

KALGOORLIE CONSOLIDATED GOLD MINES PTY LTD



ANNUAL NOISE MONITORING REPORT

**Environmental Protection (Fimiston Gold Mine
Noise Emissions) Approval 2016**

APRIL 2020

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GLOSSARY OF ACRONYMS AND ABBREVIATIONS

ACRONYM	DEFINITION
KCGM	Kalgoorlie Consolidated Gold Mines Pty Ltd
DWER	Department of Water and Environmental Regulation
NVMMP	Noise and Vibration Monitoring and Management Plan
L _A	A-weighted Statistical Sound Pressure Level
L _{eq}	Equivalent Continuous Level
WIF	Weather Influencing Factor
ENB	Environmental Noise Bund
UWA	University of Western Australia

1. PURPOSE

Kalgoorlie Consolidated Gold Mines Pty Ltd (KCGM) is required to submit an Annual Noise Monitoring Report to the CEO of the Department of Water and Environmental Regulation (DWER) within one month from the end of the reporting year in accordance with Condition 10 of the *Environmental Protection (Fimiston Gold Mine Noise Emissions) Approval 2016* (2016 Fimiston Noise Approval).

The Annual Noise Monitoring Report (this report) is required to include:

- (a) a summary of the noise and airblast levels recorded under clause 8 during the year; and
- (b) a summary of the progress of the implementation of the noise management plan submitted or revised under clause 9.

This report covers the period from 22 March 2019 to 21 March 2020. In accordance with the approved KCGM Noise and Vibration Monitoring and Management Plan (August 2018) (NVMMMP) the data presented in the annual report is for the twelve month period from 1 April 2019 to 31 March 2020 in order to align with the quarterly reporting periods.

2. SUMMARY OF KCGM OPERATIONS

KCGM operates the Fimiston Open Pit, Mt Charlotte Underground Mine and the Fimiston and Gidji Processing Plants on behalf of joint venture owners; Saracen Mineral Holdings Limited (Saracen; 50%) and Northern Star Resources Ltd (Northern Star; 50%).

The Fimiston Operations and Mt Charlotte Underground Mine are located adjacent to the City of Kalgoorlie-Boulder approximately 600 km east of Perth, Western Australia, whilst the Gidji Processing Plant is located approximately 17 km north of Kalgoorlie-Boulder.

KCGM comprises many facets of mining and mineral processing including:

- Open pit mining (Fimiston);
- Waste rock disposal (Fimiston);
- Underground mining (Mt Charlotte);
- Mineral processing (Fimiston and Gidji);
- Tailings disposal (Fimiston and Gidji);
- Ultra-fine grinding (Fimiston and Gidji);
- Electrowinning and refining (Fimiston); and
- Exploration.

On average, KCGM produces 600,000 ounces of gold each year and has a gold reserve of approximately 7 million ounces. The current production mine life for KCGM's operations will see mining continue until around 2026, and mineral processing until around 2034 through the processing of low-grade stockpiles. On completion, the Fimiston Open Pit will measure 3.5 km in length, 1.5 km in width and up to 700 metres in depth.

3. NOISE MONITORING

In accordance with Condition 8 of the 2016 Fimiston Noise Approval, KCGM undertakes the following noise monitoring programmes:

- Continuous Environmental Noise Monitoring;
- Compliance Environmental Noise Monitoring; and
- Airblast Monitoring.

Each of these monitoring programmes are outlined in the NVMMP.

3.1 Continuous Environmental Noise Monitoring

During the reporting period, continuous environmental noise monitoring was undertaken, as far as practicable, at Metal Exploration Premises (MEP) and Boulder Primary School (BPS) in accordance with Condition 8(1) of the 2016 Fimiston Noise Approval.

Results of the continuous environmental noise monitoring programme are provided in the Quarterly Noise and Blast Monitoring Reports submitted to the DWER. The quarterly report also contains the following, with respect to continuous noise monitoring:

- Information on any data loss; and
- Graphs of continuous noise levels recorded at the MEP and BPS monitoring sites.

To avoid duplication of data, this report does not include the detailed results as previously submitted in the quarterly reports, but provides a summary of the continuous noise levels recorded at MEP and BPS during the period 1 April 2019 to 31 March 2020.

The noise generated from the Fimiston Operations is considered to be very constant and stable. The average noise levels are summarised for day (0700 to 1900 hours), evening (1900 to 2200 hours) and night (2200 to 0700 hours) periods in Figure 1 (BPS) and Figure 2 (MEP). Noise data from BPS is recorded as L_{A10} , L_{A50} and L_{A90} , and noise data from MEP is recorded as L_{Aeq} due to different configurations of the sound level meters. Noise levels are consistent with previous years.

