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NOISE MONITORING PROGRAM
KAOLIN MINE & SAND QUARRY
NEWNES JUNCTION

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Rev 02

Prepared for: Sydney Construction Materials
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1.0 INTRODUCTION

As part of specific noise Conditions referenced in the Minister's for Planning Approval, dated 14 March 2006 for the kaolin mining and sand quarrying operation at Newnes Junction, Schedule 3 Condition 13 requires the Proponent (Newnes Kaolin Pty Ltd) to prepare (and following approval implement) a Noise Monitoring Program. The Ministers approval requires the Proponent to prepare and implement a noise monitoring program in consultation with the OEH, and to the satisfaction of the Director-General. The program must include a combination of attended and unattended noise monitoring, and a noise monitoring protocol for evaluating compliance with the noise consent impact assessment criteria.

2.0 SCOPE

The purpose of the Noise Monitoring Program (NMP) is to provide procedures for assessing and managing potential noise impacts from the Newnes Kaolin Mine & Sand Quarry (NKMSQ) to acceptable levels for residential neighbours and regulatory stakeholders in order to address the requirements of Schedule 3 – Condition 13. This program also makes reference and takes into consideration the requirements of Schedule 3 – Conditions 8, 9 10, 11 & 12 and Environmental Protection Licence (EPL) 13389.

The Program applies to the monitoring and management of environmental noise from the NKMSQ including extraction/processing activities and train loading.

2.1 Roles/Responsibility

The Program will be implement by the NKMSQ Environmental Coordinator or designate with the assistance of mine/quarry staff and qualified contractors approved by the OEH.

It is the responsibility of the NKMSQ Environmental Coordinator to maintain, audit and review the Noise Monitoring Program.

3.0 BACKGROUND

The Newnes site is located north of Newnes Junction, between Bell and Lithgow to the north-east of Sandham Road. The site is bounded by Clarence Colliery to the north-west and north, Blue Mountains National Park to the east, former Rocla quarry to the south and Sandham Road and Main Western Rail Line to the south and south-west.

The site has a total area of approximately 25 hectares. It is estimated that the project will produce approximately 119,000 tpa of kaolinite to supply ceramic, paper coating and related industrial markets. A by-product of the separation of kaolin from its ore is high quality sand suitable for glass manufacture and high grade construction purposes. Up to 1.281 million tonnes per annum of high grade sand will be produced. Average annual extraction rate at the mine will be approximately 1.1 million tonnes.

The expected lifespan of the mine is twenty-one (21) years, with a total estimated reserve of 23.7Mt. The mine has approval to conduct extraction operations and train loading between 7.00am and 6.00pm Monday to Saturday.

3.1 Construction Noise

Prior to the commencement of mining operations, the site will be cleared, access and internal roads constructed, acoustic/visual barriers erected, materials handling system installed, storm water runoff ponds constructed, servicing, maintenance and administration facilities established.

The site establishment and construction works will be performed in two (2) stages with total estimated duration of not more than six (6) months (26 weeks).

3.2 Operational Noise

With the site infrastructure, acoustic/visual barrier and site preparation completed, a surface miner would mill and deposit the ore into windrows. Scrapers (35-50t) will be utilised to collect the ore from the windrows and transfer the material to the stockpile ROM area then conveyed to a surge bin adjacent to the railway line for loading trains.

The main stationary mine infrastructure including conveyor (train loading), covered stockpile and maintenance facilities are located along the northern portion of the site.

3.3 Noise Limits

Project noise conditions imposed by the Minister (DA 329-7-2003) dated 14 March 2006 are documented in Schedule 3 of the Approval *(Attachment 1)*. A copy of the Environmental Protection Licence 13389 (*L6*) is provided in *Attachment 2* and contains specific conditions and noise limits relating to construction noise from the development.

The specified limits outlined in DA 329-7-2003 (Condition 8) relate to Stage 2 construction noise emissions. EPL 13389 does not specify to which construction activities the L6.2 noise limits apply, however taking into account the outcomes of *'Noise Impact Assessment. Kaolin Mine. Newnes Junction'* Report No. 34.5058.R2:CFCD1 Rev02 dated May 2004 (*Table 11*) and noise limits of DA 329-7-2003, for the purposes of this NMP it is assumed to relate to Stage 2 construction only.

