

Kalgoorlie Consolidated Gold Mines Noise Regulation 17 Variation

Kalgoorlie Consolidated Gold Mines Pty Ltd

**Report and recommendations of the
Environmental Protection Authority**

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Comments are to the Minister for the Environment and should be addressed to the Appeals Convenor. No fee applies.

All clarifications from Bulletin 1271 are in blue print.

About This Bulletin

This revised report provides the Environmental Protection Authority's (EPA's) advice and recommendations to the Minister for the Environment on the application by Kalgoorlie Consolidated Gold Mines Pty Ltd (KCGM) for an Approval pursuant to noise regulation 17 for its proposed Fimiston Gold Mine Operations Extension (Stage 3) and Mine Closure Planning. The Approval will enable KCGM to vary its noise levels from the prescribed standard in the noise regulations.

Following the release of the EPA's initial advice and recommendations to the Minister for the Environment, Bulletin 1271, the Minister for the Environment directed the EPA to re-assess the proposal more fully by the final preparation of the report not being delegated to the Chairman. The reason for this direction was the Minister's concern that there may have been a perception of bias and/or a conflict of interest arising from the previous assessment because the former Chairman, Barry Carbon, had received payment from KCGM for some consultancy work carried out nine years ago.

The EPA Board notes it was regrettable the previous Chairman, Mr Barry Carbon, did not record his previous association with KCGM nine years ago. However, the EPA Board confirms that this in no way affected the EPA's deliberations and conclusion on the environmental acceptability of the proposal.

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1. Introduction and Background

Kalgoorlie Consolidated Gold Mines' (KCGM) Fimiston Operations are located immediately east of the city of Kalgoorlie-Boulder in the Goldfields Region of Western Australia, approximately 600 km east of Perth.

Gold was discovered and mining and prospecting was initiated in Kalgoorlie in 1893. Kalgoorlie Consolidated Gold Mines Pty Ltd (KCGM) was formed in 1989 from three companies that effectively controlled all mining operations in Kalgoorlie, from Mt Percy and Mt Charlotte at the northern end to Chaffers at the southern end. The current Joint Venture owners of KCGM are Barrick Gold of Australia Ltd and Newmont Australia Ltd, each having an equal 50% share of the operation.

KCGM is the largest gold producing operation in Australia with an annual gold production in 2005 of about 834,000 ounces (26 tonnes) and is supported by an estimated gold reserve of around 10 million ounces. KCGM is recognised as a major employer within Kalgoorlie-Boulder with the majority of the 725 employees and full-time contractors residing within the local community.

KCGM comprises many facets of mining and mineral processing including:

- open pit mining (Fimiston Open Pit);
- waste rock disposal (Fimiston Open Pit);
- underground mining (Mt Charlotte);
- mineral processing, electrowinning and refining (Fimiston Mill);
- tailings disposal (Fimiston Mill and Gidji Roaster);
- roasting (Gidji Roaster); and
- exploration.

KCGM was granted environmental approval by the Western Australian Minister for the Environment on 24 October 1991, following formal assessment by the EPA (Consultative Environmental Review – Mine and Waste Dumps – Fimiston, August 1990, KCGM, 1990). The Fimiston Open Pit operations have been managed in accordance with the requirements of Ministerial Statement 188 (Appendix 3) and Department of Industry and Resources (DoIR) tenement conditions since that time. Because of the proximity of the Fimiston Open Pit to the localities of Kalgoorlie, Boulder and Williamstown, noise emissions have been a significant issue.

KCGM's operations commenced prior to the development of the *Environmental Protection (Noise) Regulations 1997*, and consequently noise emissions have been regulated through the Ministerial Conditions for the project. A Minister's Statement published on 24 October 1991 specified the "Noise Level Standards for Operations at Kalgoorlie" (Appendix 4). According to the Standards, noise emission from the Project in the two measurement locations located in Kalgoorlie Technical School (KTS) and Boulder Primary School (BPS) shall not exceed both –

- a) the ambient noise level present at the time of measurement by more than 5dB; and
- b) $L_{A10, 1 \text{ hour}}$ noise levels of 40 dB(A) at night, 45 dB(A) during evenings and on Sundays and public holidays, and 50 dB(A) during the day.

The "ambient noise" in the Standards was so defined as to include the generally non-intrusive and unidentifiable mining noise. Also, the overall "ambient noise" at various times of the day has often exceeded the three noise levels specified in the Standards, thus making compliance difficult to demonstrate. This has led to considerable confusion over the years.

The *Environmental Protection (Noise) Regulations 1997* brought in a prescribed standard for noise in which the assigned $L_{A 10}$ noise levels were generally 5 dB(A) lower than those in the amended Conditions (See Appendix A2), when measured at any noise-sensitive premises. Thus it is more difficult for KCGM operations to comply with the noise regulations.

Whilst the EPA is satisfied that KCGM has taken all reasonable and practicable measures to comply with the noise regulations, the EPA acknowledges that there is still a residual noise impact. In terms of non-compliance with the noise regulations, KCGM has always had a defence under the Act whilst they operated in accordance with their Ministerial Conditions for noise. The EPA therefore considers that the noise regulation 17 approval presents an appropriate response, by providing clear and enforceable noise limits to KCGM's operations for the first time.