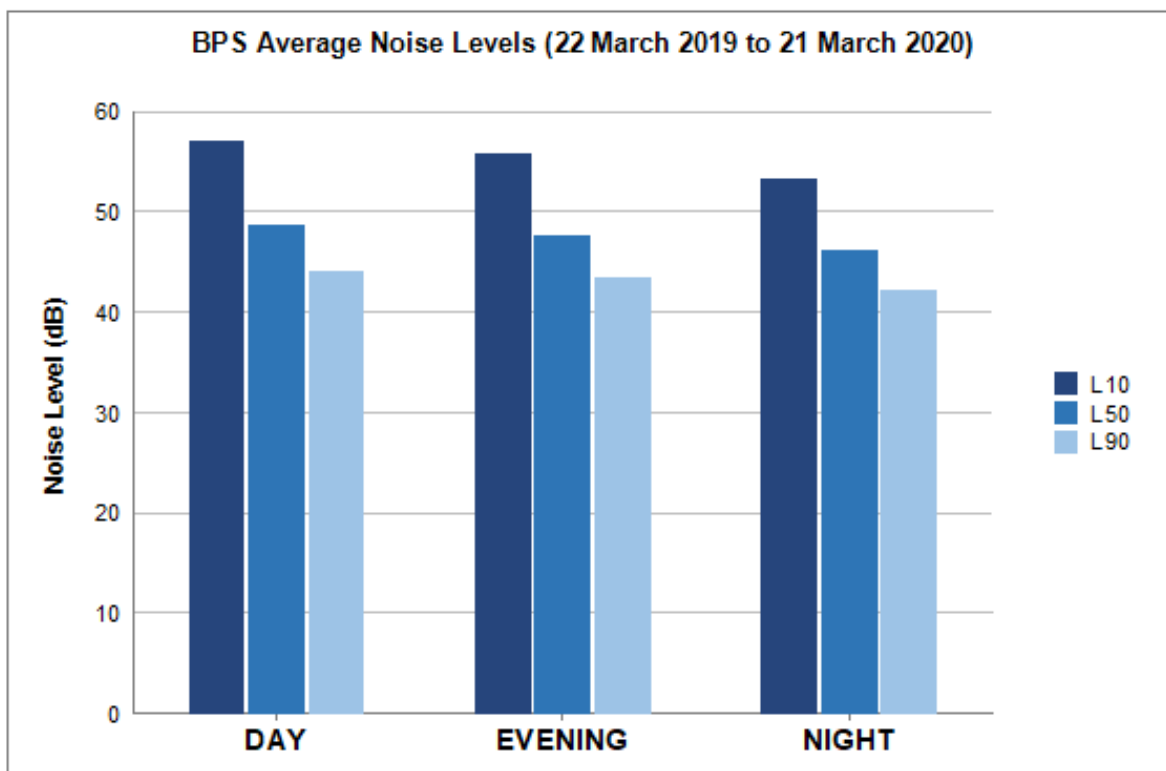


Figure 1: BPS Noise Level Summary

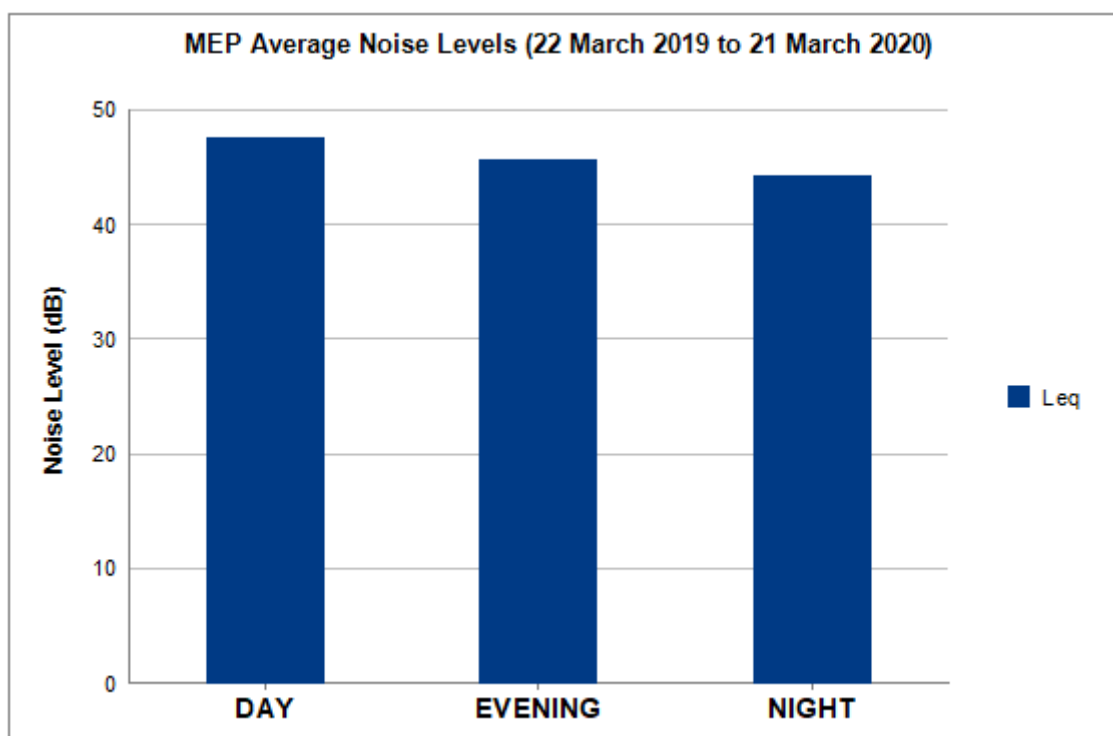


Figure 2: MEP Noise Level Summary

3.2 Quarterly Compliance Environmental Noise Monitoring

Approved noise levels for KCGM's Fimiston Operations are stipulated in Condition 4 of the 2016 Fimiston Noise Approval. During the reporting period, quarterly compliance noise monitoring was undertaken at each of the five reference locations (Figure 3) in accordance with Condition 8(2) of the 2016 Fimiston Noise Approval.

The approved noise levels also take into account a Weather Influencing Factor (WIF). Data from the weather monitoring equipment at KCGM's weather station MEX (Figure 3) is used to determine the WIF based on measured weather conditions prevailing at the time the noise is received.

During the reporting period, the measured levels at all locations complied with the approved noise levels for the night time period. A summary of the measured noise levels and the approved noise levels by location are shown in Figure 4, 5, 6, and 7.