4.0 NOISE MONITORING

In order to verify that the noise emission limits are satisfied this NMP has been developed for NKMSQ. There is a preliminary site establishment and construction phase prior to commencement of mining operations, accordingly the NMP proposes construction noise monitoring for early works followed by quarterly inspections and annual monitoring to assess compliance. Where validated complaints are received by NKMSQ or there is a change in plant and equipment or process, additional noise monitoring would be considered.

4.1 Monitoring Program and Locations

The NMP will include assessing noise from all mining extraction and transfer processes in addition to train loading operations.

Visual and aural inspections will be undertaken quarterly, site attended noise monitoring undertaken annually and/or to assess noise complaint received by the NKMSQ Environmental Coordinator or designate. Where there is a change in plant and equipment or process additional site attended noise audits would be considered. The monitoring locations for annually monitoring are referenced in *Table1* and identified in *Figure 1* Noise measurements will be conducted at exposed property boundary or where the boundary is locate more than 30m from the dwelling, within 30 metres of any residential dwelling on that property. The measurements will be conducted with the sound level meter microphone at a height of between 1.2 and 1.5 metres above ground level.

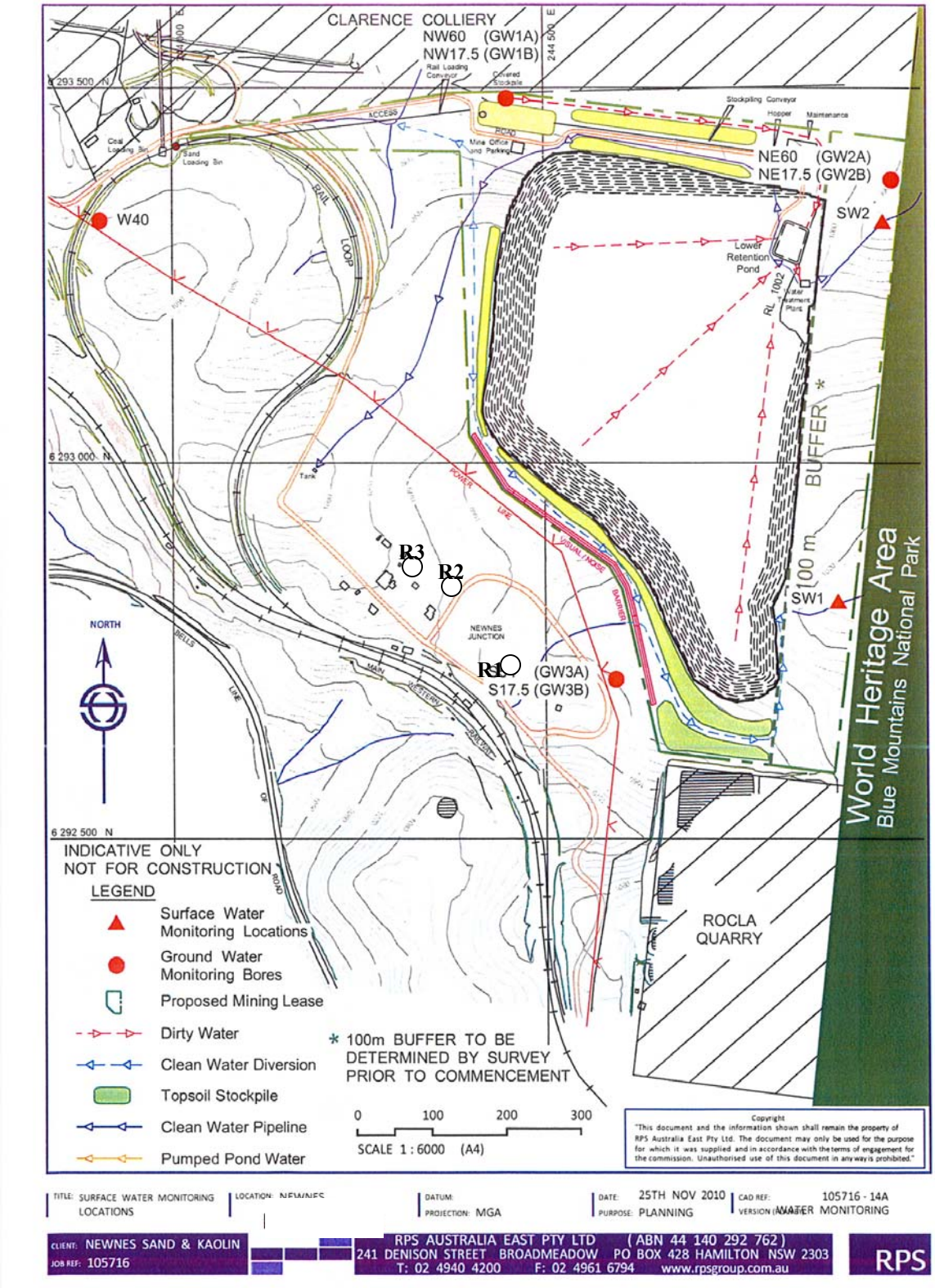
Table 1: Reference Measurement Locations

