Submission in Response

to the Environmental Assessment

for the

Proposed

Flyers Creek Wind Farm, Carcoar

from

J & H Gerathy

G & V Knox

J Harries

19 December 2011

TABLE OF CONTENTS

19th December 2011

The Department of Planning & Infrastructure

GPO Box 39

SYDNEY NSW 2001

Attention Mr Toby Philp

RE: Submission in Response to the EA on the Proposed Flyers Creek Wind Farm (MP08_0252)

Dear Sir,

We the undersigned are three landholders northwest of Carcoar who live adjacent to the site proposed for the Flyers Creek Wind Farm.

We object to the proposed development for the reasons contained in this Submission.

A. Introduction

Details pertaining to our land holdings are provided below and in Attachments 1-3.

John Gerathy: "Errowanbang", Carcoar, NSW, 2791. Non Wind Farm Site No 12.
See Attachment 1 for details.

Geoff and Vanessa Knox: "Triangle Park", 30 Panuara Road, Carcoar, NSW, 2791. Non Wind Farm Site No 17. See Attachment 2 for details.

Jann Harries: "Old Errowanbang" Carcoar, NSW 2791. Non Wind Farm Site 13. See Attachment 3 for details.

Our Submission contains several important reasons why this proposal is inappropriate and ought be refused planning consent by the Department of Planning & Infrastructure.

The reasons, in summary, are as follows:

- In November 2011 the Full Court of the Supreme Court of South Australia set aside the decision of the Environment, Resources and Development Court ('ERD Court') to approve the proposed Hallett 3 Wind Farm (Quinn & Ors v. Regional Council of Goyder & Anor). The Supreme Court found there were *"important factual issues(s) to be resolved"* (para 5) regarding *"the extent of noise generated by wind turbines"* (para 2). In part, at issue is the technical adequacy of the South Australian Environment Protection Authority's *Wind Farms – Environmental Noise Guidelines, 2003 (*amended in 2009) to assess noise and sound impacts. This very same noise impact assessment standard is used by the NSW Government.

  Given the Supreme Court of South Australia decision, the NSW Government should take no decision on the proposed Flyers Creek Wind Farm - or any other wind farm proposal - until such

time as the ERD Court has reconsidered the noise issues for Hallett 3 and the adequacy of the Noise Guidelines is established.

- A review by two technical experts has revealed significant deficiencies in both the background noise survey and in the noise impact predictions for the Flyers Creek project. These are elaborated on in the Submission below.

- The noise impact assessment in the EA is based on an 'indicative' turbine design only, not the committed design. Whilst the noise impact modelling was done on a GE 2.5 MW wind turbine generator, the EA hedges it bets and states they may have a 3.0 MW generating capacity. Elsewhere in public statements, including the Project Overview mailout (see Attachment 11), the proponent suggests the turbine size could be up to 3.3 MW in size. It is unacceptable to have such vagueness and lack of specificity as to the turbine generation capacity (hence noise and sound implications) and physical dimensions.

- Similarly, the visual impact assessment is based on the same uncertain 'indicative' turbine design. Furthermore, the general visual impact and the shadow flicker impacts were modelled at different turbine hub heights of 100 m and 85 m respectively. This is unacceptable impact assessment methodology and the project should be rejected on this aspect alone because all matters should have been assessed on the worst case scenario of 100 m hub height.

- The NSW Government is preparing Wind Farm Planning Guidelines that are in the final throes of drafting. A planning decision on the project should be deferred until the guidelines are finalised and adopted.

- The traffic and transport impacts are poorly quantified and management of the impacts are inadequately addressed. The area features basic rural roads that are narrow, winding with many sharp bends and tree hugging. Intersections are of a similar description. The roads are not designed to handle vehicles that are over size (longer than 19 m) and over-mass (gross mass in excess of 42.5 tonnes).

  The costs associated with road infrastructure upgrades, repairs and maintenance should be made transparent now as part of the assessment process. The state and local governments need a commitment from the proponent to pay all upgrade, repair and ongoing maintenance costs.

- The proponent has not complied with the Department of Planning & Infrastructure's warning letter to the proponent dated 16th August 2011 to engage in an adequate level of community dialogue.

- The EA is silent on how much the proponent will contribute financially to the Blayney Shire Council during the life of the project. As ratepayers we wish to know what financial contributions will be made for road and associated infrastructure upgrades, repair and maintenance over the life of the project, what land rates will be paid given the affected lands are being changed from rural to industrial land use, and contributions to other local services and infrastructure.

- There will be adverse impacts on Orange Airport aircraft approach procedures. Airservices Australia advised the proponent (6th January 2011) that the proposed project would adversely impact on the approach procedures for aircraft arriving at Orange Airport because six (now five) turbines exceed the maximum allowable height. This highlights a potentially catastrophic aviation risk that is unacceptable.

The arguments supporting the abovementioned points are presented below.

B. South Australian Judicial Review Underway – Has Implications for the Standing of the Noise Assessment Guidelines.

With regards to noise, the Director General's Requirements state the impact assessment of the wind turbines must be undertaken consistent with the South Australian Environment Protection Authority's *Wind Farms – Environmental Noise Guidelines, 2003* ('Noise Guidelines') and amended in 2009. The NSW Office of Environment & Heritage (OEH, formerly the Department of Environment & Climate Change - DECC) reiterates this requirement in its correspondence on the project.

The Background Noise Monitoring Survey Report and the Noise Impact Assessment for the project were carried out by Vipac Engineers and Scientists. It is acknowledged in Appendices G1 and G2 that the abovementioned Noise Guidelines have been applied. The issue of the extent of noise generated by wind turbines, together with the role of the Noise Guidelines in setting appropriate standards for noise limits, prediction and compliance, is likely to come under scrutiny when the South Australian ERD Court rehears the Quinn matter in 2012.

The extent of this scrutiny and the Supreme Court's recent judgement that "important factual issue(s) (need) to be resolved" raises questions about the adequacy of the Noise Guidelines.

In a letter from the Director General of the Department of Planning & Infrastructure to Mr J Gerathy dated 15th December 2011 it states that *"The Department will take account of the ERD Court determination once it is made".* For the Department to follow through on this undertaking we expect that it will not make a decision on the Flyers Creek proposal until the ERD Court judgement is handed down and the implications for the Flyers Creek project are considered. Can the Department please confirm that this is its intention.

B.1 Background

On 7 November 2011, the Full Court of the Supreme Court of South Australia ([2011] SASCFC 126) allowed the appeal from the Environment, Resources and Development Court (the ERD Court) in the matter of Quinn & Ors v. Regional Council of Goyder & Anor [2010] SAERDC 63. At issue in the proceedings is the approval of the Hallett 3 wind farm in the Mount Lofty Ranges. The approval given by the Goyder Council was initially confirmed by the ERD Court but **the ERD Court decision has now been set aside by the Supreme Court and the matter will be re-heard by the ERD Court in 2012**.

Although the case covers a variety of issues specific to the Hallett 3 project and the relevant council Development Plan, the Noise Guidelines are at the heart of the examination in relation to predicted wind farm noise levels, wind farm noise assessments and compliance testing.

B.2 Technical Adequacy of the SA EPA Noise Guidelines

Professor Colin Hansen from Adelaide University is of the view that the Noise Guidelines are deficient in certain elements. Professor Hansen's credentials include:

- Professor at the University's School of Mechanical Engineering with a First Class Honours degree in Mechanical Engineering and a PhD in acoustics;
- A Chartered Professional Engineer and a Fellow of Engineers Australia, the Australian Acoustical Society and the International Institute of Acoustics and Vibration;
- Served as President of the International Institute of Acoustics and vibration; and
- Awarded the 2009 Rayleigh Medal by the British Institute of Acoustics for outstanding contribution to acoustics.

Professor Hansen believes there a number of deficiencies in the Noise Guidelines, shortcomings that are directly relevant to the Flyers Creek Wind Farm and to the background noise monitoring and noise impact predictions carried out by Vipac. The shortcomings in the Noise Guidelines include:

a) Procedures for determining ambient noise levels prior to installation of a wind farm require that many 10-minute average measurements are recorded at some representative receiver locations as a function of wind speed at a monitoring mast which is typically in the general vicinity of where the wind farm will be located. The 10 minute average data points are then plotted on a graph of dB versus wind speed and a typical scatter would be plus or minus 15 dB about a mean line that is drawn through the data. The mean line through the data is designated the ambient noise level for the purpose of assessing the impact of the proposed wind farm.

   There are a number of flaws with this approach, as outlined below:

   - The actual ambient noise level can be up to 15 dBA (or more in some cases) below the average line, which is problematic especially when it is noted that each data point represents a 10-minute average (LA90), and there are many times when the ambient noise is much less than the averaged line level for long periods of at least 10 minutes;

   - The wind strength measured on a weather station mast high on a hill at a potential turbine location is not necessarily correlated with the wind strength at the receiver location, perhaps in a valley below. In fact there are many times at night when there is sufficient wind at hill height to drive a turbine while there may be little or no wind at a residential location. This negates the argument often used that as the wind gets stronger and the turbines become noisier, the turbine noise is masked by the general noise caused by the wind;

   - Sound logging instrumentation typically used by consultants cannot measure below about 20 dBA. However, there are many times on still nights when the ambient noise without the wind farm can be below 20 dBA. Thus the Noise Guidelines need to specify instrumentation requirements for measurements down to 10 dBA.

   - Night time measurements should be the focus as these are the ones that are critical for assessing the extent to which wind farm noise exceeds the ambient noise and thus its potential for sleep disturbance. It would be more meaningful to divide the time

sampling into at least four periods, namely midnight to 5am, 5am to 7am, 7am to 7pm and from 7pm until midnight and determine an ambient noise for each time period.

b) The use of a single number descriptor (LAeq) for wind farm noise is inadequate for assessing the effect of the noise on humans as it does not allow quantification nor assessment of the effects of modulation depth and short term maxima on sleep disturbance.

c) For some reason the Noise Guidelines specify 35 dBA for areas zoned rural 'living' (eg lifestylers) and 40 dBA for other areas (including rural 'industry', which characterises all farmers).

It is clearly unreasonable and erroneous to zone farmers in rural 'industry'. The land use zoning for the Flyers Creek area is for 'rural activity' and it is not zoned for 'industry' in the usual sense of the word, which infers industrial-type activities and characteristics such as lots of heavy vehicles, heavy machinery and equipment, sirens, pumps, valves, etc and associated noises. The 35 dBA + 5 dBA - the + 5 dBA for industrial activity - is a con by the wind farm sector and is plainly environmentally unjust. The Noise Guidelines should have an exception for farming that does not include a factory (such as a winery) and specify 35 dBA in such circumstances.

d) The Noise Guidelines do not specify how compliance is to be checked. Preferably it should be done during nights when weather conditions are stable, when wind at turbine height is blowing towards the point of compliance measurement and when the wind at the point of compliance measurement is very light. Also a number of measurement points for compliance should be specified and agreed to by all stakeholders prior to development approval being given.

e) The Noise Guidelines make no mention of allowable vibration levels inside a residence and they make no mention of allowable infrasound levels and low frequency noise levels inside a residence.

C. <u>Flyers Creek Background Noise Monitoring Survey Report</u>

The Flyers Creek Wind Turbine Awareness Group Inc has engaged the services of two experienced, independent acoustics experts who have conducted extensive studies into wind farm projects to examine the EA and advise of their findings.

The Companies are:

- L Huson & Associates Pty Ltd; and
- The Acoustic Group Pty Ltd.

We the undersigned refer to and adopt their reports.

Their findings regarding the background noise studies are summarized below, with their full reports tabled in Attachments 4 and 5 respectively.

L Huson & Associates:

- The proponent states (12.6.1): "In setting noise amenity criteria pertinent to wind farm projects, it is recognised that, whilst background sound level can be relatively low at low wind speeds, the wind turbines do not operate at these speeds." This flies in the face of long established evidence relating the difference in wind speeds at receptor location and turbine location. The proponent continues

"Also, as wind speed increases the background sound levels tend to increase." This is an unjustified and incorrect assumption.

- The deficiencies in the regression analysis for background noise testing are under scrutiny in the Quinn litigation. The necessity of taking background measurements specifically when wind speeds are low has also been highlighted given wind speeds can differ significantly between the turbines on high ridges, and houses on the slopes and in the valleys below. This is not addressed in the Vipac data for Flyers Creek.

- There is insufficient detail to show what data was deemed to be removed from the analyses and no detail on the effects caused by the reported equipment failures. The noise modelling described is at best unintentionally confusing. Incorrect parameters were fed into the CONCAWE noise model and the results of this were used to justify the use of ISO9613 for the results presented to assess compliance.

- Contradictory noise model accuracies are presented and various numbers used to feign an approach of conservatism. Despite the vagaries of the noise predictions the results show non-compliance in idealised conditions for the wind farm for a number of dwellings.

- The Vipac background noise report dated 7 June 2010 has implemented the 2009 version of the Noise Guidelines for the measurements but has prepared the background noise trend curves using 10m AGL wind speed as per the earlier and outdated 2003 version of the Noise Guidelines. Why is this so?

- The Noise Guidelines 2003 and 2009 require determination of wind speed across each microphone used in the background study. This requirement is emphasised by OEH yet it appears that only two rainfall detectors and three wind speed and direction weather stations were used for the five monitoring sites. Obviously, the two background sites not having local wind speed measurements are non-compliant with the measurement requirements. Rainfall was only measured at two of the five background sites.

- The Vipac report refers to wind screen manufacturers data, yet does not correct for wind speed at the microphone as is required by the Noise Guidelines. Rather, the simplistic approach of discarding data where the local wind speed exceeds 5m/s is used to remove invalid data (as provisioned in the Noise Guidelines when there is no manufacturer's data for the wind screens used). It is not clear from the reports if the 90th percentile wind speed was used as the limit to discard noise data as required by the Noise Guidelines.

- Background sound level data at locations 12 and 25 have not been measured for local wind speed at the microphone in accordance with the Noise Guidelines or OEH directions.

- Rainfall at the two background monitoring sites (27 and 89) has been used to remove rain affected data at all five sites. Rainfall can be localised so it would be preferable to have a rainfall meter at each monitoring site.

- It was noted that equipment failure occurred multiple times at locations 78 and 89, however the total data excluded in Table 5.1 of the Appendix G1 report lists only data removed due to rain or wind. There would be significant amounts of data removed due to equipment failure.

For example, if the equipment at the end of a survey period did not calibrate successfully then one suspects all of the data in that survey was removed. Presumably, this would mean that only the last surveys at location 78 (4th to 17th December 2009) and location 89 (10th to 24th December 2009) would be valid. Appendix C of the background noise report does not show the continuous sound level data for location 78. All the data for location 89 is presented even though it is stated that there were equipment failures.

- Background noise curves at four of the five background monitoring sites have been applied to other residences using an 'educated guess' procedure. A better approach would be to apply the lowest noise curve obtained from the four monitored sites as a conservative measure for all other residences. Alternatively, take measurements at those residences.

- The regression analysis curve for location 89 is considered doubtful. The continuous noise data at this location shows the instrument noise floor to be approximately 30 dB(A) using the first instrument to 4 December 2009, then the noise floor reduces to below 20 dB(A), then the noise floor for the last instrument used from 10 December 2009 appears to be around 24 dB(A).

  The manufacturers of the ARL316 used in the latter part of the survey at location 89 and the first part of the survey at location 78 state the operating range (range over which sound level can be measured in compliance with the appropriate Australian Standard for sound level meters) is a minimum of 30 dB(A). Data below 30dB(A) using this type of equipment at location 89 and 79 will be inaccurate and outside the approved measurement range for the instrument. The use of this particular instrument has been criticised on other wind farm assessments over the past two years.

  The Noise Guideline states that "The lower limit of the instrument measurement range must be chosen to provide accurate measurements which might be limited by the noise floor of the data acquisition device." Given that sound levels below 20 dB(A) have been recorded at location 89 using alternative instrumentation, the use of the ARL316 having a minimum certified measurement range to 30 dB(A) is inappropriate. The absence of wind data from 16 November 2009 to 25 November 2009 at location 89 is of concern since it is in this period that high sound levels occurred. The wind speed at the site measurement tower has exceeded 20m/s during this period, yet no wind data is recorded at location 89.

  We believe there has been a malfunction of the wind speed sensor during this time and that the sound levels reported are suspect. Data from this period has been included in the trend analysis. At the very least, background measurements for location 89 should be repeated with suitable instrumentation.

  The trend analysis chosen is a third order polynomial, eg. Y = x3 + x2 + x + C. A third order polynomial gives two inflexions in the trend curve. The assessment of wind turbine sound power measurements as per the International Standard: Wind Turbine Generator Systems – Part 11: Acoustic Noise Measurement Techniques (ISO 61400-11) stipulates the use of second order polynomial trend curves. The reason why the third order polynomial fits the data better than a second order polynomial is because there is marked clipping near the noise floors of the instruments used.

A better approach would be to use integer bin wind speed averaging; however, this approach is not described in the Noise Guidelines. We note that the Noise Guidelines (2009) stipulate that the correlation coefficients are to be stated for each order from linear to third order. Only the third order has been provided in the background noise report.

- The background noise report states that only one met mast was used to produce all of the noise trend curves. It would be more accurate to use the met mast at turbine location 17 for background survey locations 12 and 78 and to use met mast data nearest turbine location 4 for background measurements at locations 25, 27 and 89. The objective of the background trend curve is to determine wind at the *nearest* wind turbines to the monitoring locations and to trend this data against background sound levels. The analysis should be repeated for measurement locations 25, 27 and 89 using data from the northernmost met mast.

The Acoustic Group:

- The noise data does not truly reflect ambient background levels. Logger positions with respect to residences and trees have not been adequately identified to enable assessment. There are unexplained discrepancies in wind speed data and there is no evidence in relation to essential wind speed correlations. There is no evidence that wind direction has been analysed in correlation to background levels.

- There is no analysis in relation to noise emitted from the wind farm taking into account various weather conditions, and in particular the presence of temperature inversions with and without downwind effects.

