OBJECTIONS TO THE PROPOSED MODIFICATION TO THE WILPINJONG COAL MINE

OBJECTORS:

1. Greg Mackay of "Talga Cottage", 1499 Barigan Road, Wollar NSW 2850.
2. Bernadette Murphy of "Talga Cottage", Barigan Road, Wollar NSW 2850.
3. Walter and Jane Brangwin of "Talga", Barigan Road, Wollar NSW 2850.
4. Helen Barnes of "Delbarn", Barigan Road, Wollar NSW 2850.
5. John and Lorraine Jakes, directors of Heaven Reach Pty Ltd of "Derowen", Barigan Road, Wollar NSW 2850.

OBJECTIONS

A. BLASTING AND OPERATIONAL NOISE

1. The Environmental Assessment submitted by Wilpinjong Coal Pty Limited ("**the EA**") is seriously flawed due to its failure to properly monitor, or monitor at all, the impacts of blasting and operational noise from its Wilpinjong Coal Mine on residents of the Barigan Valley and to report upon the same.
2. The EA makes no mention of noise levels in the Barigan Valley other than to produce two maps showing predicted noise contours: Appendices H1 and H2 to Appendix A to the EA. It is difficult to understand how predictions could be made without any proper whole of valley specific real time monitoring being done.
3. The Barigan Valley has its own specific micro-climate, which results in there being:
   (a) frequent and extended periods of cold dense air trapped in the valley due to temperature inversions during autumn, winter and early spring; and
   (b) significant shallow groundwater and surface water from springs and rainfall in spring and summer resulting in humidity and mimicking the winter temperature inversion;

   which result in noise being transmitted further and louder when those conditions exist.
4. The Barigan Valley has its own specific topography, which result in there being harmonic and amplified effects on noise.
5. The Report of Mr R. G. Banks of SoilFutures Consulting Pty Ltd dated 9 September 2013 detailing the meteorological and topographical features of the Barigan Valley in relation to the subject mine is attached.
6. The EA contains no data, report or opinion in relation to the Barigan Valley or its specific features.
7. This is not a situation where the topography provides possible noise attenuation but rather one where it leads to noise exaggeration.
8. Whilst consent conditions do not apply if temperature inversions occur, that may be acceptable for areas of normal topography where temperature inversions are rare. It is not acceptable where temperature inversions are the norm.
9. Wilpinjong Coal Pty Ltd commissioned an assessment by Terrock Consulting Engineers of a complaint by John and Lorraine Jakes on behalf of Heavens Reach Pty Ltd of blast vibration on 16 June 2012 at 2.22 p.m. which resulted in their cattle spooked and breaking out of their wooden yards. The conclusion in their report dated 14 September 2012 was that airblast levels were increased by 5 and 20 dBL by the effects of meteorology. Those meteorological conditions were at the Coal Mine, not in the valley and provide no assistance. It is that valley specific meteorology that the Objectors maintain makes their residences and farms so prone to blasting noise. The

Jakes note that the EA contains no mention of that investigation or its results despite the fact that it was done.

10. Wilpinjong Coal Pty Limited also commissioned limited noise monitoring at the property of Helen Barnes at “Delbarn”, Barrigan Valley between 4 September 2012 and 16 October 2012, as reported on by Advitech Environmental on 5 December 2012. The conclusion was that meteorological conditions excluded some of the date and vitiated other data. Those meteorological conditions were at the Coal Mine, not in the valley and provide no assistance. It is the valley specific meteorology that the Objectors maintain makes their residences and farms so prone to blasting and operational noise. Mrs Barnes notes that the EA contains no mention of that investigation or its results despite the fact that it was done.

11. On 7 March 2013, Mrs Barnes heard an extremely loud noise at her house and noticed that the house shook and windows rattled immediately after blasting had been conducted by Wilpinjong Coal Pty Limited at its Pit 4. She was advised that an investigation would be initiated by Wilpinjong Coal Pty Limited but was only told later that Wilpinjong Coal Pty Limited considered its blasting met its limits.

