

# REF

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## RENEWABLE ENERGY FOUNDATION

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05 October 2012

### ***Renewable Energy Foundation Response to:***

### ***IoA Discussion Document on “A Good Practice Guide to the Application of ETSU-R-97 for Wind Turbine Noise Assessment”***

#### ***Introduction***

- 1.1 The Renewable Energy Foundation (REF) has taken a particular interest in the issue of wind farm noise assessment and has produced three information notes relevant to this subject:
  - (i) Freedom of Information data obtained from University of Salford Report on wind farm amplitude modulation (AM) noise complaints<sup>1</sup>
  - (ii) An assessment of the Den Brook AM condition<sup>2</sup>
  - (iii) A Critique of the IoA Treatment of Background Noise for Wind Farm Noise Assessments<sup>3</sup>
- 1.2 In each of these documents we have stated that the existing wind farm noise guidance document, ETSU-R-97, is out of date, contains errors and omissions, and is not fit for purpose.
- 1.3 The current exercise (of which this consultation is part) has been undertaken by the Institute of Acoustics, under commission by DECC, in order to develop good practice guidance based on the existing ETSU-R-97 standards.

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<sup>1</sup> <http://www.ref.org.uk/publications/151-ref-publishes-data-on-wind-farm-noise-obtained-under-the-freedom-of-information-act>

<sup>2</sup> <http://www.ref.org.uk/publications/242-the-den-brook-amplitude-modulation-noise-condition>

<sup>3</sup> <http://www.ref.org.uk/publications/255-ioa-critique>

## **Flawed Remit**

- 1.4 However, it is misguided. There are inherent problems from the outset, including the fact that the indicative noise limits suggested in ETSU-R-97 may not be questioned. Furthermore, the character of turbine noise is also off limits and the actual environmental impacts of the noise standards in terms of audibility and likelihood of complaints are not addressed. Moreover, the guidance diverges from ETSU-R-97 in a number of key areas resulting in a reduction in protection from noise for wind farm neighbours.
- 1.5 We also believe that the IoA document, like ETSU-R-97, is not fit for purpose. The major deficiencies are as follows.

## **Environmental impacts not described**

- 1.6 The purpose of the IoA document is to help ensure that local planning authorities and planning inspectors receive reliable information on the noise impacts of a proposed wind farm in order that a robust planning decision may be made.
- 1.7 The IoA guide does not appear to recognise that it is a legal requirement that a noise assessment forming part of an Environmental Statement must supply "*the data required to identify and assess the main effects which the project is likely to have on the environment*",<sup>4</sup> and that the "*direct effects and any indirect, secondary, cumulative, short, medium and long-term, permanent and temporary, positive and negative effects of the project must be described*".<sup>5</sup>
- 1.8 A noise assessment is required to describe the '*levels and **effects of noise** from the development*'.<sup>6</sup> There is an obligation that the '*democratic right of a member of the public to make representations must be **meaningful** and therefore the information which is made available must be sufficient to enable a member of the public:*
- a) to respond to the significant effects on the environment to which it is suggested the project may give rise;*
- b) to examine the project to see whether it is likely to give rise to significant effects which have not been identified.*<sup>7</sup> (Emphasis – bold – added.)

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<sup>4</sup> EIA Directive 2003/35/EC, Article 5 paragraph 3

<sup>5</sup> EIA Directive 2003/35/EC, Annex IV, paragraph 4

<sup>6</sup> Environmental impact assessment: guide to procedures DCLG

<http://www.communities.gov.uk/documents/planningandbuilding/pdf/157989.pdf>

<sup>7</sup> Newman J. in R(Burkett) v London Borough of Hammersmith and Fulham, [2003] EWHC 1031 para 8 (vii)

- 1.9 The problem with the IoA Discussion Document is that it does not require a noise assessment to include any interpretation of the myriad of technical acoustic detail such that the actual environmental effects can be understood in any “**meaningful**” way, as is required by law.
- 1.10 For example, there is no requirement to quantify or to discuss whether the wind farm development will be audible at neighbouring dwellings, either indoors or outside and for what duration. That is to say, the IoA does not require that a developer assess and describe the likely impacts of the noise in the context of the existing soundscape.
- 1.11 As a consequence of this fundamental flaw, a developer who followed the guidance indicated in the IoA document would nevertheless fail to comply with over-arching legal requirements, and neither the neighbours of the proposed application, nor the decision maker, would have access to non-technical noise information that would allow them to understand the effects that would result. This is obviously an absurd outcome, and the IoA document must rectify the failing.