Location	Description	Measurement Location
R1*	Sandham Road – southeast of village	Approx 30m from dwelling facing mine
R2	Sandham Road – central northern house in village	South-east boundary of property
R3	Sandham Road – north-western house in village	Approx 30m from dwelling facing mine

* Currently owned by Newnes Kaolin Pty Ltd

Figure 1: Noise Monitoring Locations (EPL 13389)

○ Noise Monitoring Locations



4.2 Noise Monitoring Instrumentation

Instrumentation selection for noise measurement will be NATA or factory calibrated and holds current *Certificates of Calibration*. The reference level of each instrument will be checked in the field prior to and after the measurements with a NATA or factory calibrated calibrator. Any variations with the reference field calibration level check will be noted. Statistical sound level meters will be set to A-weighting, fast response and fifteen (15) minute sampling periods. Sound level meters for attended measurements and audits shall be of Type 1 in accordance with AS 1259 and IEC 61672:2002, whilst unattended noise logging may be conducted with Type 1 or Type 2 noise logging instrumentation.

4.3 Measurement Procedures

The ambient sound levels will be measured and recorded as percentile A-weighted sound levels. The parameters noted will include the "L_{Aeq}" the equivalent continuous noise level or the level of noise equivalent to the energy average of noise levels occurring over a measurement period; the "L_{A90}", the level exceeded for 90% of the sample period and referenced as the "background or average minimum noise level; the "L_{A10}", the level exceeded for 10% of the sample period and referenced as the "average maximum noise level; and the "L_{A1}", the level exceeded for 1% of the sample period.

Additional measurements will be undertaken, if required, to assist with the identification and assessing noise level contributions from specific noise sources identified during the site attended audits and to cross reference against source noise levels utilised in the construction noise modelling as presented in *Table 2*.

Table 2: Construction Plant & Equipment Sound Power Levels
dB(A) re: 10^{-12} Watts

Plant Description	Number of Items	Sound Power Level dB(A)
STAGE 1		
Dozer (D8-D10)	1	110
Excavator	1	106
Front End Loader	1	104
Truck Mounted Auger	1	99
Truck Mounted Crane	1	100
Truck	2	105
Grader*	1	99

Table 2: Construction Plant & Equipment Sound Power Levels (cont.)
dB(A) re: 10^{-12} Watts

STAGE 2		
Dozer (D6*)	1	100
Crane	1	108
Truck	2	105
Scraper*	1-2	105

* acoustically treated plant

4.4 Measurement Periods

Measurements would include unattended monitoring over a period of seven (7) days at the three reference locations (*or equivalent alternate locations should access be restricted*) in addition to site attended noise audits over a fifteen (15) minute assessment periods during the installation and retrieval of the unattended noise loggers.

4.5 Personnel

The annual and complaint requested noise audits and reporting will be conducted by an Accredited Noise Consultant or Acoustic Engineer who will attend monitoring locations, install monitoring equipment and conduct attended receiver noise audits. In addition site attended nearfield audits of plant and equipment and the evaluation of the existing noise controls and management procedures will be undertaken.