12. Wilpinjong Coal Pty Limited also commissioned further noise monitoring at the property of Mrs Barnes from 4 July 2013 to 31 August 2013 during which period Mrs Barnes kept a daily log of the blasting and operational noise levels, some of which were extremely loud and constitute sustained exceedances. Whilst that report alleged daily data recordings, Mrs Barnes was told by the technicians who collected the monitoring equipment at the end of the period that they were disappointed that it had only actually worked for one week during that period. Mrs Barnes notes that she has not been provided with any report based on that monitoring and that the EA contains no mention of that monitoring or its results despite the fact that it was done.

13. The evidence as to noise impacts from the present operations of the Mine is that the noise is either at or, at times, above levels established in its existing consent; it has annoying characteristics, and it is disruptive.

14. The noise levels of the present operations of the mine are at a level sufficient to impact on amenity, including sleep disruption.

15. The NSW Industrial Noise Policy ('INP') provides that noise management involves the following main steps:

    (a) Determining the project specific noise levels for intrusiveness and amenity that are relevant to the site or the area (*Section 2*).

    (b) Measuring and determining existing background and ambient noise levels, using the method relevant to the expected level of impact (as outlined in *Section 3*).

    (c) Where the proposed development is expected to produce annoying noise characteristics, adjustments are to be applied to the noise levels produced by the development in question (as outlined in *Section 4*).

    (d) Predicting or measuring the noise levels produced by the development in question, having regard to meteorological effects (such as wind, temperature inversions) (see *Section 5*).

    (e) Comparing the predicted or measured noise level with the project-specific noise levels and assessing impacts (*Section 6*).

    (f) Considering feasible and reasonable noise mitigation strategies where the project-specific noise levels are exceeded (*Section 7*).

    (g) Negotiation between the regulatory/consent authority and the proponent and between the community and the proponent to evaluate the economic, social and environmental costs and benefits from the proposed development against the noise impacts (*Section 8*).

    (h) The regulatory/consent authority sets statutory compliance levels that reflect the achievable and agreed noise limits for the development (*Section 9*).

(i) Monitoring of environmental noise levels from the development to determine compliance with the consent/licence conditions (*Section 11*).

16. The INP requires that the noise limits in the approval conditions (which ordinarily should be the project-specific noise levels) should apply under all weather conditions characteristic of the area. These may include conditions of calm, wind and temperature inversions (INP, 1.4.4, p 5; 5.1, p 31 and 9.1, p 47). To ensure that the noise limits in the approval conditions do apply under typical meteorological conditions, the INP recommends inclusion of a condition of approval to this effect. However, the INP recognises that the approval condition may exclude application of the noise limits in non-standard meteorological conditions (INP, 9.2, p 48).

17. The data used by the Proponent is that recorded by the meteorological station located on the site, not in the Barigan Valley.

18. The INP identifies two situations where meteorological conditions may increase noise levels: during temperature inversions and where there is a wind gradient with wind direction from the source to the receiver (INP, 5.1, p 31). These two types of meteorological conditions are included in the first example of a condition of approval given in the INP (pp 47-48). However, to be an exception, the inversion or the wind gradient must be non-typical or non-characteristic of the area. Conditions of wind and temperature inversion which are typical or characteristic of an area should not be excepted. The INP's example is of a development where F-class inversions (normally associated with non-arid areas such as the Hunter Valley) are a feature of the area. The Condition given applies the noise limits in all meteorological conditions (including during F-class inversions) except where there is a non-standard intense inversion (a G-Class inversion in the example given). The INP's example also exempts application of the noise limits when there are source-to-receiver wind speeds (at 10m height) which are greater than 3 m/s (INP, 9.2, p 48).

19. The weather data is taken at the mine, and not at the receiver, and it is therefore possible for experience of actual noise impacts at the receivers to be different, and potentially non-compliant.

20. None of the steps required by the INP have been undertaken by the Proponent for the Barigan Valley.

21. The Objectors accept that, in the absence of compliance with the INP, the Department of Planning and/or the Planning Assessment Commission, cannot impose a condition upon the Proponent that it acquire the Objectors' properties upon written request. What the Objectors cannot accept is that the Department of Planning and/or the Planning Assessment Commission give its Consent to the Proponent's Modification application in the absence of such compliance as it relates to the Barigan Valley.