### ***Role of acoustician***

- 1.12 Acousticians acting for developers routinely exceed their area of expertise in noise assessments; their reports often contain claims in relation to wind farm power output, meteorological factors or impacts of noise on sleep and health of neighbours. The IoA document also errs in this way. The acoustician’s role is to do no more than gather and interpret the necessary acoustic data, providing the public and decision makers with a clear and accessible description of the noise impacts.
- 1.13 It is not the acoustician’s role to make value judgements about the merits or otherwise of the planning application. At times, the IoA document strays into planning territory and makes statements which reveal an inappropriate support for wind generation. For example paragraph 4.3.4 comments that a conservative choice of noise prediction parameters will negatively impact wind energy generation levels. The discussion on increased noise limits for dwellings which may or may not house people with a financial interest in a wind farm is not appropriate for a document on acoustic practices (paragraphs 3.3.21-22).
- 1.14 Similarly, there is an extensive discussion on what noise limit should be set for a locality which takes into account the power output of a wind farm. Calculating power output does not lie within the area of expertise of acousticians and should not form part of their deliberations.

1.15 It is our position that acousticians should concentrate on quantifying the “likely duration and level of exposure” (paragraph 3.3.2), as we have done,<sup>8</sup> by calculating the percentage of time in a year that complaints would be likely or marginal based on the BS4142 metric. This information could then be used by a planning inspector or local authority to decide if a proposal is satisfactory and what noise limits would be acceptable given the site-specific results.

### ***'Flawed Standardised' IoA methodology endorsed***

1.16 ETSU-R-97 is clear in describing how to measure the dependence of background noise data on wind speeds measured at 10m height. The IoA document seeks to change the way this is done and to endorse a new methodology that relies on the concept of a 'standardised 10m wind speed'. This is not the actual 10m wind speed, but a hypothetical wind speed that only occurs in certain meteorological conditions.

1.17 The 'standardised 10m wind speed' method is demonstrably less protective of wind farm neighbours. In our previously published critique of this new methodology, we demonstrated by use of real wind speed data, that this methodology

- Increases the uncertainty of the background noise curves, contrary to ETSU-R-97 guidance, and consequently, reduces the reliability of noise conditions based on them,<sup>9</sup>
- Produces different noise conditions depending on the dates chosen for the baseline background noise survey, thus yielding differences in permitted wind farm noise levels of as much as 5dB for the same site<sup>10</sup>, and
- Can even result in permitting site layouts where the wind farm noise would breach ETSU-R-97 conditions known to be unacceptable.<sup>11</sup>

1.18 A further problem is that noise conditions based on a 'standardised 10m wind speed' require accurate measurement of hub height wind speed in any noise compliance testing. As can be seen in paragraphs 8.1.10 of the IoA document, this is problematic: nacelle anemometers need to be accurately and verifiably

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<sup>8</sup> See “Quantifying Noise Impact on Neighbouring Dwellings” in A Critique of the IoA Treatment of Background Noise for Wind Farm Noise Assessments

<http://www.ref.org.uk/publications/255-ioa-critique>

<sup>9</sup> Appendix C of ETSU-R-97 describes how noise impacts on neighbours are worse when background noise levels are so scattered that they cannot be accurately represented by a single fitted line. Figure 3 in the REF Critique (<http://www.ref.org.uk/publications/255-ioa-critique>) demonstrates that the 'standardised 10m method' results in a third of background noise points falling 4dB or more lower than the line used to derive the noise condition.