- There is no adequate, specific examination of substation noise, construction noise or transmission line noise.

Also on the matter of background noise measurements we provide the following feedback.

Residence number 12 is the home of Mr J Gerathy. Baseline noise monitoring equipment was installed near his house for about a month. For approximately the first two weeks the equipment was placed 160 m from the house 1 m above the ground but **tied to a 3 m high pine tree** and 4 m from a much taller tree. This site was directly under overhead power lines. For the following two weeks the equipment was relocated to 34 m from the house, tied to a fence but just **2 m from a large, 12 m high pine tree** and about 9 m from a eucalypt tree that is over 18 m tall. The placement of the monitoring equipment immediately next to or under trees in this manner is not considered appropriate and will generate misleading data. The background noise report does not specify from which location the data has been obtained. Mr Gerathy proposes to undertake his own comprehensive noise monitoring program for future reference.

There are some 104 non-host residences affected by the project as well as a School. Despite such a high level of surrounding population, there have been background tests carried out at only five residential locations. The extrapolation of a “similar ambient acoustic environment”, to “non-logged residences” is drawing a long bow and cannot be justified. The Vipac report acknowledges this shortcoming by admitting that “it is not possible to be definitive on all of these items as these factors vary over time.”

D. Flyers Creek Noise Impact Assessment Predictions

The Flyers Creek Wind Turbine Awareness Group Inc has engaged the services of two experienced, independent acoustics experts who have conducted extensive studies into wind farm projects to examine the EA and advise of their findings.

The Companies are:

- L Huson & Associates Pty Ltd; and
- The Acoustic Group Pty Ltd.

We the undersigned refer to and adopt their reports.

Their findings regarding the noise impact predictions are summarized below, with their full reports tabled in Attachments 4 and 5 respectively.

L Huson & Associates:

- The Flyers Creek noise predictions used the SoundPlan software suite. This software package includes a number of sound propagation models and some of these models, such as CONCAWE, have been altered within the software implementation. This is stated for distances closer than 200m in the SoundPlan literature but apart from this variation we *assume* that the SoundPlan implementation is true to the original. A comment on the variations from a noise model is required by the Noise Guidelines and none has been provided in the Vipac reports.

- The noise models used have an accuracy of +/- 2 dB(A). There are a number of properties that would exceed the suggested noise limits derived from the background sound surveys. As outlined above, even with questionable background survey data, it remains that the suggested compliance margins are often less than 2 dB(A). The report states that to address this issue the predicted sound levels will be increased by 2 dB(A) where the target noise levels are already 2 dB(A) or more higher than predicted. This has no material effect on compliance, however, if the model accuracy of up to +/- 5dB(A) is used, as stated in the Vipac report section 6.2 of Appendix G2 Model Accuracy, then non-compliance would result.

  For the situation where the suggested error margin of +/- 2 dB(A) is less than the margin between predicted and derived compliance levels then this situation could cause an exceedance of the Noise Guidelines. However, the proponent asks us to believe that in these circumstances they will ensure compliance with the Noise Guidelines. This is a huge leap of faith and there has been no demonstration of compliance in the report. The assessment is certainly not conservative, especially since the Vipac report in Appendix G2 states that the accuracy of the noise model is worse than +/- 2dB(A).

- Despite reference to CONCAWE in the reports, Vipac has used the International Standards Organization 9613 -2: 1996 Acoustics – Attenuation of Sound During Propagation Outdoors (ISO 9613) algorithm for all of the noise modelling results. The statement that 'The model was run for the worst case wind conditions for the range of wind speeds from 3m/s to 12m/s' is puzzling because the ISO 9613 algorithm does not include wind speed or direction. CONCAWE does include weather

categories but ISO 9613 does not. The ISO 9613 standard is considered valid only up to wind speeds of about 3m/s.

- The discussion of the noise model in part 6 of Appendix G2 states that CONCAWE was used with only partially reflective ground factor (G=0.7) when the Noise Guidelines stipulate that a ground factor of G=0 should be used. The atmospheric conditions stipulated in the Noise Guidelines to be used for modelling of 10 degrees Celsius and 80% relative humidity is not referred to in the Vipac reports. It is stated in the Vipac report that the ISO 9613 results were used because they were higher than the CONCAWE results. This needs to be demonstrated with the use of appropriate conditions set in the Noise Guidelines for the CONCAWE noise model, rather than using alternative ground absorption values.

- The title for Table 6.2 in Appendix G2 is misleading since ISO 9613 does not include wind speed or direction so the reference to wind speed only relates to the sound power from the wind generator and 'Meteorological Conditions G=0.0' is actually a value for ground absorption.

- Even with the use of questionable noise modelling, there are exceedances of target noise limits that require special noise reduction operating modes for some turbines. Yet it is still proposed that these turbines be built and that the level of actual noise reduction required will be resolved by undertaking compliance testing. This approach is inappropriate as it is unreasonable to build the industrial infrastructure and then try and modify it to fit within the environmental constraints. This tactic simply means the local community unfairly wears unacceptable impacts.

- Section 6.2 of Appendix G2 states that the 95% accuracy of ISO 9613 is of the order of +/- 4dB(A) to +/- 5dB(A). This is contradictory to the model accuracy stated in Chapter 12 of the main report which uses +/- 2dB(A) as described earlier in this review.

- The fourth bullet point in section 6.2 of Appendix G2 can be used equally to justify higher noise levels than modelled and does not represent a conservative approach. No account has been made for the turbulence effects from upwind turbines that can increase noise emissions above those used for the modeling, for example turbines 3-12 located northeast of Sites 12, 13 and 17. It would be preferable to use CONCAWE as recommended by the Noise Guidelines with the recommended input parameters. At least the CONCAWE model can account for higher wind speeds using Category 6.

- A lesson learnt from the Capital Wind Farm project is that a major issue in winter is a strong enhancement of noise due to temperature inversions. The Flyers Creek area gets very cold in winter and temperature inversions are commonplace. The proponent should be required to assess noise impacts during temperature inversions.

- Construction noise at the Capital Wind Farm project gave rise to significant noise impacts upon local residents. Based on this experience, construction noise impacts should be required to be assessed for the Flyers Creek EA.

- The 'Noise sub plan' of the OEMP refers to situations in the event of non-compliance with noise limits derived in accordance with the Noise Guidelines. The compliance checks are to be conducted at the closest relevant receiver residences but these are not identified. The words allow for just two residences to be measured as a minimum. The text goes on to say that if complaints arise from 'more distant receivers' that these will be investigated. However, no compliance checks are offered

for these residences. The difficulty in assessing compliance comes from the fact that background sound levels were not completed at each potentially exposed residence. Rather, only five monitoring locations have been used for all of the residences. The background surveys have collected suspect data and this makes any test of compliance problematic.

The Acoustic Group:

- The noise impact assessment fails to deal adequately with the lack of data for the type of turbines assumed.

- The computer prediction provides tolerances greater than that nominated in the predicted levels, which therefore presents concerns in relation to the adequacy of the assessment.

- There is no analysis of the noise impact of the wind farm as a whole. Such an analysis is required by the Director-General's Requirements.

- The acoustic assessment for the proposed Flyers Creek Wind Farm is very similar to that for the Capital Wind Farm proposal. Both proposals purport to indicate there will be no acoustic issues. Further measurements and testing are required at Capital Wind Farm to provide additional data to the preliminary testing. However the preliminary testing undertaken to obtain measurement data to check the Vipac assessment suggests that the assessment and its predictions are incorrect. They suggest there is valid foundation for complaints in relation to the noise impact of that wind farm.

- There is no doubt that the acoustic environment inside residential dwellings in rural areas is different to that outside.

- The assumptions made as to outside/inside attenuation for a typical suburban dwelling do not apply for rural dwellings subject to the impact of noise/energy generated by wind farms.

- It is impossible to predict from available data what buffer zones would be required to give protection from noise impacts to the residents affected by the proposed wind farm.

We also make other comments listed below regarding tonality, substations, compliance testing and management, and the non-committal turbine size.

a. Tonality

The noise impact assessment effected by Vipac was based on the GE 2.5 MW generator. At the time of modelling, the actual turbine to be built had not been settled. Nevertheless, Vipac will have relied on advice from the proponents and it is reasonable to assume that the preferred turbine is the specified and nominated turbine. Aurecon state “For the purposes of the noise assessment the noise characteristics of the GE 2.5x1 2.5MW turbine have been used. This turbine was selected for the noise assessment as being the turbine with the noise levels typical of the turbines that are under construction for this project.” (12.3 at p.12-2)

In relation to the critical issue of tonality and the GE 2.5 turbine, Vipac (Appendix 2, p.9) state “There was **limited published data from the manufacturers outlining any detectable tones or any other**

significant characteristics such as impulsiveness, modulation or low frequency components in the sound power spectrum." So there is an acknowledged lack of precise data in relation to these characteristics. However, what data there is, suggests **tonality is present.** The EA goes on to state "We note that a preliminary report for the GE turbines show that tone at 7m/s wind speed ... Additionally, we are aware that GE are actively working on eliminating any measurable tonality in their 2.5MW turbine, and at the time of installation, tonality may not be present in the near field of the WTG."

In the circumstances outlined above, **the only appropriate course is to add the required 5dbA penalty for tonality to all noise modelling for the project. It is unacceptable to provide noise modelling based on a turbine which has acknowledged tonality and not to include a tonality penalty in the modelling.**

The Vipac "Noise Model" report goes on to state in relation to tonality: "**Additionally, this tone (measured in the near field) is likely to attenuate, and be masked by background noise effects at the nearest residential receiver (and therefore not audible, and penalty should not be set**)." There is no factual or scientific basis for this statement. In many cases, masking noise could well be other noise generated by the turbine being measured. However mid and high frequency turbine noise attenuates more rapidly with distance from a turbine such that low frequency tonal noise is likely to be more noticeable at greater distances from the source. The masking noise itself is likely to reduce over distances such that the noise effect of the tonality will be especially significant at distance and worse when there is a relatively high speed at turbine height and little wind at the receptor.

The established failure of the turbines at Hallett 2 to comply with the Noise Guidelines has been detected as a result of tonality. The tests carried out by Vipac at Hallett 2 did not detect tonality and residents have endured two years of significant adverse impacts as a consequence.

b. Substations

There has been no 5dbA penalty added for the tonality present in substation noise. It is well established that substation noise is dominated by transformer noise and transformer noise is marked by very pronounced tones at 100HZ, 200HZ, 300HZ and 400HZ. The predicted transformer levels should be increased by 5 dbA before being combined with wind turbine noise levels.

c. Compliance Testing and "Good Faith" Issues

Aurecon has no proposed noise compliance assessment protocol. They have not stated what will occur in the event of non-compliance. In the event of complaints from "more distant relevant receivers," these complaints "will be investigated." Ultimately, "necessary measures to achieve compliance" will be implemented. In such circumstances the onus of proof is unfairly placed on the resident to prove non-compliance and seek redress, rather than the proponent being mandated to promptly and effectively resolve the issue. This is most unjust and unacceptable.

Vipac's position in relation to potential impacts for which compliance and monitoring may be required is clearly out of touch with reality and scientific fact - "The psycho-acoustic response or annoyance level to a new noise source is subjective ....but is unlikely to be significant with wind farm noise ...". Aurecon seems to express a similar, dismissive attitude that is unacceptable.

In the Quinn/Hallett litigation it was asserted and accepted for all noise predictions that there would be, and was, no tonality with the Hallett turbines. But tonality was known and present, and evidence in the hands of AGL clearly established tonality prior to wind farm construction. The residents of Hallett 2 suffered significant disturbance to their lives and wellbeing for two years while complaints were

ignored. Wind data in the hands of AGL was not fully or properly discovered to the complainants in the legal proceedings. The litigation may deal will this in due course but in the meantime, it demonstrates that effective monitoring and compliance regimes must be imposed by the planning and regulatory authorities from the outset.

As potential neighbours to this industrial landuse we request that the proponent be required to delete turbines numbered 3 to 9, 10, 11 and 12 from the field. The reason is these turbines are north east of our properties and given the predominance of winds from that direction we wish to minimize the risk of noise/sound and visual impacts on our living environment.

d. **Noise impact assessment based on uncertain 'indicative' turbine design, not committed design.**

The EA indicates that at the time of modelling the turbine type for the project had not been determined. However the GE 2.5xl wind turbine generator was selected as the ***indicative*** wind turbine for the noise study. (Vipac Report, page 3). The Vipac report goes on to say "The model incorporates the proposed locations of WTG arrays ***at a hub height of 85m above the ground level*** which will be the hub height should the GE 2.5xl turbine model be selected for the project" (Vipac report page 9)

Why were noise impacts modelled on a hub height of 85 m (see page 9-46), so too shadow flicker assessment (see page 9-26 and Appendix C page 1), when the visual impact study was modelled on a hub height of 100 m (see page 9-1)?

The only reference to the blade length on the topic of noise appears to be in Appendix F of the Vipac report (page 32) where it refers to a rotor diameter of 100 m (***ie blades 50 m in length***).

The Vipac report restates "the turbine selection is indicative only, and may change as the project develops" (Vipac report page 9). The EA (Chapter 12, page 12 -29) goes on to say that "should the turbine selected at the final design stage have a higher noise specification than the GE 2.5xl-2.5 MW wind turbine used in the noise assessment described here, the proponent will undertake a new noise impact assessment, the results of which will be provided to the Department of Planning". That is not acceptable. **The project must be determined only on using GE 2.5 MW turbine options.** If the proponent wishes to select a different turbine by a different manufacturer or a larger GE turbine then the Development Application must be rejected and the EA redone.

In relation to the critical issue of tonality and the GE 2.5 turbine, Vipac in Appendix 2 acknowledges that for this particular turbine **tonality is present.** The EA goes on to state "We note that a preliminary report for the GE turbines show tone at 7m/s wind speed ... Additionally, we are aware that GE are actively working on eliminating any measurable tonality in their 2.5MW turbine, and at the time of installation, tonality may not be present in the near field of the WTG." It is unsatisfactory to try and dismiss the issue with such a hopeful, sweeping statement. Much more substantive information is required.

We note that the noise impact assessment has been based on four turbines (WTG 4,5,16 and 18) operating in noise reduction mode (page 15, Vipac report). Page 14 of the report indicates that the noise reduction mode necessary to meet the noise criteria will be confirmed 'during compliance testing after construction'. This suggests that residents will potentially be exposed to excessive noise and sound whilst the turbines are commissioned and adjusted, a scenario that is unacceptable.

It is recommended DPI obtain a definitive statement from the proponent regarding the exact specifications of the turbines to be constructed and confirmation that that exact specification has been modelled. This information needs to be specific to enable meaningful noise and visual impact assessments. If consent was to be granted it should clearly specify the technical and structural design and power specifications of the turbine and all its related parts, including tower height and diameter.

E. <u>Visual impact assessment is based on uncertain 'indicative' turbine design, not committed design.</u>

It is noted that the general visual impact was modelled with a turbine hub height of 100 m whereas the shadow flicker impacts were assessed with a hub turbine height of 85 m. Why weren't the shadow flicker risks assessed at 100m hub height? Surely they should have been, given the flicker is a visual impact matter.

To Illustrate:

- On page 9-1 the EA states "The indicative wind turbine for this Environmental Assessment, the GE 2.5 MWxl, has a hub height of 85 metres and a blade length of 50 metres for a total height of 135 metres. However, for this visual assessment, the dimensions of the wind turbine were assumed to be a **hub height of 100 metres and a blade length of 50 metres. Therefore, this assessment is a 'worst case' based on the maximum height of the wind turbine being 150 metres above ground level."**

- The shadow flicker assessment used the GE 2.5xl wind turbines with a 100 meter blade diameter and **85 metre hub height**. (see page 9-26)

It is unacceptable that shadow flicker impacts be based on an 85 m hub height. This is a visual impact matter and should be redone at 100 m hub height.

The assessment should be conducted on the <u>exact</u> turbine infrastructure to be built and there should be no 'wriggle room' for changing the infrastructure specifications after the assessment process is complete.

As outlined above regarding noise impact assessment, it is recommended DPI clarify:

a) The actual measurements of the turbine design that was <u>assessed</u> (ie tower height and diameter, blade length and width and hub height – including colours, power output, etc);
b) The actual measurements of the turbine design that is <u>proposed to be built</u> (ie tower height and diameter, blade length and width and hub height – including colours, power output, hub length and weight, etc); and
c) The actual <u>generation capacity</u> of each of the 44 turbines.

We have commissioned an independent, professional photographer to portray the likely visual impact of the 150 m tall Flyers Creek turbines and compare them to the Blayney Wind Farm (Carcoar) turbines 68.5 m high (45m hub – 47.5 diameter blades).

Our results show that the photomontages contained in the EA and created by 'stitching' together a series of 50 mm fixed lens photographs, misrepresent and understate the likely visual presence and impact of the Flyers Creek wind turbines.

A picture is worth a thousand words and so it is when you see the independent, professional photomontages we have prepared. The images are as follows:

Attachment 6: (Image 1) - a view from Blayney Wind Farm Viewing Area. Note the profile differences between the Blayney and proposed Flyers Creek turbines;

Attachment 7: (Image 2) - a view from Wind Farm Road – 2,300 m from the nearest turbine. Note 2,300 m is the distance of Infigen's proposed turbine No 12 to the home of Mr John Gerathy (Residence No 12 in the EA);

Attachment 8: (Image 3) - shows our photomontage of the view from the front steps of Residence No 12 (home of Mr John Gerathy) showing proposed turbines numbered 3 to 12. It has been compiled using distance and size scales ascertained from the preparation of Image 2 data above to allow the 2,300 m distant view of the proposed 150 m high turbines as well as a 68.5m Blayney Wind Farm turbines; and

Attachment 9: (Image 4) - shows a proposed 150 m high turbine and a 68.5 m high turbine superimposed over Aurecon's panorama Plate C12 of the EA, allowing for the correct distances, taken from the same front steps of Residence No 12. We are of the view that Aurecon's panorama Plate C12 is both misleading and deceptive in the way several photos were 'stitched' together such that it misrepresents the true vista. What is presented shows the vegetation on the sides of the photo much more prominently that is in fact reality. See Attachment 10 for correspondence from expert photographer Mr Alf Manciagli of Gecko Photographics in Orange regarding how he prepared Image 4 and his comments on Aurecon's Plate C12.