2. The Application

Noise regulation 17 provides that *“where a person is of the opinion that he or she cannot reasonably or practicably comply with a standard prescribed under these regulations ... that person may apply to the Minister for approval to allow the emission of noise in that case to exceed or vary from the standard.”*

KCGM has applied to the Minister for the Environment for an Approval pursuant to noise regulation 17 to enable it to vary its noise levels from the prescribed standard in the noise regulations, which has been triggered by the Environmental Impact Assessment of the proposed Fimiston Gold Mine Operations Extension (Stage 3) and Mine Closure Planning. In accordance with noise regulation 17, the Minister has referred the application for variation to the EPA for assessment.

The basis of the application is that, while KCGM is committed to operating the existing Fimiston Open Pit Operations and Fimiston Operations Extension using best technologies and procedures in terms of noise emissions, it cannot reasonably and practicably comply with the prescribed standard in the noise regulations, principally as a consequence of the effect of meteorological conditions on sound propagation.

3. Noise Management

3.1 Noise emission levels

The EPA notes that the Department of Environment and Conservation (DEC) has undertaken an extensive evaluation of the noise emissions from the existing Fimiston Open Pit operation and from the proposed Golden Pike Cutback. This has been based both on DEC's own monitoring and also on analysis of the data from the KCGM noise monitoring stations located at Kalgoorlie Technical School (KTS) and Boulder Primary School (BPS), as well as noise assessment reports prepared by KCGM's acoustical consultant Herring Storer Acoustics (HSA).

The EPA's assessment has focussed on five reference locations, representing noise-sensitive areas affected by noise from mining operations. These are –

- 1) Kalgoorlie Technical School (KTS), corner Davidson/Wilson Streets, Kalgoorlie;
- 2) Boulder Primary School (BPS), Bookman Street, Boulder;
- 3) Outram Street, corner Shannon Street, Boulder;
- 4) York Street, between Lane and Hamilton Streets, Boulder; and

5) Barton Street, corner Baden Street, Williamstown.

The long-term noise monitoring data indicates that the KCGM mining operation noise, though significantly affected by the weather conditions during transmission into nearby residential areas, is quite constant and stable 24 hours a day. Table 1 shows the averaged L_{10} , L_{50} and L_{90} levels at three KCGM noise monitoring stations. The averaging period is between 1 am to 2 am during the summer months in 2006. The reason for choosing this time period is that it is the time that other noise contributions such as social and traffic noise are the least. Table 1 shows clearly that, firstly, the noise from KCGM operations is very constant and stable (as the readings of L_{10} , L_{50} and L_{90} levels are very close), and secondly, current noise levels at all three monitoring locations are already significantly over the assigned level set by the noise regulations.

Table 1: KCGM Monitored Averaged $L_{A 10}$, $L_{A 50}$ and $L_{A 90}$ Levels

<i>Location</i>	<i>Averaged L_{10} dB(A)</i>	<i>Averaged L_{50} dB(A)</i>	<i>Averaged L_{90} dB(A)</i>
<i>KTS</i>	52	49	49
<i>BPS</i>	53	50	49
<i>Outram Street</i>	52	49	48

Monitoring indicates that noise from the existing KCGM operations exceeds the assigned noise levels in the noise regulations at all five reference locations, during both day and night. Because the noise emissions are constant, the exceedance over the assigned levels is larger at night time than in the day time (assigned levels are lower at night).

It is predicted that the KCGM Fimiston Extension operations will not increase the current level of noise emissions from KCGM operations. Instead, the noise emission may be reduced when the Golden Pike Cutback operations reach at least 20 m below ground level. However, the noise from KCGM operations will still be significantly above the assigned noise levels at the five reference locations, as demonstrated in Table 2. The exceedances over the assigned $L_{A 10}$ noise levels prescribed in the regulations are 11-15dB at night and 1-5dB in the daytime.

Table 2: Current Assigned Noise Levels and Measured/Predicted Noise levels ($L_{A 10}$) from KCGM Operations at Five Reference Locations

Location	Daytime ⁽¹⁾		Evening/Sunday ⁽²⁾		Nighttime ⁽³⁾	
	Modelled Level dB(A)	Assigned Level dB(A)	Modelled Level dB(A)	Assigned Level dB(A)	Modelled Level dB(A)	Assigned Level dB(A)
<i>BPS</i>	51	48	51	43	51	38
<i>KTS</i>	51	48	51	43	51	38
<i>Outram Street</i>	54	49	54	44	54	39
<i>York Street</i>	55	51	55	46	55	41
<i>Barton Street</i>	48	47	48	42	48	37

Notes:

(1) Day : 0700 to 1900 hours Monday to Saturday

(2) Evening : 1900 to 2200 hours all days and 0900 to 1900 hours Sunday and Public Holidays

(3) Night : 2200 on any day to 0700 hours Monday to Saturday and 0900 hours Sunday and Public Holidays

3.2 Noise reduction

The EPA would normally only recommend approval of a regulation 17 application in cases where the applicant demonstrated that they could not reasonably or practicably comply with the prescribed standard.

KCGM has implemented some noise reduction measures and investigated others over the years, and is of the view that all practicable measures have been implemented.

The EPA's assessment of these measures follows:

Noise bunds –

The key noise reduction measure that has been taken is the establishment of the environmental noise bunds. The environmental noise bund has been found to be most effective in reducing environmental noise when the mining operation is at or near surface level; and is also important for specific projects in close proximity to the bund.

The environmental noise bund was first constructed using waste rock in the early 1990's. A gap was required between the north and south sections of the noise bund to provide access to KCGM's old administration and stores buildings. An infilling of this gap and an extension to the northern side of the bund was completed in February 1999. In December 2000, a further extension to the northern side of the bund was completed. During 2001, the Croesus Rehabilitation Project was undertaken which closed a noise emission corridor near the northern end of the open pit operations. In 2004, a major southern extension of the noise bund was commenced and in 2006 an application for a realignment of the noise bund was approved.