<sup>10</sup> See table 1 in the Critique <http://www.ref.org.uk/publications/255-ioa-critique>

<sup>11</sup> See table 2 in the Critique <http://www.ref.org.uk/publications/255-ioa-critique>

calibrated and the wind speeds measured by the nacelle anemometers on each turbine will be affected by the wake of adjacent turbines. Even if a free-standing meteorological mast is part of the site application, there will be ambiguity about the accuracy of wind speeds when the mast is within the wake of the turbines. The IoA document is silent on how these issues could be resolved.

- 1.19 No valid justification has been presented by the IoA for changing this part of ETSU-R-97 guidance. In view of the fact that it decreases the protection of wind farm neighbours, results in unreasonably variable noise conditions, and increases the difficulty of achieving an enforceable noise condition, it is hard to believe that any such justification could exist.

***Assertions unsubstantiated by data***

- 1.20 There are a significant number of unsubstantiated assertions in the IoA documents.
- 1.21 For example, it is stated that “there is no evidence that atypical wind shear conditions during the survey period can have other than a minor effect on the derived background noise levels for the site” (paragraph 2.3.4). On the contrary, the empirical data that REF produced in its Critique provides such evidence, and moreover, the assertion is weakened by the admission at paragraph 3.1.8 that “there is at present limited information on the potential significance of the variations of wind shear conditions during typical survey periods.”
- 1.22 The document states that there is no reason to suggest that background noise measurements need be taken at more than one time of the year and produces no evidence to justify disregarding seasonal variations. This ignores evidence in the public domain which demonstrates seasonal variations in background noise measurement; for example, the noise assessment for the Linton Wind Farm, undertaken by the Hayes McKenzie Partnership, includes data for winter and summer surveys and demonstrates substantial variation in noise levels between the two seasons.
- 1.23 It is claimed that realistic predictions of turbine noise levels can be achieved with particular prescribed parameters (paragraph 4.3.5). No data is available in the public domain by which this assertion can be validated and although some of the authors of the document clearly have access to such data, they have routinely refused to publish that data.
- 1.24 These unsubstantiated assertions are in themselves fatal to the credibility of the document, but they are only a selection. There can be no confidence in good practice guidance unless it is rigorous and its claims are capable of independent verification using publically accessible data.

### ***Importance of public access to data ignored***

- 1.25 Wind farm developers are often reluctant to allow neighbours access to the raw background noise, turbine noise and wind speed data necessary to independently determine the noise impacts of a proposed wind farm. Members of the public still experience the extraordinary situation of being refused access to background noise measurements taken on their land with their permission.
- 1.26 This is contrary to European and UK environmental law, which gives the right to the public concerned to be given early and effective opportunities to participate in the environmental decision-making procedures.<sup>12</sup> Without access to the relevant data, it is impossible for neighbours, or an acoustic expert acting on their behalf, to test claims made by a developer.
- 1.27 It is surprising, indeed it is disgraceful, that the IoA should be party to this tendency to withhold data. For example, we note that this document suggests an offer to provide background noise measurements data to the landowner is contingent upon the developer being in agreement (paragraph 2.2.2).
- 1.28 We would remind the IoA of its own Code of Conduct which includes the principle that "Members shall show proper regard for the sanctity of data. In particular members will:[...] ensure that primary data used in any publication or report are available in a form that would allow for independent scrutiny and that sufficient details of any experiments, by which the data were derived, are available to allow others to replicate such experiments."<sup>13</sup>
- 1.29 We believe that it is a professional duty of members of the IoA to make sure that residents are properly informed of the implications of a noise assessment and that this includes being given all relevant data and being made aware that a considerable amount of information about their property will be put into the public domain including location and often photographs of their house and garden.

### ***Reliance on noise conditions unfounded***

- 1.30 As a result of developers producing noise assessments for candidate, rather than specific, turbine models or relying on noise-capped, reduced-power, turbines (e.g. paragraph 4.5.1), it seems that it is implicitly accepted that noise conditions are now being used as a means of constraining noise contrary to the assumption in ETSU-R-97.