We would be pleased to provide electronic copies of the images mentioned and copied in this Submission.

We believe the Aurecon's panoramas in the EA significantly understate the visual impacts of the turbine vista. Based on our assessments, the visual impacts are unacceptable and will be accentuated by the prominence of noise.

F. Visual Impact: shadowing, flicker and alignment of multiple turbines

An issue that has not been given appropriate attention in the EA is the matter of the casting of long shadows and blade flicker by the turbines, especially in the morning, over the School and other neighbours (for instance Residences 12, 13 and 17). The shadowing/flicker effect will exacerbate the movement and sound of the turbine blades. The turbines in this ENE quarter are up to 400 m higher than the School and the residence of John Gerathy. The dominant wind is from the NE so sound will travel to the School and the houses in question. In the early morning sun they will cast a long shadow.

What impact will the shadow and flicker have on the School population and other neighbours? The numerous turbines nearby will be generating a kaleidoscope of movement and sound over the nearby population, including 40 young people at the School. What health effects will this have?

G. Inconsistencies in the stated design specifications of the turbines and major implications for overall impact assessment.

Turbine Physical Dimensions

The commentary in the EA relating to the description of the design components of the wind turbine is rather equivocal, giving the impression that the proponent is 'hedging its bets' on what type of turbine will be selected. Examples are outlined below.

Chapter 3, page 3-3 and Figure 1.3 describes the various component parts of the wind turbines. According to page 3-3 the towers will be **"about" 80 to 100 m tall** with a diameter of five m at the base and 2.5 m at the top. However, Figure 1.3 shows a 3.0 m diameter at the top of the tower. So which is correct, 2.5 m or 3 m? It is noted that for the visual impact assessment a tower diameter of 2.5 m at the top was used.

According to page 3-3 the turbines will be three-bladed with a "rotor diameter of between 88 to 112 m" . This means each blade is 44 to 56 m long. However Figure 1.3 shows the blade length as 44 to 55 m. To make matters even more confusing, a turbine length of 50 m was used for the visual impact assessment (p 9-1).

So how long are the blades to be - 44 m, 50 m, 55 m, or 56 m or something in between?

Turbine Generation Capacity

The EA states the generation capacity of the turbines will be between 2 and 3 MW – see extracts below. Yet in other forums (for example, the turbine co-operative sales pitch meeting) the proponent suggests 3.3 MW might be the generation capacity of the turbines – also see below and Attachment 11.

This means that a number of different turbines are being considered for use, hence different physical dimensions and generation capacity, and noise and sound outputs. Yet the impact assessment studies are based on only a GE 2.5 MW turbine. The project should only be evaluated by DPI on a scope of 2.5 MW turbines.

- The EA Summary under 'Project Description' says:

"The project involves the construction and operation of up to 44 wind turbines each with a typical generation capacity of **between 2 and 3 MW** (million watts or megawatts). The installed capacity may vary from about **88 to 132 MW** depending on the turbine model selected and total number of turbines installed. The **GE 2.5xl 2.5MW turbine has been used as the indicative turbine** for this Environment Assessment; however, it is possible that another turbine model may be selected for construction." (writer's emphasis).

- Furthermore, in Chapter 1: Introduction it states:

"The wind farm will have a generation capacity to produce **between 88 and 132 MW** (million watts) of electrical power from the combined output of up to 44 wind turbines, **each with a generation capacity of between two and three megawatts.** The final details of the number of turbines and

turbine model to be used have not yet been confirmed and this assessment addresses all the sites that have potential for development." (writer's emphasis).

Yet the proponent is on the public record (see Attachment 11 – Flyers Creek Wind Co-operative proposal) of having wind turbine generators with a generation capacity of "**between 2.5 and 3.3 megawatts** (MW)", and **project capacity will be between 110 – 145 MW**.

Clearly the proponent is purposely being vague about what the specific generation capacity of the actual turbines will be. It is unacceptable for the EA to hedge its bets so much about the power output and physical dimensions of the turbines as it has profound implications for the likely level of impacts.

DPI should obtain clarification on the turbine specifications and ensure the noise and visual impact assessment work has been as per the exact turbine design that will be constructed. If the construction specifications have changed then the EA should be rejected outright by DPI, with the proponent being advised to resubmit the impact assessment studies to properly match the project design and scope.

H. Planning decision should be deferred until the NSW Wind Farm Planning Guidelines are finalised and adopted.

In 2009 the General Purpose Standing Committee No. 5 in the Legislative Council of the New South Wales Parliament conducted an inquiry into rural wind farms. A key recommendation (number seven) of the Committee was that the Minister for Planning include a **minimum setback distance of two kilometres between wind turbines and residences on neighbouring properties** in the soon-to-be – drafted NSW Planning and Assessment Guidelines for Wind Farms. The recommendation also stated that the guidelines should identify that the minimum setback of two kilometres can be waived with the consent of the affected neighbouring property owner.

The NSW Government, in its response to the Committee's report in mid 2010, said it was preparing NSW Wind Farm Planning Guidelines and they would be released in late 2010. It is now the end of 2011 and the guidelines are not yet available.

However, given the NSW Guidelines are in the final throes of drafting, a planning decision on the project should be deferred until the guidelines are finalized and adopted. That would provide for a more robust and sound basis for Government decisions on wind farms.

Furthermore, it should be noted that on 19th October 2011 the South Australian Minister for Urban Development, Planning and the City of Adelaide introduced the Statewide Wind Farms Development Plan Amendment, effective immediately, which stipulates, inter alia:

*"2 (i) a **setback of at least 1 kilometre of a wind turbine from a dwelling** that is not associated with the development".*

We recommend that this initiative by the South Australian Government be matched by the NSW Government as it frames its planning guidelines. (Note the host farmer's leases for the Flyers Creek project only specify a setback of 500 m).

It is also noted that in Victoria, the Government has introduced Amendment VC78 to its policy on wind energy facilities. Amendment VC82, gazetted on 29 August 2011, amends the Victoria Planning

Provisions and all planning schemes in Victoria to **prohibit** a wind energy facility from installing and operating a **wind turbine within two kilometres of an existing dwelling**, except where the planning permit application includes evidence of written consent from the owner of the dwelling to the location of the turbine.

The NSW Government should be listening to what is happening in other States. There are good reasons for the decisions taken by South Australia and Victoria.

I. Poorly quantified traffic and transport impacts and management of those impacts.

The EA glosses over deficiencies in the essentially basic rural road network surrounding the proposed project site. As can be amply seen from the photographs in the EA, the local road network was not designed to handle vehicles that are over size (longer than 19 m) and over-mass (gross mass in excess of 42.5 tonnes). The roads in the main are narrow, winding with many sharp bends and tree hugging. Intersections are of a similar description. See Attachments 12-1 to 12-5 for photographs of the local roads showing their poor condition.

The proponent has failed to include in the EA a Traffic and Transport Study as Infigen provided for the Capital 1 and 2 projects and proposes to complete for the Bodangora Wind Farm. This is despite the topography and road network being far more challenging at Flyers Creek than the other sites mentioned. Such a study should be prepared and assessed prior to any project approval so that all is being evaluated in a balanced and objective way, not afterwards when the balance of negotiating power shifts to the proponent.

The proponent should be required to undertake, as part of the assessment process, a detailed appraisal of all roads - both state and local - being considered for use, and address:

a) Pavement width and strength;
b) Bridge and culvert width and strength;
c) Design, layout and pavement strength of intersections, including turning paths, acceleration and deceleration lanes;
d) Removal of trees, rock outcrops and other obstacles;
e) Road, intersection, bridge and culvert upgrade costs;
f) Road, intersection, bridge and culvert damage repair costs; and
g) Road, intersection, bridge and culvert maintenance costs.

The costs associated with road infrastructure upgrade, repairs and maintenance should be made transparent now. The proponent should reach an in principle agreement with Blayney Shire Council on these costs and who pays BEFORE any planning approval is granted.

The EA also tries to shift much of the traffic and transport issue on to the shoulders of the yet-to-be-appointed haulage contractor. As the RTA rightly points out “It is essential that the applicant is accountable for this process (ie detailed Traffic Management Plans) rather than the haulage contractor” (RTA letter to Aurecon dated 1 February 2011). The same comment about the plans is also applicable to the local Council roads.

J. Inadequate Community Engagement as identified by the Department of Planning & Infrastructure

The Director General of the Department of Planning & Infrastructure issued a letter to the proponent dated 16th August 2011 expressing concern at the inadequate level of community engagement being undertaken. The Director General was right to issue such a warning letter. Unfortunately by then however the dye had been cast and the EA was essentially completed and the proponent was fixed in its views about the scope of the project.

For the benefit of the Department of Planning & Infrastructure, outlined below is exactly what transpired regarding public interaction by Infigen regarding wind energy generation in general and the proposed project in particular:

- Two 'information days' were held at Tallwood Hall in the local area on the 19-20th November 2010, in the early days of the project proposal being public. The hall was set up with Infigen displays and people wandered by to look, with some company representatives engaging in one-on-one conversation. There was no structured, formal presentation to an audience of what was proposed regarding the development, nor was there any question and answer session and no formal opportunity to convey feedback.

- Infigen spoke at two public forums (on 27th April 2011 in Orange and on 28th April 2011 in Bathurst) on the **general topic of wind energy**. The former was organised by Environmentally Concerned Citizens of Orange (ECCO), the latter by the Bathurst Climate Action Network. These events were effectively a promotion of the general concept of wind energy. The events were NOT forums arranged by the company to enable the local Flyers Creek community and other stakeholders to genuinely engage on the specifics of the Flyers Creek proposal – that is, at these events there was no opportunity to hear what was proposed, no discussion of specific issues, no question and answer sessions and no invitation to receive feedback.

- Public meetings arranged by Infigen were held on 13th October 2011 in Orange and 14th October 2011 in Bathurst, not to explain the proposed wind farm and to seek feedback, but to **promote the sale of one of the proposed turbines to a community co-operative**. The discussion at the events was all about how to form a co-operative and related financial aspects. The sales pitch to attend the meetings talked of "offering the opportunity to own a share of a wind turbine". See Attachment 11 for information provided to the participants clearly focusing on establishing a co-operative.

- Blayney Shire Council – not Infigen – arranged a 'Community Meeting' to discuss the project at Blayney on the 28th November 2011. A professional facilitator chaired the meeting. Infigen gave a 15 minute presentation about the project, followed by general discussion. **Finally, this was a legitimate community engagement event but it was not run or initiated by the proponent. Rather, the local council, concerned at the lack of genuine engagement, had to become the instigator as the proponent preferred to remain silent and invisible, or at best opaque.**

  We urge the Department to require the proponent to engage formally with a community consultation committee NOW to modify the proposal and ameliorate the impacts. It is misleading for Infigen to suggest that it fulfilled a genuine community consultation program germaine to this project. No community consultation and engagement program has been run

that would satisfy the general tenor of the relevant Ku-ring-gai Council Land & Environment Court Case.

K. Inadequate Commentary and Transparency Regarding Financial Contributions to Blayney Shire Council

The EA is essentially silent on how much the proponent will contribute financially to the local Council during the life of the project. There is one vague and unspecified commitment on page 7-41 which states that there will be "payments to Blayney Shire Council associated with contribution to local infrastructure".

As ratepayers we wish to know now:

a) What financial contributions will be made for road and associated infrastructure upgrades, repair and maintenance over the life of the project?;
b) Will the rating for the affected lands be changed from rural to industrial and what will be the rate?;
c) How much rates will be paid over the life of the project?; and
d) What financial contributions will be made for other Council services and infrastructure?

Another relevant topic is waste management. The proposal is not specific on the types and volumes of waste generated by the project. However it is proposed that waste be deposited at Council facilities. We wish to know:

a) What types and quantities of wastes require disposal?
b) What gate fee will Council charge? and
c) What impact will the volumes and types of waste have on landfill filling rates and the life of local waste management facilities?

It is vital that there be openness and transparency regarding demonstration that this industrial project 'pulls its weight' regarding making fair and reasonable financial contributions to what is a small rural Council already burdened by demands for the provision of infrastructure and services.

See Attachment 13 regarding the diminution of road quality caused by construction traffic for the Macarthur Wind Farm in Victoria. The severe damage means some roads will revert to lower quality gravel pavement instead of being sealed.

L. Human Health Impacts of the Flyers Creek Wind Turbines

We request that the proponent examine the research *paper "Wind turbines, flicker and photosensitive epilepsy: Characterizing the flashing that may precipitate seizures and optimizing guidelines to prevent them"* by G Harding, P Harding and A Wilkins in Epilepsia 49(6): 1095-1098, 2008 (See Attachment 14).

This paper advises, inter alia, that:

- Flicker that interrupts or reflects sunlight at frequencies greater than 2.5-3 Hz poses a risk of inducing photosensitive seizures;
- Among children aged 7-19 the rate of photosensitive epilepsy is five times greater than for the general population;

- The risk is maintained for a distance of 100 times the hub height (ie 10 km for the proposed Flyers Creek turbines);
- The rotation speed of the turbine blades should be kept to less than 60 rpm; and
- The layout of the wind farm should be designed to prevent the general public from viewing the casting of the shadows of one turbine upon another. The point being that when several turbines are in roughly line with the sun, there is flicker from a combination of blades from different turbines which results in a higher flash frequency than from a single turbine, producing a kaleidoscope effect.

This issue is of serious concern to us as there is a School of 40 students and residences numbered 12, 13 and 17 directly in line with approximately 10 turbines such that it will be exposed to the morning turbine shadow and a flicker kaleidoscope. This matter has not been assessed and we request the DPI instruct the proponent to do so.

Furthermore, one of the authors of this Submission, Ms J Harries, has two grandchildren who attend her property daily and have Autism. We have concerns that wind farm flicker will seriously compromise the health of the children and those who care for them (see Attachment 3). We seek to have this matter addressed by the proponent and DPI.

Also note the health aspects commentary in the Huson & Associates report (Attachment 4) which discusses the added adverse impacts of noise/sound/flicker/visuals on more vulnerable people in our community, for example the sick, infirmed, aged, young, those with blood pressure and those vulnerable to sleep disturbance.

M. Adverse Impact on Orange Airport Aircraft Approach Procedures

In correspondence dated 6th January 2011 Airservices Australia advised the proponent that the proposed project would adversely impact on the approach procedures for aircraft arriving at Orange Airport.

The email correspondence advises that "proposed turbines 1, 3, 4, 19, 20 and 33 will affect the NDB-A (approach) procedure." It is noted in Attachment 1 page 3-32 of the EA that the maximum heights (AHD) of the nominated turbines are:
Turbine 3: 1,064.0m (3,491ft)
Turbine 4: 1,095.0m (3,593ft)
Turbine 19: 1,058.0m (3,472ft)
Turbine 20: 1,092.0m (3,583ft)
Turbine 33: 1,053.0m (3,455ft)

The Airservices Australia correspondence goes on to state "the maximum height the penetrating turbines can be is as follows:
Turbines 3, 4 and 33: 1,040m (3,413ft) AHD
Turbine 19: 1,046m (3,432ft) AHD
Turbine 20: 1,064m (3,491ft) AHD".

Turbine 4 is 55 m higher than AirServices Australia allows and the others nominated exceed the Airservices limits.

Given the above advice was received by the proponent in January 2011, why weren't the heights of the turbines reduced to avoid potentially catastrophic aviation consequences?

If the height of the specific turbines as mentioned has to be reduced, what are the consequences regarding economic viability of those turbines, changes in noise and visual profiles and possible locations?

DPI should liaise with AirServices Australia and CASA on this matter. There must be no compromises made to air safety.

In addition, aerial agricultural activities (crop spraying, fertilizer application, etc) are at risk from wind turbines and meteorological masts, as are military helicopters that transit through this area at low level (Aerial Agricultural Association of Australia letter dated 14th December 2009). The Department of Defence (correspondence dated 6th December 2010) requires monitoring masts be fitted with aviation marker balls and wind turbines to be "painted to contrast with the sky and their surroundings."

Will turbines be painted a more conspicuous colour? If so, that would lead to a significant worsening of the visual impact to surrounding receptors on the ground. If the towers are not painted a conspicuous colour, how will the Department of Defence manage the aviation risk?

N. Adverse Impact on the Economic Value of Land Surrounding the Project Site

As Landowners we are most concerned at the diminution in the value of our property holdings caused by the very prospect of having a wind farm in our neighbourhood. Evidence suggests that the UCV on properties potentially affected by wind farms and comparable industrial developments falls by at least 30 %. To add insult to injury, there is no compensation forthcoming to the Landowner for the loss of market value.

One of Australia's experts in rural land valuations, Elders National Sales Manager Shane McIntyre, is on record in early 2011 as stating that there was "no doubt" that land near wind farm turbines "falls significantly in value" and could lead to a decline of 30-50 per cent in value. In his 30-year experience in rural and regional real estate, McIntyre said, when a possible buyer "becomes aware of the presence of wind towers, or the possibility of wind towers, in the immediate district of a property advertised for sale, the fall-out of buyers is major". "Very few go on to inspect the property and even fewer consider a purchase. On the remote chance they wish to purchase, they seek a significant reduction in price."

Mr McIntyre also states that wind turbines adjacent to a property had the same effect as high-voltage power lines, rubbish tips, piggeries, hatcheries and sewage treatment plants. This meant, he said, that "if buyers are given a choice, they choose not to be near any of these impediments to value".