Quarterly audits will be conducted by an Accredited Noise Consultant, Acoustic Engineer or the site Environmental Officer which will conduct visuals and aural inspections and evaluations of plant and equipment, installed noise controls and review the operational management procedures.

4.6 Monitoring Intervals and Outcomes

Monitoring will be undertaken in accordance with procedures outlined in *Table 3*.

Table 3: Overview of Noise Monitoring Procedure

Frequency	Assessment Locations	Period	Minimum Outcome
Annual	o Residential Properties o Site Plant	o Day (0700–1800 hours) - unattended - attended	o Ambient statistical noise measurements - unattended (7 days) - attended audit o $L_{A10,\ 15min}$ contributions for construction phase* o $L_{Aea,\ 15min}$ contributions for plant and equipment o Prevailing weather conditions o Inspection of site noise controls o Nearfield audits of site plant and equipment o Review of noise management procedures o Assessment against DoP DA 329-7-2003 Consent and EPL 13389 o Compliance Statement File
Quarterly	o Site Plant	o Day (0700–1800 hours)	o Inspection of site noise controls o Review of noise management procedures. o Record findings
Complaint Driven	o Residential Properties o Site Plant *if required*	o Day (0700–1800 hours) - attended	o Ambient statistical noise measurements - attended audit o $L_{A10,\ 15min}$ contributions for construction phase* o $L_{Aea,\ 15min}$ contributions for plant and equipment o Prevailing weather conditions o Inspection of site noise controls o Nearfield audits of site plant and equipment *if required* o Assessment against DoP DA 329-7-2003 Consent and EPL 13389 o Review of noise management procedures. o Record findings o Report findings to Management and Complainant o Follow up with additional investigations if required
As Required ^	o Site Plant	o Day (0700–1800 hours) - attended	o Audit measurement and assessment against modelled noise sources (*Table 2*) o Where exceedance of source level identified, follow receiver audits to determine compliance status with DoP DA 329-7-2003 Consent and EPL 13389 o Inspection of site noise controls o Review of noise management procedures. o Record findings

* $L_{A10,15min}$ for construction noise only
^ As required noise audits of plant and equipment when a change in plant or change in process is proposed

5.0 REPORTING

Compliance status with the noise assessment criteria would be identified through annual and complaint driven noise monitoring.

If the monitoring program identifies any trends with exceedences of the noise criteria referenced in the Ministers Consent Conditions (*Attachment 1*) and Environmental Protection Licence 13389 (*Attachment 2*), the Department of Planning (DoP) and affected landowners will be notified in accordance with Schedule 5 – Condition 4 of the Consent within seven (7) days. The report must include:

- date, time and nature of the exceedance/incident;
- identify the cause or likely cause of the exceedance/incident;
- describe what action has been taken to date; and,
- describe the proposed measures to address the exceedance/incident.

Under Schedule 5 – Condition 5, the results of noise monitoring and audit measurements will be reported as part of the Annual Environmental Monitoring Report (AEMR) to the Director-General and relevant agencies and include the following:

- standards and performance measures that apply to the development;
- describe works carried out in the last twelve (12) months;
- describe proposed works for the next twelve (12) months;
- include a summary of complaints during past year and compare to previous years;
- summary of noise monitoring results including methodology, equipment, times / dates, monitoring locations and weather conditions;
- include an analysis of monitoring results against relevant criteria:
    - impact assessment criteria
    - monitoring results from previous years; and,
    - predictions in the EIS and Supplementary Report.
- identify any trends in the noise monitoring over the life of the development;
- identify any non-compliance during the previous year; and,
- describe what actions were, or are being taken to ensure compliance.

5.1 Audit and Review

This NMP will be reviewed as required by Schedule 5 – Condition 8 *'Independent Environmental Audit'* of the Development Consent i.e. within one year of commencement of extraction and every two years thereafter. Changes to the NMP will be considered where inadequacies are identified or as instructed by the DoP. Changes to the NMP will be undertaken in consultation with the OEH and forwarded to the Director General of DoP for approval.

ATTACHMENT 1: MINISTERS CONSENT CONDITIONS (Noise)

NOISE

Impact Assessment Criteria

8. [2]The Applicant shall ensure that the noise generated by the development does not exceed the criteria specified in Table 2.