Construction of a 20 m high outer wall as a noise bund has also been proposed for the Northern Waste Rock Dumps. The dumping of waste rock will only be conducted continuously behind the outer wall when it is 20 m high. When the height of the outer wall is reduced to less than 20 m, then dumping will be restricted between 2200 – 0700

hrs to southerly, westerly and north-westerly winds. Dumping of the final lift behind the barrier will also be restricted to 0700 – 2200 hrs under westerly winds only. The noise levels resulting from this procedure are predicted to be consistent with KCGM’s “no noise increase” commitment.

The EPA considers that, while environmental noise bunds will continue to play a very important role in managing KCGM’s mining operation noise, this measure alone cannot practicably achieve compliance with the noise regulations.

Operation times –

An important part of reducing noise impact is through the restriction of the operation time period of certain noisier activities. For instance, long hole percussion drilling or rock-breaking at the surface are normally restricted to daytime only, when conducted at locations where they could foreseeably result in high residential noise levels.

Noise reduction to mobile plant –

The application of appropriate engineering noise control techniques to noise emissions from mobile equipment, such as haul trucks, front end loaders, face shovels and drills, etc. has been implemented to the extent that such techniques are reasonable, practicable and safe in a mining environment. Noise from the haul truck fleet was identified as the major noise source in Fimiston Open Pit operation in 2000, and it was also found that both the level and the tonality of the truck noise could be significantly reduced by newer trucks. Based on these findings, KCGM undertook an improvement programme to retrofit existing haul trucks with quieter engines at a cost of approximately \$2 million during 2002. Engines on older trucks were replaced, and all 20 trucks have been converted. Additional trucks with quieter engines as standard have been since added to the fleet. KCGM has an existing fleet of 34 haul trucks and does not require any additional trucks for the remaining open pit mine life.

In order to further reduce the noise from haul trucks, KCGM commenced trialling one Cat 793C “XQ” (extra quiet) truck on site in 2002, which had been found to be up to 10 dB quieter than the standard model by other users. However, the trial conducted by KCGM in the Goldfields concludes that the truck has not performed to expectations to date. This is primarily due to the additional weight of the noise control features which mean the truck is less efficient in both the amount of material it can move and overall fuel consumption. It has also proven to be harder to maintain. KCGM has committed to continue to work with suppliers and manufactures to investigate further opportunities to minimise tonality and noise characteristics of equipment where practicable through procurement specifications.

The EPA considers that, while the above measures may be able to further reduce KCGM’s noise emission in the future, at this stage KCGM has implemented all reasonably practicable measures.

3.3 Noise management via monitoring

The EPA notes that continuous noise monitoring for KCGM operations occurs at two permanent sites in Kalgoorlie-Boulder: Kalgoorlie Technical School (KTS) and Boulder Primary School (BPS). To establish the contribution of mining noise at the monitoring sites, a tape recorder tripping mechanism is used.

Due to the fact that mining noise is most noticeable when noise from other sources (background noise) is low, the tape trigger is set to operate during evenings and nights

(1900 hours to 0700 hours) when the noise exceeds a set level for more than two minutes. Tape recordings are retrieved and reported at quarterly intervals and the dominant noise identified, where possible, for each noise event.

Where noise monitoring results show that mining noise is causing tape trigger events, this is interpreted by KCGM as an indication of a potential concern for residential areas (even if no complaints are received). Mining noise triggers are investigated to determine the source of the noise and when the source is identified, action is taken to reduce the noise where possible

It is a recommendation of this report that KCGM continues to undertake noise monitoring and modelling of equipment to identify further and ongoing opportunities for noise reduction from the operation.

4. Community Impacts and Consultation

The EPA notes that KCGM is actively engaged with the community at a number of levels, and conducts regular community forums where environmental issues can be addressed. The EPA also notes that KCGM has a 24-hour Interaction Line (established in 1993) that can be contacted for a wide range of issues including emergencies, complaints, inquiries and feedback. Both the public and employees (including contractors) can use the Interaction Line on any matter relating to the operations. The Public Interaction Line (PIL) is backed up by an electronic database which enables the categorisation of queries and the automation of subsequent action allocation and follow-up mechanisms.

During business hours, the enquiries are forwarded immediately to the relevant department supervisor to take the required action. Incoming calls received outside office business hours may be forwarded to the shift supervisor for immediate action or where appropriate will be followed up the next working day.

KCGM records indicate that a total of 164 complaints regarding noise management have been received from 1993 to 2006 (no complaints to date in 2007). Complaints regarding the Fimiston Open Pit relate primarily to general mining noise and reversing alarms. Most complaints are from isolated individuals rather than numerous complaints on any particular occasion.

The EPA notes from Table 3 that the number of complaints received by KCGM about noise from Fimiston Operations was very limited. The EPA is of the view that people's reasons for complaining or not complaining are complex, and that numbers of complaints may not be a true indication of community impact.

Although a specific community consultation for the noise regulation 17 application has not been conducted yet, the community's responses to KCGM's intention to apply for noise regulation 17 approval were collected in 2006, during the Public Environmental Review (PER) process for the Fimiston Gold Mine Operations Extension (Stage 3) and Mine Closure Planning. In general, there was a lack of support from the public regarding the noise regulation 17 application. This was largely due to the perception that an approval would allow KCGM to increase its noise emissions. The EPA's view is that, in addition to the public release of the PER and the EPA's assessment report, this regulation 17 report should be made publicly available for further comment.

