SUBMISSION TO THE RENEWABLE ENERGY (ELECTRICITY) AMENDMENT (EXCESSIVE NOISE FROM WIND FARMS) BILL 2012

By Andrea Strong on behalf of the Community for the Accurate Impact Assessment of the Dalton Power Station (CAIAD)

I am the owner of a farming property near Dalton, NSW. Our property is in close proximity to the site where AGL has recently received approval to construct the largest open cycle gas fired power station ever built in Australia. Through my involvement in the Dalton project environmental assessment (EA) process it is evident that many of the noise issues relevant to wind farms are the same as those faced by residents living nearby open cycle gas fired power stations. In literature discussing problems of low frequency noise, open cycle gas fired power stations are at the top of the list of low frequency noise emitting industries.

The Dalton EA process has highlighted serious deficiencies in government policy in protecting communities from the low frequency noise associated with electricity generating infrastructure. The adverse impacts felt by individuals and communities from approvals of such infrastructure developments under past and present assessment criteria clearly demonstrate that Australia needs to establish criteria based on international best practise for controlling low frequency noise in order to maintain the correct balance between the need for industrial development and the preservation of the acoustic amenity of our rural environment.

Recently AGL has suspended the Dalton project citing falling electricity demand as the reason for putting this project on hold. However the proponent has 5 years from the date of approval to commence construction before approval lapses. So our community still faces the real prospect of lost acoustic amenity if the project does go ahead.

Our concerns about the noise issues associated with the Dalton project were reinforced when we spoke to residents neighbouring another recently commissioned open cycle gas fired power station in NSW at Uranquinty near Wagga Wagga. Uranquinty was commissioned in 2009. Recent reports indicate up to 10 farming families have left the Uranquinty area because of intolerable noise generated by that facility.

A. SPECIFIC ISSUES RELATING TO LOW-FREQUENCY NOISE

The specific issues relating to low frequency noise are summarised by the UK Department for Environment, Food and Rural Affairs (DEFRA) as follows:

1. Low frequency noise is not attenuated to the same extent as mid and high frequency noise by travelling through the atmosphere and across the surface of the earth. This means that as sound travels its frequency content changes making low frequencies more prominent at greater distances.
2. For people inside buildings with windows closed, this effect is exacerbated by the sound insulation properties of the building envelope. Again mid and high frequencies are attenuated to

a much greater extent than low frequencies. Thus the frequency content again alters emphasising still further the low frequency content.

3. Resonance can be set up inside a room with nodes (quiet points) and anti-nodes (loud points). The number and position of these nodes and anti-nodes will depend on the specific room dimensions and the frequency of the noise. The consequence is that the room resonances can cause elevated levels of low frequency noise at points within a room.
4. People's hearing tends to deteriorate with age, but not equally across the frequency spectrum. Hearing deteriorates more rapidly at the mid and higher frequencies than at the lower frequencies which means that older people's hearing tends to be proportionately more acute at low frequencies.
5. It has been postulated that some people exhibit discrete peaks in their hearing threshold. This means that a sound could appear tonal to one person but not to another. http://www.scotland.gov.uk/Resource/Doc/158512/0042973.pdf

These characteristics of low frequency noise and the nature of human response to low frequency noise mean that: distances between the industry and dwellings must be much greater; at receptor mitigation such as double glazing a dwelling is unlikely to be an effective remedy and may in fact make the problem worse; and farmers with hearing loss are likely to be a population particularly sensitive to low frequency noise.

The Uranquinty case

A large number of families for this small community in a 2.5km radius have been bought out by the recently commissioned Uranquinty gas fired power station because of intolerable low frequency noise levels. At the time we wrote our submission in response to the Dalton EA, five families neighbouring the Uranquinty gas fired power station had gone, two more families were in negotiation to go, and another two were being paid compensation. More recent reports put the loss of families to the district at 10.

Uranquinty residents comment they can feel vibrations through the ground and that windows rattle even as far as 4 to 5km away.

They say:

> "The vibrations are often felt separately to the low frequency noise. They can be noticed through the rattling of windows or felt through the body. If you stand in certain parts of our house you can feel the vibration reverberate through your body from the floor. It is quite an unpleasant feeling when a combination of both vibration & low frequency is felt. Neighbours with 'hearing loss' (which is many of the male farmers) are affected more by the low frequency emissions than those with 'full hearing'".

The EA for the Dalton power project didn't assess vibrations from the plant. It said "Gas turbine plant operate at high rotational speed and are very sensitive to vibration and hence very well

balanced preventing vibration at levels that could be intrusive to surrounding receptors." (AGL and URS 2011, p12-7).