Results of the quarterly compliance noise monitoring programme are provided in the Quarterly Noise and Blast Monitoring Reports submitted to the DWER and are provided on KCGM's website (www.superpit.com.au).

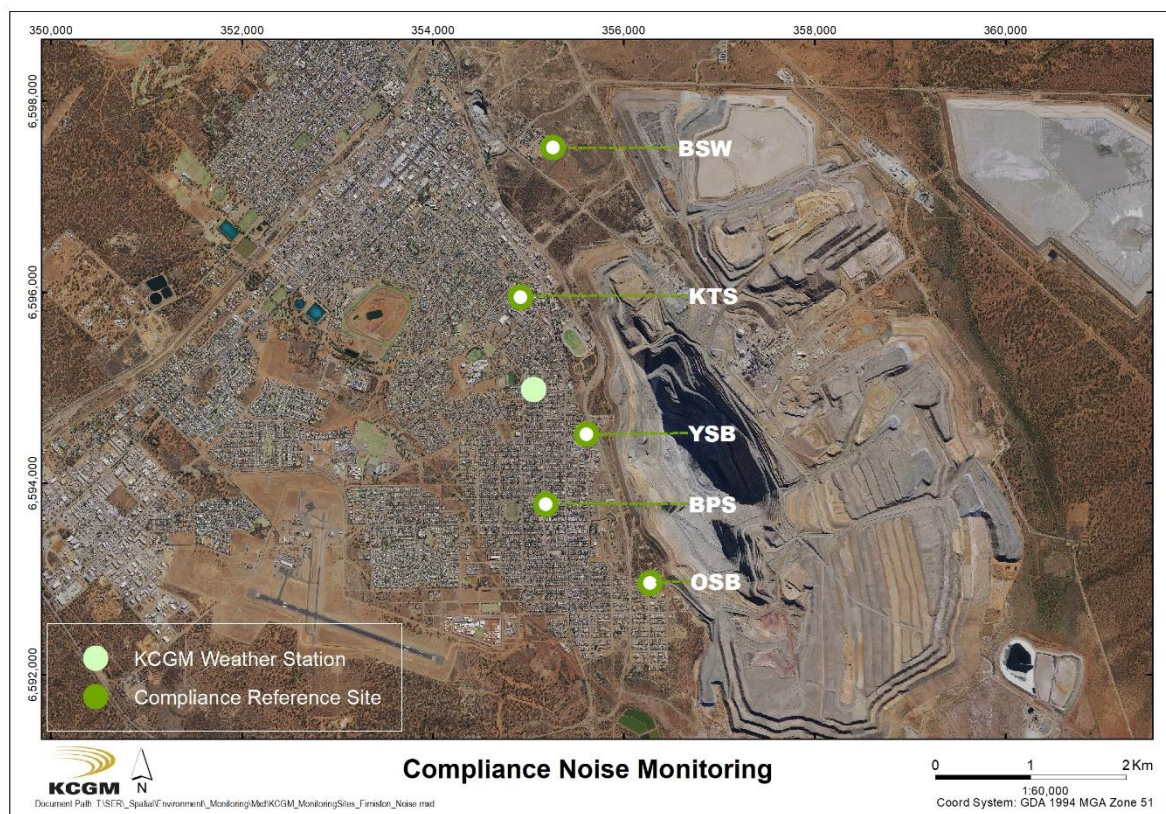


Figure 3: Compliance Noise Monitoring and Weather Station Locations