Table 3. Statistics of community noise complaints about KCGM Fimiston noise in recent years.

Year	Number of complaints	Complained about
2002	1	Truck reversing alarms and general noise.
2003	1	Truck reversing alarms, truck loads being dumped and a continuous 'droning' noise.
2004	12	In two of these cases noise was not from KCGM operations; Ten complaints were from two residents at South Boulder. These two residents were relocated.
2005	4	General open pit operation noise. Investigation could not identify the source.
2006	1	A continuous alarm. Investigation did not identify the source.
2007	0	

5. EPA Assessment

In summary, the EPA's view is that, in light of the proximity of the operations to the residential areas of Kalgoorlie, Boulder and Williamstown, the noise management measures described above cannot reasonably be expected to bring the noise emissions into compliance with the noise regulations.

The EPA recognises the perception that existing Ministerial Conditions and the related noise levels have not been met, and that experience has shown that they could not be met all the time. This has led to a level of frustration within the community and some uncertainty as to what noise levels actually apply.

The EPA considers that the granting of a noise regulation 17 approval would be an appropriate response in this case. [A noise regulation 17 approval would contain noise limits that are not only based on KCGM's "no noise increase" commitment but which go beyond this commitment by considering what KCGM can practicably achieve to further reduce noise. The noise regulation approval will, for the first time, provide clear and enforceable noise limits to KCGM's operations.](#)

The EPA suggests that KCGM organise information sessions for the public to outline a noise regulation 17 approval and KCGM's commitments for managing noise under the approval. This will help the community understand the proposed regulation 17 approval, and help the Minister obtain relevant comments and submissions from the public.

6. Outline of noise regulation 17 approval

The EPA considers that, should an approval be granted, the approval should contain the following features:

6.1 Develop appropriate new L_{A10} and $L_{A \max}$ noise limits

The existing noise emissions from KCGM Fimiston Gold Mine operations exceed both the daytime and nighttime assigned noise levels at the nearby residential locations in Boulder, Kalgoorlie and Williamstown. With the proposed Fimiston Gold Mine Operation Extension (Stage 3), the mining operations will approach closer to the nearby residences. Five representative locations, situated to the west, north and south of the KCGM Fimiston Operations, have been selected for setting the limits for noise emissions from the KCGM

operations, as described in section 3.1 above. Two of them – Kalgoorlie Technical School (KTS) and Boulder Primary School (BPS) – are also the noise monitoring sites set in the Noise Level Standards under the Ministerial Conditions of Statement 188 in 1992.

The noise regulations specify noise limits in the form of $L_{A\ 10}$ and $L_{A\ 1}$ assigned levels, that is, levels not to be exceeded for more than 10% and 1% of a representative assessment period; and $L_{A\ max}$ assigned levels that are not to be exceeded at any time (See Appendix A2). As a result of the reasonably constant and continuous nature of the noise emitted from the KCGM Fimiston operations, the EPA does not consider that $L_{A\ 1}$ assigned levels will be required as part of an approval. However, the EPA considers that $L_{A\ 10}$ and $L_{A\ max}$ noise level limits should apply, in order to be in line with the amended Ministerial Conditions (see Appendix A1), and to limit the maximum noise level from any abnormal emission.

The representative assessment period is defined in the noise regulations to be not less than 15 minutes and not more than four hours. For clarity, and in order to account for variations in noise emissions over several hours, the approval should fix the representative assessment period at one hour.

The proposed baseline approved noise levels at the five reference locations are based both on the results of noise monitoring and measurement of current KCGM's normal operations in neutral weather conditions, and on the noise emission predictions in the PER for the Fimiston Gold Mine Operation Extensions when the operation reaches 20m below surface.

From the acoustical consultant's (Herring Storer Acoustics) assessment, the noise emission levels vary significantly with the wind conditions. The variation can be as high as 10dB from upwind to downwind conditions. Introduction of a "weather influencing factor (WIF)" into the Approved Levels is proposed to take into account the effects of wind speed and direction and the presence of temperature inversions (which are reported to be common in Kalgoorlie). This approach will allow KCGM to conduct its normal operations: thus higher limits will apply under downwind conditions, and lower limits at other times.

The proposed noise level limits in Appendix B have been developed to be consistent with existing noise emission levels and with KCGM's "no noise increase" commitment. To accommodate the normal mining operations, the proposed "daytime" approved noise levels are the same on Sundays and public holidays (after 9am) as on weekdays, whereas the daytime assigned levels in the noise regulations are 5dB lower on Sundays and public holidays (Appendix A2).

6.2 Limit the Golden Pike operation to days only before it reaches 20m below surface

Once the Golden Pike operation is deeper than 20m below the surface, the noise emission level from the Fimiston Gold Mine Operations will drop to a level where the noise will be dominated by the haul trucks located near the top of the haul road on the farther side of the Open Pit. Noise emission levels will then be relatively constant over the rest of the mine life.

The noise regulation 17 Approved Levels would be set to manage the noise emission for this long term and stable operation condition. For the period before the Golden Pike operation reaches 20m below surface (about 6 months), KCGM has committed to limit its operation to days and evenings. While this measure allows for a slight increase in daytime

and evening noise levels for a limited period, KCGM considers that it is consistent with its commitment not to increase the noise impact on residents. The EPA notes that while this increase would be accommodated by the proposed Approved Levels for daytime, it would not be accommodated for evening. The EPA considers that the Golden Pike operation during this period should be limited to daytime only.