When we discussed the reports of vibrations from Uranquinty power station with the EPA they said although residents thought they were feeling vibrations, the vibrations were in fact most likely a manifestation of the low frequency noise. No assessment as to whether low frequency noise would cause a vibration sensation was undertaken in the EA for Dalton.

Residents at Uranquinty talked about feeling the need to escape the noise and that they would get in their cars and drive into town to get away from the noise, walking the streets aimlessly and hoping the power station that operates in periods of peak electricity demand would have ceased operating by the time they got home. They discussed the sensation of low frequency noise as something indefinable. The effects however were more tangible and included symptoms of nausea, faintness and "vertigo".

The affected residents at Uranquinty are bound by confidentiality agreements having won a legal battle over noise with the plant operator. The lawyer for the residents said he had never seen a case like it. Stoic farmers, not easily rattled by adverse environmental circumstances having endured terrible droughts and bushfires, were coming into his office one after another and breaking down because of the impact the power station had had on their family's quality of life and health. In some cases their farms had been in the family for four generations but the family was finding the noise intolerable and wanted to leave.

The Uranquinty power station at 640MW is less than half the size of what was initially proposed at Dalton (a 1500MW power station), and less than two thirds the size of the approved 1000MW Dalton power station. Nevertheless Uranquinty has not been able to meet the EPA noise limits once commissioned despite retro fitting noise abatement measures. When we lodged our submission in response to the EA of the Dalton power station, the owner of the Uranquinty power station was in litigation with the turbine manufacturer and had spent $60million on abatement measures which seemed to make the problem worse rather than better.

Our concern at Dalton is that if Uranquinty couldn't meet noise limits with a smaller number of the quieter E class turbines, and AGL proposes to construct with a larger number of the larger noisier F class turbines, then it would seem impossible to prevent unacceptable adverse noise impacts on neighbouring properties.

AGL argued that they had done a better job than the Uranquinty gas fired power station at buying surrounding properties to ensure a better buffer between impacted neighbours. There are three reasons why AGL's argument that they "have done a better job" is incorrect: 1. Low frequency noise is not attenuated effectively by distance so distance from residences is less important than using quieter technology; 2. Dalton is much bigger than Uranquinty and is using noisier technology; and 3. There are in fact a number of dwellings in close proximity to the proposed site.

There are three dwellings less than 2.5km from the Dalton site and many a little further out, including the town of Dalton 3.7km away. As residents 2.5km away have been forced from their

homes in the case of the smaller Uranquinty power station, it would seem the proposed AGL power station, being much larger, will cause significant adverse noise impacts. A map showing the location of residences near the Dalton power station site is shown in Appendix B of this submission. A map, included in our submission in response to the Dalton EA, showing the location of residences near the Uranquinty power station site, where families have left their homes, are in negotiations to leave, or are being paid compensation for noise, is shown in Appendix A of this submission.

The inability of the Uranquinty gas fired power stations to meet noise controls once in operation isn't an isolated incident.

The Alice Springs case

The submission by Canberrans for Power Station Relocation (CPR) Inc to the development proposal for the Tuggeranong 210MW gas turbine power station says the proposed Titan 130 turbines when installed actually produced 103.1 dBa rather than the 87 dBa as claimed in the Tuggeranong Noise Assessment. They say that ..

> the Titan 130, installed at the Ron Goodin Power Station (RGPS) in Alice Springs, "produces 103.1 dBa and they apparently cannot get it anywhere near the suggested 87dBa. This is detailed in the comprehensive report which was published in January 2007 (Full report - http://www.powerwater.com.au/news/media_releases/2007/1001_noise_report_ron_goodin_power_station.htm)
>
> On page 7 of the RGPS report it states: This real world example indicates that a Titan 130 produces levels somewhere between 99.2 and 103.1 dBa which is much higher than Bassett's base data of 87dBa. This once again, calls into serious question the quality of the Noise Assessment.
>
> This situation is even more extraordinary when you consider that the above report was commissioned AFTER approximately $800,000 was spent in an effort to reduce the noise to an acceptable level.
>
> They failed, so the generator is being moved 25 km out of Alice Springs. Full details can be found here: http://www.powerwater.com.au/news/ron_goodin_power_station.htm ....."