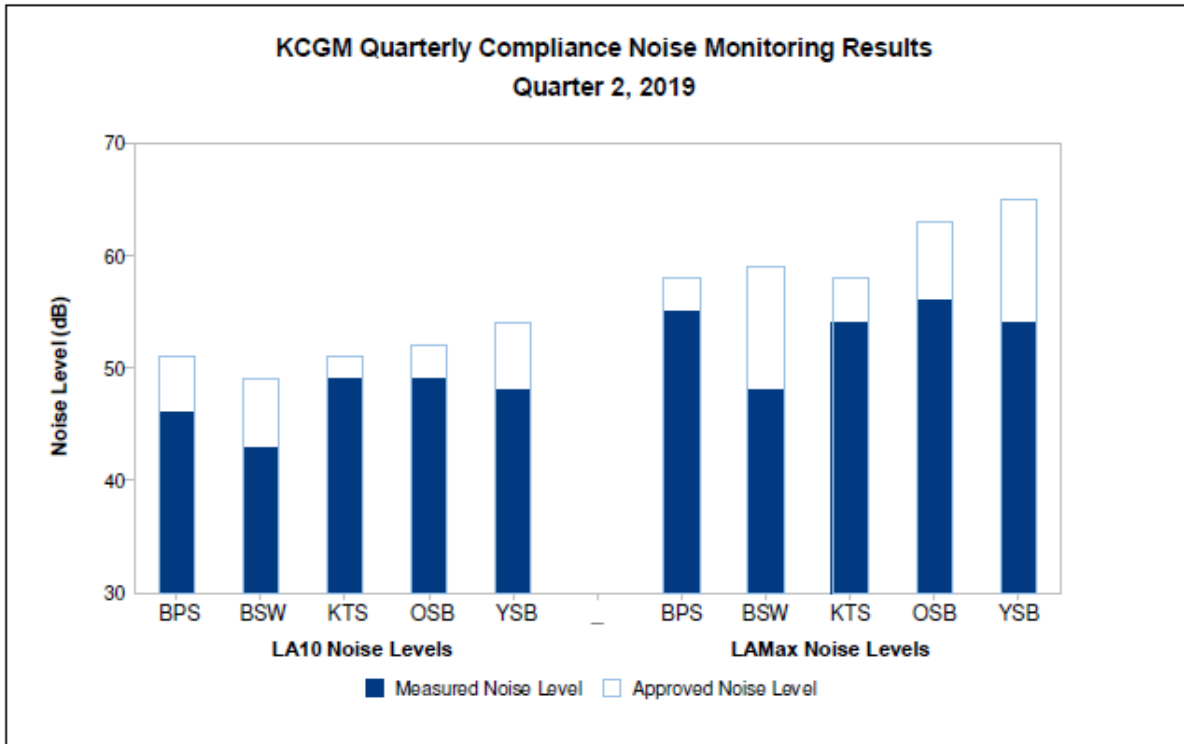


Figure 4: Compliance Noise Monitoring Q2 2019

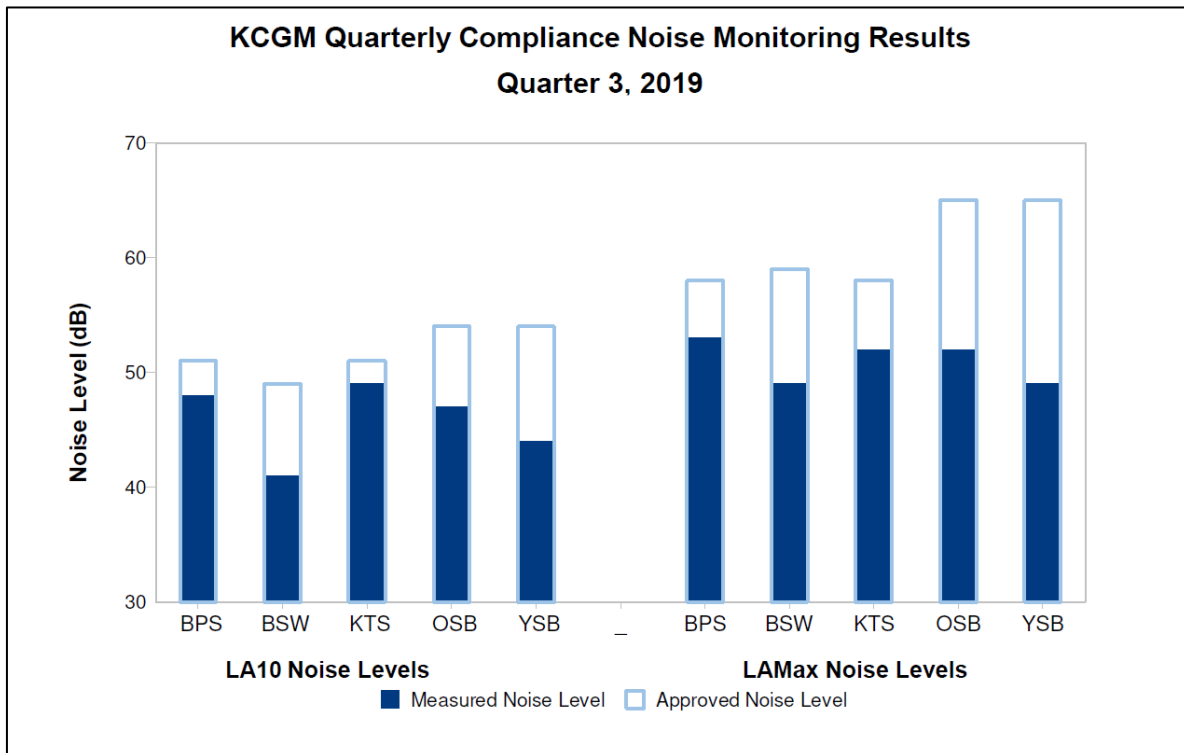


Figure 5: Compliance Noise Monitoring Q3 2019

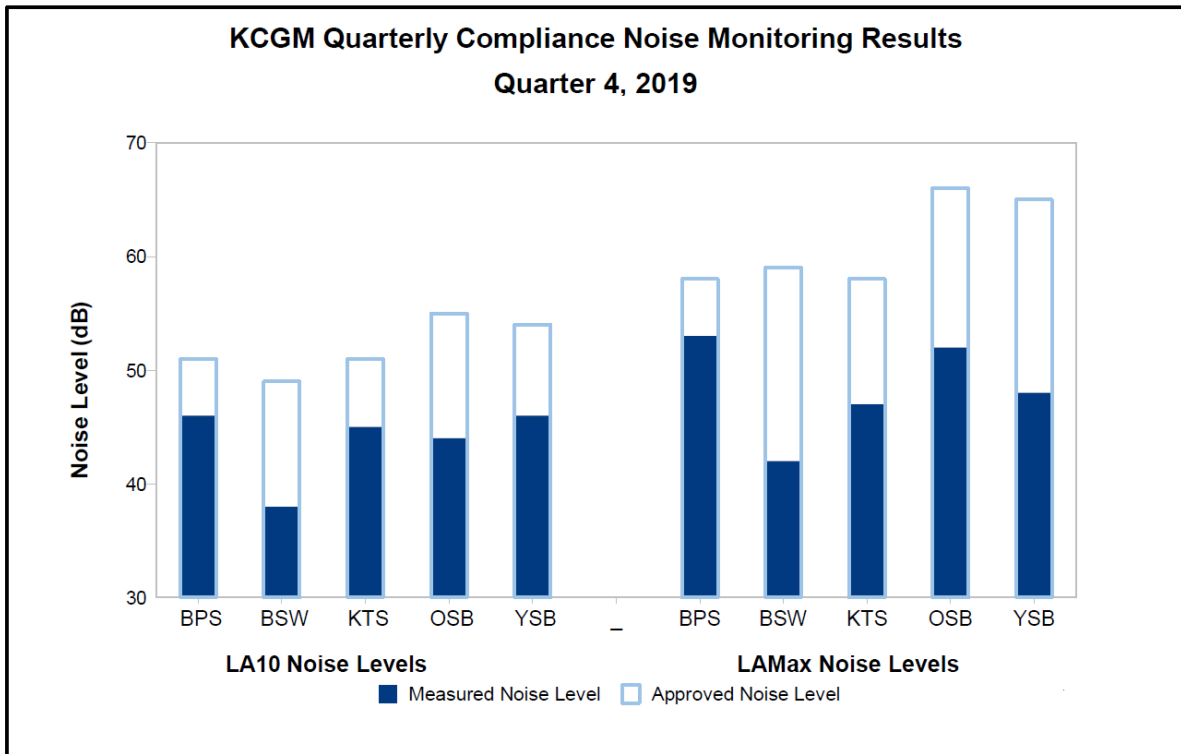


Figure 6: Compliance Noise Monitoring Q4 2019

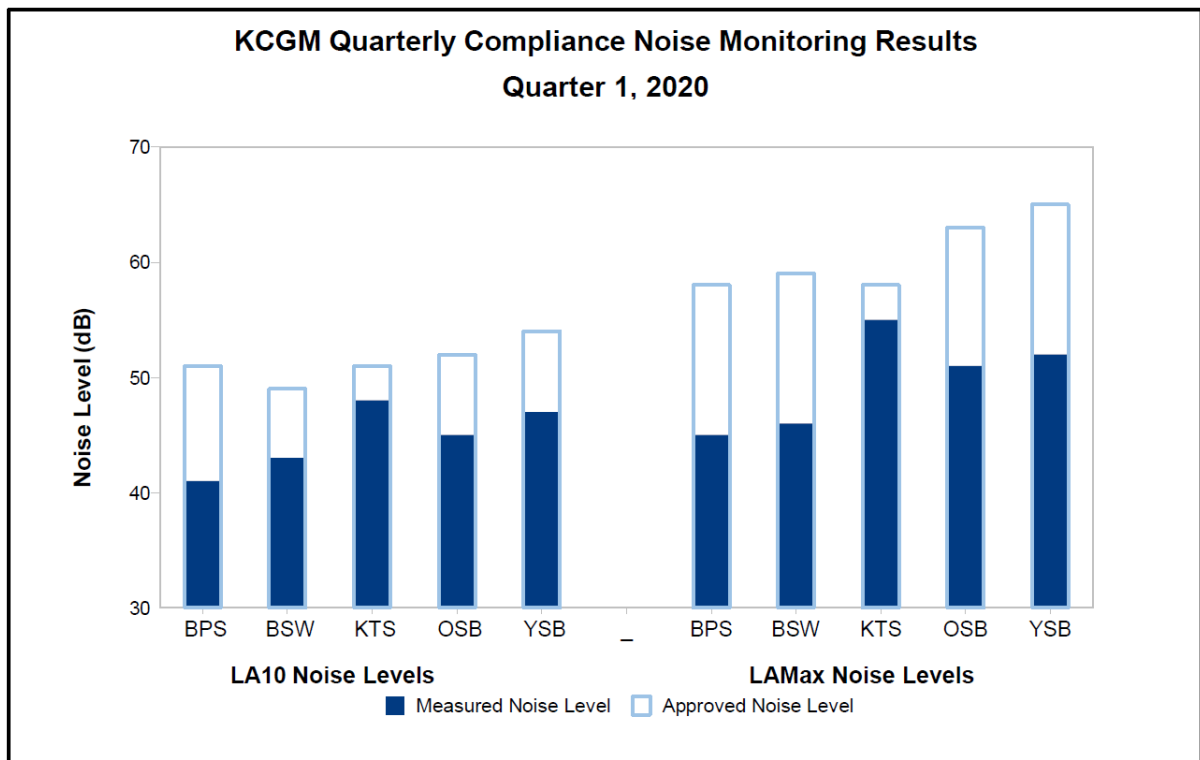


Figure 7: Compliance Noise Monitoring Q1 2020

3.3 Airblast Monitoring

Approved airblast levels for KCGM's Fimiston Operations are stipulated in Condition 4 of the 2016 Fimiston Noise Approval. During the reporting period, airblast levels received at each blast monitoring station (Figure 8) were recorded in accordance with Condition 8(3) of the 2016 Fimiston Noise Approval.