6.3 Remove the 5dB adjustment for tonality in the noise regulations

The noise regulations require that a noise emission be free of the annoying characteristics of tonality (humming, whining), modulation (regular variation in loudness or tone) and impulsiveness (banging). The regulations provide that, where the characteristic cannot practicably be removed, adjustments be made to the measured noise level.

The EPA notes that the noise emissions from KCGM's operations are not generally found to contain these characteristics, although tonality may occasionally appear. The noise limits that are proposed above do not include any allowance for an adjustment for tonality. The EPA therefore proposes that a noise regulation 17 approval should not provide for adjustments to be made to measured noise levels to account for tonality. Instead, as outlined below, the noise management plan should contain measures aimed to minimise tonality.

6.4 Development of noise management plan

The EPA has identified a number of other noise management requirements that it considers are best dealt with through a Noise and Vibration Management Plan required under a noise regulation 17 approval. KCGM should be required to revise and implement its noise and vibration management plan, and continuously commit to noise management measures such as:

- Regularly notify the local community of noise issues in the local Kalgoorlie Miner newspaper and on the KCGM website www.superpit.com.au;
- Complete the current program of replacement of reversing alarms with the less-intrusive broad band reversing alarms;
- Regularly monitor the noise levels of individual haul trucks to track noise performance and identify if additional maintenance is required;
- Work with suppliers and manufacturers to investigate further opportunities to minimise tonality and noise characteristics of equipment where practicable through procurement specifications;
- Train employees and contractors with procedures for noise control;
- Register and respond to noise complaints, concerns and inquiries in accordance with the KCGM procedure.

With regard to noise monitoring, KCGM would be expected to initiate improvements to the current program involving the permanent monitoring stations at KTS and BPS, with a view to providing improved information to the community. This would involve KCGM checking the noise emission levels at all five reference locations regularly (some continuously) and monitoring the weather conditions in and around the Open Pit area. The Noise and Vibration Management Plan would be expected to contain details of a program – utilising new technologies as relevant – to provide relevant and understandable noise information to the community.

KCGM would also be required to regularly monitor the sound power levels of its major noise emitters, especially its haul truck fleet.

6.5 Reporting requirement

KCGM would be required to report regularly to the Department of Environment and Conservation (DEC) on noise and weather monitoring results and progress with implementation of its Noise and Vibration Monitoring and Management programme. The report should include –

- noise levels, determined from the results of monitoring carried on at its KTS and BPS permanent monitoring stations and regular checks at other three reference locations, to be likely to be attributable to operations carried on at the mine site;
- noise emission levels of significant individual plant items and cumulative plant items which have been in use at the mine site;
- noise reduction measures which have been implemented at the mine site.

The monitoring results would help inform DEC on compliance. DEC would assess the results, and if noise levels were found to be of concern, then a more detailed report could be required. KCGM may then be notified to report in more detail on factors unusually influencing noise emissions during that season, including for example –

- weather conditions which may have influenced sound propagation, e.g. incidence of temperature inversions;
- the total sound power level of the fleet operating at the noisiest times, based on the stationary noise test data;
- the approximate location of the fleet at these times; and
- practicable noise reduction measures in place at these times, and reasons why noise could not be reduced further.

The purpose of this requirement would be to ensure best practice at all times.

7. Other requirements

The EPA notes that the noise from construction of noise bunds (and other construction work) is managed under noise regulation 13, and expects that noise management plans for those activities will be developed and approved under that regulation as required.

The EPA also notes that airblast noise from blasting is regulated under noise regulation 11 and is not addressed as part of a noise regulation 17 approval.

8. Conclusions and Recommendations

The EPA concludes that –

1. The current noise emission levels exceed the levels set in the prescribed standard in the noise regulations, when determined at the nearby schools and residential locations in Kalgoorlie, Boulder, and Williamstown. The exceedences over the assigned noise levels prescribed in the regulations are 11-15 dB at night and 1-5 dB in the daytime.
2. While noise reduction measures have been implemented, particularly in terms of noise bunds and noise treatment of haul trucks with quieter engines, the proximity of the residential areas and the nature and effect of the prevailing meteorological conditions on sound propagation means it is unlikely to be reasonably practicable

for KCGM to further reduce the noise emission and achieve compliance with the prescribed standard.

3. The proposed Fimiston Gold Mine Operations Extension (Stage 3) and Mine Closure Planning can be managed so as not to increase the current noise emissions from the KCGM mine operations to the nearby residences.

The EPA recognises that the Ministerial Conditions and the related noise level Standards established in the early 1990's, prior to the advent of the noise regulations, have not been met, and that experience has shown that they could not be met all the time. This has led to a level of frustration within the community and some uncertainty as to what noise levels actually apply.

The EPA considers that the granting of a noise regulation 17 approval would be an appropriate response in this case, in that a noise regulation 17 approval would contain a legally-drafted set of noise levels providing clear and enforceable noise limits that are consistent with KCGM's "no noise increase" commitment.

Recommendations

The EPA recommends that –

- a) a variation to the prescribed standard in the noise regulations be granted in accordance with the attached preliminary drafting instructions (See Appendix B);
- b) the Environmental Protection Act Licence for the Fimiston Open Pit be reviewed with a view to incorporation of the further requirements outlined in Section 7 above; and
- c) given the limited consultation on noise regulation 17 to date, KCGM actively participate in the process of public comment on the EPA bulletin.

Appendix A

Noise Level Standards

Appendix A1 – Noise Level Standards in Ministerial Statement

The Noise Level Standards for the KCGM's Fimiston Project Stage II – Mine and Waste Dumps were specified in a Minister's Statement published on 24 October 1991.