Table 2: Noise impact assessment criteria dB(A)

Receiver Location	Stage 2 Construction Limits $L_{A10\ (15\ min)}$	Operation Limits (inc. train loading) $L_{Aeq\ (15\ min)}$
R1 Sandham Road – southeast of village	42	37
R2 Sandham Road – central northern house in village	44	38
R3 Sandham Road – northwestern house in village	43	38
R4 Sandham Road – central southern house in village	43	38

[2] Incorporates DEC GTA

Receiver Location	Stage 2 Construction Limits $L_{A10\ (15\ min)}$	Operation Limits (inc. train loading) $L_{Aeq\ (15\ min)}$
R5 Sandham Road – western southern house in village	43	38
Blue Mountains National Park / WHA	-	50

Notes:

- *Receiver locations as identified in Document B – Noise Impact Assessment, within the Supplementary Report.*
- *Stage 2 construction activities as identified in Document B – Noise Impact Assessment (pg.26), within the Supplementary Report.*
- *The noise criteria do not apply where the Applicant and the affected landowner have a valid agreement in regard to noise from the development, and a copy of the agreement has been forwarded to the Director-General and DEC. In this case the Applicant may exceed the noise limits in Table 2 in accordance with the noise agreement.*
- *Noise from the development is to be measured at the most affected point or within the residential boundary, or at the most affected point within 30 metres of a dwelling (rural situations) where the dwelling is more than 30 metres from the boundary, to determine compliance with the noise limits in the above table. Where it can be demonstrated that direct measurement of noise from the development is impractical, the DEC may accept alternative means of determining compliance (see Chapter 11 of the NSW Industrial Noise Policy). The modification factors in Section 4 of the NSW Industrial Noise Policy shall also be applied to the measured noise levels where applicable.*
- *The noise level for the Blue Mountains National Park limit is to be measured at the most affected point within 50 metres of the National Park boundary.*
- *The criteria above apply to noise emissions under the following weather conditions of wind speed up to 3 m/s at 10m above ground level.*

Noise Mitigation

9. Prior to carrying out any extraction, the Applicant shall construct an acoustic barrier in accordance with the design in the Supplementary Report (as reproduced in Appendix 1) to the satisfaction of the Director-General.

Note: The alignment of the acoustic barrier is shown conceptually on the figure in Appendix 1, and is modified by condition 45 below.

10. The Applicant shall only extract and haul material using a Surface Miner and self-loading scrapers, unless otherwise authorised by the Director-General.

Note: The Director-General will only consider alternative methods if they would result in a net environmental improvement.

Operating Hours

11. [3]The Applicant shall comply with the operating hours in Table 3:

Table 3: Operating hours

Activity	Day	Time
Mining/quarrying operations and train loading	Monday – Friday	7:00am to 6:00pm
	Saturday	7:00am to 6:00pm
	Sunday and Public Holidays	Nil
Maintenance (if inaudible at neighbouring residences)	Any day	Anytime

Note: Construction activities, such as the construction of the acoustic barrier and infrastructure, shall only be carried out between 7:00am to 6:00pm Monday to Friday, and 8:00am to 1:00pm on Saturdays. No construction activities are to be undertaken on Sundays or Public Holidays.

Continuous Improvement

12. The Applicant shall:
    a) implement all reasonable and feasible best practice noise mitigation measures;
    b) investigate ways to reduce the noise generated by the development, including rail noise; and
    c) report on these investigations and the implementation and effectiveness of these measures in the AEMR,

    to the satisfaction of the Director-General.

[3] Incorporates DEC GTA

Noise Monitoring Program

13. [4]Prior to carrying out any development, the Applicant shall prepare, and subsequently implement, a Noise Monitoring Program for the development, in consultation with DEC, and to the satisfaction of the Director-General. This program must include a combination of attended and unattended noise monitoring, and a noise monitoring protocol for evaluating compliance with the noise impact assessment criteria in this consent.

