduction of new species to the relic habitats will be inevitable. Some introductions will take place by design (grass species for tees, greens and fairways) whilst others will happen by accident from biological material associated with machinery, staff and visitors. Even with a site biosecurity plan, it is difficult to envisage preventing change to relic habitats in the long term.
- 9.8 Trampling will take place in areas of rough by golfers and throughout the site by spectators. This will cause instability in the dunes and damage sensitive species such as the lichens. Pressure will build to lower water tables to avoid discomfort, with consequent impacts on habitats.
- 9.9 The gradual build-up of most or all these indirect impacts makes their mitigation particularly difficult, and we are very concerned that the long-term effects of the changes are almost impossible to predict. While it is not possible to say conclusively that the areas of direct and indirect damage would be strictly proportional, it is clear that more sympathetic design would greatly reduce not only direct losses of important habitat - especially in relation to the SSSI – but also the indirect effects resulting from more intensive management of altered habitat. Additional indirect effects therefore constitute a further adverse effect, the nature and extent of which are very hard to predict, especially into the long term.

10. Proposed mitigation

- 10.1 Mitigation of losses of *Carex maritima* is proposed by seed collection and sowing and translocation of turf and soil. We are particularly sceptical about the likelihood of success of these methods. Whilst it is true that this rare sedge is being found in new localities, it is also disappearing from previously-recorded locations. This suggests that its habitat requirements are extremely precise and may not be met, in the long run, at some sites as ephemeral micro-habitats disappear. Replicating the conditions necessary for colonisation and maintaining them long-term will clearly be difficult. It is worth noting that efforts to manage habitat for a large colony at St Andrews Golf Course were unsuccessful and it was last reported as not having been seen there recently. (RSB 13). An additional difficulty may be posed by erratic fruiting of this plant: it is reported that no fruiting specimens were found at Menie in 2007, although several thousand were present the previous year. (TIGLS Document T50, p30). It is unclear whether this is a reflection of erratic fruiting or different dates of botanists' visits. This may affect the ability to source seed in some years.
- 10.2 Within the SSSI, movement of a tee and routing of paths are suggested as methods of avoiding damage to, or loss of, key species. (TIGLS Document T50, p29) It is unclear what stand-off distances will be employed and whether these will be effective in preventing secondary effects such as nutrient enrichment, changes in local hydrology or trampling. It is also important to note that far from being a method of avoiding damage to species and habitats, there will be significant losses due to the construction of routes round the site for golfers and machinery. Given the length of the course and the indicative nature of the track network, this could be a particularly serious issue in certain parts of the course however the tracks are routed.
- 10.3 The applicant accepts that avoidance of major interest on the fairway of Hole 18 is impossible and suggests that "*Species material will have to be translocated to suitable habitat elsewhere.*" We consider that such translocation of lichens and fungi is most unlikely to work and examples where the technique has been employed successfully must be produced before it can be contemplated as anything more than aspiration – see Section 11 below.
- 10.4 Outwith the SSSI, impacts on *Pyrola media*, *Ophioglossum azoricum* and lichen-rich grassland are firmly predicted (but no mitigation for these is mentioned). It would be

extremely difficult to translocate and maintain the pattern and diversity of the existing vegetation and in particular of the rare species such as the *Ophioglossum* and the *Pyrola*, which are very localized and highly dependent on very specific ground hydrological conditions and microtopography. A few centimetres above or below the mean water table seem to be critical for these rare species and this is easily demonstrated by a site inspection of their distribution.

- 10.6 We agree with the statement (TIGLS Document T50, p29) “Impacts on fungi are likely to be adverse severe in slacks and dune grasslands” but evidence is currently lacking to back the applicant’s view that “*Mitigation via translocation might be possible.*”
- 10.7 No consideration has been given to the increased risk of accidental fire damage to stable dune communities resulting from accumulation of biomass. Since many of the communities with substantial biomass will still have continuous extent in the avenues between the fairways once the course is constructed, some means of containing fires within limited areas will be necessary, in order to eliminate the risk of losing the whole extent of some Priority habitats to uncontrolled fire. Consequently, even more high conservation value areas will be lost for the construction of firebreaks and water-holding facilities.