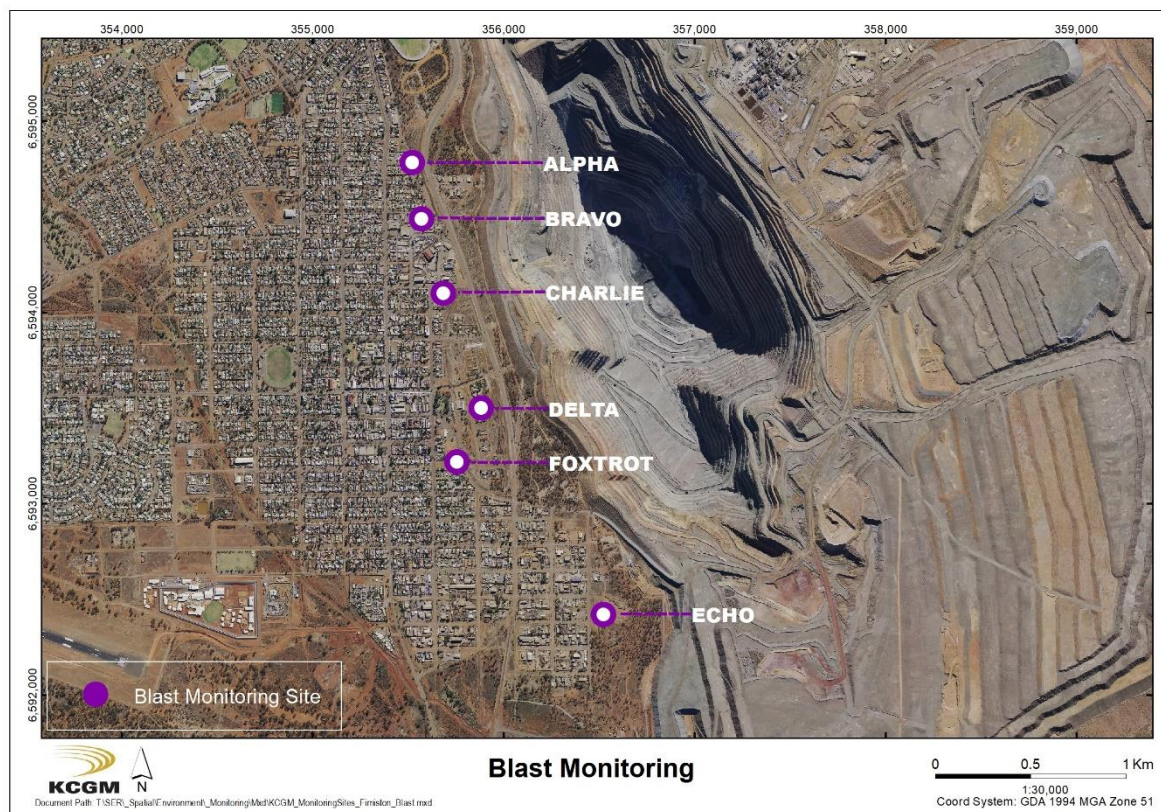


Figure 8: Fimiston Open Pit Blast Monitoring Sites

Results of the recorded airblast levels are provided in the Quarterly Noise and Blast Monitoring Reports submitted to the DWER. During the reporting period, the measured airblast levels at all locations complied with the approved noise levels (Table 1). A summary of the measured airblast levels are shown in Figure 9.

Table 1: Noise Emissions from Blasting as per Schedule 3 of the 2016 Fimiston Noise Approval

Time of Day	Approved airblast level (dB L _{Z peak})	
	Not to be exceeded anytime	Not to be exceeded for 9 in any 10 consecutive blasts
0700 to 1800 hours Monday to Saturday (excluding public holidays)	125	120
0700 to 1800 hours Sunday and public holidays	120	115

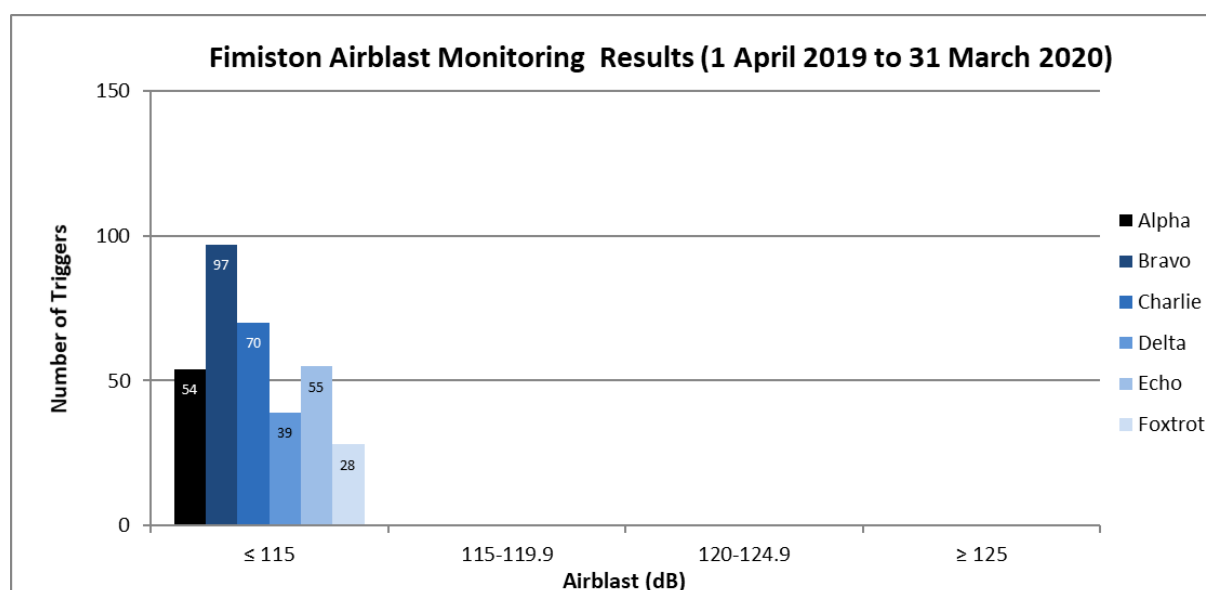


Figure 9: Summary of Fimiston Airblast Monitoring Results

4. NOISE MANAGEMENT PLAN IMPLEMENTATION

KCGM's NVMMP has been developed and implemented by KCGM in accordance with conditions set by the Minister for Environment since the early 1990's. The NVMMP is implemented to fulfil the requirements of Ministerial Statement 782 *Fimiston Gold Mine Operations Extension (Stage 3) and Mine Closure Planning*, and the 2016 Fimiston Noise Approval.