ATTACHMENT 2: ENVIRONMENTAL PROTECTION LICENCE 13389 (Noise)

Section 55 Protection of the Environment Operations Act 1997

Environment Protection Licence

Licence - 13389

NSW GOVERNMENT | Environment, Climate Change & Water

L6 Noise Limits

L6.1 Construction: Hours

Construction activities, such as the construction of the acoustic barrier and infrastructure, shall only be carried out between:

(a) 7:00am to 6:00pm Monday to Friday;
(b) 8:00am to 1:00pm Saturday; and
(c) at no time on Sundays or Public Holidays.

L6.2 Construction: Limits

Construction activities, such as the construction of the acoustic barrier and infrastructure, must comply with the following noise limits:

(a) 42 dB(A) $_{LA10\ (15\ min)}$ at R1 Sandham Road – south east of village;
(b) 44 dB(A) $_{LA10\ (15\ min)}$ at R2 Sandham Road – central northern house in village;
(c) 43 dB(A) $_{LA10\ (15\ min)}$ at R3 Sandham Road – north western house in village;
(d) 43 dB(A) $_{LA10\ (15\ min)}$ at R4 Sandham Road – central southern house in village; and
(e) 43 dB(A) $_{LA10\ (15\ min)}$ at R5 Sandham Road – western southern house in village.

L6.3 Noise from the premises is to be measured at the most affected point or within the residential boundary, or at the most affected point within 30 metres of a dwelling (rural situations) where the dwelling is more than 30 metres from the boundary to determine compliance with condition L6.2.

L6.4 The noise emission limits identified at condition L6.2 apply under all meteorological conditions except during wind speeds (at 10m height) greater than 3m/s.

4 Operating conditions

O1 Activities must be carried out in a competent manner

O1.1 Licensed activities must be carried out in a competent manner.

This includes:
(a) the processing, handling, movement and storage of materials and substances used to carry out the activity; and
(b) the treatment, storage, processing, reprocessing, transport and disposal of waste generated by the activity.

O2 Maintenance of plant and equipment

O2.1 All plant and equipment installed at the premises or used in connection with the licensed activity:
(a) must be maintained in a proper and efficient condition; and

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ATTACHMENT 3: TERMS AND DEFINITIONS

A-Weighted: See dB(A)

Adverse weather: Weather effects that enhance noise (that is, wind and temperature inversion) that occur at a site for a significant period of time (that is, wind occurring more than 30% of the time in any assessment period in any season and/or temperature inversions occurring more that 30% of the nights in winter).

Ambient noise: The all-encompassing noise associated within a given environment. It is the composite of sounds from many sources, both near and far.

Assessment background level (ABL): The single figure background level representing each assessment period day, evening and night (that is, three assessment background levels are determined for each 24-h period of the monitoring period). Its determination is by the tenth percentile method.

Assessment period: The period in a day over which assessments are made: day (0700-0800h), evening (1800 to 2200h) or night (2200 to 0700h).

Background Noise: The underlying level of noise present in the ambient noise, excluding the noise source under extraneous noise is removed. This is described using the L_{A90} descriptor.

Cumulative noise level: Refers to the total level of noise from all sources.

Day: The period between 0700 and 1800hrs (Monday-Saturday) and 0800-1800 (Sunday and Public Holidays).

dB: Abbreviation for decibel-a unit of sound measurement. Given sound pressure to a reference pressure.

dB(A): Unit used to measure "A-weighted" sound pressure levels. A-weighting is an adjustment made to sound level measurement to approximate the response of the human ear.

A change of 1dB(A) or dB(A) in the level of a sound is difficult to detect, whilst a 3dB(A) to 5dB(A) change corresponds to a small but noticeable change in loudness. A 10dB(A) change corresponds to an approximate doubling or halving in loudness.

The table below lists examples of typical noise levels.

Sound Pressure Level (dB(A))	Typical Source	Subjective Evaluation
130	Threshold of pain	Intolerable
120 110	Heavy rock concert Grinding on steel	Very noisy
100 90	Loud car hone at 3m Construction site with pneumatic hammering	Noisy
80 70	Kerbside of busy street Loud radio or TV	Loud
60 50	Department store General Office	Moderate to quiet
40 30	Inside private office Inside bedroom	Quiet to very quite
20	Unoccupied recording studio	Almost silent

Default parameters: In assessing meteorological enhancement of noise, refers to set values for weather parameters, such as wind speeds and temperature gradients, to be used in predicting source noise levels.