The Laverton case

The original licence for the Laverton North power station only allowed the power station to operate for 10% of the year, but in May 2007 the Victorian Civil and Administrative Tribunal ordered that the plant remain shutdown on weekdays between 8am and 5pm, due to the neighbouring offices being affected by the level of noise and vibration. The restriction on operation was removed in July 2007 because of the drought which was impacting on alternate hydro peaking capacity.

Herald Sun, May 11, 2007:

"**A POWER station that supplies extra energy in the summer peak has closed in business hours because of health risks. By** Wayne Flower

The Snowy Hydro gas-fired power station in Laverton North will halt at 8am today after Victorian Civil and Administrative Tribunal deputy president Helen Gibson issued an interim enforcement order.

The order follows complaints by office workers across the road from the plant about the level of noise and vibration emanating from the unmanned station.

Metroll Victoria general manager Frank Collett said most of the company's 20 office staff had reported headaches, nausea, ear aches and other adverse health effects since the plant fired up last November.

The order, which will remain in place until at least July 29 when the matter heads back to VCAT, means the plant will be unable to operate between 8am and 5pm on weekdays."

http://www.heraldsun.com.au/news/victoria/health-risk-to-close-power-plant/story-e6frf7kx-1111113511468

B. PROBLEMS WITH THE ENVIRONMENTAL ASSESSMENT OF THE DALTON POWER STATION AS INDICATORS OF DEFICIENCIES IN THE ASSESSMENT PROCESS GENERALLY

The environmental assessment of the Dalton power project, with respect to noise was undertaken with reference to the NSW Industry Noise Policy (INP). The NSW INP and the environmental assessment had problems for the community for a number of reasons.

1. **The INP ignores very low ambient noise in a rural environment**
2. **The INP ignores that power stations are being sited in populations more susceptible to annoyance by low frequency noise**
3. **Under the NSW INP the proponent is exempt from meeting the noise criteria in adverse weather conditions and these conditions occur most of the time in the region.**
4. **No noise data were available for the proposed power station stacks so the proponent *assumed* the noise for the stacks wouldn't exceed limits**
5. **Instead of a 5dB(A) penalty on the intrusiveness criteria because of the presence of low frequency noise, a dB(C) limit is introduced**

1. The INP ignores very low ambient noise in a rural environment

The NSW Industry Noise Policy (INP) assessment process has problems for people living in a rural area because it doesn't take into account the very low ambient noise levels in the bush.

People in urban areas don't seem as affected by these developments as farmers. This may be because towns have a higher level of ambient sound. Often farmers may be closer to the developments, but an important factor seems to be that they are going from a 'no noise environment' to a 'noise environment'. This isn't taken into account in the NSW INP assessment process as the Rating Background Level (RBL) of noise, if found to be less than 30 dB(A), is raised to 30 dB(A). For instance at one location near the Dalton site, the RBL during the day and at night was found to be 25dB(A). As this is less than 30dB(A), for assessment purposes, this was raised to 30dB(A) and the Intrusive Noise Criteria is set at 5 dB(A) above this, i.e.35dB(A). This allows the power station to increase noise levels by up to 10 dB(A) (35 dB(A) criteria less 25 dB(A) actual RBL). In an urban situation where the RBA is 30dB(A), industry can only raise ambient noise 5dB(A).

It is noted that the WHO guidelines for community noise states that noise has the potential to disrupt tranquillity and "existing quiet outdoor areas should be preserved", http://www.who.int/docstore/peh/noise/Commnoise4.htm. On many properties, waterways and old remnant stands of trees are fenced off for conservation purposes, and should have their tranquillity preserved.

It is also noted that the *Interim Guidelines for the Control of Noise from Industry in Country Victoria,* EPA Publication No N3/89, 2010 makes provision for lower noise limits in areas where background sound levels are very low (i.e. <25). This suggests that governments are beginning to recognise that allowing noise generating industry in areas of otherwise very low ambient noise has problems.

2. The INP ignores that power stations are being sited in populations more susceptible to annoyance by low frequency noise

The aim of the NSW INP is "to protect at least 90 per cent of the population living in the vicinity of industrial noise sources from the adverse effects of noise for at least 90 per cent of the time". The Dalton power station is being located in a population expected to be sensitive to low frequency noise, farmers with hearing loss, and therefore more stringent controls are needed to protect that community from annoyance by low frequency noise.

3. The proponent is exempt from meeting the noise criteria in adverse weather conditions

The proponent predicted adverse weather conditions would only increase noise 3-4db and therefore noise won't exceed the criteria in these conditions. However the NSW INP says adverse weather conditions generally increase noise by 5-10db and up to 20db. Our community raised concerns that the proponent had seriously underestimated the impacts of weather on noise propagation.