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<sup>12</sup> EIA Directive 2003/35/EC, Article 6 paragraph 4,

<sup>13</sup> A1.5 IoA Code of Conduct <http://www.ioa.org.uk/membership/code-of-conduct.asp>

- 1.31 This necessarily means that noise conditions must be robust and capable of very rapid enforcement. Experience has shown that this is not the case, and the evidence in the IoA document is that wind farm noise conditions are over-complex, utterly dependent on data in the developer's control and open to interpretation.
- 1.32 It is unreasonable to recommend that noise conditions should be based on 'standardised 10m wind speeds' derived from measured hub height wind speeds when measuring those wind speeds is flawed as demonstrated by the document itself.
- 1.33 The tonal part of the noise condition is clearly inadequate if it cannot protect neighbours from tonal noise with a 'droning character' (Paragraph 8.2.6).
- 1.34 There is no apparent requirement for, or evidence of historic, monitoring of outcomes of noise complaints or noise compliance testing. We are aware that there continue to be noise complaints made about many wind farms, very few if any of which seem to be resolved to the complainant's satisfaction. As far as we are aware, there is no compliance measurement data in the public domain.
- 1.35 In view of the fact that such data must exist, and that this data could be used to validate some of the assumptions made in the IoA document and the efficacy of current noise conditions, we believe that the IoA should insist that the data is made publically available.

### ***About The Renewable Energy Foundation***

The Renewable Energy Foundation is a registered research and education charity encouraging the development of renewable energy and energy conservation whilst emphasizing that such development must be governed by the fundamental principles of sustainability. REF is supported by private donation and has no political affiliation or corporate membership. In pursuit of its principal goals, REF highlights the need for an overall energy policy that is balanced, ecologically sensitive, and effective.

**INSTITUTE OF ACOUSTICS**

**IOA CONSULTATION DOCUMENT ON THE  
“GOOD PRACTICE GUIDE TO  
THE APPLICATION OF ETSU-R-97  
FOR WIND TURBINE NOISE ASSESSMENT”**

**JULY 2012**



## FOREWARD

**\*\* PLEASE READ \*\***

This consultation document has been produced by a working group on behalf of the Institute of Acoustics consisting of the following members:

Matthew Cand	Hoare Lea Acoustics
Robert Davis	RD Associates
Chris Jordan	Northern Group Systems (Environmental Health)
Malcolm Hayes	Hayes McKenzie Partnership
Richard Perkins (Chair)	Parsons Brinckerhoff Ltd

This document is designed to be read in conjunction with the "Discussion Document on A Good practice Guide to the Application of ETSU-R-97 to wind turbine noise assessment" dated July 2012, and includes questionnaire style responses. Respondents to the consultation are encouraged to provide their comments on this form. A word version has been provided to allow respondents to increase box sizes as required.

All comments on the consultation draft should be sent electronically to:

[ETSUCONSULT@IOA.ORG.UK](mailto:ETSUCONSULT@IOA.ORG.UK)

Alternatively, written responses can be sent to:

IOA NWG GPG Consultation Feedback  
Institute of Acoustics  
3rd Floor St Peter's House,  
45-49 Victoria Street,  
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Herts.  
AL1 3WZ.

The closing date for the receipt of comments is **Friday 28<sup>th</sup> September 2012**. Late comments may not be reflected in the final document.