Equivalent Continuous Noise Levels: The level of noise equivalent to the energy average of noise levels occurring over a measurement period.

Evening: Refers to the period between 1800-2200hrs.

Extraneous Noise: Noise resulting from activities that are not typical of the area. Atypical activities may include construction, and traffic generated by holiday periods and by special events such as concerts or sporting events. Normal daily traffic is not

considered to be extraneous.

Feasible and reasonable measures: Feasibility relates to engineering considerations and what is practical to build; reasonableness relates to the application of judgement in arriving at a decision, taking into account the following factors:

- noise mitigation benefits (amount of noise reduction provided, number of people protected)
- cost of mitigation (cost of mitigation versus benefits provided)
- community views (aesthetic impacts and community wishes)
- noise levels for affected land uses (existing and future levels, and changes in noise levels).

Fluctuating Noise: Noise that varies continuously and to an appreciable extent over the period of observation.

Greenfield site: Undeveloped land.

Impulsive Noise: Noise having a high peak of short duration, or a sequence of such peaks. A sequence of such peaks. A sequence of such impulses in rapid succession is termed 'repetitive impulsive noise'.

Intrusive Noise: refers to noise that intrudes above the background level by more than 5 decibels.

L_{A90}: The A-weighted sound pressure level that is exceeded for 90% of the time over which a given sound is measured. This is considered to represent the background noise.

L_{Aeq}: The equivalent continuous noise level – the level of noise equivalent to the energy average of noise levels occurring over a measurement period.

Long-term annoyance: Prolonged annoyance over months and years.

Median: The middle value in a number of values sorted in ascending or descending order. Hence, for an odd number of values, the value of the median is simply the middle value. If there is an even number of values the median is the arithmetic average of the two middle values.

Meteorological conditions: wind and temperature inversion conditions.

Most-affected locations(s): Locations that experience (or will experience) offensive noise from the noise source under consideration. In determining these locations, one needs to consider existing background levels, exact noise source locations(s), distance from source (or proposed source) to receiver, and any shielding between source and receiver.

Negotiated agreement: An agreement involving the negotiation of an achievable noise limit in cases where the project specific noise levels cannot be met. The agreement is negotiated between the proponent and the DEC or the proponent and the community. Such an agreement is reached through balancing the merits of a development, the feasibility and reasonableness of available mitigation measures and the noise impacts produced.

Night: The period between 2200 and 0700 (Monday-Saturday) and 2200-0800 (Sunday and Public Holidays)

Noise criteria: The general set of non-mandatory noise level targets for protecting against intrusive noise (for example, background noise plus 5dB) and loss of amenity (for example, noise levels for various land uses).

Non-mandatory: With reference to the proposed policy, means not required by legislation. The proposed policy specifies criteria to be strived for, but the legislation

does not make these criteria compulsory. However, the policy will be used as a guide to setting statutory (legally enforceable) limits for licences and consents.

Performed-based goals: Goals specified in terms of the outcomes/performance to be achieved, but not in terms of the means of achieving them.

Rating Background Level (RBL): the overall single-figure background level representing each assessment period (day/evening/night) over the whole monitoring period (as opposed to over each 24-h period used for the assessment background level). This is the level used for assessment purposed. It is defined as the median value of:

- all the day assessment background levels over the monitoring period for the day
- all the evening assessment background levels over the monitoring period for the evening; or
- all the night assessment background levels over the night period

Receiver: The noise-sensitive land at which noise from a development can be heard.

Stationary noise sources: Sources that do

Individual stationary sources such as:

- heating, ventilating and air conditioning (HVAC) equipment,
- rotating machinery,
- impacting mechanical sources,
- other mechanical equipment and machinery such as conveyors.

Mobile sources confined to particular location such as draglines and haul trucks.

Facilities, usually comprising many sources of sound, including:

- industrial premises,
- extractive industries,
- commercial premises,
- warehousing facilities,
- maintenance and repair facilities.

(In this case, the stationary source is understood to encompass all the activities taking place within the property boundary of the facility).

Temperature inversion: An atmospheric condition where temperature increases with height above the ground.