The conditions of consent for the power station currently exempt AGL meeting 35dBa intrusiveness criteria under certain weather conditions. The weather conditions when AGL is not required to meet the noise criteria are when wind exceeds 4m/s and during strong G class temperature inversions. In the Dalton region wind speeds exceed 4m/s 50% of the time

and G class stability conditions are estimated to occur 15% of the time. Therefore for 65% of the time there are no limits on the noise the power station can make.

Exempting industry from meeting noise controls during certain weather conditions has been a problem for the people Uranquinty. Residents there claimed that the power station exceeded limits but the plant operator said those noise events were excluded from the noise sampling as the weather conditions were propagating the noise. However the propagation of noise by the prevailing weather conditions was and is part of the problem for the residents.

4. No noise data were available for the proposed power station stacks so the proponent *assumed* the noise for the stacks wouldn't exceed limits

Quite extraordinarily in a footnote to Table 5-4 (Appendix G) of the Dalton EA it is stated that the "Sound power level of the exhaust stack has been estimated based on the maximum cumulative sound power level the site can generate in order to meet noise limits. To ensure the compliance with the noise limit, sound power level of exhaust stack opening and body combined should not exceed 110 dB(A)". This assumption and subsequent testing seemed completely without scientific rigour. It is assumed the stacks wont emit more than 110 dB(A), and then this figure is put into the model to see if it exceeds the noise limits. By assumption it doesn't.

5. Instead of a 5dB(A) penalty on the intrusiveness criteria because of the presence of low frequency noise, a dB(C) limit is introduced

There is an urgent need for a comprehensive review of competing international assessment criteria to be undertaken rather than allowing proponents to propose criteria which suit their applications.

The Dalton project failed to meet existing NSW INP noise criteria for low frequency noise and the proponent successfully argued for their project to be assessed against another criteria. NSW INP is a whole of government agreed position on industry noise and has been developed with all stakeholders involved: industry; the community; and government. It is essential we have robust best practise policy that cannot be altered when a proponent fails to satisfy the criteria.

The current NSW INP controls industry noise by intrusiveness and amenity criteria. The intrusiveness criteria was the relevant constraint in the Dalton case, limiting noise emissions to 35dB(A) at the closest receptor. Under the NSW INP if the noise has annoying characteristics such as low frequency elements and/or tonality a penalty of 5dBA is applied for each annoying characteristic which effectively reduces the criteria to 30dBa for the first penalty and 25dBa for the second.

The NSW INP guidelines say the 5dBa penalty needs to be applied if the difference between the A and C weighted levels is greater than 15. The NSW guidelines are less stringent than

the WHO guidelines which state that low frequency should be considered if the difference between the A and C weighted levels is more than 10 (http://www.who.int/docstore/peh/noise/Commnoise4.htm).

Although the Dalton Gas Fired power station substantially exceeded the INP difference approach for assessing low frequency noise impacts, the EA successfully argued recent literature by Broner (2008) indicated "the INP difference approach is not suitable for use in assessments when the noise levels are low" (AGL and URS 2011, p12-24).

As such, no 5db(A) penalty was applied to the intrusiveness criteria for low frequency noise. Instead a direct control on low frequency noise was applied. DP&I argued a direct control on low frequency noise would better protect the community.

> DP&I said "The EPA has advised that alternative approaches to low frequency noise are being investigated. However, they have not sufficiently progressed to an agreed industry standard. Once finalised, it is expected that an Application Note to the *NSW Industrial Noise Policy* will be prepared to guide the assessment of low frequency noise. Discussions have been held between the Department and the EPA Noise Policy Branch regarding the assessment of low frequency noise for the proposed Dalton Power Project. The agreed outcome was that low frequency noise from gas-fired power stations should be regulated on a case-by-case basis until the Application Note to the *NSW Industrial Noise* Policy is finalised by the EPA. Further, it was considered that the C-A weighting plus 5 dB(A) penalty approach as defined in the *NSW Industrial Noise Policy*, was not a good measure of annoyance, and could result in the application of measures that would not improve environmental outcomes.
>
> Consequently, following consultation with the OEH, the Department formed the opinion that the most appropriate criteria for the measurement of noise, and in particular low frequency noise, should be the addition of a dB(C) criteria, rather than the *NSW Industrial Noise Policy* penalty approach. In this respect, the Department has recommended a condition of approval limiting noise levels at the nearest sensitive receivers to 65 dB(C) during the day and 60 dB(C) during the evening and night, in addition to the maximum allowable noise limit of 35 dB(A) during the day, evening and night. The EPA, and subsequently the PAC, has agreed to this approach which is more stringent than that recommended by the OEH in its response to the Submissions Report" (Director-General's Environmental Assessment Report, Section 75I of the *Environmental Planning and Assessment Act 1979,* May 2012, p29).