Evidence to confirm Mr McIntyre's observations is attached in the form of:

a) A valuation report for a property (containing wind farm residence numbers 13, 75 and 129) adjoining the proposed wind farm dated 24th August 2011 showing a valuation of $2.1 Mil. At auction on the 27th September 2011 there was only one bid and the property was passed in. It was subsequently purchased

by that one bidder after the auction for $1.7 Mil, a 20% reduction. There was little interest in the property because of the unpleasant spectre of the proposed wind farm. See Attachment 15.

b) A letter from a Principal of Ray White Real Estate in Orange advising that the prospect of the wind farm adversely affected the sale price of a property - Lot 63 DP 750358 - in March 2009, causing a price reduction of 35%. See Attachment 16.

Clearly, despite what wind farm proponents will say, there is a negative impact on the value of land adjoining wind farms because of people's experiences. It is time the Department of Planning & Infrastructure acknowledged this reality and set distance limits for wind farms to be away from rural residences. Also it is time wind farm proponents were required to step up to the plate and compensate adjoining landowners for loss of value on all fronts – economic, environmental and social.

O. Potential Impact on Fauna on Land Adjoining the Project Site

The EA examines the potential impact of turbine blade-strike and the clearance of habitat in the process of constructing wind farm infrastructure, but is silent on the impact noise and sound changes might have on neighbouring bird types and numbers. Overseas studies have shown that various bird species are adversely affected.

For instance, studies of the Sandhill Crane in the Southern High Plains of Texas examined roost occupancy, habitat use and bird behaviour by comparing areas with wind turbines to those without. Results showed that, apart from the obvious impacts where habitat was destroyed, the birds tended to avoid foraging within 2 kilometres of the wind farms and exhibited a clumped distribution when found near wind farms. Additionally, Cranes foraging within two kilometres of the wind farms spent more of their time being vigilant and less time relaxing than the Cranes outside the two kilometres.

Hence we believe the EA is deficient in not addressing the noise effects of wind turbines on the various species of birds that inhabit areas adjoining the project site, such that they might avoid the area. This impact assessment matter should be rectified before DPI makes a decision on the project.

P. Inclusion of a Condition to Terminate Approval if Evidence of Non-Compliance

If the Government was of a mind to approve the development, then we seek to have a consent condition included that terminates approval to operate a particular turbine or turbines if there is any evidence that those turbines do not comply with the noise and sound limits imposed, and that those conditions are based on a noise assessment standard (SA Noise Guidelines) that has been accepted as valid by the upcoming ERD Court hearing - Quinn/Hallett case.

As per the Taralga Landscape Guardians Inc v Minister for Planning and RES Southern Cross Pty Ltd [2007] NSWLEC 59 (12 February 2007) case, is not appropriate for wind farm operators to simply purchase affected properties after the facility is built. Any purchase should be in accordance with compulsory acquisition valuation and procedures.

Q. Decommissioning

Once the project life as per any consent has expired we wish to see the site decommissioned with the site returned to its pre-existing condition, including exhuming the concrete foundations and rehabilitating all the vehicular tracks constructed. If the Government was of a mind to issue approval then we expect to see inclusion of extensive decommissioning conditions.
A recent study of the Beech Ridge Energy Project (a 124 wind turbine project in West Virginia) by Energy Ventures Analysis (EVA) revealed that the net cost of decommissioning the project equated to US $ 83,900 per turbine which was more than the salvage scrap value of each turbine. Hence we request the Department impose a condition requiring a security bond of a minimum of $100,000 per turbine (plus an annual 3% CPI index) to capture the true demolition costs and escalation risk.

Blayney Shire Council should be the beneficiary of the security and it should include terms under which the funds would be dispersed.

R. Transparency of DPI Deliberations

We seek full transparency from the Department of Planning & Infrastructure as it deliberates on the wind farm project proposal. To this end we request:

a) Receiving a copy of the proponent's response to all submissions;
b) Receiving a copy of any correspondence or reports generated subsequent to receipt of submissions; and
c) Receiving a copy of any draft consent conditions at the same time that they are forwarded to the proponent for comment.

These actions are considered most necessary as it is important in a democratic process that we as potential neighbours are kept fully informed and engaged in this planning decision.

S. Conclusion

We have carefully examined the contents of the EA for the proposed Flyers Creek Wind Farm and firmly believe that there are major deficiencies that warrant the Department of Planning & Infrastructure not approving the project as currently documented.

As outlined above, there are several key reasons why this proposal is inappropriate and ought be refused planning consent.

To recap, the main reasons are:

- The Supreme Court of South Australia has determined that the ERD Court must reconsider the Hallett 3 matter, including re-examination of noise/sound issues, in part the SA EPA's *Wind Farms – Environmental Noise Guidelines, 2003 (*amended in 2009). The very same Guidelines are used by the NSW Government to assess the Flyers Creek development proposal. We support the proposition put by the Director General of the Department of Planning & Infrastructure in his letter to Mr J Gerathy dated 15th December 2011 that *"the Department will take account of the ERD Court determination once it is made"* regarding this upcoming ERD Court case. For this to happen the Department will have to await the Court's decision;

- Reviews by two technical acoustic experts have revealed significant deficiencies in both the background noise survey and in the noise impact predictions for the proposal;

- The noise and visual impact assessment is based on an 'indicative' turbine design only, not the committed design.

  The noise modelling was done on a 2.5 MW turbine yet the EA states they may use machines with a 3.0 MW generating capacity. Also, elsewhere in public statements the proponent suggests the turbine size could be up to 3.3 MW in size. This variation in turbine generation capacity is unacceptable as it impinges on noise/sound and visual impact assessments.

  Furthermore, the general visual impact and the shadow flicker impacts were modelled at <u>different</u> turbine hub heights of 100 m and 85 m respectively. This is unacceptable impact assessment methodology and the project should be rejected on this aspect alone;

- The NSW Government is currently preparing Wind Farm Planning Guidelines. A planning decision on the project should be deferred until the guidelines are finalised and adopted;

- The traffic and transport impacts are poorly quantified and management of the impacts inadequately addressed. The area features basic rural roads not designed to handle over- size and over-mass vehicles. A more robust Traffic and Transport Study is required as per Capital 1 and 2 projects and the Bodangora project;

- The costs associated with road infrastructure upgrades, repairs and maintenance need to be quantified now before any planning decision is made. The state and local governments should have a commitment up front from the proponent to pay all upgrade, repair and ongoing maintenance costs;

- The proponent has not complied with the Department of Planning & Infrastructure's warning letter to the proponent dated 16th August 2011 to engage in an adequate level of community dialogue;

- The EA needs to be transparent regarding how much the proponent will contribute financially to the Blayney Shire Council during the life of the project for such matters as road and associated infrastructure upgrades, repair and maintenance and the land rates that will be paid given the affected lands are being changed from rural to industrial land use; and

- The EA proposes turbine heights that exceed Airservices Australia limits for air traffic on approach to Orange Airport. This potentially catastrophic aviation risk that is unacceptable.

We thank you for your willingness to understand and appreciate the matters raised and we look forward to a favourable response to our request, namely that, because of the arguments outlined above, the Department of Planning & Infrastructure refuse the granting of consent to the proposed Flyers Creek Wind Farm.

Furthermore, we kindly request an opportunity to meet with DPI officers and officials in due course when the submissions are being evaluated to explain our Submission and to later comment on the proponent's responses.

This Submission has been prepared with assistance from Warwick Giblin, Director, OzEnvironmental Pty Ltd.

It is possible that we the undersigned may submit additional material to the Department on this project as it comes to hand.

If you have any queries regarding the abovementioned matters please don't hesitate to contact Mr John Gerathy on ph 0415 225 940.

Yours sincerely,

(Signed)
John Gerathy

(Signed)
Jann Harries

(Signed)
Geoff Knox

ATTACHMENT 1

J & H Gerathy – Landowners

John & Hilde Gerathy
"Errowanbang"
Carcoar NSW 2791
(Non Wind Farm Residence 12)

Re: **Non Wind Farm Residence 12 – "Errowanbang", Pt Lot 51 Residence 75 & Lot 211**

I would like to express my concerns, as stated in our main Submission and herein, and object to the Flyers Creek Wind Farm Proposal.

"Errowanbang" was originally settled and built by the explorer William Lawson and his family and the current homestead is heritage listed. My parents purchased the property (90 ha) in 1975 and retired to their idyllic country farm in 1980.

I have owned the property, running a cattle stud, since 2001 and I have recently retired from my legal practice and intend to spend much of my future life at "Errowanbang", which has great amenity with views of the surrounding ridges virtually devoid of structures and lights. Cadia's operations are not visible from "Errowanbang" nor Residence 75.

To ensure the viability of my cattle stud I have recently purchased part of "Old Errowanbang" (lot 51 DP39600) (100 ha), on which Residence 75 is located, and also Lot 211 DP 1096675 (50 ha) which adjoins the Errowanbang Primary School - Lot 212 DP 1096675 (site 57).

Lot 211 is a subdivision with residential rights as referred to in the Director Generals Requirements. Being creek flats there are only two potential residential sites on Lot 211, one immediately next to the School and the other preferred site on the crest above Gooley's Creek which is only 1.4 km from turbine 12.

In addition to the matters raised in our main Submission I make the following additional comments as they relate to me personally or to my properties.

Noise/Tonality/infrasound/Frequency Modulation/ Shadow Flicker / Visual Pollution (both by day and at night from lighting).

All three of my properties lie to the south west of proposed turbines 3-12 and although the closest (at 2.3 km) is turbine 12 and the furthest (at 6 km) is turbine 3, the grouping of turbines 10, 11, and 12 and the line of turbines 3-9 pointing directly at these properties from elevations of up to 500m above the residential sites and with prevailing NE winds, gives me great concern as to my health (I have suffered high blood pressure for over 20 years) the health of my wife and family, farm manager and his family (Residence 75) and the loss of the general amenity of these properties in respect of the above issues.

The main Submission goes to some considerable length to provide evidence-based material addressing each of the topics flagged above, including health consequences as outlined in Attachment 14 - a

research paper entitled "*Wind turbines, flicker and photosensitive epilepsy: Characterising the flashing that may precipitate seizures and optimizing guidelines to prevent them"* By Professor G Harding, P Harding and A Wilkins. Neurosciences Institute Aston University, Birmingham, United Kingdom; and Department of Psychology, University of Essex, Colchester, United Kingdom). See also Attachment 4 – a report by L. Huson and Associates P/L on noise and health related matters.

My bedroom faces northeast, completely exposed to turbines. I always sleep with an open window.

Whilst turbines 13-37 (the closest turbine 24 (at 2.3 km) and the furthest turbine 37 (at 7 km)) are sited from the ENE around to the ESE of my properties, they don't have quite the same prevailing wind issue but they will pose serious flicker, noise and visual pollution issues for each of my properties.

It is impossible to reconcile the DPI's reluctance to address these issues when the DPI is the driving force behind residential solar access. Solar access has become the predetermining factor in residential development, regularly causing many potential residential units to be removed from development proposals, thereby reducing our strained housing stock, to provide solar amenity to existing residences. Where are the DPI's protections for rural non-host wind farmers? The same rule should apply-delete development that offends or find a more suitable site. Refer to my Conclusions herein.

I refer to the cumulative impact response in FCWTAG's submission.

Photomontages

I query the accuracy and integrity of the Aurecon Photomontage Plate C12 of the EA and refer you to Attachments 8 and 9 in the main Submission.

Plate C 12 in the EA gives additional prominence to a rose bush that is NOT in the primary field of view from the bottom of my front steps towards the ridges across the valley. I attach an email from Aurecon (Chris Berg) dated 18 April 2011, as Annexure 1 which explains some of the background. Attachment 8, provided by an independent specialist, provides a more realistic view.

According to Aurecon the photographs for Plate 12 were taken at the bottom of the steps, that is with the rose bush behind the camera. Yet plate C12, allegedly providing a 124 degree vision, features the rose bush, giving a misleading and distorted view (shown in Attachment 9).

Mr Alf Manciagli's photomontage – see Attachment 8 - taken with the same photographic 50mm fixed lens and from the same position as Aurecon's gives a much truer vision of the scale of the proposed turbines as viewed from Residence 12. Aurecon's very wide degree of vision (stitching) does not give an accurate visual perception. See also Attachment 10 in the main Submission for Mr Alf Manciagli's (Gecko Photographics) letter explaining the procedure he adopted to present a more accurate representation of the views and scale of the proposed turbines.

I apply the same comments for all of the photomontages in the EA Appendix C1.

The Department of Planning & Infrastructure should refer to the material, and particularly compare Aurecon's photomontages, with the 40 km and 50 km distant photographs from Clare of the Hallett 2 Wind Farm in the website: http://ramblingsdc.net/Australia/WindSA.html#Hallett-map

Roads

As a ratepayer and regular user of the Flyers Creek area roads I make the following comments:

- There is no Traffic and Transport Strategy in the EA, as distinct from Infigen's Capital or Bodangora Wind Farms. Why not?
- Infigen – EA Chp 13 – seeks to rely on post approval consultation by contractors (not Infigen) with Blayney Council and RTA rather than negotiate with the stakeholders a comprehensive Traffic and Transport Strategy, as part of the approval process. See the RTA letter dated 1 February 2011 in the EA.
- The wind farm site is over 110 square km² and broken into four distinct areas Calvert, Fern Hill, Hopkins and Halls Gap all at high elevations and dropping off significantly into valleys below - with access to each of these areas from various directions by about 80 km of minor Council roads. It should be noted that Infigen specifically refers to upgrading or creating 37 km of access tracks but does not mention any upgrading of the existing Council road network – but refers to temporary works on Council and RTA roads. Flyers Creek is completely different to Capital Wind Farm's limited area and common access via Taylors Creek Road. The Flyers Creek Wind Farm locality is atypical and should be addressed as such.
- The EA identifies in 13.3.2 five (5) alternate access routes, which in combination (eg Cadia/Panurara/Errowanbang Rds) provide many more alternatives which Infigen's contractors (not only RAVs and concrete trucks)could and will use.
- Attachment 12 in the main Submission graphically shows the current parlous state of councils roads referred to in the EA and do not support the statements of the proponent such as at: EA Chp. 13 P 13-13 where Infigen claims the Mandurama Burnt Yards Errowanbang Road is in general good condition and feasible for RAVs with minimum or no modifications to bridges or roads required for heavy vehicle use. The EA Chp 13.3.1 indicates most RAVs will come via Cowra therefore this is the first and most likely route to be used by haulage contractors.
- Infigen suggests RAVs and concrete trucks (up to 12m³), at least 1,040 of them, travelling from Orange (Table 13.4) will go via Millthorpe or even Carcoar - locals know the direct route is via Orchard Rd and Forest Reefs Rd to Forest Reefs and then down the Errowanbang / Mandurama Road to all of the sites. Who will stop the concrete trucks or other RAV's using the direct route, in either direction?
- The AGL Hallett 2 Wind Farm brochure (see Annexure 2) for 34 x 2.1MW turbines (124 m high) states 3400m³ of concrete (100m³ per mill) was used in conjunction with 130 km of rock anchors (3.8 km per turbine). Clearly Infigen's (Table 13.4) stated 5200m³ of concrete (118m³ per turbine) does not take into account the potential / intended huge increase in the size of the turbines from 2.5 MW to 3.3 MW **nor** the lack of rock anchors. Concrete trucks movements are likely to be more than twice the 1,040 stated in Table 13.4.

- Similarly with RAVS or concrete trucks from Blayney using the Errowanbang/Gap Roads proposed route, what will stop contractors driving straight up Errowanbang Rd to Sites 21-37?
- Halls Rd is a gated idyllic single track country lane which is as emblematic of the Blayney Shire as any other attribute. It is totally unsuitable for RAV's or other heavy industrial transport. This use will destroy the beauty and exceptional amenity of Halls Road.
- There is no mention of the ongoing suitability of the local road net work for tourists viewing the wind farm – these roads are positively dangerous enough without wind farm stargazers.
- Conditions of consent would leave Blayney Council, ratepayers and existing traffic exposed to a fait accompli.
- Blayney Council has not conducted any surveys, studies or road compaction tests on these roads to determine their suitability for the construction program (18 months) maintenance program (20-30 years) and tourist traffic? How will these roads remain open to local traffic during the construction program?
- The proponent should, because of the particular characteristics of this site (large area, high elevations/ valleys, various alternative roads and in poor condition) be required to complete an approved Traffic and Transport Study and resolve which access routes are to be used and monetary issues with Council before any Project Approval.

Consultation

The DPI's letter of 25 November 2011 (Annexure 3) indicates that two (2) EA's (dated January 2011 and May 2011) have been submitted, with the later submitted to the Department on 10 June 2011 well outside the DGR's extended lodgement date 19 April 2011 (originally 19 January 2011).

This in itself is a matter for serious consideration by any party seeking to assess this application - it is out of time and should be rejected.

Further, on 16 August 2011 the Director General issued 'supplementary requirements which must be addressed in the preparation of (Infigen's) Environmental Assessment'.

One finds it impossible to reconcile the fact that the Director General found it necessary to issue these supplementary requirements more than 2 months after the EA was lodged with his Department yet the EA is now deemed to have satisfied the Director General's Requirement. Some might be disillusional as to the benefits of wind farms but we are not quite into time warps yet.

My letter to the Director General dated 25 November 2011 and his reply dated 15 December 2011 are attached as Annexures 4 and 5.

Any suggestion that Infigen's mail out "Flyers Creek Wind Farm Overview" (see Attachment 11 in the main Submission) or the exhibition of the EA itself satisfies the supplementary requirements beggars belief. The overview is nothing more than a propaganda sheet for the proponent which perpetuates the total uncertainty of the generating capacity (size) of the turbines "2.5 – 3.3".

How can this process be determined genuine consultation – more like half truths, tricks and mirrors rather than a frank disclosure of what is intended and therefore what the community can expect.

In the "Overview" Infigen claims that the proponent met with Blayney Shire Council officers and /or councillors continually over the past 3 – 4 years to obtain their comments and feedback on the project. This bold statement is not supported by the facts:-

- There is no correspondence in the EA either to or from Council;
- Council felt that it was so ill informed as to the project and the EA that it found it necessary to call a Community Meeting to inform itself on Council's submission; and
- Councillors deny consultation.