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## **1 Introduction to the consultation**

### **1.1 Background**

- 1.1.1 The Institute of Acoustics Noise Working Group (IOA NWG) has prepared two documents for the purpose of consultation to IOA Members and other interested parties on what should be considered good practice in the application of ETSU-R-97 for wind turbine noise assessment.
- 1.1.2 The IOA NWG has tried to set out the main issues in a way that explains the rationale behind those issues. The intention of the IOA NWG post-consultation is to be as definitive on what can be considered as “good practice” as possible for the final document, but at this consultation stage, some aspects have been discussed in more depth to promote discussion, and to ensure that an informed response to the consultation can be provided.
- 1.1.3 The second consultation document is called the “DISCUSSION DOCUMENT ON A GOOD PRACTICE GUIDE TO THE APPLICATION OF ETSU-R-97 FOR WIND TURBINE NOISE ASSESSMENT”, which sets out the issues, and what might be considered to be good practice. Areas not covered by ETSU-R-97 (such as turbine noise propagation), or areas where the IOA NWG suggest that specific consultation responses are required, have been highlighted in yellow, and a specific response box with an explanation has been provided below.
- 1.1.4 The Institute of Acoustics is also holding a workshop where members can discuss the issues in more depth.
- 1.1.5 Feedback is encouraged on all aspects of the document, whether positive or negative, with suggestions for omissions and amendments as appropriate.

## 2 Consultation Aims and Responses

### 2.1 Chapter 1 (General)

- 2.1.1 Please provide comment in relation to the Background, Project Aims and Objectives, and Scope of the Document:

Please see main consultation response by REF for substantive points.

### 2.2 Chapter 1.4 Noise assessment Philosophy

- 2.2.1 The IOA NWG considers that the assessment philosophy behind ETSU-R-97 is not always clearly understood, and has set out what it believes is the correct interpretation of the guidance. Please provide feedback on the assessment philosophy:

Our main objection to the assessment philosophy is covered in our main consultation response.

In addition :

Diurnal variation in wind shear was not understood when ETSU-R-97 was written. Thus, the ETSU definition of amenity hours means that low shear periods during the before-sunset hours of the amenity period contaminate the data collected in the high shear periods of the after-sunset hours. This is to the wind farm neighbours' disadvantage. Amenity hours should be changed to include the evening hours of 18:00 to 23:00 only.

Re 1.4.5. The concept of "masking" is introduced but not discussed further. In practice, we understand that masking does not occur because the character and frequencies of modern wind turbine noise is not similar to that of wind induced noise in vegetation. In view of the fact that the Companion Guide to PPS22 states that "Noise levels from turbines are generally low and, under most operating conditions, it is likely that turbine noise would be completely masked by wind-generated background noise.", we feel this idea should be explicitly corrected if the IOA agrees it is erroneous.

### 2.3 Chapter 1.5 Engagement

- 2.3.1 ETSU-R-97 is clear that Engagement is a necessary part of the wind farm noise assessment process. Please provide comment on what the IOA NWG considers is "good practice in this regard:

In addition to our main consultation response, we would draw the author's attention to the recent ICO ruling regarding the duty of providing confidentiality of the location used for background noise monitoring.(FER0454326)

It appears that the authors have not considered the necessity to ensure that neighbours are fully informed of the consequences of permitting background noise measurements at their property.

## 2.4 Chapter 2 Baseline Data Collection

### 2.4.1 Please provide feedback on Chapter 2.1 Scoping for Baseline Noise Surveys

Covered in main response.

### 2.4.2 Please provide feedback on Chapter 2.2 Noise Measurement Equipment

In addition to the points in our main response, we note that data we have seen shows significant variation in background noise levels depending on microphone location. Several short term measurements should be made to ensure that the quietest location is selected – it is not good enough for the acoustician to choose a spot arbitrarily, he must provide data to validate his choice of location.

### 2.4.3 Please provide feedback on Chapter 2.3 Timing of Surveys

Covered in main response.

### 2.4.4 Please provide feedback on Chapter 2.4 Wind Speed Measurement

Data needs to be provided to justify the suggested methods. We see significant flaws in the methods. For example, re (a) a single anemometer means no assessment of site specific wind shear can be made which will result in justifiable disputes; b) two anemometers are insufficient – our experience is that there are inevitably periods when one or other anemometer is frozen or otherwise out of commission c) is SODAR & LIDAR feasible for determining annual variation in wind shear as is routinely provided from regular met masts? d) no site specific wind shear measurements can be made.