22. There should be an evaluation of the acceptability of the noise impacts in the whole of the Barigan Valley. The evaluation of acceptability should take into account:

(a) Characteristics of the area and receivers likely to be affected, such as the extent of the areas and the numbers of receivers likely to be affected by noise level above the project-specific noise levels, the daily activities of the community (in particular, effects such as sleep disturbance and level of annoyance), the potential change in the ambient noise level as a result of the Project, cumulative noise impacts in the area, and whether parts of the area that are already moderately or badly affected by noise will be more affected;

(b) Characteristics of the project and its noise, such as the noise characteristics of the activity, the extent to which any remaining noise impact exceeds the project-specific noise levels, the circumstances and times when the project-specific noise levels are likely to be exceeded, the circumstances and times when the source noise levels are likely to be below the project-specific noise levels (for example when wind blows source noise away from the receiver), the accuracy with which impacts can be predicted and the likelihood that the

impacts will occur in the manner predicted, and the economic benefit and social worth of the project for the local area, the region or the nation;

(c) The feasibility of additional mitigation or management measures; and

(d) Equity issues in relation to the costs borne by some for the benefit of others, the long term cumulative increase in noise levels, and the opportunity to compensate effectively those affected.

23. The INP requires modifying factor corrections to be applied to the noise from the source measured or predicted at the receiver before comparison with the noise criteria (see Section 4 of INP).

24. The noise criteria in the EA do not have regard to, and do not refer to, low frequency noise in the Barigan Valley. Low frequency noise is taken into account in evaluating compliance with the noise criteria in any conditions of approval such as compliance monitoring being carried out in accordance with the relevant requirements for reviewing performance set out in the INP (in Section 11) relating to, amongst other matters, "modifications to noise data collected, including for the exclusion of extraneous noise and/or penalties for modifying factors apart from adjustments for duration". One of the penalties for modifying factors would be to apply a correction of 5 dB to the source noise level at the receiver if the difference between the C-weighted and A-weighted levels over the same period is 15 dB or more (INP, Table 4.1, p 29). Making this correction may result in the corrected source noise level at the receiver exceeding the noise criteria in the proposed conditions of approval for that receiver.

25. The EA proposes no attended or unattended monitoring in the Barigan Valley to evaluate compliance. The EA does not specify the number of attended monitoring stations, the location of the monitoring stations, the frequency of attended monitoring or the duration of attended monitoring on any occasion.

26. The evidence of attended monitoring in the past is insufficient to allow the Department to draw any inference that attended monitoring in the future is likely to evaluate adequately compliance with the noise criteria. Past attended monitoring has been at only one location on only two occasions, neither of which is reported on in the EA.

27. At the noise levels proposed in the Modification application, the noise impacts of the Project on the residents of Barigan Valley, including the impact of the noise source on receivers, taking account of annoying noise characteristics and the effect of meteorological conditions, are likely to be significant, intrusive and reduce amenity. The noise mitigation strategies proposed are not likely to reduce noise levels to the project-specific noise levels recommended by the INP or to levels that have acceptable impacts on those residents. The significant residual impacts are unacceptable, taking into account social and economic factors. Further, the extensive noise control that is likely to be required at receivers, being mitigation treatment and acquisition of properties in the Barigan Valley, is likely to cause social impacts. But, without any data being placed before the Consent authority as to the noise impacts in the Barigan Valley, no confident conclusion can be drawn that the noise impacts of the Project will be acceptable.

28. The Objectors respectfully submit that Consent for the Modification be withheld until the Proponent has complied with the INP insofar as the Barigan Valley is concerned.

B. ANIMAL HUSBANDRY

1. John and Lorraine Jakes on behalf of Heavens Reach Pty Ltd had incorporated Embryo Transfer as one of their cattle management practices. This requires female cattle to be placed in the cattle yards on 14 very precise separate occasions in a 35 day period.