11. Translocation

- 11.1 We address here the issues surrounding TIGLS proposals to mitigate impact through large-scale translocations as outlined in TIGLS Document T50. Conservation of species and habitats in situ will, almost without exception, be preferable to translocation. The reasons for this are manifold but the most important is that, over a period of time, organisms and habitats will have adapted to fit with their local surroundings. Their relationships are intimate and detailed, the reasons why a plant may occur in one location but not in another which may appear identical may be very subtle and our knowledge of their needs is often rudimentary. Although we sometimes know enough about an organism’s requirements to replicate those conditions elsewhere so that a translocation is initially successful – i.e. the organism does not die immediately – such an outcome cannot be regarded as success. The real test is whether the organism can survive and reproduce over several generations without further human assistance. Where what has to be moved is a habitat, the

difficulties are even greater, as the subtlest environmental change may favour one species over another in a way not shown at the donor site. The issue at Menie is not just related to a few species, but an interconnected community of plants and animals, especially invertebrates. All these must be 'translocated' and this is extremely difficult.

- 11.2 Aesthetic arguments also favour *in situ* conservation over translocation. We can see a tiger in a zoo, a Rhododendron in a garden but these are mere simulacra of where these organisms belong. So too, a sand dune with its attendant vegetation which has formed naturally in one location will intrinsically be more fitting than one which has been re-created in an alien location.
- 11.3 Nevertheless, there are occasions when a translocation of a plant or animal will be preferable to allowing its destruction by human, or natural, agency. Those are when the damaging action is unavoidable and the value of the individual, or its genetic makeup, merits the necessary effort. Detailed knowledge of the organism's requirements will be a prerequisite if they are to be matched, but even then failures will be commonplace. It is necessary therefore to consider further some of the issues that must be overcome in the Menie dune system if such a strategy is to succeed.
- 11.4 Sand dune systems of alternating dunes and slacks present a complex sequence of conditions for soil formation and plant colonisation which is related to topography (RSB 73). Different soil water regimes, aspect and slope of the dune faces influence the vegetation. Abiotic factors also vary greatly and are influential on plant communities; these include factors such as wind exposure, sand accretion and erosion, soil salinity, salt spray, water table, evaporation and desiccation, heat stress, soil nitrogen and phosphorus and fire (RSB 75).
- 11.5 Arbuscular mycorrhizal fungi (AMF) have a symbiotic relationship with the majority of vascular plants in coastal sand dunes, enhancing growth, uptake of nutrients – notably phosphorus – and water, increasing plant survival and offering protection to plants against harmful pathogens. If AMF are not successfully transferred along with the rest of the vegetation, the likelihood of successful translocation is much diminished. Knowledge of the required techniques is minimal. (RSB 75). These factors illustrate the background complexity of attempting any sort of habitat translocation exercise.

- 11.6 An understanding of the processes applicable to the receptor site is necessary, notably those that could lead to degradation: accretion regime, extent of flooding, intensity of grazing and trampling (RSB 75). Newly restored and translocated dune habitats require protection from grazing livestock and rabbits and from trampling, especially after any initial planting, by temporary exclusion of people, livestock and rabbits. Plant propagules adapted to the locality will be more likely to succeed. Plant transplants may be seed or offsets, which may be sown/planted direct or propagated in a nursery first (RSB 75). Long-term monitoring of the translocation site is essential, with interventions being made as necessary to make good any deficiencies. These measures could include replanting or further transplanting, control of alien plants and inoculation with AMF.
- 11.7 RSB 75 reviewed three examples of the construction of new coastal dune slacks in the Netherlands; measures including reintroduction of traditional management practices such as mowing, grazing and sod removal, or construction of artificial dunes (RSB 70; RSB 76). None of these was considered successful and all were included in the 'less successful projects' section of their review (p.191 *et seq.*), with no dune slack creation projects listed in the 'successful projects' section. This also reviews the work of Geelen et al. (Document T23), which is considered as a large-scale rewetting project, rather than dune slack creation – that is, not directly transferable to the Menie context.
- 11.8 The role of persistent seed banks in providing source material for dune succession, or for successful translocation or restoration of dunes has been the subject of several studies. It is apparent that successional change in dune slacks is reliant upon dispersal, rather than the seed bank (RSB 70; RSB 71; RSB 72). Bossuyt & Hermy (RSB 72) investigated soil seed bank composition from a sample of 20 dune slacks, ranging in age from five to 55 years in age. Some early successional species persist in the seed bank, but generally only in low numbers. Most typical dune slack species do not form persistent seeds, so that re-establishment from the seed bank is not to be expected when the species has disappeared from the vegetation.
- 11.9 Bakker et al. (RSB 70) studied seed bank composition and vegetation in wet dune slacks that had a variable extent of groundwater level rise in combination with either topsoil removal or mowing. Restoration management led to substantial disturbance of the seed bank. Changes in species abundance after the restoration impact were not related to species abundance in the seed bank, but to ongoing succession and

current year dispersal. The authors concluded that, to attain a high number of new establishments, restoration projects should preferably be planned in the proximity of refuge populations, rather than relying on the seed bank alone.