It is important to note that the DP&I and the EPA have accepted the Broner criteria despite the fact that no peer review of the criteria against international best practise has been made available. International standards point to a reference curve with the dB limit determined by the Hz level as the best means of controlling low frequency noise.

Further, no assessment has been carried out to determine whether affected residents nearby other facilities, such as Uranquinty, would have been protected with his criteria. Nor has there been any assessment of the effectiveness of the Broner criteria for preventing sleep disturbance or disturbance inside a dwelling. It is noted that Broner's criteria are criticised as being far too high by the Parkesbourne/Mummel Landscape Guardians Inc. in their submission to the NSW PLANNING GUIDELINES: WIND FARMS: A resource for the community, applicants and consent authorities, pp45-47.

We contacted Dr Broner to see if his criteria would have protected the community of Uranquinty. He said it would be interesting to review the data from Uranquinty and doing so would allow him to check his proposed criteria (email 6/5/2012). The community questioned why the project was approved before the criteria had been checked and peer reviewed.

We also pointed out in a submission to the Planning Assessment Commission (PAC) that the 5dBC penalty on the criteria recommended by Broner, if the low frequency noise is fluctuating, has not been adopted as policy or a condition of consent for the Dalton power project. Broner recommends that his criteria for low frequency noise be reduced to 55dBC (night) and 60dBC (day) if the low frequency noise is fluctuating. The fact that this penalty does not form part of the conditions of consent is a major omission for the community. AGL failed the existing NSW INP difference approach for controlling low frequency noise and argued for using the Broner approach. To then only implement those aspects of the Broner approach with which the proponent is able to comply is very frustrating and unfair for the community and poor government policy. Our "please explain" letter to the Minister for Planning on this specific issue remains unanswered.

One of the reasons DP&I argue for the adoption and application of the Broner dB(C) criteria is that it is simple. However, it is submitted that protection of amenity rather than simplicity should be driving criteria selection.

C. VITAL CONDITION OF CONSENT

The community has had one small win in the Dalton power station approval process. During the consultation the proponent gave a public undertaking to the community that if the Dalton power station exceeded noise limits AGL would shut it down. The PAC recommended that if environmental criteria are exceeded, operation shall be ceased or limited to ensure compliance.

The normal process, when industry exceeds environmental noise limits, after the plant is built, is for the power station owner to:

i. Mitigate at source – retro fit abatement measures to the power station. If that fails then…
ii. Mitigate at the receptor – insulate and double glaze the neighbouring homes. If that fails then…
iii. Pay compensation. If that fails then…

iv. Acquire the dwelling.

This process puts the cost of the power station failing to meet noise limits on the community. There is no incentive to get the noise assessment correct or build plant within noise limits. It is a small cost to a $1.5billion power station owner to buy out affected residents. The requirement that the plant is shut down if it exceeds noise limits puts a big incentive on the owner to get it right. An idle $1.5billion power station is a big incentive to ensure the plant is constructed so noise limits aren't exceeded.

The community strongly believes that all development approvals in Australia should require that if environmental criteria are exceeded, operation shall be ceased or limited to ensure compliance. This internalises the noise pollution cost to the proponent and drives noise efficient plant development.

CONCLUSION

Whether low frequency noise is caused by wind farms, open cycle gas fired power stations or other industry, it is responsible for forcing residents from their homes. Low frequency noise is a complex problem. Much greater separation of industry from dwellings is needed to allow attenuation of low frequency noise and the practise of sound proofing dwellings is largely ineffective. At Uranquinty windows rattle up to 5km away from that open cycle gas fired power station.

It is possible to make industry less noisy by spending more money on quieter technology and building smaller plant. Government policy that sets limits on low frequency noise needs to be based on international best practise to encourage industry to invest in plant with better environmental outcomes. Such best practise policy will encourage the equitable balance between industry development and preservation of amenity for residents.

The existing low ambient noise in rural environments needs to be taken into account when allowing noise emitting industry in rural areas. Also the characteristics of the population neighbouring noise emitting industry needs to be understood and more stringent controls on low frequency noise are needed where there is a high level of hearing loss in the community.

