

26 April 2002

Our ref: D149/G02108/DJM

The Secretary
SIRA Inc.
PO Box 919
KENMORE QLD 4069

Dear Sir,

Review of Noise Report for Proposed Kholo Creek Hard Rock Resource - Transportation Route

This letter outlines my review of a report prepared by PPK Environment & Infrastructure Pty Ltd titled *Kholo Creek Hardrock Resource Consultancy for Road Transport Planning, Noise Assessment Report, Department of State Development*, April 2001. From my reading of the above report, those aspects which require further information/explanation or with which I have a different opinion/approach, are as follows:

1. Complete definition of "acoustic quality objective" and its requirement that the existing acoustic environment not be allowed to significantly deteriorate.
2. Matters for consideration where an administering authority is assessing an application for an environmentally relevant activity.
3. Definition of beneficial assets and whether or not the transportation route associated with the hard rock resource is a beneficial asset.
4. Transportation (truck) noise level.
5. Ambient noise levels, and particularly the background sound level during the daytime.
6. Audibility of truck noise at the closest residences, number of truck passing events per day and duration of truck noise being audible at the closest residences.
7. Noise limit criteria.

1. ACOUSTIC QUALITY OBJECTIVE

Whilst PPK details in their report that the acoustic quality objective is 55 dB(A) $L_{Aeq,24h}$ and that this "... is the long-term goal of attaining a good standard of amenity with respect to environmental noise. ...", another part of the "definition" of the acoustic quality objective is:

"... (3) it is not intended that, in achieving the acoustic quality objective, any part of the existing acoustic environment be allowed to significantly deteriorate. ..."

The acoustic quality objective is not intended to be used as a "noise limit" and PPK do not use it, as such, in their report.

It is my opinion that any noise limit criteria for the transportation route should reflect the existing acoustic environment, and ensure that this acoustic environment is not significantly deteriorated by truck activity on the transportation route.

2. MATTERS FOR CONSIDERATION BY ADMINISTRATIVE AUTHORITY FOR APPLICATION FOR ENVIRONMENTALLY RELEVANT ACTIVITY

Extraction of the hard rock resource is an environmentally relevant activity. In accordance with the Environmental Protection (Noise) Policy 1997:

"Matters for Consideration

14. *In making its decision, the administering authority must evaluate the noise relevant activity in relation to the following matters –*

- (a) whether the noise relevant activity is the use or operation of a beneficial asset;*
- (b) the characteristics of the noise from the noise relevant activity;*
- (c) any of the following matters of which it is aware –*
 - (i) a matter concerning the lawfulness, apart from under the Act, of the applicant carrying out the noise relevant activity at the relevant site;*
 - (ii) the order in which the applicant and affected persons started to occupy land at or near the relevant site;*
 - (iii) the order in which the applicant and affected persons started to carry out the noise relevant activity and other activities that may be affected by noise from the noise relevant activity;*
 - (iv) the views of affected persons about noise from the noise relevant activity;*
 - (v) other noises ordinarily present at or near the relevant site;*
 - (vi) any other information or other matter concerning the effect of the noise relevant activity on the acoustic environment."*

With respect to the above, the following should be noted:

- **Beneficial Asset.** In accordance with the Environmental Protection (Noise) Policy 1997, the definition of a beneficial asset is as follows:
- "... 5.(1) A "beneficial asset" is an airport, approved industrial estate, navigable waterway, public road or railway. ..." From the above definition and the consultant's understanding of the Kholo Creek hard rock resource and transportation route, it would not be a beneficial asset. The transportation route, in accordance with the PPK report, is a private road.
- **Characteristics of the Noise.** With respect to the transportation route, the noise would be with respect to the trucks using the road, both full and empty. The characteristics of the noise of these trucks would be:
 - cyclic or intermittent;
 - possibly tonal;
 - possibly impulsive, particularly 'bangs' associated with empty trailers.

- Lawfulness of Noise Relevant Activity. It is my understanding that, at present, the proposed hard rock quarry and transportation route are not lawful uses and this is why the application has been made. If the hard rock quarry and transportation route were approved, then part of this approval would be making the activities, for that site, lawful.
- Order of Occupancy. For the transportation route, all of the current residences in close proximity to the this route are, obviously, in occupancy before the route. This fact further emphasises the importance of not significantly deteriorating the existing acoustic amenity which, from my knowledge of the area, does not contain a lot of truck traffic noise.
- Order of Activity. Clearly the 'affected persons' would be conducting their normal activities now, whereas the transportation noise will not be (if approved) until some time in the future.
- Views of Affected Persons about Noise. Whilst the noise has not yet commenced, a number of persons who will be affected have very strong views about the noise – I believe that they are opposed to the noise.
- Other Noises Ordinarily Present. The existing ambient noise sources would include:
 - insects and birds;
 - wind in the tress;
 - some traffic noise;
 - domestic noise;
 - some aircraft noise.
- Other Information. Nil.