Infigen has refused to hold a public forum in relation to the project despite numerous requests by myself and others, yet Infigen held a meeting at Duntry League in Orange on 13 October 2011 to launch a co-operative to purchase a wind mill.

I refer to my email to Infigen dated 18 July 2011 and Infigens reply dated 4 August 2011 attached as Annexures 6 and 7. The public forums referred to in Infigen's penultimate paragraph of Annexure 7 were general renewable energy forums held in Bathurst and Orange and had nothing to do with the Flyers Creek proposal.

Each of the other points under the Overview's heading "Community Consultation" have avoided any form of public forum and had been conducted prior to the Director General's (DG's) supplementary requirements. The proponent cannot be said to have satisfied the DG's supplementary requirements of 16 August 2011 items numbered 1, 2, 3 and 4.

Any party seeking to assess this application must find that the supplementary requirements have not been met and the application rejected.

Errowanbang Public Primary School

What is most reprehensible is the fact that there was no consultation with or consideration of the Errowanbang Primary School (site 57) in the EA. The school is located within 1.5 km of turbine 12 and will suffer all of the Noise/Tonality/Infrasound/Frequency Modulation/ Shadow Flicker / Visual Pollution and possibly to a greater extent as with my properties as stated above from turbines 3-12 and flicker from all turbines to the east within 10 km and the sun's summer alignment**.**

Please see attached two letters to the Minister for Health and the Minister for Education dated 6 and 16 December 2011 (Annexures 8 and 9).

By reason of the impact on the school alone, this application should be rejected.

Birds

The reports by Kevin Mills' Associates were conducted over short periods of time at higher elevations and in woodland or exotic pastures did not address the potential effects on birds/bats in the creeks (Flyers, Gooleys, Slatterys and Cheesman), watercourses, dams, wetlands and in the native and exotic

gardens of various farmhouses, such as “Errowanbang”, where birdlife is abundant and a great source of general amenity. What effect will the proposed mills have on these birds/bats?

Telecoms

Our property currently receives full TV reception but poor radio reception and poor mobile phone reception. We are concerned the proposed Wind Farm will greatly diminish these services which are such an essential part for modern society especially for people like me who are in later life and need communication for family, business, social and health purposes.

Visual Amenity

In essence my properties will be dominated by turbines running over the entire length of the high scenic quality ridges running in the east from due North to due South. So much for visual amenity!

Conclusion

In addition to my detailed submission’s conclusions I say:

1. The application should be rejected because:

    i. It is out of time;

    ii. The proponent has not met the Director General’s supplementary requirements on community consultation;

    iii. The impact on Errowanbang School has not been assessed; and

    iv. It fails to protect the reasonable amenity of neighbouring residences.

2. That if it is minded to approve the Application then it be amended by removing Turbines 3-12 and:

    - Leave the wind farm with 34 turbines, sufficient to remain viable - as in AGL’s Hallett 2 - 34 x 2.1 MW mills (71.4 MW) and Acciona’s Gunning -31 x 1.5 MW mills (46.5 MW);
    - Relieve the School and all of the closer settled properties in the significantly higher elevations of the northern (Calvert) end of the proposed wind farm from the various and undoubted serious negative effects of these turbines;
    - Leave the 34 turbines set on what is generally regarded as larger agricultural holdings at lower elevations in the south thereby causing less impact from the various negative effects including the visual landscape and road access; and

- Permit the proponent, subject to the Minister's Consent and a new EA modelled on 3.3 MW turbines, to use such turbines rather than the modelled 2.5 MW turbines which will produce a slightly higher output of 112.2 MW power than the EA's proposed 110 MW.

3. Any consent should be conditioned that any turbine that fails to meet ultimate guidelines be shut down rather than force landowners (farmers with years and even generations of occupation of their properties) to sell out and sell out without the benefit of compulsory acquisition entitlements.

Please be advised that I intend to conduct extensive independent expert background noise monitoring at my three (3) residences/sites which I will provide to the Director General for the purpose of ongoing compliance.

John Gerathy

Hilde Gerathy

19 December 2011

ANNEXURE 1
Aurecon Correspondence

Mon 18-Apr-11 3:48 PM

gerathy@internode.on.net

Dear John

Thank you very much for your response to our email.

First up, I would like to clarify a few points. The photographs sent to you on 6 April were for your information as requested. You are absolutely correct that the collage shows a view field over 180 degrees and is therefore not suitable for preparing a photomontage. The pictures were sent to provide you an overview of the photos taken as it was our understanding that you wanted to review all photos taken from your homestead. Please accept my apologies if this has caused a misunderstanding.

I have enclosed a representative panoramic photo that represents a view field of 124 degrees that could be used to create a photomontage. The panorama is based on the individual photos provided to you earlier, which were taken from the patio of your homestead at the time requested by the Farm Manager.

Preparing a photomontage is a complex process and there are specific technical requirements to accurately portray a proposed project in the landscape. As such, photographs should be taken with a 50mm fixed lens. A series of photographs are then "stitched" together with a 30% overlap to achieve a 124 horizontal field of view, which represents the primary field of view of the human eye. GPS coordinates and the compass bearing are also recorded in order to enable the photomontage to be accurately created.

The photograph you provided seems to be taken with a wide-angle lens. While it is a very nice photo of high quality, it would be unsuitable to create an accurate representative photomontage compliant with standard practice.

You may have noticed that the panoramic photo attached is not ideal as it is a bit “washed-out” due to the position of the sun at the time. It would have been preferable to have taken the photos in the late afternoon.

As it so happens, I am scheduled to be back up in the district this Wednesday April 20th. If you would like me to re-take the photographs at a more appropriate time of day---around 3-4pm, please contact me by Wednesday morning at 10am on my mobile phone 0420 336 399.

If you have any questions please do not hesitate to contact me.

Best Regards

Chris Berg | Environmental Advisor | Aurecon
Ph: +61 2 8197 4628 | **Fax:** +61 2 8197 4620
Email: **bergc@ap.aurecongroup.com**
116 Military Road (PO Box 538) Neutral Bay | NSW 2089 | Australia
http://www.aurecongroup.com

From: Hilde [mailto:gerathy@internode.on.net]
Sent: Tuesday, 12 April 2011 4:00 PM

To: Heather Tilley
Subject: RE: Flyers Creek Wind Farm - Proposed Photomontages

Dear Heather,

Thank you for sending the photos through for approval.

The panorama showing through over 180 degrees gives a distorted representation of the view from the front of our homestead and is NOT approved for use.
Photographs 1,2and 3 do not represent the view, rather similar to Jonathan's efforts, they are NOT approved.
Photograph SAM.0518 is irrelevant.
I attach a scanned photograph taken by my photographer Alf from Gecko Photographics which is a clearer and wider photograph than your photo No4, which is NOT to be used.

However, Gecko's photograph can be used to prepare a photomontage of the mills. (Please let me know if you want to use it and I will ask Gecko Photographics to forward you the original.)
This photomontage cannot be used by Infigen without my prior consent and should if possible show mills 10, 11, 12, 9 and those behind 9 as well as any mills visible to the east of mill 9.

Regards

John Gerathy

34/10 Lincoln Cres
Woolloomooloo
NSW 2011
Ph: 02 9358 4200
Fax: 02 9358 4300
Mobile: 0415 225 940
email: gerathy@internode.on.net

From: Heather Tilley [mailto:TilleyH@ap.aurecongroup.com]
Sent: Wednesday, 6 April 2011 3:39 PM
To: gerathy@internode.on.net
Cc: Colin A. Ross
Subject: FW: Flyers Creek Wind Farm - Proposed Photomontages

Hi John

Please find attached the photographs taken from your property on Friday 1 April as requested.

We took two sets of photographs - one set from the patio as requested (SAM_0516) and one set just at the bottom of the steps (SAM_0518).

The attached panorama view is the combined view from the set of photographs taken at the bottom of the steps.

The individual photographs (John Gerathy 1-8) were taken from the patio. Due to the closeness of the camera to the posts of your patio these are not really suitable to produce a panorama view, however I have included them here for your information.

If you are satisfied that we can use these to create the photomontage, please let me know.

Regards
Heather

Heather Tilley | Energy | Aurecon
Ph: +61 2 8197 7624 | **Fax:** +61 2 8197 4620
Email: **tilleyh@ap.aurecongroup.com**
P O Box 538, Neutral Bay | NSW 2089 | Australia
http://www.aurecongroup.com
http://www.aurecongroup.com/apac/groupentity/

ANNEXURE 2
AGL Hallett 2 Wind Farm Brochure

AGL HALLETT 2 WIND FARM

PROJECT PROFILE

Key Statistics

The green energy produced by this wind farm will power approximately 45,000 average Australian households per year, with emission savings of over 200,000 tonnes of greenhouse gases per annum.

Wind turbines convert the energy in moving air into electrical energy. The moving air passing through the 34 588 wind turbines in one hour, at full production, weighs over 12,000,000T.

The payback period of "embodied energy" of the whole wind farm was approximately 5 months.

- Installed capacity: 71.4MW (2.1 mw)
- Hub Height: 80m
- Maximum Blade Tip Height: 124m
- Swept area of each WTG: 1.5 acres;
- Total swept area for the wind farm: 51 acres
- Number of truck journeys during construction: 1240
- High tension cables for rock-anchor footings: 130km
- Rock trenching for 33kV reticulation: 17km
- Concrete: 3,400 m3
- Steel for towers: 5,800T
- Underground cable: 17km
- Overhead cable: 10km
- Total weight of cargo to be transported to site: 10,350T

SUZLON ENERGY AUSTRALIA PTY LTD
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info-au@suzlon.com www.suzlon.com

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ANNEXURE 3
Department of Planning & Infrastructure Letter dated 25th November 2011

NSW GOVERNMENT | Planning & Infrastructure

Contact: Toby Philp
Phone: (02) 9928-6343
Fax: (02) 9228-6455
Email: toby.philp@planning.nsw.gov.au

Our ref.: MP08_0252

Mr Colin McFadzean
Shaw Reynolds Dowden & Gerathy lawyers
Level 3
151 Macquarie Street
Sydney NSW 2000

Dear Mr McFadzean

Subject: Flyers Creek Wind Farm MP08_0252

In response to your letter dated 10 November 2011 with respect to the Flyers Creek wind farm proposal, the Department can provide the following information:

1. The amended Director-General's requirements (DGRs) were issued on 23 Decembe 2010.
2. The updated project application form (dated 11 February 2011) was lodged with the Department on 16 February 2011.
3. An Environmental Assessment (EA) (dated January 2011) accompanied the updated project application form.
4. The EA (dated January 2011), which accompanied the updated project application form satisfied the DGRs date of expiration for lodgement of the EA by 19 April 2011.
5. The EA, dated May 2011, was submitted to the Department on 10 June 2011.

Please be advised that a formal application under the *Government Information (Public Access Act 2009* is required to access the additional information that you have requested. Further note your request for an extension on the exhibition period. The statutory time frame fo exhibition periods is 30 days. As the project will be exhibited for 60 days the Departmen believes this is an appropriate exhibition period for the community to adequately consider the proposal and make its views known.

Your contact officer for this proposal, Toby Philp, can be contacted on (02) 9228-6343 or via email at toby.philp@planning.nsw.gov.au. Please mark all correspondence regarding the proposal to the attention of the contact officer.

Yours sincerely,

25/11/11

Glenn Snow
A/Director
Infrastructure Projects

ANNEXURE 4

Gerathy to DPI Letter 25th November 2011

John Gerathy

34/10 Lincoln Cres
Woolloomooloo
NSW 2011
Ph: 02 9358 4200 Mobile: 0415 225 940
email: gerathy@internode.on.net

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25 November 2011

Mr Sam Haddad
Director General
Department of Planning
Bridge Street
Sydney NSW

Dear Director,

Re: **Windfarm Development – Flyers Creek**

I refer to prior correspondence and your letter to Infigen Energy Ltd dated 16/08/11 concerning compliance with Director Generals Requirements dated 19 January 2009 regarding local community and landowner consultation.

Infigen's Local Community/ Landowner Consultation

Infigen has never held a Public Forum to discuss the wind farm despite repeated requests to Infigen to do so, by myself and others.

Infigen has conducted very discreet and limited information days and private one on one meetings to expose its windfarm proposal to the local community and landowners.

The information days as referred to in Chapter 6 of the EA were held over 14.5 hours on the 19th and 20th November 2010 – during which period less than 50 people attended (approx 3 persons per hour). Plates 6.1 and 6.2 Chapter 6 show the nature of these information days.

I received a letter from a landowner (Di Colman) who stated:*" All in all, it could have been confused with a time share promotion as people were mainly approached one on one by the salespeople. It was not conducted as a public forum whereby everybody was addressed through a formal presentation, followed by question time".*

The brochure issued by Infigen in connection with the information days (EA appendix 6.3) was quite vague regarding the specifics of the wind farm and in particulart the size and capacity of the

proposed mills. The EA itself is similarly deficient in relation to the specifications of the size and capacity the proposed mills yet the EA in Chapter 13 details specific noise monitoring.

Blayney Council Community Meeting Monday 28 November 2011

Attached is a copy of an invitation from Blayney Council (received on 23 November) calling a Community Meeting for the Proposed Flyers Creek Wind Farm Prop

That Council felt it was necessary to call this meeting demonstrates the failure on the part of the proponent to provide public consultation as required by the Director General's with Blayney Council, the local community and landowners.

Infigen's Co-Operative Meeting on 13 October 2011

Attached is a notice issued by Infigen convening a public meeting to discuss the formation of a co-operative to purchase a Flyers Creek Wind mill.

I attended this meeting which was conducted as a genuine forum where issues relative to the formation of a co-operative and ancillary financial aspects thereof were fully ventilated.

This type of forum has not been conducted by Infigen in relation to the wind farm proposal itself consistent with the general tenor of the Ku -ring – Gai Council Case.

At this forum Infigen still would not disclose the specifications of the proposed mills, stating that the mills would be 2.5 – 3.3 mega watts.

Similarly, in relation to questions regarding roads, Infigen stated ...."we will leave the roads as we find them". This response is totally unsatisfactory given the construction and state of the Flyers Creek road network and the fact that Infigen has not submitted a Traffic and Transport Strategy Paper with its EA.

Director General, this E.A. is open to public submission until 19 December 2011 (60 days) however I should point out to you the following salient points:-

i. The proponent has NEVER provided sufficient specifications of the wind mills to allow proper assessment of the proposal. The EA should be resubmitted with proper specifications.

ii. The proponent has not provided a Traffic and Transport Issues paper as it proposes for the Bodangora Wind Farm (see copy cover sheet attached) and seeks to rely, post project approval, on haulage contractors' consultation with Blayney Council in relation to the very serious road and traffic issues involved (see chap 13). The EA should be resubmitted with an appropriate Traffic and Transport Issues paper.

iii. The SA Wind Farms - Environmental Noise Guidelines 2003 specified in the Director Generals Requirements as the appropriate guidelines are subject to judicial review following the recent South Australian Quinn Case.

iv. NSW Department of Planning and Infrastructure is preparing NSW Wind Farm Guidelines and

v. The Minister/ Director General allowed on 23rd November 2011 , 98 days for submission in relation to the Kings Plain Wind Farm -Glen Innes EA. Eight (8) days clearly related to Christmas/ New Year – but 90 days in lieu of Flyers Creek 60 days. Where is the consistency?

In all of these circumstances and the probability of matters arising out of Monday's Council Community Meeting requiring further research and submission the Minister/ Director General should:-

1. Defer consideration of the application until issues i – iv above are resolved or
2. At the very least extend the period of EA submission until February 2012.

Can you kindly confirm when this EA is to be assessed it well be referred to the Planning Assessment Commission as previously indicated.

Yours faithfully

John Gerathy

Blayney Shire Council

INVITATION TO ATTEND A COMMUNITY MEETING FOR THE PROPOSED FLYERS CREEK WIND FARM PROPOSAL

Blayney Shire Council invites you to a Community Meeting to discuss the proposed Flyers Creek Wind Farm Proposal Environmental Assessment (EA) currently on exhibition until 19 December 2011 by NSW Planning.

The object of the meeting is for community members to provide advice that assists Council in developing the preparation of Blayney Councils submission to NSW Planning and Infrastructure. An independent facilitator will be used to ensure the meeting realises its objectives. The proponent Infigen Energy will provide a 15 minute overview of the proposal at the start of the meeting. A whiteboard will be used to develop any issues raised at the meeting on the proposal, for Council to consider in its submission and conditions. A copy of Councils submission will be placed on the NSW Planning and Infrastructures website www.planning.nsw.gov.au.

Venue: Blayney High School Hall

Date: Monday 28 November 2011

Time: 7.00pm to 9.00pm

Facilitator: Grahame Collier T Issues Consultancy

AGENDA

- Presentation by Infigen on the proposed Flyers Creek Wind Farm (15minutes)
- Discussion on proposal to assist Blayney Shire Council for its submission to NSW Planning

Council looks forward to your attendance and constructive input to this proposal.

Yours faithfully

G A Wilcox
General Manager

ABOUT US

BOARD (/ABOUT-US/BOARD.HTML)

MANAGEMENT (/ABOUT-US/MANAGEMENT.HTML)

CORPORATE GOVERNANCE (/ABOUT-US/CORPORATE-GOVERNANCE.HTML)

NEWS (/ABOUT-US/NEWS.HTML)

CAREERS (/ABOUT-US/CAREERS.HTML)

NEWS

INFIGEN AND LOCAL COMMUNITY TO ASSESS THE FEASIBILITY OF A WIND CO-OP

29th September, 2011

Infigen announced today that it is seeking community feedback on the feasibility of a wind farm co-operative (co-op) as part of its proposed Flyers Creek Wind Farm near Orange, New South Wales. The proposed co-op would provide the local community with the opportunity to have a direct financial stake in Australia's growing renewable energy sector.

As part of growing community support for renewable energy, community owned wind farm co-ops are being developed around the world and are part of a growing trend in Australia.