### 2.4.5 Please provide feedback on Chapter 2.5 Rain measuring equipment

2.4.6 Please provide feedback on Chapter 2.6 Synchronisation of noise, wind and rainfall measurements

2.4.7 Please provide feedback on Chapter 2.7 Durations of surveys

2.4.8 Please provide feedback on Chapter 2.8 Range of wind speeds during noise surveys

We don't agree with easing the requirement to study the full range of wind speeds recommended in ETSU-R-97.

**2.5 Chapter 2.9 Required size of data set**

2.5.1 The minimum size of the dataset to be obtained to ensure that the assessment is sufficiently robust has been debated at many Planning Inquiries, and the consensus view of the IOA NWG has been proposed. Feedback on this issue is welcomed:

The size of the dataset is of less importance than the size of the dataset for critical wind speeds, directions and shear conditions. It is rare to see a background noise data set with sufficient data points covering these critical periods.

**2.6 Chapter 3 Data Analysis & Noise Limit Derivation**

2.6.1 Please provide feedback on Chapter 3.1 Analysis of Background Noise Data:

Please refer to REFs main consultation response.

Unfortunately, the description of fitting background noise data with higher or lower order polynomials and consideration of the goodness of fit reveals a fundamental lack of understanding of this statistical methodology. We would suggest input from a statistician is required to correct this section.

2.6.2 Please provide feedback on Chapter 3.2 Derivation of Prevailing Background Noise:

There should be a discussion of the impact on noise conditions arising from what is often a very poor fit to the measured noise data i.e. an elaboration of what is discussed in Appendix C of ETSU-R-97.

## 2.7 Determining the fixed limit

2.7.1 The HMP report requested further clarification on the setting of fixed limits. Please provide feedback on Chapter 3.3 Determining the fixed limit:

See REFs main response – most of this section is outside of an acoustician's area of expertise and should not be undertaken. The one area which is relevant – namely, "the likely duration and level of exposure" is incomplete.

## 2.8 Noise Predictions

2.8.1 ETSU-R-97 does not describe a method to predict the immission levels at the nearest residential properties, but clearly demonstration of the likely noise impact at the nearest receptors is required in any planning situation, and this must be reliable and robust. Feedback is therefore requested on the following aspects of the Prediction Methodology.

2.8.2 Please provide feedback on Chapter 4.2 Turbine Source Noise Data:

See REF'S main consultation response.

In addition, we note that the four methods of 4.2.3 will generally give rise to 4 different sound power levels – which one should be selected? Where is the data to justify the claim that these methods give rise to 'conservative emission values'?

Re 4.2.5, where is the measured data which validates the assumption that an LA90 can be derived from an LA Eq by subtraction of 2dB. On the basis of the limited data that REF has seen, this assumption is not valid, especially at times of higher amplitude modulation.

2.8.3 Please provide feedback on Chapter 4.3 Noise Propagation model and input parameters:

See REF's main consultation response.

Why is there no discussion of errors inherent in the ISO9613 methodology?

Re Topographic screening – evidence that predicted turbine noise levels can be reduced by 2dB where there is no direct line of site needs to be produced. We have observed at Deeping St Nicholas that there was no view of the turbines but audibility increased significantly when the turbines were screened.

2.8.4 Please provide feedback on Chapter 4.4 Directivity:

## 2.9 Cumulative Issues

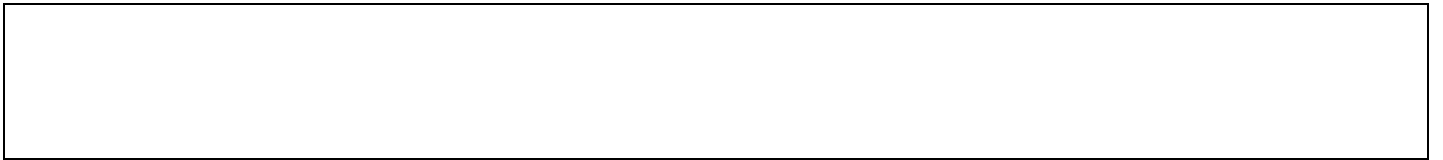
2.9.1 The IOA NWG has debated the various cumulative issues that arise when considering wind turbine noise, and has set out the key issues as the basis for discussion. Particular feedback is requested on this aspect.