2. On 16 June 2012, John and Lorraine Jakes had cattle in their yards when those cattle were spooked by the noise from a blast from the mine. The cattle broke out of the yards. After complaints by the Jakes, the Proponent agreed to fix the broken part of the yards and did so.

3. As blasting occurs on average 4 times a week and Wilpinjong Coal Pty Limited only provides short notice in respect of its blasting, it is impossible for the Jakes to pursue their Embryo Transfer program because they could not defer treating the cattle during the 35 day period due to the precise timing it entails and it is far too dangerous for them to be in the yards with the cattle when they get spooked.

4. Others of the Objectors have similar concerns of being near their stock when blasts are felt or heard.

C. WOLLAR VILLAGE

1. Wilpinjong Coal Pty Limited has acquired almost all of the property in the village of Wollar. The majority of those residents who have sold have moved away, leaving the village without its community. This strategic acquisition program was conducted before consent to the Modification was sought and allowed the proponent to assert that the Modification would have little impact on the community whereas the gutting of that community had already occurred as a result of this pre-Development Application manoeuvre. The Objectors have been left without their local community as a result of the Modification.

2. In November 2010, the General Manager of the Mid-Western Regional Council said that Council would expect Wollar to disappear as a community in the next year. He was right.

3. Because of the reduction in residents caused by Wilpinjong Coal Pty Limited's acquisition of the village's properties, Australia Post notified Wollar residents by letter dated 18 January 2012, that it had decided to reduce its mail service from five days a week to three days a week in early 2012 because the existing service was no longer commercially viable.

D. WOLLAR SERVICE CENTRE/GENERAL STORE

1. On 22 November 2010, Ron Bush, the Project Development Officer for Wilpinjong Coal Pty Limited wrote, on company letterhead, to members of the Wollar community advising that there would be a community meeting at Wollar on 2 December 2010 to update the community on the recent Modification to the Project, specifically the noise buffer zone and Wilpinjong Coal Pty Limited's parent company, Peabody's, current land acquisition process.

2. That meeting was subsequently postponed to May 2011 and held at "Talga Cottage", Barigan Valley, the home of Greg Mackay and Bernadette Murphy. Ron Bush advised the residents who attended the meeting that his company had purchased the Wollar Service Centre but assured those present that all services that existed at the store at that time would be continued except alcohol and including mechanical services, rural hardware and stockfeed ("**the Bush Assurance**").

3. Wilpinjong Coal Pty Limited failed to honour this commitment of its own Project Development Officer and the Service Centre, now called the General Store, no longer provides mechanical repairs, hardware, stockfeeds, garden requirements, veterinary products or fencing material, all of which the store provided before it was acquired by Wilpinjong Coal Pty Limited.

4. Despite the above, the store's current operator engaged by the Proponent to run the store, who has been there since December 2011, unfortunately advertises that she provides such services. We **attach** a copy of her marketing Calendar for 2013.

5. In its Community Newsletter dated June 2011, Wilpinjong Coal Pty Limited stated that its parent, Peabody appreciated the fact that the service centre provided a range of facilities for the local Wollar community and quoted Ron Bush as saying that Peabody remained committed to providing this important service for the village as is appropriate

6. When the issue of the Bush Assurance was raised at the Wilpinjong Community Consultative Committee Meeting on 24 June 2013, Jamie Lee, the Manager Project Development & Approvals who replaced Rob Bush, stated that Wilpinjong Coal Pty Limited cannot speak for employees who no longer work for the company and

(cannot) confirm or deny verbal conversation. This is recorded in the meeting's minutes and those minutes have been accepted by Mr Lee at the subsequent meeting. Given that Ron Bush gave the Bush Assurance in his capacity as one of the most senior officers of Wilpinjong Coal Pty Limited and Wilpinjong Coal Pty Limited has never produced any written denial by Mr Bush that he gave the Bush Assurance, it is totally unacceptable for a corporation that claims itself to be a good neighbour to not abide by the Bush Assurance.