The objective of the NVMMP is to manage noise emissions from the Fimiston Operations to minimise potential impacts to the residents of the City of Kalgoorlie-Boulder. Through implementation of the NVMMP, KCGM commits to undertake all reasonable, practicable and safe measures to meet the relevant noise and vibration standards.

In accordance with Condition 9 of the 2016 Fimiston Noise Approval the NVMMP was updated following gazettal of the *Environmental Protection (Fimiston Gold Mine Noise Emissions) Approval 2016* in March 2016. The revised NVMMP (June 2016) was submitted to the DWER on 22 June 2016, and was approved by the DWER (then DER) on 19 September 2016 and the DWER (then OEPA) on 1 November 2016.

The NVMMP covers the following aspects:

- Management Plan Summary
- Overview of the Fimiston Operations and History of Fimiston Noise Approvals
- Noise Modelling and Verification
- Management Approach (environmental noise, blast vibration and airblast)
- Environmental Criteria and Monitoring Programmes
- Complaint Management
- Reporting Provisions
- Adaptive Management and Review
- Stakeholder Consultation

KCGM believes the NVMMP provides best practices and procedures to enable the Fimiston Operations to continue in a reasonable and practicable manner, while providing an acceptable noise environment for the residents of the City of Kalgoorlie-Boulder.

A summary of the progress of the implementation of the NVMMP is provided in Table 2, which lists the key activities undertaken with regards to KCGM's Management Approaches as outlined in the NVMMP.

Table 2: Summary of NVMMP Implementation

MANAGEMENT APPROACH		PROGRESS OF IMPLEMENTATION
Mining Activities	Environmental Noise Bund	<ul style="list-style-type: none"> • A key noise management feature at KCGM has been the establishment of the Environmental Noise Bund (ENB). Major changes to the pit design take into consideration the location of the ENB and potential noise impacts on the City of Kalgoorlie-Boulder.
	Surface Activities	<ul style="list-style-type: none"> • Certain surface activities (e.g. rock breaking) continue to be restricted to daytime only. • Three complaints were received in relation to mining activities during the reporting period (refer to Table 3).
	Mt Charlotte Waste Rock Conveyor	<ul style="list-style-type: none"> • KCGM continues to manage noise emissions from the Mt Charlotte Waste Rock Conveyor via routine inspections and maintenance of the conveyor belt, the rollers and related infrastructure. • Three complaints were received in relation to the Mt Charlotte Waste Rock Conveyor during the reporting period (refer to Table 3).

MANAGEMENT APPROACH		PROGRESS OF IMPLEMENTATION
Haul Truck Noise	UWA Research Project	<ul style="list-style-type: none"> KCGM has implemented a Noise Amelioration Programme by means of co-funding a Research Project entitled “<i>Integrated Passive and Active Control of Humming noise from KCGM’s Haul Trucks</i>” put forward by the University of Western Australia (UWA). The project is aimed at achieving total sound power attenuation through development of a prototype engine enclosure as well as examining ways to reduce noise associated with the haul truck muffler. The final report for the ARC Linkage Project (LP140100987) “Integrated Passive and Active Control of Humming Noise from KCGM’s Haul Trucks” was submitted to KCGM in August 2019. In summary, the outcome of this project includes three innovative techniques that can effectively reduce the noise from KCGM haul trucks. Of these techniques, the partial acoustic enclosure and retrofitted mufflers are considered the most practicable and cost-effective for use on-site to achieve noticeable noise reduction. Whilst the single-channel Active Noise Control (ANC) is a good method for the control of tonal noise radiation in a specific direction, it is not practical for use on-site. KCGM is reviewing these noise reduction techniques to determine if implementation is feasible.
	Reversing Alarms	<ul style="list-style-type: none"> Broadband reversing alarms continue to be utilised on select mining equipment permanently located onsite.
Resource Definition Drilling		<ul style="list-style-type: none"> KCGM’s resource definition drilling programmes often occur in close proximity to the City of Kalgoorlie-Boulder. A desktop noise assessment is undertaken for each drilling programme prior to commencement to verify compliance with the <i>Environmental Protection (Noise) Regulations 1997</i>. In 2016, KCGM commenced a resource definition drilling programme on the western side of the ENB which were in close proximity to industrial premises in Boulder. Several desktop noise assessments have been undertaken which indicated that the proposed 24/7 drilling operations would comply with the <i>Environmental Protection (Noise) Regulations 1997</i>. The drilling programme is still ongoing. During the 2017/18 reporting period noise level measurements were conducted for a proposed drilling program at Mt Charlotte that was in close proximity to Williamstown residents. These measurements allowed subsequent assessment of the drilling to ensure compliance with the <i>Environmental Protection (Noise) Regulations 1997</i>. During the reporting period, KCGM continued to undertake resource definition drilling to the south of the open pit operations (near the Super Pit Lookout). These activities operate in close proximity to industry premises within the South Boulder area. Sea containers are utilised to manage noise emissions as required.

MANAGEMENT APPROACH		PROGRESS OF IMPLEMENTATION
		<ul style="list-style-type: none"> Nearby property owners are notified of the planned drilling activities via letter drop prior to commencement. No issues or complaints were received in relation to KCGM's resource definition drilling activities during the reporting period.
Surface Blasting	Blasting Times	<ul style="list-style-type: none"> KCGM only detonated explosives on the premises between the hours of 0700 hours and 1800 hours. All reasonable effort was taken to avoid blasting on Sundays. Blasts are not scheduled on Sundays and each request to blast is subject to an internal, multi-departmental review and takes into account a number of considerations including likely impact to near neighbours. It is important to note that no complaints or enquiries have been received as a result of these blasts. On occasions whereby a blast is fired on a Sunday, an explanation is provided in the Quarterly Noise and Blast Monitoring Reports submitted to the DWER.
	Blast Design and Modelling	<ul style="list-style-type: none"> Each blast is carefully designed to meet internal design criteria and takes into account external factors which may potentially increase the vibration and/or airblast levels. No issues or complaints were received in relation to airblast as a result of surface blasting activities during the reporting period.