Infigen is organising a public meeting on 13 October 2011 at Duntryleague with the aim of establishing a community stakeholder group to assess the feasibility of a co-op at the proposed Flyers Creek Wind Farm. The meeting will give local residents the opportunity to discuss the proposal with Infigen, ask questions and provide input on how the co-op could be developed.

Local and community ownership of wind projects, ranging from full ownership of small projects to smaller levels of participation in larger projects, can bring significant benefits to the local community and economy. "Should the wind turbine co-op proceed, it would provide the local community with the opportunity to financially benefit from the Flyers Creek Wind Farm project," said Jonathan Upson, Senior Development Manager.

The community stakeholder group, with Infigen's support, would be responsible for developing the co-op proposal. It is intended that the stakeholder group would seek regular feedback from the local community.

"Offering the opportunity to own a "share" of a wind turbine and be part of a wind energy project will give the local community the opportunity to play an active role in Australia's transition to renewable energy," said Maju Tenissen, Communications Coordinator. The co-op should also serve to improve the community's understanding of wind turbines and the electricity market in which they operate.

The Australian Government has set a target to generate 20 percent of our electricity from renewable energy sources by 2020. Involving communities in wind power generation has a significant part to play in meeting these targets and Infigen is aiming to be at the forefront of this campaign.

Infigen looks forward to engaging with the local community to assess the feasibility of a co-op at the proposed Flyers Creek Wind Farm.

The public meeting will be held at 5:30pm (for a 6:00pm start) at Duntryleague on Woodward Street in Orange, NSW, on Thursday, 13 October 2011.

For more information visit: www.windco-op.com.au

Ends

For further information please contact:
Maju Tenissen, Communications Coordinator
Tel +61 2 8031 9900

infigen

Bodangora Wind Farm

Traffic and Transport Issues

Revision 0.1: DRAFT FOR WELLINGTON SHIRE COUNCIL AND RTA COMMENT

September 2011

ANNEXURE 5
Director General DPI Letter 15 December 2011

NSW GOVERNMENT | Planning & Infrastructure

Office of the Director General

Mr John Gerathy
34/10 Lincoln Cres
Woolloomooloo NSW 2011

11/21212

Dear Mr Gerathy

I refer to your letter of 25 November 2011 concerning the Flyers Creek Wind Farm project.

The Department is aware of the community's concerns about the level and type of consultation undertaken by some wind farm proponents during the preparation of their Environmental Assessment (EA) documents. As a result, I issued supplementary assessment requirements to wind farm proponents, including the Flyers Creek proposal.

These requirements emphasise the need for proponents to undertake a comprehensive, detailed and genuine community consultation and engagement process, including the provision of sufficient information to enable communities to understand the nature of the projects and their potential impacts. The Department was satisfied that the proponent had addressed these requirements in the EA through a mail-out of the project overview to neighbours of the project, local media and facilitation of community information days. The EA also details how community concerns have been addressed.

As the final turbine model is only selected following approval of a wind farm, the EA documents the worst case environmental impact (i.e. maximum noise and visual impact), based on a maximum turbine capacity and maximum height of the turbine, as well as the associated infrastructure. This is consistent with other wind farm project applications, and allows the Department to assess, and the community to understand, what the worst case impact scenario may be. Exact specifications of the final turbine model are therefore not required during the assessment process.

The EA also details the potential traffic related impacts of the project, and it is common for detailed traffic management measures associated with any of these impacts (i.e. any required road upgrades) to be finalised post approval between the proponent and relevant agency or Council.

Draft NSW Wind Farm Planning Guidelines are expected to be released for public comment shortly and will include NSW Wind Farm Noise Guidelines. Options for applying the draft guidelines to existing projects are being considered and more guidance on this will be provided when the guidelines are released for public comment. However, the SA wind farm environmental noise guidelines, which the Department currently applies, are considered to be amongst the most stringent noise guidelines in

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Telephone: (02) 9228 6111 Facsimile: (02) 9228 6191 Website planning.nsw.gov.au

the world. The Department understands the South Australian Environment, Resources and Development (ERD) Court has reaffirmed the appropriateness of the SA guidelines for the assessment of wind farm noise. It also understands that in the case of the Hallet 3 wind farm (Quinn), issues due to tonality (at Hallet 2 wind farm), relate to potential mechanical issues with turbines, not adequacy of the guidelines. The Department will take account of the ERD Court determination once it is made, where relevant to the guidelines.

Finally in relation to the exhibition period, the statutory time frame for exhibition periods is 30 days. As the Flyers Creek project will be exhibited for 60 days the Department believes this is an appropriate exhibition period for the community to adequately consider the proposal and make its views known. However, the Department will consider submissions received within a reasonable period after the close of the exhibition period. The Sapphire Wind Farm project was extended to February 2012 as the exhibition period extends over the Christmas and associated school holiday periods, whereas the Flyers Creek Wind Farm project exhibition concludes prior to Christmas.

I trust the above advice addresses your concerns.

Yours sincerely

SHaddad

Sam Haddad
Director-General
15/12/2011

ANNEXURE 6
Email Gerathy to Infigen 18 July 2011

'Jonathan Upson' <Jonathan.Upson@infigenenergy.com>

Mon 18-Jul-11 6:10 PM

Jonathan,

Noise Monitoring

Please provide me with Infigen's noise monitoring results on my property Errowanbang as well as any photographs of my property you have submitted or propose to use in support of your application.

Your contractor's noise monitoring station was originally placed on the gravel entry road some 250m east of the main residence on my property (picking up noise from Burnt Yard Rd as well as the gravel drive)and later moved to a relatively noisy position on the pebbled drive within the house garden but completely oblique to all the bedroom areas of this Heritage homestead. If you wish to rely on any noise monitoring on my property you will need to reinstall your noise monitors in the residential areas and take genuine readings of ambient background noise.

The contractors advised me that the noise monitoring locations were determined by you after you had visited my property.

Noise from neither of these sections of road is audible from the bedroom areas of the principal house or the manager's quarters. Accordingly the ambient background noise in the vicinity of the bedrooms is much lower than on the gravel road.

Your monitoring should be completely objective. It is not in my instance. Any use of your current monitoring would be deceptive.

Old Errowanbang

Your current plan Figure 1.4 (updated as to the 16th March) shows residences at 13 ,75 and 129 as being Windfarmer - off lease residences on Old Errowanbang. This is inaccurate as 129 is a significant historic shearing shed not a residence.

Old Errowanbang is currently under sale by order of the Family Court of Australia and unlikely to remain Windfarmers off lease residences.

Heritage Items

Items Nos 12, 13 and 129 are significant Heritage Listed items. How does your proposal relate to these listings not only in terms of noise, infrasound, shadow flicker etc but also in terms of visual pollution**?**

Surrounding Roads

The 50 odd km of roads surrounding the windfarm, both bitumen and gravel, are in very poor condition and were never constructed for nor are suitable for the heavy and increased traffic the windfarm will generate.
Blayney Council actively promotes the existing Blayney windarm as a major tourist attraction. However, this windfarm pales into insignificance in terms of scale and size to the proposed windfarm which is in near proximity to the ever growing tourist centres of Orange and Millthorpe. These roads are certainly not suitable for tourist traffic nor the blending of tourist traffic with your industrial requirement and the traffic generated by the Cadia Mine contractors and employees.

Who will upgrade and maintain these roads?

Transparency

I understand you had incamera meetings with Blayney Shire Council. This is not conducive to community transparency. A FOI/GIPA application will be made to Council in respect of all meetings and submissions.

Similarly a FOI/ GIPA application will be made to the Department of Planning concerning Minister Kenneally's determination that your proposal was critical infrastructure. A court challenge could ensue.

Photomontages

Your contractor Aurecon has produced photomontages of mills as viewed from my property. However, these photomontages are of poor quality and do not accurately represent the outlook, drawing into the extremely wide lens the gardens either side of my front steps thereby distorting the view presented. This photomontage shows a field of vision much wider than the human eyes' I have as you are aware commissioned my own photomontages (updated) which I will submit with my submission against the windfarm. I note that I did offer to Aurecon our photography which was much clearer ,however, this offer was rejected by Infigen.

Errowanbang School

Errowanbang School which has approximately 45 student is in close proximity to mills 9,10,11 and 12 and the in the interests of the health and general amenity of these primary school students these mills should be deleted from your proposal.

Native Birds

The open wooded grasslands, domestic garden and orchard together with abundant water, reeds etc In Flyers and Cheesmans Creeks , earth dams and garden fountains attract over 100 different variety of native birds to Errowanbang.

What study has Infigen undertaken to ascertain the extent of the existing birdlife and the likely impact of the windmills on this huge variety of native birds.

On exhibition of your application we will seek a condition of any consent that any mill that records noise or infrasound levels above determined noise and infrasound levels be shut down permanently.
John Gerathy

ANNEXURE 7

Infigen Reply dated 4 August 2011

Infigen Energy Limited
Level 22, 56 Pitt Street
Sydney NSW 2000
Australia
T +61 2 8031 9900
F +61 2 9247 6086
www.infigenenergy.com

4 August 2011

Mr. John Gerathy
34/10 Lincoln Cres
Woolloomooloo
NSW 2011
via email

Dear John,

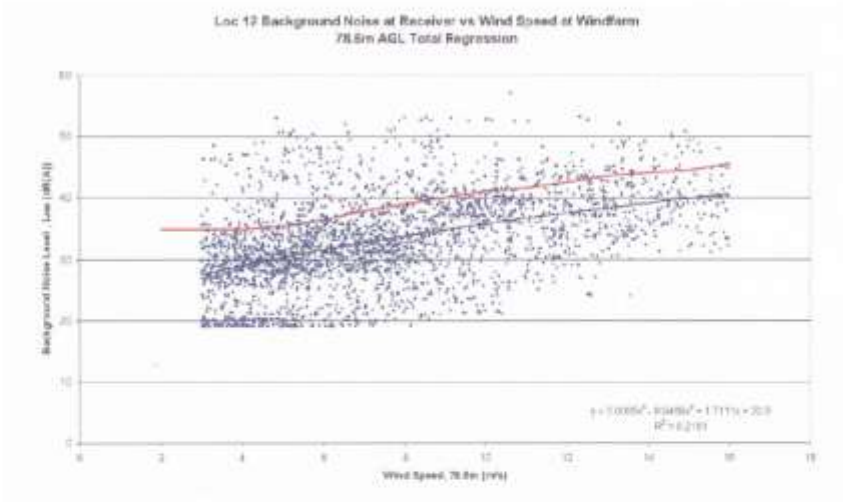
Thank you for your email late last month. Please find our response to your questions below. In some instances, your questions are quite broad and would be more comprehensively answered by the relevant chapter(s) in the Flyers Creek Wind Farm Environment Assessment (EA) than I could do in this letter.

Noise Monitoring
I understand from the independent noise consultant that the initial location for background noise monitoring some 150-200 metres from your house was strongly suggested by yourself (or your farm manager). However, the noise specification requires the background noise monitoring location to be within 20 metres of the residence. Therefore, when management at the noise consulting firm learned of the initial monitoring location, they instructed the acoustic engineers to re-position the noise monitor closer to the house.

The driveway near the second noise monitoring location will have no effect on the readings as they are a 10 minute average of the noise levels that are exceeded 90% of the time. Therefore, one would have to drive up and down the driveway 9 minutes out of 10 to influence just one of the over 2000 data points collected. I trust you would agree that such occurrences would be exceedingly rare.

I should also correct the impression in your email that I was contacted during the background noise monitoring process and specified the detailed locations of where noise monitors were to be placed. I can assure you this did not occur.

Per your request, the background noise results are shown in the graph on the next page which shows background noise measured vs hub height wind speed at the wind monitoring mast. An "average" of the results is indicated by the blue line; the red line indicates the resultant noise limit which is the greater of 35 dB(A) or 5db(A) above the background noise level (i.e. the blue line). This graph, along with a far more detailed explanation of background noise measurement process, will appear as part of the Environment Assessment.



The noise consultant is extremely confident in the robustness of the background noise levels obtained at your residence. After you read the EA background noise report, I trust you will have a similar opinion.

A photo of the original noise monitoring location and the photomontage, previously sent to you by Aurecon, are the only photos from, or featuring, your residence that will appear in the Environment Assessment.

Old Errowanbang

We were aware that "residence" 129 is a shearing shed. The primary reason it was included on the residence map was its historical listing.

We are also aware that residence #13 may be sold sometime in the future; however, studies and maps must be prepared reflecting the current situation at the time. At the time the maps were prepared, as is still the case, residence #13 is an off lease windfarmer residence.

Historical Items

As you would have read in the Flyers Creek DGRs, there is no explicit requirement to assess non-indigenous heritage buildings or structures within, or near, the project site. That being said, the EA does assess and discuss non-indigenous heritage items within the project boundary. With regards to potential impacts on the heritage values of your residence, from infrasound for example, I believe it's pretty clear that any infrasound from the wind farm will have no effect to the heritage values of your residence. You may also be

pleased to know the shadow flicker analysis in the EA shows that your residence will not encounter any shadow flicker from the wind farm project. This is due to the fact that your residence is too far from the wind turbines to experience shadow flicker.

Surrounding Roads
The Flyers Creek EA has an entire chapter dedicated to traffic and transport management; therefore, I would suggest that you read this chapter once the EA is on public display. However, I will reassure you that Flyers Creek Wind Farm Pty Ltd will remedy any damage to local roads caused by the transport of wind farm components or other wind farm construction activities.

Errowanbang School
Your concern is noted; however, there is no scientific or medical evidence of wind turbines causing any detrimental health impacts anywhere in the world to support your proposition.

Native Birds
Extensive bird surveys were conducted as part of the environmental studies we have commissioned. I would suggest that you read the Flora & Fauna Chapter and Appendix of the EA which contain very detailed discussions of the bird surveys undertaken and their results.

With regards to the issue raised in your second email, I should point out that I presented at two widely publicised public forums in late April, 2011. Both forums were attended by members of the Flyers Creek Wind Turbine Awareness Group.

It has been awhile since we last met. If you would like to meet with me to discuss the Flyers Creek project in Sydney, or at the project site, please do not hesitate to let me know.

Sincerely,

Jonathan Upson
Senior Development Manager

ANNEXURE 8
Gerathy to Ministers for Health & Education 6 December 2011

John Gerathy

email: gerathy@internode.on.net

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6 December 2011

The Hon Jillian Skinner MP
Minister for Health
Parliament House
Sydney NSW

The Hon Adria Piccoli MP
Minister for Education
Parliament House
Sydney NSW

Dear Ministers,

Re: **Environmental Assessment Flyers Creek Windfarm Development – Errowanbang Primary School.**

I own both properties adjoining this school (lot 22 DP 241473 (EA site 12) and Lot 211 DP1096675) which is located on Lot 212 DP 1096675 (EA site 57)(copy attached) at Errowanbang.

The school has had substantial State and Commonwealth Government investment over the past few years and school numbers have grown from less than 10 to over 40 pupils.

I am concerned that the proposed wind farm may have dire health and educational implications in terms of noise, infra sound, tonality, frequency modulation (amplitude) and shadow flicker for the school's students and staff.

The school community, including the school principal, is compromised as this community is split between wind farm host farmers and non- wind farm landowners. This community division is becoming common place with the introduction of wind farms into long established rural communities. The principal is not prepared to make any submission re the Environmental Assessment (EA).

The proponent's EA does not adequately address the above implications sufficiently in the interests of the school community and both Governments' investment. If it is subsequently proven that these issues prevent the school from continuing a lot of taxpayers' money will be wasted in abandoning the current site and potentially establishing a new school site.

You will note from Chapter 12 of the EA Noise Assessment at 12.4.2 the proponent suggests that my residence some 600 – 700 metres further south than the school from the nearest windmills 10, 11, and 12 should be representative of the school.

The EA acknowledges that the criteria used are not suitable for a school. Are there not frequent periods of profound silence during school hours. Not only may pupils suffer health issues but also be constantly distracted from their class work.

The school is located approximately 1600m from mill 12 and clearly within the exclusion zone now adopted in Victoria. More importantly the school will be subject to excessive noise/tonality/frequency modulation when prevailing NE winds blow through Mills 3 – 9 and Mills 12, 11 and 10 directly at the school.

The SA Environmental Noise Guidelines for Wind Farms 20003 are the criteria, under the Director General's Requirements, to be applied to this wind farm application.

These guidelines are the subject of judicial review in the South Australia following the SA Full Supreme Court decision in the Quinn Case. I attach a press release from the Waubra Foundation relative to these Guidelines and the Quinn Case.

In relation to shadow flicker the EA (appendix C2) does not even deal with the school.

I believe it is incumbent upon you, to make formal submission in response to the EA (before 19th December2011) to protect the interests of these young pupils, your staff and both Governments' investment in the Errowanbang Primary School – **that the project does not proceed until Quinn's Case and the relevant noise guidelines are resolved.**

Conditions of consent will not solve the problem as enforcement will only exacerbate the community division and make the school principal's position untenable.

Yours faithfully

John Gerathy

CC: Mr Sam Haddad
Director General
Department of Planning

ANNEXURE 9

Gerathy to Ministers for Health & Education 16 December 2011

John Gerathy

email: gerathy@internode.on.net

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16 December 2011

The Hon Jillian Skinner MP
Minister for Health
Parliament House
Sydney NSW

The Hon Adria Piccoli MP
Minister for Education
Parliament House
Sydney NSW

Dear Ministers,

Re: **Environmental Assessment Flyers Creek Windfarm Development – Errowanbang Primary School.**

I refer to my letter to both of you of 6 December 2011.

I attach a paper of *Wind turbines, flicker and photosensitive epilepsy: Characterising the flashing that may precipitate seizures and optimizing guidelines to prevent them."* Of Professor G Harding, P Harding and A Wilkins. Neurosciences Institute Aston University, Birmingham, United Kingdom; and Department of Psychology, University of Essex, Colchester, United Kingdom.

This paper, among other things establishes that young people (7-19 years old) are five times at greater risk and that the risk of seizures does not decrease appreciably until the viewing distance exceeds 100 times the hub height, in Flyers Creek a distance of up to 10 km.