The problems with trying to obtain permission for successive wind farms in a single locality highlighted in this section demonstrate that this is not feasible.

## 2.10 Planning Conditions

2.10.1 Please provide feedback on Chapter 6.1 Discussion:

See REF'S main consultation response.



IOA CONSULTATION RESPONSE



2.10.2 Please provide feedback on Chapter 6.2 Simplified approach for setting noise limits:

The flaw is in the words "controlled in practice by a condition". There is no evidence that wind farm noise conditions can do this.

## 2.11 Reporting Results of the Noise Assessment

2.11.1 Please provide feedback on Chapter 7 Reporting Results:

See REF'S main consultation response.

Also: The section does not make clear that all relevant data necessary to replicate the noise assessment needs to be provided in electronic format. Eastings and northings of turbines and all neighbouring dwellings must be provided.

Predictions of noise levels at the site boundary would be useful for compliance monitoring. An assessment of  $R^2$  and discussion of the goodness of fit should be included.

## 2.12 Other Matters

2.12.1 Please provide feedback on Chapter 8.1 on Compliance Measurements:

8.1.16 The suggestion that compliance measurements be made at a different site to that chosen for initial amenity areas is wholly unreasonable and it is difficult to understand how a development could be considered to comply with the noise condition if this is done. Surely the background levels would be increased and the turbine noise levels decreased by this means.

2.12.2 Please provide feedback on Chapter 8.2 on Character Penalties:

Having identified some fundamental problems with the tonal noise condition – most notably that it does not protect against a 'droning noise', it is difficult to understand why the IoA continues to support the tonal noise condition.

It would be helpful to see data where the tonal noise condition has been exercised so that what is an extremely complex test can be examined in detail. Undoubtedly the authors have access to such data.

## 2.13 Recommendations for Further Research

2.13.1 Please provide feedback on Chapter 9 on Recommendations:

**3 Annex**

**3.1 Annex A**

3.1.1 Please provide feedback on whether the IOA NWG has met the aims of the Terms of Reference, or whether further aspects need to be included:

See REF'S main consultation response.

**3.2 Annex B**

3.2.1 Please provide feedback on terms to be included in the Glossary:

### 3.3 Annex C

3.3.1 Please provide feedback on the revision of Standards & Guidance:

### 3.4 Annex D

3.4.1 Please provide feedback on whether the flow chart adequately reflects the process:

### 3.5 Annex E

3.5.1 Please provide feedback on this discussion on wind shear:

See REF'S main consultation response as well as REF's critique on the IoA methodology (<http://www.ref.org.uk/publications/255-ioa-critique>)

In summary, we consider the methods of assessing impact of wind shear in this section wholly inadequate and present a more rigorous methodology in the critique referred to above.

As a general principle, we would expect to see all the underlying raw data before we would consider accepting the data in the table at 8.4. We expect that site-specific considerations would preclude the use of such a table.

### 3.6 Annex F

3.6.1 Please provide feedback on the example planning condition:

See REF'S main consultation response

### 3.7 Your details

3.7.1 Please provide your name and contact details in case the working group wishes to clarify any of the points raised in your feedback:

Dr Lee Moroney, Planning Director, [lee.moroney@ref.org.uk](mailto:lee.moroney@ref.org.uk)  
Dr John Constable, Director, [john.constable@ref.org.uk](mailto:john.constable@ref.org.uk)

Renewable Energy Foundation, 21 John Adam Street, London WC2N 6JG.

The IOA NWG thanks you for your help in completing this document.

Richard Perkins  
Working Group Chair

IOA CONSULTATION RESPONSE