5. PUBLIC COMPLAINTS

KCGM's approach to Complaint Management is outlined in the NVMMP.

A summary of any complaints regarding noise and/or vibration received are provided in the Quarterly Noise and Blast Monitoring Reports submitted to the DWER and have been listed below in Table 3 for the annual reporting period associated with this report.

Table 3: Summary of Complaints in the Reporting Period (22 March 2019 to 21 March 2020)

Complaint Category	Date	Summary of Complaint
Noise	08/04/2019	Local resident complaint regarding noise from the overground conveyor belt. The belt was inspected no fault was found. Feedback was provided to the complainant. No further correspondence has been received.
Noise	28/07/2019	Local resident complaint regarding noise from the Mt Charlotte overland conveyor belt. The crusher operator was contacted to identify and fix the noise. The source of the noise was found to be a squeaky roller which was subsequently repaired. The complainant did not require any follow up communication and no further correspondence has been received.

Complaint Category	Date	Summary of Complaint
Noise	21/8/2019	Local resident complaint regarding mining noise from the Fimiston Open Pit. KCGM's External Relations Superintendent met with the complainant on Thursday 22 August 2019 to discuss. The complainant explained that they had been having trouble sleeping and that the noise from the Fimiston Open Pit had seemed worse over the past six months but did not give any specifics. KCGM offered to review the available noise monitoring data to be discussed with the complainant at a follow-up meeting. However, the complainant advised that the noise was no longer a concern and that there was no need for a follow-up meeting. The complainant was grateful for the follow up.
Noise	2/9/2019	Local resident complaint regarding noise from the Fimiston Open Pit. They reported that for 3-4 weeks there has been a loud humming coming from the pit - both day and night. KCGM's External Relations Superintendent followed up with complainant.
Noise	12/10/2019	Complaint regarding alarm noise coming from the overland conveyor. The conveyor was undergoing testing at the time (stopping and starting, resulting in the start-up alarm being activated). Conveyor testing was stopped immediately.
Noise	17/03/2020	Local resident complaint regarding noise from the Super Pit operations. The resident did not leave any contact details or detail their property location. The recent commencement of mining activities within the Brownhill area was likely the primary source of noise emissions, however the works were undertaken in accordance with Environmental Noise Assessment for Brownhill.

Figure 10 shows a summary of noise complaints received by KCGM since 2009 (by calendar year) with respect to activities managed under the NVMMP.

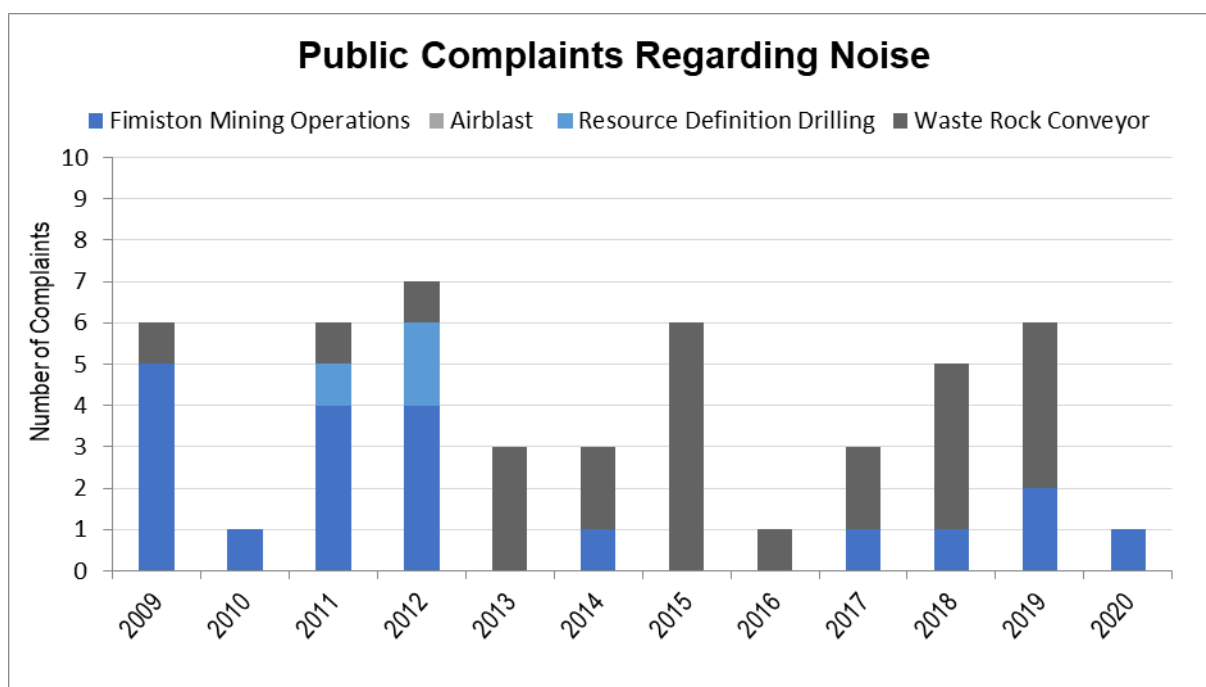


Figure 10: Summary of Noise Complaints by Calendar Year Since 2009