Further it is vital for the protection of acoustic amenity of communities that if plant exceeds noise limits once commissioned, that operation is ceased or limited to ensure compliance with environmental criteria. This puts an incentive on industry do their homework and build plant to meet approved environmental criteria. It also means that it is essential that the criteria are set appropriately and that industry is not exempt from meeting the criteria in weather conditions that occur frequently in a region.

These industries emitting low frequency noise are being located are peaceful rural areas. The communities in these areas want their tranquillity preserved.

Appendix A:

Appendix A contains details of the families at Uranquinty who have been seriously impacted by noise in excess of NSW INP guidelines. Of the families:

- 5 have been bought out by Origin and left the area (see Figure A-1 below)- Wyrilla & The Pines were 4th generation families;
- 2 have taken compensation payments for the next 5 years with the option to be bought out if the noise levels cannot be mitigated;
- 2 are currently in negotiations with Origin.

Residents at Uranquinty say that initially engineers installed "prongs" into the top of the stacks to reduce the 'rumbling' but have now created low frequency noise and vibration problems. Origin has had engineers from Germany and Canada on site trying to find a solution and is looking at rebuilding the stack configuration at a cost of $60 million.
In Figure A-2 the circle with a 2.5km radius shows the location of residents relative to the Uranquinty power station.