- 11.10 To reiterate, therefore, TIGLS have proposed that losses of important habitat to the development will be mitigated by translocation. It is acknowledged (TIGLS Document T50, p26) that:

"Translocation on this scale (19.4 ha within the SSSI, 35.1 ha for the development area as a whole) is a very large project which has to be done in an environmentally sensitive way. Large-scale dune restoration by translocation has not been attempted before in Scotland."

The proposals to translocate 35 ha, presented as mitigation could, under the best scenario, represent no net loss or gain assuming complete success. However, complete success is very unlikely if not impossible. In circumstances where vegetation of high nature conservation value is threatened, it is preferable to create compensatory habitat of an area significantly greater than the area threatened as well as to provide mitigation measures.

- 11.11 TIGLS also state *"All vegetation types in the trials are likely to recover within 1-2 years of the initial disturbance by translocation. This method is likely to be largely successful because dune vegetation can usually cope with some turf damage (e.g. rabbit burrowing and scraping) and will recover"*. (T50, para 7.1.2)

- 11.12 The scale of what is proposed is several orders of magnitude greater than the impacts of rabbit burrowing and scraping so the confidence that it will be successful is surely misplaced. Furthermore, the provision of bare soil may well encourage the spread of alien, ruderal weeds – especially as heavy plant will be involved on what will be a major construction and engineering site – rather than those annuals and perennials more commonly associated with mobile duneslacks. There appears to be a conflation of species richness, which is not necessarily a desirable attribute, with biodiversity value, which is what conservationists strive for:

"In the short term it [damaged ground] can increase species biodiversity."

- 11.13 It is conceded that it is uncertain that translocation can be done entirely successfully but the author judges that at least two thirds of translocation is likely to be successful in the short term. No justification for this claim is made and, in any case, it is the long-term success which matters. The author (of T50: Dargie) goes on to surmise that residual impacts “*are likely to be low (of the order of 7 ha in the SSSI and 12 ha overall for the development)*” – again without supporting evidence.
- 11.14 For the reasons set out above, we consider therefore that the translocation proposals represent an area of major uncertainty and raise some very significant questions about the likelihood of success. The consequences of failure of translocation will be seriously adverse to the SSSI and to the site as a whole. The experimental work, reported in the paragraph following the above quote, acknowledges that the best result was only “*moderate success*” and although the longevity of the experiment is not reported, it appears likely to have been only short-lived. Long-term success in even the most favourable example has not been demonstrated.
- 11.15 A key issue is that would be very difficult to find 35 ha of receptor site with suitable impeded drainage and hydrological characteristics. Almost by definition, all the suitable sites are already occupied by dune slacks. The few sites that lack such vegetation are unsuitable by reason of too much instability or inappropriate drainage or nutrient levels. There are few if any slack sites that are in such poor condition that they would benefit from having vegetation translocated from elsewhere, so there would appear to be only a net loss of habitat from the proposed translocation programme.
- 11.16 We would have greater confidence in the Applicant’s ability successfully to translocate dune habitat on a large scale if evidence of success elsewhere in the world could be produced. As shown above, though, there are few if any good examples of this elsewhere in this habitat type in Europe, although clear cases of failure have been identified (e.g. SNH 46). The distance over which habitat is translocated, as well as suitability of the receptor site, will determine the ongoing colonisation, species retention and successional development of the translocated dune slack. In particular, species that are slow to disperse or able to disperse over only short distances may not reach or may not persist in the translocated habitat. For dune slack translocation to have a chance of success, the receptor site must combine suitable topography and hydrology with proximity to source material to aid dispersal, rather than rely on just the translocated seed bank which will limit species

diversity and successional development. These conditions, when viewed within the context of the uncertainties summarised above, are unlikely to be met at Menie.