Further that wind turbines should be sited where buildings were not in the west south/west direction from the turbines (southern hemisphere). The school is clearly west/south west of mills 3-12 and at distances ranging from 1.8 km to less than 6 km. Importantly mills 3 – 9 are almost in line in the direction of the school and present a potential kaleidoscope flicker effect notwithstanding that the individual mills may not be rotating at 60 rpm.

You recall that my previous comment that the proponents EA does not even mentioned the school in the context of flicker when it appears to be a most serious problem for young people at this school.

Yours faithfully

John Gerathy

ATTACHMENT 2

G & V Knox - Landowners

Mr&Mrs G. Knox
"Triangle Park"
30 Panuara Road
Carcoar, NSW, 2791
Wind Farm Site 17

13/12/2011

To Whom It May Concern,

Re **Wind Farm Site 17**

We are writing to express our concern about, and object to, the proposed Flyers Creek Wind Farm as stated in our submission.

We are a young family who will be directly affected by the proposed Wind Turbines. Although we have recently purchased our property, "Triangle Park", we did so knowing that the Wind Farm was still only a proposal.

The reason behind our purchase was to help expand our property for our children. We are part of a Family Trust. As part of this trust we will eventually inherit the neighbouring farm land. This land has been in the family for nearly 40 years and was Geoffrey's home until we married. It is necessary to expand the family farm as it is a business. This business provides income for two families and having three children, we felt it was necessary to keep expanding when opportunities arise (which is quite rare in this tightly held property area).

The Wind Farm will devalue our land. It could also possibly have detrimental effects on our health, as our residence is within 2 kilometres from some of the Wind Turbines. We are extremely worried about the noise /infrasound / frequency modulation/ flicker that the Wind Turbines will produce.

Our Property is also located close to Errowanbang Public School, where Geoffrey schooled and where we had planned to send our children. If the Wind Farm goes ahead we will not let our children attend this school as they could be subject to photosensitive seizures, which is not an ideal learning environment.

Yours Sincerely

Geoffrey Knox

Vanessa Knox

ATTACHMENT 3
J Harries - Landowner

"Old Errowanbang"
CARCAOR NSW 2791
Wind Farm Site 13

Phone: 02 63667236
Mobile: 0400667231
Fax: 02 63667273
Email: minebiz1@bigpond.com

16 December 2011

Re **Wind Farm Site 13**

To Whom It May Concern

I would like to express my concerns, as stated in our submission, and object to, the proposal of Wind Turbines being erected in the Errowanbang Valley.

I have lived at Old Errowanbang, a heritage listed property settled and built by the Explorer William Lawson and his son, since 1979 following my marriage and have since November 11th become an owner of 'Old Errowanbang.

I run my business, Minebiz Pty Limited from the homestead and have done so since 2003.

My daughter, Kellie McGaw is the Minebiz Payroll Administrator and she comes to "Old Errowanbang" to work daily. Kellie has two children (my grandchildren) diagnosed with Autism and we have grave concerns that the effects of the Wind Turbines will seriously effect these children with noise/ infrasound/frequency modulation/ flicker which may increase the severity of their Autism.

I attach a paper on "Wind turbines, flicker and photosensitive epilepsy: Characterising the flashing that may precipitate seizures and optimizing guidelines to prevent them." Of Professor G Harding, P Harding and A Wilkins.
This paper, among other things establishes that young people (7-19 years old) are five times at greater risk and that the risk of seizures does not decrease appreciably until the viewing distance exceeds 100 times the hub height, in Flyers Creek a distance of up to 10 km. my residence is only 1.8 km from mills.

Kind regards

JANN HARRIES

ATTACHMENT 4

L Huson & Associates Pty Ltd - Noise Report

PLEASE REFER TO THE FLYERS CREEK WIND TURBINE AWARENESS GROUP INC

SUBMISSION IN RESPONSE TO THE EA FOR A COPY OF THIS DOCUMENT

ATTACHMENT 5

The Acoustic Group Pty Ltd – Noise Report

PLEASE REFER TO THE FLYERS CREEK WIND TURBINE AWARENESS GROUP INC

SUBMISSION IN RESPONSE TO THE EA FOR A COPY OF THIS DOCUMENT

ATTACHMENT 6

IMAGE 1: VIEW OF MILLS FROM BLAYNEY VIEWING AREA

ATTACHMENT 7

IMAGE 2: VIEW OF BLAYNEY WINDFARM PHOTOGRAPHED FROM 2300m

ATTACHMENT 8

ATTACHMENT 9

ATTACHMENT 10

Photographer Letter

John & Hilde Gerathy
34/10 Lincoln Cres
Wooloomooloo NSW 2011

28/11/11

Dear John and Hilde

I have examined the photo montage supplied to you by the Aurecon Group. A 50mm lense will represent, as close as possible, what the human eye perceives and this is why I used a 50mm lense on a Nikon D3 full sensor camera and used 2 images to create the panoramic shot from your front verandah step. I feel that this is a closer representation of this view as seen by the naked eye without the peripheral interference of the extreme wide angle image supplied by Aurecon and taken from the same position.

Aurecon has had to stitch several images together overlapping by 30% etc. I feel this is overly complicated. I have taken the photograph of 68.5m Blayney Windfarm mills from the same distance (2.3km) as from your home to mill 12 using the same lense and camera. I have used this photograph as reference to create a 150m mill in the Blayney Windfarm image using the scaling tool in photoshop. I have then pasted these mills into your panorama and have checked the measurement using a 16m gum tree as reference to double check the height. These mills appear larger in my panorama from your verandah than that supplied to you by Aureon as do the 68.5m mills in the Blayney Windmill Farm from 2.3km.

I have been a commercial photographer for 45 years both in Australia and Internationally. I graduated from America's New York Institute of Photography and I believe I have the experience to tell if a subject has been visually represented correctly.

Kind regards

Alf Manciagli

gecko photographics
studio 1 323 Summer Street Orange
76 Lysterfield Road Orange NSW 2800
p // **0418 217 638** • f // 02 6365 3525
e // alf@geckophotographics.com.au
w // www.geckophotographics.com.au
abn 41 845 836 942

ATTACHMENT 11 – Company Handout

Flyers Creek Wind Farm Overview

The Proposal

The Flyers Creek wind farm is proposed to include 44 Wind Turbine Generators and associated infrastructure including access tracks, primarily underground cables linking the turbines to the wind farm substation. The turbines are likely to have a generating capacity of 2.5-3.3 MW[1] depending on the model chosen. While the Flyers Creek turbines are going to be about twice as tall as those installed near Carcoar at the Blayney wind farm, each turbine will generate about five times more electricity.

Project Background

The Flyers Creek project was initiated when two farmers approached Infigen Energy to inquire whether their land, and that of their neighbours, was suitable for a wind energy facility in 2008. After meeting with the Shire & other stake holders and performing some preliminary feasibility studies, three 80 metre wind masts were erected to measure the area's wind speed. The wind monitoring towers are a good representation of the likely height of the wind turbine towers (not including the blades) and have confirmed an excellent wind resource. Numerous technical and environmental studies have been undertaken and completed and they are contained in the Flyers Creek Environmental Assessment (EA). A quick summary of the results of the studies in the EA appear below.

Environment Assessment

- **Planning Scheme Provisions** – The use of the land for a wind farm is compliant with the Blayney Shire planning scheme for the General Rural zone in which the project is located. There are no Environment Protection or Rural Small Holding zones near the project site.
- **Acoustic Studies** - Sophisticated computer modelling has estimated the acoustic levels at every neighbouring residence using very conservative assumptions. The predicted noise levels are fully compliant with the NSW wind farm noise standard which are the most strict in Australia and amongst the most stringent in the world.
- **Native Vegetation** – The project site's vegetation consists mostly of pasture grasses and no threatened or endangered plant species were identified during the native vegetation surveys.
- **Avifauna; Birds & Bats** – Only one threatened species of bird (Superb Parrott) and one threatened bat species (Yellow-bellied Sheathtail Bat) were detected during the extensive surveys conducted during several seasons. As both species were found in relatively small numbers, the independent ecologist concluded that the proposed wind farm would not have an ecologically significant impact on either species.
- **Cultural Heritage** – Extensive heritage surveys were undertaken for areas proposed to be disturbed by the project with traditional owners. A few scattered artifacts were found along with two potential archaeological deposit areas. The final layout of the wind energy project will avoid any areas of cultural significance.

[1] MW or Megawatt is a Million watts of electricity (enough electricity to supply 25,000 x 40 watt light bulbs)

- **Shadow Flicker** – Computer modelling has shown that less than ten neighbours to the wind farm project will experience any shadow flicker from the wind farm. Even those neighbours will experience less than 10% of the accepted shadow flicker guideline of 30 hours per year as a result of the design of the wind turbine layout.
- **Visual Amenity** - The visual impact from each neighbouring residence has been accessed and the potential for vegetation planting and other mitigation techniques have been examined.
- **Telecommunications** – The wind turbines have been located to avoid the telecommunication paths over the project site. While interference with analog TV signals is possible, but unlikely, this will not be an issue as analog TV broadcasting is scheduled to cease, in favour of digital TV, well before the wind farm is operational.
- **Traffic & Transport** – The traffic management and transport plan was developed in consultation with Blayney Shire's Engineering Services department. A survey of Shire roads in conjunction with the Shire's Roads Department will ensure that conditions of local roads are no worse than when construction started. Some minor upgrades of local roads, at our expense, will also occur. Should the wind farm be approved, we will continue to work with Blayney Shire, Roads NSW, and other stakeholders to minimise traffic related issues.

Community Consultation

The proponent has undertaken a significant program of community consultation including such steps as:

- The proponent has met with Blayney Shire Council officers and/or councillors continually over the past 3-4 years to obtain their comments and feedback on the project.
- Over 35 meetings with nearby neighbours have occurred answering questions and obtaining feedback on the project.
- Two mail outs to nearby neighbours have occurred describing and providing updates on the project. In addition, engagement with local media has kept the local community abreast of the project's progress
- Two community information days were held at a local hall where maps, photos, noise contour maps, and other information was on display and questions and comments obtained from the local community
- As a result of the community information days, two high yielding turbines were deleted from the project to increase the distance between wind turbines and northern neighbours

Project Environmental Benefits

Computer modelling of the actual output of the Flyers Creek wind farm, utilising a 2.5MW wind turbine, will result in:

1. Annual electricity generation of over 340,000 MW-hrs of pollution-free, renewable electricity---enough electricity to power over 45,000 typical NSW Households.
2. Annual greenhouse gas abatement of over 300,000 tonnes CO_2 ---equivalent to taking about 70,000 cars off the road.
3. Significant savings in electricity transmission losses by providing locally generated electricity as opposed to importing electricity to the district from far away coal fired generators

Should a wind turbine with a larger electrical capacity be selected for the project, substantially more electricity would be generated.

Economic Benefits

The Flyers Creek wind farm will provide significant opportunities for local businesses and contractors particularly during the construction phase. Meetings have already been held, in conjunction with the NSW Industry Capability Network, to identify and meet with local contractors who have the skills and experience to work on the project. Besides the direct benefits of new construction jobs and increased work for construction contractors, there will be many indirect economic benefits to the hospitality and other industries.

However, the economic benefits continue after the construction period is finished. At Infigen Energy's Capital Wind Farm, commissioned over two years ago, Infigen Energy is still spending $4 Million annually in the local community on salaries, services, landowner payments, and community contributions. For example, Infigen Energy purchased a new fire truck for the Bungendore CFA and sealed a local road primarily utilised by neighbours to the wind farm project as shown below.

Examples of Community Contributions by Infigen Energy in conjunction with the its Capital Wind Farm near Bungendore, NSW

Conclusion

Wind Energy is one of the fastest growing industries in the world with wind energy capacity doubling every 3 years for the past 15 years. In Australia, wind energy currently supplies over 20% of South Australia's electricity and has resulted in hundreds of millions of dollars in regional investment there. Infigen Energy is seeking planning approval for the Flyers Creek Wind Farm project to help NSW realise the benefits of clean wind energy. As Australia's largest owner of wind energy facilities, we have the experience and capability to make this project a success for our company as well as the local community. If you have any questions about the proposed project, please do not hesitate to contact the Project Manager using the details below:

Jonathan Upson
Senior Development Manger, Infigen Energy
02-8031-9900
Jonathan.upson@infigenenergy.com

ATTACHMENT 11 (Continued)

Flyers Creek Wind Co-operative

PROPOSAL

The Wind Co-op provides the community the opportunity to effectively buy a wind turbine and receive all profits generated by that wind turbine. Such infrastructure co-operatives are transparent, accountable and local. Some examples are Coleambally Irrigation, Harvey Water and Hepburn Wind.

The Wind Co-op will be run by the local community, for the local community. While Infigen Energy is kicking off this inititative, and will facilitate the start-up where it can, community members will manage the co-op's formation and operation.

Flyers Creek Wind Farm Proposal

The proposed Flyers Creek Wind Farm comprises 44 Wind Turbine Generators (WTGs) along with a substation, switchyard, cabling, access tracks and other associated infrastructure.

Depending on the model of the WTG, electrical capacity is likely to be between 2.5 and 3.3 megawatts (MW*), and project capacity will be between 110 – 145 MW.

Flyers Creek Wind Farm would result in over 340,000 MWh of annual electricity generation, which is sufficient to power over 45,000 typical NSW homes. This will help to avoid the abatement of over 300,000 tonnes of CO2 each year (equivalent to taking 70,000 cars off the road).

The Flyers Creek wind turbines will be about twice as large as the Blayney Wind Farm turbines, however, they will produce about 5 times more electricity.

First public meetings

Public meetings were held on 13 October 2011 in Orange and 14 October 2011 in Bathurst to commence the process for including a community owned wind turbine as part of its proposed Flyers Creek Wind Farm.

Core group of interested parties from both meetings have offered to form a committee to facilitate the development of the proposed co-operative. If you would like to register your interest to become a member of the Flyers Creek Wind Farm Co-op, please provide your details in the registration form.

** MW is a Megawatt, or Million watts of electricity, (equivalent to 25,000 x 40 Watt light bulbs)*

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www.windcoop.com.au/about-windcoop/flyers-creek-all-info/

ATTACHMENT 12 -1

Roads: B 0227 Burnt Yards Road outside "Errowanbang"

ATTACHMENT 12 -2

Roads: C 0234 Errowanbang/Carcoar Rd west of Turbine 19

ATTACHMENT 12 -3

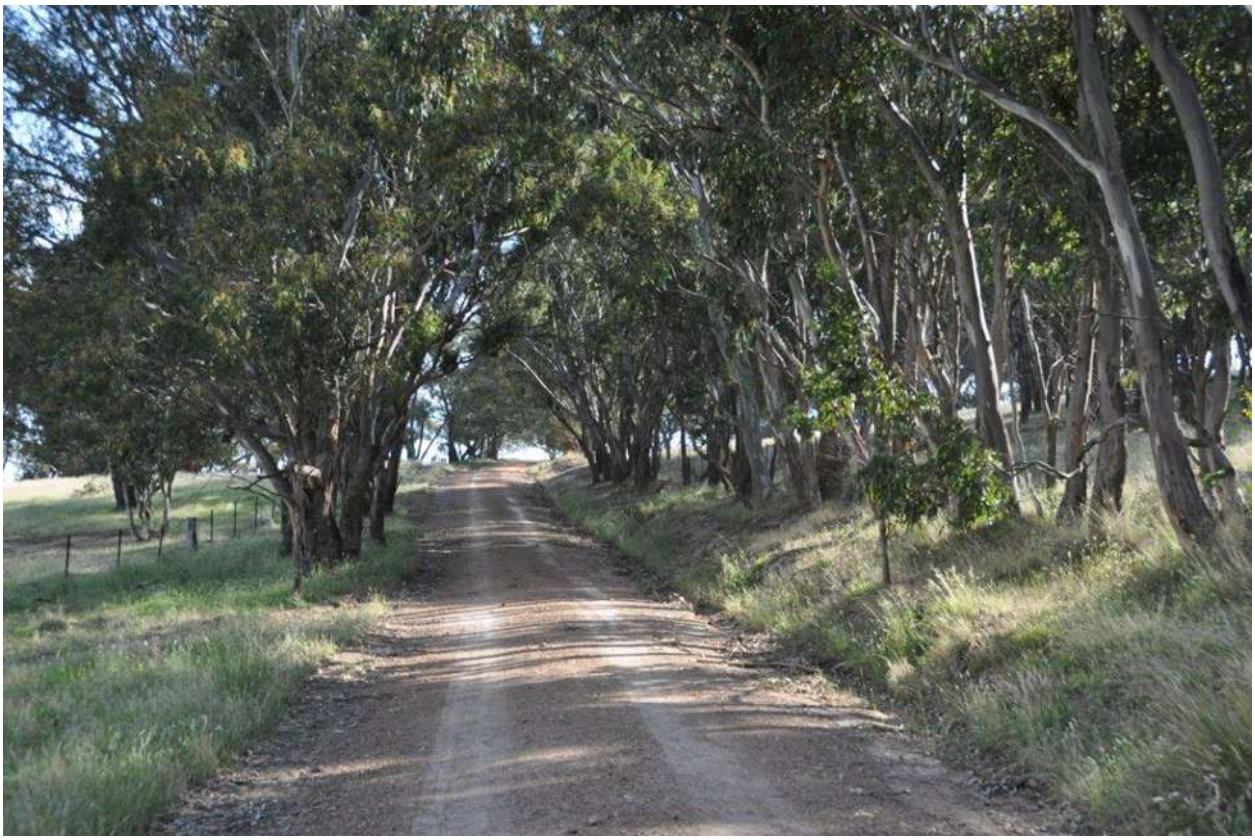
Roads: E 0242 Errowanbang Rd near School & Burnt Yards Rd Intersection

ATTACHMENT 12 -4

Roads: F 0252 Gap Road near Beneree Road Intersection

ATTACHMENT 12 -5

Roads: G 0257 Typical shot of Halls Road



ATTACHMENT 13

Call for wind farm roads to be resealed

ABC Ballarat
November 17, 2011

The Moyne Shire says the Victorian Government must ensure roads near the Macarthur wind farm are resealed after construction there finishes.