E. INABILITY TO SELL

1. The Objectors now find themselves at the southern end of a valley where basically all of the land to the north and north-west of them has been bought by the Proponent.
2. Visitors to the Barigan Valley have to drive past the Mine, including its Modification, and through mine owned land, will all of the attendant noise, dust and visual amenity impacts, to get to the Objectors' properties. There is no viable southern entrance to the valley.
3. The marketability of each such property has been significantly, if not fatally, affected by the Mine and its Modification. When the property owned by Heavens Reach Pty Ltd was valued in August 2011 by a valuer appointed by the Proponent, he noted that the property had been unsuccessfully put to auction in 2010 and that the activities of the Wilpinjong mine may have been a contributing factor, amongst other factors, in that lack of sale success.
4. The Objectors are land locked by the Proponent's activities and landholdings and are unable to sell their land to anyone other than the Proponent.

F. ACQUISITION ASSURANCES

1. On 22 November 2010, Ron Bush, the Project Development Officer for Wilpinjong Coal Pty Limited wrote, on company letterhead, to members of the Wollar community advising that there would be a community meeting at Wollar on 2 December 2010 to update the community on the recent Modification to the Project, specifically the noise buffer zone and Wilpinjong Coal Pty Limited's parent company, Peabody's, current land acquisition process.
2. John Jakes, on behalf of Heavens Reach Pty Ltd, then had numerous conversations with Ron Bush.
3. The property owned by Heavens Reach Pty Ltd was then valued in August 2011 by a valuer appointed by the Proponent.
4. An agreement was reached whereby Wilpinjong Coal Pty Limited would acquire the property of Heavens Reach Pty Ltd for an agreed price.
5. Wilpinjong Coal Pty Limited has refused to honour that agreement, simply advising Mr Jakes that Mr Bush did not have authority to bind the company.
6. Given that Ron Bush struck the deal in his capacity as one of the most senior officers of Wilpinjong Coal Pty Limited and Wilpinjong Coal Pty Limited has never produced any written denial by Mr Bush that he come to the agreement, it is totally unacceptable for a corporation that claims itself to be a good neighbour to not abide by the acquisition agreement.
7. There is only one buyer in town for the Objector's land, should they wish to sell and relocate. That is the Proponent but the Proponent is refusing to deal with the Objectors.

G. WOLLAR BUSH FIRE BRIGADE

1. Reduction in community membership through property acquisition has resulted in numbers of available and the number of trained fire fighters are diminishing.
2. The EA contains no proposal for Wilpinjong Coal Pty Limited to assist the local bush fire brigade, despite the fact that it is responsible for the decline in numbers.

H. SOCIAL IMPACTS

1. The Objectors contends that the Project, including the Modification, will have a significant social impact on the Wollar, contrary to the public interest and the principle of intergenerational equity. The mine will exacerbate existing experiences of solastalgia and there is a risk that the Wollar community will be destroyed. Solastalgia, or "loss of place", is a condition caused by the gradual erosion of the sense of belonging to a particular place and a feeling of distress about its transformation. People have been, and will be, forced to leave Wollar as a result of the environment, social and economic impacts. The Objectors contends that the social impact on Wollar community has been underestimated in the EA, and that the mine, including its Modification, will ultimately result in the destruction of the Wollar village and its wider community as a result of the environmental, social and economic impacts, as has been the case in the neighbouring community of Ulan.

2. Whilst approval of the Modification would have some positive social impacts, particularly in the form of continuing employment in the local and broader community, there will be significant negative social impacts arising from continuation of adverse impacts of noise, visual impacts, and adverse impacts arising from a change in the composition of the Wollar community. Those impacts must be taken into account in the consideration of all the relevant factors in determining whether the Project should be approved.

3. The EA fails to provide the Consent authority with sufficient information to allow it to properly consider those impacts and is, therefore, flawed.

I. CONCLUSION

The EA fails to properly consider all of the above impacts on the residents of the Barigan Valley and should be rejected until it has done so.

Dated: 9 September 2013

SoilFutures Consulting Pty Ltd

REVIEW OF TEMPERATURE INVERSION EFFECTS AND SOUND REFLECTION LIKELY TO OCCUR IN THE BARIGAN VALLEY (UPPER HUNTER VALLEY NSW)

Prepared for
RURAL LAW WITH PETER LONG
September 2013

Table of Contents

1. Introduction

This brief report has been prepared by Robert Gordon Banks of SoilFutures Consulting Pty Ltd as supplementary information for a submission on the proposed Wilpinjong Coal Mine Modification.