Appendix A: **Figure A-1**

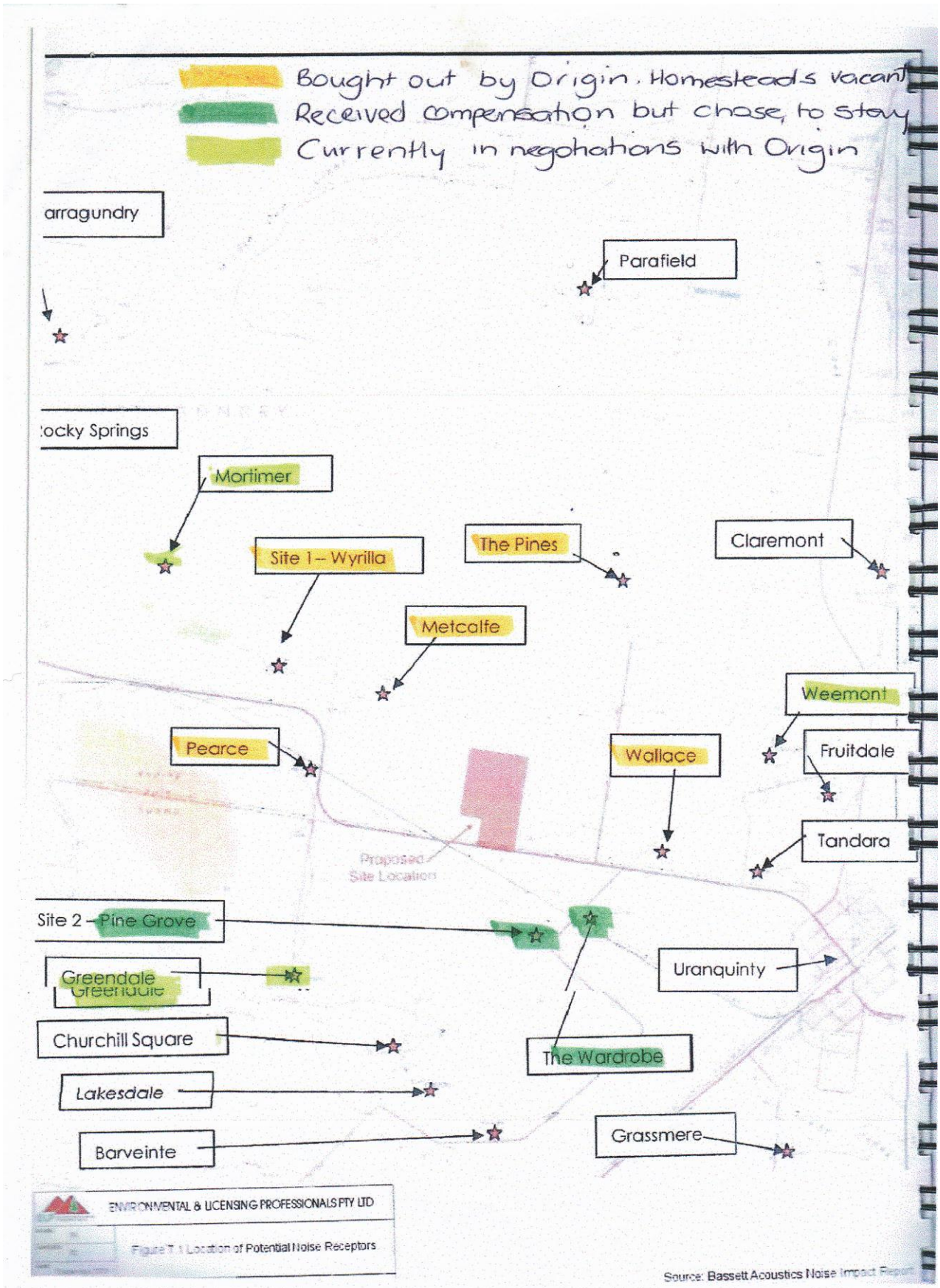
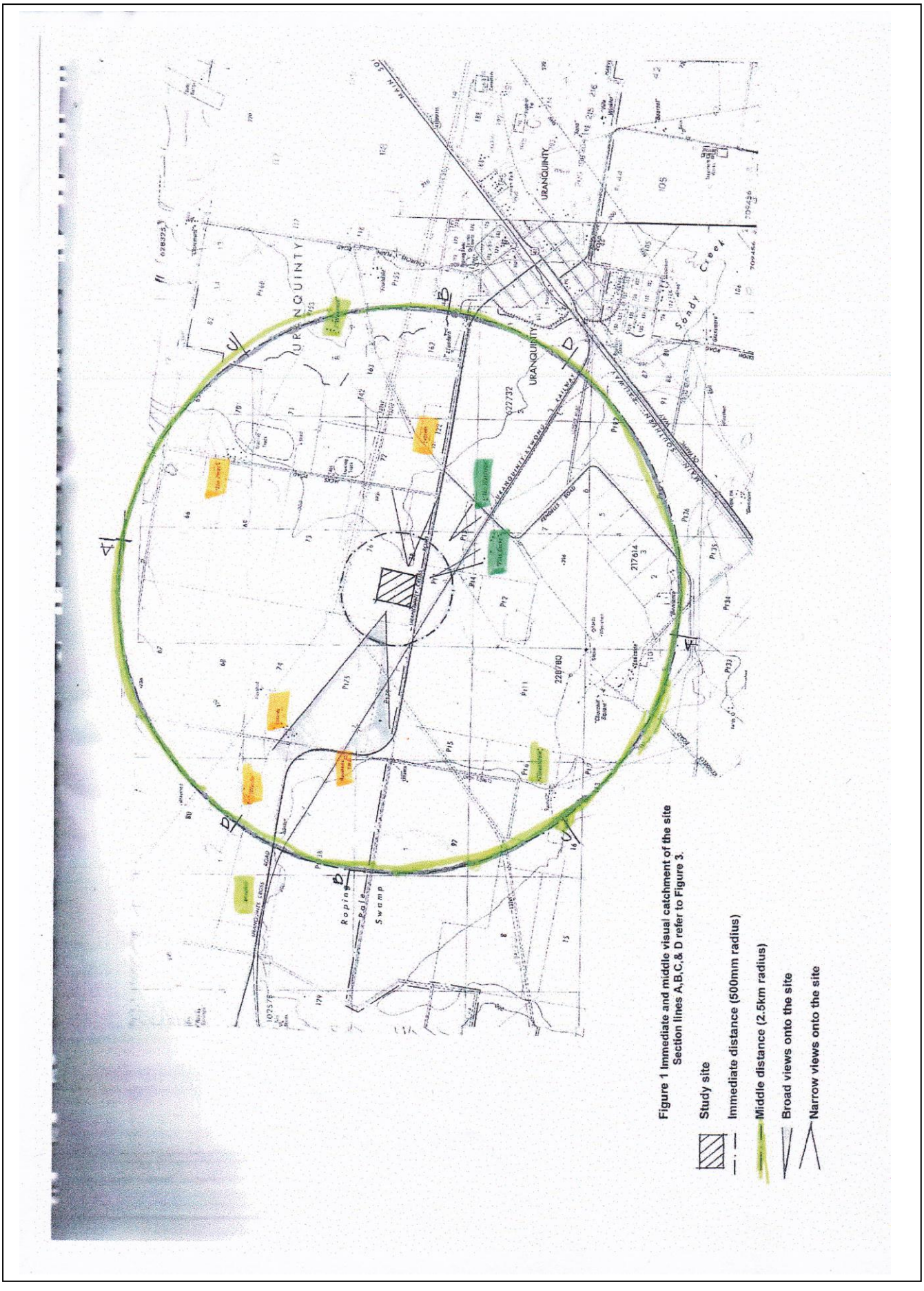
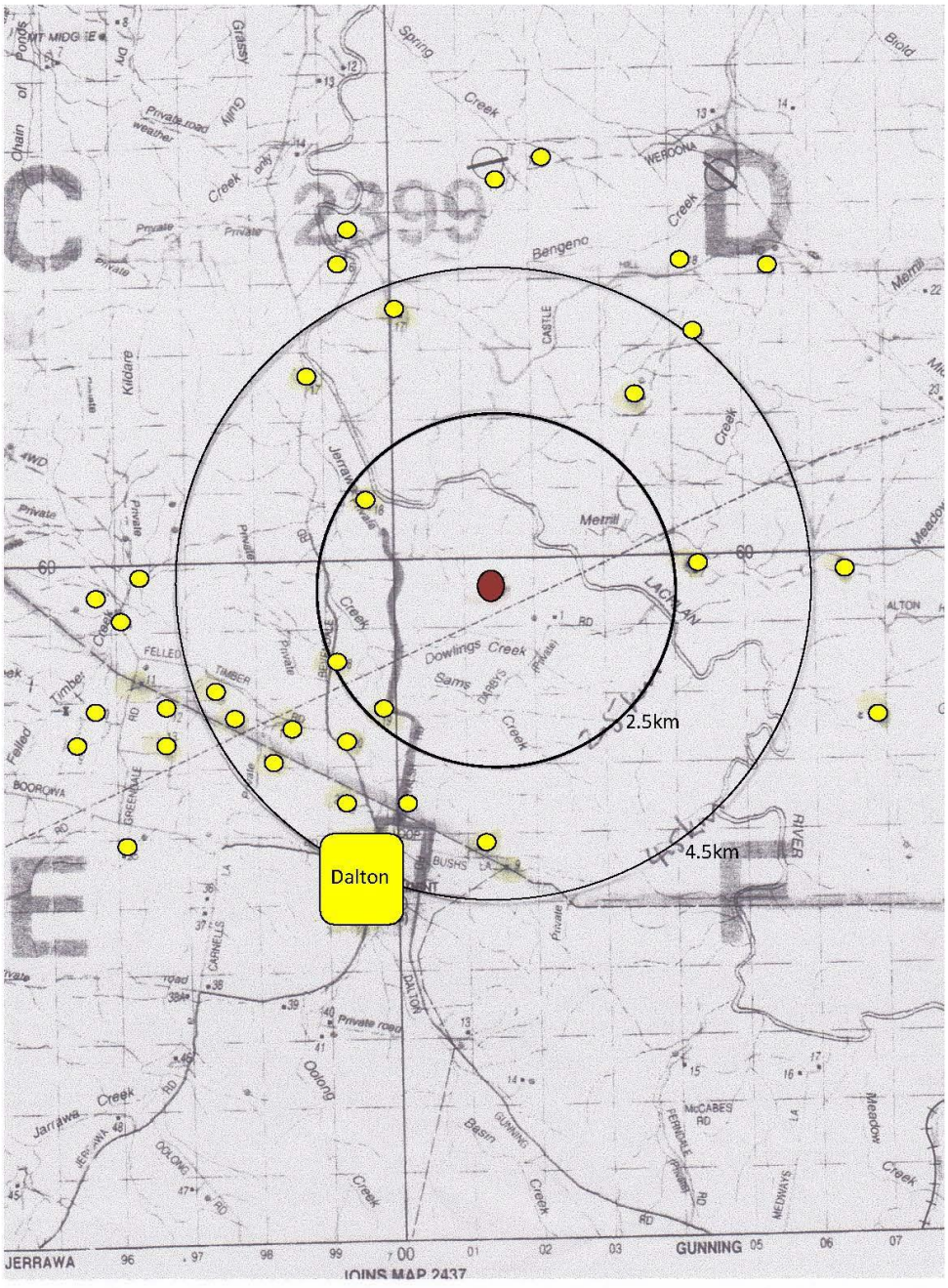


Figure A-2: Radius of 2.5km from the Uranquinty power station and the location of dwellings



Appendix B: **Figure B-1: Radius of 2.5km and 4.5lm from the proposed Dalton power station and the location of dwelling in the Dalton area.**



Bushfire brigade map of Dalton showing location of Power Station and residents in a 2.5km and 4.5km radius