“Part D of general noise level standards is read as follows:

Part D. General Noise Level Standards

The proponent should conduct its operations so that noise emissions from its mining and mineral processing activities, except blasting operations, comply with the following requirements.

D1 Noise emissions should not, when measured outside, at either of the two measurement locations specified in Part F of this document, in the presence of other noise in the area:

exceed both the ambient noise level present at the time of measurement by more than 5dB L_A , and

- 40 dB $L_{A10.1}$ hour slow between 2200 hours and 0700 hours on any day;*
- 45 dB $L_{A10.1}$ hour slow between 1900 hours and 2200 hours on any day, and between 0700 hours and 1900 hours on Sundays and gazetted public holidays;*
- 50 dB $L_{A10.1}$ hour slow between 0700 hours and 1900 hours on Monday to Saturday inclusive;*

and never exceed maxima of

- 50 dB L_A slow between 2200 hours and 0700 hours on any day;*
- 55 dB L_A slow between 1900 hours and 2200 hours on any day, and between 0700 hours and 1900 hours on Sundays and gazetted public holidays; or*
- 70 dB L_A slow between 0700 hours and 1900 hours on Monday to Saturday inclusive.*

D2 Noise emissions from those activities which are of concern to occupiers of residences shall not exhibit tonal characteristics, amplitude modulation and frequency modulation, and impulsiveness of a nature which increases the intrusiveness of the noise.

D3 Requirement D2 shall not apply to audible warning devices which are required to be fitted and used under Regulation 17.8 of the Mines regulations Act Regulations 1975, however, it is expected that every reasonable and practicable opportunity will be taken to minimise the impact of noise, on the community, from these devices.

D4 Noise measurements and assessments, made for the purposes of establishing compliance with the standards specified in this part, shall be made by a person or persons approved by the CEO.

In Part B of the Standards, the ambient noise included general mine noise and was defined as:

"ambient noise" means the generally non intrusive, unidentifiable noise which is always present due to such sources as motor vehicles operating on roads (other than those adjacent to premises where the noise environment is being assessed), mining and mineral processing activities where individual noise sources such as fans, crushers, drills or haul trucks cannot identified, and natural noise sources such as wind induced vegetation noise.

Appendix A2 – Assigned levels in regulations

Table 1 - Assigned Levels derived from Table 1 of Regulation 8 of the *Environmental Protection (Noise) Regulations 1997*

Type of premises receiving noise	Time of day	Assigned level, dB		
		L _{A 10} (slow)	L _{A 1} (slow)	L _{A max} (slow)
Noise sensitive premises, at locations within 15 metres of a building directly associated with a noise sensitive use.	0700 to 1900 hours Monday to Saturday	45 + influencing factor	55 + influencing factor	65 + influencing factor
	0900 to 1900 hours Sunday and public holidays	40 + influencing factor	50 + influencing factor	65 + influencing factor
	1900 to 2200 hours all days	40 + influencing factor	50 + influencing factor	55 + influencing factor
	2200 hours 0700 hours Monday to Saturday and 0900 hours Sunday and public holidays.	35 + influencing factor	45 + influencing factor	55 + influencing factor
Noise sensitive premises, at locations further than 15 metres from a building directly associated with a noise sensitive use.	All hours	60	75	80
Commercial Premises	All hours	60	75	80
Industrial and utility premises	All hours	65	80	90

“**L_{A max} assigned level**” means an assigned level which, measured as a L_{A Slow} value, is not to be exceeded at any time;

“**L_{A 1} assigned level**” means an assigned which, measured as a L_{A Slow} value, is not to be exceeded for more than 1% of the representative assessment period;

“**L_{A 10} assigned level**” means an assigned which, measured as a L_{A Slow} value, is not to be exceeded for more than 10% of the representative assessment period; and

“**influencing factor**” means the influencing factor determined under Schedule 3 of the regulations.

Note: The influencing factor in the townsite is generally in the range 2 – 6dB(A).

Appendix B

Preliminary Drafting Instructions for a Noise Regulation 17 Approval

**PRELIMINARY DRAFTING INSTRUCTIONS
FOR A NOISE REGULATION 17 APPROVAL**

AUTHORITY:

The Approval would be granted by the Minister for the Environment under regulation 17(7) of the *Environmental Protection (Noise) Regulations 1997* after receiving a report from the Authority for the purposes of the regulation.

CITATION:

(1) The Approval may be cited as the *Environmental Protection (Kalgoorlie Consolidated Gold Mines) Approval 2007*.

DURATION:

(2) (1) The Approval would operate for a period beginning on the day it is signed by the Minister and ending on 31 December 2017 unless it continues under subclause (2).

(2) If KCGM applies before 1 July 2017 for a further approval under regulation 17 in relation to noise emissions from the Fimiston Gold Mine, then this approval would continue to operate until the Minister either grants or refuses to grant the further approval.

INTERPRETATION:

(3) The following terms may need definition:

“**assigned level**” has a meaning affected by subclause 4(3);

“**construction noise**” has the meaning given in regulation 13 and includes construction of noise bunds;

“**Golden Pike Cutback**” means a cutback along a section of the western edge of the existing Fimiston Open Pit;

“**KCGM**” means Kalgoorlie Consolidated Gold Mines Pty Ltd, ACN 009 377 619;

“**L_{A 10} approved level**” means an assigned level which, measured as a L_{A Slow} value, is not to be exceeded for more than 10% of any period of one hour;

“**L_{A max} approved level**” means an assigned level which, measured as a L_{A Slow} value, is not to be exceeded at any time;

“**L_{A Slow}**” has the same meaning as in regulation 2(1);

“**mining noise**” means noise emitted during mining operations but excludes construction noise and the noise of safety warning devices required under other legislation;

“**reference location**” means a location specified in Schedule 3 for the assessment of noise emissions;

“**regulation**” means regulation of the *Environmental Protection (Noise) Regulations 1997*.