This report provides information on the extent of temperature inversions in the Barigan Valley which runs to the south of the current mine and may both carry and amplify sound (particularly blast noise) to the upper limits of the valley. The report also provides information on extent of reflective and refractive surfaces in the form of cliff faces which can assist with funneling sound along the valley.

2. Qualifications and Experience

I reside at 139 Blackjack Forest Road, Gunnedah in the State of New South Wales.

I was born on 5 June 1967.

I am a Soil Scientist.

I graduated with a Bachelor of Science degree at Macquarie University in Sydney in 1990 with Honours in Biology, and Soils and Geomorphology. Geomorphology is the science of landform evolution. The interaction of the elements upon the landscape is an essential element in such evolution.

Upon graduation, I immediately secured employment with the Soil Conservation Service of New South Wales as a Soil Scientist based at the NSW State Government's Gunnedah Research Station doing work throughout New South Wales.

My employer changed its name to the Department of Conservation and Land Management ("**CALM**") in or about 1992 but I continued working in the same position. The Department continued to change its name from this time on.

By 1998, I was a Level 2 Certified Professional Soil Scientist, which allowed me to undertake site classification of soil profiles.

Throughout my employment with the Soil Conservation Service of New South Wales and with CALM, I was required to do soil surveying of New South Wales. This work included preparation of and editing of soil landscape maps explaining the distribution of soils and their physical and chemical qualities and limitations. An understanding of the interaction of water upon the soil landscape was an integral component of preparing such explanations.

My maps and reports were published by the Department.

In 2004, I set up my own soil consultancy through my company, SoilFutures Consulting Pty Ltd and I have continued to provide soil science services to clients, including governments, for New South Wales.

In 2013, I was appointed Adjunct Fellow with the University of Queensland's Faculty of Science's Department of Agriculture and Soil Science.

3. Methods and background information

Soil Landscape mapping for the Hunter Valley shows the surface geomorphology of the entire Hunter Valley at a scale of at least 1:100 000 (SoilFutures 2009). The geomorphic framework of the valley is further used to determine the extent of suites of soils called soil landscapes (Northcote 1978).

The surface geomorphology layer of mapping summarises the way in which water, in particular, moves down the valley. Air, like water, has fluid properties that follow most of the same rules of fluid dynamics. Although air is at least 780 times less dense than water, it tends to flow, particularly as it cools, in the same pathways as water. If cold air collects in a

valley floor with warmer air on top of it, it is called a temperature inversion. When an inversion layer is present (for example, early in the morning when ground-level air temperatures are cool and higher level air temperatures are warmer), if a sound or explosion occurs at ground level, the sound wave can travel much further than normal because the sound is refracted by the temperature change at the boundary and it undergoes total internal reflection. Much of the sound is thus trapped under the layer and the sound can travel much greater distances than normal.

Temperature inversions through winter are a very common effect along the Barigan Valley, occurring for most of the winter months and often for extended periods both in autumn and spring. Mid-winter temperature inversions have been observed to last well into daylight hours along the Barigan Valley.

In terms of sound movement through air, temperature inversions can trap and amplify sound, particularly lower frequency sound (such as blasting) and concentrate that sound in the cooler, near surface layer of the inversion as shown in Figure 1 below.

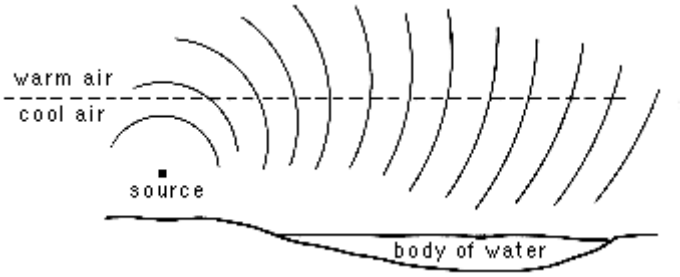

Figure 1: Concentration of sound waves along ground due to a temperature inversion

In addition to temperature inversion effects, most of the Barigan Valley and the mine site is surrounded by cliff faces of sandstone, which can both reflect sound (like an echo) and refract sound (bend sound around corners) (Russell, 2011). The echo effect and the refraction of sound effect of the cliffs may cause areas of harmonic amplification along the valley floor, which can then be transmitted a long distance within the temperature inversion.