3. TRANSPORTATION (TRUCK) NOISE LEVEL

From my interpretation of the PPK report, no noise level measurements appear to have been taken of quarry trucks – it appears that they may have relied completely on the transportation noise levels detailed in "Calculation of Road Traffic Noise", Department of Transport, HMSO, Welsh Office, 1988.

This document is designed specifically for public roads with predominantly passenger vehicles and a percentage commercial vehicles (trucks).

To enable a proper assessment of the PPK report, information needs to be provided with respect to how the source noise level measurements were obtained, where from, for what type of trucks, at what speed, loaded and/or unloaded, semi trailers or B doubles, etc.

The PPK report states that they have removed the CORTN algorithm that applies to a correction for percentage heavy vehicles based on mean traffic speed, in terms of the percentage heavy vehicles, as they only considered heavy vehicles. Why didn't they leave this algorithm in the process and apply 100% heavy vehicles?

$$\text{Correction} = 33 \log_{10} (v + 40 + (500 \div v)) + 10 \log_{10} (1 + (5p \div v)) - 68.8$$

where p = percentage heavy vehicles; and
v = speed of traffic.

If v = 60 kph and p = 100%, the correction would be +8 dB(A) to the base traffic noise level.

For 5,000,000 tonnes per year, there would be 62 trucks per hour full and 62 returning empty trucks, or 124 trucks per hour. This would create a noise level of:

$$L_{A10,1h} = 42.2 + 10 \log_{10} q \quad \text{where } q = 124.$$

$$L_{A10,1hr} = 42.2 + 20.9 = 63 \text{ dB(A)}.$$

Correction for the fact that this traffic volume was 100% commercial vehicles would result in a traffic noise level of 71 dB(A) $L_{A10,1h}$.

Across flat ground, in accordance with CORTN, this would equate to truck noise levels of:

- base noise @ 13.5 m = 71 dB(A) $L_{A10,1h}$
- gradient adjustment, flat ground = 0
- distance attenuation = -11.7 dB(A)
- ground attenuation (average height = 1 m) = -6.5 dB(A).

Therefore, at 200 metres, truck noise levels would be $71 - 11.7 - 6.5 = 53 \text{ dB(A)}$.

The above is an example only and, if the location of the receptors relative to the proposed haul routes were known, could be used to provide an indication of the accuracy of the modelling, provided the intervening land between the haul route and residence was flat.

Regardless of the above, measured quarry truck noise levels would be the most appropriate source noise level data. If measured results have not been used as the basis of the computer modelling, then it is my opinion that the results of the modelling may not accurately reflect the noise impact of the transportation route.

4. AMBIENT NOISE LEVELS

The type of equipment used to obtain ambient noise levels was not detailed in the PPK report. If this equipment was Type 2 in accordance with AS 1259-1990, then its accuracy would not be as great as if Type 1 equipment were used. It also appears that the measurements were obtained, at least for part of the time, during adverse weather conditions. This is indicated by the PPK report, which explains that *"for periods where precipitation or excessive wind speed was observed, the measured noise data was removed from the analysis"*. The report also explains that, at times, PPK staff visited the monitoring locations to personally assess the noise sources.

It is unclear how much ambient noise level data was discarded due to precipitation and excessive wind. It is not clear what is meant by "excessive wind" (wind speed over ? m/s). Was the excessive wind relative to site or Amberley measurements? What are the Amberley measurements (instantaneous result at each of the nominated times, or a 3-hour average or something else)? How often were the measurement sites visited?

Further to the above, and irrespective of the prevailing ambient noise sources and atmospheric conditions at these ambient noise level measurement locations, the results of the ambient noise levels did not form part of the assessment of noise impact of the transportation route.

Based on my interpretation of the acoustic quality objective, noise from the proposed transportation route should not result in significant deterioration of the existing acoustic environment. Therefore, the noise from the transportation route should be compared to the existing acoustic environment, to determine whether or not, at any of the existing or future residences, the noise from this transportation route significantly deteriorates the existing acoustic environment, with due consideration of the existing acoustic environment (noise sources) and the fact that the residences are already established in the area.