GRANT OF APPROVAL:

- (4) (1) Subject to subclause (2), Approval would be granted to KCGM to allow mining noise to cause a level of noise received at other premises that exceeds an assigned level determined under regulation 8(2).
- (2) The Approval would not apply in any period during which mining noise, when determined at a reference location, exceeds an approved level determined for that reference location and that period by reference to Schedule 1.
- (3) For the purposes of this Approval, the Act and the regulations (except regulation 8) would apply to mining noise as if –
 - a) the reference in regulation 7(1)(a) to the assigned level were a reference to the $L_{A 10}$ or $L_{A max}$ approved level determined under Clause 6; and
 - b) the following were deleted from regulation 7(1)(a) –
“ , or significantly contribute to, ”.

CONDITIONS OF APPROVAL:

The Approval would be granted on the condition that –

- (5) (1) KCGM Golden Pike Cutback mining operation is limited to days only, as specified in Schedule 1, before it reaches a level that is 20 metres below the undisturbed ground surface level; and
- (2) KCGM develops a Noise and Vibration Management Plan and submits this to the Director not later than 3 months after commencement of the Approval.

DETERMINATION OF APPROVED LEVELS AT REFERENCE LOCATIONS:

- (6) (1) The $L_{A 10}$ and $L_{A max}$ approved levels at a reference location and time of the day are to be determined by adding the Weather Influencing factor taken from Table 2 (Schedule 2) for that reference location, and corresponding to the weather conditions prevailing at the time, to the decibel values in Table 1 (Schedule 1) for the corresponding time of day.

DETERMINATION OF MINING NOISE LEVELS AT REFERENCE LOCATIONS:

- (7) (1) Noise levels at reference locations are to be measured at the locations specified in Schedule 3 or as close to those locations as is practicable in the circumstances.
- (2) An adjustment for noise characteristics under noise regulation 9(3)(b) is not to be applied when determining the level of mining noise at a reference location.
- (8) (1) A Noise and Vibration Management Plan prepared under Clause 5(2) is to include, but is not limited to –

- a) details of a noise monitoring program for each reference location;
- b) details of a program to monitor weather conditions relevant to the assessment of mining noise levels at the reference locations;
- c) details of a program for provision of information to the community regarding mining noise emissions;
- d) noise complaint response procedures to be adopted;
- e) procedures to be adopted for adapting mining operations to minimise mining noise emissions based on the noise monitoring program;
- f) procedures to be adopted for minimising tonality, modulation and impulsiveness in the mining noise emissions;
- g) procedures to be adopted for minimising noise emissions from haul trucks during maintenance, including noise testing procedures; and
- h) details of a program for ongoing noise modelling and verification.

REPORTING REQUIREMENTS

- (9) (1) KCGM should be required to provide an annual report to the Director, in a form and by a date approved by the Director containing the following information for the previous year –
 - a) noise levels, determined from the results of monitoring carried on at its two permanent monitoring stations and regular checks at other three reference locations, to be likely to be attributable to operations carried on at the mine site;
 - b) noise emission levels of significant individual plant items and cumulative plant items which have been in use at the mine site;
 - c) noise reduction measures which have been implemented at the mine site.
- (2) Where requested by the Director, KCGM would be required to provide more detailed reporting data for any period of the reporting year as specified by the Director.

ONGOING NOISE REDUCTION

- (10)(1) KCGM should be required to use the noise monitoring and modelling of equipment to identify further and ongoing opportunities for noise reduction.

SCHEDULE 1 – APPROVED NOISE LEVELS

[cl. 4]

Table 1: APPROVED NOISE LEVELS

Reference location ⁽¹⁾	Time of day	Approved level (dB)	
		L _A 10	L _A max
Kalgoorlie Technical School	Day ⁽²⁾	50 + WIF ⁽⁵⁾	62 + WIF
	Evening ⁽³⁾	45 + WIF	52 + WIF
	Night ⁽⁴⁾	45 + WIF	52 + WIF
Boulder Primary School	Day	50 + WIF	62 + WIF
	Evening	45 + WIF	52 + WIF
	Night	45 + WIF	52 + WIF
Outram Street, Boulder	Day	52 + WIF	65 + WIF
	Evening	49 + WIF	60 + WIF
	Night	49 + WIF	60 + WIF
York Street, Boulder	Day	52 + WIF	65 + WIF
	Evening	49 + WIF	60 + WIF
	Night	49 + WIF	60 + WIF
Barton Street, Williamstown	Day	50 + WIF	65 + WIF
	Evening	45 + WIF	55 + WIF
	Night	45 + WIF	55 + WIF

Notes to Table 1:

(1) Reference location as specified in Schedule 3

(2) Day : 0700 to 1900 hours Monday to Saturday and 0900 to 1900 hours Sunday and Public Holidays

(3) Evening : 1900 to 2200 hours all days

(4) Night : 2200 on any day to 0700 hours Monday to Saturday and 0900 hours Sunday and Public Holidays

(5) WIF = Weather Influencing Factor specified in Schedule 2

SCHEDULE 2 – WEATHER INFLUENCING FACTOR

[cl. 5]