4. Results

Low angled valley fill geomorphic groups called transferal landscapes and Alluvial (valley flat/floodplain) landscapes were grouped together to define the area in which temperature inversions occur in the valley. The map (Figure 2) shows where water or air slows down and tends to pool in the case of a temperature inversion. Clearly there is a connection from the mine site directly to the upper Barigan Valley in terms of the valley's capacity to have a continuous temperature inversion from the mine site to the valley head.

In addition to the cold air drainage landscapes, the steep colluvial landscape (major force of formation is gravity and mass movement), dominated by reflective and refractive cliff faces, is shown in the map. Once again, both the mine site and the Barigan Valley are surrounded by the reflective and refractive cliff surfaces, which can direct sound waves in unexpected ways.

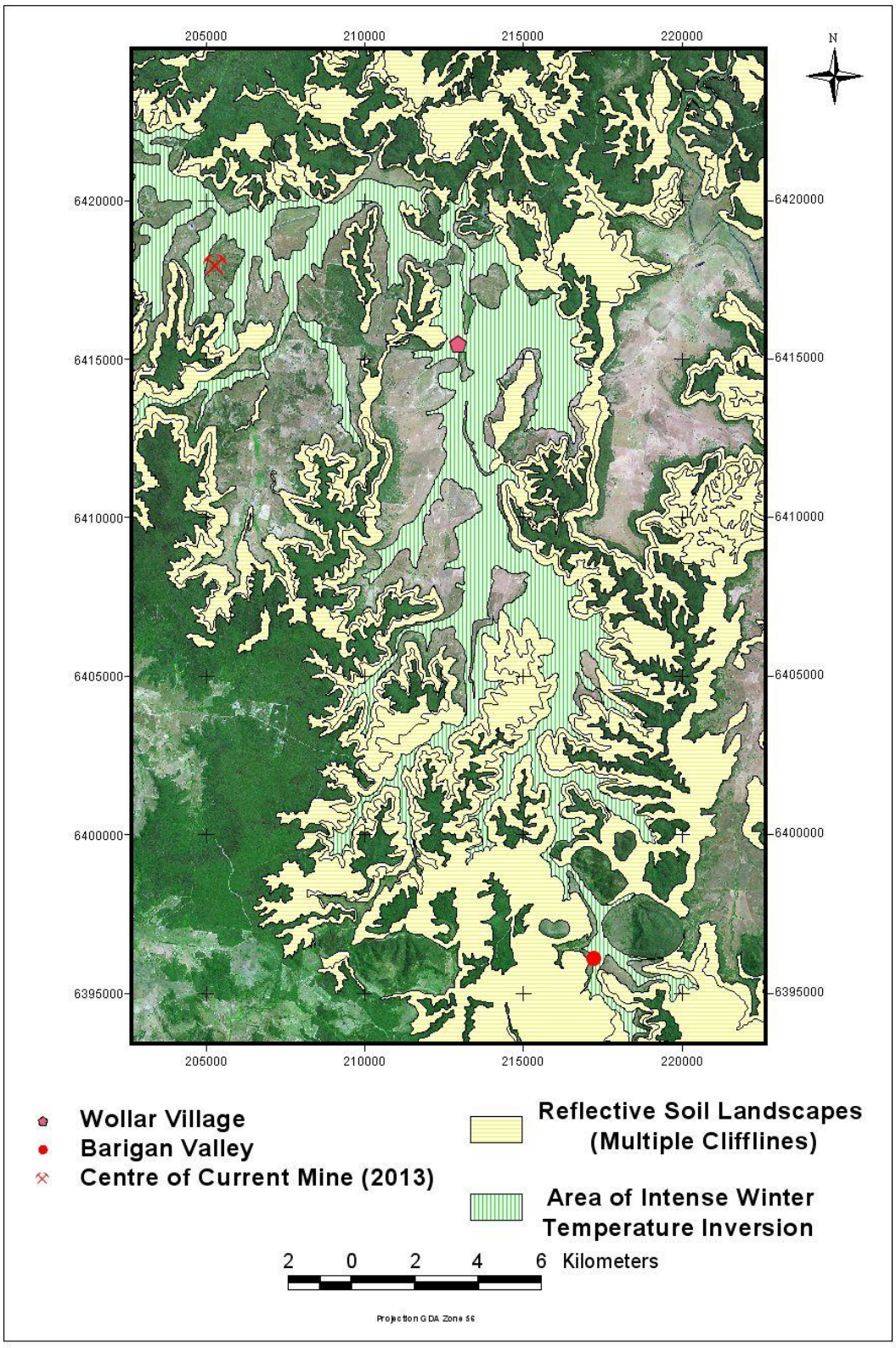

Figure 2: Map of Temperature Inversion extent and reflective/refractive surfaces along valley.

5. Concluding Remarks

The map in Figure 2 shows clearly that there is the potential for a temperature inversion to exist connecting the mine site and the upper Barigan Valley, along which sounds such as blasting may travel very long distances. The NSW Industrial Noise Policy (EPA 2000) clearly states that, in the case of an intense temperature inversion being present in the vicinity of a noise source, it must be investigated in detail.

In addition to the presence of an inversion layer, much of the higher land in the Barigan Valley and behind the mine site has reflective or refractive cliff faces which can echo and bend sound waves from any mine noise including blasting, which may then further direct sound into a temperature inversion layer, amplifying the effect of the inversion. From this brief mapping exercise, it is clearly possible that noise from blasting can be transmitted to the head of the Barigan Valley within an inversion layer.