Ambient noise level measurements should be repeated, with Type 1 measurement equipment, to accurately determine the noise levels. These measurements should be conducted at a time when weather conditions are conducive to noise level measurements and the ambient noises are representative of what is generally encountered (with due consideration of seasonable variables).

With respect to the actual measurements themselves, no raw data is provided, merely the averages. To fully assess "significant" deterioration, the complete suite of ambient noise levels should be considered. In addition to the above, the following is also not detailed in the PPK report:

- Are the averages arithmetic or logarithmic?
- What was the overall range of noise levels for each nominated time period?
- Was the average for each time period the average of the total number of days sampled, the day with the highest average, or the day with the lowest average?
- To determine the average background noise level, the Environmental Protection Agency is recommending that the mean be obtained for the total time period being considered, eg daytime, and the background be the average of all of the noise level samples that are less than the mean. Was this approach adopted?

Details of all of the above should be provided, together with precisely how much of the measured data was actually used to determine the averages.

5. AUDIBILITY OF TRUCKS ON TRANSPORT ROUTE

In accordance with the PPK report, there are two possible tonnages per year – 3 million and 5 million – with each truck holding 27 tonnes. This equates to the following number of laden trucks:

Annual tonnage:	5,000,000 tpa	3,000,000 tpa
Tonnes per truck:	27	27
No. of trucks per year:	185,185	111,111
No. of work days per year (not including weekends)	260	260
No. of laden trucks per day:	712	427
No. of laden trucks per hour (12 hour work day)	59	36
Total number of trucks per hour:	118	72
No. of trucks per minute:	2	1.2

At between 1 and 2 trucks per minute, there would be one truck per 500 m or 1000 m along the transportation route, respectively, assuming uniform distribution of the trucks. If a residence were 200 metres from the transportation corridor, then there would always be one truck within 320 metres and 540 metres of that residence, respectively. If the terrain were flat, this would equate to trucks always being audible at this residence, for the 12 hours that the transportation was occurring over.

If truck noise is either currently inaudible at some of the residences adjoining the transportation route, or only inaudible some of the time, and this proposed development will result in truck noise being audible all, or virtually all, of the time, from 6 am to 6 pm weekdays. It is my opinion that this would be a significant deterioration of the existing acoustic amenity.

6. NOISE LIMIT

It is difficult to determine an appropriate noise limit for the transportation route, but it is my opinion that it should not be based on a general ILO standard, but it should be referenced back to the existing acoustic amenity.

For the constant continuous noise of plant, a noise limit criteria of "background +5 dB(A)" has been applied in the past, and still forms part of the environmental authorities and development conditions of approval today. Whilst the noise of the trucks would be audible almost continuously, it would not constitute, by definition, constant continuous noise.

For intermittent noise – for example, a public address system – a noise limit of "background +10 dB(A)" has at times been applied. For this noise limit the noise source was expressed as the adjusted average maximum A-weighted sound pressure level.

In accordance with the Brisbane City Council City Plan 2000, "Noise Impact Assessment Planning Scheme Policy", a noise limit criteria is described for time-varying noise, which the noise of the trucks would be. This noise limit criteria is as follows:

"... Comparison of like parameters will mostly be applicable to assessment of noise emissions, in which case, an acceptable environmental outcome using this methodology is achieved when the chosen parameter assessing the impact of the development does not exceed the same parameter describing the ambient noise by more than 3 dB(A). ..."

This criteria applies to time-varying noise, with the following qualifications:

- applies during the daytime and evening;
- requires the source noise to be adjusted for tonality and impulsiveness, as appropriate;
- applies as a measured level, not a component level;
- applies at a distance of at least 3.5 metres from sensitive receptors.

The noise limit applied by PPK was 50 dB(A) L_{Aeq} , which would be equivalent to 47 dB(A) L_{A10} .

If the background +10 dB(A) noise limit was applied, then the noise limit would be approximately 45 dB(A) L_{A10} , with the noise of the trucks adjusted for tonality and impulsiveness, which could be equivalent to a noise limit of approximately 43 dB(A) L_{A10} .

For the Brisbane City Council criteria, and assuming a daytime L_{A10} ambient noise level of 43 dB(A), the noise limit would be approximately 41 dB(A), with a 2 dB(A) penalty for tonality and/or impulsiveness taken into account.

Based on the above, it is my opinion that the noise limit selected by PPK may be too high and should be based on the existing ambient noise levels to ensure that there is no significant deterioration of the existing acoustic amenity.

Yours sincerely,
DAVID MOORE & ASSOCIATES PTY LTD

David Moore