VicRoads has told the council it will convert some of the roads to gravel because they have been severely damaged by trucks carrying building materials to the site of the $1 billion wind farm.

It says annual funding and road maintenance priorities will determine when the roads are resealed.

Moyne Mayor Jim Doukas fears the roads may be left with a gravel surface indefinitely.
"We asked well, fair enough, if you haven't got the time because of the traffic to fix them, but what happens when all of the trucks are left and no longer require the road and they said there's a very, very good chance that they won't be resealed again," he said.
"Well, we just can't accept that, that's not on."

A local farmer, Jeff Riordon, says some of the roads around the wind farm have become too dangerous to drive on.

He says residents are taking long alternative routes because they do not believe the roads are safe.

"Some of them you don't really want to drive on," he said.

"We've got to go the long way round to get to Warrnambool and they're only narrow roads."

ATTACHMENT 14

Health Matters

Epilepsia, 49(6):1095–1098, 2008
doi: 10.1111/j.1528-1167.2008.01563.x

BRIEF COMMUNICATION

Wind turbines, flicker, and photosensitive epilepsy: Characterizing the flashing that may precipitate seizures and optimizing guidelines to prevent them

*Graham Harding, *Pamela Harding, and †Arnold Wilkins

*Neurosciences Institute Aston University, Birmingham, United Kingdom; and †Department of Psychology, University of Essex, Colchester, United Kingdom

SUMMARY

Wind turbines are known to produce shadow flicker by interruption of sunlight by the turbine blades. Known parameters of the seizure provoking effect of flicker, i.e., contrast, frequency, mark-space ratio, retinal area stimulated and percentage of visual cortex involved were applied to wind turbine features. The proportion of patients affected by viewing wind turbines expressed as distance in multiples of the hub height of the turbine showed that seizure risk does not decrease significantly until the distance exceeds 100 times the hub height. Since risk does not diminish with viewing distance, flash frequency is therefore the critical factor and should be kept to a maximum of three per second, i.e., sixty revolutions per minute for a three-bladed turbine. On wind farms the shadows cast by one turbine on another should not be viewable by the public if the cumulative flash rate exceeds three per second. Turbine blades should not be reflective.

KEY WORDS: Photosensitive epilepsy, Flicker, Rotors, Visual discomfort, Wind farms, Wind turbines, Green power.

The provision of energy from renewable sources has produced a proliferation of wind turbines. Environmental impacts include safety, visual acceptability, electromagnetic interference, noise nuisance and visual interference or flicker. Wind turbines are large structures and can cast long shadows. Rotating blades interrupt the sunlight producing unavoidable flicker bright enough to pass through closed eyelids, and moving shadows cast by the blades on windows can affect illumination inside buildings.

Planning permission for wind farms often consider flicker, but guidelines relate to annoyance and are based on physical or engineering considerations rather than the danger to people who may be photosensitive.

PHOTOSENSITIVE EPILEPSY

Photosensitive epilepsy (PSE) occurs in one in 4,000 of the population (Harding & Jeavons, 1994). The incidence is 1:1 per 100,000 per annum. Among 7–19 year-olds the incidence is more than five times greater (Fish et al., 1993). Photosensitivity persists in 75% of patients (Harding et al., 1997).

PRECIPITANTS

Sunlight is a precipitant of photosensitive seizures, whether reflected from waves, or interrupted as the subject travels past an avenue of trees or railings. In 454 patients Harding & Jeavons (1994) found 33 cases where seizures had been precipitated by flickering sunlight.

Television is a common precipitant of seizures and guidelines now prevent the broadcast of programs with flicker at rates exceeding 3 flashes per second, the frequency above which the chance of seizures is unacceptably high.

FLICKER FROM ROTATING BLADES

The interruption of light by helicopter blades has caused seizures (Johnson, 1963; Gastaut & Tassinari, 1966; Cushman & Floccare, 2007) but to our knowledge there are no reports of seizures induced by rotating ceiling fans.

Accepted February 1, 2008; Online Early publication April 4, 2008.
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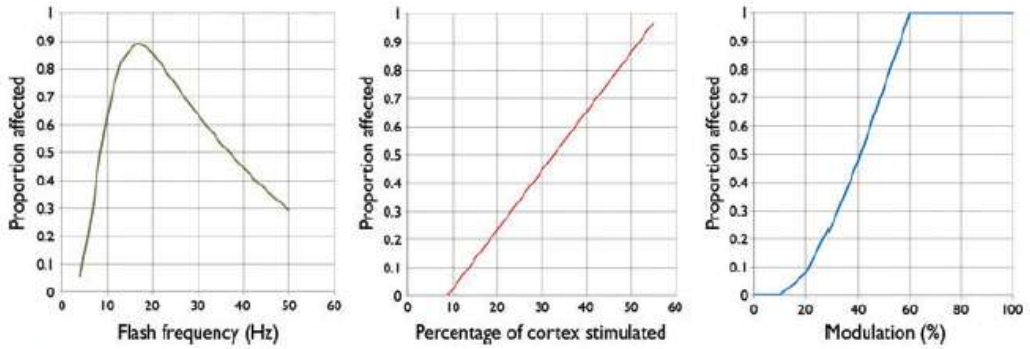

Figure 1.
Proportion of patients with photosensitive epilepsy sensitive to flicker, shown as a function of the frequency, the proportion of the cortex to which the flicker projects (estimated from the response to striped patterns, and the modulation depth of the flicker (expressed as a Michelson fraction). The data are taken from Binnie et al. (2002).

Large wind turbines usually rotate at between 30 and 60 revolutions per minute (rpm). Many are three-bladed and operate at a constant speed, and at 60 rpm produce flicker at a rate of 3 Hz; some two bladed wind turbines also exist. Turbines that rotate faster or have more blades will produce flicker at frequencies for which the chances of seizures are unacceptably high. Smaller variable-speed turbines range between 30 and 300 rpm (Verkuijlen & Westra, 1984) and some have more than three blades, so their flicker is within the range for which seizures are likely.

When several turbines are in line with the sun's shadow there is flicker from a combination of blades from different turbines, which can have a higher frequency than from a single turbine.

If the blades of a turbine are reflective then there is the possibility of flicker from reflected light at viewing positions that are unaffected by shadows.

Exposure to flicker from a turbine is determined by the hub height and the diameter of the blades, the height of the sun and the direction of the blades relative to the observer. These variables are affected by the time of day, time of year, wind direction, and geographical location (Verkuijlen & Westra, 1984). Shadows can be cast on the windows of nearby buildings, affecting the internal illumination giving rise to flicker that cannot be avoided by occupants. Verkuijlen & Westra determined the shadow tracks of wind turbines and their effect relative to the hub height of the rotor. They assumed that the rotor diameter was 75% of the hub height, but many wind turbines deviate from this ratio.

To avoid the problems of shadow flicker Verkuijlen and Westra proposed that wind turbines should only be installed if flicker frequency remains below 2.5 Hz under all conditions, and that wind turbines should be sited where buildings were not in East-NE or WNW directions from the turbine (northern hemisphere recommendations).

Two examples of seizures induced by wind turbines on small wind turbine farms in the UK have been reported to the authors in 2007.

The seizure-provoking effects of flicker depend on the time-averaged luminance of the flicker, its contrast, frequency and mark-space fraction and the area of retina stimulated, and are well described (Fig. 1).

The area of retina stimulated by flicker from a wind turbine might be expected to depend on the area that the rotors subtend at the eye. However, if the rotors interrupt direct sunlight casting a shadow upon the observer then the luminance of the flicker is likely to be such as to scatter sufficient light within the eye as to stimulate the entire retina with intermittent light. If the eyes are closed, the light is diffused by the eyelids, and intermittent light reaches the entire retina.

The luminance contrast ratio of the flicker depends on the extent to which the blades occlude the sun. Given that the sun subtends about 0.5 degrees, it is only completely occluded when the blades subtend more than 0.5 degrees at the eye, ignoring flare. When the observer is at a distance at which the blades subtend less than 0.5 degrees, the contrast of the flicker is reduced. Flicker ceases to be provocative at luminance contrasts less than about 10%, see Fig. 1. Assuming that contrasts of less than 10% occur when the width of the turbine blade subtends at the eye an angle that is 10% of the sun's diameter (0.05 degrees), it is possible to set a limit for the distance at which shadow flicker is likely to be seizure provoking. For a turbine blade 1 m in width, this distance is 1.14 km. Most shadows are likely to be of contrast sufficient to be provocative. It may be insufficient to restrict the

siting of turbines to a distance 10 diameters from habitation (Clarke).

In EEG laboratories, epileptiform EEG activity is induced in photosensitive individuals by a xenon gas discharge lamp providing a series of very brief flashes, i.e., laboratory studies have not investigated the effect of very brief dark periods in an otherwise bright stimulus (such as might be provided by a wind turbine rotor). However, in the case of a seizure induced by helicopter blades reported by Cushman and Floccare (2007) the dark period of the shadow flicker was between 24 and 27 times per second. Helicopter blades are usually narrower than those on wind turbines and would provide for a shorter dark interval that might be expected to be less provocative than for a wind turbine blade.

Flashing can occur by the reflection of sunlight from the gloss surface of blades (Clarke). The blades are likely to cause flicker only if the amount of sun reflected toward an observer varies with the rotation of the blades. Given the shape of the blades, such variation is likely. These considerations introduce the possibility of a danger zone different from that provided by the shadow cast by the blades.

In the case of reflected sunlight, the flicker may be less bright than that cast by a shadow, and the light scattered within the eye may be insufficient to cause a problem. If so, the effectiveness of the stimulus will depend on the visual angle subtended by the rotor at the observer's eye. This visual angle will be directly proportional to the rotor length (radius) and the distance from which the observer is viewing the rotor.

The visual angle subtended by the flickering light determines the likelihood of seizures. From the studies of Binnie et al. (2002) or Wilkins et al. (2005) it is clear that the risk of seizures is in direct proportion to the area of visual cortex stimulated, see Fig. 1. For this reason, flicker that is directed at the center of the visual field is more provocative than flicker in the visual periphery. (The central 10 degrees of vision provide for 90%of the neural output from the retina to the brain.)

Suppose a turbine with blades 75% of hub height is viewed from a distance (Fig. 2). The sunlight is not simultaneously reflected from more than one blade given that the angle of the blades relative to the sun will rarely be similar. We will assume that the blades are of uniform width equal to 10% of their (radial) length. The angle at the eye of an observer subtended by any blade is maximum when the blade is at the bottom of its path. Assuming gaze is centered half way up the blade, the proportionate area of the visual cortex stimulated can be calculated (Drasdo, 1977). The proportion of visual cortex (P) to which a circular centrally fixated stimulus, angular radius A, projects is $P = 1 - e^{-0.0574A}$.

Applying this formula to angular segments of the rotor surface centrally fixated, the area of cortex to which the rotor projects can be calculated and the proportion of patients liable to seizures can be estimated, using the relationship between proportion affected and stimulated area of the cortex (Fig. 1). The proportion of patients affected is shown as a function of viewing distance (expressed as a factor of the height of the hub) (Fig. 3). Note that the risk of seizures does not decrease appreciably until the viewing distance exceeds 100 times the height of the hub, a distance typically more than 4 km.

The above analyses indicate that flicker from wind turbines is potentially a problem at considerable observation distances. Over 1 km, 25% of the light should be attenuated by the atmosphere (Curcio et al., 1953). Such attenuation should reduce the risk by a similar proportion (Binnie et al., 2003).

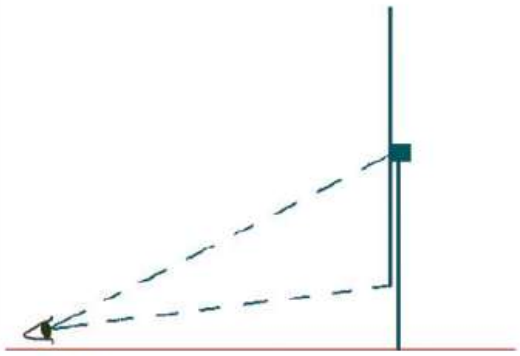

Figure 2.
Maximum visual angle is subtended by blades when at the bottom of their path.
Epilepsia © ILAE

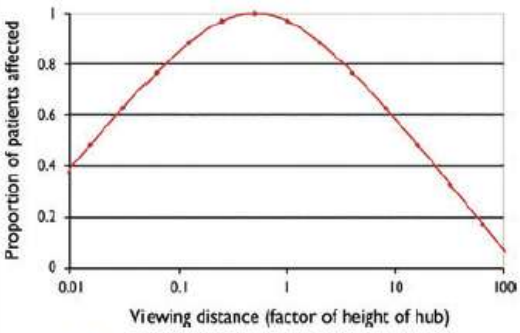

Figure 3.
Proportion of photosensitive patients liable to seizures from light reflected from a turbine blade shown as a function of viewing distance. The viewing distance is given as a factor of the height of the hub.
Epilepsia © ILAE

Discussion

Flicker from turbines that interrupt or reflect sunlight at frequencies greater than 3 Hz poses a potential risk of inducing photosensitive seizures. At 3 Hz and below the cumulative risk of inducing a seizure should be 1.7 per 100,000 of the photosensitive population. The risk is maintained over considerable distances from the turbine. It is therefore important to keep rotation speeds to a minimum, and in the case of turbines with three blades ensure that the maximum speed of rotation does not exceed 60 rpm, which is normal practice for large wind farms. The layout of wind farms should ensure that shadows cast by one turbine upon another should not be readily visible to the general public. The shadows should not fall upon the windows of nearby buildings. The specular reflection from turbine blades should be minimized.

Acknowledgments

None of the authors have any associations, which might affect their ability to present and/or interpret data objectively, particularly financial ties to funding sources for the work under review.

Conflicts of interest: We confirm that we have read the Journal's position on issues involved in ethical publication and affirm that this report is consistent with those guidelines.

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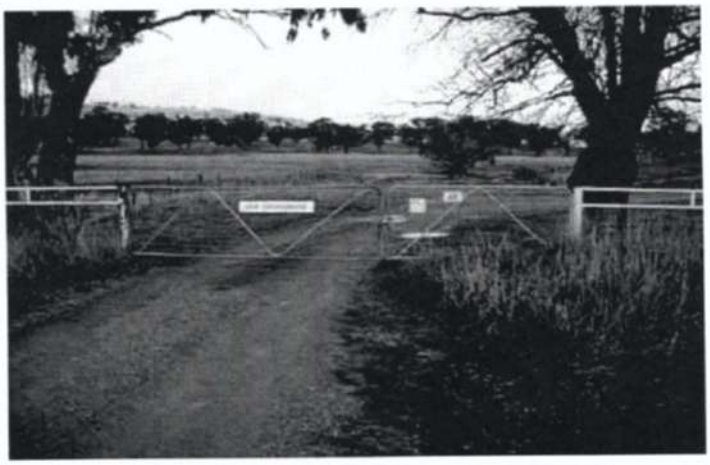
ATTACHMENT 15

Valuation Report

Opteon

Australia's Property Advis



Property:	Part 'Old Errowanbang' 64 Old Errowanbang Lane **Carcoar NSW 2791**
Instructions:	Report prepared for: Ms Jann Harries, Mr Charlie Knox and Mr John Gerathy Instructions received from: Ms Jann Harries Minebiz Pty Ltd 'Old Errowanbang' 64 Old Errowanbang Lane **Carcoar NSW 2791**
Purpose:	To assess the fair market value of real estate for proposed purchase purposes and to apportion values for the proposed subdivided lots on two bases.
Date:	Inspection: 24 August 2011 Valuation: 24 August 2011

Opteon (Central West NSW)
Lvl 1, 29-31 Sale Street ORANGE NSW 2800
Ph: (02) 6362 5988 Fax: (02) 6362 5116
orange.info@opteon property.com.au
www.opteonproperty.com.au

Value made visible

1.6.1.3 Value In One Line

Valuation of Lot 51 In One Line

Improvements						
Main House						
Main			$	465,000		
Garage			$	2,000		
Storeshed			$	1,000	$	468,000
Cottage						
Main			$	110,000		
Garage			$	3,000		
Storeshed			$	1,500	$	114,500
Outbuildings						
Machinery Shed 1			$	5,000		
Machinery Shed 2/Workshop			$	10,000		
Hayshed			$	15,000		
Horse Enclosure			$	5,000		
Shearing Shed			$	25,000		
Cattle Yards			$	15,000	$	75,000
Total Improvements					$	657,500
Land	298.5	ha at	$	4,750	per ha	$ 1,417,875
Total					$	2,075,375
Round to Say					$	**2,100,000**

OPTEON (Central West NSW)

MARK K HOPCRAFT

FAPI Certified Practising Valuer
Registered Valuer No 20340

ATTACHMENT 16

Ray White Real Estate Letter – Property Values

Ray White.

94 Sale Street
Orange NSW 2800
PO Box 1037
Orange NSW 2800
tel 02 6362 0211
fax 02 6363 1495
orange.raw@raywhite.com
raywhite.com

Re: Proposed Flyers Creek Wind Farm Land Value

I am a Principal of Ray White Orange and have been engaged in the real estate industry for over 30 years, 25 of which have been in Orange.

In or about February 2009 I was engaged by Michael Redman, then owner of Lot 63 DP 750358, to sell his property. This comprised 251 acres of undulating to steep grazing land with permanent creek access, and a recently built 2 bedroom cottage.

The property was marketed at $610,000 and subsequently sent to auction on the 23rd March, 2009, where it did not sell.

Despite a thorough marketing campaign the proposed Wind Farm was a complete negative to this property's most likely market, the lifestyle hobby farmers. The only market where the property had any real interest was with neighbours, and people thinking of buying a block with potential wind farm revenue. However, these purchasers were not prepared to pay anything like the property's market value.

The property was ultimately sold for $395,000.

The negative affect on property values by Wind Farms was clearly demonstrated with this property.

Yours Sincerely

David Blunt

Orange