Memorandum

To: Andy Cole, North Devon Council
From: Bob Davis
Date: 6 November 2020
Project : Batsworthy Cross Wind Farm – Noise Compliance
Ref: NDC 061120/1

Review of email from RES (S Higman) dated 8 October 2020:
Comments on RES's proposal that the Council should rely on the predicted effect of a noise curtailment strategy to demonstrate compliance with noise limits.

Background

The noise compliance measurements carried out to date demonstrate compliance with the noise limits at all the agreed monitoring locations except at the location representing Birchwood House and adjoining properties. The most recent survey at this location (strictly the 'Birchwood House proxy' but referred to in this note as 'Birchwood House') was commissioned by the Council and carried out in February – April 2019 by 24 Acoustics/RD Associates (Report R7792-1). The results showed that the wind farm noise level at that location exceeded the night noise limit of 40 dB L_{A90} by 1.5 dB at a wind speed of 7 m/s (at 10 m height), but complied with the limits at other wind speeds.

RES have not questioned the reliability of these noise measurements, but dispute the reliance on wind speed measurements from the permanent anemometer mast. They claim that using wind speeds measured at this mast as a reference for the noise data overstates the derived noise levels, to the extent that (in their view) the noise limits at Birchwood House are incorrectly shown to be exceeded. The RES Report by Jeremy Bass (Reference GT01-502040 - October 2019) sets out the rationale for this assertion.

The Council's position is that the measurements have been carried out in accordance with the Planning Conditions: These measurements demonstrate a breach of noise limits at Birchwood House. The Council requires that noise levels at this location are mitigated and that evidence of compliance with noise limits is provided (email from Matthew Brown to RES of 16 September 2020).

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Although RES does not agree with the Council's stance, it appears from Steve Higman's email of 8 October that they are willing to accept that position and are prepared to permanently implement a noise curtailment strategy (which they state is already in operation).

Proposed Mitigation (Curtailment)

RES's curtailment strategy involves operating some turbines in lower-noise modes for a specified range of wind directions. With the curtailment applied, predictions by RES indicate that the noise level at Birchwood House at 7 m/s wind speed would be reduced to 39.5 dB L_{A90}, which would comply with the noise limit of 40 dBL_{A90} (night-time).

RES are requesting that Council accept the results of these predictions of the effect of the curtailment strategy as evidence that, with the curtailment strategy in operation, the noise levels at Birchwood House comply with the noise limits and that the Council can therefore discharge the relevant Planning Condition(s).

I have been asked by Andy Cole to review the RES email and to identify the actions the Council could take to progress the matter.

Possible Future Action by NDC

There seem to be three options for further action by the Council:

- ***Require the Operator to carry out further noise monitoring***

The Planning Conditions and the agreed Noise Compliance Survey Method Statement require the noise levels to be determined by noise measurements. There is no reference to the use of predictions to adjust or correct measured noise data. The Council might therefore decide that compliance can only be confirmed by means of further noise monitoring at the Birchwood House location, especially since the predictions indicate that compliance at Birchwood House, even with curtailment, is expected to be marginal (within 1 dB). However, from experience, the measurement and analysis process could be expected to extend over a number of months because of the requirement to obtain sufficient data in specific combinations of wind speed and wind direction. Although not of direct concern to the Council, the Operator would incur considerable costs: the Council might also incur costs in meeting a requirement to oversee the monitoring and review the data.

- ***Accept adjustments based on the predictions currently presented by RES***

The RES email of 8 October presents the predicted effects on noise levels at Birchwood House, at 7 m/s (10m) wind speed, of implementing the proposed noise curtailment. My interpretation of the values shown is that the predicted noise reduction at Birchwood House is 2 dB, such that the pre-curtailment noise level of 41.5 dB (as measured in early 2019) would be reduced to 39.5 dB L_{A90}, and therefore lower than the night limit of 40 dB.

I have no reason to dispute these predictions, but I do not consider that they are sufficiently comprehensive: because the prediction relates only to a single wind speed, whereas the curtailment strategy will affect noise levels across a range of wind speeds, there is no formal statement of noise levels at Birchwood House, for a range of wind speeds, that can be compared with the noise limits in Tables 1 and 2 of the Conditions. Also, no information is provided about the basis of the predictions – the prediction model used and the data inputs – that would enable the predictions to be reviewed and validated if required.

In my view, if the Council is minded, in principle, to agree to RES's proposal to rely on noise predictions (in conjunction with available noise measurements) to determine noise compliance at Birchwood House then more information should be requested.

- **Accept adjustments based on predictions, subject to review of additional information**

Noise levels in the area around a wind farm are predicted using an 'industry standard' prediction model based on International Standard ISO 9613-2. The *absolute* levels of noise calculated by the prediction model are subject to some uncertainty, particularly in hilly terrain, but the calculation of *changes* in noise levels resulting from a change in the 'at source' noise levels (the Sound Power

Levels of the turbines), with all other factors remaining the same, can be expected to be reliable. In this case the calculated change in noise level resulting from the curtailment strategy, applied to the pre-curtailment noise levels measured in February-April 2019, would be expected to provide a robust measure of noise levels following mitigation.

In my opinion the Council could therefore reasonably accept the use of additional predictions to 'adjust' previously measured noise data (as explained above) as evidence of noise compliance, subject to the following information (1 – 3 below) being provided by the Operator and being reviewed and validated:

1 **A statement of the turbine Sound Power Levels for wind speeds in the range 3-10m/s, as provided by the turbine manufacturer (Senvion) for each of the defined operating modes (A, B and C).**

2 **For the avoidance of doubt, a statement of the pre-curtailment operating modes applied to each turbine for the 200-350º wind sector during the period February-April 2019, (the dates of the relevant noise survey) and, for completeness, a restatement of the modes as currently applied in the curtailment strategy. This statement should derive from the organisation responsible for implementing the mode changes.**

3 **ISO 9613-2 noise predictions at Birchwood House for wind speeds from 3 to 10 m/s for the 200-350º wind sector with the turbines operating in both pre-curtailment and post-curtailment modes.**

The results of these predictions would enable noise levels at Birchwood House to be determined, by means of adjustments applied to measured data, across the above range of wind speeds. The resulting complete dataset would match the datasets available for other locations - it would define noise levels at all relevant wind speeds for direct comparison with the noise limits – whereas if predictions are limited to a single wind speed of 7 m/s there is no definitive statement of noise levels at this location across the wind speed range.

Other recommended action

Compliance with noise limits at Batsworthy Cross is dependent on turbines being operated in the appropriate noise modes. To address the possible criticism that the Council has no means of ensuring that these modes remain unchanged during the life of the wind farm. I recommend that Operator should be asked to:

Provide a means for the Council to obtain confirmation, on request, to confirm the operating modes programmed for each turbine for each wind direction sector on any given date.

I note that Condition 40 does require the operator to record turbine operating data and to provide it to the Council on request.

This provision should apply whichever course of action the Council decides to take.