Robert Gordon Banks
9 September 2013

6. References

EPA (2000) NSW *Industrial Noise Policy.* NSW Environment Protection Authority, Sydney

Northcote K.H. (1978). *'Soils and Landuse', in Atlas of Australian Resources.* Division of National Mapping, Canberra ACT

Russell, D.A. (2011) Acoustics and Vibration Animations. Graduate program in Acoustics notes. Pennsylvania State University

SoilFutures Consulting Pty Ltd (2009) *Soil Landscapes and Soil Landscape Facets of the Hunter Councils Region.* Map and Report. SoilFutures Consulting Pty Ltd. Gunnedah

JUNE

on.	Tues.	Wed.	Thu.	Fri.	Sat.
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JULY 2013

E's-E-2-C CALENDAR

NEW MOON 8th 5:14PM

FIRST QUARTER 16th 1:18PM

FULL MOON 23rd 4:15AM

LAST QUARTER 30th 3:43AM

AUGUST

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sion, Aged, Disability lows, Retirement, e Parents, Carers, etc. t. Veterans Affairs sion Day ily Payment an also be paid fortnightly ected by the recipient.	Wk No. 27 **1** Canada Day (Proclaimed 1867) Territory Day (NT) Reserve Forces Day	PERTH SUNRISE SUNSET 7.18 5.24 **2** Middle of the Year (182 gone - 182 to go)	ADELAIDE SUNRISE SUNSET 7.24 5.16 **3**	MELBOURNE SUNRISE SUNSET 7.36 5.13 **4** Independence Day, U.S.A. P	SYDNEY SUNRISE SUNSET 7.01 4.59 **5** Tynwald Day Tynwald Parliament Isle-of-Man Oldest Democratic Parliament Alice Springs Show Day*	BRISBANE SUNRISE SUNSET 6.38 5.06 **6**
Day No. 188	28 **8**	7.17 5.27 **9** Independence Day, Argentina	7.23 5.19 **10**	7.34 5.17 **11** VF	6.59 5.03 **12** Tennant Creek Show Day*	6.37 5.09 **13**
195 **4**	29 **15**	7.15 5.31 **16**	7.20 5.23 **17**	7.31 5.22 **18**	6.56 5.07 **19**	6.35 5.13 **20**