Table 2: WEATHER INFLUENCING FACTOR

Wind Direction	Wind Speed (km/hr)	Reference Location / Weather Influencing Factor(dB)				
		Barton St Williamstown	Kalgoorlie Technical School	York St Boulder	Boulder Primary School	Outram St Boulder
Calm	< 2	3	6	4	6	5
Northerly	≥ 2	-2	6	5	6	5
North Easterly	≥ 2	2	6	5	6	4
Easterly	≥ 2	4	6	5	6	4
South Easterly	≥ 2	4	6	5	6	3
Southerly	≥ 2	4	6	5	4	2
South Westerly	≥ 2	3	5	4	2	2
Westerly	2-7	0	3	2	2	3
Westerly	> 7	-4	-2	-3	-3	3
North Westerly	2-7	-4	3	2	4	4
North Westerly	> 7	-6	-1	-1	3	3

SCHEDULE 3 – REFERENCE LOCATIONS

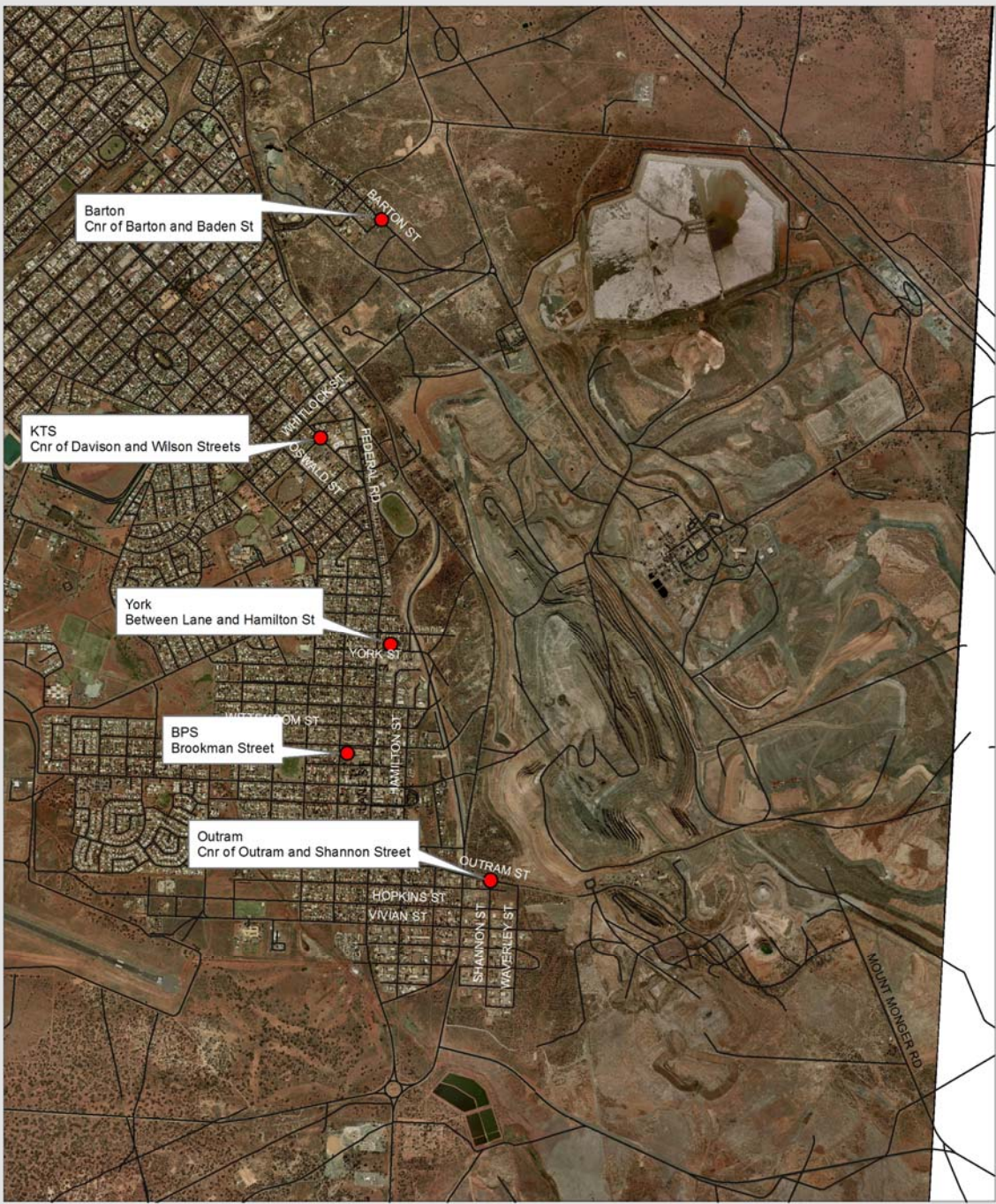
[cl. 6]

Table 3: Reference Locations

Reference location	Description
Kalgoorlie Technical School	Any location at or within the boundary of the premises known as Kalgoorlie Technical School, corner Davidson Street and Wilson Street, Kalgoorlie
Boulder Primary School	Any location at or within the boundary of the premises known as Boulder Primary School, Brookman Street, Boulder
Outram Street, Boulder	Any location at or adjacent to the corner of Outram Street and Shannon Street, Boulder
York Street, Boulder	Any location on York Street, between Lane Street and Hamilton Street, Boulder
Barton Street, Williamstown	Any location at or adjacent to the corner of Barton Street and Baden Street, Williamstown

Appendix C

Noise reference locations




LEGEND

● Noise Reference Locations

Image Source: Kalgoorlie (2003)




 Projection: Map Grid of Australia Zone 50
 Datum: Geocentric Datum of Australia, 1994
 Scale: 1:34,000

LOCALITY MAP

